

**Prevalence and Perceptions of Food Insecurity and Coping Strategies
in Fort Albany First Nation, Ontario**

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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ABSTRACT

Background: Food insecurity has been described as an urgent and pervasive public health issue for Aboriginal people (First Nations [FN], Métis, and Inuit) in Canada. However, national health surveys have generally excluded a large portion of the Aboriginal population (FN living on-reserve and Inuit), resulting in limited data on food insecurity in these individuals and communities. In addition, scales for measuring food insecurity have not been validated in Canadian Aboriginal populations. Food security challenges faced by Aboriginal people living in remote communities are unique and few studies have examined the perceptions of and coping strategies for food insecurity in this population.

Objectives: The overall objective of this research was to explore various aspects of food insecurity (prevalence, perceptions, and coping strategies) in the remote, on-reserve First Nations community of Fort Albany, Ontario. This thesis consisted of five studies conducted in Fort Albany. The objectives for **Study I** were to quantitatively measure the prevalence of food insecurity using the **Household Food Security Survey Module (HFSSM)** and to use two qualitative interview questions to evaluate the **relevance of the HFSSM**. **Study II** used qualitative interview questions to examine the perceptions of and **coping strategies for food insecurity**. Studies III and IV investigated two programs in Fort Albany that had the potential to affect food security: the school snack program and a greenhouse project. **Study III** assessed the impact of the **school snack program** on student food intake. **Study IV** was a descriptive case study of the context and implementation of a **community greenhouse project**. **Study V** involved the development and formative evaluation of supplemental questions for the HFSSM intended to be relevant for **measuring food security in First Nations households**.

Methods: One adult from each household in the community was invited to complete the 18-item HFSSM, demographic questions, and an interview with questions on the relevance of the HFSSM for First Nations food security and strategies used to cope with food insecurity. To evaluate the snack program, 24 hour diet recall data were collected using the Waterloo Web-based Eating Behaviour Questionnaire (WEB-Q) in November 2004 and December 2007 with grade six to 10 students attending Peetabeck Academy in Fort Albany. Food group consumption and nutrient intake of students participating in the school snack program were compared with students who chose not to participate. Five additional questions asked students about their participation, preferences, and impressions of the snack program. Data sources for the greenhouse project included semi-directed interviews with a purposive and snowball sample of community key informants, direct observations, written documentation, and photo-documentation. The case study was carried out over a period of 33 months; from early 2009 until October of 2011. The supplemental questions for the HFSSM were drafted based on themes that had emerged from the evaluation of the relevance of the HFSSM and relevant literature. Feedback on the importance, clarity, and cultural appropriateness of each proposed question was gathered from key informants (n=12) working on food security issues with Aboriginal groups, using an online survey.

Results: For the HFSSM study, of 64 households (87% response), 70% were food insecure, 17% severely and 53% moderately. The prevalence of food insecurity in households with children was 76%. Among respondents from homes rated as having severe food insecurity, all (100%) reported worrying that food would run out; times when food didn't last and there wasn't money to buy more; and times when they couldn't afford to eat balanced meals. When asked about the relevance of the HFSSM, the majority of respondents felt the HFSSM did not fully capture an

accurate picture of food security for their situation. Aspects missing from the HFSSM included the high cost of market food and the incorporation of traditional food practices. For the coping strategies study, a thematic analysis of interviews (n=51) revealed that food sharing, especially with family, was regarded as one of the most significant ways to adapt to food shortages. The majority of participants reported consuming traditional food (wild meats) and suggested that hunting, preserving and storing traditional food has remained very important. However, numerous barriers to traditional food acquisition were mentioned. Other coping strategies included dietary change, rationing and changing food purchasing patterns. In order to improve access to healthy foods, improving income and food affordability, building community capacity and engagement, and community-level initiatives were suggested. Findings from the school snack program study showed that students participating in the snack program had significantly higher intakes from specific food groups and related nutrients compared to those who did not participate. With the exception of Meat and Alternatives in 2004, there was a trend for a higher percentage of students to meet dietary recommendations if they participated in the snack program. Students indicated that the three things they liked most about the school snack program were the juice, that the program kept them from feeling hungry at school, and that they got a snack at school every day. Students indicated that the snack program helped them to eat healthier by motivating them, eating more fruit, and making better dietary choices. Qualitative analysis of the greenhouse case study data generated gardening related themes: seasons, fertile ground, sustainability, gardeners, ownership, participant growth, and sunshine. Amongst the gardeners, local champions were critical to project success. Positive outcomes included the involvement of many community members, a host of related activities being carried out, and that the greenhouse had introduced an opportunity to gain knowledge about growing plants in a northern greenhouse

setting. For the study on measuring food security in FN households, valuable feedback was provided by key informants (n=12) on clarifying the wording of the questions as well as providing perspectives on how the questions may or may not be applicable to different Aboriginal populations. A revised list of questions was created that incorporated the feedback from key informants.

Conclusions: A very high prevalence of household food insecurity was reported in this community with the prevalence especially high in households with children. On-reserve remote FN communities may be more susceptible to food insecurity than off-reserve Aboriginal populations. Findings point to the continued importance of traditional food acquisition and food sharing, as well as community solutions for food systems change. These data highlight that traditional and store-bought food are both part of the strategies and solutions participants suggested for coping with food insecurity. Given the positive impact of the school snack program on the food and nutrient intake of student participants, it is clear that school snack programs can be an important venue to address the nutritional vulnerability of FN youth living in remote communities. Community and school greenhouse projects require local champions to be successful and foster community participation and ownership. Implementing a greenhouse project can engage community members, including children, and provide a great learning opportunity for gardeners in a remote, northern community. Finally, input from community participants and experts suggest additional questions that may add relevance to food security questionnaires for FN populations. Data highlight the urgency for public health policies and initiatives that promote food security for vulnerable FN populations. Findings can be used to inform assessment and program planning activities and to advocate for policies at the local, provincial and federal levels to strengthen community food security.

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Chapter 1: INTRODUCTION AND OVERVIEW

1.1 Rationale

Food insecurity has recently been described as an urgent and pervasive public health issue for Aboriginal people (First Nations [FN], Métis, and Inuit) in Canada (Power, 2007; Power, 2008; Willows, 2005a). Food security is recognized as an important determinant of health (McIntyre, 2003; McIntyre & Tarasuk, 2002) and food insecure individuals are at a greater risk for many negative health consequences (Che & Chen, 2001; McIntyre & Tarasuk, 2002). There is substantial evidence that many health problems experienced by Aboriginal people are related to diet (Willows, 2005a). The most apparent health disparities in Canada are those between Aboriginal people and the non-Aboriginal population (Adelson, 2005; Frohlich, Ross, & Richmond, 2006). National surveys have consistently found that certain sub-populations are at much higher risk of food insecurity and include: Aboriginal people living off-reserve, people living on low incomes, social assistance recipients and female lone parents (Che & Chen, 2001; Health Canada, 2007; Ledrou & Gervais, 2005; Willows, Veugelers, Raine, & Kuhle, 2009). As Aboriginal people are identified as one of these groups and are often overrepresented in the other categories, they therefore may face multiple risk factors and are at greater susceptibility for food insecurity (Rideout, 2005; Willows, 2005a).

It has been acknowledged that food security challenges faced by Aboriginal people are unique (Agriculture and Agri-Food Canada, 1998; Dietitians of Canada, 2005; Dietitians of Canada, 2007; Kuhnlein & Receveur, 1996; Power, 2007; Power, 2008), especially for Aboriginal people living in remote and isolated communities. The unique qualities of Aboriginal food systems are primarily related to the two avenues of food provision: the harvesting, sharing and consumption of traditional (or country) foods and the purchasing and consumption of market

(or commercial) foods (Kuhnlein & Receveur, 1996; Power, 2007). Despite the combination of the traditional food system and market food system as being distinct from the non-Aboriginal food system, current conceptualizations of food security lack the context, food practices, and perspectives of Aboriginal people (Power, 2008; Willows et al., 2009). In many remote communities, traditional food systems are an economic necessity as well as a vital element for good health; influencing physical health, cultural identity and social well-being (Kuhnlein, 1995; Kuhnlein & Chan, 2000; Power, 2008; Samson & Pretty, 2006; Van Oostdam et al., 1999; Wein, 1995). Traditional food systems are increasingly threatened by many factors, and thus remote communities that depend on traditional foods are likely to experience mounting food insecurity (Fieldhouse & Thompson, 2012; Kuhnlein & Receveur, 1996; Lambden, Receveur, & Kuhnlein, 2007; Power, 2008).

National health surveys have generally excluded a large portion of the Aboriginal population (FN living on-reserve and Inuit), resulting in limited data on food security in these individuals and communities (McAmmond, 2000; Power, 2007). Available data on food security in off-reserve Aboriginal people are alarming: families of Canada's hungry children were more than four times more likely to represent people of Aboriginal descent (McIntyre, Connor, & Warren, 2000), 24% of Aboriginal households had a compromised diet (reduced quality and/or quantity) compared to 8.4% across the rest of Canada (Che & Chen, 2001), and the prevalence of food insecurity in Aboriginal households was 33% compared to 9% in non-Aboriginal households (Health Canada, 2007; Willows et al., 2009). Until recently, what was known about food security in on-reserve FN and Inuit people was gathered from a few studies in discrete isolated communities. These studies had shown extremely high prevalence of food insecurity, from 40% to 83% (Indian and Northern Affairs Canada [INAC], 2003; 2004a; 2004b). Food insecurity was

also shown to be closely tied with northern and isolated geography (Ledrou & Gervais, 2005), thus remote communities appear especially vulnerable (Agriculture and Agri-Food Canada, 2006). New data has been published in the past few years that provide a more complete picture of food insecurity for Aboriginal people; the prevalence of food insecurity from Inuit household data in 36 Arctic communities was 43% to 69% depending on region (Rosol, Huet, Wood, Lennie, Osborne, & Egeland, 2011) and over half (54.2%) of all households were found to be food insecure in the First Nations Regional Health Survey Phase 2 (2008/2010) (RHS) (First Nations Information Governance Centre [FNIGC], 2012).

Despite evidence that food insecurity is prevalent in Aboriginal communities, little information is known about the characteristics of the individuals or households experiencing this problem (Willows, Iserhoff, Napash, Leclerc, & Verall, 2005) and the determinants of their food insecurity. Issues related to food security in Aboriginal populations that have not been studied in-depth include: prevalence or severity of food insecurity in on-reserve populations, how this varies by season or time period; concerns about contamination of traditional food; traditional food systems and food security; how food pricing influences food choice; how traditions of sharing and reciprocity of food contribute to food security; how families cope internally with food shortages; how individuals within families experience or cope with food shortages differently; how communities cope with widespread food insecurity; and what solutions or strategies have worked (or not worked) in the past and what new strategies are suggested by community members (Power, 2007; Power, 2008; Willows, 2005a; Willows et al., 2009).

Scales for measuring food insecurity, including the widely used Household Food Security Survey Module (HFSSM), have not been validated in Canadian Aboriginal populations and these measures need to consider languages, cultural perceptions, unique life experiences, and

traditional food attributes (Lambden, Receveur, & Kuhnlein, 2007; Power, 2008; Willows, 2005a; Tarasuk, 2001). There is a need for valid, reliable, relevant and feasible instruments to examine and measure food-related issues among Northern Aboriginal peoples. Qualitative research is also needed to better understand conceptualizations of food security by Aboriginal people (Healey & Meadows, 2007; Power, 2008; Willows, 2005a; Willows et al., 2009).

Food security research in the Arctic appears to be expanding (Beaumier & Ford, 2010; Chan et al., 2006; Duhaime & Godmaire, 2002; Ford & Beaumier, 2011; Huet, Rosol, & Egeland, 2012; Lambden, Receveur, Marshall, & Kuhnlein, 2006; Lardeau, Healey, & Ford, 2011; Nancarrow & Chan, 2010; Schuster, Wein, Dickson, & Chan, 2011; Theriault, 2009), while research with on-reserve FN populations is severely lacking (Power, 2007). Collecting data with isolated communities is not without merit as each reserve has unique characteristics and many want local information to direct local policies and programs (Ho, Gittelsohn, Harris, & Ford, 2006; Newbold, 1997; Vastine, Gittelsohn, Ethelbah, Anliker, & Cabellero, 2005).

1.2 Objectives

The overall objective of this dissertation was to examine various aspects of food insecurity in the remote on-reserve FN community of Fort Albany, Ontario. The thesis was based on the following specific objectives pertaining to five studies:

Study I: Prevalence and severity of household food insecurity; Relevance of the HFSSM

Objective #1: To measure the prevalence and severity of household food insecurity in Fort Albany, Ontario using the Household Food Security Survey Module (HFSSM).

Objective #2: To evaluate the perceived relevance of the HFSSM as a tool for assessing food insecurity of on-reserve FN households using input from a specific qualitative question from participants completing the HFSSM.

Study II: Perceptions of and coping strategies for food insecurity

Objective #1: To explore food insecurity from the perspective of families and community members using qualitative interviews with participants completing the HFSSM. The two research questions addressed by this study were: (1) “What are the coping strategies for food insecurity used by community members?”; and, (2) “What suggestions do community members have to improve food security in your community?”

Study III: Impact of the school nutrition program

Objective #1: To examine the impact of an existing school nutrition program on the dietary intakes of grade six to 10 students at Peetabeck Academy by comparing results from the Waterloo Web-based Eating Behaviour Questionnaire (WEB-Q) between those participating and not participating in the program on survey days in 2004 (n = 63 students) and 2007 (n = 50 students).

Study IV: The community/ school greenhouse and gardening project

Objective #1: To conduct a descriptive case study of the context and process surrounding the planning and implementation of a community greenhouse from the perspectives of community participants.

Study V: Draft of a supplemental First Nations component for the HFSSM

Objective #1: To use data from perceptions of the relevance of the HFSSM to assess food security of on-reserve households (Study I, Objective #2) to draft a list of potential questions that could be used as a supplemental FN component for the HFSSM.

Objective #2: To modify the supplemental FN food security module based on feedback on the drafted questions from volunteer key informants from the Aboriginal Nutrition Network of the Dietitians of Canada.

1.3 Chapter Overview

This thesis proposal is organized into nine chapters. The first chapter provides an overview of the entire dissertation. Chapter 2 is a review of the literature on food insecurity with a specific focus on Aboriginal populations. The literature review also covers potential policy and program strategies that can be used to increase food security in northern Canadian Aboriginal communities and a brief section regarding two food security strategies related to this thesis: (1)

school nutrition programs, and (2) greenhouse/ gardening programs. Chapter 3 provides details about the community, study population, past research, and an overview of the methods used in each of the five studies. Chapter 4-7 are presented as manuscripts for each of the first four studies (Studies I, II, III, and IV). Chapter 8 covers the background, methods and results for Study V. Chapter 9 is a general discussion that summarizes the key findings and contributions from all five studies and recommendations for future research. Although this is a manuscript-style thesis, references are listed at the end of the thesis for simplicity. Please be aware that there are pieces of writing that are repeated in this document; first they are included as part of the overall literature review and methods for this thesis, and then segments of the literature review have been written into the introduction sections and methods into the methods sections of the manuscripts.

A number of chapters have either been published or submitted for publication in peer-reviewed journals. Chapter 4 (Study I) was submitted to the journal *Public Health Nutrition* and revisions to this manuscript have been returned to the journal. Chapter 5 (Study II) was published in the journal *BMC Public Health* on May 2, 2013 and Chapter 6 (Study III) was published in the *Rural and Remote Health* journal on August 22, 2012. Chapter 7 (Study IV) was submitted to the *Rural and Remote Health* journal and is under review. The details of the manuscripts that have been published, accepted and submitted are as follows:

CHAPTER 4 (Study I):

Skinner K, Hanning RM, Tsuji LJS. (revisions submitted March 2013). Prevalence and severity of household food insecurity of First Nations people living in an on-reserve, sub-Arctic community within the Mushkegowuk Territory. *Public Health Nutrition*.

CHAPTER 5 (Study II):

Skinner K, Hanning RM, Desjardins E, Tsuji LJS. (2013). Giving voice to food insecurity in a remote indigenous community in subarctic Ontario, Canada: traditional ways, ways to cope, ways forward. *BMC Public Health*, 13, 427.

CHAPTER 6 (Study III):

Skinner K, Hanning RM, Metatawabin J, Martin ID, Tsuji LJS. (2012). The impact of a school snack program on the dietary intake of grade six to ten First Nation students living in a remote community in northern Ontario, Canada. *Rural and Remote Health*, 12(3), 2122.

CHAPTER 7 (Study IV):

Skinner K, Hanning RM, Metatawabin J, Tsuji LJS. (submitted February 2013). The implementation of a community greenhouse in a remote, sub-arctic First Nations community in Ontario, Canada: a descriptive case study. *Rural and Remote Health*.

Chapter 2: LITERATURE REVIEW

2.1 Food Security

Food security centres around one of the most fundamental human rights – the right to food. Food insecurity is a significant global health problem (WHO, 2006). Not only is it an important public health issue in the developing world; developed countries, including Canada have inhabitants experiencing food insecurity on a regular basis. Food security has been recognized as a determinant of health and individuals experiencing food insecurity are at a greater risk for many negative health consequences (McIntyre & Tarasuk, 2002). Food security has a strong relationship with income and the growing inequalities in Canada's population have resulted in disturbing and increasing levels of food insecurity (McIntyre & Tarasuk, 2002).

2.1.1 *What is food security?*

The most widely recognized definition for food security was developed at the World Food Summit (FAO, 1996) and subsequently endorsed by the Canadian government: *Food security exist when all people, at all times, have physical and economic access to sufficient, safe and nutritious foods to meet their dietary needs and food preferences for an active and healthy life* (Agriculture and Agri-food Canada, 1998). *Food insecurity* exists when people do not have adequate physical, social or economic access to food as defined above (FAO, 1996). Various terms are often used to describe the concept of food security. These include hunger, food poverty, food insufficiency, and others (Tarasuk, 2001). This thesis will primarily use the terms food security and food insecurity and only use other terms if they are specific to the literature that is being discussed.

According to the World Health Organization (WHO), food security is based upon three basic components: food availability (i.e. having sufficient quantities of food available on a consistent

basis), food access (i.e. having sufficient resources or income to obtain appropriate foods for a nutritious diet), and food use (i.e. appropriate use based on knowledge of basic nutrition and care) (WHO, 2006). These components have also been described as having two domains: food *quantity* and food *quality* (Tarasuk, 2001). A fourth new concept that is beginning to be included encompasses the risks of climatic fluctuations, conflict, job loss, and epidemic disease all of which can disrupt any of the first three factors (Webb et al., 2006). A group called “Growing Food Security in Alberta” understands food security to be more than just availability and accessibility and include acceptability (i.e. culturally), adequacy (i.e. quality, safety, sustainability) and community action (towards food security) in their description of maintaining food security (GFSA, 2004).

Food security has many variables, definitions, and determinants and is often categorized into three types: individual (Dietitians of Canada, 2005; Radimer, Olson, Green, Campbell, & Habicht, 1992), household (Dietitians of Canada, 2005; FAO, 1996; Radimer et al., 1992), and community (Dietitians of Canada, 2007; McCullum, Desjardins, Kraak, Ladipo, & Costello, 2005; Ontario Public Health Association, 2002). Individual food insecurity is characterized by nutritional inadequacy, insufficient intake, lack of food choice, feelings of deprivation, and disrupted eating patterns (Radimer et al., 1992). Household food insecurity is the application of the food insecurity concept to the family level, with individuals within households as the focus of concern (FAO, 1996) and is characterized by unsuitable food, food depletion, food anxiety, and food acquisition in socially unacceptable ways (Radimer et al., 1992). Community food security combines concerns about both food consumption and food production and focuses on food systems based on collective rather than individual needs (Dietitians of Canada, 2005; McCullum et al., 2005). Policy and practical implications differ between the three types of food security.

Community food security considers food policy while individual and household food security are more concerned with social policy (Dietitians of Canada, 2005). To acknowledge the unique food security considerations (i.e. the harvesting, sharing, and consumption of traditional food) of Canadian Aboriginal people, Power (2008) proposes “cultural food security” as another level beyond individual, household, and community food security.

Table 2.1 shows considerable overlap between the various definitions of food security. While the definition used by the WHO and developed at the World Food Summit in 1996 is probably the most widely adopted and progressively developed definition, the definition that may more appropriately fit the Aboriginal context is from the Food Security Assembly (2004) (shaded row in Table 2.1).

This definition specifically involves food that is “culturally appropriate”. Successful health interventions with Canada’s Aboriginal people require policies and programs which respect cultural values and belief systems (Hudson & Taylor-Henley, 2001; Macauley et al., 1998) and this can begin right from the definition of an issue, such as food security (Lambden et al., 2007).

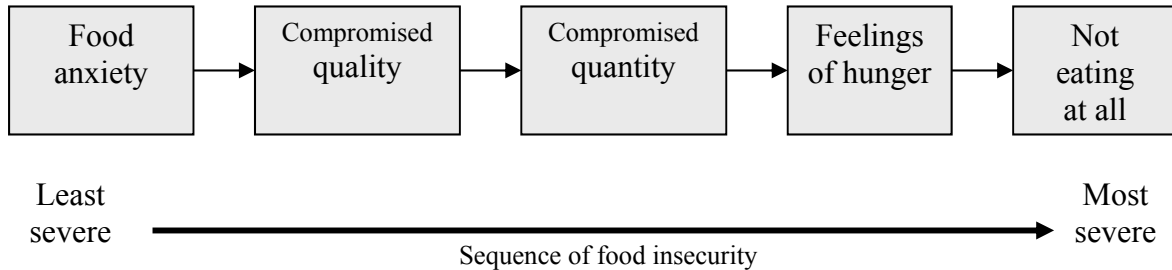
Table 2.1: Food security/insecurity definitions

Author/Organization	Definition
<i>Food Security/ Insecurity (Individual and Household)</i>	
WHO, 2006; World Food Summit (FAO, 1996); Dietitians of Canada, 2005	Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.
Food Security Assembly, 2004	Food security is the assurance that all people at all times have both the physical and economic access to the food they need for an active, healthy life. It means that the food itself is safe, nutritionally adequate, culturally appropriate and that this food be obtained in a way that upholds basic human dignity.
Davis & Tarasuk, 1994	Food insecurity is the inability to acquire or consume an adequate diet quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so.
Campbell, 1991; Travers, 1996	Food insecurity includes problems in obtaining nutritionally adequate and safe foods due to a lack of money to purchase them, or the limited availability of these foods in geographically isolated communities.
Indian and Northern Affairs Canada, 2001	Food insecurity is the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.
<i>Community Food Security</i>	
Dietitians of Canada, 2007	Community food security exists when all community residents obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for everyone.
Ontario Public Health Association, 2002	Community food security is a strategy for ensuring secure access to adequate amounts of safe, nutritious, culturally appropriate food for everyone, produced in an environmentally sustainable way, and provided in a manner that promotes human dignity.
Hamm & Bellows, 2003	Community food security exists when all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice.
Anderson & Cook, 1999	Practitioners and advocates of community food security envision food systems that are decentralized, environmentally sound over a long time-frame, supportive of collective rather than only individual needs, effective in assuring equitable food access, and created by democratic decision-making

Food insecurity is a dynamic phenomenon, may be transitory or chronic and often follows a sequence of events. Tarasuk (2001) has outlined this progression, which begins with food anxiety and can continue to the most severe level of food insecurity, which involves skipping meals completely (summarized in Figure 2.1). These components were the basis for the

development of the 18-item *Household Food Security Survey Module*, which is the dominant measurement tool for food security in the United States and Canada (Health Canada, 2007; Tarasuk, 2001).

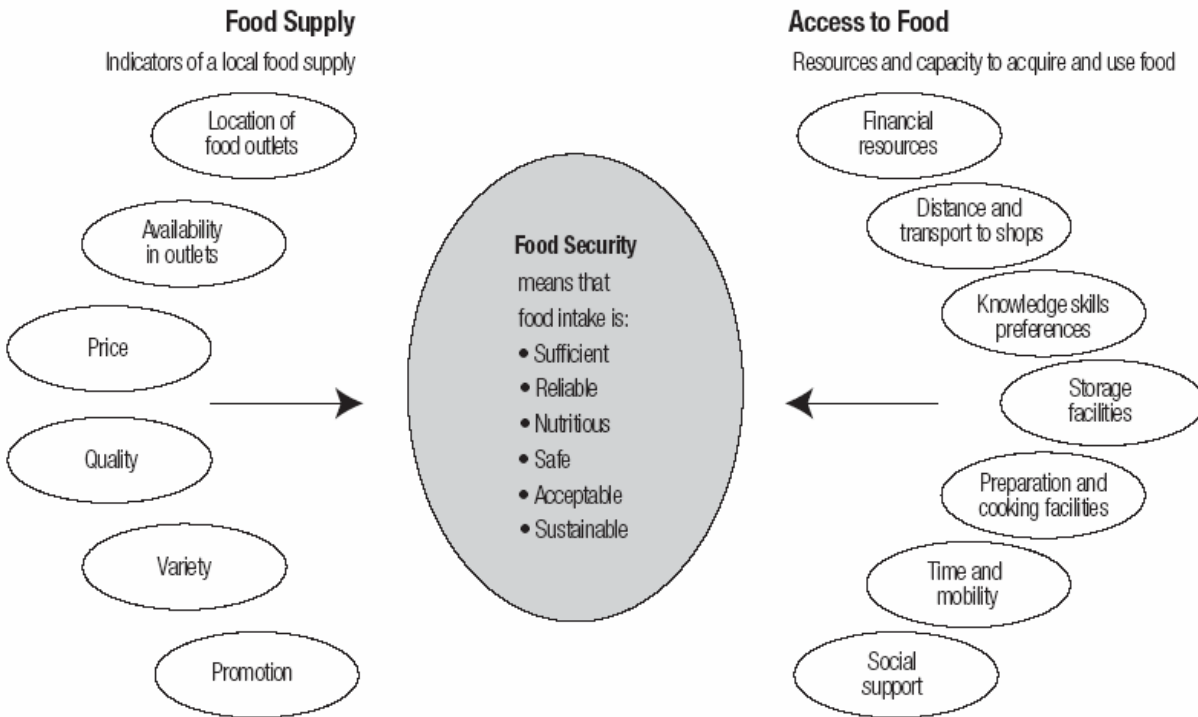
Figure 2.1: The progression of being food secure to food insecure



Source: Summarized from the text of Tarasuk (2001)

Income and financial insecurity are the most significant determinants of food insecurity (McIntyre & Tarasuk, 2002; Rose, 1999; Williams, Watt, Amero et al., 2012) and the odds of reporting food insecurity are three times higher for households relying on social assistance than those with other sources of income (Che & Chen, 2001). As income decreases the odds of reporting food insecurity increases (McIntyre & Tarasuk, 2002; Rose, 1999). For many low income families, the unfortunate reality is that the grocery budget is flexible, whereas other bills (e.g., rent, phone, hydro) are not. Figure 2.2 depicts the basic determinants of food security; the factors contributing to or detracting from a state of being food secure (Rychetnik, Webb, Story, & Katz, 2003).

Figure 2.2: Determinants of food security

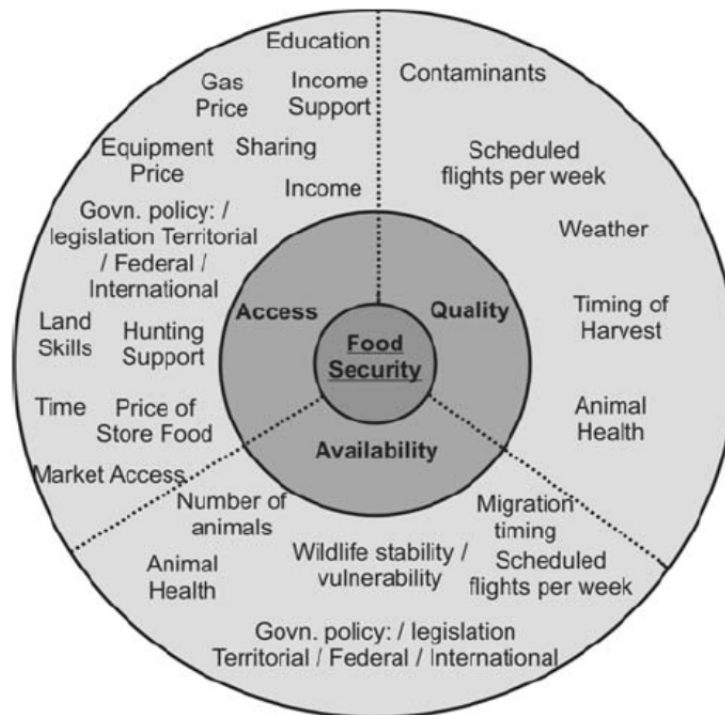


Source: Rychetnik et al. (2003) (Adapted from a model by McComb, Webb, & Marks, 2000)

Income and food costs become more powerful determinants of food selection due to wide spread poverty and reliance on social assistance in many Aboriginal communities (Willows, 2005a; Willows et al., 2009). Food insecurity in remote FN communities is exacerbated by many factors: high incidence of poverty (Willows et al., 2009), environmental contamination of traditional food sources (Donaldson et al., 2010), climate change affecting hunting and fishing practices (Ford, 2009; Furgal & Seguin, 2006; Guyot, Dickson, Paci, Furgal, & Chan, 2006), loss of traditional food practices and access to land, unreliable food supplies, and high cost and reduced availability, quality of healthy market food (Ford, 2009; Power, 2007; Power, 2008; Socha, Chambers, Zahaf, Abraham, & Fiddler, 2011; Socha, Zahaf, Chambers, Abraham, & Fiddler, 2012; Thompson, Kamal, Alam, & Wiebe, 2012). Ford (2009) has identified and summarized the various factors that influence the security of Inuit food systems (Figure 2.3).

Although the reliance on traditional food consumption may be lower in First Nations communities when compared to Inuit communities, the factors included in Ford's (2009) diagram present a much more comprehensive picture that is specific to the determinants of food security for remote First Nations communities than those depicted in Figure 2.2.

Figure 2.3: Food security determinants (traditional and store food) for Canadian Inuit communities



Source: Ford (2009)

Another determinant unique to remote communities may be store management practices and policies in what may be the only community store (Boult, 2004; Socha et al., 2011; Socha et al., 2012; Willows, 2005a). In these regions, where often only one store serves the community, personal beliefs and attitudes of the store manager about stocking healthful foods may play a significant role in the community food supply (Lee, Bonson, & Powers, 1996). Inadequate demand for healthy foods may deter store managers from stocking them (Socha et al., 2011). Socha and colleagues (2011) interviewed the grocery store manager in a remote Northwestern

Ontario community and reported the challenges that the manager faced. The store manager did not have control over the base cost of the items shipped to the store, but where she did have power, was over the volume of each product shipped weekly. The manager's ability to predict sales contributed to the maintenance of lower prices. It was also noted that community members did not blame the store manager for the high cost of food (Socha et al., 2011).

The cost of and accessibility of certain foods varies considerably with geographic region. The cost of purchasing market food in northern communities is high, because of the long distance the food must be transported by truck, by ship and, most expensively, by air (Indian and Northern Affairs Canada, 1994; Lambden et al., 2006; Socha et al., 2011). As a result of the length of time required for transport, variety is limited, quality of fresh produce is poor and perishable foods quickly deteriorate in quality (Lawn, Langner, Brule, Thompson, & Hill, 1994; Socha et al., 2011; Wein, 1994a; Wein, 1995). Thus, market food consumption patterns are closely related to the degree of isolation of an Aboriginal community (Wein, 1994b). Living in poverty and a lack of financial resources affects the ability of First Nations and Inuit to access both market foods and traditional/country foods. Store bought foods are extremely expensive in northern and isolated communities and accessing food from the land can be costly for equipment, supplies, and gas (Dana, 2010; Egeland, 2011; Ford & Berrang-Ford, 2009; Gates et al., 2012; Lambden et al., 2006; Government of Canada, 2013; Socha et al., 2011; Spiegelaar & Tsuji, (in press); Thompson et al., 2012). Lambden and colleagues (2006) found that the affordability and accessibility to hunting and fishing in the Arctic were major barriers to food security. Spiegelaar and Tsuji (in press) recounted that high gasoline prices were blamed for preventing frequent hunting trips and that few people in Fort Albany hunted at all because they could not afford to. In other studies, although those who could afford to hunt greatly treasured the time spent engaging

in traditional harvesting activities, hunting was not seen as a cost saving activity for accessing food, as the costs of gas, materials, equipment, and travel, amounted to a higher monetary value than the food was worth (Thompson et al., 2012).

2.1.2 *Why is food security important?*

Food insecurity is a condition with harmful consequences for health and well-being that include nutritional implications (e.g., poorer quality dietary intakes and nutrient inadequacy) (Cristofar & Basiotis, 1992; Kendall, Olson, & Frongillo, 1996; McIntyre et al., 2002; McIntyre et al., 2003; Rainville & Brink, 2001; Rose & Oliveira, 1997; Rose, 1999; Tarasuk & Beaton, 1999; McIntyre & Tarasuk, 2002), physical health implications (e.g., poorer self-rated health status) (Campbell, 1991; Cristofar & Basiotis, 1992; McIntyre et al., 2000; McIntyre & Tarasuk, 2002), and social implications (e.g., social exclusion) (Hamelin, Habicht, & Beaudry, 1999; Klesges, Pahor, Shorr, & Wan, 2001; McIntyre & Tarasuk, 2002). Unfortunately, none of these studies mention the inclusion of Aboriginal people in their data.

A recent study of FN women living in a semi-isolated community in Quebec found that self-efficacy in healthy food preparation was associated with food insecurity and obesity (Mercille, Receveur, & Potvin, 2012). Willows, Veugelers, Raine, and Kuhle (2011) found that adults living in off-reserve food insecure households were more likely to report poor general and mental health problems than those who lived in food secure homes. Despite new evidence that food insecurity occurs regularly in Aboriginal communities, little information is known about the characteristics of food insecure Aboriginal people (Power, 2007; Power, 2008; Willows et al., 2005). The health consequences for food insecure Aboriginal individuals appear to be much more pronounced than in the non-Aboriginal Canadian population. Studies have shown that many health problems experienced by Aboriginal peoples are related to diet and include anemia,

dental caries, obesity, heart disease, high blood pressure and type 2 diabetes (Egeland, Pace, Cao, & Sobol, 2010; Egeland, Johnson-Down, Cao, Sheikh, & Weiler, 2011; Haman et al., 2010; Rosol et al., 2011; Health Canada, 2003; Willows, 2005a; Willows, Hanley & Delormier, 2012). The extremely high prevalence of obesity and type 2 diabetes (CIHI, 2004; Katzmarzyk, 2008; Young, Reading, Elias, & O'Neil, 2000; Willows, 2005b) amongst Aboriginal peoples may be exacerbated by food insecurity (Bird, Wiles, Okalik, Kilabuk, & Egeland, 2008) and vice versa. Food insecurity also limits the ability for Aboriginal individuals with type 2 diabetes to manage their disease (Socha et al., 2011). The “nutrition transition” that entails a dietary transition from nutrient-dense traditional/country food to energy-dense, nutrient-poor market food as well as sedentary lifestyles for Aboriginal peoples are major contributors to chronic diseases, specifically impacting high rates of obesity and type 2 diabetes (Batal, Gray-Donald, Kuhnlein, & Receveur, 2005; Egeland et al., 2011; Haman et al., 2010; Theriault et al., 2005). It has been well documented that consumption of traditional or country food provides positive health benefits, such as improved diet quality and nutrient adequacy due to high levels of antioxidants, omega-3 fatty acids, monounsaturated fatty acids, protein and other micronutrients (Jamieson, Weiler, Kuhnlein, & Egeland, 2012; Kuhnlein & Receveur, 2007; Theriault et al., 2005). There is mounting evidence that healthier diets cost more than diets that are high in fats and sweets (considered unhealthy) and that this may be contributing to the obesity epidemic in North America (Drewnowski, Darmon, & Briend, 2004; Drewnowski & Darmon, 2005). Food insecurity also limits the ability for Aboriginal individuals with type 2 diabetes to manage their disease (Socha et al., 2011) resulting in further and more severe health consequences and complications (Canadian Diabetes Association, 2006).

A study by Willows and colleagues (2005) documented the prevalence of maternal anxiety about food supply in Cree women in northern Quebec who had nine month old infants. This study sought to understand the maternal and infant characteristics associated with food anxiety. Participants were asked, “Do you ever worry you don’t have enough money to buy your children food to eat?” Maternal characteristics during pregnancy with the infant (age, parity, anemia in the first trimester, smoking status) were obtained. They found that food-related anxiety was associated with anemia and smoking during pregnancy, and with bottle-feeding (versus breast-feeding) at nine months postpartum (Willows et al., 2005). Even though this study did not directly measure nutritional, physical health, or social implications from food insecurity, it does provide a glimpse into some of the other potential consequences of food insecurity that may be experienced by Aboriginal women and their infants.

It is evident from numerous studies that food insecurity compromises health and well-being. Moreover, food security is a significant determinant of health status and this may be even more important in remote First Nations communities where geographic remoteness and vulnerability influence food supply and there are reduced financial means to purchase healthy and nutritious market food and to harvest traditional food.

2.1.3 *How do we measure food security?*

Due to food security being a major health determinant and the myriad of consequences for health and well-being, there is a need to monitor the problem. Tarasuk (2001) argues that the extent and severity of food insecurity is difficult to determine from other nutritional monitoring actions and thus for greater understanding of this problem it should be monitored in its own right. Food security can be a characteristic of nations, communities, households or individuals and thus can be studied at different levels (Campbell, 1991). Campbell (1991) suggests that there

are four essential components (quantity, quality, psychological acceptability, and social acceptability) to measuring food insecurity at the individual and household levels as shown in Table 2.2.

Table 2.2: Essential components of a measure of food insecurity at the individual and household levels of study

Component	Individual level	Household level
1. Quantity	Energy sufficiency of intake	Quantity of household stores
2. Quality	Nutrient adequacy of intake	Quality and safety of on-hand food
3. Psychological acceptability	Feelings of deprivation or restricted choice	Anxiety about food supplies
4. Social acceptability	Normal meal patterns	Conventional sources of food

Source: Campbell (1991); Adapted from Radimer, Olson & Campbell (1990)

Measures of food insecurity can be classified into two categories: direct and indirect. Indirect indicators lack the specificity and sensitivity of direct measures, whereas the downside of direct measures is that they require substantial resources and are intrusive (Tarasuk, 2001). Direct measures are usually conducted at the individual or household level, such as the Household Food Security Survey Module (HFSSM) (Health Canada, 2007), and the Household Food Insecurity Access Scale (HFIAS) (Webb et al., 2006; Coates et al., 2006; Swindale & Bilinsky, 2006). Indirect measures are often aimed at community level proxy measures, such as the “Healthy Food Basket” (HFB) (also called the Nutritious Food Basket) (Nathoo & Shoveller, 2003). Other indirect indicators include measures of poverty, food bank utilization statistics, presence of food security related programs (e.g., community kitchens, community gardens, targeted feeding programs, etc.), and the store-turnover method (Tarasuk, 2001; Brimblecombe, Mackerras, Clifford, & O’Dea, 2006).

The 18-item HFSSM is the most widely used direct measure of food insecurity in North American populations (see Appendix A). As described by Health Canada (2007), “The HFSSM

contains 18 questions about the food security situation in the household over the previous 12 months, ranging in severity from worrying about running out of food, to children not eating for a whole day. Ten of the 18 items are specific to the experiences of adults in the household or the household in general, while eight are specific to the experiences of children under the age of 18 years in the household. Each question specifies a lack of money or the ability to afford food as the reason for the condition or behaviour.” The HFSSM was used to assess household food security in the Canadian Community Health Survey (CCHS), Cycle 2.2, 2004 (Health Canada, 2007). Unfortunately, scales for directly measuring food insecurity, including the HFSSM have not been validated in Canadian Aboriginal populations and these measures need to consider languages, cultural perceptions, unique life experiences, and traditional food attributes (Lambden et al., 2007; Power, 2008; Willows, 2005a; Tarasuk, 2001). Culturally appropriate and relevant community health and capacity indicators need to be developed for Canadian Aboriginal people; the existence of these indicators would allow health information to be tracked in a meaningful way by First Nations health organizations at the community level (Jeffery, Abonyi, Labonte & Duncan, 2006). Ideally, instruments would have the flexibility to address local issues and also provide common data across reserves.

The HFB determines the availability and cost of a selection of foods in a shopping basket across a number of stores in various geographic locations and neighbourhoods (Nathoo & Shoveller, 2003). Indian and Northern Affairs Canada (2005b) has used a similar indicator which they call the “Northern Food Basket” (NFB). The NFB was developed primarily to track the impact of the Food Mail Program transportation subsidy in Canada and to monitor the cost of a nutritious diet in northern isolated communities. The NFB was modeled after Agriculture Canada’s Thrifty Nutritious Food Basket, contained 46 items (Lawn, 1998), and was used to

monitor the cost of a nutritious diet for a family of four from 1990 to 2006 (INAC, 2007). In 2006, the “Revised NFB” (RNFB) was introduced as an updated version of the NFB (INAC, 2007). The intention of the RNFB was to be more culturally appropriate for Aboriginal people (INAC, 2005b) and to ensure it was consistent with the newest version of Canada’s Food Guide and the Aboriginal version of the Food Guide (INAC, 2007). In comparison to the NFB, the RNFB differs in a number of respects: it contains 67 food items rather than 46; it is more consistent with current food consumption patterns of northern residents (e.g., it includes more meat); perishable foods comprise a much larger portion of the basket (e.g., yogurt, a greater variety and more fresh fruit and vegetables), and; it uses average prices for each product in the basket, rather than the lowest price available in the community (Government of Canada, 2012; INAC, 2007). Neither the NFB nor the RNFB consider the costs of traditional food acquisition. According to INAC (2007, p. 18), “it would be impossible to design and price a food basket using traditional foods that are consumed throughout the North”. The HFB (NFB or RNFB) provides only a proxy estimate of individual food affordability and accessibility and should be combined with other food security measurement tools (Nathoo & Shoveller, 2003).

The store-turnover method has been used for the past 20 years to assess food intake in remote Aboriginal communities in Australia. This method records and assesses the food ordered by the store over a 12-week period and calculates the per capita availability of nutrients and foodstuffs. Due to the increasing complexity of the food supply in these communities, Brimblecombe and colleagues (2006) have suggested the need to develop a revised version of the store-turnover technique and that Market Basket Surveys (the term for the HFB in Australia) are currently more practical to implement.

Assessing food security in remote Aboriginal communities may require both types of indicators as direct measures are not feasible on a regular basis and it is still important to frequently monitor the problem. Despite the fact that traditional food plays a significant role in the food systems of Aboriginal people (Lambden et al., 2007; Power, 2008), there are no measures which capture food security and its relationship with traditional food (Power, 2008). The first step towards developing this type of measurement tool would require qualitative research with Aboriginal people to gain an adequate and appropriate understanding of food security that incorporates their perspectives and distinct food systems (Power, 2008).

Some qualitative studies related to food security have been conducted in the United States and Canada (Bird et al., 2008; Chan et al., 2006; Cohen, 2002; Hamelin, Beaudry, & Habicht, 2002; Lambden et al., 2006; Lambden et al., 2007; Pierre, Receveur, Macauley, & Montour, 2007; Skinner, Hanning, & Tsuji, 2006; Willows et al., 2005). The methodologies of these studies varied considerably by: the number (1 to 12 questions) and nature of the questions asked (e.g., individual, household, community level); the type of qualitative inquiry (e.g., interviews or focus groups); and target population (e.g., Aboriginal, non-Aboriginal, mothers of infants). Seven of the nine studies were directed at Aboriginal people in Canada. The details of these nine studies, including the specific questions asked, are summarized in Table 2.3.

Table 2.3: Details of qualitative studies of food insecurity

Study	Location and/ or study population	Methods	Questions/interview guide and probes
Bird et al., 2008	Inuit with diabetes, Baffin Island N = 4	In-depth interviews	<ol style="list-style-type: none"> 1. Tell me the story of the day you found out about your high blood sugar. (Where were you, who were you with, what were you told, by whom, who did you talk to?) 2. How is your life different since you found out that you have diabetes? 3. What can a person do to manage their blood sugar? 4. Have you made changes in your life to control/manage your blood sugar? (Example: meds, diet, activity) 5. Describe which food make you feel best? 6. How often are you able to have these foods? 7. Are you able to have the foods that you need to feel healthy? 8. What is it like to avoid foods that you once enjoyed? 9. Who would you trust most to give you information about high blood sugar? 10. Have you discussed high blood sugar with your family? 11. What is Inuit Qaujimagatuqangit (IQ)? 12. Are there any guiding principles from IQ that help you live with diabetes?
Chan et al., 2006	Kitikmeot, Kivalliq and Qikiqtaaluk (Baffin) Regions, Inuit, Nunavut, 6 communities, 1 focus group per community with 7 - 9 participants, N = 46 total	Focus groups	<ol style="list-style-type: none"> 1. Some people have told us that they cannot afford to buy what they need to eat and that they sometimes run out of food. Is this happening in homes of your family and friends? (<i>Probe for: suggestions to improve food security at the level of the individual, community, government (ask separately)</i>). 2. Some people have said that getting traditional food is more difficult than it was 10-15 years ago. What has been your experience? (<i>Probe for: barriers to accessing traditional food; perception as to whether other communities are experiencing similar access issues; situations that make communities/members more vulnerable</i>) 3. Do you think people would eat traditional food more often, if availability was better? (<i>Probe for: reasons for market food purchases; facilitators of traditional food consumption; acceptable methods to increase traditional food access; factors in decision to purchase traditional food</i>) 4. Now, I'd like to get a better understanding of how well the grocery stores in the community meet your needs? I'd like to hear from you what you like and what, if anything, you would like to see change? (<i>Probe for: acceptability of current confectionary food use; suggestions on reducing confectionary food use; suggestions to improve consumption of foods considered a healthier choice</i>)
Cohen, 2002	USDA Community Food Security Assessment Toolkit (specific target population not described)	Not applicable	<p>Let's start by thinking back to this past year. Give some thought to the times when you either didn't have enough food for everyone in your home or worried about whether you would have enough food.</p> <ol style="list-style-type: none"> 1. How many people would say that they either ran out or worried about running out of food during the past year? 2. I'm wondering about the frequency of these things happening. How many people would say that they either ran out or worried about running out of food every month? Did these things happen at specific times of the month? Or at certain times of the year? 3. How many people would say that they either ran out or worried about running out of food every month? Do these things happen at specific times of the month? Or at certain times of the year? 4. Do these events (running out of food or worrying about it) follow any pattern? That is, does something else happen regularly that causes you to run out of food or to worry about it? (<i>Probe for: medical emergencies, large bills, helping family members with their needs, changes in job status</i>)

			<p>5. I'm wondering about what you do if there isn't enough food. Let's start by discussing the things you might do to make the food you have last longer. What are some of these things? (<i>Probe for: cut amounts of food, cut size of meals, skip meals, water down ingredients, eat cheaper foods like potatoes or pasta, serve less expensive foods, serve less nutritious foods because they are cheaper, serve children nutritious foods but eat less or less nutritious foods yourself</i>)</p> <p>6. People sometimes go to different places to get enough food to go around when they are running short of money. What types of places have you gone to for food and how often? (<i>Probe for: food assistance programs, food pantry, soup kitchen, other "free" food resources</i>). Which of these places works the best for you? Why? Do they each have a different role—do you go to them at different times or use them differently?</p> <p>7. You also may have a less formal "help" network, that is, people you know who will lend you money, give you food, feed you, or let you buy on credit. Can you describe some of these networks? Do you ever provide this type of support for family members or friends?</p> <p>8. What would you say is most important in helping you cope with times when food or food concerns are a major problem?</p> <p>9. We've focused up to this point on household issues and strategies. Switch your thinking a bit to the community. What do you think the community (government, businesses, people) could do to make it easier for people to get enough food? Think about how they could work to make food accessible, available, and affordable.</p>
Guyot et al., 2006	Deh Gah Got'ie First Nation, Fort Providence, NWT, 1 focus group, N = 12; White River First Nation, Beaver Creek, YT, 1 focus group, N = 10	Focus groups	<p>Specific qualitative questions asked were not listed in the published article for this study, however, the methods stated:</p> <p>"Both specific and open-ended questions were asked about the harvest of traditional food, in order to facilitate discussion about these issues and to gather an understanding of how climate change may be affecting the traditional food harvest and, further, what implications these changes could have for community members. A map of the harvesting area was presented to both focus groups to trigger memories, provide an opportunity for participants to specify harvesting areas, and to record any changes that they have noticed in these areas."</p>
Hamelin et al., 2002	Quebec City, Quebec, 98 households, 23 focus groups with 3 – 6 participants, 12 interviews, N = 98	Mixed-methods - group interviews and personal interviews	<ol style="list-style-type: none"> 1. Give your first name and tell us who, in your family, does the grocery shopping, where and when. 2. What does enough food mean to your family? (enough in terms of what?) 3. Do you have enough to eat in your family? Explain. <ul style="list-style-type: none"> If NOT, <ol style="list-style-type: none"> 3.1. Did you experience this situation only once or does it happen regularly? Would you say it is cyclical or chronic? When it happens, how long does it last? 3.2. How does one feel when one does not eat enough? How does one feel when one knows that one is going to encounter a lack of food? 4. How do you manage to feed every one within your budget? 5. How is money spent in your family? Are there things for which you don't make any compromises? Who decides how money is used? 6. How is food distributed between members of your family? Is there someone in particular who decides who will eat what and when? Who is that person? 7. When you don't have any food left at home and you cannot buy what you need, how do you feed yourself and your children? Do you have any other choice than what you do in that situation?

			<p>7.1. Many families have recourse to food aid (e.g. food banks; soup kitchens). Do you? Why do you use it? Or why don't you use it?</p> <p>8. In difficult times, or when you have recourse to food aid, do your meals change a lot compared to the usual? How do they differ (number of meals, composition, choice of food)?</p> <p>9. What contributes to the fact that your household lacks food?</p> <p>10. What contributes to the fact that, at other times, your household does not lack food?</p> <p>11. What would be needed to insure that your household never lacks food?</p> <p>12. What are the factors or events that suddenly occur to make your household lack food?</p>
Lambden et al., 2006	Arctic Canada [Yukon First Nations, Dene/Métis, Inuit], women, 44 communities, N = 1,771	Survey with close-ended questions with space to add comments	<p>1. Could your family afford to buy all the food it needs from the store?</p> <p>2. Does your household have enough equipment to go fishing for the family's food needs?</p> <p>3. Is the fishing equipment working?*</p> <p>4. How costly is it to go fishing?</p> <p>5. Does your household have enough equipment to go hunting for the family's food needs?</p> <p>6. Is the hunting gear working?*</p> <p>7. How costly is it to go hunting?</p> <p>* Question was only asked of participants who had access to such equipment</p>
Lambden et al., 2007	Arctic Canada [Yukon First Nations, Dene/Métis, Inuit], women, 44 communities, N = 1,771	Survey with open-ended questions	<p>Question 1: What do you think are the most important advantages of traditional food?</p> <p>Question 2: Have you noticed any recent changes in the quality or healthy of traditional plants or meats of land animals, birds or fish?</p> <p>Question 3: Is there any traditional food that you think is especially good for health?</p> <p>Question 4: What are your favourite traditional foods?</p> <p>Question 5: Harvesting and traditional food use [respondents were asked to agree or disagree with or have no opinion about traditional food attributes – this was to explore agreement with cultural responses to harvesting and using traditional food]</p>
Skinner et al., 2006	Fort Albany First Nation, Ontario, 2 focus groups with adults [n = 22] and 3 with youth [N = 30], 7 interviews, N = 55 total (some adults participated in both focus groups and interviews)	Mixed-methods - focus groups and interviews	<p>Youth focus group script for barriers to and supports for healthy eating:</p> <p>1. What kinds of healthy foods do you eat?</p> <p>2. What kinds of unhealthy foods do you eat? (<i>Probes: What foods would you like to eat?</i>)</p> <p>3. What kinds of things do you think prevent you from eating healthier foods? (<i>Probes: Are there healthy foods that you like? Can you have these foods regularly? Do you prefer foods prepared in a certain way?</i>)</p> <p>4. What kinds of things do you think could be done to make it easier for you to eat in healthful ways? (<i>Probes: Consider opportunities at home, school, and in the community for eating healthy. What is feasible to change?</i>)</p> <p>5. Who do you think can help you to eat healthier? (e.g., yourself, parents, teachers, community health workers, band council, elders, etc.)</p>
Willows et al., 2005	Cree women, Quebec, 9 communities, N = 245	Interviews	Do you ever worry you don't have enough money to buy your children food to eat?

2.1.4 *Challenges of Measuring Food Insecurity in Aboriginal Populations*

Culturally appropriate research recognizes the difficulties that can develop from cultural differences between researchers and their subjects and attempts to find ways of respecting those differences to address cultural bias (Hudson & Taylor-Henley, 2001). Researchers, in collaboration with Aboriginal peoples, need to develop new frameworks, protocols and dissemination strategies that are both “scientifically sound and culturally relevant” to Aboriginal communities (Smylie et al., 2004, p. 214). This is crucial to obtaining and distributing Aboriginal-specific research data. Inevitably, to accomplish greater cultural sensitivity, it must be appreciated that the most culturally appropriate approaches will come from the Aboriginal people themselves (Maar et al., 2012; Macauley et al., 1998).

Campbell, Diamant, Grunau, and Halladay (1994) have outlined some methodological considerations for conducting dietary surveys in Aboriginal communities including: the importance of community involvement, understanding local customs and food habits, working with local interviewers, logistical issues, and aspects of research design. These suggested approaches address important considerations for collecting data in Aboriginal communities. They also highlighted the difficulty in using traditional sampling techniques and suggested that successful surveying of Aboriginal groups requires less vigorous sampling methods and greater effort towards building relationships between the researchers and the community. Wein (1995) has discussed issues in evaluating food use in Aboriginal populations. Regardless of the method of dietary assessment, consultation with Aboriginal community leaders is vital to successful research planning and implementation. Clearly emphasized in Wein’s (1995) paper was the importance of time to develop mutual respect and foster a collaborative effort.

2.1.5 *What is the prevalence of food insecurity?*

Until recently, data on food insecurity in Aboriginal Canadians were limited. Information on food insecurity from the Canadian National Population Health Survey (1998/1999) only included Aboriginal people living off-reserve, which excluded many remote Aboriginal communities. Those numbers alone were alarming; 27% of off-reserve Aboriginal households were food insecure and 24% had a compromised diet (reduced quality and/or quantity) compared to 10% and 8.4%, respectively, across the rest of Canada (Che & Chen, 2001). Results from the 1994 National Longitudinal Survey of Children and Youth found that families of Canada's hungry children were more than four times more likely to represent people of Aboriginal descent living off-reserve (data for Northwest Territories and the Yukon Territory were not included) (McIntyre et al., 2000). Figures from the 2000/2001 Canadian Community Health Survey, Cycle 1.1 (CCHS 1.1) appeared to provide the most comprehensive information on levels of food insecurity in Aboriginal peoples. Data were collected from across Canada and included Nunavut, the Northwest Territories, and the Yukon. Results of the CCHS 1.1 showed that food insecurity was closely tied to geography, as people living in the territories appeared especially vulnerable. Over half of the population of Nunavut (56%) reported food insecurity and rates in the Northwest Territories (28%) and the Yukon (21%) were also well above the national level of 14.7% (Ledrou & Gervais, 2005). Of the Aboriginal households surveyed, only 60.8% reported always having enough of the kinds of foods they wanted; 57.6% of the households with children (Health Canada, 2007). The CCHS 1.1 may have underestimated the prevalence of food insecurity in the territories and Canada as a whole because it did not cover Aboriginal people living on reserve (Ledrou & Gervais, 2005).

Up until 2010, what we knew of food security in on-reserve Aboriginal people was gathered from a few studies in discrete isolated Aboriginal communities. These had shown high prevalence of food insecurity, from 40% to 83% (Boult, 2004; INAC, 2003; 2004a; 2004b). For example, a pilot program for Inuit in the remote northern community of Kugaaruk found that 5 out of 6 (83%) households in the community were food insecure and more than half of the families had experienced hunger in the past year (Boult, 2004). Comparing the prevalence of food insecurity across these studies was problematic as measurement tools and analytical categories varied. However, the formal adoption of the 18-item HFSSM into the Canadian monitoring system (Health Canada, 2007) now allows for direct comparisons to be made in future studies at the community and population level as long as the analytical techniques and categories used are equivalent.

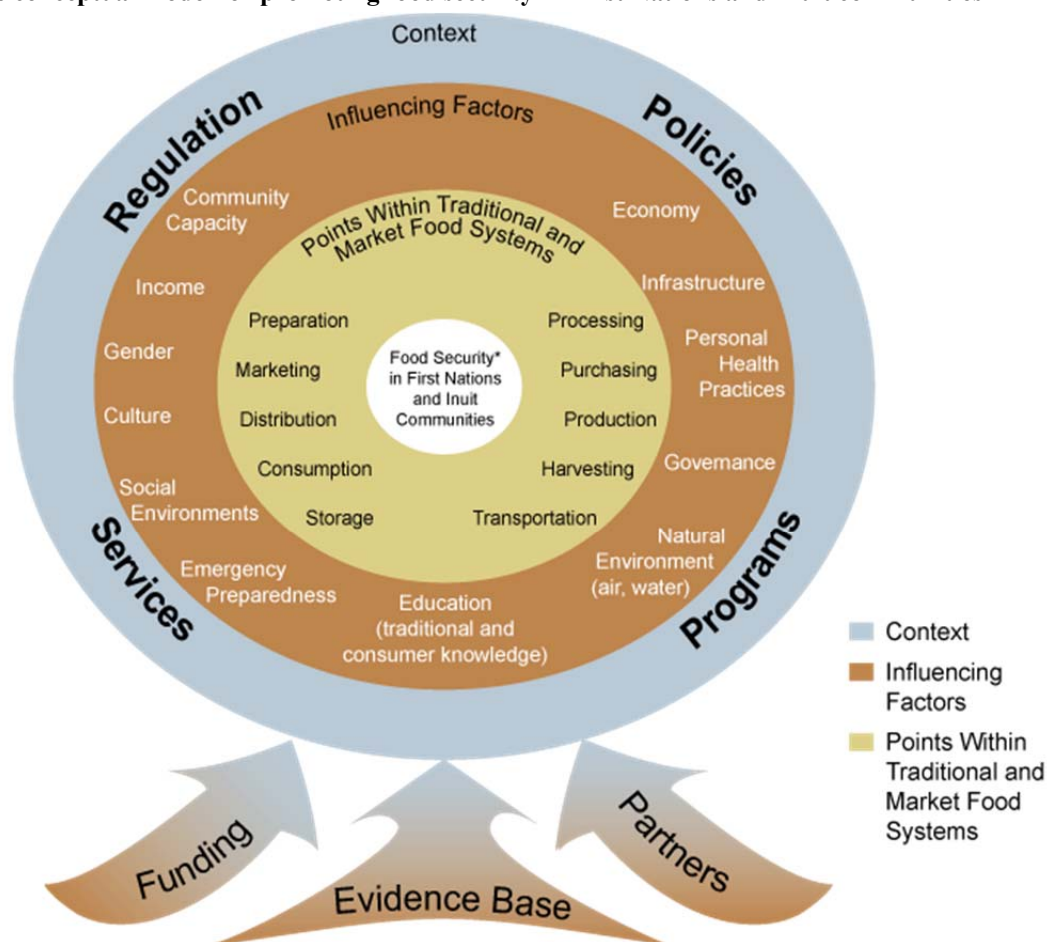
New data has been published in the past few years that provide a more complete picture of food insecurity for Aboriginal people in Canada. Data from the Inuit Health Survey found the prevalence of household food insecurity from 36 Arctic communities to be 43% to 69% depending on region (Rosol et al., 2011), with nearly 70% of Inuit pre-schoolers residing in households rated as food insecure (Egeland et al., 2010). Results from the First Nations Regional Health Survey Phase 2 (2008/2010) (RHS), using an abridged version of the HFSSM, found over half (54.2%) of all households were food insecure (FNIGC, 2012). Three of four households (75%) were found to be food insecure from a study of 14 communities in northern Manitoba (Thompson et al., 2012). Forthcoming data expected to emerge from the First Nations Food, Nutrition, and Environment Study (FNFNES) will greatly add to the knowledge of food insecurity prevalence and attributes for FN people across the country (FNFNES, 2012).

2.2 Conceptual Models for Food Security in Aboriginal Populations

In general, conceptualizations of food security have been developed without consideration for Canadian Aboriginal contexts (Power, 2008) and only three models have been proposed for food security that can be directly applied to northern Canadian Aboriginal populations (Assembly of First Nations, 2007; Duhaime & Godmaire, 2002; Food Security Reference Group, 2008; Ford, 2009). The model by Duhaime and Godmaire (2002) presents an “integrated conceptual framework for the study of the conditions for food security” intended for application to Arctic populations around the world. The Duhaime and Godmaire (2002) model is meant to be used as an analytical tool to examine the state of food security (Duhaime & Godmaire, 2003). More recently, two new models have been developed: one for promoting food security in First Nations and Inuit communities (Assembly of First Nations, 2007; Food Security Reference Group, 2008), and the other related to food security and climate change in Inuit populations (Ford, 2009).

The conceptual framework developed by the Food Security Reference Group (2008) (Figure 2.4) views food security in three parts: points of intervention within traditional and market food systems, factors influencing traditional and market food systems, and the broader context (programs, services, regulation, and policies) that can influence food security.

Figure 2.4: The conceptual model for promoting food security in First Nations and Inuit communities



* 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 an active and healthy life. (World Food Summit, 1996). This definition has unique considerations and implications for First Nations and Inuit.

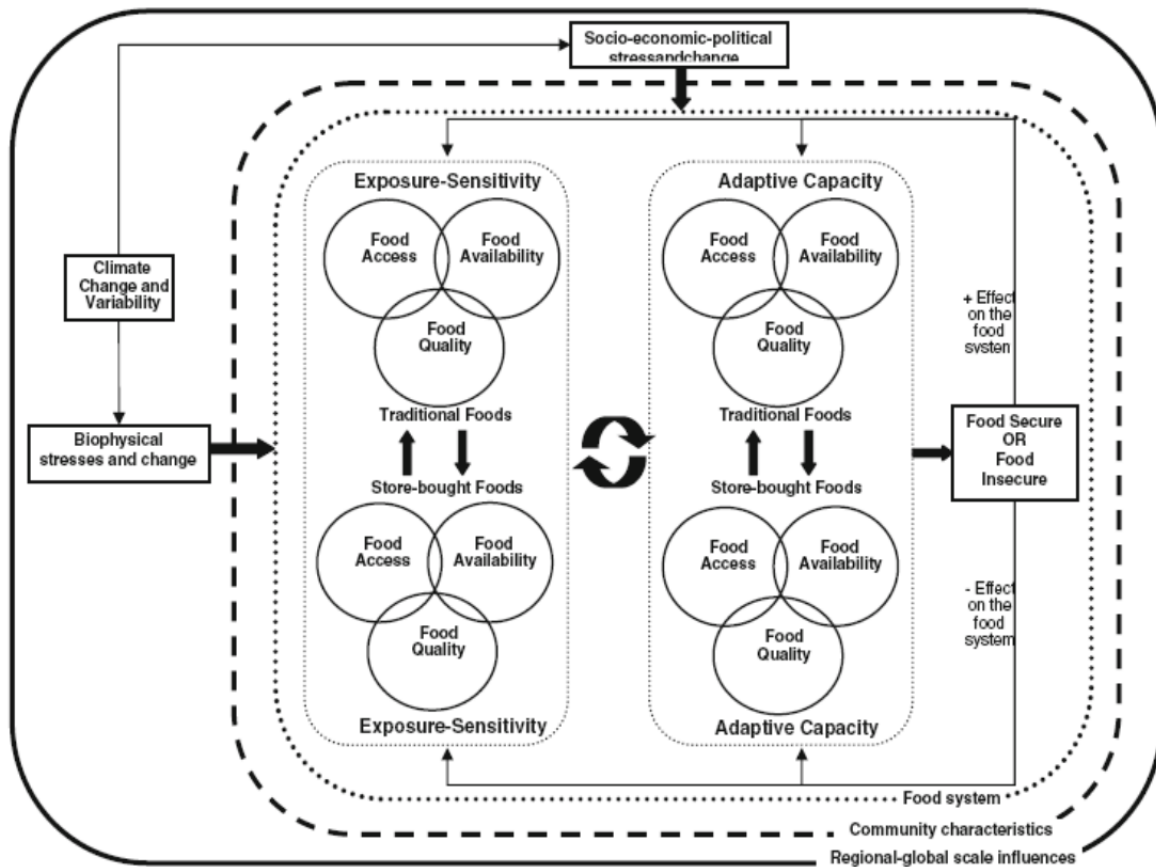
The “points of intervention within traditional and market food systems” sphere included entry points in the traditional and market food systems where an intervention to promote food security might take place. The “factors influencing traditional and market food systems” sphere highlights which factors can play a key role in influencing food security for FN and Inuit communities. Funding, partnerships and evidence are inputs that facilitate the planning and development of interventions (Food Security Reference Group, 2008).

The Food Security Reference Group (2008) was established bringing together the federal government (Health Canada’s First Nations and Inuit Health Branch, the Public Health Agency of Canada and INAC), Inuit Tapiriit Kanatami and the Assembly of First Nations to share

information, discuss strategies and opportunities, and set priorities for action, with a view to helping focus collective efforts towards improved food security for FN and Inuit. Their recent efforts resulted in the drafted conceptual model for food security in FN and Inuit communities (Figure 2.4). They are currently informing the development of point interventions to address food security issues in FN communities (Assembly of First Nations, 2007). For example, one option is the development of food cooperatives to provide a safer and more affordable supply of nutritious foods in FN communities. The Food Security Reference Group could be considered an advocate for food security strategies in remote FN communities. This model identifies points where there may be opportunities to promote food security in FN and Inuit communities.

Similarly, Ford's (2009) model (Figure 2.5) identifies entry points for influencing the food system. Ford's model suggests that understanding the processes and pathways within this model are essential for determining entry points for policy to strengthen food systems in this context. Figure 2.5 exhibits the conceptual model developed by Ford (2009) to examine the vulnerability of Inuit food systems to food insecurity as a result of climate change.

Figure 2.5: A vulnerability-based model for assessing potential implications of climate change for food security for Inuit communities in Canada



Source: Ford (2009)

Ford's (2009) model highlights the vulnerability of northern food systems to influences that are external or internal to a community. It also illustrates that the vulnerability of a community's food system is determined by its exposure and sensitivity to influences and its adaptive capacity to deal with those risks. The interdependence displayed between the access, availability, and quality of traditional foods and store-bought foods is what makes this model relevant and directly applicable to northern Aboriginal communities. Even if the effect of climate change was removed from this model or replaced by an alternate external driver(s), it still demonstrates the unique nature and characteristics of northern food systems.

2.3 Vulnerability and Adaptive Capacity of Aboriginal Populations

Aboriginal people in Canada have been recognized as a vulnerable population. Historically, they have suffered from social, cultural, and economic marginalization which has led to a disproportionate burden of disease and illness compared to other Canadians (MacMillan, MacMillan, Offord, & Dingle, 1996; Waldram, Herring, & Young, 1998). Many of the social, economic and political changes that are taking place in northern communities are linked to or compounded by environmental change (SydneySmith, Andrachuck, Smit, & Hovelsrud, 2010).

Aboriginal populations living in northern communities are increasingly vulnerable to the transformation of local culture and society, including the erosion of indigenous language and traditional ecological knowledge, as well as a significant shift from a primarily subsistence way of life (SydneySmith et al., 2010). SydneySmith and colleagues describe four broad “vulnerability contexts”, which are: local culture and society; subsistence-related livelihoods; market-related enterprises; and community infrastructure. These contexts are a reflection of patterns or similarities in types of exposure-sensitivities and lead to a host of adaptive strategies employed by communities. While all four vulnerability contexts could be related to food security, “subsistence-related livelihoods” is the most directly applicable context. The attributes of subsistence-related livelihoods include communities where harvesting for consumption is important for households and livelihoods and have implications for income, food security, and culture (SydneySmith et al., 2010).

2.4 Strategies for Promoting Food Security in Remote First Nations Communities

Canada’s Action Plan for Food Security (Agriculture and Agri-Food Canada, 1998) was launched in response to the World Food Summit to provide a framework for working towards food security domestically and internationally. One of the ten priorities outlined in the action

plan specifically acknowledged and supported the important role of traditional food acquisition methods of Aboriginal communities. Suggested actions to strengthen food access in these communities were the reduction of environmental contaminants, sustainable management of resources (including fisheries), and appropriate supplementation with high-quality commercial foods (Agriculture and Agri-Food Canada, 1998). However, it appeared that most initiatives undertaken by Canadian federal, provincial and territorial governments to improve food security had either not pertained to Aboriginal communities or had failed to have an effect in this population. Canada's fourth progress report on food security listed 48 governmental initiatives, of which only 10 applied to Aboriginal populations (Agriculture and Agri-food Canada, 2006). Of those 10, two federal initiatives, the National Child Benefit (NCB) and the Food Mail Program (now Nutrition North Canada), were likely to result in the greatest impact of initiatives due to their extensive reach (i.e., the NCB reached approximately 600 First Nations communities; the Food Mail Program reached approximately 60 isolated northern communities and 46,000 people; 84 northern communities are eligible for full subsidy with the new Nutrition North Canada program) and their ability to address key factors (i.e., income and food supply/food costs) affecting food security in remote First Nations communities (Government of Canada, 2012; INAC, 2003; INAC, 2005c; Northern Food Prices Project Steering Committee, 2003).

The National Child Benefit initiative is a partnership among the federal, provincial and territorial governments and First Nations that aims to help prevent and reduce the depth of child poverty, support parents as they move into the labour market and reduce overlap and duplication of government programs. It combines two key elements: monthly payments to low-income families with children, and benefits and services designed and delivered by the provinces and

territories to meet the needs of families with children in each jurisdiction (INAC, 2005c). The Food Mail Program pays part of the cost of shipping nutritious perishable food and other essential items by air to remote northern communities (INAC, 2002; 2006).

Unfortunately, both of these initiatives have been criticized for their inability to fully accomplish their aims (Boult, 2004; Dietitians of Canada, 2005; Dietitians of Canada, 2007; Lyall, 2004; Northern Food Prices Project Steering Committee, 2003). Many provinces and territories recover the National Child Benefit supplement from families receiving social assistance (Canadian Association of Food Banks, 2004), penalizing the households that the supplement intends to support. Even with the Food Mail Program subsidy, the cost of market food was incredibly high in remote communities and may not have translated into food security. Older price surveys of a weekly food basket for a family of four suggested that the revised northern food basket cost about twice as much in remote northern communities than southern (e.g., in 2008, the food basket cost was \$412 in Fort Albany, ON and only \$212 in Ottawa, ON) (Aboriginal Affairs and Northern Development, 2010). Note that some community retailers at that time did not participate in the Food Mail Program, including Fort Albany. Food shipping companies, and not the retail outlets operating in northern communities, applied for the subsidy (Boult, 2004; Lyall, 2004). Extensive paperwork and the need for a credit card limited the number of people who could access the program (Boult, 2004). Wholesalers and retailers in Manitoba indicated that Food Mail restrictions (e.g. perishable foods that are subsidized must be shipped separately from ineligible foods and non-perishables) made using the program complicated and logistically difficult (Lyall, 2004). Other factors may increase retail food costs, such as lack of competition (Boult, 2004; Thompson et al., 2012); higher building and utility costs; higher rates of spoilage due to transportation difficulties during delivery; or failed heating

or refrigeration equipment (Lyall, 2004; Socha et al., 2011). The Food Mail Program also had no effect on the quality, variety, and availability of foods (Power, 2007) and did not regularly monitor the prices of products it subsidized (Boult, 2004). A higher number of grocery stores in a community may provide increased competition with improved pricing and quality for consumers (Thompson et al., 2012). A food pricing study of 353 food and household items from a Northern Store in a northern Ontario community did not find a difference in price ratio between perishable and non-perishable goods (Socha et al., 2011). Yet they did find higher price ratios for items weighing more than 1Kg, fruits and vegetables, and liquid items. It was also noted that these three variables explained only a small proportion of variation in price ratio, and that other factors, such as the shorter shelf life of fruits and vegetables and the expense of shipping heavier items, contributed to the variability (Socha et al., 2011).

A new program called Nutrition North Canada (NNC) was launched in April 2011 to replace and improve upon the Food Mail Program. The main premise of NNC is the same as the Food Mail Program, to provide subsidization for perishable healthy foods and increase access to these foods as well as necessary household items for isolated northern communities. In addition, the NNC subsidizes country (or traditional) foods that have been commercially-processed in the North and communities eligible for the full NNC subsidy also qualify for funding for culturally-appropriate nutrition education and health promotion initiatives (Government of Canada, 2012). The NNC subsidy is provided directly to retailers, suppliers, and country food processors that apply for and register with the program. Retailers are required to sign funding agreements to pass on the subsidy to customers when they purchase eligible food items. Registered southern suppliers must also pass on the subsidy to individuals and social institutions, such as schools, when they place direct orders (Government of Canada, 2012). It is promising that the new NNC

program recognizes that traditional foods are an important source of nutrients and support the role that these foods play in the diet of northern populations. Under NNC, 84 northern communities are eligible for a full subsidy, while 19 are eligible for a partial subsidy. There are two levels of the subsidy: a higher amount (level 1) applies to the most nutritious perishable foods and a lower amount (level 2) applies to other nutritious perishable foods, to non-perishable foods and to non-food items. Examples of foods qualifying for the higher subsidy level are fresh or frozen fruit and vegetables, milk, and eggs. The amount of the full subsidy for store-bought items at each level are dependent on the remoteness of the community and the subsidy ranges are \$1.20/kg-\$16.00/kg for level 1 items and \$0.05/kg-\$14.20/kg for level 2 items. Rates are \$0.05/kg for both levels 1 and 2 for communities who are only eligible for partial subsidy. There are currently only three country food processing facilities that meet the NNC program requirements and all are situated in Nunavut (Government of Canada, 2012).

As of March 2012, reports on the cost of the Revised Northern Food Basket (RNFB) are published online quarterly for each community eligible for NNC. Data from the Food Mail Program from March 2011 are included to allow for comparison to the prices of the RNFB following the implementation of the new NNC subsidies. For example, the cost of the RNFB for one week for a family of four living in Fort Albany was \$465.21 in March 2011 under the Food Mail Program and decreased by \$37 to \$432.29 in March 2012 under NNC (Government of Canada, 2012). Projecting those calculations over the course of a year would equate to reduced food costs of approximately \$1924. However, it must be noted that the period of April 2011 when the NNC program was launched until October 1, 2012 was considered a transitional period from the Food Mail Program whereby the list of subsidized items remained more expansive with the inclusion of non-perishable and non-food items to ensure a smooth transition between

programs. Some specific food items were also moved from a high to low level of subsidy. As of October 2012, a number of non-perishable food items included in the RNFB were no longer subsidized by NNC (Government of Canada, 2012). Data collected after this date have not yet been posted online and it remains to be seen whether the new NNC program will continue to report a significant reduction in food costs for eligible northern communities. Another aspect of the store-bought food system where NNC does not have control is the quality of the subsidized food items that are transported to northern stores. Irrespective of whether a fresh fruit or vegetable is highly subsidized, it may have become bruised or kept at inappropriate temperatures during transport, resulting in reduced quality, and is not palatable for consumers. Costs of the entire National Nutritious Food Basket list were found to be 38% higher for fly-in communities, and 79% higher for fruits and vegetables, on average, than northern communities connected by roads in Manitoba (Thompson et al., 2012). Community members in northern Manitoba surmised that the Nutrition North Canada subsidy was not being passed on to consumers.

According to a scan of food security related policies in Canada (Epp, 2009), provincial approaches to food security also appeared to be inadequate to meet the need for food security policy and program development in northern Canada. For example, there were no significant health related food programs in the Territories. In this report, Manitoba was highlighted as a leader in addressing northern food security issues through its Northern Healthy Foods Initiative (NHFI). What began as a pilot project in a few communities, as of 2009 the NHFI had expanded to 28 northern communities, with an annual budget of \$600,000, the initiation of 400 vegetable gardens, and the building of eight greenhouses. Remote Manitoban communities had also initiated freezer programs, which helped with food preservation and enabled residents to store harvested food or to buy food in bulk quantities (Epp, 2009). Community freezers are specific to

Aboriginal communities. They are a form of food sharing network strategy to enable food insecure individuals living remotely or on reserves to store and have year-round access to traditional foods (Willows, 2005a).

Charitable food distribution and community-based responses to food insecurity exist to fill the need where broader responses (e.g., policy or system level responses) fall short. These include a variety of initiatives: food banks, food co-operatives, good food boxes, community kitchens, community freezers, school food programs, community gardens and greenhouses (Boult, 2004; Dietitians of Canada, 2005; Thompson et al., 2011; Thompson et al., 2012). For example, the Northern Healthy Foods Initiative community freezer program in northern Manitoba enabled community residents to preserve local and seasonally produced and harvested vegetables, berries, wild meat and fish, importantly increasing the ability to store traditional foods (Thompson et al., 2011). However, the food must be available to stock the freezers with traditional food and without hunter support, going out on the land remains too expensive for many FN people (Spiegelaar & Tsuji, in press; Thompson et al., 2011).

This thesis focuses on two of these potential initiatives that have the potential to affect food security in Fort Albany: an established school snack and breakfast program and a new greenhouse and gardening project. Therefore, the remainder of this literature review covers information on school nutrition programs and greenhouse/gardening initiatives.

2.4.1 *School Nutrition Programs*

Among possible avenues for promoting food security are school nutrition policies and programs (Lyons, 2008). Evidence of the association between healthy eating and school academic performance in non-Aboriginal students has influenced many schools to play a larger role in improving the nutritional status of their students (Florence, Asbridge, & Veugelers, 2008;

Papamandjaris, 2000). Access to nutritious food during school hours can contribute to both the quality and quantity of dietary intake for school-aged children (Chao & Vanderkooy, 1989). School food programs are often believed to enhance the cognitive functioning of children (Hoyland, Dye, & Lawton, 2009). A systematic review of the effect of breakfast on the cognitive performance of children and adolescents found that 11 of 13 studies showed positive effects from the provision of breakfast at school (Hoyland, Dye, & Lawton, 2009). Positive effects included: improved memory (Cueto & Chinen, 2008; Vera Noriega et al., 2000), improved concentration (Shemilt et al., 2004), higher scores on spatial cognitive tests (Worobey & Worobey, 1999), and higher mathematics and arithmetic scores (Cueto & Chinen, 2008). School breakfast programs were also associated with increased attendance (or decreased absenteeism), which may be a possible explanation for the improved scholastic achievement (Hoyland, Dye, & Lawton, 2009). School breakfast programs (SBP) have been found to help students build good eating habits, consume a better overall diet, consume a lower percentage of calories from fat, were less likely to have a low intake of magnesium, reduced the probability of micronutrient deficiencies for vitamin C, vitamin E, and folate, and increased the probability that students met the recommendations for potassium and iron intakes (Bhattacharya, Currie, & Haider, 2004). For every outcome examined, SBP availability either promoted better outcomes or at the least, did not promote worse outcomes. The results of this study suggested that the availability of an SBP had beneficial effects for children. In one study of pre-school children, not eating breakfast every day nearly doubled the odds of being overweight (Dubois, Girard, Potvin, & Kent, 2006).

Schools are an ideal setting for promoting healthy eating. Eating habits start during childhood and can be influenced by a healthy school food environment. School breakfast and snack programs can provide nutritionally balanced, free meals to students each school day. This is

especially important in remote northern communities like Fort Albany where fresh produce and other nutritious perishable foods are generally either not available or extremely expensive (Wein, 1994a; Willows, 2005a). School snack and breakfast programs have been suggested as viable actions to combat food insecurity in Aboriginal populations (Lyons, 2008; Gates, Hanning, Gates, McCarthy, & Tsuji, 2012; Gates, Hanning, Gates, McCarthy, & Tsuji, 2013; Hanning, Skinner, Gates, Gates, & Tsuji, 2011; Northern Territory Government, 2002; Rideout, 2005). School nutrition programs in Aboriginal communities have contributed substantially to calcium, fiber, protein, phosphorus, vitamin A, vitamin D, vitamin C and vitamin B12 intakes in students (Gates et al., 2011; Gates et al., 2012; Gates et al., 2013; Lytle et al., 2002; Wein, Gee, & Hawrysh, 1992; Saksvig et al., 2005).

The Centers for Disease Control and Prevention (CDC) suggested that effective school-based health and nutrition interventions must be comprehensive and include classroom lessons, access to healthy foods, and children having support from others (e.g., peers, teachers, etc.) (Centres for Disease Control [CDC], 1996). The CDC guidelines (1996) and other literature sources (American Dietetic Association [ADA], 2006; Brant County Health Unit, 2005; FRESH, 2008; Jeffery & Leo, 2008; OSNPPH, 2004; Perez-Rodrigo & Aranceta, 2001; 2003; Taylor, Evers, & McKenna, 2005; Veugelers & Fitzgerald, 2005; WHO, 2008) suggested the following components for successful school-based health and nutrition programs: nutrition policy implementation including a supportive school environment; curriculum for nutrition education; the integration of healthy school food service; training for teachers and staff (for nutrition curriculum and to serve as role models); family and community involvement in supporting and reinforcing nutrition education; and program evaluation.

An environmental scan of nutrition programs and policies in First Nations schools (Lyons, 2008) identified five key findings that were integral components to the development of a National First Nations School Nutrition Strategy. These five components were as follows: community at its core, a wholistic approach, supporting nutritious and universal school nutrition programs, funding for success, and sharing knowledge (Lyons, 2008). As part of this environmental scan, a survey was developed to gather information relating to the presence of school food programs and policies in Canadian First Nations communities. All 633 First Nations communities in Canada were contacted and the scan had a response rate of 48% (303 communities). Respondents represented all provinces and territories except for Nunavut and 76% of respondents were from on-reserve communities (Lyons, 2008). Of the respondents, 86% indicated they had a school nutrition program (breakfast, lunch, and/or snack, with most of them [74%] offered every school day) and 63% reported the existence of a school nutrition policy (Lyons, 2008). The scan also found that half of the respondents with a school nutrition program expressed a need to improve or expand their existing program, and almost all of those without a current program were interested in implementing one. Lack of funding was cited as the main barrier to implementing school nutrition programs in these communities (Lyons, 2008) and other communities (Hanning et al., 2011). In addition to requiring sufficient and sustained funding, limitations of programmatic approaches included consistent personnel (paid or volunteer) to run programs (Hanning et al., 2011). Unfortunately, the content, scope, and strength of the school nutrition programs and policies were not assessed by this scan. Research is necessary to capture the nature and impact, especially with respect to nutritional adequacy, of First Nations school nutrition programs in Canada. Sharing and exchanging knowledge about existing programs

would help to direct improvements for those programs as well as providing valuable information for communities wanting to initiate programs (Hanning et al., 2011).

2.4.2 *Greenhouse and Gardening Projects*

Both community gardens and garden-based nutrition-education programs for school children are gaining in popularity and are viewed as promising strategies for increasing fruit and vegetable consumption (McCormack, Laska, Larson, & Story, 2010; Robinson-O'Brien, Story, & Heim, 2009) and improving food security (Wood, Swinburn, & Burns, 2003). The American Community Gardening Association (2009) estimated that there were more than 18,000 community gardens in the United States and Canada, often built on underutilized urban land. Some of the positive health benefits reported from community gardens included: improved access to food and better nutrition, increased physical activity, improved mental health, increased social capital and community cohesion, and opportunities for community development (Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007). However, Wakefield and colleagues (2007) suggested that much of the evidence used to support community gardens was anecdotal. Similarly, a review by McCormack and colleagues (2010) found there were few well-designed research studies evaluating the influence of community gardens on nutrition-related outcomes. The majority of studies had focused their research on the benefits of community gardening for community development (Alaimo, Packnett, Miles, & Kruger, 2008).

Throughout the United States, many youth garden education programs have been implemented to encourage increased intakes of vegetables and fruit (Robinson-O'Brien et al., 2009). Reports from these initiatives have pointed to other improvements (besides increased vegetable and fruit consumption) among youth participants, such as: environmental attitudes;

community spirit; social, leadership, and motor skills; self-confidence, volunteerism, scholastic achievement, and nutritional attitudes (Robinson-O'Brien et al., 2009).

During the design phase of the studies in this thesis, this researcher found only three published studies related to gardening initiatives with Aboriginal or Native North American groups (Lombard, Forster-Cox, Smeal, & O'Neill, 2006; Stroink & Nelson, 2009; Viola, 2006) and no published studies on gardening that occurred in a greenhouse setting. More recently, new papers have been published from the Northern Healthy Foods Initiative that report on gardening and greenhouses as part of provincial food security programming in northern Manitoba (Fieldhouse & Thompson, 2012; Thompson et al., 2011; Thompson et al., 2012). Lombard and colleagues (2006) wrote a paper where one of the objectives was to offer suggestions on the role that home and community gardening could play in diabetes reduction for Navajo natives in the United States. This paper was not a research study, but a "personal view" article. Their perspective was that due to the tradition of farming among Navajo people and the positive benefits reported by other gardening projects, gardening could be used as part of a multi-sectored approach in comprehensive diabetes prevention programs for Navajo people (Lombard et al., 2006). Stroink and Nelson (2009) evaluated the process and outcomes of the *Learning Garden* program which was implemented in two FN communities in northwestern Ontario. The *Learning Garden* program involved a series of workshops, designed and facilitated by community-based coordinators, with topics that included cultivated gardening and forest foods. Box gardens were established in each community to provide hands-on gardening experience. The researchers observed that some of the participants had an "Aboriginal worldview" of gardens and gardening. These gardeners planted in or near forested areas, planting was done in a spontaneous manner (compared to careful rows), and intervention (e.g., thinning of plants, regular watering) was

minimized throughout the growing season (Stroink & Nelson, 2009). The authors concluded by suggesting that including both traditional ways and western ways into the growing of food was necessary for gardening initiatives in Aboriginal communities. Viola (2006) evaluated the “Outreach School Garden Project”, which used school-based gardens as a nutrition education tool to incorporate nutrition into the school curriculum in two remote Indigenous school communities in Australia. The study found an increase in students’ knowledge and skills in nutrition and gardening as well as positive improvements in the physical and social environments at the schools. In the grey literature, information is available on community garden projects that are part of Manitoba’s Northern Healthy Foods Initiative (Bayline Regional Roundtable, 2005; Yonda, n.d.). The main objectives of this initiative were to increase healthy living, promote awareness of diabetes, and increase community involvement through gardening and related activities (Bayline Regional Roundtable, 2005). The project also intended to provide better access to healthy produce and reduce the overall cost of healthy eating in northern remote parts of Manitoba. For a number of communities in northern Manitoba, funding for rototillers, gardening tools, soil, and seeds was provided to support the initiation of gardening projects. Activities have been carried out to increase knowledge and skills related to growing and preserving (canning and freezing) produce that has been harvested (Bayline Regional Roundtable, 2005). Outcomes of the Manitoba Northern Healthy Foods Initiative included a continual increase of gardens, gardeners, and greenhouses over a three year period of the program and authors mention the establishment of greenhouse pilot projects in northern schools (Fieldhouse & Thompson, 2012). Thompson et al. (2012) found a significant positive relationship between food security and gardening, whereas there was not a significant relationship between food security and household hunting and fishing. The probability of having

household food security increased with how often individuals ate from their garden in communities where there was a country food program but no access by road or public transportation (Thompson et al., 2012).

For many northern communities, gardening without a greenhouse may be less feasible due to their climactic extremes, inadequate soil (or permafrost), and considerably shorter growing seasons, but this is changing with global warming (Spiegelhaar & Tsuji, in press). Likely the most famous northern greenhouse is in Inuvik, Northwest Territories. This greenhouse was converted from an old hockey arena in 1999 with funding from territorial and federal governments as well as private donors (Langston, n.d.). The main floor of the greenhouse has over 80 garden plots maintained by about 100 gardeners and there is a waiting list for people to obtain a spot. The growing season in the greenhouse is guaranteed to be from mid-May to the end of September compared to the variable outdoor growing season in Inuvik from mid-June to August. A range of positive outcomes have been reported as a result of the greenhouse, including: increased community beautification projects and civic pride, tourism, sense of community by local inhabitants and a focal point for community development, community outreach (e.g., a garden club for children), and increased food security (Dowd, 2008; Langston, n.d.; Lees & Redman, 2009; Mahoney, 2004). Some local community members even call the Inuvik greenhouse “a community wellness centre” (Langston, n.d.). In the Arctic of eastern Canada, residents of Iqualuit, Nunavut were inspired by the success of the Inuvik greenhouse to build their own community greenhouse called “Piruqsiavut” (Lees & Redman, 2009). The goal of the Iqualuit greenhouse is to show that it’s possible to eat locally and reduce the quantity of greenhouse gas emissions used to ship fresh produce to Iqualuit (“Iqualuit Greenhouse: an experiment in food security”, 2008). Members of the greenhouse are encouraged to grow vegetables instead of

flowers and all of the produce harvested from the greenhouse is weighed to prove how much food the greenhouse produces. As with the Inuvik greenhouse, community outreach is an important component of the project. Recipes, events, and volunteer opportunities are communicated through an online blog maintained by the Iqualuit Community Greenhouse Society (2009). They even host a competition at the end of the season (mid-September) called “The Great Greenhouse Grow-off” where gardeners can enter their harvest (or plot) in categories such as “the greatest produce-produced” (judged by weight) and the “best single vegetable” (Iqualuit Community Greenhouse Society, 2009).

A report by the Public Health Agency of Canada of promising practices of collaborative community planning initiatives related to the built environment to improve health outcomes profiled a case study of a school greenhouse in Newfoundland (Lees & Redman, 2009). The initial goal of the St. Francis School Greenhouse project was to encourage entrepreneurship using the greenhouse as a venue for a real business venture in the rural community of Harbour Grace, Newfoundland (Lees & Redman, 2009). Students from schools across the region participate in planting, harvesting, and preparing foods grown in the greenhouse. In addition to fulfilling the initial goal of the project, youth have become interested in healthy eating and the greenhouse has become an educational resource for the school and community (Lees & Redman, 2009). The key lesson learned from this project was the importance of partnerships with local health and educational organizations, especially linking with the Department of Education’s curriculum on healthy eating (Lees & Redman, 2009).

The focus of daily life for FN people living in remote communities has shifted from a more simple subsistence livelihood to a more complex dual food system with both traditional and market food. Traditional food harvesting and consumption has been decreasing over the past half

century, with a greater reliance on store bought food. However, the import system for store bought food is neither a viable nor sustainable strategy for addressing food security in remote communities as it will always be expensive and does not contribute to self-sufficiency nor broader food security constructs such as sustainable livelihoods and food sovereignty. Hunting, fishing, and gathering remain important to FN culture, health, and well-being and should continue to be supported by policies and programs. In addition, local food production is a possible strategy to reduce the reliance on imported food for northern populations. Gardening on the land and using greenhouses along with other agricultural activities and also supporting traditional food harvesting have been seen as important to promoting successful food systems and food security (Fieldhouse & Thompson, 2012).

2.5 Summary

This chapter has provided an overview of food security: what it is; why it is important; how it is measured; as well as the prevalence of and relationship to food insecurity in northern Aboriginal populations. It is apparent that food insecurity is a serious issue for Aboriginal populations in Canada, yet the severity of food insecurity has not been adequately measured in First Nations communities. Nor have appropriate (e.g., culturally) measurement tools been developed that acknowledge their unique food system. Conceptual models for food security in Aboriginal populations have been presented and two specific strategies to possibly combat food insecurity have been described in detail in this literature review: school nutrition programs and greenhouse/gardening projects. This background information and knowledge from Chapter 1 is intended to set the stage for the five studies included in this dissertation.

Chapter 3: METHODS

3.1 Population

3.1.1 *Fort Albany First Nation*

Fort Albany FN, Ontario, Canada is located on the west coast of James Bay, on the south bank of the Albany River with a population of approximately 850 people. Fort Albany is geographically remote (52° 15' N; 81° 35' W) and only accessible by airplane year-round. There is access by a snow/ice road (i.e., winter road) for approximately 6-8 weeks in the winter and by boat or barge during the ice-free season (INAC, 2006). The winter road connects Fort Albany to nearby northern Ontario communities; Kashechewan and Attawapiskat to the north and Moosonee/Moose Factory to the south. The community is governed by the Muskegowuk Tribal Council. The native language of these people is Cree and there is one school (Peetabeck Academy) in the community with students from kindergarten to grade 12.

There are no data available for Fort Albany from the 2006 Census and only a small amount of specific information available from the 2011 Census, therefore, data from the 2001 Census are also cited. Fort Albany has a young population; 33% of the Fort Albany population was less than 15 years of age according to 2011 Canadian census data, nearly double compared to the Ontario population (17%) in the same age range (Statistics Canada, 2012). According to Statistics Canada (2001) and the information available from their FN Profile (INAC, 2008) on Fort Albany, residents in the community had only a 43% employment rate, 57% of adults had not obtained a high school graduation certificate, the average total income (of all persons with income) was \$17, 473, and 40% of households were lone parent families. In 2001, 65% of the homes required major repair and 27% minor repair, which left only 8% of the dwellings needing no repair (INAC, 2008). Fort Albany's score on the First Nations Community Well-being Index

(CWB) was 59 (of a possible high score of 100), compared to the FN average score of 68. The non-FN average score on the CWB was 85 (INAC, 2008). The CWB was developed by the Department of Indian and Northern Affairs Canada and uses data from the 2001 census to assess and compare socioeconomic well-being between FN and non-FN communities based on four indicators: education, labour force activity, income, and housing (McHardy & O’Sullivan, 2004; O’Sullivan & McHardy, 2004).

At the time of these studies, the community of Fort Albany had one grocery store, which was the major supplier of food, and two small convenience stores. Community members participated in traditional hunting and fishing activities, however, availability and consumption of traditional foods from these endeavors were seasonal, varied in abundance from year-to-year, and were limited by individual means (e.g., financial constraints for travel to hunting sites). The main traditional foods consumed included: moose, deer, geese (Canada, snow/wavy), goose eggs, duck (teal, mallard, pintail, black), duck eggs, fish (bass, Brook trout, Lake trout, pike, pickerel, whitefish), rabbit/hare, tea blos (prepared by mixing steeped tea, lard/shortening/goose grease, flour, sugar), berries, and bannock.

3.1.2 *Remoteness*

This thesis uses the definition of geographic remoteness, including “special access” from INAC which states that “remote is a zone where a First Nation is located over 350 km from the nearest service centre having year-round road access” and “special access is a zone where a First Nation has no year-round road access to a service centre and, as a result, experiences a higher cost of transportation” (INAC, 2005a). From the 2006 Census, 43% of FN people lived in on-reserve communities and 21% of FN people lived on reserves located in remote or special access

locations (INAC, 2005a). Fort Albany is considered a geographically remote community with special access.

3.2 Past and Ongoing Research

A community-university partnership had been built since 2003 between Fort Albany members and this researcher. The initial interest in assessing the lifestyle behaviours of Fort Albany youth was community-driven and arose out of concerns about rising rates of overweight, obesity, and type 2 diabetes. Specifically, past research by this researcher and her colleagues has been to describe: the food and nutrient intakes (including traditional food intake; based on food frequency questions and 24-hour dietary recall), physical activity (7-day recall and Physical Activity Questionnaire for Children (PAQ-C)), food-related behaviours, knowledge and intentions for food behaviour change, and concerns about environmental contaminants in FN school children in grades 6 to 12 along the west coast of James Bay (Hlimi et al., 2012; Skinner et al., 2006; Sutherland, Skinner, Hanning, Montgomery, & Tsuji, 2007). For the studies regarding nutrition and physical activity assessment among youth, a unique web-based survey tool that captures these lifestyle behaviours (Hanning et al., 2009; Hanning et al., 2007; Minaker et al., 2006; Storey et al., 2009a; 2009b), was developed at the University of Waterloo, and adapted for FN students through previous quantitative and qualitative research in Fort Albany and other FN communities. Data from the initial assessments of nutrition and physical activity drove the agenda and led to further work to explore the barriers to and supports for healthy eating and physical activity in the community (Skinner et al., 2006) and to identify community-informed strategies to address concerns (Skinner, Hanning, Sutherland, Edwards-Wheesk, & Tsuji, 2012a). Food insecurity and empowerment were two themes that emerged from some of

the earlier studies (Skinner et al., 2006; Skinner et al., 2012a) and became a topic area that Fort Albany community members and this researcher hoped to further understand.

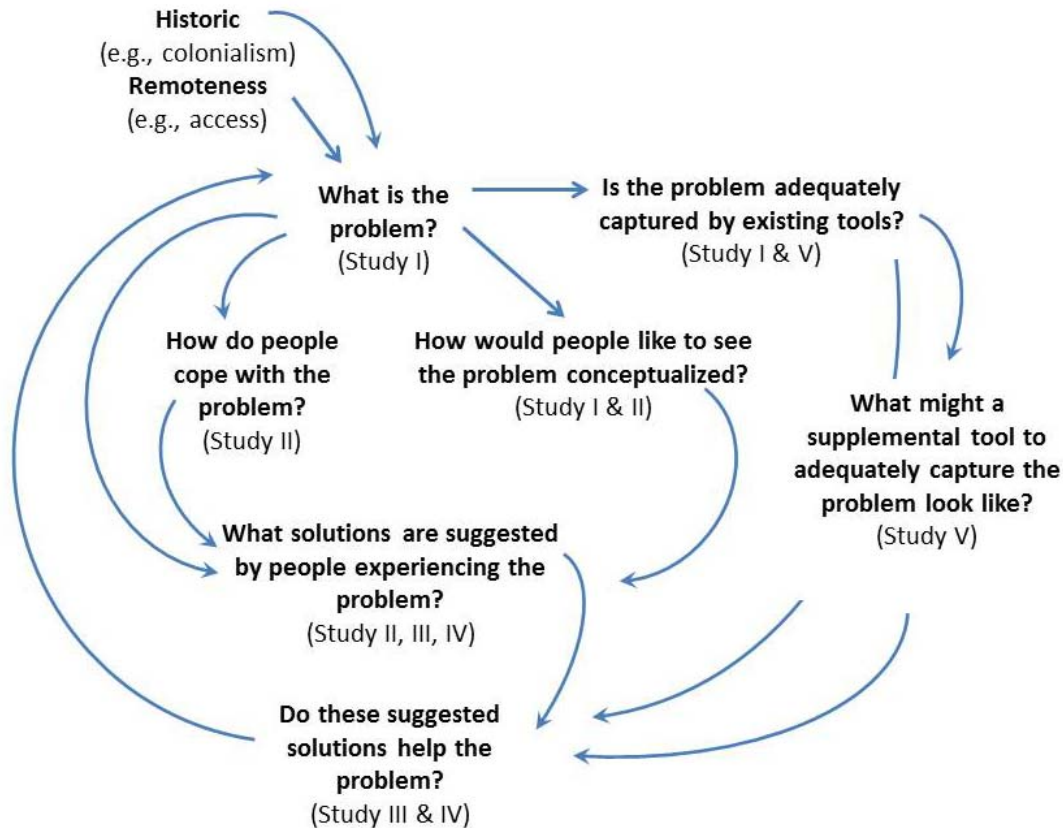
Food insecurity and its related factors can be a sensitive topic for discussion and qualitative research with FN people requires an understanding of the context in which they live. Therefore, it is important to explain this researcher's previous experience with the community of Fort Albany and the trusting relationship that has been built with the people living there. This researcher has been working with the people in the community of Fort Albany on nutrition issues since 2003. She has traveled to the community many times during the past 10 years and keeps in contact with a number people in the community via telephone, social media (e.g., Facebook) and email in the interim. She has developed sensitivity to the unique culture of FN people and has built relationships of mutual trust with Band council members, local health agencies, school officials, and many community members. She has engaged in many projects with people in the community of Fort Albany, including: the assessment of nutrition and physical activity behaviours with local youth; expansion and enhancement of the school snack program; offering training workshops for writing grant proposals (n=3); and the assessment of household food security status and related issues and perspectives.

3.3 A Holistic Perspective

This thesis was based on a holistic perspective that integrated the relationships about the problem of food insecurity in Fort Albany across the five studies (see Figure 3.1). This allowed for a more comprehensive approach to studying food security in the remote community Fort Albany First Nation including assessment of prevalence and severity, relevance of current monitoring instruments, coping mechanisms, suggestions for community initiatives, assessing

the impact and implementation of existing and new strategies, and the development of a culturally appropriate measurement tool.

Figure 3.1: A holistic perspective of food insecurity in Fort Albany



3.4 Methods

This section provides an overview of the study methods that were used in each of the studies. Therefore, the rest of this chapter is organized by each individual study. Details about the community advisory committee, community research assistants, participant recruitment, consent procedures, data collection tools, data collection methods, and data analysis are included.

3.5 Community Advisory Committee(s)

Participatory approaches require time to build a trusting relationship between academic researchers and the communities that they are collaborating with and these relationships are critical to ensuring that the principles of ownership, control, access, and possession are respected and carried out (Macauley et al., 1998; Schnarch, 2004). Although a trusting relationship between this researcher, her colleagues and members/organizations in the community had been previously established, the specific formation of community advisory committees was critical to creating a participatory environment between community members and researchers. The projects related to the studies in this thesis were a collaborative effort involving a number of local stakeholder organizations in Fort Albany: Band Council (elected First Nations governing body), Mundo Peetabek Education Authority (local education officials), Peetabek Academy (principals, teachers, director of the school snack/breakfast program and students at the school), and Peetabek Health Services (health care workers); many were parents and all were members of the community at large. Representatives from these groups formed our project advisory committees and were chosen based on their expertise and interest in participating in these studies. Usually the community advisory committee for a project consisted of five or six people and often these people overlapped on committees for more than one project, depending on the focus of the research. Members of the Fort Albany advisory groups were involved in the design of data collection tools (e.g., focus group probes, web-survey questions), provided input on the cultural sensitivity of study methodologies, assisted in collecting data, provided input on the interpretation of results, assisted with dissemination of results, and setting the stage for the relevance of the work and uptake of the results. Data collection methods were tailored to be culturally appropriate (e.g., verbal consent instead of written consent, interviews occurring

during a shared meal for the greenhouse study) (Hudson & Taylor-Henley, 2001). Community feedback was provided in the form of community presentations, school feedback reports following web-survey data collection with youth, and community newsletters.

3.6 Community Assistants

In the past, our research team has employed First Nations community members and trained them in study design methodology, as well as provided hands-on experience in project planning, proper protocol for collection of data, and questionnaire administration/semi-directive interviews. For Studies I (HFSSM), II (food security interviews), and IV (greenhouse project), local community assistants from Fort Albany were hired to collect data. This researcher or one of her colleagues were in regular contact with the community assistants either in-person, by telephone, or by email to discuss progress on data collection and to answer any questions that came up related to the data collection. The data collected (e.g., HFSSM surveys, interview transcripts, and digital photographs) were periodically returned to this researcher in batches as they were completed by the community assistant(s). Data were checked for quality assurance when they were returned to the researchers. Any issues where data appeared to be missing or did not include enough detail were discussed with the community assistant(s) and clarified.

In the case of Studies I and II, one community assistant conducted the data collection. This particular community assistant had been employed by our research team in the past and trained in proper protocols for data collection, including the administration of surveys and conducting interviews. The community assistant also speaks Cree, which was helpful if any of the participants requested Cree translation. The community assistant was trained to administer the HFSSM according to the guidelines outlined by Bickel and colleagues (Bickel, Nord, Price, Hamilton, & Cook, 2000). Specifically, a member of the research team went through the HFSSM

with the community research assistant, question by question, to ensure that the intent of the questions were clear. The community assistant had stature in the community and was respected by community members which was very important to his ability to discuss sensitive topics, like food security, with participants.

For Study IV (greenhouse case study), the Director of the school snack / breakfast program, Joan Metatawabin, was the community investigator overseeing the data collection for the greenhouse case study. She had been a consistent member of advisory committees and also been employed by our research team in the past and trained in proper protocols for data collection. Moreover, she has been a well-respected member of the community for many decades which facilitated her effectiveness leading the implementation of the greenhouse and in collecting data.

3.7 Study I

Study I had two primary objectives: (1) to measure the prevalence and severity of household food insecurity in Fort Albany, Ontario using the Household Food Security Survey Module (HFSSM), and (2) to evaluate the perceived relevance of the HFSSM as a tool for assessing food insecurity of on-reserve FN households using input from a qualitative question with participants completing the HFSSM.

3.7.1 *The Household Food Security Survey Module (HFSSM)*

As described by Health Canada (2007), “The HFSSM contains 18 questions about the food security situation in the household over the previous 12 months, ranging in severity from worrying about running out of food, to children not eating for a whole day. Ten of the 18 items are specific to the experiences of adults in the household or the household in general, while eight are specific to the experiences of children under the age of 18 years in the household. Each question specifies a lack of money or the ability to afford food as the reason for the condition or

behaviour.” The survey was designed to reduce respondent burden by using internal “screens” (see Appendix A) (Health Canada, 2007). Limitations of the HFSSM include: responses are self-reported; it cannot determine the food security status of each individual member living in a household; and it cannot be assumed that all members of a household are in the same food security situation. Each question on the HFSSM specifies a lack of money or the ability to afford food as the reason for potentially compromising eating patterns or food consumption; however, it was not designed to capture other possible reasons for compromised food consumption (e.g., voluntary dieting).

While this researcher decided to retain the integrity of the original HFSSM to assess the prevalence of household food insecurity in Fort Albany, the HFSSM was also reviewed by the community advisory committee during group meetings to identify any need for clarification of the instructions or content. Using the existing version of the HFSSM allowed for comparisons of the prevalence of food insecurity in this sample to CCHS data (Health Canada, 2007) and the Inuit Health Survey (Egeland et al., 2011).

3.7.2 Participant Recruitment, Consent, and Data Collection

One adult (male or female; ≥ 18 years) from each of the on-reserve homes in Fort Albany was approached in-person by the community research assistant to participate in the HFSSM. Selection of any member of the household reduced the burden of data collection procedures for the research assistant and helped to obtain a greater response rate. The CCHS Cycle 2.2 had a much more complex sampling strategy where base demographic data were obtained on all residents of selected households and one person aged 0 or above was randomly selected to participate in the complete survey, with parents responding for children under the age of 6 and with children from 6 to 11 years (Health Canada, 2007). These same individuals were asked to

participate in the qualitative interview questions for Study I, Objective #2 (relevance of the HFSSM) and for Study II (coping strategies for food insecurity) after they had completed the HFSSM. Participants were provided with an information/recruitment letter when they were approached (see Appendix B). The study was explained to them, the confidentiality of their participation and data assured, and they were invited to participate at a time and place convenient for them. Verbal consent was obtained from all participants, being culturally appropriate for this region and for this type of project (Skinner et al., 2006; Kirby, Levesque, Wabano, & Robinson-Wilson, 2007). Therefore a consent letter was not used. Since participation in the study was completely voluntary, participants could opt to refuse participation, decline to answer any of the questions during the questionnaire or interview and had the option to withdraw from the study at any time. Those who refused to participate were asked their reason(s) for refusing. Possible reasons for refusing to participate included: no interest in the survey, no time to participate, uncertainty about participating in research, not liking the questions, or the option to specify another reason. The HFSSM was administered in accordance with the guide for using this tool (Bickel et al., 2000). Demographic characteristics of the respondent and household were collected (e.g., gender, age range, employment status, number of people living in the household, how many children/dependents living in the household, see Table 3.1).

Table 3.1: Demographic Questions for Respondents and Households

Demographic Question	Targeted at...
Are you male or female?	Respondent
What is your age?	Respondent
What is your marital status? (Options: married; common-law; widowed; divorced; separated; single, never married)	Respondent
Is this a single parent household or a couple-led household?	Household
What is the highest level of education you have completed? (Options: elementary grad or lower; some secondary; secondary grad; some post-secondary; post-secondary grad)	Respondent
What is the main source of income for your household? (Options: salary/wages; social assistance; workers compensation/employment insurance; pension/senior; other)	Household
How many children (<18 years) do you have?	Respondent
How many children do you have 6 years of age or under?	Respondent
How many families live in this household?	Household
How many people usually live in this household?	Household
How many children (<18 years) usually live in this household?	Household
How many children 6 years of age or under usually live in this household?	Household

3.7.3 Data Analysis

Categorizing and determining the food security status of households in Fort Albany who had completed the HFSSM for Study I followed the procedures outlined by Health Canada (2007) during the analysis of the HFSSM from the 2004 CCHS. This allowed for direct comparisons to the prevalence of food insecurity in non-Aboriginal and off-reserve Aboriginal Canadians. Health Canada uses three categories to describe the food security situation experienced by adults, children, and households overall: (1) food secure, (2) food insecure – moderate, and (3) food insecure – severe. The food security status of an entire household (adults and children) was determined by the number of food-insecure conditions reported; more specifically, by the number of questions in the HFSSM that the respondent answered affirmatively on behalf of the household. Since the response options varied depending on the question, a response was considered affirmative if the respondent indicated (i) "yes", (ii) "often" or "sometimes", or (iii)

"almost every month" or "some months but not every month". To be considered "food secure", no items, or only one item, in the adult or child scale was affirmed (see Table 3.2).

Table 3.2: Thresholds for defining food security categories

Food Security Status		
Category Labels	Category Description	
	10-Item Adult Food Security Scale	8-Item Child Food Security Scale
Food Secure	<i>no, or one, indication of difficulty with income-related food access</i> <i>0 or 1 affirmed responses</i>	<i>no, or one, indication of difficulty with income-related food access</i> <i>0 or 1 affirmed responses</i>
Food Insecure, Moderate	<i>indication of compromise in quality and/or quantity of food consumed</i> <i>2 to 5 affirmed responses</i>	<i>indication of compromise in quality and/or quantity of food consumed</i> <i>2 to 4 affirmed responses</i>
Food Insecure, Severe	<i>indication of reduced food intake and disrupted eating patterns</i> <i>≥ 6 affirmed responses</i>	<i>indication of reduced food intake and disrupted eating patterns</i> <i>≥ 5 affirmed responses</i>

Source: Health Canada, 2007

Initially, data were analyzed separately for adults (using the 10 adult-reference items in the HFSSM) and children (if present, using the 8 child-referenced items in the HFSSM) in the household. Food security status of the entire household was then derived from the food security status of adults and of children (if present) in the household. For households without children, adult food security status equated to household food security status. The household was considered food secure if both adults and children in the household were categorized as food secure. However, if *either* adults or children, or *both* adults and children were categorized as moderately food insecure (with neither severely food insecure), the household was considered moderately food insecure. If *either* adults or children were categorized as severely food insecure, then the household was considered severely food insecure (Health Canada, 2007).

Considering the food security status separately for adults and children is an approach now used by Canada (although it is not the U.S. standard method) because research has indicated that

the relationship between the food security status of adults and children in the same households is highly contingent on the ages of the children (Nord & Bickel, 2002). In addition to following the current analytic approach used by Health Canada, another reason to calculate food security status this way was that this was the method used in the analysis of the baseline surveys from three isolated northern communities for the Canadian Food Mail Program Pilot Projects (INAC, 2003; 2004a; 2004b).

3.7.4 *Study I, Objective #2*

The methods for Study I, Objective #2 (relevance of the HFSSM) were similar to those used in Study II (coping strategies for food insecurity), and therefore are included in detail in the next section.

3.8 Study II

The objective for Study II was to explore the perceptions of and coping strategies for food insecurity by families and community members using qualitative interviews with participants completing the HFSSM.

3.8.1 *Qualitative Question Development*

Lambden and colleagues (2007) concluded that traditional food attributes must be included in studies of food security in the Arctic. Although this study was in the sub-arctic, it was the opinion of this researcher and her colleagues, from previous work with Cree in the western James Bay region that questions related to traditional food were very important for studying food security in this community. Subsistence harvesting for Cree of the western and eastern James Bay region remains an integral part of the culture (Tsuji, 1998; Tsuji & Nieboer, 1999; Tsuji et al., 2006a; 2006b). Outside of the clear nutritional value of wild food, the spring and fall

harvesting periods constitute a cultural event which increases social and community cohesiveness. Thus, the contribution of wild food to the Cree diet must be preserved for both economic (store bought food is often too expensive to be a feasible alternative; [Tsuji, 1998] in the western James Bay region) and cultural reasons. These considerations were taken into account during the question development for the qualitative interviews.

When members of the community advisory committee reviewed the HFSSM (see Study I, Objective #1), they had the opportunity to provide any additional open-ended comments they felt should be added to better address issues relevant to Fort Albany and/or First Nations households. These comments were considered during the development of the questions for Study I, Objective #2 and Study II.

For Study I, Objective #2, two simple questions were developed to ask participants to provide input on the HFSSM and what could be added to improve its relevance to the First Nation on-reserve context. The questions asked directly after a participant completed the HFSSM were:

Q. Does this survey measure food security for First Nations communities? Are there any aspects of food security for First Nations people that are missing from this survey?

Participants were provided with the most common definition of food security to assist them if they were unfamiliar with the terminology.

For Study II, the intention was to determine participants' perceptions of food security (e.g., relationships between traditional and store-bought food) and the range of adaptive strategies they used at an individual and household level and saw in the community to cope with food insecurity. For this study, a set of three questions and probes were developed and informed by a

number of sources: (1) literature from other qualitative studies of food security (see Table 2.3), (2) consultation with and input from members of the community advisory committee, and (3) this researcher and her colleagues' personal experiences with the people and community of Fort Albany. The process of selecting, developing and determining the final three questions and probes went through two drafts and is outlined in Figure 3.2. Initially, draft one consisted of nine questions that were selected primarily from three qualitative food security studies (Table 2.3: Chan et al., 2006; Cohen, 2002; Lambden et al., 2006); two of which had been conducted with Aboriginal populations in Canada. During the revisions of the second and final drafts, questions were combined, revised, or removed. The nine questions from the first draft were reduced to five questions in the second draft and resulted in three questions and accompanying probes in the final draft. After the first nine questions were chosen from the literature, the investigator, in consultation with university advisors on this project, evaluated these questions to determine whether there was overlap between them and whether probes could be used to stimulate responses that might not have come directly from the initial question. During this process, the objective of the study with respect to coping/adaptive strategies for food insecurity was kept in mind to ensure that the questions pertained specifically to the topic of the objective. The five questions in draft 2 were reviewed by the investigator, in consultation with university advisors, and a few members of the community advisory committee (n = 3) to determine whether they could be combined into a smaller number of questions and still fulfill the objective. The number of questions for the final draft (n = 3) was kept small to reduce the response burden of the participants. Consultation with the community advisory committee helped to ensure that the final questions were culturally appropriate and relevant to the food security issues in First Nations communities.

The final three questions and probes were:

Q1. The government questionnaire we did seemed to ask mostly about store-bought foods. Can you tell me about traditional foods and your household?

Probe for

- Any barriers to accessing traditional food
- Has environmental change affected access to traditional foods
- Any methods to increase traditional food access and consumption

Q2. How do you adapt if there doesn't seem to be enough food (traditional or store-bought) for your household?

Probe for

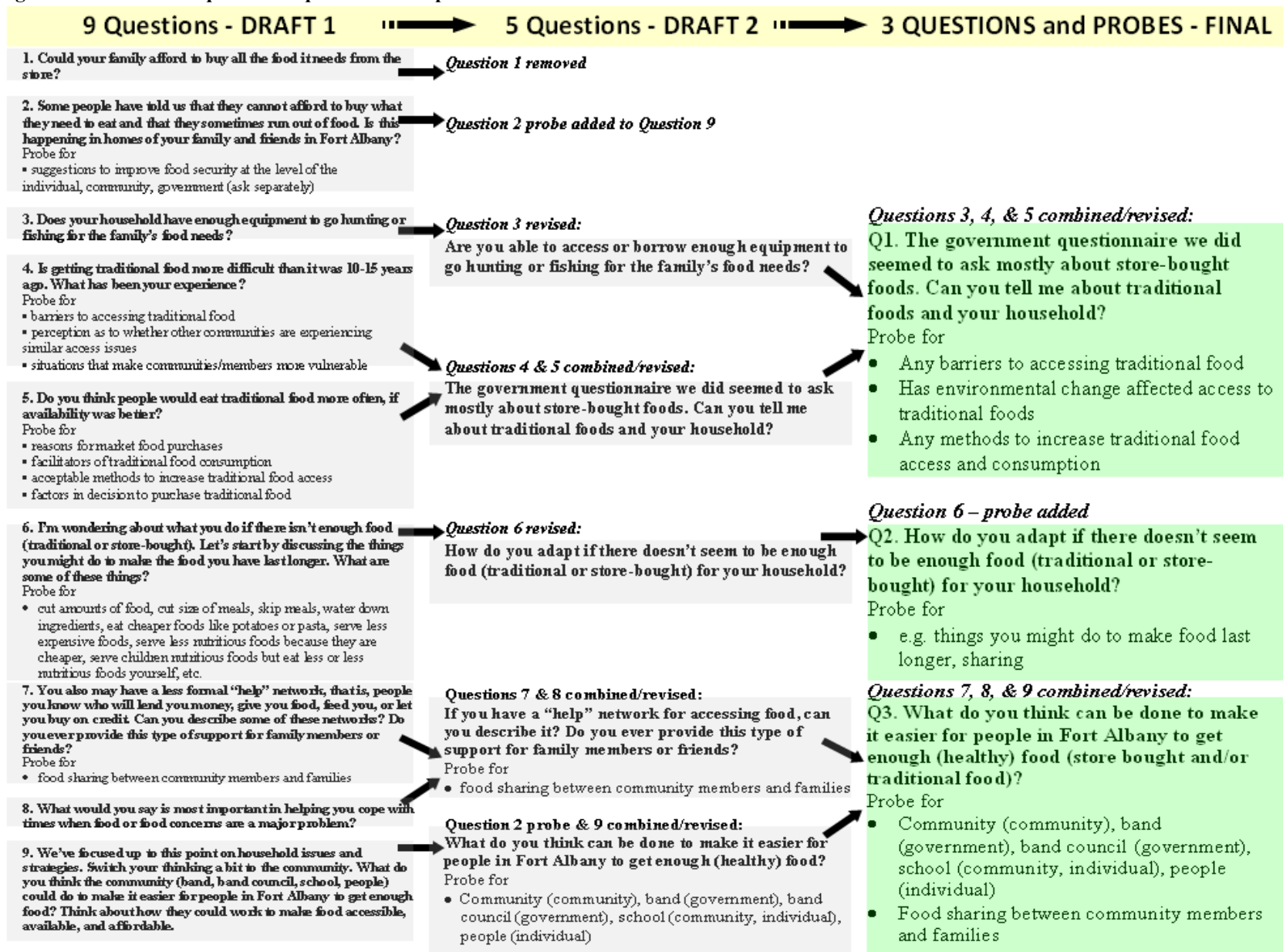
- e.g., things you might do to make food last longer

Q3. What do you think can be done to make it easier for people in Fort Albany to get enough (healthy) food (store bought and/or traditional food)?

Probe for

- Community (community), band (government), band council (government), school (community, individual), people (individual)

Figure 3.2: Process for qualitative question development



3.8.2 *Participant Recruitment, Consent, and Data Collection*

Because the participants approached to complete the HFSSM (Study I, Objective #1) were subsequently approached to participate in the qualitative interviews (Study I, Objective #2, relevance of the HFSSM; and Study II, coping strategies for food insecurity), participant recruitment and consent procedures were the same for Study II as Study I (see previous section).

For Study I, Objective #2 and Study II, all interviews were in English. Cree interpreters were available during data collection, but were not requested. Participants and the local research assistant conducting the interviews were not comfortable with audio-recording. Therefore, the local research assistant took detailed verbatim notes during each interview. Data from the interviews were transcribed.

3.8.3 *Data Analysis*

Organization and coding of the transcribed data for the qualitative analysis was conducted both by hand and using QSR NVivo® computer software (NVivo, version 8.0; Doncaster, Australia: QSR International Pty Ltd, 2008). It has been demonstrated that a combination of both manual and computer-assisted methods (NVivo) are likely to achieve the best results during qualitative analysis (Welsh, 2002). Initially, the data were segregated and organized into logical and meaningful segments on paper (i.e., sorted into the various aspects of food insecurity that were brought up during the interviews) by hand (Patton, 1997). At this point the orderly data were observed for detectable basic patterns and the interpretative examination of the data began (Patton, 1997). Often called coding, this step involved developing criteria for organizing the data in groups or “themes”. More specifically, the transcribed comments were re-read and assigned a theme (or in some cases more than one theme) (The Health Communication Unit, 2000). Initial thematic analysis was conducted by this researcher who has academic training and

research experience in qualitative methods. To increase reliability, the themes for a random selection of half of the interviews were confirmed by a second independent analyst who had familiarity with qualitative methods and analysis, and extensive knowledge on the topic of food security. The credibility of the interpretation is enhanced if at least two researchers conduct the analysis (Patton, 1997). The data were then imported into NVivo for better management of the data. The thematic analysis involved open coding. Words, sentences and/or paragraphs were assigned to a theme and could belong to more than one theme. Themes were collapsed or expanded, and sub-themes identified and organized according to the major themes. Emergent themes were shared with the community advisory committee, who were also participants in the study, to confirm that they accurately reflected their perspectives. This is a close knit community, therefore, even those who were currently food secure may have experienced food insecurity in the past and had relationships (family, professional) with those who were currently food insecure.

The analysis of the data from the qualitative interviews served two purposes in accordance with the objectives for Study I, Objective #2 and Study II: (1) to evaluate the perceived relevance of the HFSSM as a tool for assessing food insecurity of on-reserve First Nations households, and (2) to explore the perceptions of and coping strategies for food insecurity by families and community members. The themes resulting from analysis for Study 1, Objective #2 were used to draft a supplemental First Nations specific component to the HFSSM (see Study V).

3.9 Study III

The primary objective of Study III was to assess the nutritional impact of the school snack program at Peetabeck Academy using results from the Waterloo Eating Behaviour Questionnaire (WEB-Q).

3.9.1 *Background on the School Nutrition Program*

To provide this researcher with an in-depth understanding of the context of the school nutrition program, documentation of the program was collected. This documentation was not analyzed per se, but was important for this researcher to be able to describe the program clearly in the manuscript and interpret the findings of Study III. Documentation of the history and logistics of the school snack and breakfast program involved three forms of data collection: (1) a review of historical documents from the program, (2) an informal interview with the Director of the program (Joan Metatawabin), and (3) direct observations of the program during this researcher's numerous visits to Fort Albany.

Few historical documents exist related to the school nutrition program in Fort Albany. Fortunately, this researcher was able to obtain the original request for funding to start the program in 1992 (Metatawabin, 1992). Other documents that were obtained include: past receipts from ordering food for the program, calculations of the costs of running the program, and photographs of the program in action.

The interview with Joan Metatawabin was conducted by this researcher in the cafeteria of Peetabeck Academy in February of 2007. A follow-up interview, to capture any program changes and provide an update of the program components, was performed in January 2011. Prior to the first interview, a list of 22 questions was written out (see Appendix C) to ensure that specific details were covered during the interview. The interview was an informal dialogue about the program and did not strictly follow the questions outlined. However, the list of questions provided a reference point for the interviewer to remember what details needed to be recorded about the program. During the interviews, both the interviewer and a colleague (E. Liberda) took detailed notes on paper. The handwritten notes were transcribed on the same day into an

electronic file. A brief interim interview took place between Joan and this researcher in April of 2009 to discuss some of the logistics of ordering and transporting food for the program. The interviewer brought a map of the James Bay region (northeastern Ontario and northwestern Quebec) to assist with the dialogue that focused around the ordering, food suppliers and transportation routes that Joan used to bring food to Fort Albany for the program. Notes and information from this conversation were written directly on the map (see Appendix D). In April of 2009, this researcher also obtained information about the costs of the program and obtained the calculations from Joan that were used to determine the cost per student per day (see Appendix E).

The studies in this thesis were built on an understanding of the context of the community and community programs through direct observations made during visits to the community of Fort Albany since 2004. Between November of 2004 and April of 2009, this researcher visited Fort Albany nine times with most of those visits lasting 2-3 weeks. This researcher began her PhD program in 2006 and thus only notes from visits following September 2006 were included in the data for this thesis. Further visits to the community took place in January and October 2011. During seven of the 11 visits, this researcher spent the majority of her time assisting with the school nutrition program and was in the school working on related projects (and thus still able to make observations of the program) during the other four visits. A journal was kept and pictures taken during visits to record observations made related to the school nutrition program. Observations were recorded in detailed field notes and electronic images (digital photographs), as suggested by Gibbs, Friese and Mangabeira (2002).

A newspaper article was written by this researcher and published in Wawatay News in April of 2009 (Skinner, 2009; see Appendix F) to disseminate simple details about the school nutrition program to other communities.

3.9.2 *The Waterloo Web-based Eating Behaviour Questionnaire (WEB-Q)*

The WEB-Q is a validated web-based tool developed at the University of Waterloo to assess food and physical activity behaviors of children and adolescents (Forbes et al., 2009; Hanning et al., 2007; Hanning et al., 2009; Hlimi et al., 2012; Minaker et al., 2006; Storey et al., 2009a; Storey et al., 2009b; Sutherland et al., 2007; Vance, Woodruff, McCargar, Husted, & Hanning, 2009; Woodruff & Hanning, 2009a; Woodruff & Hanning, 2009b; Woodruff & Hanning, 2010; Woodruff, Hanning, Lambraki, Storey, & McCargar, 2008; Woodruff, Hanning, & McGoldrick, 2010; Woodruff, Hanning, McGoldrick, & Brown, 2010). The survey was designed to collect demographic and anthropometric information, a 24 hour dietary recall, food frequency questions for selected food items (e.g., consumption of milk, cola-type pop, French fries, salty snacks, pizza, candy/chocolate bars), valid measures of physical activity (Crocker, Bailey, Faulkner, Kowalski & McGrath, 1997) and related behavioral variables in grade six to 10 students.

Some validity testing of the WEB-Q had also been conducted with First Nations. Dietitian-administered interviews were conducted with twenty-five Fort Albany students during a data collection in 2004 and compared to the web-survey that had first been completed for the same 24-hour recall period. Food models from the Ontario Food Survey assisted with portion estimation during dietitian interviews. The results for Fort Albany (n=25) showed that there was good agreement for energy and key nutrient intakes (intraclass correlation coefficients for calories, carbohydrates, protein, iron, vitamin C, and fibre > 0.67, n = 25, grades six to ten) from the web-based survey versus dietitian administered interviews (Hanning et al., 2009).

The WEB-Q has been used to collect nutrition and physical activity information from over 15,000 non-Aboriginal students in Canada and ~400 First Nation students in Ontario and Quebec. It was adapted for First Nation students through our previous quantitative and qualitative research which included input through our local community advisory committees from a number of First Nations communities (Christian Island, southern Ontario; Ouje-Bougoumou, northern Quebec; Weenusk [Peawanuck], northern Ontario; and communities on the west coast of James Bay: Fort Albany; Attawapiskat; and Moose Factory, Ontario). The survey underwent some adaptation for each community and adaptations included: listing local market and traditional foods and physical activities, questions related to school breakfast and snack programs (as applicable), questions regarding traditional food intake, factors influencing traditional intake, appraising any concerns regarding environmental contaminants, and questions to assist local planning. Adaptations relevant to Fort Albany and suggested by the community advisory committee were made to the WEB-Q. The primary adaptation involved the addition of traditional Aboriginal foods to the list of possible food choices (>900) in the 24-hour dietary recall. One food frequency question was added to ask students about the frequency of game (i.e., wild meat) consumption.

In 2004, for one of the existing WEB-Q questions (“At which times did you eat *anything* yesterday?” [Check all that apply: breakfast, middle of the morning snack, lunch, middle of the afternoon snack, after school snack, dinner, early evening snack, later evening snack]), an additional response option [school snack/breakfast program] was added to capture whether students had participated in the school nutrition program on the previous day. Therefore, this allowed for analysis on the possible nutritional impact of the school nutrition program by comparing students participating in the program versus non-participating students. Retrospective

secondary data were collected using the WEB-Q in Fort Albany in November 2004 with 63 grade six to 10 students. These data were combined with prospective data, collected in 2007 after the PhD began, in the current analysis for the thesis. From the retrospective data, food group consumption and nutrient intake (from the 24 hour dietary recall) of students participating in the school snack program on the previous day were compared to students who did not participate. ANOVAs were used to assess differences between groups and by gender. Preliminary data analyses were presented in poster format at the Canadian Public Health Association conference in 2007 (see Appendix G).

The secondary data analysis of the 2004 school snack program data according to program participation revealed high levels of non-participation. To further explore this, five questions were added to the WEB-Q based on input from the Director of the program (Joan Metatawabin). These five questions were asked during the prospective data collection with grade six to 10 students in Fort Albany in December of 2007. This data collection used a shortened version of the WEB-Q: with the extra five program questions included. The five additional questions on the WEB-Q related to the Fort Albany school nutrition program were:

- 1. How often do you participate in the school snack/breakfast program?** [Response options were: Every school day, More than half of the week (three or more days each week), Less than half of the week (two or fewer days each week), Rarely or never, Not answered]
- 2. What do you like most about the school snack program?** [Check all that apply: I get a snack at school every day; It helps me to focus in class; It keeps me from feeling hungry at school; Juice; Eggs; Cereal or toast; Cut up fruit]
- 3. Is there a different vegetable or fruit you would like to get as a snack at school?** [Open-ended]
- 4. If you could change one thing about the snack program, what would it be?** [Open-ended]
- 5. Because of the school snack program...** [Agree, disagree, not answered: I am motivated to eat healthier; I make better choices about what I eat; I eat more vegetables; I eat more fruit; I have asked my parents to buy or serve vegetables or fruits I try at school]

The web-based approach to collecting survey data may have special advantages for Aboriginal populations, especially those living in remote northern communities. Web sites are easily adapted to reflect the character and interests of a given school and community or to make changes during the pilot phase of a project (DiSogra & Glanz, 2000). Use of the Internet allows flexibility and a wider geographic coverage than more resource-intensive tools (e.g., interviews requiring on-site experts, such as dietitians) (DiSogra & Glanz, 2000). The method is cost effective (Jones & Pitt, 1999; Rhodes, Bowie, & Hergenrather, 2003; Schleyer & Forrest, 2000; Weible & Wallace, 1998) relative to mail surveys or interviews, and easily accommodates repeat surveys. It was also interactive whereby the FN children are actual participants rather than subjects.

The interface allowed the incorporation of audiovisual and interactive elements that enhance student acceptance (DiSogra & Glanz, 2000; Nix, D'Agostino, Strobino, & Williams, 1999). For example, the WEB-Q had icons and photo images of food portions; prompts; and immediate individual feedback with respect to *Canada's Food Guide* portions consumed relative to recommendations. Visual and hands-on tasks are culturally appropriate for FN students (Aboriginal Services Branch and Learning and Teaching Resources, 2005; Battiste & McLean, 2005; Byrnes, 1993; Canadian Council on Learning, 2007; McMullen & Rohrbach, 2003; Pewewardy, 2002; Ryan, 1992; Stairs, 1995; Toulouse, 2008). There were no issues with lack of computer resources (Halfors, Khatapoush, Kadushin, Watson, & Saxe, 2000) as all the FN communities we have worked with have had computer facilities with internet connections. Fort Albany, specifically, had a dedicated computer room for students. Data were immediately transferred directly to the University of Waterloo and food intake data were directly analyzed using the most recent version of the Canadian Nutrient File on the ESHA Food Processor

(Salem, OR, USA, Version 7.1) nutrient analysis program; thus, errors and costs associated with data entry were eliminated. This allowed for improved speed of data collection and processing (Weible & Wallace, 1998; Halfors et al., 2000) and reduced missing data or interviewer errors. There appeared to be improved reporting of sensitive information, (e.g., junk food intake and body weights) during the WEB-Q validation study, compared with dietitian interviews (Hanning et al., 2009).

Since the 24 hour dietary recall portion of the WEB-Q was used in this study, this section provides more detail about how it was administered. Students were asked to describe in detail the food they had eaten over the previous 24 hours before the data collection. The prior 24 hour period was categorized by meals and students select foods eaten during breakfast, lunch, dinner and snacks. Students could select foods using either of two methods: searching from an alphabetical listing of over 800 foods, or choosing a food group from the Eating Well with Canada's Food Guide which lists the foods according to categories of: vegetables and fruit; grain products; milk and alternatives; and, meat and alternatives. The categories "combination foods", "other foods" and "beverages" could also be selected. For each selected food, the student chose an estimate of the serving size, which was aided by pictures of portion sizes and comparisons to common objects (e.g. the size of a tennis ball). Prompts were used throughout the dietary recall to capture missed questions and forgotten foods, drinks, and toppings. Students had the option of deleting food items from their plate if they had made an incorrect choice. Following the completion of the 24-hour recall section of the questionnaire, students were given an overall meal summary and could make changes to their selections if necessary. Finally, their food group data were totaled and age-specific guidelines presented.

3.9.3 *Participant Recruitment, Consent, and Data Collection*

Parental passive consent/information letters (see Appendix H) were sent home with students one week before the scheduled data collections. This researcher and/or her colleagues supervised students while they completed the WEB-Q and answered any questions the students had about the survey. Unique login and passwords were assigned to each student to ensure anonymity and confidentiality. The survey was completed during class time using computers with internet access in the computer room at Peetabeck Academy. The WEB-Q took up to 45 minutes to complete and this varied depending on the speed of the internet access and the age of the student. Younger students tended to take more time as they read more slowly than older students. Participants were a sample of all consenting students who were in attendance on the days of the data collection and in grades six to 10 in Fort Albany.

For this thesis, data from two separate data collections were used to assess the impact of the school nutrition program, retrospective data from November of 2004, collected with students (n=63) using the 24 hour recall portion of the WEB-Q, and prospective data from December of 2007 collected using a shortened version of the WEB-Q (with the five extra snack questions) with 50 students in grades six to 10 at Peetabeck Academy.

3.9.4 *Data Analysis*

From the December 2007 data, analyses for the questions: “How often do you participate in the school snack/breakfast program?”, “What do you like most about the school snack program?” and “Because of the school snack program...” consisted of frequencies and results were presented as descriptive characteristics. For the open-ended school nutrition program questions (“Is there a different vegetable or fruit you would like to get as a snack at school?” and “If you could change one thing about the snack program, what would it be?”), responses were grouped

according to common themes and ordered according to the most common theme (or response) versus the least common theme (or response).

From both the 2004 and 2007 data, food group consumption, and selected macro- and micro-nutrients were compared between self-reported participants and non-participants in the program using ANOVAs.

3.10 Study IV

The objective of Study IV was to conduct a descriptive case study of the context and process surrounding the planning and implementation of a community greenhouse project in Fort Albany. In February and March of 2009, community members in Fort Albany were contacted to determine what type of intervention they might want to focus on in their community related to healthy eating and/or physical activity. The decision to have a greenhouse built in the community was community-driven. For this project, a 16 by 20 foot greenhouse was manufactured and shipped to Fort Albany in the fall of 2009 and partially funded by a CIHR grant that allowed for seed funding of community-driven initiatives to address identified diet-related concerns. Other costs associated with the foundation, set-up, and maintenance of the greenhouse were covered by in-kind donations and community funds.

3.10.1 *Participant Recruitment, Consent, and Data Collection*

Study IV was a *descriptive* case study. A descriptive case study presents a complete description of a phenomenon within its context (Yin, 2003). The quality of a case study is enhanced when the researcher uses multiple sources of evidence. This allows for a process of triangulation or the development of “converging lines of inquiry” (Yin, 2009). Using multiple sources of evidence is one tactic that can be used during data collection to gain construct validity (Yin, 2009).

Multiple sources of evidence were collected for this study. The sources of evidence included written documentation, photo-documentation, interviews, and direct observations. Written documentation included email and phone correspondence with community members on greenhouse matters, and journal entries made by this researcher during community visits. Photo-documentation was taken by this researcher during community visits and by the community investigator throughout the two years of the project. As Power (2003, p.16) explained, “collaborative and participatory models of visual research are especially favoured when working with marginalized groups, who often find it easier to represent themselves and their world view through visual rather than textual means.” The collaborative visual images included in this case study provided an opportunity to include a local perspective on the implementation of the greenhouse and, in Power’s (2003, p.15) words, “de-centered the authority of the researcher.”

Informal, unstructured interviews were conducted with a number of community members involved with the greenhouse. These people were chosen based on how involved they were with the greenhouse; the intention was to have a dialogue with people who had been directly involved with aspects of the greenhouse. These interviews followed verbal consent procedures as in Study II. The interviews were conducted by this researcher. Potential interview participants were approached and asked if they want to participate in the case study. Snowball sampling was used to identify additional participants. The interviews were conducted in October 2011 after the greenhouse had been assembled and gardening activities had been established.

Direct observations of greenhouse activities and the greenhouse itself took place whenever this researcher was visiting the community of Fort Albany. A journal was kept and pictures taken during these visits to record observations made related to the greenhouse project.

3.10.2 *Data Analysis*

All documentation data sources (i.e., email and phone correspondence, digital photographs), interviews transcripts, and notes from direct observations were compiled into one data file. Hence, data analysis did not distinguish between the sources of the information. Analysis of the data followed a categorical aggregation approach (Creswell, 2013; Stake, 1995) to develop themes and the development of a case description (Yin, 2009).

3.11 Study V

Study V had two primary objectives: (1) to draft a list of questions that could be used as a supplemental First Nations component for the HFSSM, and (2) to obtain feedback on the supplemental HFSSM component from key informants.

3.11.1 *Participant Recruitment and Data Collection*

The themes and outcomes resulting from analysis for the second objective of Study I (i.e., to evaluate the perceived relevance of the HFSSM as a tool for assessing food insecurity of on-reserve FN households) were used in combination with literature sources to draft a list of First Nations specific questions to the HFSSM. The purpose of creating questions for a supplement would be to enhance the relevance of the HFSSM for First Nations peoples with the intention of being able to better address relevant food security issues in on-reserve First Nations households and communities.

The drafted questions were mounted into an online survey using FluidSurveys (Ottawa, Ontario) to obtain feedback on the importance of each question to food security in First Nations populations and to explore content, construct, and cultural validity. Key informants from the Aboriginal Nutrition Network of the Dietitians of Canada were approached to provide feedback

and input on the drafted questions. Feedback provided by the key informants was incorporated into a revised set of questions.

3.12 Funding and Ethics

3.12.1 *Study I and Study II*

Studies I and II were primarily funded by a two-year dietetic practice-based research grant from the Canadian Foundation for Dietetic Research (CFDR) of the Dietitians of Canada (DC). This researcher was the principal investigator (PI) for that grant and the co-investigators were Dr. Rhona Hanning (Associate Professor, School of Public Health and Health Systems, University of Waterloo) and Ellen Desjardins (then PhD Candidate, Wilfred Laurier University). A letter of intent was submitted to the grant competition in October 2007. We were asked to submit a full proposal for the grant competition in March 2008 and in June of 2008 were notified that we were one of eight proposals receiving grant funding (\$15,000) in this competition. The title of our grant proposal was “Perceptions of Food Insecurity and Coping Strategies of First Nations People Living in an On-Reserve Remote Community within the Mushkegowuk Territory”. Full ethics clearance was received February 11, 2009 from the Office of Research Ethics at the University of Waterloo. A support letter from the community of Fort Albany was provided and included in the grant proposal application (Appendix I).

3.12.2 *Study III*

Study III was funded by a one year community-based research seed funding grant from the Indigenous Health Research Development Program (IHRDP). The grant proposal was written by this researcher and her co-applicants (Joan Metatawabin, Director of the school/snack program and teacher at Peetabeck Academy, Fort Albany; Dr. Leonard Tsuji, Professor, Environment and

Resources Studies, University of Waterloo; Dr. Rhona Hanning, Associate Professor, School of Public Health and Health Systems, University of Waterloo) and submitted in March 2007. We were awarded a grant of \$25,000 from this competition for our proposal “Evaluation and Expanding the School Snack Program in Fort Albany”. Full ethics clearance was received August 8, 2007 from the Office of Research Ethics at the University of Waterloo. A support letter from the community of Fort Albany was provided and included in the grant proposal application (Appendix J).

3.12.3 *Study IV*

Study IV was part of a much larger study called “Implementing a web-based survey to assess food intake and physical activity in Cree school children living in Hudson and James Bay regions of northern Canada” which was funded for three years by a four-way partnership from the Canadian Institutes of Health Research, the Rx&D Health Research Foundation, the Heart and Stroke Foundation of Canada, and the First Nations and Inuit Health Branch of Health Canada. The principal investigator for this study was Dr. Rhona Hanning (Associate Professor, School of Public Health and Health Systems, University of Waterloo), the co-investigator was Dr. Leonard Tsuji (Professor, Environment and Resources Studies, University of Waterloo) and this researcher was a Student Investigator. As part of this study, health eating and physical activity interventions were being implemented in five communities along the west coast of James Bay/Hudson Bay, including Fort Albany. Since Fort Albany already had an established school nutrition program, our research team decided to dedicate the intervention funds towards a different project determined by the community. The community wanted to have a greenhouse, thus funds were used to pay for the greenhouse structure. Full ethics approval for the larger study was obtained February 4, 2009 from the Office of Research Ethics at the University of Waterloo.

Chapter 4: PREVALENCE AND SEVERITY OF HOUSEHOLD FOOD INSECURITY OF FIRST NATIONS PEOPLE LIVING IN AN ON-RESERVE, SUB-ARCTIC COMMUNITY WITHIN THE MUSHKEGOWUK TERRITORY

4.1 Overview

Objective: To measure and describe the prevalence and severity of household food insecurity in a remote on-reserve First Nations community using the Household Food Security Survey Module (HFSSM) and to evaluate the perceived relevance of the HFSSM for this population.

Design: Household food security status was determined from the 18-item HFSSM following the classifications developed by Health Canada for the Canadian Community Health Survey, Cycle 2.2 Nutrition. One adult from each household in the community was invited to complete the HFSSM and to comment on its relevance as a tool to measure food security for First Nation communities.

Setting: Sub-Arctic Ontario, Canada

Subjects: Households (*n* 64)

Results: Seventy percent of households were food insecure, 17% severely and 53% moderately. The prevalence of food insecurity in households with children was 76%. Among respondents from homes rated as having severe food insecurity, all (100.0%) reported worrying that food would run out; times when food didn't last and there wasn't money to buy more; and times when they couldn't afford to eat balanced meals. The majority of respondents felt the HFSSM did not capture an accurate picture of food security for their situation. Aspects missing from the HFSSM included the high cost of market food and the incorporation of traditional food practices.

Conclusions: A high prevalence of household food insecurity was reported in this community. On-reserve remote First Nations communities may be more susceptible to food insecurity than

off-reserve Aboriginal populations. Initiatives that promote food security for this vulnerable population are needed.

4.2 Introduction

Food insecurity has been described as an urgent and pervasive public health issue for Aboriginal people (First Nations [FN], Métis, and Inuit) in Canada (Egeland et al., 2010; Power, 2007; Power, 2008; Rosol et al., 2011; Willows, 2005a; Willows et al., 2009; Willows et al., 2011). However, National health surveys have generally excluded the large portion of the Aboriginal population living on-reserve, resulting in limited data on food security in these individuals and FN communities (Power, 2007; McAmmond, 2000).

Results of the 2001/2002 Canadian Community Health Survey, Cycle 1.1 (CCHS 1.1) (Ledrou & Gervais, 2005) showed that food insecurity was closely tied to northern geography, as people living in the territories appeared especially vulnerable. Thus, geographically, communities that are remote and isolated may be particularly susceptible to high levels of food insecurity (Agriculture and Agri-Food Canada, 2006). Over half of the population of Nunavut (56%) reported household food insecurity and rates in the Northwest Territories (28%) and the Yukon (21%) were also well above the national level of 14.7% (Ledrou & Gervais, 2005). The CCHS 1.1 may have underestimated the prevalence of food insecurity in the territories and Canada because it did not cover Aboriginal people living on-reserve (Ledrou & Gervais, 2005). The CCHS, Cycle 2.2 conducted in 2004 (Health Canada, 2007) did not include individuals who lived in the territories or on-reserve and found the prevalence of food insecurity in off-reserve Aboriginal households to be 33.3% compared to 8.8% in non-Aboriginal households. Recent data from the Inuit Health Survey found the prevalence of household food insecurity from 36 Arctic communities to be 43% to 69% depending on region (Rosol et al., 2011) with nearly 70%

of Inuit pre-schoolers residing in households rated as food insecure (Egeland et al., 2010).

Results from the First Nations Regional Health Survey Phase 2 (2008/2010) (RHS) (FNIGC, 2012), found over half (54.2%) of all households were food insecure.

National surveys have consistently found that in addition to Aboriginal people living off-reserve, certain sub-populations are at much higher risk of food insecurity and include: people living on low incomes, social assistance recipients and female lone parents (Ledrou & Gervais, 2005; Health Canada, 2007; Che & Chen, 2001). As Aboriginal people are identified as one of these groups and are often overrepresented in the other categories, they may face multiple risk factors for food insecurity (Willows, 2005a; Willows et al., 2009; Rideout, 2005). Scales for measuring food insecurity have not been validated in Canadian Aboriginal populations and there is a need for valid, reliable, relevant and feasible instruments to examine and measure food-related issues among northern Aboriginal people (Power, 2007; Power, 2008; Willows, 2005a).

Food insecurity in remote FN communities is exacerbated by many factors: high incidence of poverty, environmental contamination of traditional food sources, climate change affecting hunting and fishing practices (Ford, 2009; Furgal & Seguin, 2006; Guyot et al., 2006; Hori et al., 2012; Tam, Gough, & Tsuji (2011), loss of traditional food practices and access to land, unreliable food supplies, and high cost and reduced availability and quality of healthy market food (Power, 2007; Power, 2008; Ford, 2009; Gates et al., 2012). The objectives of this study were: (1) to measure the prevalence and severity of household food security in a remote, on-reserve, sub-Arctic FN community in Ontario, Canada using the Household Food Security Survey Module (HFSSM), (2) to determine whether specific sociodemographic characteristics were associated with food security status, and (3) to evaluate the perceived relevance of the HFSSM as a tool for assessing food insecurity of on-reserve FN households with participants

completing the HFSSM. This paper provides a current analysis of food insecurity in a remote FN community and adds to our previous community-level data. The results provide baseline data for the community as they work towards improved food security. The findings are particularly important in light of recent FN data from the RHS (FNIGC, 2012) using an abridged version of the Household Food Security Survey Module and from forthcoming data expected to emerge from the First Nations Food, Nutrition, and Environment Study (FNFNES) (FNFNES, 2012).

4.3 Methods

4.3.1 *Setting*

This study was part of a larger project on food security in the community of Fort Albany, Ontario, carried out from the summer of 2009 until the late fall of 2011. As described previously (Skinner et al., 2012a; 2012b), Fort Albany is an on-reserve, geographically remote (52° 15' N; 81° 35' W), sub-Arctic FN community along the Albany River on the west coast of James Bay and is home to approximately 850 Cree people. The community is only accessible by airplane year-round and is connected to neighboring communities by a snow/ice road for approximately 6-8 weeks in the winter and by boat or barge during the ice-free season. The community has one grocery store, which is the major supplier of food, and two small convenience stores. Community members participate in traditional hunting and fishing activities, however, availability and consumption of traditional foods from these endeavors are seasonal, vary in abundance from year-to-year, and are limited by individual means (e.g., financial constraints for travel to hunting sites) (Skinner et al., 2012a; Tsuji & Nieboer, 1999). Prior formative research in Fort Albany identified food insecurity as an important barrier to healthy eating for youth living in the community (Skinner et al., 2012a; Skinner et al., 2006). A community advisory committee

of community members from local stakeholder organizations (n=6) was established prior to the study.

4.3.2 *Recruitment and Data Collection*

The 18-item HFSSM (Health Canada, 2007) was used to assess the prevalence and severity of food insecurity. Prior to data collection, the HFSSM was reviewed by the community advisory committee during group meetings to identify any need for clarification of the instructions or content for the participants. A local community research assistant was hired and trained to collect survey data. The assistant was a Band member, had stature in the community, and has lived there for more than 25 years. The community assistant was specifically trained to administer the HFSSM according to the guidelines outlined by Bickel and colleagues (Bickel et al., 2000). The authors were in regular contact with the community research assistant either in-person or by telephone to discuss progress on data collection and to answer any questions that might come up related to the data collection. Surveys were periodically returned to the authors in batches as they were finished and were checked for completeness. The community assistant spoke Cree, which was helpful in the event that any of the survey respondents requested Cree translation. A map displaying each building in the community was used to identify eligible households. Households excluded from the study were those outside of reserve property (off-reserve), as well as those designated for non-local school teachers and staff, nurse's residences, and visitors housing. The map was also used by the community assistant as a recording tool to keep track of the homes that had been approached and those that had completed or refused to participate in the survey. One adult over the age of 18 years from each of the on-reserve FN homes in Fort Albany was approached in-person by the community research assistant to participate in the study. Participants were provided with an information/recruitment letter when they were approached.

The study was explained to them, the confidentiality of their participation and data assured, and they were invited to participate at a time and place convenient for them. Verbal informed consent was obtained from all participants, being culturally appropriate for the Western James Bay region for this type of project (Skinner et al., 2006; Kirby et al., 2007). The verbal consent was formally recorded. The HFSSM was administered in accordance with the guide for using this tool (Bickel et al., 2000). Demographic characteristics of the respondent and household as well as reasons for non-participation were also collected. Non-participants were asked to choose from five possible reasons for refusal including: no interest in the survey, no time to participate, does not like research, does not like the questions, or the option to specify another reason.

Following completion of the HFSSM questionnaire, each respondent was invited to comment on the relevance of the HFSSM as a tool to measure food security for FN communities and what could be added to improve its relevance to the FN on-reserve context. Based on input from our advisory committee for the larger project, two simple qualitative questions were developed to ask participants to provide feedback on the HFSSM. The questions were: (1) “Does this survey measure food security for First Nations communities?”, and (2) “Are there any aspects of food security for First Nations people that are missing from this survey?”. Participants were provided with a definition of food security to assist them if they were unfamiliar with the terminology. Responses to these questions were recorded in verbatim handwritten notes made by the research assistant.

4.3.3 *Data Analysis*

Categorizing and determining the food security status of households in Fort Albany followed the procedures outlined by Health Canada (2007) for the analysis of the HFSSM from the 2004 CCHS. This allowed for direct comparisons to the prevalence of food insecurity in non-

Aboriginal and off-reserve Aboriginal Canadians. Health Canada used three categories to describe the food security situation experienced by adults, children, and households overall: (1) food secure, (2) food insecure – moderate, and (3) food insecure – severe. The food security status of an entire household (adults and children) was determined by the number of food-insecure conditions reported; more specifically, by the number of questions in the HFSSM that the respondent answered affirmatively on behalf of the household. Since the response options varied depending on the question, a response was considered affirmative if the respondent indicated (i) "yes", (ii) "often" or "sometimes", or (iii) "almost every month" or "some months but not every month". To be considered "food secure", no items, or only one item, in the adult or child scale was affirmed.

Initially, data were analyzed separately for adults (using the 10 adult-reference items in the HFSSM) and children (if present, using the 8 child-referenced items in the HFSSM) in the household. Food security status of the entire household was then derived from the food security status of adults and of children (if present) in the household. For households without children, adult food security status equated to household food security status. The household was considered food secure if both adults and children in the household were categorized as food secure. However, if *either* adults or children, or *both* adults and children were categorized as moderately food insecure (with neither severely food insecure), the household was considered moderately food insecure. If *either* adults or children were categorized as severely food insecure, then the household was considered severely food insecure (Health Canada, 2007).

Considering the food security status separately for adults and children is an approach now used by Canada (although it is not the U.S. standard method) because research has indicated that the relationship between the food security status of adults and children in the same households is

highly contingent on the ages of the children (Nord & Bickel, 2002). In addition to following the current analytic approach used by Health Canada, another reason to calculate food security status this way was that this was the method used in the analysis of the baseline surveys from three isolated northern communities for the Canadian Food Mail Program Pilot Projects (INAC, 2003; INAC, 2004a; INAC, 2004b).

Differences in selected sociodemographic characteristics for food secure and food insecure households were assessed using the chi-square statistic. Further analysis was conducted using multiple logistic regression models. Data were analyzed using Predictive Analytics SoftWare (PASW) version 18 (SPSS Inc., Chicago IL, USA). Statistical tests were considered significant with p-values < 0.05. Thematic data analysis was carried out to evaluate and interpret the comments made by participants for the two qualitative questions.

Permission to conduct this study was obtained from Fort Albany First Nation (the locally elected government). This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving participants were approved by the Office of Research Ethics at the University of [name of the ethics committee removed for blinding].

4.4 Results

Of the 76 eligible households contacted from June 2009 to January 2011, 66 individuals/households agreed to participate in the study, resulting in a response rate of 86.8%. Two individuals chose to provide demographic information but did not complete all HFSSM questions and thus were excluded from the analysis. Non-participants (n=10) were asked their reason for refusal and all said they were not interested in the survey.

Table 4.1 shows the sociodemographic characteristics for respondents and households. More than one-third of respondents had elementary school as their highest level of education and

nearly one-third had social assistance as their main source of income. Of those households with children (n=50, 78.1%), nearly one-third had three or more children under the age of 18. Almost half of households had two families living under the same roof with an average of 4.5 people living in each home.

Table 4.1: Sociodemographic characteristics of respondents and households (N=64)

Sociodemographic variable	Value
Respondent	N (%)
Sex	
Male	34 (53.0)
Female	30 (47.0)
Highest level of education	
Elementary graduate or less	22 (34.4)
Secondary graduate or some secondary	24 (37.5)
Post-secondary graduate or some post-secondary	18 (28.1)
Main income source	
Salary/wages	44 (68.8)
Social assistance or other*	20 (31.2)
Household	N (%)
Household type	
Couple with children	41 (64.1)
Couple, no children†	10 (15.6)
Lone parent‡	9 (14.1)
Other§	4 (6.2)
Children < 18 years living in household	
None	14 (21.9)
1 or 2	31 (48.4)
3+	19 (29.7)
Number of families¶ living in household	
1	33 (51.6)
2	31 (48.4)
	Mean, range
Age (years)	43.6, 26-63
Number of people living in household	4.5, 1-10
Number of children < 18 years in household	2.6, 1-8

*Respondents could choose other sources of income, including worker's compensation/employment insurance, pension/senior's benefits or any other source (e.g., alimony, child tax benefits, etc.), however all respondents without a main income source from salary/wages chose social assistance.

†Includes couples living alone or those with children > 18 years

‡Includes lone parents living with at least one child < 18 years

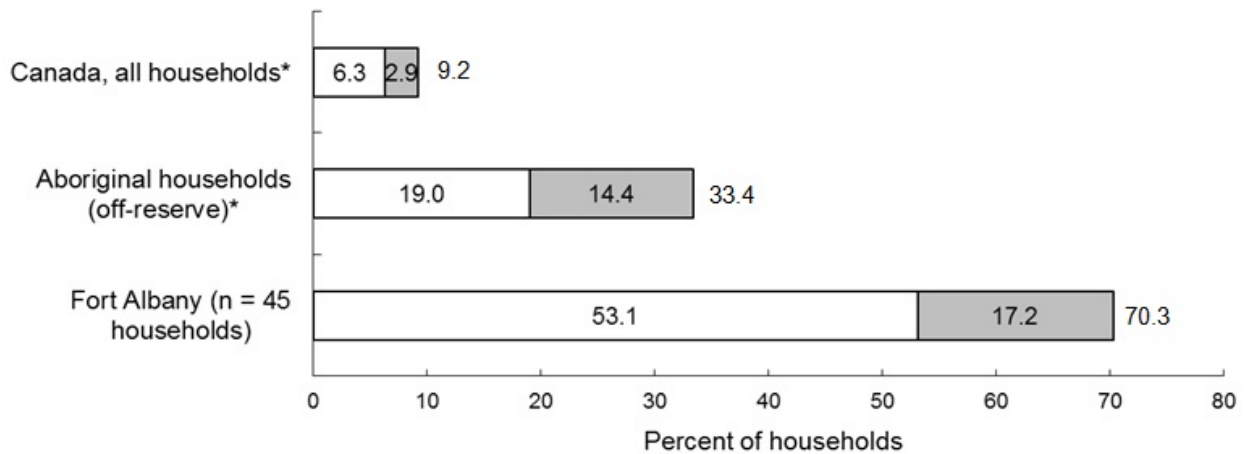
§Includes unattached individuals not living with any children < 18 years

||Of those households with children

¶A "family" was defined according to the Statistics Canada definition for Census Family (Statistics Canada, 2012)

The prevalence of food insecurity among Fort Albany households was 70.3%, with 53.1% moderately food insecure and 17.1% severely food insecure, more than double the prevalence of food insecurity in off-reserve Aboriginal households in Canada (see Figure 4.1).

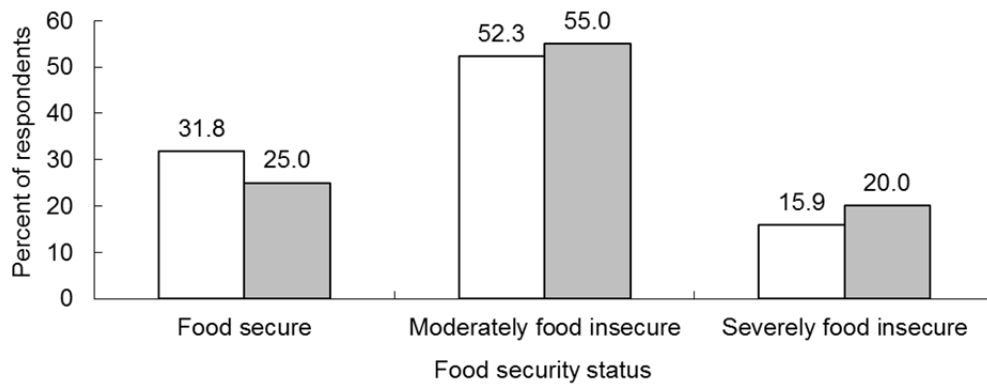
Figure 4.1: Household food security status (□ moderately food insecure; ■ severely food insecure) from CCHS (Cycle 2.2, 2004) and Fort Albany data



*Source: Health Canada, 2007

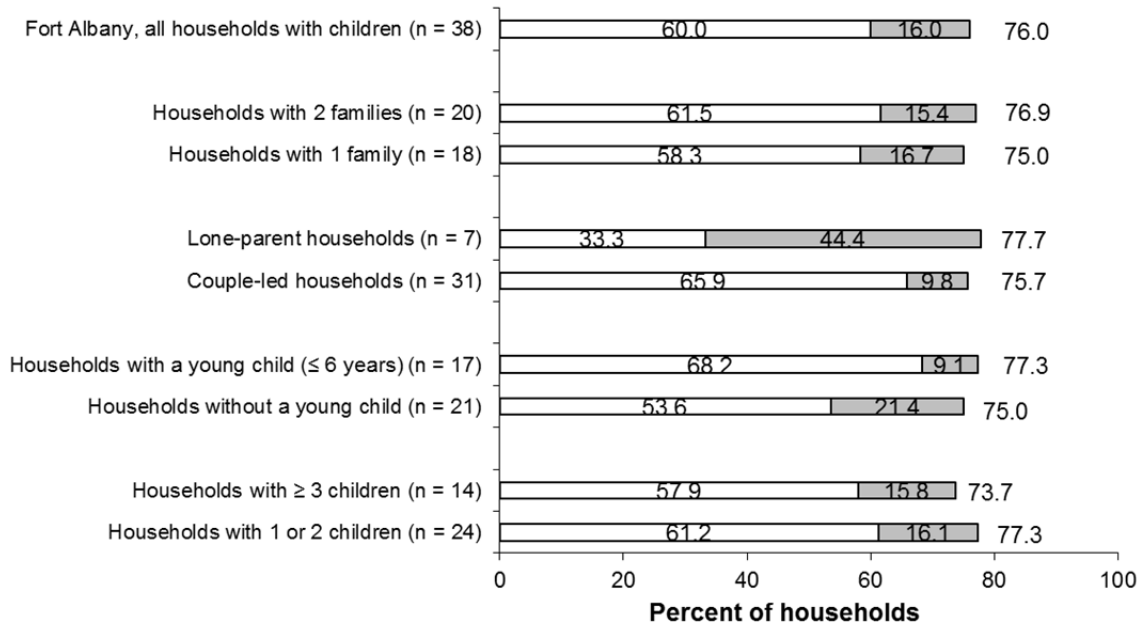
There were no statistically significant differences between food secure and food insecure households for any of the selected sociodemographic characteristics in this study from either analyses using the chi-square statistic or logistic regression. When social assistance was their main source of income, 75% of households experienced food insecurity compared with 67% of households with a salary or wage earner (not significant, $p=0.58$, Figure 4.2). The overall prevalence of food insecurity appeared higher in households with children ($n=38$ of 50 households, 76.0%) than those without children ($n=7$ of 14 households, 50.0%), but was not significant.

Figure 4.2: Food security status of Fort Albany households by main income source (□ salary/wages; ■ social assistance) of respondent (N=64)



For food insecurity in households with children, households with two families compared with one family ($p=0.51$), lone-parent households compared to couple-led households ($p=0.58$), those with at least one young child six years or under compared to those with no young children ($p=0.89$) and those with three or more children compared with those with two children or fewer ($p=0.51$) are depicted in Figure 4.3 though comparisons were not statistically different.

Figure 4.3: Percentage of food insecure (□ moderately food insecure; ■ severely food insecure) Fort Albany households with children by selected characteristics (N=38)



Among respondents from homes rated as having severe food insecurity, all 11 (100.0%) gave affirmative responses (i.e., often, sometimes or yes) to the first three questions regarding worry that food would run out; times when food didn't last and there wasn't money to buy more; and times when they couldn't afford to eat balanced meals (Table 4.2) and nearly all respondents (91.2%, 88.2%, 91.2%, respectively) from moderately food insecure homes also responded affirmatively to these questions. Among all Fort Albany respondents, 10.9% affirmatively answered the question, "In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?", with nearly two-thirds (63.6%) of respondents from severely food insecure homes answering this question affirmatively.

Table 4.2: Prevalence of affirmative responses to questions about food insecurity: Fort Albany, International Polar Year Inuit Health Survey and Canadian Community Health Survey (Cycle 2.2) data

Questions*† “In the past 12 months...”	Number and/or prevalence of affirmative responses Fort Albany				International Polar Year Inuit Health Survey (Rosol et al., 2011)	Canadian Community Health Survey (Health Canada, 2011)
	Food secure households n=19 N (%)	Moderately food insecure households n=34 N (%)	Severely food insecure households n=11 N (%)	All respondents n=64 N (%)	All respondents n=2595 (%)	All respondents n=33346 (%)‡
Adult						
1. You and other household members worried that food would run out before you got money to buy more	3 (15.8)	31 (91.2)	11 (100.0)	45 (70.3)	(61.1)	(10.0)
2. The food that you and other household members bought just didn't last, and there wasn't any money to get more	0	30 (88.2)	11 (100.0)	41 (64.1)	(59.7)	(7.7)
3. You and other household members couldn't afford to eat balanced meals§	1 (5.3)	31 (91.2)	11 (100.0)	43 (67.2)	(50.0)	(8.4)
4. You or other adults in your household ever cut size of meals or skipped meals	0	1 (2.9)	8 (72.7)	9 (14.1)	(31.2)	(4.3)
5. How often did this happen?	0	1 (2.9)	8 (72.7)	9 (14.1)	--	(3.3)
6. You (personally) ever ate less than you felt you should	0	6 (17.6)	8 (72.7)	14 (21.9)	(32.4)	(4.6)
7. You (personally) were ever hungry but did not eat	0	1 (2.9)	6 (54.5)	7 (10.9)	(24.5)	(2.6)
8. You (personally) lost weight	0	1 (2.9)	7 (63.6)	6 (9.4)	(18.2)	(1.6)
9. You or other adults in your household ever did not eat for whole day	0	0	7 (63.6)	7 (10.9)	(17.6)	(0.9)
10. How often did this happen?	0	1 (2.9)	6 (54.5)	7 (10.9)	--	(0.8)
Child						
11. You or other adults in your household relied on only a few kinds of low-cost food to feed the children	0	27 (79.4)	9 (81.8)	36 (56.3)	(57.5)	(2.8)
12. You or other adults in your household couldn't feed children a balanced meal§	0	23 (67.6)	7 (63.6)	30 (46.9)	(48.5)	(1.9)
13. The children were not eating enough	0	14 (41.2)	6 (54.5)	20 (31.3)	(40.4)	(0.8)
14. You or other adults in your household ever cut the size of any of the children's meals	0	3 (8.8)	6 (54.5)	9 (14.1)	(21.9)	(0.2)
15. Were any of the children ever hungry	0	1 (2.9)	6 (54.5)	7 (10.9)	(23.1)	(0.2)
16. Did any of the children ever skip meals	0	1 (2.9)	6 (54.5)	7 (10.9)	(19.3)	(0.1 E) ‡
17. How often did this happen?	0	1 (2.9)	6 (54.5)	7 (10.9)	--	(0.1 E) ‡
18. Did any of the children ever not eat for a whole day	0	0	4 (36.4)	4 (6.3)	(13.1)	F‡

*The wording of each question as presented to the respondent included explicit reference to resource limitation (e.g. "...because there wasn't enough money for food").

† "Yes, "Often true", and "Sometimes true" were considered affirmative responses, with the exception of questions 5, 10, and 17, where "Almost every month" and "Some months but not every month" were considered affirmative responses. Data from the International Polar Year Inuit Health Study were not included for questions 5, 10, and 17 because they also included "1-2 months" as an affirmative response.

‡ E=Statistics Canada suggests that this data be interpreted with caution; F=These data were suppressed due to a cell size < 30.

§ For these questions, the term "balanced meal" was changed to "healthy meal" for the International Polar Year Inuit Health Survey

Forty-one of the 66 participants chose to respond to the two qualitative questions. Of those 41 respondents, 73% indicated that the HFSSM did not measure food security for First Nations communities. Moreover, respondents felt the HFSSM did not incorporate some of the determinants of food insecurity specific to northern FN households that were important to understand context, such as the extremely high cost of market food, high cost of living, and reduced availability of healthy foods. They also felt that traditional foods should be incorporated into measures of food security for northern FN populations as these foods are essential to capturing a more comprehensive picture of northern food security. They spoke about the poor accessibility of traditional foods, especially for households without an active hunter or those households without relatives that were able to share wild meat. They also discussed their experiences with climate change and its effect on hunting yields and remarked that hunting is often very expensive and does not ensure food.

4.5 Discussion

High levels of food insecurity for Canadian Aboriginal people have been reported by a number of studies; however, until recently there has been very little data for FN populations living in on-reserve communities. Results from this study showed a high prevalence of food insecurity overall for on-reserve Fort Albany First Nation households (70.3%), more than double the prevalence for off-reserve Aboriginal Canadian households (33.4%) and more than 7 times the rate of food insecurity for Canadian households (9.2%) using the same survey questions and scoring system (Health Canada, 2007). The prevalence of food insecurity in Fort Albany was similar to the region from the Inuit Health Survey with the highest prevalence of food insecurity (Nunavut, 68.8%), although a larger proportion of households in Nunavut were severely (34.1%) rather than moderately (34.6%) food insecure compared to Fort Albany (17.2% severely and 53.1% moderately food insecure) (Rosol et al., 2011). Similarly to Fort Albany, communities in Nunavut are geographically isolated and

face significant challenges in accessing adequate, safe, and nutritious food (Boult, 2004). The rate of child food insecurity reported in Nunavut was 56.5% (Rosol et al., 2011). A study in northern Manitoba found that 58% of households with children experienced food insecurity (Thompson & Mailman, 2010). Hence, there is an extremely high rate (76%) of food insecurity in Fort Albany households with children. The most severe state of food insecurity – hunger – was reported by more than one in ten Fort Albany respondents.

Willows and colleagues (2009) found the prevalence of sociodemographic risk factors for household food insecurity to be higher for off-reserve Aboriginal Canadians than non-Aboriginal households. These risk factors included households with three or more children, lone-parent households, households with lower educational attainment, and households having income from sources other than wages or salaries (Willows et al., 2009). The current study did not find statistically significant differences for selected sociodemographic characteristics between food secure and food insecure households. Community-specific data are important to the Fort Albany community, reflected in the high degree of participation in this study. Nevertheless, the numbers do not support the power needed to identify associations and confirm that findings seen in broader samples have relevance also to this community. Although this study lacked the power for subgroup analysis, the directions of the findings seemed to agree with results from the CCHS (Cycle 2.2, 2004) (Health Canada, 2007) and the Inuit Health Survey (Rosol et al., 2011; Huet et al., 2012). Results from the Inuit Health Survey specifically point to inter-related themes between inadequate nutrition, food insecurity, and poor housing conditions (Egeland et al., 2011). Data from the RHS (FNIGC, 2012) indicate an association between food security and a healthy diet; the majority (61.1%) of First Nation adults who were food secure reported always or almost always eating a nutritious diet while the majority of those who were food insecure rarely or never did. The causes of food insecurity in Fort Albany are complex and likely the result of a myriad of

interconnected factors. These factors may include the following: nearly half of the homes in Fort Albany having two families living in the same dwelling (current study); grocery store food prices that could be two to three times higher than stores in southern urban cities (Gates et al., 2012); concerns about environmental contaminants and game meat consumption in children and youth (Hlimi et al., 2012); and a lack of road access. Thompson and colleagues (2010) found that communities in northern Manitoba without road access had higher levels of food insecurity than those that did.

Although the results of this study represent data from only one community, the response rate was very high (86.8%) and the use of the full 18-item HFSSM allowed for comparison to existing data from other recent food security studies. The RHS used only nine of the 18 food security questions from the HFSSM (FNIGC, 2012). Data on food security from the FNFNES, which used the full 18-item HFSSM questions, is only beginning to be released from Western Canada with timelines for regional reports from Ontario data to be released in 2014 (FNFNES, 2012).

Food security research in the Canadian Arctic appears to be expanding (Chan et al., 2006; Duhaime & Godmaire, 2002; Lambden et al., 2006), with many recent publications from the International Polar Year Inuit Health Survey (Egeland et al., 2011; Egeland et al., 2010; Huet et al., 2012; Rosol et al., 2011) and other food security studies (Beaumier & Ford, 2010; Ford & Beaumier, 2011; Lardeau et al., 2011), while research with on-reserve FN populations is lacking (Power, 2007) and only beginning to be conducted and reported. Collecting data with isolated communities is not without merit as each reserve has unique characteristics and many want local information to direct local policies and programs (Ho et al., 2006; Newbold, 1997; Vastine et al., 2005).

While the 18-item HFSSM is currently the best available tool for measuring income-based food insecurity at the household level, the limitations for its use with Canadian

Aboriginal populations must be acknowledged. The HFSSM has not been validated in Canadian Aboriginal populations and it has been recommended that food security assessment tools for this population need to consider languages, cultural perceptions, unique life experiences, and traditional food attributes (Power, 2008; Willows, 2005a; Lambden et al., 2007; Tarasuk, 2001). Respondents from this study indicated that the HFSSM could be more relevant to northern FN populations if it included questions pertaining to traditional food as well as addressing the high costs and poor accessibility of both market and traditional food in northern communities. We plan to use these data to draft a supplemental FN specific component to the HFSSM. The purpose of creating such a supplement would be to enhance the relevance of the HFSSM for FN peoples with the intention of being able to better address relevant food security issues in on-reserve FN households and communities.

4.6 Conclusions

A very high prevalence of food insecurity was reported in Fort Albany households with even higher levels of food insecurity among those households with children. On-reserve remote FN communities may be more susceptible to food insecurity than off-reserve Aboriginal populations and require special attention towards initiatives that promote food security. Traditional food attributes should be incorporated into food security measurement tools for FN populations.

Chapter 5: GIVING VOICE TO FOOD INSECURITY IN A REMOTE INDIGENOUS COMMUNITY IN SUBARCTIC ONTARIO, CANADA: TRADITIONAL WAYS, WAYS TO COPE, WAYS FORWARD¹

5.1 Overview

5.1.1 *Background*

Food insecurity is a serious public health issue for Aboriginal people (First Nations [FN], Métis, and Inuit) living in Canada. Food security challenges faced by FN people are unique, especially for those living in remote and isolated communities. Conceptualizations of food insecurity by FN people are poorly understood. The purpose of this study was to explore the perceptions of food insecurity by FN adults living in a remote, on-reserve community in northern Ontario known to have a high prevalence of moderate to severe food insecurity.

5.1.2 *Methods*

A trained community research assistant conducted semi-directed interviews, and one adult from each household in the community was invited to participate. Questions addressed traditional food, coping strategies, and suggestions to improve community food security and were informed by the literature and a community advisory committee. Thematic data analyses were carried out and followed an inductive, data-driven approach.

5.1.3 *Results*

Fifty-one individuals participated, representing 67% of eligible households. The thematic analysis revealed that food sharing, especially with family, was regarded as one of the most significant ways to adapt to food shortages. The majority of participants reported consuming traditional food (wild meats) and suggested that hunting, preserving and storing traditional

¹ This paper was published in the BMC Public Health journal. Citation: Skinner, K., Hanning, R.M., Desjardins, E., & Tsuji, L.J. (2013). Giving voice to food insecurity in a remote indigenous community in subarctic Ontario, Canada: traditional ways, ways to cope, ways forward. *BMC Public Health*, 13, 427.

food has remained very important. However, numerous barriers to traditional food acquisition were mentioned. Other coping strategies included dietary change, rationing and changing food purchasing patterns. In order to improve access to healthy foods, improving income and food affordability, building community capacity and engagement, and community-level initiatives were suggested.

5.1.4 *Conclusions*

Findings point to the continued importance of traditional food acquisition and food sharing, as well as community solutions for food systems change. These data highlight that traditional and store-bought food are both part of the strategies and solutions participants suggested for coping with food insecurity. Public health policies to improve food security for FN populations are urgently needed.

5.1.5 *Keywords*

Canada, First Nations, food security, nutrition policy, poverty, remote, coping strategies

5.2 Background

Food insecurity is a serious public health issue for Canada's indigenous population (Power, 2008; Willows, 2005a). The term "Aboriginal people" describes the three groups that comprise Canada's indigenous population; First Nations [FN], Métis, and Inuit. First Nations are the largest of these three groups, making up nearly 60% of the Aboriginal population living in Canada with approximately 60% of FN people living off-reserve lands. Data on food security in off-reserve Aboriginal people are alarming; 24% of Aboriginal households had a compromised diet (reduced quality and/or quantity), and 33% experienced food insecurity compared to 8.4% and 9%, respectively across the rest of Canada (Che & Chen, 2001; Health Canada; 2007; Willows et al., 2009). In on-reserve FN households and Inuit households in Arctic communities the prevalence of food insecurity appears to be even higher. The First Nations Regional Health Survey found just over half (54.2%) of households surveyed were food insecure, while the Inuit Health Survey conducted in 36 Arctic communities found a range of household food insecurity from 45-69% depending on region (FNIGC, 2012; Rosol et al., 2011). Food insecurity in Aboriginal households in Canada has been associated with high levels of poverty, multi-child households, low levels of education attainment and labour force participation, reliance on social assistance/welfare, and female lone-parent households (Willows et al., 2009).

Food security challenges faced by Aboriginal people are unique (Power, 2008; Agriculture and Agri-Food Canada, 2006; Dietitians of Canada, 2005; Dietitians of Canada, 2007; Kuhnlein & Receveur, 1996; Power, 2007), especially for Aboriginal people living in remote and isolated communities. Aboriginal food systems are primarily characterized by two avenues of food provision: the harvesting, sharing and consumption of traditional (or country) foods and the purchasing and consumption of market (or commercial or store-bought) foods (Kuhnlein & Receveur, 1996; Power, 2007). Food harvested from the wild by

First Nations people is called “traditional food” while the Inuit call wild-harvested food “country food”. Despite the combination of the traditional food system and market food system as being distinct from the non-Aboriginal food system, current conceptualizations of food security lack the context, food practices, and perspectives of Aboriginal people (Power, 2008).

Regardless of evidence that food insecurity is prevalent in Aboriginal communities, little information is known about the characteristics of the individuals or households experiencing this problem (Willows et al., 2005). While numerous food system studies have been published on Inuit people living in the Canadian Arctic in recent years (Rosol et al., 2011; Beaumier & Ford, 2010; Chan et al., 2006; Duhaime & Godmaire, 2002; Egeland et al., 2010; Egeland et al., 2011; Ford & Beaumier, 2011; Ford, Lardeau, & Vanderbilt, 2012; Huet et al., 2012; Lambden et al., 2006; Lardeau et al., 2011), there are still few food system studies with on-reserve FN communities (Power, 2007). Many gaps remain about the nature and extent of food insecurity for FN people in Canada. Lead authors in this field (Power, 2008; Willows, 2005a; Willows et al., 2009) have recommended qualitative studies to better understand the food security situation for FN people. The knowledge gained can help to tailor food security programs and policies to the unique needs of these communities and population (Power, 2008; Willows et al., 2009).

In this study, we explored food insecurity from the perspective of First Nation adults living in a remote, on-reserve sub-arctic community in northern Ontario, Canada. Previous work by our group had identified a high prevalence of household food insecurity using the Household Food Security Survey Module (Health Canada, 2007; Skinner, Hanning, & Tsuji, in press). The intention of this study was to determine participants’ perceptions of food security and the range of adaptive strategies they use at an individual and household level. The two research questions addressed by this study were: (1) “What are the coping strategies

for food insecurity used by community members?"; and, (2) "What suggestions do they have to improve food security in their community?"

5.2.1 *Community profile and study population*

This study was conducted in Fort Albany First Nation which is situated on the west coast of James Bay in the Mushkegowuk Territory along the Albany River in northern Ontario, Canada. As described previously (Skinner et al., 2012a; Skinner et al., 2012b), the Fort Albany reserve is home to approximately 850 people. Fort Albany is geographically remote (52° 15' N; 81° 35' W); it is accessible only by plane year-round, by boat and barge during the ice-free season, and by ice road after freeze-up. In Canada, a remote community is defined as being more than 350 kilometres from the nearest service centre (or city) having year-round road access. Fort Albany also is categorized as a community with "special access" which means that it is located in a zone where there is no year-round road access to a service centre. Timmins, Ontario is 769 kilometres from Fort Albany and is one of the closest cities with road access. Timmins is considered a main entry point for food distribution to Fort Albany as food is flown from there during most of the year with the exception of 6-8 weeks in the winter when the ice road allows for accessibility to closer communities. One of the communities accessible by ice road is Moosonee, which is 128 kilometres southeast of Fort Albany and has train access. As a result of being remote with special access, transportation of goods into the community of Fort Albany, including commercial food, is very expensive.

At the time of this study, the community had one main grocery store and two small convenience stores. Although traditional foods remain an important part of their diet, the majority of dietary intake is from store bought food. Community members participate in traditional harvesting activities (also referred to as traditional food acquisition) including hunting, fishing, and gathering food from the land. However, these activities have been declining in recent decades, especially for young people. As these endeavours are seasonal,

are limited by financial constraints for harvesting transportation and equipment, and the yield varies greatly depending on the success of the harvest, there is much variability in the consumption of traditional foods between households and over the course of the year.

Traditional foods commonly harvested and consumed include berries (e.g., ground berries - *Gaultheria procumbens*), fish (e.g., whitefish - *Coregonus clupeaformis*), large land-based animals (e.g., moose - *Alces alces*), game birds (e.g., goose - *Branta canadensis interior* and *Anser caerulescens caerulescens*), and small game (e.g., hare - *Lepus americanus*).

Community members live in small houses and many households have extended family living together.

Fort Albany First Nation was an ideal location for this project for a number of reasons: we have established a community advisory committee with broad community representation; have good rapport with the community and school as we have been working on school programs for healthy eating and physical activity for many years; and community members have a keen interest in improving the dietary habits of their population (Skinner et al., 2012a; Skinner et al., 2012b; Skinner et al., 2006; Tsuji, Nieboer, Karagatzides, Hanning, & Katapatuk, 1999).

5.3 Methods

This study builds upon our previous work where community focus groups and individual interviews with Fort Albany community members identified food insecurity as a constraint to healthy eating in children and youth (Skinner et al., 2012a; Skinner et al., 2006). This study was also part of a larger project to examine food security in the community. The theoretical framework for the larger project was based on systems thinking and a critical social theory perspective (Getty, 2010). Critical social theory includes aspects of theories from feminism, postcolonialism, and Indigenist critical theory which better reflects Indigenous ways of knowing than a purely postcolonial approach (Getty, 2010). This theory allows for a more

holistic spiritual viewpoint and represents an Indigenous research paradigm that supports self-determination. The theory also focuses on specific language used by participants as a source of information about meaning (Getty, 2010).

5.3.1 *Community advisory committee*

A community advisory committee (CAC) of six community members representing local stakeholder organizations (e.g., Band Council, Health Centre, school) and parents and the community at large was established prior to the study. For this study, members of the CAC were involved in the design of data collection tools (e.g., qualitative questions and probes), helped to adapt approaches to decrease the cultural sensitivity of study methodologies, assisted in collecting data, provided input on the interpretation of results, and assisted with the dissemination of results. Although a trusting relationship between the investigators and members/organizations in the community has been previously established, the specific formation of a CAC was fundamental to this participatory research. Ethics approval for this study was obtained from the Office of Research Ethics at the University of Waterloo and permission to conduct this study was obtained from Fort Albany First Nation.

5.3.2 *Question development*

As part of the larger project, the first part of each interview began with having the participants respond to the 18-item US Household Food Security Survey Module (HFSSM). The HFSSM is a government questionnaire that was used by Health Canada in the 2004 Canadian Community Health Survey (Cycle 2.2) to determine the prevalence and severity of food insecurity in the off-reserve population (Health Canada, 2007). The qualitative interviews for the current study were conducted following completion of the HFSSM, which is why the first interview question refers to the government questionnaire.

Lambden and colleagues (2007) concluded that traditional food attributes must be included in studies of food security in the Arctic. Although this study was in the subarctic, it is apparent from previous work with Cree in the western James Bay region that questions related to traditional food are very important for studying food security in this community. These considerations were taken into account during the question development for the qualitative interviews.

A set of three questions and probes were developed using an iterative process: 1) Initially, nine questions were informed by the qualitative food security literature, including studies with Aboriginal populations in Canada (e.g., Chan et al., 2006; Lambden et al., 2006; Cohen, 2002); 2) During subsequent drafts, questions were reviewed to ensure they were more understandable, culturally appropriate and relevant to the food security issues in FN communities based on consultation with and input from members of the CAC (n=3) and the investigators' (n=3) personal experiences with the people and community of Fort Albany. The number of questions for the final draft (n=3) was kept small to reduce the response burden for the participants. The final three questions were: (1) The government questionnaire we did seemed to ask mostly about store-bought foods. Can you tell me about traditional foods and your household?, (2) How do you adapt if there doesn't seem to be enough food (traditional or store-bought) for your household?, and (3) What do you think can be done to make it easier for people in Fort Albany to get enough (healthy) food (store-bought and/or traditional food)?. Table 5.1 displays the final three questions and probes.

Table 5.1: Interview questions and probes

<p>Q1. The government questionnaire we did seemed to ask mostly about store-bought foods. Can you tell me about traditional foods and your household?</p> <p>Probe for</p> <ul style="list-style-type: none">• Any barriers to accessing traditional food• Has environmental change affected access to traditional foods• Any methods to increase traditional food access and consumption
<p>Q2. How do you adapt if there doesn't seem to be enough food (traditional or store-bought) for your household?</p> <p>Probe for</p> <ul style="list-style-type: none">• e.g., things you might do to make food last longer, other sources of food
<p>Q3. What do you think can be done to make it easier for people in Fort Albany to get enough (healthy) food (store-bought and/or traditional food)?</p> <p>Probe for</p> <ul style="list-style-type: none">• Community (community), band (government), band council (government), school (community, individual), people (individual)• Food sharing between community members and families

5.3.3 Participant recruitment, consent, and data collection

A local community research assistant was hired to collect the data. He had been employed by our research team in the past and trained in proper protocols for data collection, including the administration of surveys and conducting interviews. He had an understanding of the project's aims, was instructed to provide probes when appropriate, and was familiar with the practice of active listening during interviews (Noaks & Wincup, 2004). The community assistant spoke Cree, which was helpful if any of the participants requested Cree translation. The assistant was also a Band member, had stature in the community, and has lived there for more than 25 years. Therefore, the assistant had full understanding of the language and culture of the respondents as well as established trust and rapport; all of which are important elements for conducting qualitative interviews (Fontana & Frey, 2000). The status of the interviewer was very important for the comfort of the participants in discussing the sensitive topics around food insecurity.

One adult in each of the on-reserve First Nation homes in Fort Albany was approached in-person by the community research assistant to participate in the study. Participants were

provided with an information/recruitment letter and/or the study was explained orally. Participants were given the option to be interviewed in their language of choice and their location of choice. As in our previous studies, verbal consent was obtained from all participants, being culturally appropriate for the Western James Bay region for this type of project (Skinner et al., 2006; Kirby et al., 2007). Semi-directed, in-depth interviews were conducted with each willing participant from June 2009 to January 2011. Interviews were guided by the three open-ended questions and the probes were only used to prompt more discussion if the participant needed examples to stimulate the conversation. The CAC decided that due to the sensitive nature of the topic of food insecurity it was not appropriate to audio-record the interviews. The community research assistant took verbatim handwritten notes during interviews. Demographic characteristics of the respondent and household were also collected. Interviews were coded by number for anonymity and to maintain confidentiality of respondents. All willing respondents participated in the interview regardless of whether their household was classified as food secure or food insecure.

The university research team was in regular contact with the community assistant either in-person or by telephone to discuss progress on data collection and to answer any questions that might come up related to the data collection. Interview transcripts were periodically returned to the research team in batches as they were completed.

5.3.4 *Data management and analysis*

The handwritten interviews were transcribed verbatim. Organization and coding of the transcribed data for the qualitative analysis was conducted both by hand and using QSR NVivo® computer software (NVivo, version 8.0; Doncaster, Australia: Sage Publications Software, 2008). Thematic data analyses were carried out according to the stages and steps described by Boyatzis (1998) and followed an inductive, data-driven approach (Boyatzis, 1998). Initially, the raw data were reduced into logical and meaningful segments on paper

(Patton, 1997). Subsequently, data were organized into groups, and “themes” (Braun & Clarke, 2006) were identified within a subsample of data from ten randomly selected interviews. The themes were then compared across subsamples and codes were created. Creating the codes was an iterative process of the writing, editing, and reconstruction of statements from the preliminary themes into a set of revised themes using the qualitative techniques of the constant comparison method and searching for deviant cases (Charmaz, 2006). The qualitative analysis continued until saturation was reached, where no new themes emerged from the data. This also was an indication that there were a sufficient number of interviews and the sample size was adequate (Strauss & Corbin, 1990). During the process of analyses, the theme and subtheme labels were created based on an interpretation of the statements and phrases of the participants. Therefore, the thematic labels presented in the study findings are not a verbatim representation of the exact words spoken by the participants during the interviews. Memos were used to record thoughts and ideas about the codes during the process of code development (Lofland & Lofland, 1995). The codes were then used to analyze the rest of the qualitative data from all of the interviews. Initially the three interview questions were coded separately. Then the codes were opened to be coded across the three questions as the analyst found that the questions asked “triangulated”. The final codes were arranged into a hierarchical coding list.

Initial thematic analysis was conducted by the lead author. To determine the consistency of judgment of the coders and to establish inter-rater reliability (Hruschka et al., 2004; Patton, 2002), the codes for the themes and subthemes were confirmed by a second independent analyst who had documented expertise with qualitative methods and analysis and expertise on the topic of food security (Desjardins, 2010; McCullum et al., 2005). The second analyst applied the themes to a subset of the data which was a random selection of 50% (n=25) of the interviews. The percent agreement between the two coders was 83%. The second coder also

recommended the reorganization and addition of two subthemes and one main theme. The additions of these themes were discussed between the two coders and it was agreed that they should be included in the analysis. The final code included 10 themes and 39 subthemes.

Final emergent themes and subthemes were shared with a few of the interviewed participants (n=5) by the lead author to confirm that they accurately reflected their perspectives. A listing of the themes and subthemes was discussed with members of the CAC and revisions to the wording of the final themes and subthemes were suggested. Sharing the themes with participants and the CAC was a form of member checking to verify results of the study (Lincoln & Guba, 1985).

5.4 Results

Of the 76 individuals approached to participate in this study, 10 declined participation in the larger study, and 15 refused to participate in the interviews, resulting in a response rate of 67%. A total of 51 respondents participated in the interviews, 27 male and 24 female with an average age of 43.7 years. The main reason 15 individuals chose not to participate in the interviews was respondent fatigue as they had already completed the HFSSM questionnaire. Just over half of the non-participants were male (n=8, 53%) and lived in households categorized as food secure (n=8, 53%) and their average age was 41.3 years. Personal and household characteristics of the participating study population are shown in Table 5.2. Although more than three-quarters of the 51 participants had a salary from employment as their main source of income, 75.5% lived in households that were classified by the HFSSM as food insecure.

Table 5.2: Personal and household characteristics of participants (N=51)

	N	%
Personal characteristics of participants		
Age in years		
21-30	3	5.9
31-40	16	31.4
41-50	22	43.1
51-60	10	19.6
Sex		
Male	27	52.9
Female	24	47.1
Highest level of education		
Elementary graduate or less	17	33.3
Secondary graduate or some secondary	19	37.3
Post-secondary graduate or some post-secondary	15	29.4
Main source of income		
Salary/wages from employment	39	76.5
Social assistance or other ^a	12	23.5
Household characteristics of participants		
Household food insecurity ^b		
Food secure household	12	24.5
Moderately food insecure household	27	55.0
Severely food insecure household	10	20.5
Household type		
Couple with children	31	60.8
Couple, no children ^c	11	21.6
Lone parent ^d	7	13.7
Other ^e	2	3.9
Children < 18 years living in household		
None	13	25.5
1 or 2	25	49.0
3+	13	25.5
Number of families ^f living in household		
1	27	52.9
2	24	47.1
Total number of people living in household		
1-3	15	29.4
4-6	33	64.7
7+	3	5.9

^aRespondents could choose other sources of income, including worker's compensation/employment insurance, pension/senior's benefits or any other source (e.g., alimony, child tax benefits, etc.), however all respondents without a main income source from salary/wages chose social assistance.

^bBased on participant responses to the Household Food Security Survey Module (HFSSM). The n=49 as two individuals chose not to respond to the HFSSM questionnaire.

^cIncludes couples living alone or those with children > 18 years

^dIncludes lone parents living with at least one child < 18 years

^eIncludes unattached individuals not living with any children < 18 years

^fA "family" was defined according to the Statistics Canada definition for Census Family [46] (Statistics Canada, 2012)

The results section documents an interpretation of the findings based on the three interview questions that were asked and selected discussions that followed between participants and interviewer. Figure 5.1 illustrates the hierarchical coding list of themes and subthemes that represent the participant's perspectives on food insecurity. Although there was some overlap between the questions asked, the interviews generally fell into the three question categories: traditional food acquisition; coping strategies for food insecurity; and suggestions to improve food security. For the remaining Results section, the paragraph headings are the themes. The full list of themes and subthemes are depicted in Figure 5.1. In Figure 5.1, the themes are the darkly shaded boxes where the number in parentheses denotes the number of times each theme was represented by a quote. The subthemes under each theme are listed in order according to the number of participants with at least one quote for the subtheme.

5.4.1 1) *"Can you tell me about traditional foods and your household"*

5.4.1.1 *Barriers to traditional food acquisition*

When describing traditional food acquisition for their household, the majority of participants reported various barriers that prevented them from acquiring traditional food on a regular basis despite their desire to eat game meats more often. The two main barriers reported were the high cost of hunting and environmental change affecting their ability to hunt in specific areas and during specific times. The high costs were attributed primarily to the cost of fuel to travel to hunting sites and the financial means to own hunting equipment. Hunting equipment included vehicles for transportation, guns, and ammunition. A number of participants pointed out that even if money was spent to go out hunting, there was no guarantee that the hunt would be successful.

“It costs money to go hunting – gas, snow machine, and you need that money for everything else because everything is expensive.” (Interview 4, female)

“Gas is expensive...\$1.85 a litre. But you can spend all the money to go out hunting and come back with nothing. So you’ve spent your money, but still have no food.” (Interview 25, male)

“Still go hunting, geese, moose, caribou but the seasons are changing and it gets harder to get wild food. For spring hunting – geese fly at odd times now. In April it is still too cold, snow and sometimes it gets too warm and snow melts too fast. Geese won’t land where there is no snow. I guess we have to change our hunting season [May and June] and go hunting at the Bay instead of the muskeg [swamp]. We try to get 12 geese at least and cook one per month.” (Interview 17, male)

Other categories of barriers mentioned included the loss of culture as a reason for no more hunting; less [personal] time for hunting, fishing and cooking traditional food due to employment, and concern about environmental contaminants in hunted food.

5.4.1.2 No barriers to traditional food acquisition

A few participants did express that they thought there were no barriers to traditional food acquisition. However most of these people also admitted that they did not hunt, did not prefer game meat, or consumed only store-bought food.

5.4.2 2) *“How do you adapt if there doesn’t seem to be enough food for your household”*

5.4.2.1 *Importance of hunting/fishing/gathering and traditional food practices*

This importance of traditional food acquisition and traditional food practices was a prevalent discussion topic throughout the interviews and was the predominant theme across all three of the interview questions. In addition to describing their access of traditional food from hunting, fishing, and gathering for themselves, the participants also mentioned accessing food from other people and the importance of food practices such as storing and preserving traditional food for future consumption.

“As for me, I don’t really eat traditional food only when family member gives me wild meat. Would be nice to eat traditional food every supper.” (Interview 46, female)

5.4.2.2 *Food sharing*

When asked how they adapt when there isn’t enough food, the majority of participants mentioned food sharing. Food sharing with family was the most common, followed by food shared between community members and then food shared with friends. Food sharing with family included immediate family as well as relatives, even if the relatives lived in another community. Food sharing was seen as a normal part of daily life and occurred more often during hunting seasons when game meat was made available by hunters. Most of the participants described that the food shared was traditional game meats.

“We have get-togethers as family and we go to another family house and we share what we have in our homes and the other family does as well.” (Interview 29, male)

“Our parents have a lot of wild meat and share with our family.” (Interview 19, female)

“One way is to give food if other families can’t afford to buy what they run out of.”

(Interview 45, female)

5.4.2.3 Dietary change, rationing, and food purchasing patterns

Participants explained how they would change their eating and food purchasing patterns in times where they didn’t have enough food or when they couldn’t afford to purchase certain foods. They described how they bought food in bulk from the south and stocked up their provisions of non-perishable food when the winter road was usable. Some mentioned reducing portion sizes and changing their consumption patterns. For example, they bought dry goods like rice and pasta which were cheaper to purchase.

“We buy more in Moosonee during the winter months. Buy foods such as macaroni, rice, other dry food.” (Interview 2, male)

5.4.3 3) “What do you think can be done to make it easier for people in Fort Albany to get enough (healthy) food”

5.4.3.1 Improve income and food affordability

When participants were asked to suggest ways to make it easier for community members to get enough food, the majority pointed to the high prices of food at the local store and the low incomes of community residents. They thought that the store food should be reduced in price to become more affordable and that freight costs for shipping food should be decreased. Increasing income by increasing the amount of social assistance (welfare) payments or having more employment opportunities were also mentioned.

“Lower cost of food would be nice so all people can afford, especially welfare recipients.”

(Interview 5, male)

5.4.3.2 *Building community capacity and engagement*

Many participants discussed the importance of increasing independence and self-sufficiency so that they didn't have to rely on food transported from the south. They wanted to advocate for food security initiatives and put some of the responsibility for improving food security towards community leaders. For example, the Band and Band council were frequently mentioned and were viewed to be in a position to make positive changes towards increasing food availability and affordability. Many participants said "the Band should do this...". The participants used terms that indicated a collective movement whereby community members could work together towards solutions. For example, many respondents used the words "we could..." or "we should..." or "we need...".

"As for the last part of the question, one method is to move back in the upper bush land (upriver) and not depend on the white society. But...we, the First Nations in the communities have already accepted everything from the start...like the signing of the treaty or letting our kids go in the residential school to get educated...we need to be independent and start doing things for ourselves." (Interview 52, female)

"[There should be] scheduled hunting trips where gas and supplies are paid [by the Band] and traditional food/meat caught given to lower income families – salary for the hunter. This would provide jobs and feed the lower income groups. Lots of great hunters and trappers in this community – utilize them." (Interview 49, female)

5.4.3.3 *Community-level initiatives*

Participants also pointed out a number of community-level initiatives that they thought could improve food security. The most common community initiative suggested was related to gardening or farming. Community members were reminiscent about times in the past when they gardened or remembered when there used to be farming activity in the community.

“Start a garden. You could grow things like rhubarb for jam or pies. We used to have a garden and we grew potatoes. We used the potatoes at the goose camp. We know that you can grow things here.” (Interview 50, female)

Community members also were keen to continue and support the ‘Farmer’s Markets’ that had been started by a few community food champions. The ‘Farmer’s Market’ was an event initially held once every few months where food was purchased from a southern store and a plane was chartered to fly the food into the community. The food was then sold to community members at prices that covered the cost of the food and freight with no profit. These events were organized by a few people in the community who wanted to improve food access and affordability for community residents.

“Okay, as for me I think they should hold more Farmer’s Markets.” (Interview 47, female)

Another suggestion was to employ community hunters. This was seen as a way to increase the harvesting of traditional foods as well as income support for community members who were willing and keen to hunt, but might be unable to afford to hunt due to financial constraints.

“Get Band Council to get some hunters to go hunting for spring and fall. Supply the hunters with guns, shells, gas for their trip. Whatever game [meat] is killed, it should be shared within the community.” (Interview 51, female)

5.4.3.4 Improving the built environment/infrastructure

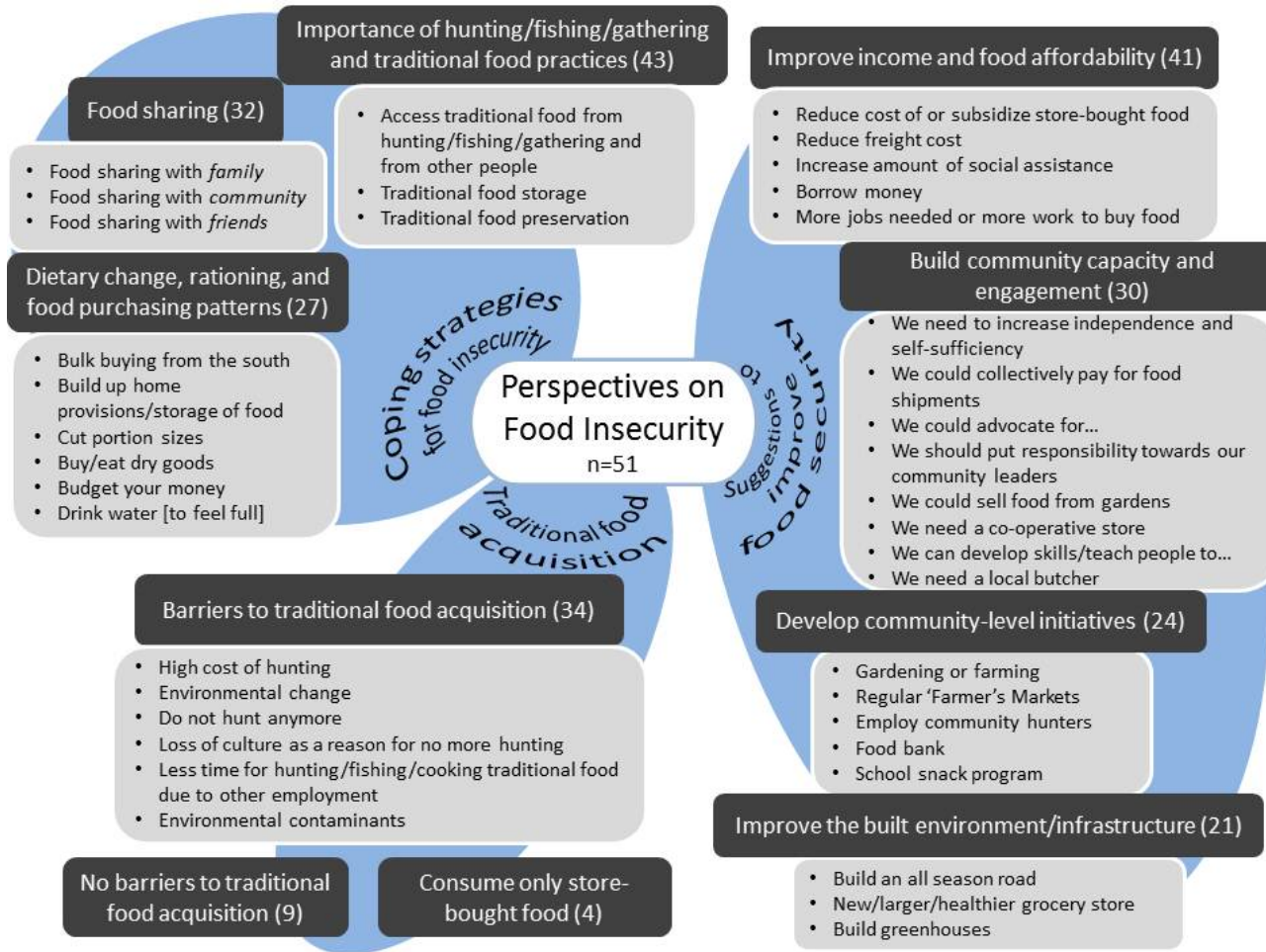
Participants made recommendations for building physical structures to promote food security and these were categorized as improving the built environment or infrastructure. They primarily mentioned the building of an all-season road in the community. An all-season road could provide year-round access to southern stores and reduce the cost of transporting food into the community.

“Maybe an all-season road will help to have more food in cupboards, like winter time.”
(Interview 37, male)

Some participants also mentioned having a larger grocery store with more healthy food and that greenhouses should be built to grow local food in the community. The one main store in the community was regarded by residents as being too small for the size of Fort Albany, even when it was first built. In addition to housing groceries, the store also serves as the local bank and the only local business where residents can buy clothing, appliances, furniture, and electronics. Respondents expressed a desire to have better quality and more quantity of fresh fruits and vegetables as well as more fresh meat that had not been frozen. It is important to note that a small greenhouse was built at the community school over the summer and fall of 2010. The five by six meter greenhouse was partially funded through a university research grant as a case study of food security intervention strategies in the community. It was not clear from the interviews whether the respondents were motivated by

the school greenhouse to suggest that more greenhouses be built or whether the idea of building greenhouses originated elsewhere.

Figure 5.1: Themes and subthemes that emerged from the thematic analysis of participant perspectives on food insecurity



5.5 Discussion

Over the past century, Aboriginal populations living in northern communities have become increasingly vulnerable to the transformation of local culture and society, including a significant shift from a primarily subsistence way of life (Sydney-Smith et al., 2010). They are no longer nomadic and do not experience extreme feast or famine situations as they had in the past; however in many communities the experience of food insecurity prevails. The introduction of store-bought foods and reduction in traditional food acquisition has been a detrimental nutrition transition resulting in considerable changes to their health and well-being (Kuhnlein & Receveur, 1996). As northern and remote populations in Canada are continuing to be exposed to external stressors, such as environmental change; they become increasingly reliant on coping mechanisms to maintain food access (Beaumier & Ford, 2010; Ford & Beaumier, 2011). Issues related to food security in Aboriginal populations that have not been studied in-depth include: how traditions of sharing and reciprocity of food contribute to food security; how families cope internally with food shortages; how individuals within families experience or cope with food shortages differently; how communities cope with widespread food insecurity; and what solutions or strategies have worked (or not worked) in the past and what new strategies are suggested by community members (Power, 2008; Power, 2007; Willows, 2005a). The goal of this study was to begin to explore some of these understudied issues from the perspectives of individuals living in a remote FN community. To our knowledge, this is the first study to examine coping strategies for food insecurity with a remote, subarctic FN population. The findings point to the continued importance of traditional food acquisition and food sharing as well as listening to proposed community solutions for food systems change.

5.5.1 *Traditional Food Acquisition and Coping Strategies for Food Insecurity*

Similar to findings from this study, the high cost of hunting and environmental change have been cited as barriers to traditional food acquisition and affecting food security for Aboriginal people living in Canada's north (Chan et al., 2006; Ford & Beaumier, 2011; Furgal & Seguin, 2006; Guyot et al., 2006; Lemelin et al., 2010; Lougheed, 2010; Nancarrow & Chan, 2010; Schuster et al., 2011). In this study, hunting, fishing, gathering of traditional food and traditional food practices (e.g., traditional food preservation) were important ways for community members to cope with food shortages. Subsistence harvesting for Cree of the western and eastern James Bay region remains an integral part of the culture (Berkes et al., 1994; Delormier, 1993; Tsuji, 1998; Tsuji & Nieboer, 1999; Tsuji et al., 2007; Tsuji et al., 2006). Outside of the clear nutritional value of wild food, the spring and fall harvesting periods constitute a cultural event which increases social and community cohesiveness. The extremely high cost of market food is prohibitive (Gates et al., 2012; LeBlanc & Veeraraghavan, 2012). Thus, the contribution of wild food to the Cree diet must be preserved for both economic and cultural reasons (Tsuji, 1998). The importance of traditional food for northern populations has been well documented (Egeland et al., 2011; Nancarrow & Chan, 2010; Schuster et al., 2011). Traditional food storage has become modernized with the use of freezers to store game meat for future consumption. It was not clear from the interviews whether the preservation of food, such as smoking or drying, has decreased with the increased use of freezers.

Food sharing was expressed by 63% of participants as a means of coping with food shortage. This important part of Aboriginal culture and traditions has been documented widely in the literature (FNIGC, 2012; Chan et al., 2006; Ford & Beaumier, 2011; Delormier, 1993; Ford, 2009; Gombay, 2007; Kaplan & Gurven, 2001; Robidoux, Haman, & Sethna, 2009; Socha et al.,

2012) including food sharing by the James Bay Cree (Tsuji & Nieboer, 1999; Tsuji et al., 2007). The First Nations Regional Health Survey (FNIGC, 2012) found that nearly nine of ten (85.5%) respondents had traditional food shared with their household in the past year prior to the survey. Fort Albany residents felt that food sharing between family, community members, and friends was a key coping strategy when their household did not have enough food. In contrast to a few recent studies reporting that food sharing has been decreasing in northern Aboriginal communities (Beaumier & Ford, 2010; Ford & Beaumier, 2011; Socha et al., 2012), the current study found that food sharing continues to be an important way for community members to adapt to food shortages and a weakening of food sharing was not mentioned during interviews. Other studies pointing to a decline in food sharing networks cite reasons including the high cost of hunting; an increasing number of households without a hunter; and stress on hunting yields due to environmental changes (Beaumier & Ford, 2010; Ford & Beaumier, 2011; Ford, 2009; Socha et al., 2012). The high costs of hunting and environmental change were both subthemes that emerged as barriers to traditional food acquisition in Fort Albany.

Dietary change, such as consuming less expensive food like rice and pasta, and rationing of food intake are coping mechanisms for food insecurity that emerged from the current interviews and are commonly cited in the literature (Maxwell et al., 1999; Maxwell & Caldwell, 2008; Norhasmah, Zalilah, Mohd Nasir, Kandiah, & Asnarulkhadi, 2010; Shariff & Kohr, 2008). Less severe forms of food rationing include cutting portion sizes to more severe behaviours such as skipping meals completely (Maxwell et al., 1999; Tarasuk, 2001). Participants of this study even mentioned drinking water to feel full, which indicates the severity of food insecurity for some Fort Albany residents. Specific food purchasing patterns, such as buying in bulk from more southern stores and using this practice to build up home food provisions may be unique to remote

communities with seasonal road access. After freeze-up when the winter road can be safely travelled is a time of year with a great flurry of community activity as people try to buy supplies that they otherwise have difficulty accessing due to reduced availability and cost at their local store.

5.5.2 *Suggestions to Improve Food Security*

It must not be overlooked that the key determinant of food insecurity is poverty (McIntyre & Tarasuk, 2002; Rose, 1999). Income and food costs become more powerful determinants of food selection due to wide spread poverty and reliance on social assistance in many Aboriginal communities (Willows, 2005a). Suggestions to improve food security in Fort Albany reflect the reality of low incomes and high food costs in the community. However, it is positive that Fort Albany members are keen to start building community capacity and engagement and initiate community-level initiatives to improve their food security. Community-driven initiatives in FN communities tend to result in greater community buy-in and more successful outcomes.

Initiating and maintaining nonconventional agricultural initiatives have the potential for the community to increase self-sufficiency and reduce reliance on imported produce (Spiegelaar & Tsuji, in press). Likewise, hiring community hunters could reduce dependence on meat transported from the south and provide employment. While gardening and farming would require considerable commitment by community residents, it is already gaining momentum in the community and has benefitted from pilot-projects, including a provincially funded “Get Growing” community garden project (LeBlanc, 2012) and a pilot agroforestry (local-substitution) project (Spiegelaar & Tsuji, in press). Community gardens have been suggested by other studies as a step towards greater food security and food sovereignty (Socha et al., 2012; Spiegelaar & Tsuji, in press). Harvester support programs that subsidize the cost of hunting,

fishing, and trapping have been carried out in the Arctic (Duhaime & Godmaire, 2002; Government of Nunavut, 2008) and subarctic (No author, 2006) resulting in benefits at the community level.

In 2007 community food champions in Fort Albany began to organize a non-profit ‘farmer’s market’ event every few months. A plane would be chartered to fly in fresh and healthy food to be sold at cost to local residents. This means the prices are at least 50% lower than the same foods sold at the local grocery store because there are no overhead costs. Fort Albany has now started to call their ‘Farmer’s Markets’ an ‘alternative market’. The concept of their alternative market has begun to receive attention from a broader audience, has grown into a bi-weekly event and is being supported by external agencies that are aiming to improve northern food systems (LeBlanc & Veeraraghavan, 2012). Awareness by external groups of the alternative market increased after it was presented at a national food security conference in November 2012 (Food Secure Canada, 2012). While the alternative food market does not move the community food system towards greater self-sufficiency, it can help the community take more control over food pricing of transported foods and may lead to feeling empowered for food system change.

Building an all-season road into the community was suggested by numerous participants, but is a contentious issue. On one hand, having an all-season road would mean the ability to travel by truck to other neighbouring communities - and a year-round land connection to more southerly communities - where food costs are lower even taking into account the added cost of transportation for foods imported into the community. However year-round land access could also have negative consequences, such as the greater ease of transporting drugs and alcohol.

The participants in this study spoke about the need to increase independence and self-sufficiency with respect to accessing adequate food. They are not alone with this plea as the

indigenous food sovereignty movement has been gaining momentum in Canada and has been documented through the *People's Food Policy* project. They state that the “tribal values of giving, sharing and trading are at the heart of land care and food sovereignty” and that “the core of food sovereignty is reclaiming public decision-making power in the food system.” (Food Secure Canada, 2011). Fort Albany residents did not use the exact term food sovereignty during their interview dialogue, but food sovereignty was, in essence, what they were describing; they expressed a desire and suggested strategies to enhance their independence, self-sufficiency and acquisition of new skills, in addition to advocating for better food security. Food security is a precondition for, and outcome of, food sovereignty. The goal is to achieve food security concurrently with food sovereignty.

The strengths of this research include the large sample of community members that participated in the interviews and the willingness of the respondents in describing their experience of food insecurity despite the sensitivity of the topic. Participants were likely more willing to discuss their perceptions of being food insecure because of their comfort level and rapport with the local community research assistant who conducted the interviews. There were two main limitations of this study: the inability to audio-record the interviews and the generalizability of the results. First of all, although it was deemed inappropriate by the CAC to audio-record the interviews, audio-recording would have allowed the interviewer to focus all of his attention on questioning and listening during the conversation as well as capturing elements of tone and emphasis made by the participants. However, one advantage of the absence of a tape recorder is that it may have led to the relaxed nature of the interviews. Secondly, the findings in this study are not generalizable to individuals living in contexts that vary greatly in terms of food accessibility and availability. For example, those living off-reserve and in more accessible

geographic locations where store bought food is considerably less expensive and where traditional food practices are not an integral and important part of the food system.

5.6 Conclusions

Aboriginal people in Canada like the remote community of Fort Albany experience staggering rates of food insecurity and it continues to be an urgent and pervasive public health issue. Findings from this study point to the continued importance of traditional food acquisition and food sharing as well as listening to proposed community solutions for food systems change. These data highlight that traditional and store-bought food are both part of the strategies and solutions participants suggested for coping with food insecurity. The findings can be used to inform assessment and program planning activities and to advocate for policies at the local, provincial and federal levels to strengthen community food security, specifically in remote Aboriginal communities. Public health policies to improve food security for FN populations are urgently needed. While short and medium term strategies (e.g., greater employment and building community gardens and greenhouses) are important for initiating food systems change, long term sustainable food systems require policy strategies and instruments to be effective in building and strengthening food security and community capacity. Fort Albany was at the forefront of the Food Secure Canada conference in 2012 when the newly elected Chief of Fort Albany received a standing ovation for his emotional speech on food sovereignty in remote communities (Food Secure Canada Conference, 2012). Community members in Fort Albany are speaking up about the need for food systems change, and it appears that their local leaders are listening and supporting their mission. It's time for the provincial and federal governments in Canada to pay attention and to work with remote communities towards greater food security and to support a vision for food sovereignty.

5.7 Acknowledgements

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Chapter 6: THE IMPACT OF A SCHOOL SNACK PROGRAM ON THE DIETARY INTAKE OF GRADE SIX TO TEN FIRST NATION STUDENTS LIVING IN A REMOTE COMMUNITY IN NORTHERN ONTARIO, CANADA²

6.1 Overview

6.1.1 *Introduction*

School snack and breakfast programs may be especially important in remote northern communities where many households are food insecure. Despite the strong potential for school programs to improve the dietary intake and eating behaviours of children and youth, very few studies have reported on the effects of school nutrition programs in Aboriginal communities. The purpose of this study was to examine the impact of a school snack program on the dietary intake of grade six to ten First Nation students living in a remote community in northern Ontario.

6.1.2 *Methods*

Data were collected in November 2004 and December 2007 with grade six to ten (aged 10-18 years) students ($n=63$ and $n=50$, respectively) using a validated web-based 24 hour diet recall survey, the WEB-Q. Food group consumption and nutrient intake of students participating in the school snack program on the previous day were compared to students who chose not to participate. In each year, ANOVA was used to assess differences between participants and non-participants, genders, and grade groups. The second data collection in December of 2007

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included five questions asking students about their participation, preferences, and impressions of the snack program.

6.1.3 *Results*

Students participating in the snack program during the 2004 data collection (37%; $n=23$) compared with those who did not (63%; $n=40$) had significantly ($p<0.05$) higher mean intakes from the Vegetables and Fruit food group (7.5 vs. 3.4 servings), folate (420 vs. 270 μg), dietary fiber (18 vs. 8 g), Vitamin C (223 vs. 94 mg), calcium (1055 vs. 719 mg) and iron (16.5 vs. 11.7 mg). For the 2007 data collection, snack program participants (52%; $n=26$) had higher intakes from the Milk and Alternatives food group (3.3 vs. 2.2 servings), Vitamin A (697 vs. 551 RE), calcium (1186 vs. 837 mg), and Vitamin D (6.9 vs. 4.4 μg) and significantly lower intakes of “Other” foods (6.0 vs. 7.2 servings) compared to non-participants (48%; $n=24$). For 2004 and 2007, differences in intake also occurred by gender and grade groupings, with no interaction effects between snack participation and gender or grade. With the exception of Meat and Alternatives in 2004, there was a trend for a higher percentage of students to meet dietary recommendations if they participated in the snack program. Students indicated that the three things they liked most about the school snack program were the juice (50%), that the program kept them from feeling hungry at school (40%), and that they got a snack at school every day (32%). Students indicated that the snack program helped them to eat healthier by motivating them (74%), eating more fruit (86%), and making better dietary choices (68%).

6.1.4 *Conclusions*

Given the positive impact of the program on the food and nutrient intake of school snack program participants, qualitative feedback will be used to enhance the program and participation.

Clearly, school snack programs can be an important venue to address the nutritional vulnerability of First Nation youth living in remote communities.

6.1.5 *Key words*

adolescent, Canada, child, First Nations, food habits, nutritional status, program evaluation, schools

6.2 Introduction

Aboriginal peoples is a collective name for the original peoples of North America and their descendents. Over the last few decades, rapid cultural change has occurred in many Aboriginal populations affecting their dietary patterns; transitioning from locally harvested traditional foods to a diet of primarily market food purchased from stores (Egeland et al., 2011; Kuhnlein et al., 2004). In particular, Aboriginal youth have departed greatly from traditional food consumption patterns (Kuhnlein, Receveur, Souieda, & Egeland, 2004). Traditional foods such as game meat, fish, berries and plant foods have been replaced by processed foods, high fat meals, and added sugars; especially in Aboriginal adolescents (Khalil, Johnson-Down, & Egeland, 2010; Szathmary, Ritenbaugh, & Goodby, 1987; Wolever et al., 1997). Numerous studies have reported low consumption of vegetables and fruit and dairy products by Aboriginal children (Khalil et al., 2010; Downs et al., 2009; Ng, Young, & Corey, 2010). Nutrient inadequacies in Aboriginal children and adolescents from certain communities have been documented for iron, folate, vitamin D, calcium and vitamin A (Wolever et al., 1997, Downs et al., 2009; Moffatt, 1995).

Recent studies have found associations between overall diet quality and academic performance (Florence et al., 2008) and a systematic review found that school breakfast

programs can have positive effects on academic performance (Hoyland et al., 2009). Schools are an ideal setting for promoting healthy eating due to the number of weekday hours that students spend there and the opportunity to teach children and youth about healthy foods and eating behaviours. Eating habits start during childhood and can be influenced by a healthy school food environment. School breakfast and snack programs can provide nutritionally balanced, free meals to students each school day. This is especially important in remote northern communities where many households are food insecure (Egeland et al., 2011; Power, 2007; Power, 2008); fresh produce and other nutritious perishable foods are inconsistently available and can be extremely expensive (Willows, 2005a; Wein, 1994a). School snack and breakfast programs have been suggested as viable actions to combat food insecurity in Aboriginal populations (Lyons, 2008; Gates et al., 2012; Gates et al., 2013; Hanning et al., 2011; Northern Territory Government, 2002; Rideout, 2005).

Aboriginal peoples in Canada refers to three groups: Indian (commonly referred to as First Nations), Métis, and Inuit. Nearly two-thirds of the Aboriginal population in Canada identify themselves as FN people and there are more than 600 FN communities. An environmental scan of nutrition programs in FN schools in Canada found that more than 85% of the 303 schools surveyed reported having a school nutrition program and 75% of those schools offered their program daily (Lyons, 2008). Despite the large number of nutrition programs existing in Canadian FN schools, only a few papers have been published in the academic literature that report on school meal programs (breakfast, lunch, and/or snack) in these communities (Saksvig et al., 2005). These programs have contributed substantially to calcium, dietary fiber, Vitamin A, Vitamin C, and Vitamin D in students (Gates et al., 2012; Gates et al., 2013; Saksvig et al., 2005; Wein, Hawrysh, & Gee, 1993).

The current study examined the impact of an existing school snack program on the dietary intakes of grade six to ten FN students living in the remote sub-arctic community of Fort Albany, Ontario. The main objective was to examine the dietary intakes of students participating in the snack program compared to those who did not participate using a validated web-based survey called the Waterloo Web-based Eating Behaviour Questionnaire (WEB-Q). Two data collections were conducted in separate years, 2004 and 2007. Given that fewer than half of students reported participating in the school snack program on the days of the 2004 data collection, the repeat evaluation in 2007 incorporated questions to assess the habitual participation in the program and obtain feedback on perceived program strengths and suggestions for improvement.

6.3 Methods

6.3.1 *Participants*

Participants in this study were students in grades six to ten at Peetabeck Academy in Fort Albany, Ontario. Fort Albany is situated on the west coast of James Bay along the Albany River and houses the community of Fort Albany FN which is home to approximately 850 Cree people. Fort Albany is remote and isolated as it is accessible only by plane year round. The community is connected with other James Bay coastal communities by boat and barge during the ice-free season and by a snow/ice road after freeze-up. Peetabeck Academy serves Fort Albany First Nation students from kindergarten to grade 12. The school snack program has been provided to students in Fort Albany for more than 15 years. At the time of this study, the snack program at Peetabeck Academy provided a morning snack to all students and an afternoon snack to all elementary (kindergarten to grade 8) students each school day. Morning snacks were usually breakfast type foods such as cereal with milk or whole wheat toast with a spread (cheese or jam)

and fruit juice, while afternoon snacks usually consisted of cut up fruit and fruit juice or milk to drink. Boiled eggs, yogurt, or homemade muffins were usually offered once a week when there were more volunteers to assist with snack preparation and distribution. Vegetables were offered occasionally when time and availability allowed. Traditional foods, such as bannock and game meats, were sometimes offered during special events.

6.3.2 *Data collections*

For this study, two separate data collections in 2004 and 2007 were used to assess the impact of the school nutrition program. Because time and availability of computer terminals did not permit single day data collections, the data were collected in each year over the course of two days. The WEB-Q was conducted in Fort Albany in November 2004 with 63 grade six to ten students (Data Collection #1). The two day data collection took place with grade six and seven students completing the WEB-Q on November 11th and grade eight, nine, and ten students completing the WEB-Q on November 12th. In December of 2007 data were collected with grade six and seven students on December 12th and grade eight, nine, and ten students on December 13th with 50 students (Data Collection #2). All 24 hour recall dietary data were collected to reflect weekday consumption (i.e., the impact of the school snack program), as the data were collected Tuesday to Friday.

6.3.3 *Web-based survey*

The WEB-Q is a validated web-based survey tool developed at the University of Waterloo to assess food and physical activity behaviors of children and adolescents (Forbes et al., 2009; Hanning et al., 2007; Hanning et al., 2009; Hlimi et al., 2012; Minaker et al., 2006; Storey et al., 2009a; Storey et al., 2009b; Sutherland et al., 2007; Vance et al., 2009; Woodruff & Hanning,

2009a; Woodruff & Hanning, 2009b; Woodruff & Hanning, 2010; Woodruff et al., 2008; Woodruff et al., 2010). The survey includes a 24 hour dietary recall which asks students about what types of food and how much of those foods they consumed on the previous day.

The WEB-Q simulates a dietitian interview and includes prompts for missed food items, pictures and comparisons to common objects to aid in portion size estimation, as well as immediate feedback for students to compare their individual food intake to recommendations. The WEB-Q has been used to collect nutrition and physical activity information from over 15,000 non-Aboriginal students in Canada and over 500 FN students in Ontario and Quebec. The WEB-Q was adapted for FN students through previous quantitative and qualitative research which included input through a local community advisory committee from a number of FN communities in southern Ontario, northern Ontario, and northern Quebec. The survey underwent some adaptation for each community; such as, adding questions related to school breakfast and snack programs (as applicable to each community), questions regarding traditional food intake, factors influencing traditional food intake, and questions to assist local planning. Specific to this study, adaptations relevant to Fort Albany and suggested by the community advisory committee were made to the WEB-Q. The primary adaptation involved the addition of traditional Aboriginal foods to the list of approximately 900 possible food choices in the 24 hour dietary recall.

Following adaptations, validity testing of the WEB-Q was conducted with FN students. Dietitian-administered interviews were conducted with twenty-five Fort Albany students during a data collection in 2004 and compared to the web-survey that had first been completed for the same 24 hour recall period. Food models from the Ontario Food Survey assisted with portion estimation during dietitian interviews. The results for Fort Albany ($n=25$) showed that there was

good agreement for energy and key nutrient intakes (intraclass correlation coefficients for calories, carbohydrates, protein, iron, vitamin C, and fibre > 0.67, $n=25$, grades six to ten) from the web-based survey versus dietitian administered interviews (Hanning et al., 2009).

The WEB-Q asked “At which times did you eat *anything* yesterday?” Students were to indicate all options that applied to them: breakfast, middle of the morning snack, lunch, middle of the afternoon snack, after school snack, dinner, early evening snack, later evening snack, school snack/breakfast program. This question was used to capture whether students had participated in the school nutrition program on the previous day. Based on input from the director of the program and questions used by FAVES – an evaluation survey of a school fruit and vegetable snack intervention conducted in London, Ontario (London District Catholic School Board, 2009; Population Health Research Group, 2009), five questions were added to the WEB-Q and asked during the second data collection with grade six to ten students in Fort Albany in December of 2007. The five additional questions on the WEB-Q related to the Fort Albany school nutrition program were as follows:

1. How often do you participate in the school snack/breakfast program? [Response options were: Every school day, More than half of the week (three or more days each week), Less than half of the week (two or fewer days each week), Rarely or never, Not answered]
2. What do you like most about the school snack program? [Check all that apply: I get a snack at school every day; It helps me to focus in class; It keeps me from feeling hungry at school; Juice; Eggs; Cereal or toast; Cut up fruit]
3. Is there a different vegetable or fruit you would like to get as a snack at school? [Open-ended]
4. If you could change one thing about the snack program, what would it be? [Open-ended]

5. Because of the school snack program... [Agree, disagree, not answered: I am motivated to eat healthier; I make better choices about what I eat; I eat more vegetables; I eat more fruit; I have asked my parents to buy or serve vegetables or fruits I try at school]

6.3.3.1 Participant Recruitment, Consent, and Data Collection

Parental passive consent/information letters were sent home with students one week before each scheduled data collection, as passive consent is culturally appropriate in this community. In addition, students had to provide active consent on the first page of the WEB-Q, by selecting the checkmark on the screen to participate or the X, to decline participation in the study. The lead author or her colleagues supervised students while they completed the WEB-Q and answered any questions the students had about the survey. Each student was assigned a unique login and password which ensured anonymity and confidentiality. The surveys were completed during class time using computers with internet access in the computer room at Peetabeck Academy. This study used a convenience sample of all consenting students who were in attendance on the days of each data collection; the participation rate was 100% as all students in attendance participated.

6.3.3.2 Data Analysis

From the WEB-Q data, food group consumption and nutrient intake (from the 24 hour dietary recall) of students participating in the school snack program on the previous day were compared to students who did not participate for 2004 and 2007, respectively. Descriptive statistics (means, standard deviations, frequencies, percentages) were calculated. For both the food-group and nutrient datasets, multivariate analysis of variance (M)ANOVA was used to assess differences between groups (snack program participants and non-participants), and by gender and grade. Owing to the small sample size, grades were categorized into two groups with

elementary students in grades six, seven, and eight versus high school students in grades nine and ten. Differences in grade were assessed because an afternoon snack was not offered to high school students (grades 9 and 10) and from past research indicating that older students tend to eat differently from younger students. Individual participant intakes were compared to current Canadian dietary recommendations for food groups and nutrients with an Estimated Average Requirement (EAR) value to determine the percentage of participants that were not meeting recommendations. The EAR has been used in dietary studies to describe the population prevalence of inadequate intakes. Data were analyzed using SPSS statistical software (Version 18; SPSS, Chicago IL; www.spss.com). Statistical tests were considered significant with P values < 0.05.

From the December 2007 data, analyses for the questions: “How often do you participate in the school snack/breakfast program?”, “What do you like most about the school snack program?” and “Because of the school snack program...” consists of frequencies and results are presented as descriptive characteristics. Frequencies from these questions were compared by gender. For the open-ended school nutrition program questions (“Is there a different vegetable or fruit you would like to get as a snack at school?” and “If you could change one thing about the snack program, what would it be?”), responses were grouped according to common themes and ordered according to the most common theme (or response) versus the least common theme (or response).

6.3.4 Ethics Approval

Permission to conduct this study was obtained from Fort Albany First Nation (the locally elected government), Mundo Peetabeck Education Authority (the local First Nation administered school board), and the Office of Research Ethics at the University of Waterloo.

6.4 Results

Characteristics of the study population for the two data collections are shown in Table 6.1.

Table 6.1: Characteristics of study population by data collection

	Data collection #1	Data collection #2
Dates of data collection	November 11-12, 2004	December 12-13, 2007
N	63	50
Percentage of eligible participants [†]	86	83
Age, years \pm SD	13.5 \pm 1.6	13.0 \pm 1.8
Males, <i>n</i> (%)	28 (44.4)	22 (42.9)
Females, <i>n</i> (%)	35 (55.6)	28 (57.1)
Elementary School (Grade 6-8), <i>n</i> (%)	38 (60.3)	37 (74.0)
High School (Grade 9-10), <i>n</i> (%)	25 (39.7)	13 (26.0)
Male snack participants, <i>n</i> (%)	10 (35.7)	15 (68.1)
Female snack participants, <i>n</i> (%)	13 (37.1)	11 (39.3)
Elementary School snack participants, <i>n</i> (%)	15 (39.5)	18 (48.6)
High School snack participants, <i>n</i> (%)	8 (32.0)	8 (61.5)
Total snack participants, <i>n</i> (%)	23 (36.5)	26 (52.0)

[†]Represents the number of participants in the data collection divided by the number of students enrolled in the school in grades six to ten at the time of the data collection. Note that three participants did not report gender and/or age for Data Collection #1 (so the working N was 63 for collection #1), and their data were excluded from further analyses.

The morning and afternoon snacks that were provided to students on the days prior to the data collection, which are the days reported in the 24 hour dietary recall of the WEB-Q, are listed in Table 6.2 by grade. This is a typical example of the snacks that are offered in the school program each day.

Table 6.2: Morning and afternoon snacks provided prior to data collection

Grade (n)	Morning snack [†]		Afternoon snack [†]
Data collection #1 - 2004			
	November 10th	November 11th	November 10 th and 11th
Grade 6-8 (n=38)	Cold cereal with milk, juice	Hot oatmeal with milk, juice	Oranges, apples, juice, tea biscuits
Grade 9-10 (n=25)	Cold cereal with milk, juice	Hot oatmeal with milk, juice	Do not receive an afternoon snack
Data collection #2 - 2007			
	December 12 th	December 13 th	December 12 th and 13 th
Grade 6-8 (n=37)	Cold cereal with milk, juice	Whole wheat toast with spreadable cheese, milk	Bananas, milk
Grade 9-10 (n=13)	Cold cereal with milk, juice	Whole wheat toast with spreadable cheese, milk	Do not receive an afternoon snack

[†]The cold cereal was either Honeynut Cheerios mixed with regular Cheerios or Shreddies. The juice offered with snacks was 100% juice from concentrate and was either apple juice, orange juice, or grape juice.

Overall for Data Collection #1, the majority of students did not meet current dietary recommendations for nearly half of the food groups and nutrients that were examined (Table 6.3). More than three quarters of the students did not meet recommendations for Milk and Alternatives, calcium, and Vitamin D. With the exception of Meat and Alternatives, there was a trend for a higher percentage of students to meet dietary recommendations if they participated in the snack program. The majority of snack program participants met recommendations for eight of the 12 food group/nutrient variables, whereas, the majority of non-participants only met five recommendations. For the Vegetables and Fruit food group and folate, the percentage of non-participants failing to meet recommendations was more than double the percentage of snack participants (78% vs. 35% and 60% vs. 30%, respectively).

Similarly, Data Collection #2 showed that the majority of students were not meeting current dietary recommendations (Table 6.3) and more students tended to meet recommendations if they participated in the school nutrition program.

For Data Collection #1, students participating in the snack program (37%; n=23) had significantly higher ($p<0.05$) intakes for six of the 12 variables examined than those who did not participate (63%; n=40). For example, participants in the snack program had higher mean intakes

of servings from the Vegetables and Fruit category (7.5 vs. 3.4 servings) than non-participants. Mean values and differences in food group and nutrient intakes between participants and non-participants are shown in Table 6.4. Differences in intake also occurred by gender for Meat and Alternatives, calcium, and iron, by gender and grade for “Other” Foods, Vitamin A and dietary fiber, and by grade only for folate and Vitamin C.

For Data Collection #2, students participating in the snack program (52%; n=26) had significantly higher intakes for five of the 12 variables examined than those who did not participate (48%; n=24) and with the exception of calcium, differed from the food groups and nutrients that were significant from the analysis for Data Collection #1. For example, participants in the snack program had higher mean intakes of servings from the Milk and Alternatives food group (3.3 vs. 2.2 servings) as well as Vitamin A (697 vs. 551 RE) and Vitamin D (6.9 vs. 4.4 µg) than non-participants. Vitamins A and D are nutrients that are added to most of the fluid milk sold in Canada. For Data Collection #2, differences in intake occurred by gender for nearly all the food groups and nutrients with the exception of Vegetables and Fruit, Grain Products, and Vitamin C. Figure 6.1 shows differences in food group intake by gender for snack program participants and non-participants in 2007. There were differences by grade for “Other” Foods, Vitamin A, calcium, and Vitamin D.

Table 6.3: Percentage of children not meeting dietary recommendations by snack participation and gender (N=116)

Food group or nutrient (units)	Dietary recommendation			Number (percentage of children) < minimum recommendation					
	CFG or EAR recommendation by age group [†]			Data collection #1 – 2004, n=63			Data collection #2 – 2007, n=50		
	9–13y	14–18y	CFG or EAR	Snack participants total n=23 n (%)	Non-participants total n=40 n (%)	Overall total n=63 [¶] n (%)	Snack participants total n=26 n (%)	Non-participants total n=24 n (%)	Overall total n=50 n (%)
Vegetables and Fruit (svgs)	5 (♂&♀)	7 (♂&♀)	CFG	8 (35)	31 (78)	28 (62)	23 (88)	23 (96)	46 (92)
Grain Products (svgs)	4 (♂&♀)	7 (♂) 6 (♀)	CFG	9 (39)	21 (53)	30 (48)	14 (54)	13 (54)	27 (54)
Milk and Alternatives (svgs)	2 (♂) 3 (♀)	3 (♂&♀)	CFG	17 (74)	36 (90)	53 (84)	15 (58)	16 (67)	31 (62)
Meat and Alternatives (svgs)	1 (♂&♀)	3 (♂) 2 (♀)	CFG	9 (39)	11 (28)	20 (32)	9 (35)	9 (38)	18 (36)
Carbohydrate (g/day)	100	100	EAR	1 (4)	5 (13)	6 (10)	2 (8)	4 (17)	6 (12)
Vitamin A (RE/day)	445 (♂) 420 (♀)	630 (♂) 485 (♀)	EAR	9 (39)	18 (45)	27 (43)	12 (46)	14 (58)	26 (52)
Folate (µg/day)	250 (♂&♀)	330 (♂&♀)	EAR	7 (30)	24 (60)	31 (49)	18 (69)	17 (71)	35 (70)
Vitamin C (mg/day)	39 (♂&♀)	63 (♂) 56 (♀)	EAR	3 (13)	13 (33)	16 (25)	14 (54)	14 (58)	28 (56)
Calcium (mg/day)	1100	1100	EAR [§]	14 (61)	35 (88)	49 (78)	14 (54)	19 (79)	33 (66)
Vitamin D (µg/day)	10	10	EAR [§]	18 (78)	35 (88)	53 (84)	21 (81)	21 (88)	42 (84)
Iron (mg/day)	5.9 (♂) 5.7 (♀)	7.9 (♂) 7.7 (♀)	EAR	4 (17)	6 (15)	10 (16)	2 (8)	7 (29)	9 (18)

CFG = Canada Food Guide; EAR = Estimated Average Requirement; y = years old; svgs = servings; RE = Retinol Equivalents; g = grams; µg = micrograms; mg = milligrams.

[†]Recommended number of daily servings for food groups were from Eating Well with Canada’s Food Guide (CFG) for First Nations, Inuit and Métis (Health Canada, 2007). No formal recommendations exist for “Other” foods, so they were excluded; [¶]Three students did not provide gender and/or age for Data collection #1 in 2004 and were not included in the analysis; [§]Based on the EAR values that became available in 2010 but were not in place at the time of data collections (Institute of Medicine, 2011).

Table 6.4: Differences in food group and nutrient intakes for snack program participants and non-participants

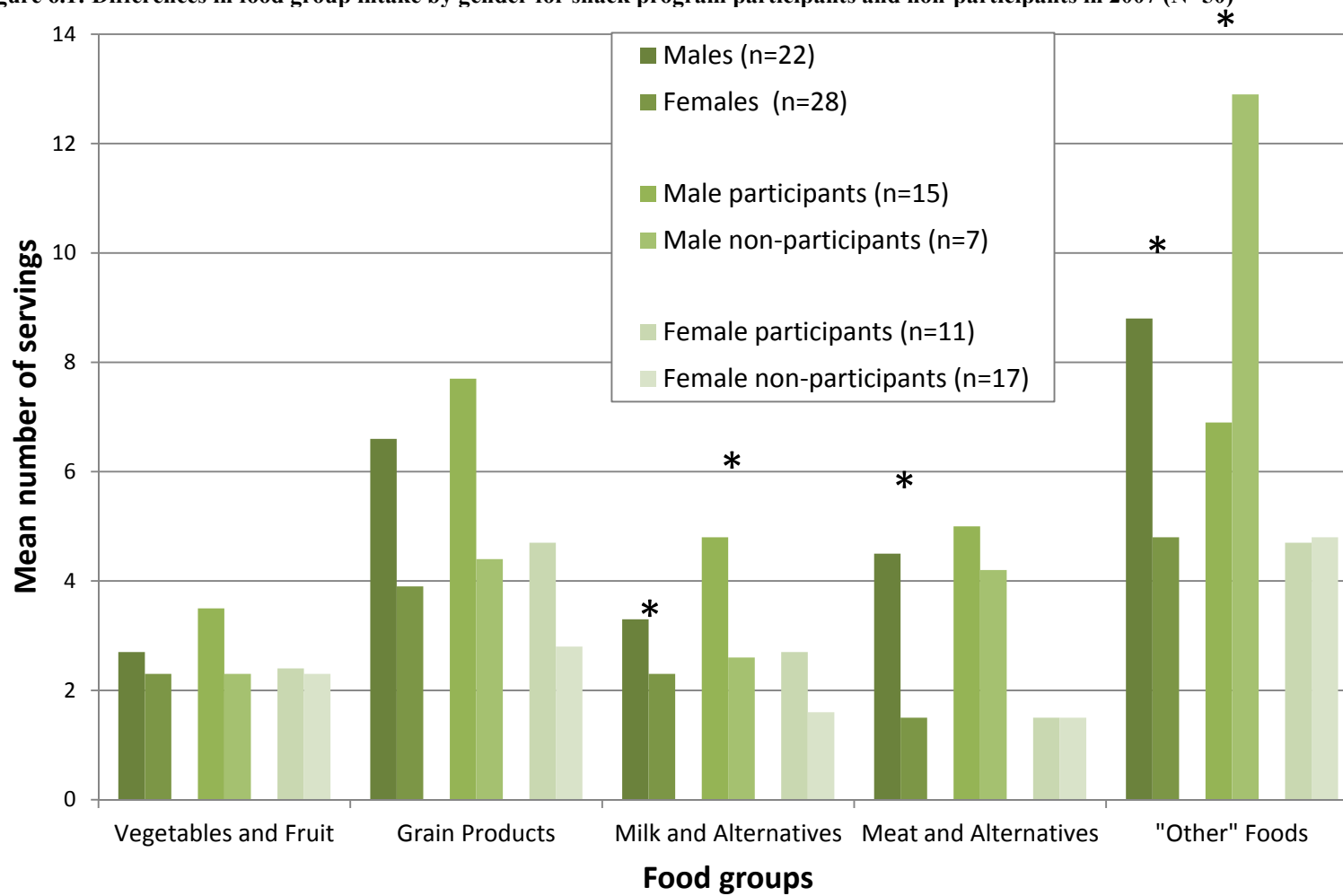
Food group [†] or nutrient (units)	Data Collection #1 - 2004			Data Collection #2 - 2007		
	Mean ± SD		P value	Mean ± SD		P value
	Participants n=23	Non-participants n=40		Participants n=26	Non-participants n=24	
Vegetables and Fruit (svgs)	7.5 ±4.2	3.4 ±2.9	<0.001*	2.4 ± 1.8	2.6 ± 2.3	0.416
Grain Products (svgs)	5.3 ±2.7	5.1 ±3.3	0.777	5.6 ± 5.9	4.6 ± 2.9	0.603
Milk and Alternatives (svgs)	2.1 ±1.9	1.5 ±1.5	0.142	3.3 ± 2.6	2.2 ± 1.7	0.010*
Meat and Alternatives (svgs)	3.3 ±3.2	2.8 ±2.2	0.471	3.1 ± 2.6	2.5 ± 2.4	0.551
“Other” Foods [¶] (svgs)	6.9 ±4.7	5.5 ±3.9	0.232	6.0 ± 4.6	7.2 ± 6.5	0.049*
Vitamin A (RE)	741.4 ±562.4	593.5 ±434.3	0.248	696.6 ± 521.4	550.9 ± 383.9	0.020*
Folate (µg)	420.2 ±236.4	270.4 ±176.6	0.006*	241.0 ± 184.7	223.0 ± 112.8	0.892
Dietary fiber (g)	18.0 ±12.3	7.8 ±5.8	<0.001*	8.9 ± 6.5	7.3 ± 5.8	0.112
Vitamin C (mg)	223.2 ±159.6	94.4 ±82.7	<0.001*	68.8 ± 77.1	67.7 ± 74.2	0.868
Calcium (mg)	1054.7 ±692.2	719.6 ±458.8	0.024*	1185.9 ± 807.9	836.9 ± 626.6	0.009*
Vitamin D (µg)	5.9 ±5.2	3.7 ±3.9	0.064	6.9 ± 6.0	4.4 ± 3.8	0.004*
Iron (mg)	16.5 ±8.7	11.7 ±4.7	0.005*	12.1 ± 8.1	13.4 ± 6.4	0.089

SD = standard deviation; svgs = servings; RE = Retinol Equivalents; µg = micrograms; g = grams; mg = milligrams. The analysis was adjusted for gender and grade grouping distribution.

[†]Food groups are from Eating Well with Canada’s Food Guide for First Nations, Inuit and Métis, 2010 (Health Canada, 2007); [¶]“Other” Foods refer to foods and drinks that were not part of the four food groups according to Eating Well with Canada’s Food Guide.

*P < 0.05

Figure 6.1: Differences in food group intake by gender for snack program participants and non-participants in 2007 (N=50)



An asterisk (*) indicates significant differences between paired columns, $p < 0.05$.

For both data collections boys generally had higher intakes from all food groups and nutrients than girls. High school students generally had higher intakes from all food groups and nutrients than elementary students. There were no significant ($p \geq 0.05$) interaction effects between snack participation and gender or snack participation and grade for either of the two data collections.

Despite only half of students participating in the snack program on the day of the second data collection, 78% students reported that they usually participate in the school snack and breakfast program more than half of the week or every day (Figure 6.2).

Students were asked to check “all that apply” when asked “What do you like most about the school snack program?” However, the majority of students (33 of 50, 66%) only chose one response option. Students indicated that the three things they liked most about the school snack program were the juice (50%), that the program kept them from feeling hungry at school (40%), and that they got a snack at school every day (32%).

Students were asked “Is there are different vegetable or fruit you would like to get as a snack at school?” This was an open-ended question, so students could choose whatever vegetables or fruit that they wanted. Many students suggested more than one vegetable and/or fruit. Of the 46 students who responded to this question, the six most common responses were grapes (n=8), bananas (n=6), apples (n=6), juice (n=6), kiwifruit (n=5), and strawberries (n=5). Apples and juice were already regularly served to students from the snack program as they were easier to transport into the community. Bananas were served occasionally, grapes and strawberries rarely and often only for very special events. At this time, kiwifruit had never been served at school.

When students were asked what they would change about the program, only 64% (n=32) of the students submitted a response. The most common response (n=16, 50%) was that they would

change nothing about the program or that they didn't know what they would change. The next most common response was that students wanted more fruit (n=6, 19%). Other program changes suggested were that students could help out more in the kitchen and that they wanted to eat their snack in the cafeteria instead of in the classroom. A few students wanted to also have a lunch program offered at school.

Students indicated that the snack program helped them to eat healthier by motivating them (74%), eating more fruit (86%), and making better dietary choices (68%) (Figure 6.3). However, the majority (50%) did not think that the snack program encouraged them to ask their parents to purchase vegetables or fruit that they had tried at school. For this question, students could choose all responses that applied to them.

Figure 6.2: How often students report participating in the snack program in 2007 (N = 50)

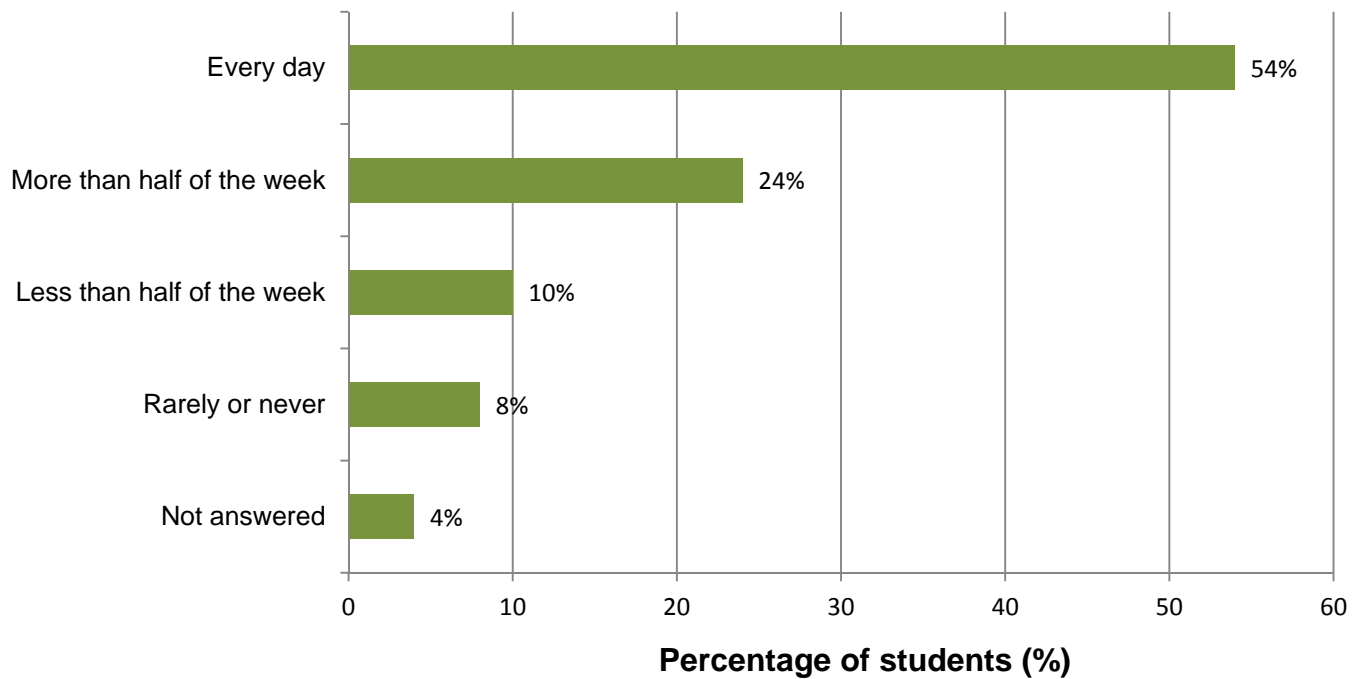
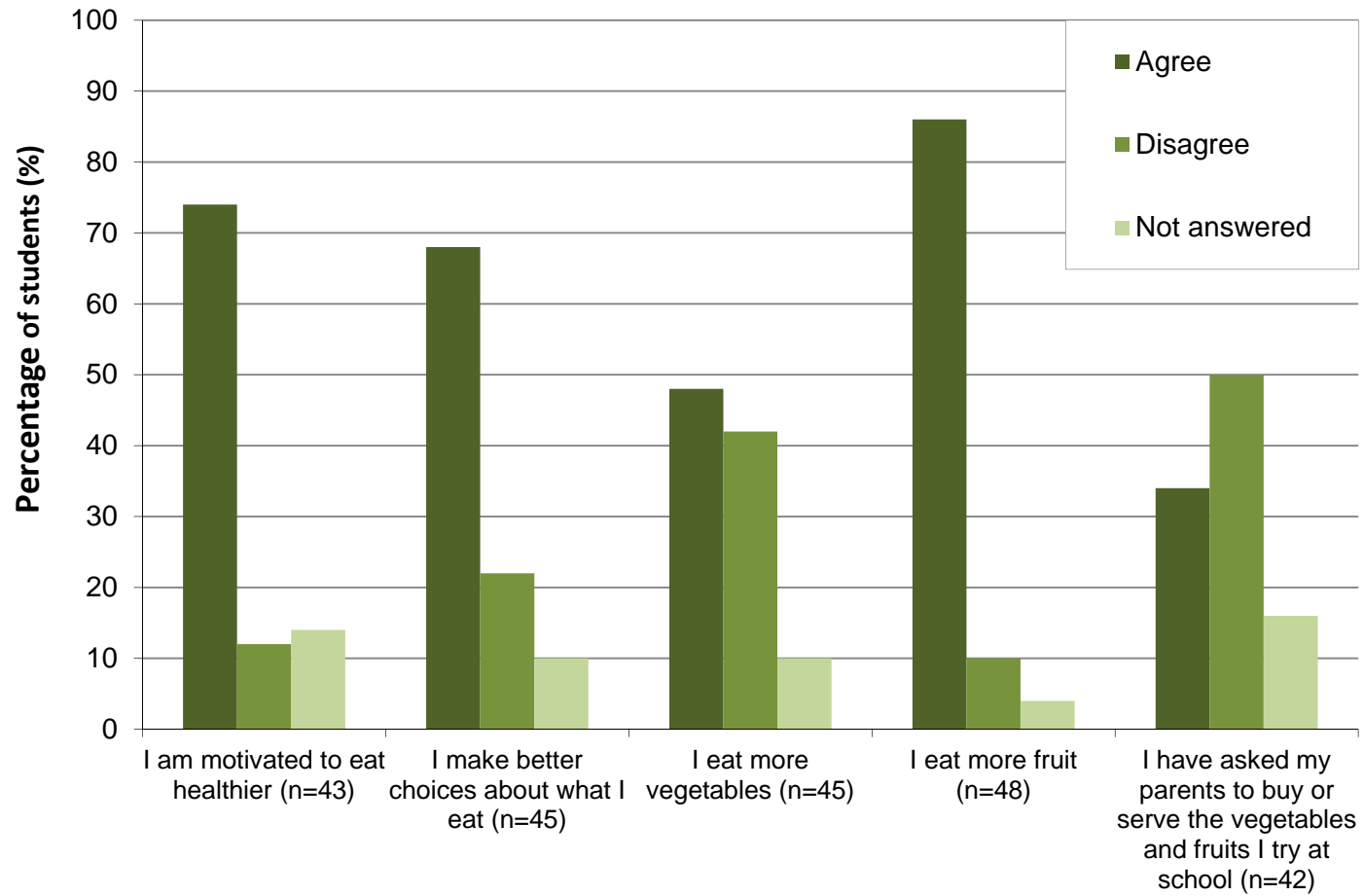


Figure 6.3: Student responses to “Because of the school snack program...”



6.5 Discussion

Findings from this study suggest that the school snack program at Peetabeck Academy in Fort Albany is having a positive impact on the dietary intake of grade six to ten students. Although the long-term effects of the school snack program were not examined in this study, the fact that the program has been providing healthy food for students for more than a decade and the findings from the WEB-Q showing improved nutritional benefits to students shows that the program is likely very important with respect to increasing food security for children and adolescents in Fort Albany.

Similar to other studies of school nutrition programs in Canadian Aboriginal children, the snack program in Fort Albany helped to improve the dietary intake of fiber (Gates et al., 2012; Saksvig et al., 2005), and Vitamin C (Gates et al., 2012) in 2004, calcium (Gates et al., 2013; Wein, 1993) in 2004 and 2007, and Vitamin A (Wein, 1993) and Vitamin D (Gates et al., 2013; Wein, 1993) in 2007. Gates and colleagues (2012; 2013) found that the impact of their snack programs in First Nations were only maintained over the short-term and not sustained at one year follow-up. It is important to note that their projects were pilot intervention programs that had not existed prior to their studies. The sustainability of their programs were hindered by a lack of funding and personnel resources over the long term. In contrast, the snack program in Fort Albany has become institutionalized in the community and the school and has been sustained and gradually improved over the course of many years. In the past few years, the program in Fort Albany has been expanded further to include an extensive and daily offering of breakfast with various breakfast food options for all high school students. The success of the school nutrition program in Fort Albany has been attributed to the dedication of a program champion throughout the program's history (Hanning et al., 2011), adequate food preparation and storage facilities,

continuous financial resources (Hanning et al., 2011), and widespread community support (Skinner et al., 2006; Skinner et al., 2012b).

As in other studies of Aboriginal children, Vegetables and Fruit consumption for the majority of students was below guidelines (Khalil et al., 2010; Taylor et al., 2007; Gates et al., 2012; Bernard, Lavalley, Gray-Donald, & Delisle, 1995). It is promising that participants in the 2004 snack program in Fort Albany had significantly higher intakes of Vegetables and Fruit and more than double the percentage of snack participants met Vegetable and Fruit recommendations compared to non-participants. In a population where the majority of children and youth do not meet dietary recommendations for many food groups and nutrients, the snack program appears to make an important contribution to meeting national nutritional guidelines. It is important to note that the EAR values are expected to satisfy the needs of only 50% of the people in that age group based on a review of the scientific literature, whereas the Recommended Dietary Allowance (RDA), a higher value, is the daily dietary intake level of a nutrient considered sufficient to meet the requirements of nearly all (97–98%) healthy individuals in each life-stage and gender group. The RDA is calculated by adding 2 standard deviations to the EAR values (Institute of Medicine, 2000). Therefore, despite improvements in dietary intakes for participants of the snack program, intakes of important nutrients were still very low. It also is important to point out that although oranges and apples were offered during the afternoon snack in 2004, the majority of the 7.7 servings of Vegetables and Fruit for snack program participants came from the consumption of fruit juice. The majority of students also reported that the juice was what they liked most about the snack program. The Canada Food Guide suggests that people have vegetables and fruit more often than juice, as they have more fiber and are more nutrient dense than fruit juice. Also recommended by the Canada Food Guide is to eat one dark green and one orange vegetable each

day; a recommendation not met by the Fort Albany snack program. The program does not regularly offer vegetables, as they are extremely expensive and can be more difficult to transport, store, and prepare. Wein and colleagues (1993) conducted a study of food preferences for traditional and store-bought foods with Aboriginal and non-Aboriginal school children in northern Alberta and suggested that nutrition programs for Aboriginal communities should use a variety of preferred foods as a means for achieving a more nutritious diet. Most students in the study indicated that they did not think the program required any changes, although there were a few types of fruit that they would like to receive more often. Since the students in Fort Albany were keen to have grapes, kiwifruit and strawberries – three fruits that were rarely or never provided - offered by their snack program, it may be important to attempt to present these fruits more frequently. Acknowledging that these specific fruits are more expensive than other fruit, difficult to transport, and to store, it would be beneficial for the school to conduct a future survey with students of the vegetables and fruit that they like. The results of this survey could contribute valuable information about how the snack program could be improved to combine student food preferences with more of the Canada Food Guide recommendations.

Interestingly, the study by Wein and colleagues (1993) found higher mean preference scores by Native children for milk than soft drinks, with apples, chicken and milk receiving the highest preference scores for store-bought food. Despite the preference for drinking milk, the authors discussed that many of the mothers participating in their study mentioned being unable to afford milk in large enough quantities to supply their families for more than one or two days a week. Milk or a milk alternative (cheese spread) was offered by the program during both morning and afternoon snacks during the 2007 data collection. Findings from the second data collection in this study, with significantly higher Milk and Alternatives, calcium, vitamin A, and vitamin D

intakes in snack program participants than non-participants, indicate that the actual content of the snacks provided were having an impact on student consumption. The cost of a 4 litre bag of milk in January of 2007 at the grocery store in Fort Albany was \$12.19 compared to \$4.49 at the same time point in southern Ontario (unpublished data; the southern Ontario price was an average price from 3 grocery stores in one city). Many studies of Canadian Aboriginal children have reported very low intakes from the Milk and Alternatives food group as well as low intakes of related nutrients such as calcium and vitamin D (Khalil et al., 2010; Downs et al., 2009; Taylor et al., 2007; Gates et al., 2013; Skinner et al., 2012b; Sharma et al., 2007). *Milk insecurity*, a phenomenon described by Williams and colleagues (Williams, McIntyre, & Glanville, 2010) as a lack of access to affordable milk for families, is probably a very common issue for northern First Nations households. The ability to offer milk and milk products to First Nations children and adolescents through a school nutrition program may be an important contributor to healthy dietary intakes in this population.

In this study, only single 24 hour dietary recalls were used and limitations of this method include recall error, inaccurate estimation of portion sizes, underreporting of foods, and the inability to capture a complete picture of usual dietary intake. However, the WEB-Q has incorporated several techniques to minimize the weaknesses of this form of assessment. For each selected food, the student could choose an estimate of the serving size, which was aided by pictures of portion sizes and comparisons to common objects. Prompts were used throughout the dietary recall to capture missed questions and forgotten foods, drinks, and toppings. Visual and hands-on tasks are culturally appropriate and appealing for First Nations students (Aboriginal Services Branch, 2005; Battiste & McLean, 2005; Byrnes, 1993; Canadian Council on Learning, 2007; McMullen & Rohrbach, 2003; Pewewardy, 2002; Ryan, 1992; Stairs, 1995; Toulouse,

2008). There was also improved reporting of sensitive information, (e.g., junk food intake and body weights) during the WEB-Q validation study, compared with dietitian interviews (Hanning et al., 2009). Wein (1995) states that dietary recalls are much better suited to the survey needs of Aboriginal communities in comparison to dietary records because they are less labour intensive for the respondent. Although multiple 24 hour recalls can better capture typical dietary intakes, the concern for respondent burden in participating children was taken into account and several studies of nutrition in Aboriginal children have successfully used a single 24 hour recall approach (Khalil et al., 2010; Wolever et al., 1997; Ng et al., 2010; Saksvig et al., 2005; Hanley et al., 2000; Receveur, Morou, Gray-Donald, & Macauley, 2008; Trifonopoulos, Kuhnlein, & Receveur, 1998).

It is surprising that only 37% of students reported participating in the snack program during the first data collection in 2004. It is possible that some students were absent on the previous day, and therefore would not have participated in the program because they were not at school. For the second data collection in 2007, more than half of grade six to ten students participated in the program. The difference in participation between 2004 and 2007 may be a result of better school attendance in 2007, as well as small improvements made to the snack program itself over time. There was an increase in financial resources applied to the program in 2007 which enabled the program to have a wider variety of foods offered, as well as more program equipment, such as, bowls and beverage cups. The director of the snack program has been constantly looking for ways to improve the program and to meet the needs and wants of the students. Responses from the extra questions in 2007 supported benefits from the program and offered few suggestions for improvement.

In a study by Gates and colleagues (Gates et al., 2012) conducted in a nearby First Nation, the question “Because of the school snack program...” was also asked. Results were similar, where 64% of students reported being motivated to eat healthier, 67% reported making better choices about what they ate, and 81% reported eating more fruit, compared to the findings of this study at 74%, 68%, and 86%, respectively (Gates et al., 2012). A comprehensive school nutrition program, including nutrition education curriculum (Isogai, Gates, Gates, Hanning, & Tsuji, 2011), was implemented over a five week period in Fort Albany in the spring of 2010 (Gates et al., 2011). This program was shown to improve knowledge, exposure to, and preferences for, vegetables and fruit, but did not impact intentions or self-efficacy towards these foods. Despite the positive impression of the program by teachers, parents, and students, it was acknowledged that the affordability, accessibility, and availability of vegetables and fruit remained a barrier to increasing consumption in Fort Albany (Gates et al., 2011). While the snack program can help to alleviate some of the barriers to food security for children and adolescents in Fort Albany, improved food security policies and programs and support for local community initiatives remain necessary.

6.6 Conclusions

Given the positive impact of the program on the food and nutrient intake of school snack program participants, qualitative feedback will be used to enhance the program. The results of this study encourage the initiation, support, and continuation of similar healthy school breakfast and snack programs in other remote, northern communities. Clearly, school snack programs can be an important venue to address the nutritional vulnerability of First Nation youth living in remote communities.

Chapter 7: THE IMPLEMENTATION OF A COMMUNITY GREENHOUSE IN A REMOTE, SUB-ARCTIC FIRST NATIONS COMMUNITY IN ONTARIO, CANADA: A DESCRIPTIVE CASE STUDY

7.1 Overview

7.1.1 *Background*

Food insecurity is prevalent in northern communities in Canada and there is a movement to improve food security through both the re-vitalization of traditional harvesting practices as well as through sustainable agriculture initiatives. Gardening in northern communities can be difficult and may be aided by a community greenhouse. The objective of this project was to conduct a descriptive case study of the context and process surrounding the planning and implementation of a community greenhouse in a remote, sub-arctic First Nations community in Ontario, Canada.

7.1.2 *Methods*

Data sources included semi-directed interviews with a purposive and snowball sample of key informants (n=14), direct observations (n=32 days), written documentation (n=107), and photo-documentation (n=621 total). Digital photographs were taken by both a university investigator during community visits and a community investigator throughout the entire project. The case study was carried out over a period of 33 months; from early 2009 until October of 2011.

Thematic data analyses were conducted and followed a categorical aggregation approach.

7.1.3 *Results*

Categories emerging from the data were appointed gardening related themes: seasons, fertile ground, sustainability, gardeners, ownership, participant growth, and sunshine. Local champions

were critical to project success. Uncertainty was expressed by several participants regarding ownership of the greenhouse; the local community members who championed the project had to emphasize, repeatedly, that it was community owned. Positive outcomes included the involvement of many community members, a host of related activities being carried out, and that the greenhouse has been a learning opportunity to gain knowledge about growing plants in a northern greenhouse setting. A strength of the project was that many children participated in greenhouse activities.

7.1.4 *Conclusions*

Community and school greenhouse projects require local champions to be successful. It is important to establish guidelines around ownership of a greenhouse and suitable procedures for making the building accessible to everyone without compromising security. Implementing a greenhouse project can engage community members, including children, and provide a great learning opportunity for gardeners in a remote, northern community.

7.1.5 *Keywords*

Canada, case study, First Nations, food security, local food systems, sub-arctic

7.2 Introduction

The prevalence of food insecurity for Aboriginal (First Nations, Métis, and Inuit) households in Canada is considerably higher than non-Aboriginal households (Che and Chen 2001; Health Canada 2007; Willows et al., 2009) with those living in on-reserve First Nations communities and arctic Inuit communities especially vulnerable (Fieldhouse & Thompson, 2012; FNIGC, 2012; Rosol et al., 2011; Skinner et al., in press; Thompson et al., 2012). Food insecurity in remote First Nations communities is heightened by many factors: high incidence of poverty (Tarasuk, 2001; Willows et al., 2009); unreliable food supplies; high cost and reduced availability of quality, healthy market food (Ford, 2009; Power, 2008; Socha 2012); potential environmental contamination of traditional food sources (Tsuji et al., 2007; 2008); climate change affecting hunting and fishing practices (Ford, 2009; Tam et al., 2010; Hori et al., 2012); loss of traditional food practices and access to land (Power, 2008). The existence of two interactive food systems (traditional and market) makes the food system unique for Aboriginal people who continue to participate in traditional food procurement and consumption.

Potential strategies to improve food security in remote and northern communities include the revitalization of traditional harvesting practices, the adoption of sustainable agriculture, and local food production (Morrison, 2008; Socha et al., 2012; Spiegelhaar & Tsuji, in press; Stroink & Nelson, 2009). Sustainable agriculture can involve agroforestry, community gardens (Spiegelhaar & Tsuji, in press), greenhouses, wild berry and fruit tree maintenance, and seed banks (Morrison 2008). For many northern communities, gardening without a greenhouse may be less feasible due to their climactic extremes, inadequate soil (or permafrost), and considerably shorter growing seasons, but this is changing with global warming (Spiegelhaar & Tsuji, in press).

Even with global warming, greenhouses can be used on their own and/or used to lengthen the growing season.

Likely the most famous northern greenhouse is in Inuvik, Northwest Territories which has a guaranteed growing season from mid-May to the end of September compared to the variable outdoor growing season in Inuvik from mid-June to August. A range of positive outcomes has been reported as a result of the greenhouse, including: increased community beautification projects and civic pride; enhanced tourism; heightened sense of community by local inhabitants and fostering community development, community outreach (e.g., a garden club for children), and increased food security (Dowd, 2008; Langston, n.d.; Lees & Redman, 2009; Mahoney, 2004). Some local community members even call the Inuvik greenhouse “a community wellness centre” (Langston, n.d.). In the Arctic of eastern Canada, residents of Iqualuit, Nunavut were inspired by the success of the Inuvik greenhouse to build their own community greenhouse called “Piruqsiavut” (Lees & Redman, 2009). The goal of the Iqualuit greenhouse is to show that it’s possible to eat locally and reduce the quantity of greenhouse gas emissions used to ship fresh produce to Iqualuit (George, 2008). Members of the greenhouse are encouraged to grow vegetables instead of flowers and all of the produce harvested from the greenhouse is weighed to prove how much food the greenhouse produces. As with the Inuvik greenhouse, community outreach is an important component of the project. Recipes, events, and volunteer opportunities are communicated through an online blog maintained by the Iqualuit Community Greenhouse Society (2009).

There are very few published studies related to gardening initiatives with Aboriginal or Native North American groups (Fieldhouse & Thompson, 2012; Lombard et al., 2006; Stroink & Nelson, 2009; Thompson et al., 2012; Viola, 2006). Outcomes of the Manitoba northern healthy

foods initiative included a growing number of gardens, gardeners, and greenhouses over a three year period of the program and authors mention the establishment of greenhouse pilot projects in northern schools (Fieldhouse & Thompson, 2012). These authors suggested local food production as a viable strategy to improve food security. They also stress the importance of community-based action combined with a supportive policy environment for creating conditions for better food access (Fieldhouse & Thompson, 2012; Thompson et al., 2012). Isolated studies suggest that gardening in Aboriginal communities, especially when traditional ways are incorporated (Stroink and Nelson, 2009), can benefit knowledge and skills of participants (Viola, 2006); social and physical environments (Viola, 2006); and ultimately disease reduction (Lombard et al., 2006). The grey literature identifies a number of Canadian First Nations communities that have included greenhouses as part of their healthy food initiatives (Food Matters Manitoba, 2005; Levenston, 2008; Thompson et al., 2012) and in conjunction with larger Indigenous food system projects where their mission is to encourage food sovereignty (Morrison, 2008).

The objective of this case study was to describe the context and process surrounding the planning and implementation of a community greenhouse from the perspectives of community participants in a remote First Nations community. This paper tracks the process and progress that community members have made towards integrating the greenhouse into their existing food system initiatives. The research questions addressed by this study were: What happened after the greenhouse arrived in the community? Who was involved in greenhouse related activities throughout the study period? What themes regarding the greenhouse emerged from the perspectives of those involved? What were the barriers and supports for progress on community greenhouse initiatives? What were the outcomes of the greenhouse project?

7.3 Methods

This research project was a *descriptive* case study. A descriptive case study presents a complete description of a phenomenon within its context (Yin, 2003). For this study, the “case”, or phenomenon was a greenhouse and the context which surrounded it, including the people who were involved and the activities and actions which took place during the study period. A case has been described as a “bounded system” (Stake, 1994, p.236) and it can be recognized that “certain features are within the system, within the boundaries, and other features outside” (Stake 1994, p. 237). Key factors for understanding the case are the boundedness and the behavior patterns of the system (Stake, 1994). This study was bounded by time (33 months) and by a single case (the greenhouse project in a community). Because context is so important to the understanding of a case, the following section of this paper provides detail about the setting and history surrounding the greenhouse so that the reader can gain perspective on the case study environment.

7.3.1 *Case study location*

Fort Albany First Nation (FAFN) is located on the southern shore of the Albany River on the west coast of James Bay in northern Ontario, Canada. The community is geographically remote (52°15'N, 81°35'W) and only accessible by plane year-round, with access by boat and barge during the ice-free season, and by a snow/ice road after freeze-up. Fort Albany is home to approximately 850 Cree people. Community members were sustained in the past by a traditional food system of hunting, fishing and gathering which has been degraded by colonization, climate change, and environmental contaminants and a heavy reliance on the market food system (Berkes et al., 1994; Spiegelaar & Tsuji, in press; Tsuji & Nieboer, 1999).

During the time of this study there was one large grocery store and two convenience stores in the community where food could be purchased. There was one school in the community with students from kindergarten to grade 12. A community-driven school nutrition program had been in existence at the school for nearly two decades (Metatawabin, 1992; Skinner et al., 2012b). Community members had also been organizing a non-profit alternative market, where fresh foods including produce and meat are flown into the community and sold at-cost to community members (LeBlanc & Veeraraghavan, 2012). The market began in 2007 and was initially held every few months and has now grown into a bi-weekly event with external support and recognition (Food Secure Canada, 2012; LeBlanc & Veeraraghavan, 2012).

Spiegelaar and Tsuji (in press) explored the historical and modern food systems of Fort Albany FN by interviewing eight community members in June 2010. Participants reported the introduction of agriculture to Fort Albany FN by Christian Missionaries in 1930. There was larger scale field production of primarily root crops as well as small gardens for diverse produce and some livestock (Spiegelaar & Tsuji, in press). The Mission also had a greenhouse which they used grow tomatoes and to start seedlings that were later transplanted into gardens. Large-scale agriculture ended around 1970 when Indian Affairs took over and removed the residential school and the grocery store was opened (Spiegelaar & Tsuji, in press). Spiegelaar and Tsuji (in press) noted that Fort Albany FN aspires to move towards sustainable food systems and become food secure (Skinner et al., 2006), to re-instate the traditional knowledge necessary for a subsistence lifestyle as well as regain connection to the land (Minkin, 2008).

7.3.2 *Past community food system projects*

Over the past decade, the research team and the community of Fort Albany have collaborated on a number of nutrition and physical activity health projects including the assessment of youth behaviours (Gates et al., 2012; Gates et al., 2012; Hlimi et al., 2012), determining the barriers of and supports for healthy eating (Skinner et al 2006), planning health promotion strategies (Skinner et al., 2012a), the impact of school nutrition programs (Gates et al., 2011; Hanning et al., 2011; Isogai et al., 2011; Skinner et al., 2012b), and the prevalence and severity of household food insecurity (Skinner et al., in press). In prior studies, Fort Albany community members identified food insecurity as a constraint to healthy eating in children and youth (Skinner et al., 2006; Skinner et al., 2012a), there was a very high prevalence of household food insecurity of 70% (Skinner et al., in press), and one of the strategies proposed to increase healthy eating was to start up a community or school garden (Skinner et al., 2012a). Building greenhouses was also one suggestion for how to make it easier for community members in Fort Albany to obtain healthy food (Skinner et al., 2013). This project involved collaboration with a community advisory committee of local stakeholders who had a keen interest in food issues and were enthusiastic about improving food security and supporting healthy lifestyle behaviors. The role of the community advisory committee (n=3) was to make decisions regarding the planning and implementation of the greenhouse project.

7.3.3 *Timeline*

In February of 2009, university partners secured seed funding for community-based initiatives to support healthy eating in Fort Albany FN youth. The community advisory committee identified priorities and decided on a greenhouse. Indeed, it had been on their agenda for many years, since the original plans for the new school, which opened in 2001, had included

a school greenhouse. Unfortunately the greenhouse had been excluded from the final school building construction due to financial constraints. Figure 7.1 is a timeline that depicts the chronological process (Creswell, 2013; Yin, 2009) for this case study over a period of 33 months; from early 2009 until October of 2011. In particular, it identifies milestones in the community development of the greenhouse, in researcher participation in the project, and process of recounting the progress. Activities carried out by the university investigator, community investigator and community member(s) are indicated.

It is important to note that during this case study, two other community gardening pilot projects were initiated: a pilot agroforestry (local-substitution) project (Spiegelaar & Tsuji, in press) and a provincially funded “Get Growing” community garden initiative (LeBlanc, 2012).

7.3.4 *The greenhouse*

The 16 by 20 foot greenhouse in Fort Albany is constructed of fivewall polycarbonate. A greenhouse made of this material was chosen for a number of reasons. In comparison to glass or twinwall polycarbonate, a fivewall polycarbonate greenhouse is more energy efficient and better for colder climates, offers built-in shading, is maintenance free, is virtually unbreakable, and is considered a four-season greenhouse. Two heater fans, to be powered by liquid propane, were included with the structure. The cost of the greenhouse and shipping was partially funded by a research grant and additional costs (e.g., building foundation, shelving, soil, seeds, gardening tools, heating expenses, maintenance, etc.) were covered by the community. The greenhouse was built on the south side of the school near the primary wing.

The process of building the greenhouse and what activities took place in and about the greenhouse after it was built was determined completely by members of the community. There were many decisions to be made including: where to put the greenhouse, what type of foundation

to use, how to organize the interior, what to plant, and how the school, students and other community members would be involved. The university investigators were on hand to provide support when requested, but otherwise did not interfere with greenhouse activities.

7.3.5 Data sources and collection

Multiple sources of evidence were purposefully sampled, including semi-directed interviews with key informants, direct observations during community visits, documentation of process including phone conversations and emails, and photo-documentation to facilitate an in-depth understanding of the case (Creswell, 2013), to test for convergence amongst the different avenues of inquiry (Yin, 2009) and to support the validity of emerging constructs (Yin, 2009). The greenhouse was the focal point for data collected from each source. For example, the interview discussions revolved around participant's greenhouse involvement and while related activities (e.g., high school student composting, community gardening) were also discussed, it was only with respect to their connection to the greenhouse. One member of the University of Waterloo-based research team made four visits to the community during the study period (April and July 2009 and January and October 2011). The purpose of these visits was to communicate in person with the community investigator, collect case study data and to monitor the progress and implementation of greenhouse activities. Table 7.1 summarizes the number of sources for each category.

Table 7.1: Summary of data sources

Source categories	Total number of sources/respondents
Interviews	14 key informants
Direct observations	32 days of field notes and digital photographs
Written documentation	107 documents (notes from 6 phone conversations; 77 emails; 24 journal entries)
Photo-documentation	621 digital photographs

7.3.5.1 Interviews

In October 2011, after the greenhouse had been assembled and gardening activities had been established, semi-directed, informal interviews were conducted with adult and child key informants by a trained interviewer. Initially, adult participants (n=5) were purposively selected based on their connection to the greenhouse; community members who had been involved with either building the structure and the raised beds, planting seedlings and seeds, caring for the greenhouse and plants, and/or teachers who incorporated greenhouse activities into their classroom curriculum. Snowball sampling helped to identify nine more key informants. The interview schedule was flexible, open-ended and based around the theme of the greenhouse. Verbal consent was obtained from adults and parental consent for children. All interviews were conducted in English, although Cree interpreters were available to translate if they had been requested. Interviews were audiotaped with the consent of the interviewees. Interviews lasted from 15 to 95 minutes where the shorter interviews were with children and the longest interviews with local champions leading the greenhouse initiative.

7.3.5.2 Direct observations

Direct observations were made during each of the four visits made by the university investigator and recorded in detailed field notes and digital photographs. The university

investigator also kept a daily reflective journal during community visits as well as writing memos during other aspects of the research process (Ortlipp, 2008; Birks, Chapman, & Francis, 2008). It was recognized that direct observations offer a better understanding and ability of the inquirer to capture the context in which the participants live and interact (Patton, 2002). Nevertheless, the university investigator was only able to be in the community periodically. Since, experimental rigor is enhanced when observations are combined with other methods, a community investigator who was central to the entire project (JM), assisted in photo-documentation (Adler & Adler, 1994; Rose, 2003).

7.3.5.3 Written documentation

Document types included detailed notes taken during phone conversations, email messages, and daily journal entries during community visits (Creswell, 2013).

7.3.5.4 Photo-documentation

Photo-documentation occurred throughout the project, even while the university investigators were absent from the community. Digital photographs were taken regularly by the community investigator throughout the study period as well as by the university investigator during community visits. During community visits in 2011, a university investigator and the community investigator reviewed and discussed all of the photographs that were taken and began the initial coding that would be included in the visual content analysis.

7.3.6 Data analysis

Audiotaped interviews were transcribed verbatim. Initially, the visual data were analyzed separately to allow the analyst to gain a full grasp of the photo-documentation and to conduct a visual content analysis (Johnson & Christensen, 2007). The visual content analysis of the data for

this study was characterized by the “identification and counting of events, characteristics, or other phenomena in visual data”, which is a more quantitative approach than other forms of visual data analysis (Johnson & Christensen, 2007). For example, the number of unique individuals in the photographs was counted to quantify the involvement of community members in greenhouse activities. Analysis of the photographs included a selection of questions posed by Rose (1996) to ask when interpreting visual images. For example, questions were answered regarding production of the images (When was it made? Where was it made?), and the “text” of the images (What is being shown? What are the components of the image? Was it one of a series? What do the different components of the image signify?) (Rose, 1996). Following the visual analysis, all data sources (interview transcripts, field notes, documents, and digital photographs) were compiled into one data file and therefore the final data analysis did not distinguish between data sources.

Categorical aggregation was used to identify themes (Creswell, 2013; Stake, 1995). Commonly used for case studies, this type of analysis is a way of classifying the data into codes and themes. The process involves aggregating instances until something can be said about them as a class (Stake, 1995). In other words, to search for a collection of instances from the data, aggregate them into categories, and then collapse them into themes (Creswell, 2013).

7.3.7 Ethics Approval

Permission to conduct this study was obtained from Fort Albany First Nation (the locally elected government), Mundo Peetabeck Education Authority (the local First Nation administered school board), and the Office of Research Ethics at the University of Waterloo.

7.4 Results

Fourteen key informants participated in the interviews: 3 teachers (2 males and one female), 2 educational assistants (both female), 4 community members (2 males and 2 females), 2 community leaders (both male), and 3 children. Three of the participants were Elders. A total of 621 photographs were taken, 370 by the community investigator and 251 by the university investigator. Photographs taken by the community investigator began in mid-November 2009 when the greenhouse arrived in the community and spanned nearly every month of the study period until October 2011. In many instances, data were verified by more than one source. For example, the chronology of events depicted in the timeline (Figure 1) were constructed from multiple sources; dates of photographs were confirmed by statements of when activities occurred by interviewed participants. During analysis, the data were aggregated into 26 categories (sub-themes) and then collapsed into seven themes.

7.4.1 Themes

Figure 7.2 is a diagram illustrating the categories and themes from the case study. Themes in Figure 7.2 are written with capital letters, while categories are written with lower case letters. The diagram also displays the relationships between categories and themes. The themes are highlighted in the following section using quotes from the interviews (see Table 7.2) and photographs (Figures 7.3-7.16) to support and illustrate specific themes. To protect the identity of community members, pictures showing individuals' faces have been cropped out of the photo or not included. The categories that emerged from the data were appointed the following gardening related themes: seasons, fertile ground, sustainability, gardeners, ownership, participant growth, and sunshine. The themes, categories (subthemes) and supporting quotations are summarized in Table 7.2.

Figure 7.1: Timeline for greenhouse case study (university investigator = UI; community investigator = CI; community member(s) = CM)

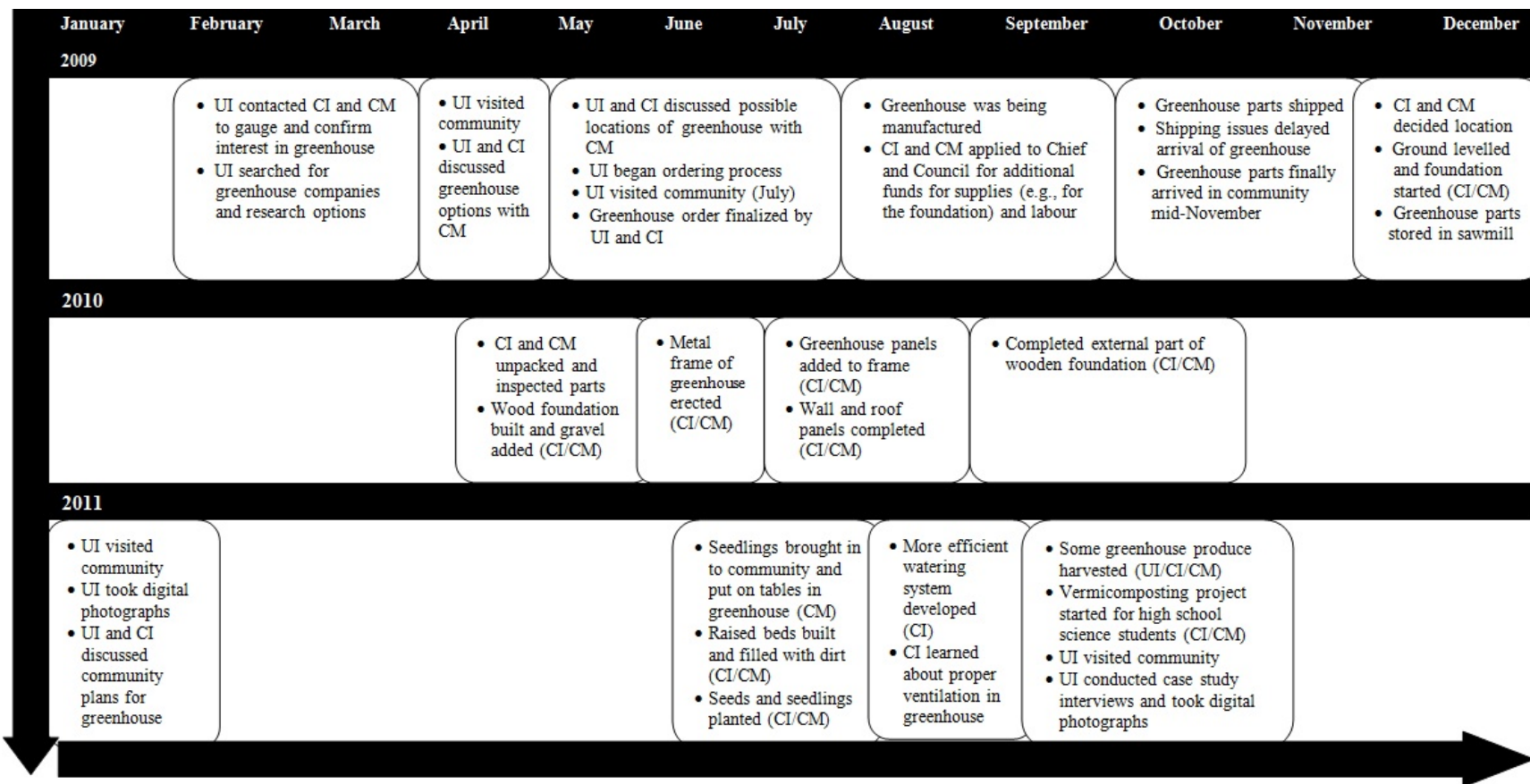


Table 7.2: Summary of themes, categories, and supporting quote examples from interviews

Themes	Categories	Quotes from Interviews
Seasons	Time to build the structure Time for plants to grow Time to build up involvement	“We worked at it on the weekends and after school through the month of June. It’s a beam foundation on top of gravel. It was kind of hard because we had to level it, we had to make sure the ground was level. We used string and it took a long time. And then it sat there for a long time. We worked on it a little bit over the summer. But then in the fall, my husband put lots of time into it. People saw him working on it and they came and helped. ... Once it was up it sat for the winter. ...All winter long people would say, when are you going to start planting, what are you going to plant ... We just watched it and talked about it and waited for spring.” (Interview 8)
Fertile Ground	Other people with gardening experience Books and internet resources Materials (e.g., soil, seeds)	“I had just seen it at [name of person} house in this book that the fungus was in that book...I took the leaf to [name of person] and she said...take that leaf away from my garden. I found out it had powdery mildew.” (Interview 11) “Most of the things that we learn are from reading. Going on the internet and researching. And [name of person] has a lot of gardening books.” (Interview 8) “We got some seeds from [name of person]. And [Name of person] had ordered many, many seeds. She had ordered anticipating the outside gardening.” (Interview 8)
Sustainability	Berry harvesting Composting Re-using/recycling Canning/preserving “Green” technology Home gardening Seed saving	“I’ll teach it 2 nd semester to the kids... Grade 10 and 11. It’s called Green Technology. We’ll talk about solar and wind energy and stuff like that. They will like it. I got my idea about the Green Technology course from the greenhouse...my idea came from there.” (Interview 3) “I got to go into the greenhouse with my science teacher. He talked about the greenhouse effect and how the plants absorb heat.” (Interview 7) “I know the kids planted in juice cans or milk cartons. Reusing shelf milk cartons. They make great planters. You just need to be resourceful. We reuse large metal cans for watering by punching a bunch of holes in the bottom.” (Interview 8) “...I brought some things from my own garden. And within 3 days my

		squashes were blooming...they were dying in my own garden...and they came alive in the greenhouse. I did a lot of work in the greenhouse for most of July...we did a lot of work in there.“ (Interview 11)
Gardeners	Champions Community members School (e.g., teachers, staff, students)	<p>“I was the one looking after it for the first many weeks. With kids we planted the beans. Oh God, they [the kids] were everywhere!...they wanted to plant.” (Interview 9)</p> <p>“One of the main people that helped us was my husband. The teachers, gr. 7 and gr. 8 mostly, there were a few other teachers too, and the phys ed teacher too.” (Interview 8)</p> <p>“I picked tomatoes in there and I washed them. Then I ate them. Some were sour and some were sweet. Sometimes I work with my mom there. I didn’t help when they put the greenhouse up. It was too dangerous. I just played in the park. “ (Interview 10)</p>
Ownership	Champions Community members School (e.g., teachers, staff, students)	<p>“Somebody asked me, what do you do with the food from your greenhouse? But we haven’t worked that out. Who will decide that? It’s a school greenhouse...I think it should be run by the school. It should be more of an overt...it belongs to the school. We should have one little bed for each class...I think we could divide it up. They could be responsible for it. Perhaps the greenhouse is a little small. But for the outside garden we could do it. I’ve done a lot of planting with the kids over the past year. But that’s what I would like to see...for the school to take ownership. I’ve learned a lot. Both about how amazing it is and that there are some downsides.” (Interview 11)</p> <p>“For the greenhouse, it has been a lot of work. And...uh...I guess the challenge might be the security of it versus making many people know they are welcome to use it. What is best. From my experience, community people will not think it’s theirs to use. If the door is open, they will come in and look.” (Interview 9)</p> <p>“The science camp...they are the ones who came one day and we gave them some seeds and they planted the seeds in the greenhouse. That’s why when we went there today they said “Those are my carrots!”. They can actually do it themselves or at least see how it is growing. They don’t know how things grow. But most kids just see a carrot from the store in a</p>

		<p>plastic bag with no top on it.” (Interview 8)</p> <p>“We’ve tried to include all the kids. That’s why it doesn’t get wrecked. They ask “Is this your greenhouse” And I say “it’s yours!” (Interview 8)</p>
Participant Growth	<p>Building and maintaining the greenhouse</p> <p>Involving others</p> <p>Growing plants</p> <p>Watering and ventilation</p> <p>Using space</p> <p>Incorporating into the curriculum</p>	<p>“In the beginning we were like, it’s so big. But once things grew in, it didn’t seem as big. That was learning too. How much things grow and how much space it takes up.” (Interview 11)</p> <p>“That was another question too...how are we going to water. We needed to figure out how to get the water in there. So we asked for a hose and we hook it up to the outside school tap on the side of the building and we run the hose into a huge barrel inside the greenhouse. And the water lasts in there [the barrel] for about a week. And the kids love watering. They know the importance of putting water on plants. They are learning quite a bit.” (Interview 8)</p> <p>“Through the summer, every day we went to water our plants. The kids would be hanging around. As soon as they would see us they would come and they wanted to get wet. Especially when it was hot. They wanted to help. And then they could watch things grow.” (Interview 8)</p> <p>“Even for them to do a group thing. For them to start growing. For those who don’t know how to garden...they could learn together. Whoever wants to do their own.” (Interview 1)</p>
Sunshine	<p>Plans for future growth</p> <p>People keen to have home-based greenhouses</p> <p>Described as “fun”</p> <p>Little vandalism</p>	<p>“There’s a lot of people who don’t know there are plants in there. They think it’s empty. I think it’s good. I thought it wouldn’t last long. I thought kids would vandalize it, but it’s good. Nobody has got in there.” (Interview 2)</p> <p>“Once it was up it sat for the winter. People said uh oh, the kids are going to smash it...especially if it isn’t going to be used. All winter long people would say, when are you going to start planting, what are you going to plant.” (Interview 8)</p> <p>“I thought the greenhouse was connected to the gardening. People are talking about getting their own gardens and even building their own greenhouses. It shows people that you can garden and things can grow in a greenhouse too. I’m surprised to see all the vegetables and all that.” (Interview 1)</p>

		<p>“Did you see all the plants? Lots eh! It’s good.” (Interview 3)</p> <p>“I’ve seen the greenhouse at the school. I want to have a greenhouse at my house. There is one in this catalogue. I could order it and get it shipped up here. Then I can grow my own food.” (Interview 10)</p> <p>“Kids will come and they want to try the things that we are growing. They love trying all these things. Even some little girls love the radishes...they have fun trying. It’s a fine line between pulling it out with them and them coming and pulling them out themselves. It’s fun. It IS fun. I can spend hours in there [greenhouse]. I love being there.” (Interview 9)</p> <p>“Someone called me last night and asked me if we would use the greenhouse over the winter. And I said, I’m reading this book about the winter harvest. We should think about this.” (Interview 11)</p>
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7.4.1.1 Seasons

From the chronological timeline (Figure 7.1), interviews, and date analyses of the photographs, the concept of seasons emerged as a major theme. This included acknowledgement by the interviewees that progress took place over the course of many seasons. It took time to build the greenhouse structure, time for plants to grow, and time to build up involvement with community members. Figures 7.3 to 7.10 depict a sequence of events over time and through many seasons, from the initial construction of the greenhouse foundation in November 2009 to the harvesting of a head of lettuce grown in the greenhouse in October 2011, nearly two years later. One person from the community took on the main leadership role of building the greenhouse and oversaw its construction from start to finish.

Figure 7.3: Foundation being built



Following the arrival of the greenhouse pieces, a few teachers and community members began to construct the foundation for the greenhouse out of wood from the local sawmill. Community members felt it was important to have the foundation initiated and to let it sit over the winter and spring thaw to make sure that it would not shift through the seasons. Photo taken November 21, 2009.

Figure 7.4: Construction underway



Greenhouse construction in progress during the following summer of 2010. Photo taken June 16, 2010.

Figure 7.5: Nearing completion



Construction of the greenhouse structure was nearly completed by the fall of 2010. The view of this picture was looking through the front door of the greenhouse. Photo taken October 18, 2010.

Figure 7.6: Waiting for spring



The greenhouse was built and sat under a blanket of snow, waiting for spring to arrive. Photo taken January 11, 2011.

Figure 7.7: Filling raised beds with dirt



Inside the greenhouse, raised garden beds were built out of wood and filled with soil. Photo taken June 25, 2011.

Figure 7.8: Planting seedlings



Planting seedlings in one of the raised beds in the greenhouse. Photo taken July 29, 2011.

Figure 7.9: Plants thriving



Vegetable plants, even sunflowers, thriving in one of the raised beds inside the greenhouse. Photo taken October 2, 2011.

Figure 7.10: Harvesting produce



Harvesting a head of lettuce to make a salad for dinner. Photo taken October 5, 2011.

7.4.1.2 *Fertile Ground*

Fertile ground represents resources for the greenhouse including materials (e.g., soil, seeds), books and internet as sources of knowledge, as well as other local experienced gardeners as sources of knowledge. Figure 7.11 is an example of one of the gardens grown and maintained by an experienced gardener.

Figure 7.11: Fertile ground



A crate garden, planted and maintained by a local and experienced gardening enthusiast. The owner of this garden was a great resource for gardening knowledge for the local project champions overseeing the greenhouse. Photo taken August 2, 2011.

7.4.1.3 *Sustainability*

Sustainable activities related to the greenhouse included composting (Figure 12), “green” technology, reusing/recycling, preserving/canning, and home gardening (Figure 13). A few of the teachers were very excited about using the greenhouse as a starting point to help students discuss different types of green technology as well as teaching students how a greenhouse works. There was also a plan to get some solar panels to be used to heat the greenhouse in early spring

and extend the growing season. Numerous home gardens were planted in the community each year during the study. In some instances, the home gardens were seen as a complement to the greenhouse; where seedlings could be kept safely in the greenhouse until they were planted outdoors.

Figure 7.12: Sustainability: composting



A worm compost maintained by the high school science teacher. Compost was collected in classrooms and the cafeteria and fed to the worms. The worm compost was used as a teaching tool for the high school students. Photo taken September 30, 2011.

Figure 7.13: Sustainability: home gardening



A vegetable garden planted and cared for by one of the community members at their home. Photo taken July 28, 2010.

7.4.1.4 Gardeners

Many people were involved with the greenhouse over the course of the study period and we labelled them “gardeners”. There were two main project champions who oversaw the planning and implementation of the greenhouse from the time it arrived in the community in November 2009. They continue to be the leaders of the greenhouse initiative at the time of writing this paper. One of those champions was the local investigator who took digital photographs for the study. Seventy-seven unique individuals were counted in the photographs, 36 adults and 41 children. Children helped to plant most of the seeds and some of the seedlings and were very keen to help with watering the plants (Figure 7.14). With the exception of the two project champion gardeners who carried out daily maintenance activities for the greenhouse during the growing season, most adults were involved when the greenhouse was being built. A few school

teachers and students planted seeds in their classrooms and those seedlings were later transplanted into the greenhouse, but the majority of teachers had not taken their students into the greenhouse.

Figure 7.14: Gardeners



A young girl helping to meticulously plant seeds in a raised bed inside the greenhouse. Photo taken July 29, 2011.

7.4.1.5 Ownership

The theme of ownership came up repeatedly during the interviews. Some community members, including children, were not clear as to whom the greenhouse belonged to. They did not think of it as a communal structure that belonged to everyone. The project champions tried to explain to community members and students that the greenhouse belonged to everyone, the community, the school and the students, and that everyone was welcome to participate in greenhouse activities. Pride in ownership by some of the gardeners did occur. For example, a sign was painted for the greenhouse with the school name (Figure 7.15).

Figure 7.15: Ownership



A colourful sign painted by literacy camp members for the greenhouse. The sign was painted in the summer of 2010. Peetabeck Academy is the name of the school situated next to the greenhouse. Photo taken October 1, 2011.

7.4.1.6 Participant Growth

Participant knowledge grew over the course of the project and community members described the greenhouse as presenting many opportunities for learning. These included learning ways to: build and maintain the greenhouse; involve others; incorporate greenhouse activities into the curriculum; grow plants; easily and adequately water and ventilate the plants in the greenhouse; and use the space available in the greenhouse (Figure 7.16). Most community members had not previously experienced gardening inside of a greenhouse and felt there was a lot to learn.

Figure 7.16: Participant growth



View at the entrance of the greenhouse. Stones from nearby were used to make a sturdy and appealing path through the center of the greenhouse. A tree stump served as a seat to be used while weeding and suckering tomatoes. Tables along the back wall held seedlings, flowers, and pitcher plants that had been retrieved during a student biology excursion. A large blue barrel was used to hold a large quantity of water for watering. Photo taken October 1, 2011.

7.4.1.7 Sunshine

All of the key informants spoke about the greenhouse with a positive “sunshine” perspective.

They were surprised that there had been very little vandalism of the greenhouse, were keen to

have their own greenhouses at their homes, had fun sowing and caring for the plants, and had many plans to improve the greenhouse in the future. The greenhouse seemed to stimulate new interests in food or in gardening.

7.5 Discussion

The themes of seasons, fertile ground, sustainability, gardeners, participant growth, and sunshine all signify that the implementation of the greenhouse was successful. Provided here is a summary of the major themes in relation to the research questions posed at the beginning of this paper.

Firstly, “*What happened after the greenhouse arrived in the community?*” The chronological timeline showed that implementing the greenhouse took place over the course of many *Seasons*. The greenhouse arrived in the late fall of 2009 and a wood foundation was started. The following summer was spent putting the greenhouse together with one main dedicated volunteer and a few occasional helpers. And in the summer of 2011, raised beds were built, seeds and seedlings were planted, and greenhouse gardening activities were maintained until the fall when produce was harvested. Resources or *Fertile Ground* were used during implementation, including: material resources, such as wood from the local sawmill; and knowledge resources, such as books/internet and local experienced gardeners. *Sustainability* activities also took place during the project and these included those that seemed directly related, such as composting and home gardening, and those that seemed indirectly related, such as green technology and re-using/recycling. Preserving and canning were also activities mentioned during the interviews, but this activity was not done with produce grown in the greenhouse. Berry harvesting also emerged as a sub-theme as community members mentioned harvesting local low cranberries and the possibility of transplanting wild raspberry canes to their home gardens.

Secondly, *“Who was involved in greenhouse related activities throughout the study period?”*

Both the timeline and Figure 2 show that many *Gardeners*, a minimum of 77, were involved and they consisted of many different groups including adults and children, community and school members, and two key project champions. A strength of the project was that there were so many children participating in greenhouse activities. From the photographs, more children were recorded as working in and around the greenhouse than adults. There could be many reasons for this; one possibility is that the greenhouse is situated next to the school where the children spend a lot of their time, or another might be that children were not as reluctant to enter the greenhouse because they didn't feel any issues about ownership.

Thirdly, *“What themes regarding the greenhouse emerged from the perspectives of those involved?”* The main theme that emerged across most of the interviews was the concept of *Ownership* as it was unclear to some community members who the greenhouse belonged to. The two project champions both agreed, independently, that ownership of the greenhouse did not belong to them and it should be made more obvious to community members and the school that the greenhouse belonged to everyone. One possible reason why community members did not feel that they owned the greenhouse was that the door was normally locked unless one of the two champions was working in the greenhouse. It was observed, during the research visits, that shortly after the door was opened, many people would come into the greenhouse to take a look at the plants and would often ask if they could help with watering.

The fourth question asked, *“What were the barriers and supports for progress on community greenhouse initiatives?”* Considerations for this question involved what needed to be learned (*Participant Growth*) as potential barriers for progress. The two champions discussed their need to learn about watering, ventilation, and general knowledge about how to grow plants in a

greenhouse setting as well as making best use of the space available to them. This may have limited some of the yield of the greenhouse in this first growing season. This study recorded only one growing season and it would be expected that the use of the greenhouse would increase and improve in subsequent years. As long as the project champions remained motivated to continue maintaining the greenhouse, the knowledge gained would be valuable for future growing seasons. Supports for progress could include the positive outlook (*Sunshine*) on the greenhouse as those interviewed appeared to be having fun with the greenhouse, had many future plans, and were happy that there was little vandalism. The greatest support for progress was the dedication of time and energy made by the two project champions. Without their commitment and enthusiasm for the greenhouse, it may not have been as successful.

And lastly, “*What were the outcomes of the greenhouse project?*” Positive outcomes included the involvement of many community members, a host of related activities being carried out, and that the greenhouse has been a learning opportunity to gain knowledge about growing plants in a northern greenhouse setting.

The implementation of the greenhouse is still in the early stages and it was beyond the scope of this case study to examine any substantial long term outcomes. Initial experiences with children harvesting vegetables from the greenhouse suggest potential impact on willingness to try locally grown produce. Future research regarding the greenhouse in this community could examine some of the outcomes reported by other greenhouse and gardening projects, such as whether the greenhouse contributes to community outreach (Dowd, 2008; Langston, n.d.; Lees & Redman, 2009; Mahoney, 2004) and an increase in students’ knowledge and skills in nutrition and gardening (Viola, 2006),

7.6 Conclusions

The case study described in this paper shows that it is possible to implement a greenhouse in a remote First Nations community. However, to be successful it may be imperative to identify one or more project champions who are motivated and dedicated to planning, planting, and maintaining gardens in the greenhouse. It may also be important to establish some guidelines around ownership of the greenhouse and suitable procedures for making the building accessible to everyone without compromising security. Implementing a greenhouse project can engage community members and provide a great learning opportunity for gardeners in a remote, northern community.

7.7 Acknowledgements

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Chapter 8: TOWARDS BETTER UNDERSTANDING AND MEASUREMENT OF FOOD SECURITY IN FIRST NATIONS HOUSEHOLDS

8.1 Introduction

The 18-item Household Food Security Survey Module (HFSSM) is the most widely used direct measure of food insecurity in North American populations (see Appendix A). The HFSSM is an internationally validated measure that contains 18 questions regarding the food security situation in the household over the past 12 months. The measure can document the extent of food insecurity and hunger caused by income limitations (Bickel et al., 2000). The questions are sensitive to the severity of food insecurity and range from worrying about running out of food to children not eating for an entire day. Ten of the 18 questions are applicable to the experiences of food insecurity/security by adults living in the household, or for the household in general, whereas eight items are specific to the experiences of children under the age of 18 years living in the household (Health Canada, 2007). The HFSSM was used to assess household food security in the Canadian Community Health Survey (CCHS), Cycle 2.2, 2004 (Health Canada, 2007). However, the CCHS Cycle 2.2 excluded Aboriginal people living on-reserve and those living in remote and isolated areas (Health Canada, 2007; Willows et al., 2009).

Unfortunately, scales for directly measuring food insecurity, including the HFSSM, have not been validated in Canadian Aboriginal (First Nations [FN], Métis, and Inuit) populations. Power (2007) specifically identified the lack of an appropriate food security measurement tool for FN and Inuit as an important research gap. The unique food security considerations for Aboriginal populations are related to the harvesting and consumption of traditional food. For Aboriginal populations living on-reserve, both the traditional food system and the market food system have an impact on food security. Therefore, to appropriately measure food security in this population,

both food systems must be taken into account. Furthermore, food security measures for Aboriginal populations need to consider language barriers, cultural perceptions, unique life experiences, as well as traditional food attributes (Lambden et al., 2007; Power, 2008; Willows, 2005a; Tarasuk, 2001). Culturally appropriate and relevant community health and capacity indicators need to be developed for Canadian Aboriginal people; the existence of these indicators would allow health information to be tracked in a meaningful way by FN health organizations at the community level (Jeffery et al, 2006). Ideally, instruments should have the flexibility to address local issues and also provide common data across Aboriginal communities.

This study was an expansion of the results from a previous study in this thesis on the relevance of the HFSSM (i.e., to evaluate the perceived relevance of the HFSSM as a tool for assessing food insecurity of on-reserve FN households). To summarize, as part of the relevance of the HFSSM study, two simple questions were developed to ask participants to provide input on the HFSSM and what could be added to improve its relevance to the First Nation on-reserve context. The questions asked directly after a participant completed the HFSSM were:

Does this survey measure food security for First Nations communities? Are there any aspects of food security for First Nations people that are missing from this survey?

Participants were provided with the most common definition of food security to assist them if they were unfamiliar with the terminology. Forty-one of the 66 Fort Albany participants (62% response rate) chose to respond to these two questions. Thematic data analysis was carried out to evaluate and interpret the comments made by participants. Of those 41 respondents, 73% (30/41) indicated that the HFSSM did not measure food security for FN communities. Of the 27% (11/41) who indicated the HFSSM was adequate, the majority of these respondents also felt there were aspects of food security specific to their situation that were not captured by the HFSSM.

Moreover, respondents felt the HFSSM did not incorporate some of the determinants of food insecurity specific to northern FN households that were important to understand context.

Specifically, the themes and sub-themes that emerged included the following points:

- High cost of living, specifically very high prices of market food
 - Amount of social assistance low compared to high food prices and high cost of living
- Reduced availability of healthy foods - poor availability of fresh produce, meat and dairy at the grocery store
- Traditional foods were not captured by the HFSSM
 - Poor accessibility of traditional foods (wild meat)
 - Some people had difficulty obtaining traditional food if they didn't have an active hunter in their household or if they didn't have relatives who could share wild meat
 - Going hunting did not ensure food
 - Hunting could be very expensive (e.g., snowmobile, boat, fuel, etc.)
 - Climate change was affecting hunting yields

The purpose of this study was to develop and formatively evaluate a list of potential questions related to food security and relevant to the unique experiences of people living in on-reserve FN households. The first objective was to use data (themes and sub-themes) from the relevance of the HFSSM study to draft a list of potential questions that could be used as a supplemental FN component for the HFSSM. The second objective was to modify the supplemental FN food security module based on feedback on the drafted questions from volunteer key informants primarily from the Aboriginal Nutrition Network of the Dietitians of Canada. The purpose of creating questions for a supplement would be to enhance the relevance of the HFSSM for FN peoples with the intention of being able to better address relevant food security issues in on-reserve FN households and communities.

8.2 Methods

8.2.1 *Draft List of Potential Questions*

The themes and outcomes resulting from the analysis of participants perspectives on the relevance of the HFSSM study were used to draft a list of FN specific questions to the HFSSM. The process for drafting the questions considered the following: findings from the participants in the study; existing food security questions from the published literature (Table 2.3 and Appendix K), especially questions that had been used with Aboriginal populations; and the format of the HFSSM (i.e. questions at the household level, questions relating to the past 12 months).

8.2.2 *Obtaining Feedback on Potential Questions*

8.2.2.1 *Survey Design*

The drafted questions were mounted electronically into an online survey platform called FluidSurveys© (Ottawa, Ontario, 2012). FluidSurveys was chosen as it is a Canadian company and all data are housed in Canada. The Dillman method of survey design was employed (Dillman, Smith & Christian, 2009) and included: following guidelines for developing web questionnaires, pre-testing the survey with colleagues, and following guidelines for survey implementation. The guidelines followed for developing web questionnaires were: evaluating the technological capabilities of the survey population, deciding how many questions to present on each web page, creating an informative welcome screen, using a consistent page layout across screens, allowing respondents to stop the survey and finish completing it at another time, and collecting paradata that provided feedback on how the respondent interacted with the questionnaire (e.g., the amount of time it took for respondents to answer the entire survey), testing of the survey using different browsers and ensuring that items were collected and coded correctly (Dillman et al., 2009). The survey was pre-tested with individuals who had special

knowledge of the topic or were members of the survey population (n=4) to evaluate the questionnaire itself and the implementation procedures (Dillman et al., 2009). Minor modifications were made to the format of the survey following pre-testing. The guidelines followed during implementation of the survey included: personalizing all contacts to respondents (i.e., emails were sent to individual respondents and were addressed by name in the body of the email), carefully selecting the subject line text, and providing clear instructions for how to access the survey (Appendix L) (Dillman et al., 2009). The invitation letter and information provided in the body of the email also provided a brief background about the study, assured respondents of their anonymity as participants and confidentiality of their responses, the expected length of time to complete the survey, and a deadline for responding. FluidSurveys suggested that the survey would take approximately 13 minutes to complete and colleagues participating in pre-testing the survey agreed that it would probably take 10-15 minutes depending on how much feedback a respondent contributed to the open-ended questions.

The online survey was designed to request feedback from respondents for each question in three areas: (1) how important the question was to food security in the Aboriginal population that the respondent worked with, (2) whether the wording of the question was clear, and (3) whether the question was culturally appropriate. An open-ended question followed to solicit suggestions for changes to the format, wording or cultural appropriateness for each question (see Appendix M). For example, Figure 8.1 shows a screenshot of one question from the online survey.

Figure 8.1: Screenshot example of Question 3 from the online survey

Question 3.

In the past 12 months, how often did someone from another household **share traditional food** with your household? (revised from this source: RHS, 2008/2010 <http://tinyurl.com/RHS-2008-10>)

- a. Often (Almost every month or more)
- b. Sometimes (Some months, but not every month)
- c. Never
- d. Don't know or refused

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>

If you think changes should be made to question 3 (e.g., format, wording, cultural sensitivity), please suggest them here:

8.2.2.2 Survey Distribution

Key informants from the Aboriginal Nutrition Network of the Dietitians of Canada (n=31; 29 emails were successfully delivered) were approached by an emailed invitation letter (Appendix L) sent out on February 12, 2013, to provide feedback and input on the drafted questions. Key informants were encouraged to forward the survey to their colleagues who might be interested in participating, thus, this study used both a purposive sample and snowball sampling (Morgan, 2008).

8.2.2.3 Survey Analysis

Frequencies of the demographic characteristics of the sample and frequencies of the importance, clarity, and cultural appropriateness of each question were calculated. Open-ended responses were copied verbatim and compiled into a table according to each question. Comments were made on the feedback provided by the key informants and next steps were suggested.

Suggestions for each question from participants were considered and a revised set of potential questions was drafted. Further development of the questions is beyond the scope of this thesis.

8.3 Results

8.3.1 Draft List of Potential Questions

A list of 10 potential food security questions for FN populations was compiled (Table 8.1). The potential questions were separated into two sections: the first section relating to traditional food and the second section to market food. If the question was stated verbatim or revised from one or more existing sources, the original source was cited. Key informants were asked to provide additional feedback on the potential questions through one final open-ended question and were also asked demographic questions (Appendix M).

Table 8.1: List of potential food security questions relevant for First Nations

Question and Source	Response Option(s) and Skip Pattern
Section A: Traditional Food	
1. In the past 12 months, did you or anyone in your household eat any <u>traditional food</u> ? Traditional foods include wild plants or animals that come from the land or water and are harvested through hunting, trapping, fishing, or gathering.	a. Yes --> go to 2. b. No --> go to 1b. c. Don't know or refused --> go to 2.
1b. What was the main reason you or your household member(s) did <u>not</u> eat any traditional food in the past 12 months?	Open-ended
2a. In the past 12 months, did you have an active hunter or fisher in your household?	a. Yes --> go to 2b. b. No --> go to 3. c. Don't know or refused --> go to 3.
2b. In the past 12 months, was the cost of hunting or fishing a barrier for you or your household member(s) to be able to hunt or fish as much as they wanted to?	a. Yes b. No c. Don't know or refused
3. In the past 12 months, how often did someone from another household share <u>traditional food</u> with your household? (revised from this source: RHS, 2008/2010 http://tinyurl.com/RHS-2008-10)	a. Often (Almost every month or more) b. Sometimes (Some months, but not every month) c. Never d. Don't know or refused
4. Some households might say, "We worried whether our <u>traditional food</u> would run out before we could get more." Was that often true, sometimes true, or never true of your household in the past 12 months? (revised from this source:	a. Often true b. Sometimes true c. Never true d. Don't know or refused

FNFNES, 2012 http://www.fnfnes.ca)	
5. Some households might say, “The <u>traditional food</u> that we got didn’t last, and we couldn’t get any more.” Was that often true, sometimes true, or never true of your household in the past 12 months? (revised from this source: FNFNES, 2012 http://www.fnfnes.ca)	a. Often true b. Sometimes true c. Never true d. Don’t know or refused
6a. Would your household like to have more <u>traditional food</u> ? (source: FNFNES, 2012 http://www.fnfnes.ca)	a. Yes --> go to 6b. b. No --> go to 7. c. Don’t know or refused --> go to 7.
6b. Can you tell me what prevents your household from using more <u>traditional food</u> ? (source: FNFNES, 2012 http://www.fnfnes.ca)	Open-ended
7. In the past 12 months, have you or your household members noticed any changes in the quality of the <u>traditional food</u> that you eat? If so, please explain these changes. (revised from this source: Lambden et al., 2007)	Open-ended
Section B: Market Food	
8. In the past 12 months, did your household ever struggle to get enough food to meet your needs? (i.e., have to borrow money for food, miss bill payments to satisfy your basic living needs, eat unsafe food). If so, how often did this happen? (revised from this source: RHS, 2008/2010 http://tinyurl.com/RHS-2008-10)	a. Often (Almost every month or more) b. Sometimes (Some months, but not every month) c. Never d. Don’t know or refused
9a. Some households might say, “We could not afford to buy all of the food that we needed from the store.” Was that often true, sometimes true, or never true of your household in the past 12 months? (revised from these sources: Chan et al., 2006; Lambden et al., 2006)	a. Often true b. Sometimes true c. Never true d. Don’t know or refused
9b. How well does the store (or do the stores) in your community meet the food needs of your household?	a. Very well b. Mostly well c. Mostly poorly d. Very poorly
9c. Some households in other communities have told us about the issues listed below. Check any that apply to your household.	<ul style="list-style-type: none"> • the healthy foods we need are not always available • the healthy foods that are available are poor quality • the healthy foods we need are too expensive for us to buy • the traditional or cultural foods we want are not available • please list any other issues: Open-ended
10. If any time in the past 12 months you did not have enough food at home and you couldn’t buy what you needed, what did you do to feed yourself	Open-ended

and your family? (revised from these sources: Cohen, 2002; Hamelin et al., 2002)	
Additional Feedback Question	
The 10 proposed questions were drafted based on the concepts that emerged from our qualitative research study. What questions could be added to improve the relevance of the HFSSM to the First Nation (or Aboriginal) context? What questions would be important to understand food (in) security in the Aboriginal populations you work with? Are there any aspects of food security for Aboriginal people that were not included in these questions and you think should be added? If so, please explain.	Open-ended

8.3.2 *Obtaining Feedback on Potential Questions*

8.3.2.1 *Respondents*

As of February 26, 2013, two weeks after the initial invitation to participate had been sent out, 12 key informants (41% response rate) had completed the online survey and provided feedback. It is not possible to know how many additional key informants received the invitation through snowball sampling; however, a colleague reported that she had been forwarded the invitation by four individuals, indicating that the email was being circulated (personal communication with E. Levi, February 16, 2013).

All respondents (100%; n=12) indicated that they worked with Aboriginal populations and specifically with FNs. As participants could choose more than one category for this question, four respondents (33%) also indicated that they worked with Métis and Inuit populations in addition to FNs. Seventy-five percent (n=9/12) worked with remote populations, 67% with rural (n=8/12), 67% with urban (n=8/12), and one respondent (8%) selected the “other” category and worked with semi-rural populations (respondents could choose more than one response option making the total responses >100%). One third of key informants worked for a government agency (33%; n=4), another third were affiliated with a university (33%; n=4), 17% were health care providers (n=2), one (8%) worked for an FN, Métis, or Inuit organization, and one (8%)

chose no affiliation. Twenty-five percent (n=3) identified themselves as Aboriginal, 50% (n=6) were non-Aboriginal, 25% (n=3) refused this question or did not select an answer.

8.3.2.2 *Paradata*

The average time taken to complete the online survey was just over 20 minutes (20:57) with a range of 8:07 to 46:22. Only one participant chose to save the survey and continue at a later time. Each of the 12 respondents made at minimum of two open-ended comments in the text-based fields and a total of 87 comments were made amongst all respondents making up nearly eight pages of text. The length of responses and the effort made by participants to provide thoughtful and constructive feedback showed that the respondents were enthusiastic to contribute to this process.

8.3.2.3 *Importance, Clarity, and Cultural Appropriateness of Survey Questions*

Table 8.2 displays the responses from key informants for the importance, clarity, and cultural appropriateness for each question. The same participant chose the response “Not at all important” for questions 1, 1b, and 3. Overall the majority of respondents indicated that each of the 10 questions and sub-questions were either important or very important, with a range of 67-100% for these two response options combined, dependent on question.

Table 8.2: Responses from key informants for the importance, clarity, and cultural appropriateness of each question (N=12)

Question and Source	Variable and Responses from Key Informants, n (%)		
Section A: Traditional Food	Is this question important?	Is the wording of this question clear?	Is this question culturally appropriate?
1. In the past 12 months, did you or anyone in your household eat any <u>traditional food</u> ? Traditional foods include wild plants or animals that come from the land or water and are harvested through hunting, trapping, fishing, or gathering.	Very important=8 (67%) Important=3 (25%) Neutral=0 Somewhat important=0 Not at all important=1 (8%)	Yes=11 (92%) No=1 (8%)	Yes=11(92%) No=1(8%)
1b. What was the main reason you or your household member(s) did not eat any traditional food in the past 12 months?	Very important=7 (58%) Important=3 (25%) Neutral=0 Somewhat important=1 (8%) Not at all important=1 (8%)	Yes=10 (83%) No=2 (17%)	Yes=10 (83%) No=2 (17%)
2a. In the past 12 months, did you have an active hunter or fisher in your household?	Very important=5 (42%) Important=3 (25%) Neutral=0 Somewhat important=2 (17%) Not at all important=0 NA=1 (8%)	Yes=7 (58%) No=4 (33%) NA=1 (8%)	Yes=8 (67%) No=1 (8%) NA=3 (25%)
2b. In the past 12 months, was the cost of hunting or fishing a barrier for you or your household member(s) to be able to hunt or fish as much as they wanted to?	Very important=6 (50%) Important=5 (42%) Neutral=0 Somewhat important=0 Not at all important=0 NA=1 (8%)	Yes=8 (67%) No=2 (17%) NA=2 (17%)	Yes=8 (67%) No=1 (8%) NA=3 (25%)
3. In the past 12 months, how often did someone from another household share <u>traditional food</u> with your household?	Very important=6 (50%) Important=4 (33%) Neutral=1 (8%) Somewhat important=0 Not at all important=1 (8%)	Yes=9 (75%) No=2 (17%) NA=1 (8%)	Yes=10 (83%) No=0 NA=2(17%)
4. Some households might say, “We worried whether our <u>traditional food</u> would run out before we could get more.” Was that often true, sometimes true, or never true of your household in the past 12 months?	Very important=3 (25%) Important=7 (58%) Neutral=0 Somewhat important=1 (8%) Not at all important=0 NA=1 (8%)	Yes=9 (75%) No=3 (25%)	Yes=10 (83%) No=2 (17%)
5. Some households might say, “The <u>traditional food</u> that we got didn’t last, and we couldn’t get any more.” Was that often true, sometimes true, or never true of your household in the past 12 months?	Very important=4 (33%) Important=5 (42%) Neutral=1 (8%) Somewhat important=1 (8%) Not at all important=0 NA=1 (8%)	Yes=8 (67%) No=4 (33%)	Yes=8 (67%) No=2 (17%) NA=2 (17%)
6a. Would your household like to have more <u>traditional food</u> ?	Very important=7 (58%) Important=3 (25%) Neutral=2 (17%) Somewhat important=0 Not at all important=0	Yes=12 (100%) No=0	Yes=10 (83%) No=0 NA=2(17%)
6b. Can you tell me what prevents your household from using more <u>traditional</u>	Very important=7 (58%) Important=3 (25%)	Yes=8 (67%) No=2 (17%)	Yes=9 (75%) No=0

<u>food</u> ?	Neutral=1 (8%) Somewhat important=0 Not at all important=0 NA=1 (8%)	NA=2 (17%)	NA=3 (25%)
7. In the past 12 months, have you or your household members noticed any changes in the quality of the <u>traditional food</u> that you eat? If so, please explain these changes.	Very important=5 (42%) Important=5 (42%) Neutral=1 (8%) Somewhat important=0 Not at all important=0 NA=1 (8%)	Yes=8 (67%) No=3 (25%) NA=1 (8%)	Yes=10 (83%) No=0 NA=2(17%)
Section B: Market Food			
8. In the past 12 months, did your household ever struggle to get enough food to meet your needs? (i.e., have to borrow money for food, miss bill payments to satisfy your basic living needs, eat unsafe food). If so, how often did this happen?	Very important=7 (58%) Important=5 (42%) Neutral=0 Somewhat important=0 Not at all important=0	Yes=8 (67%) No=4 (33%)	Yes=9 (75%) No=2 (17%) NA=1 (8%)
9a. Some households might say, “We could not afford to buy all of the food that we needed from the store” Was that often true, sometimes true, or never true of your household in the past 12 months?	Very important=9 (75%) Important=3 (25%) Neutral=0 Somewhat important=0 Not at all important=0	Yes=10 (83%) No=1 (8%) NA= (8%)	Yes=10 (83%) No=1 (8%) NA= (8%)
9b. How well does the store (or do the stores) in your community meet the food needs of your household?	Very important=5 (42%) Important=5 (42%) Neutral=1 (8%) Somewhat important=0 Not at all important=0 NA=1 (8%)	Yes=9 (75%) No=2 (17%) NA=1 (8%)	Yes=10 (83%) No=0 NA=2(17%)
9c. Some households in other communities have told us about the issues listed below. Check any that apply to your household.	Very important=9 (75%) Important=3 (25%) Neutral=0 Somewhat important=0 Not at all important=0	Yes=8 (67%) No=4 (33%)	Yes=10 (83%) No=2 (17%)
10. If any time in the past 12 months you did not have enough food at home and you couldn’t buy what you needed, what did you do to feed yourself and your family?	Very important=6 (50%) Important=6 (50%) Neutral=0 Somewhat important=0 Not at all important=0	Yes=10 (83%) No=2 (17%)	Yes=10 (83%) No=2 (17%)

NA=not answered

8.3.2.4 *Open-ended Responses*

Key informants contributed many suggestions and ways to revise the proposed questions to improve their clarity and increase the potential for obtaining meaningful responses. The open-ended comments, response to the comments, and next steps are detailed in Table 8.3. Common suggestions across the proposed questions included: clarifying terminology and defining specific terms, adding response options to open-ended questions, being cognizant of the time frame of the question (i.e. it may not make sense to refer to the previous 12 months for some questions), awareness of the potential seasonal variation of traditional and market food intake, and ensuring there are questions that pertain to community suggestions and community solutions towards food security. Key informants had differing perceptions of whether FN people ‘always’ wanted to have traditional food (or not) and how frequently/infrequently they might eat traditional food or have traditional food available in the household. For example, one key informant commented “I doubt if anyone would say no to more traditional food” and “It would be nearly impossible to find no traditional food at all in a household.” In contrast to this response, another key informant remarked, “This question assumes that there is TF in the first place...not sure who this question will work with if resident do not have access to TF.” A list of revised questions was developed based on the feedback from key informants. The revised questions and next steps to develop each question are shown in Table 8.3.

Table 8.3: Open-ended Responses from Key Informants, Comments on Responses and Next Steps

Question and Source	Open-ended Responses from Key Informants (verbatim)	Comments on Responses and Next Steps
Section A: Traditional Food		
1. In the past 12 months, did you or anyone in your household eat any <u>traditional food</u> ? Traditional foods include wild plants or animals that come from the land or water and are harvested through hunting, trapping, fishing, or gathering.	<ul style="list-style-type: none"> • "...wild plants, fish or animals..." • Is one time in 12 months sufficient? • concern regarding traditional vs. local or country foods. Also could traditional be interpreted as bannock? I doubt it with this classification. • In the past 12 months, did you or anyone in your household eat <u>or have</u> some people cultivate traditional foods (e.g. Mohawk with corn, squash and beans) • It would be nearly impossible to find no TF at all in a HH • Twelve months may be a very long time • put 'country' food in brackets. • How will this data be comparable to the rest of the country in order to portray food insecurity with non-Aboriginal populations? It's important there be enough comparability so that it can be shown how food insecure populations are. If no comparable data, we run the risk of just comparing AMONG Aboriginal populations instead of with mainstream Canadians. • Does this survey only apply to First Nations and not Inuit or Metis? 	<ul style="list-style-type: none"> • Fish are considered animals, but perhaps it is important to identify the 3 mains types of TF/CF harvested. • May need to add the term CF to all TF questions - the Inuit call wild-harvested food "country food" and food harvested from the wild by First Nations people is referred to as "traditional food". • May need to provide a definition at the beginning of the survey to establish what should be classified as TF/CF. TF sometimes refers to foods introduced by Europeans that have become a staple in the FN diet (e.g., bannock). Perhaps make a reference to food from the land. • Whether or not there has been TF in a household in the past 12 months may depend on the specific population – for example urban living FN people may have more difficulty accessing TF • It may not make sense to relate this question to the past 12 months
1b. What was the main reason you or your household member(s) did not eat any traditional food in the past 12 months?	<ul style="list-style-type: none"> • If you did not eat Traditional Foods, can you share why you did not? ie don't like it, don't have access to eat, don't know how to cook it, no one else in my house likes it, i don't know how to eat it? • ask the individual only (not anybody in the HH as one cannot answer for everybody, plus the definition of HH may be slippery. Plus as mentioned earlier, such individuals without any TF consumption will be hard to find. • Probably want to have some tick boxes + open ended, otherwise this would be a lot of data to sift through and quantify in some way. 	<ul style="list-style-type: none"> • These suggestions are some good response options and a nicer way to phrase this question • Response options could be developed by first leaving the question open-ended and survey a sample of the population, then create response options from the responses • Question may overlap with 2b and could be combined.
2a. In the past 12 months, did you have an active hunter or fisher in your household?	<ul style="list-style-type: none"> • Perhaps include other activities like gathering? • "...did someone in your household hunt or fish for traditional foods for you and your household?" • What about gatherer? • In the past 12 months, have you had an active hunter, gatherer or fisherman in your household? Adding gathering broadens the aspects of TF to forests, lands, etc. • what about TF gatherer or gardener? • This is getting to the reasons for not eating TF so not sure if this should be in another area or not but if people said no to answer 1b, then may be a duplicate question? If they say no, does that tell you that # hunters have gone down since (?). 	<ul style="list-style-type: none"> • Gathering needs to be included in this question • This question may not be applicable to those who answered no to 1b. Furthermore, this question could be turned into a response option for 1b

<p>2b. In the past 12 months, was the cost of hunting or fishing a barrier for you or your household member(s) to be able to hunt or fish as much as they wanted to?</p>	<ul style="list-style-type: none"> • This question overlaps with 1b since cost barriers will undoubtedly come up. • Should you not first ask what the barrier is? • In the past 12 months, was cost of hunting, gathering, fishing a barrier for you or your household members to be out on the land as much as they wanted to? • include TF gathering and gardening and as always make the questions personal • I think an alternative word for "barrier" should be used. For example, "In the past 12 months, did the cost of hunting or fishing prevent you or your household members from being able to hunt or fish as much as they wanted to?" • This is the same question I had with the previous question, Are you anticipating that these are reasons that come up for why less TF is eaten? 	<ul style="list-style-type: none"> • This question may also be a possible response option for 1b • The term "barrier" was a concern for the key informants. One suggestion would be to use the term prevent instead • Add land to the question
<p>3. In the past 12 months, how often did someone from another household share <u>traditional food</u> with your household?</p>	<ul style="list-style-type: none"> • Would share include community providing it at the food bank? • make it personal and include a more frequent options: (eg more than once a month) • Is the question more related to the traditional practice of sharing food and if that is a still in use practice among communities. May need to define traditional foods/fish, etc. for each question, may not think of when groups are on the land and not in home communities. 	<ul style="list-style-type: none"> • Agree that there should be a response option that covers more frequent sharing • Might need to clarify what sharing means • Consider response options as to whether sharing is used as a personal coping strategy vs. a community means • Add CF
<p>4. Some households might say, "We worried whether our <u>traditional food</u> would run out before we could get more." Was that often true, sometimes true, or never true of your household in the past 12 months?</p>	<ul style="list-style-type: none"> • Although capturing the continuum of food insecurity from worrying about enough food to going without food is important, I'm not sure what value this question adds to determining food security status, considering that First Nations consumption of traditional foods is low to moderate in some cases. • What is the purpose of this question, especially if they only eat it once... • Does your access to traditional foods run out before you can get more? • note that some people, particularly Inuit, call TF: "Country food" • What is meant by run out? It's not clear if the question is referring to running out of the food in the household, or the broader definition of our food supply running out (i.e. wild plants going extinct, shortages in salmon, etc.) • This question assumes that there is TF in the first place. It seems that TF from herds is dwindling and fish and other species are becoming more common so not sure who this question will work with if resident do not have access to TF. 12 months is a long span of time as well - may only get TF at feasts or when there is a special hunt that has been funded, etc. Who is 'we' if there is no hunter in the family - would they get it from other family members (who may nor may not be in the same 'household' with extended families or who life in crowded houses. Or, would they get some TF from buying it at the store or from someone selling it at a fish market for example. 	<ul style="list-style-type: none"> • Add CF • Determine whether there is any value in asking this question, especially for households that eat very little or infrequently eat TF. Question currently assumes that there is TF in the household. Question could be linked to those who say they have eaten TF in the past 12 months. • If question included, may need to clarify what is meant by "run out"

<p>5. Some households might say, “The <u>traditional food</u> that we got didn’t last, and we couldn’t get any more.” Was that often true, sometimes true, or never true of your household in the past 12 months?</p>	<ul style="list-style-type: none"> • remove "whether" - could we use "that"? • What do you mean "didn't last"? I can't respond to question 1 and 3 as I am not sure what the question means. • Again, same consideration as above. • Find this question relevant. • see above • note that some people, particularly Inuit, call TF: "Country food" • see above comments for question 4 • What is meant by 'didn't last' - do you mean for one meal, a week, month, year? Need to quantify if that means people had enough TF to last a year? That is hard when it is seasonal and may be abundant in the spring/fall, and not at other times - unless people store it up the whole year, it might be a difficult question to ask/answer or interpret. 	<ul style="list-style-type: none"> • Need to consider what is the difference between “running out” vs. “didn’t last” • Need to quantify “didn’t last” • Similar comments as for 4 • Agree that seasonal variation may be confound responses.
<p>6a. Would your household like to have more <u>traditional food</u>?</p>	<ul style="list-style-type: none"> • would it not be eat more traditional food??? • I doubt if anyone would say not to more TF! 	<ul style="list-style-type: none"> • Terminology needs to be examined for “have” vs. “eat”. • There may be respondents who don’t like TF and may be variation within the household
<p>6b. Can you tell me what prevents your household from using more <u>traditional food</u>?</p>	<ul style="list-style-type: none"> • This might be difficult for people to answer or the answers given might be vague. You might want to include a list of common reasons and ask for people to choose so that you can get at exactly what you are looking for (i.e., there may be some reasons that you are more interested in than others). • Perhaps some options of answers could be added (or prompts if there is an interviewer) • "...from eating more traditional..." • This question is very similar to 1b and so seems repetitive. • Good question. Is it going to be open ended? Again, the participant must understand what you mean by traditional food. I.e. INDIAN TACOS. • Can you tell me what limits or prevents your household from accessing or using more Traditional foods? You might want to ask this question twice i.e. what limits them accessing it? What limits them USING It? • Need to clarify difference between "using" more traditional food versus "having" more traditional food. If the word "using" is chosen, I think we are then questioning more about their cooking skills versus their access to food • Will have to be clear on having and using more TF - using meaning cooking, using to share/give to elders/make more dry meat to fee your immediate family, elders, etc? • keep the word the same as the prior question above - instead of "using", choose "having" 	<ul style="list-style-type: none"> • Consider terminology of “using” vs. “eating” vs. “accessing” vs. “having” • Agree that this question is similar to 1b , but 1b is only asked if there was NO TF/CF eaten. Question 6b could pertain to those who DID eat TF/CF. • Listing response options might work better than having an open-ended question
<p>7. In the past 12 months, have you or your household</p>	<ul style="list-style-type: none"> • You might have to define what you mean by quality, or ask for specifics as to what about the quality has changed. 	<ul style="list-style-type: none"> • Need to define quality • Could provide examples of quality

<p>members noticed any changes in the quality of the <u>traditional food</u> that you eat? If so, please explain these changes.</p>	<ul style="list-style-type: none"> • Perhaps define quality? Might mean different things to different people I guess. • You might want to give a few examples of "quality" • These questions are very important but they are rich mean the answer could be so varied. • Probably will need to define quality - not sure if this means - I think it would either be fit or unfit to eat? Not sure if it means food looks different due to animals not getting enough to eat and are thin; fish that look like they are contaminated? If asked this question, I would have to ask what you mean by "quality". • "quality" might be tricky to interpret/understand, but not sure if examples could be provided to make it easier to understand. Commonly I hear about contaminants/safety issues - not sure that means "quality" or what someone would interpret as "quality" 	<ul style="list-style-type: none"> • What type of response would be expected for this question? • Initial intent of this question seemed to be getting at contaminants and/or climate change affecting the quality of traditional food
<p>Section B: Market Food</p>		
<p>8. In the past 12 months, did your household ever struggle to get enough food to meet your needs? (i.e., have to borrow money for food, miss bill payments to satisfy your basic living needs, eat unsafe food). If so, how often did this happen?</p>	<ul style="list-style-type: none"> • "...miss bill payments so you can buy food..." What do you mean by "unsafe food"? • I'm not sure if the term "unsafe food" will be clearly understood. It is also dependent on the respondent's knowledge - Do respondents consider things like dented cans or freezer burned food to be unsafe? • A great question but as worded, is not specific to market food, ie., respondents could understand "enough food" to mean both traditional and market foods. • This is a VERY sensitive question. It could really shame the participant and could shut them down. I think there could be a way to get this answer without having to ask it. I.e. what barriers do you and your family have around accessing food? What could help to make accessing traditional foods and modern foods easier for your family? • every body struggle somehow! why don't you make a list of situations you want to assess: 1. borrow money for food 2. pay food with credit 2. could not make bill payment to meet basic needs 3. • may want to say 'to meet your household's needs' - still, does that mean to meet the needs of your family for all meals/snacks/family members, etc? Missing bill payments to satisfy meeting your basic 'food' needs - should add in the word 'food' there as otherwise it could mean other things, such as 	<ul style="list-style-type: none"> • Term "unsafe food" needs to be changed or clarified • Question could apply to both TF and MF • Need to consider the sensitivity of this question • Would be possible to create response options instead of an open-ended question

	clothing?	
9a. Some households might say, “We could not afford to buy all of the food that we needed from the store” Was that often true, sometimes true, or never true of your household in the past 12 months?	<ul style="list-style-type: none"> Do you find the food in the grocery store accessible? If no why? When you buy modern foods are there any barriers to purchasing, cooking or storing them you would like to share? ...buy all the food.... (not, buy all of the food) Need - how is this defined - if families are buying nothing but processed food, it would be very likely that people would run out of money to buy food - if people only bought processed sandwiches etc. then \$\$ would not last very long. I would think "need" has to be defined as needing to meet nutritional (cals, vits mins, etc) would need to be defined first. 	<ul style="list-style-type: none"> Concern over the term “needed” and what this means. The term may need to be clarified. These questions are not intended to judge how people spend their money
9b. How well does the store (or do the stores) in your community meet the food needs of your household?	<ul style="list-style-type: none"> Might want to separate this into different categories. Some people might not understand exactly what you mean by "meeting your food needs". So you might want to be specific, i.e., is the quality what you expect, is there adequate variety, does food run out... Nevermind, I see this is addressed in the next question. You may want to add a few examples of meeting food needs. It's unclear what "meet the food needs" means (ie., meet in terms of cost? or preference?) and how this contributes to (determining) food security status. See above - need to define 'need' as junk food (pop) may satisfy the need for a quick jolt of energy but does nothing to meet the nutritional needs of children, etc. Below the question asks about healthy foods but these don't and really should. 	<ul style="list-style-type: none"> Could add examples to help clarify the question
9c. Some households in other communities have told us about the issues listed below. Check any that apply to your household.	<ul style="list-style-type: none"> Although included in the market foods section, the question covers both market and traditional foods. Some households have shared issues around accessing foods for themselves and their families. Check any that apply to you: The traditional or cultural foods we want are not accessible - why? Store bought foods are expensive. The healthy foods we need are not always available - why? Foods are too expensive. Gathering traditional foods is too much for my physical limitation We don't have access to boats, hunting equipment or traditional territory. may need to differentiate here TF from MF Some households have told us about the issues listed below.(Not: Some households in other communities have told) This question could apply to families of any ethnicity. Most families indicate that the food is too expensive, but it also 	<ul style="list-style-type: none"> Agree that response options cover both TF and MF. May need to create a section that covers both types. Consider including response options specific to remote/isolated/northern community such as road access

	depends on road access, size of community etc. depending on how the access is vs. the price. The important questions are what we can do about these issues- next question starting to get at some kinds of solutions.	
10. If any time in the past 12 months you did not have enough food at home and you couldn't buy what you needed, what did you do to feed yourself and your family?	<ul style="list-style-type: none"> • May add in some common options of prompts. • There might be an advantage to asking this about a theoretical situation, rather than asking about actual experience. Answering the question means that one has not been able to meet one's family's needs, and there is some loss attached to that. • Really appreciate this question and how it gets at coping strategies. • Remember, family is considered beyond one's household. • We have heard many many families who share creative ways to make help ensure they have food for the whole month i.e. Berry picking, free fruits from fruit trees, batch cooking, eating at other family members house, community kitchens, food boxes, food banks. What have you found worked? • This question could be asked of any ethnicity. Over the past 12 months is a long time to recall - may be a seasonal issue. May want to ask if there is any one time it's worst - e.g. in winter? 	<ul style="list-style-type: none"> • May want to re-phrase this question to include prompts. • Need to consider using the term "family" as it could be beyond the household • This question could be revised to be more personal and positive • Important that this question can get an idea of some coping strategies used for food insecurity • Seasonal variation in hunting may be an issue for this question
Additional Feedback Question		
The 10 proposed questions were drafted based on the concepts that emerged from our qualitative research study. What questions could be added to improve the relevance of the HFSSM to the First Nation (or Aboriginal) context? What questions would be important to understand food (in) security in the Aboriginal populations you work with? Are there any aspects of food security for	<ul style="list-style-type: none"> • Could some questions be added that ask what people would like to have in their community e.g. somewhere to buy traditional foods at a reasonable cost, growing food, Aboriginal agencies having traditional foods for community feasts? • The only thing that occurs to me is to enquire about how people have been treated when trying to access food: Have people experienced racism or sexism while trying to access food? Have they ever been treated badly while trying to access food. It would also be interesting to ask about people's opinions on how the legacy of residential schools impact food security - There seem to be a variety of impacts on things like overeating, or under-eating, eating some foods while avoiding others, eating quickly to "get away from the table" - Many of these may be passed through the generations and impact food security. • General comments: -While I appreciate the inclusion of questions on traditional food, they seem overemphasized 	<ul style="list-style-type: none"> • Questions regarding community suggestions/community solutions are needed • Asking about how residential schools impact food security is extremely sensitive and is beyond to scope of these questions • Need to consider the overemphasis on TF – what if the respondent does not eat any traditional food? • Overall may need to consider seasons and seasonal variation in diet (for both TF and hunting seasons as well as for access to specific MF), especially if the format of the HFSSM is maintained where questions refer to the previous 12 months.

<p>Aboriginal people that were not included in these questions and you think should be added? If so, please explain.</p>	<p>compared to what is known about TF consumption among First Nations. -Will questions be tested for validity? Some concern that the questions don't truly capture food insecurity and it's continuum/ progression, i.e., from worrying about having enough food to going without food. -Very interesting work, and no doubt a huge challenge to develop a more culturally appropriate food security measurement tool!</p> <ul style="list-style-type: none"> • Do not know. The main thing may be what to do about it? Some people lack enough MF, others enough TF, others both; some more question may be asked as to what the respondent think are the causes, and what could be done about it • Questions that need to be asked: 1. What solutions (policy, program, other) can be implemented to improve food security that would make the biggest difference for my household? 2. Make it a seasonal based questionnaire where some months may be abundant and others not relevant. 3. What about access to foods from gardens/local food production - more people are now gardening and can access healthy foods from these kinds of sources. • water safety/access/trust in its safety 	
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Table 8.4: Original Questions, Revised Questions, Considerations and Next Steps to Develop Questions

Original Question and Source	Revised Question Based on Relevant Feedback	Considerations and Next Steps to Develop this Question
Section A: Traditional Food		
<p>1. In the past 12 months, did you or anyone in your household eat any <u>traditional food</u>? Traditional foods include wild plants or animals that come from the land or water and are harvested through hunting, trapping, fishing, or gathering.</p>	<p>R1. In the past 12 months, did you or anyone in your household eat any <u>traditional food*</u> or <u>country food*</u>?</p> <p>* Definition: Traditional/country foods include wild plants, fish or animals that come from the land or water and are harvested through hunting, trapping, fishing, or gathering. For the purpose of this survey, traditional/country foods do not include those foods introduced by Europeans that have become a staple in the FN diet (e.g., bannock or fry bread)</p>	<ul style="list-style-type: none"> • It may be best to ask this question at the individual level instead of the household level • Decide whether cultivated TF should be added • Consider the time frame and whether eating TF/CF once in a 12 month period is meaningful
<p>1b. What was the main reason you or your household member(s) did not eat any traditional food in the past 12 months?</p>	<p>R1b. Can you share why you did not eat any traditional or country foods in the past 12 months? Possible response options (check all that apply):</p> <ul style="list-style-type: none"> • I don't like it • I don't have access to it • I don't know how to prepare or cook it • No one else in my household likes it • There is no one in my household actively hunting, fishing, or gathering • The cost of hunting, fishing, or gathering prevented anyone from my household to be out on the land 	<ul style="list-style-type: none"> • It may be best to ask this question at the individual level instead of the household level • Response options could be further developed by first leaving the question open-ended and survey a sample of the population, then create response options from the responses • Question may overlap with 2b and could be combined.
<p>2a. In the past 12 months, did you have an active hunter or fisher in your household?</p>	<p>R2a. In the past 12 months, did someone in your household hunt, fish, or gather traditional/country foods for you or your household?</p>	<ul style="list-style-type: none"> • This question could stand alone or be incorporated into Question R1b as a response option. However R1b is only asked if there was NO TF/CF eaten in the past year and response options for R1b could also pertain to reasons why respondents have low to high TF/CF. • Might be worthwhile to ask *how much* or *how often* TF was eaten.

2b. In the past 12 months, was the cost of hunting or fishing a barrier for you or your household member(s) to be able to hunt or fish as much as they wanted to?	R2b. In the past 12 months, did the cost of hunting, fishing, or gathering prevent you or your household member(s) to be able to be out on the land as much as they wanted to?	<ul style="list-style-type: none"> • Same comment as for Question 2a above.
3. In the past 12 months, how often did someone from another household share <u>traditional food</u> with your household?	<p>R3. Can you tell me how often someone from another household shared* <u>traditional/country food</u> with your household in the past 12 months?</p> <p>Response options:</p> <p>a. Very often (Once a week or more)</p> <p>b. Often (Almost every month or every month, but not once a week)</p> <p>c. Sometimes (Some months, but not every month)</p> <p>d. Never</p> <p>*This refers to sharing between households and does not include food shared from a community food bank.</p>	<ul style="list-style-type: none"> • Question could also be applied to shared market food between households • Do not ask this Question if respondent answered “No” to Question R1.
4. Some households might say, “We worried whether our <u>traditional food</u> would run out before we could get more.” Was that often true, sometimes true, or never true of your household in the past 12 months?	R4. Some households might say, “We worried that the <u>traditional/country food</u> in our household would be eaten up before we could get more.” Was that often true, sometimes true, or never true of your household in the past 12 months?	<ul style="list-style-type: none"> • Do not ask this Question if respondent answered “No” to Question R1.as this question assumes that there is TF in the first place. • Determine whether responses to this question are meaningful. What is the purpose of this question if the respondent only eats TF/CF once? • May need to clarify who is the “we” in this question. Could it be understood that “we” refers to the members of the household?
5. Some households might say, “The <u>traditional food</u> that we got didn’t last, and we couldn’t get any more.” Was that often true, sometimes true, or never true of your household in the past 12 months?	R5. Some households might say, “The <u>traditional/country food</u> that we got didn’t last, and we couldn’t get any more.” Was that often true, sometimes true, or never true of your household in the past 12 months?	<ul style="list-style-type: none"> • Do not ask this Question if respondent answered “No” to Question R1.as this question assumes that there is traditional food in the first place. • How could “didn’t last” be quantified for this question? For example, does it mean for one meal, one week, month, or year? There may be seasonal differences depending on when during the year the question is asked.

		<ul style="list-style-type: none"> As above, may need to clarify who is the “we” in this question.
6a. Would your household like to have more <u>traditional food</u> ?	R6a. Would your household like to have more <u>traditional/country food</u> ?	<ul style="list-style-type: none"> Cannot determine variation within the household for this question. Some members may want more while others don’t. What are the implications of a yes or no response?
6b. Can you tell me what prevents your household from using more <u>traditional food</u> ?	<p>R6b. Can you tell me what prevents your household from having more <u>traditional/country food</u>?</p> <p>Potential response options (check all that apply):</p> <ul style="list-style-type: none"> I don’t like it I don’t have access to it I don’t know how to prepare or cook it No one else in my household likes it There is no one in my household actively hunting, fishing, or gathering The cost of hunting, fishing, or gathering prevented anyone from my household to be out on the land 	<ul style="list-style-type: none"> Agree that this question is similar to R1b , but R1b is only asked if there was NO TF/CF eaten. Question R6b could pertain to those who DID eat TF/CF. “Having” could include “accessing” and “eating”. May make sense to split this question into two: one for accessing and the other for eating. Response options could be further developed by first leaving the question open-ended and survey a sample of the population, then create response options from the responses
7. In the past 12 months, have you or your household members noticed any changes in the quality of the <u>traditional food</u> that you eat? If so, please explain these changes.	<p>R7. In the past 12 months, have you or your household members noticed any of the following changes in the quality or health of the <u>traditional/country food</u> that you eat?</p> <p>Potential response options (check all that apply):</p> <p>Changes could include:</p> <ul style="list-style-type: none"> physical changes in animals decreased accessibility contamination of traditional/country food reduced animal size taste or other sensory changes. 	<ul style="list-style-type: none"> Initial question from Lambden et al., 2007 had said “quality or health”. In an effort to simplify the question, the term “health” was removed. Responses indicate that this may have changed the clarity of the question. This question was already used by Lambden et al., 2007. Potential response options provided in R7 are from the results of that study.
Section B: Traditional/Country and Market Food		
8. In the past 12 months, did your household ever struggle to get enough food to meet your needs? (i.e.,	<p>R8. In the past 12 months, did your household ever use any of the following coping strategies to get enough food to meet your household’s needs?</p> <p>Potential response options (check all that apply):</p>	<ul style="list-style-type: none"> Response options could be further developed by first leaving the question open-ended and survey a sample of the population, then create response options

<p>have to borrow money for food, miss bill payments to satisfy your basic living needs, eat unsafe food). If so, how often did this happen?</p>	<ul style="list-style-type: none"> • have to borrow money for food • miss bill payments so you can buy food • eat unsafe food (e.g., food that had spoiled) <p>Set up question as a radio grid to determine “how often” these strategies were used.</p>	<p>from the responses</p>
<p>Formerly 9c. Some households in other communities have told us about the issues listed below. Check any that apply to your household.</p>	<p>R9. Some households have shared issues around accessing food for themselves and their families. Check any that apply to your household.</p> <p>Potential response options:</p> <ul style="list-style-type: none"> • the healthy foods we need are not always available at the store • the healthy foods that are available at the store are poor quality • the healthy foods we need are too expensive for us to buy at the store • the traditional or cultural foods we want are not accessible • hunting, fishing, or gathering traditional/country foods are too much for my physical limitations • we don't have access to hunting or fishing equipment • please list any other issues: Open-ended 	<ul style="list-style-type: none"> • Question moved from MF section to TF/CF and MF section • Response options could be further developed by first leaving the question open-ended and survey a sample of the population, then create response options from the responses
<p>Section C: Market Food</p>		
<p>9a. Some households might say, “We could not afford to buy all of the food that we needed from the store” Was that often true, sometimes true, or never true of your household in the past 12 months?</p>	<p>R9a. Some households might say, “We could not afford to buy all the food that we needed from the store” Was that often true, sometimes true, or never true of your household in the past 12 months?</p>	<ul style="list-style-type: none"> • Concern over the term “needed” and what this means. The term may need to be clarified. • These questions are not intended to judge how people spend their money
<p>9b. How well does the store (or do the stores) in your community meet the food needs of your household?</p>	<p>R9b. How well does the store (or do the stores) in your community meet the food needs of your household?</p> <p>Potential response options (yes/no):</p> <ul style="list-style-type: none"> • Is the quality what you expect? • Is there adequate variety? • Does the store often run out of some foods? <p>If yes to any of these options, please explain.</p>	<ul style="list-style-type: none"> • Response options could be further developed by first leaving the question open-ended and survey a sample of the population, then create response options from the responses
<p>10. If any time in the past 12 months you did not have</p>	<p>R10. We have heard many families who share creative ways to make help ensure they have food for the whole month. For example, berry picking, batch cooking, eating at other family members house and</p>	<ul style="list-style-type: none"> • Are these prompts appropriate? Should more be added or should this question list response options?

<p>enough food at home and you couldn't buy what you needed, what did you do to feed yourself and your family?</p>	<p>other ways. What have you found worked to help feed yourself and your household?</p>	<ul style="list-style-type: none"> • Question was revised to be more personal and positive.
<p>Additional Feedback Question</p>	<p>Suggested Question</p>	
<p>What questions could be added to improve the relevance of the HFSSM to the First Nation (or Aboriginal) context? What questions would be important to understand food (in) security in the Aboriginal populations you work with? Are there any aspects of food security for Aboriginal people that were not included in these questions and you think should be added? If so, please explain.</p>	<p>What solutions (policy, program, other) can be implemented to improve food security that would make the biggest difference for your household?</p>	<ul style="list-style-type: none"> • Could include response options for this question • More questions regarding community suggestions/community solutions are needed • Need to consider the overemphasis on TF – what if the respondent does not eat any TF? What other questions could be asked regarding MF?

TF = traditional food; CF = country food; MF = market food

8.4 Discussion

The majority of key informants found each proposed question to be an important or very important food security question specific for First Nations populations. This confirms that the themes that emerged from community perspectives from the relevance of the HFSSM study could be generalized to other First Nations communities beyond Fort Albany. The key informants provided constructive and informative feedback on content, wording, format, and cultural relevance. Valuable points were suggested for revisions to each question as well as additional questions that could be drafted to better understand the experience of food insecurity by First Nations people.

The purpose of this study was to begin development of a supplemental component to the HFSSM that would be applicable for understanding and measuring food security in on-reserve First Nations populations and communities and potentially identifying areas for intervention. Since the experience of food security for First Nations people living on-reserve may be very different from those living off-reserve and/or in urban cities, the revised questions from this study would need to be examined carefully before they could be generalized or applied to First Nations people living off-reserve. For example, Brown, Isaak, Lengyel, Hanning and Friel (2008) conducted a study of the perceived changes in food choices for First Nations people who had moved from reserve communities to an urban city. Not surprisingly, the participants reported a significant reduction in their consumption of traditional foods, an increase in eating convenience and fast foods, and greater access to fresh fruit and vegetables and dairy products (Brown et al., 2008).

Another key point of interest is whether the questions should continue to be directed towards the household level in the same format as the HFSSM. One of the limitations of the

HFSSM is that it does not allow for an understanding of the experience of food (in)security for individuals within the household (Health Canada, 2007). Questions directed towards individuals would allow for the examination of the chronicity of food insecurity within households and the potential range of food insecurity between household members. However, it would also require more resources as collecting data on individuals instead of households would be more intensive.

8.4.1 *Next Steps*

The next steps in the process of developing these questions is to: (1) further develop the response options for questions that were originally open-ended, (2) conduct cognitive interviews with a sample of potential survey respondents, ideally from a diverse group of FN peoples, in order to identify wording problems and understanding of the questions (Dillman et al., 2009), and (3) conduct content and construct validity testing (DeVellis, 2003) of the questions. It may be beneficial to use a modified Delphi process to move towards consensus for aspects of the survey that have generated varying responses (Brauer et al., 2007). Response options could be further developed by first leaving each of those questions open-ended and surveying a sample of the population, then create response options from their responses. The same sample could be used to conduct cognitive interviews using “think aloud” techniques to ensure that the intended respondents to the survey understand each question (Carbone, Campbell, Honesse-Morreale, 2002; Collins, 2003; Miller, 2003; Subar et al., 1995).

8.5 *Conclusions*

This chapter describes the process of developing a survey to understand some of the unique food security issues for First Nations people and its formative evaluation. The engagement and extensive and constructive feedback from Dietitians of Canada Aboriginal Nutrition Network

members was valuable and informative. Notably, the process described identifies the importance of capturing the FN voice in the assessment of food security for on-reserve Aboriginal Peoples.

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Chapter 9: GENERAL DISCUSSION

The main objective of this dissertation was to explore various aspects of food insecurity (prevalence, perceptions, coping strategies, and programmatic solutions) in the remote, on-reserve First Nations community of Fort Albany, Ontario. The purpose of this general discussion is to summarize the overall results across the five studies in this thesis, point out the key contributions of these findings to the existing literature, and suggest the next steps for future research in this area.

9.1 Overall Findings

Chapter 4 described the prevalence and severity of household food insecurity in Fort Albany using the HFSSM (Study I, Objective #1) as well as perspectives from participants on the relevance of the HFSSM for food security assessment in First Nations populations (Study II, Objective #2). As presented in Figure 4.1, the prevalence of household food insecurity in Fort Albany was very high (70%); more than double the prevalence in off-reserve Aboriginal households (33%) and more than seven times higher than households in Canada (9%). In addition, the prevalence of food insecurity in households with children was especially high at 76%. The prevalence of food insecurity in Fort Albany is comparably high to recently published results from households in 14 fly-in and rural communities in northern Manitoba, where three out of four homes were found to be food insecure (Fieldhouse & Thompson, 2012; Thompson et al., 2012). While a greater prevalence of households in northern Manitoba were severely food insecure than the prevalence of homes with severe food insecurity in Fort Albany (33% vs. 17%, respectively), the proportion of food insecure Fort Albany households with children was alarmingly high in comparison to households with children in northern Manitoba (76% vs. 58%,

respectively) (Fieldhouse & Thompson, 2012; Thompson & Mailman, 2010; Thompson et al., 2012). Although no statistically significant differences were found between food secure and food insecure households in Fort Albany for any of the selected sociodemographic characteristics, nearly half of the households in this community had multiple families living under the same roof. This has implications for both the use of national food security surveys that are applied at the household level as well as considering how household dynamics in overcrowded or multi-family homes might influence food security. There is little knowledge of how overcrowding might affect food security within households (Willows et al., 2009). Inadequate housing conditions, especially in remote communities where overcrowding, mold problems, and disrepair are common, have a negative impact on health and well-being (Egeland, 2011; FNIGC, 2012; Larcombe et al., 2011; Minich et al., 2011). Measures of food insecurity applied at the household level do not permit an understanding of the chronicity of the experience of food insecurity within households, nor do individuals within households always experience food security in the same way (Power, 2005; Power, 2006). In particular, intra-household distribution of food resources may differ depending on household composition (Power, 2005; Power, 2006). For example, studies have shown mothers compromising their own dietary intake to prevent their children from being hungry (McIntyre et al., 2002; McIntyre et al., 2003). The nature of intra-household food distribution between family members and between families living together in food insecure First Nations homes remains unclear.

While use of the HFSSM to determine household food security status in Study I allowed comparisons to national data, the majority of respondents in the subsequent interview did not think the HFSSM appropriately measured food security in First Nations communities as it lacked the context surrounding their unique food system. Based on participant's perceptions, contextual

factors missing from the HFSSM included traditional foods, the extremely high cost of market food, high cost of living, and reduced availability of healthy foods (traditional and store-bought). As FN populations are one of the most vulnerable groups experiencing food insecurity and their food security challenges are unique, evidence from this study supports the development of a food security questionnaire designed specifically for on-reserve FN people and other Aboriginal populations living in remote and northern locations.

Chapter 5 presented an exploration of the experience of food insecurity by Fort Albany members with an emphasis on what strategies they used to cope during food shortages and what suggestions they had to improve the food security situation in their community (Study II). As depicted in Figure 5.1, ten major themes centering around each of the three interview questions emerged from participant's perceptions of food insecurity. It was clear from Study II that many coping mechanisms were used by household members in Fort Albany to manage feeding their families during periods of food insecurity. The thematic analysis revealed that food sharing, especially with family, was regarded as one of the most significant ways to adapt when there was not enough food for their household. Food sharing within Canadian Aboriginal populations has been widely documented in the literature (Chan et al., 2006; Ford & Beaumier, 2011; Delormier, 1993; Ford, 2009; Gombay, 2007; Kaplan & Gurven, 2001; FNIGC, 2012; Robidoux et al., 2009; Socha et al., 2012; Tsuji et al., 2007; Tsuji & Nieboer, 1999). Most participants reported consuming traditional food (wild meats were mentioned almost exclusively) and suggested that hunting, preserving and storing traditional food has remained very important for themselves, their households and their community. The importance of traditional food was overshadowed by the numerous barriers to traditional food acquisition mentioned during the interviews. Numerous studies of both Inuit and First Nations populations have cited barriers to traditional harvesting

practices influencing the accessibility of traditional foods for consumption (Beaumier & Ford, 2010; Ford & Beaumier, 2011; Ford, 2009; Socha et al., 2012; Fieldhouse & Thompson, 2012). Additional coping strategies included dietary change (e.g., buying/eating dried goods such as rice and pasta), rationing (e.g., cutting portion sizes), and changing food purchasing patterns (e.g., bulk buying food from southern grocery stores when possible). In order to improve access to healthy foods, improving income and food affordability, building community capacity and engagement, and community-level initiatives were suggested. One of the community-level initiatives recommended by respondents was to further develop the school snack program. Other suggestions applicable to this thesis were for community members to participate in more gardening activities and to build greenhouses. During the period of time when the interviews were conducted (June 2009 to January 2011), gardening endeavors were piloted and beginning to gain momentum in the community through a “Get Growing” program supported by Nishnawbe Aski Nation (LeBlanc, 2012) as well as a local substitution agroforestry project (Spiegelhaar & Tsuji, in press). Furthermore, construction of the greenhouse, that was a part of Study IV in this thesis, took place over the spring, summer, and fall of 2010 with interviews for Studies I and II occurring throughout this period. The gardening and greenhouse events that were taking place in the community likely contributed to the views of the participants.

Chapter 6 showed the positive impact of the school snack program in Fort Albany on the dietary intakes of participating students in grades six to ten (Study III). Study III also presented feedback on participation, preferences, and impressions of the snack program by students to be used to enhance the program. Between the two data collections in 2004 and 2007, students participating in the snack program had significantly higher intakes of Vegetables and Fruit; Milk and Alternatives; Vitamins C, A, and D; folate, dietary fibre, calcium, and iron; and significantly

lower intakes of “Other” foods, than non-participants. With the exception of Meat and Alternatives in 2004, there was also a trend for a higher percentage of students to meet dietary recommendations from Canada’s Food Guide or the Estimated Average Requirement if they participated in the snack program. Aspects of the snack program that students enjoyed the most were the juice, that the program kept them from feeling hungry at school, and that they got a snack at school every day. Although the suggestion that the snack program kept students from feeling hungry at school was provided as a response option and not an original idea from the students, their selection of this response option alludes to the likelihood of them being hungry if the snack program were not available. The majority of students surveyed agreed that the snack program motivated them to eat healthier, helped them to eat more fruit, and assisted them in making better dietary choices. The importance of sustaining and enhancing the school snack program at Peetabeck Academy was supported by the results on the positive impact of the program from Study III and the support of the initiative from community members recommending the program as a way to improve food security from Study II. The program has become institutionalized in the school and is seen as a necessity by those governing the community.

A national school nutrition program was proposed and advocated for by the Food Secure Canada organization at federal pre-budgetary hearings in November 2012 (Food Secure Canada, 2012). They proposed a cost-sharing model whereby the financial contributions from local, regional, provincial/territorial, and private sources which comprise the bulk of current funding could be supplemented by federal funds of 20% of the total cost (Food Secure Canada, 2012). Food Secure Canada (2012) also noted that remote and Northern communities were one exception where current funding for school nutrition programs had not been established, yet

programs in these schools are urgently needed. There is potential to make a significant impact on the diet and overall health of FN students by forming a National First Nations Student Nutrition Program. This endeavor could be built upon the ONEXONE First Nations School Breakfast Program, which in the 2011-2012 school year supported breakfast for more than 3000 students in 19 FN schools across Canada (OneXOne, 2012), and also could enhance locally supported programs that already exist in FN schools (Lyons, 2008). Even with sufficient and continuous funding, barriers to launching and sustaining these programs may include poor infrastructure (e.g., adequate facilities to prepare, store, and distribute food in schools), lack of volunteer support, and the logistical difficulties in consistently accessing healthy food in remote locations (Hanning et al., 2011).

Chapter 7 was an in-depth description of the process and implementation of the greenhouse project (Study IV). Themes included: seasons, fertile ground, sustainability, gardeners, ownership, participant growth, and sunshine. The concept of *ownership* arose across many of the interviews as it was unclear to some community members who the greenhouse belonged to. Involving parents and their children together with school-based greenhouse activities and hosting community-wide greenhouse events with an open-door policy might help to dispel the myth about who owned the greenhouse in Fort Albany. For families interested in starting or augmenting home-based gardens, the greenhouse could be used to cultivate and nurture seedlings to be transplanted outdoors. Other communities initiating school and/or community greenhouse projects may want to establish guidelines around whom, when, and how community members can access the greenhouse to avoid confusion around ownership. An important facilitator of the Fort Albany project was that local champions were essential for successful implementation of the greenhouse. The success and sustainability of many community

health initiatives, Aboriginal and non-Aboriginal, have been correlated with the presence of a program champion(s) (Hanning et al., 2011; O'Loughlin, Renaud, Richard, Sanchez Gomez, Paradis, 1998; Scheirer, 2005; Goodman & Steckler, 1989). Identifying existing action-oriented local champions and involving them during initial project planning may be an important way for other communities to begin their own greenhouse and gardening interventions. Interestingly, uncertainty about ownership and the critical roles of local project champions may be divergent findings; where the community members did not feel ownership of the Fort Albany greenhouse because of the perceived status of the project champions. Despite the lack of clarity regarding ownership, many positive outcomes arose while building and maintaining the greenhouse including: community engagement with a large number of community members, particularly the involvement of children; an array of activities related to gardening and environmentalism (e.g., composting as a part of the high school curriculum); and the opportunity to gain knowledge towards more effective greenhouse and gardening practices in a northern setting.

Chapter 8 described the development and formative evaluation of a list of potential questions related to food security and relevant to FN people living in on-reserve households (Study V). Input from key informants from the Aboriginal Nutrition Network of the Dietitians of Canada informed revisions to the content, wording, and format of the drafted questions. Next steps in the process for further developing the questions were outlined. Feedback from the key informants highlighted the diverse experiences of food insecurity that distinct FN populations may encounter. For example, whether or not traditional food is accessible, consumed, or even wanted may greatly vary between FN households and communities. They raised points about the overemphasis of questions on traditional food, the need for a definition for traditional food and whether it included foods introduced by colonization that are now considered staples of the FN

diet (e.g., bannock), terminology that could be ambiguous for respondents (e.g., defining the term “need”), the timeline of the questions (e.g., questions were related to the past 12 months), the impact of seasonal consumption, and the impact of asking the questions at the household level versus an individual level. Where possible, recommended changes from key informants were incorporated into a revised set of questions. Further work with the development of the questions would include further developing the response options to capture the scope of food insecurity experienced, conducting cognitive interviews, and determining their content and construct validity.

9.2 Key Contributions to the Literature

Findings from these five studies contribute to the existing literature in a number of meaningful ways.

1. An example of the very high prevalence of food insecurity in an on-reserve and remote First Nations community.

Prior to the planning of this thesis, there were very few studies and only in discrete populations reporting the prevalence of food insecurity in on-reserve communities. The prevalence of food insecurity in the greater on-reserve First Nations population in Canada is only beginning to be documented through the First Nations Food Nutrition and Environment Study and a few published articles from specific provinces (FNFNES, 2012; Fieldhouse & Thompson, 2012; Thompson et al., 2012). Data on the prevalence of food insecurity in Fort Albany had not been collected previously, with Study I providing evidence of extremely high rates of food insecurity. These data can be used to advocate for programs and policies to improve food security in Fort

Albany specifically as well as other First Nations communities with similar food access issues. Strengths of this study that fill existing gaps in the literature include: the high response rate and representativeness of the sample, choosing to hire and train a local research assistant with community stature, data collection with the full 18-item food security module, and the first study to examine the relevance of the HFSSM from the perspectives of FN people. Unfortunately this study did not find associations between selected sociodemographic characteristics and food insecurity, possibly due to the small sample size and therefore a lack of statistical power to determine statistically significant relationships.

2. The continued importance of: traditional food acquisition, food sharing as a coping mechanism, and listening to proposed community solutions for food systems change.

The decreased reliance on traditional foods for sustenance had not diminished the importance of traditional food acquisition from the perspectives of Fort Albany participants. One of the main coping mechanisms to handle food shortages was food sharing between family and friends. However this means of adapting was constrained by the numerous barriers to hunting, fishing, and gathering. Infrastructure and resources are needed to support informal and formal country food harvesting and community food sharing programs and to develop organized and coordinated distribution systems both within and between communities (Beaumier & Ford, 2010). Successful approaches used in First Nations communities require cultural appropriateness as well as community-driven participatory assessment, planning and implementation (Ho et al., 2006; Maar et al., 2011; Macauley et al., 1998; Vastine et al., 2005). The most viable and effective solutions for food systems change will come from ideas proposed by community

members (Maar et al., 2011). Programs and policies that improve income and food affordability (i.e., poverty reduction) and those building community capacity and engagement are critical for tackling food insecurity in First Nations communities (Willows et al., 2009; Power, 2008).

3. Initiatives, such as school nutrition programs and greenhouse and gardening projects, can be promising practices for improving food security.

Despite the existence of many nutrition programs in First Nations schools (Lyons, 2008), only a few studies have been published on their impact on students dietary intake (Gates et al., 2011; Gates et al., 2012; Gates et al., 2013; Saksvig et al., 2005). Findings from Study III suggested that a First Nations school nutrition program can positively impact the dietary intake of youth as well as help them to meet dietary recommendations. Yet it is apparent from the high prevalence of food insecurity in households with children that the school nutrition program alone is not sufficient to ensure that Fort Albany children are food secure. There are also limitations of programmatic approaches since they require sufficient and sustained funding as well as consistent personnel (paid or volunteer) to run programs (Hanning et al., 2011). Results from Study IV indicated that greenhouse and gardening projects were a possible avenue to: initiate and build up local food production; develop skills for agricultural activities at the home and community level; and engage and involve community members, including children, in growing local produce. Identifying local program champions and addressing concerns about ownership should be considered during the planning stages of community or school-based gardening initiatives. Findings from these two studies highlighted the need to assess community assets and gaps for food security. The Fort Albany school nutrition program is a valuable community asset

and, if enhanced, may make progress towards better food security for Fort Albany children and youth. Although the amount of food able to be grown in the greenhouse would not be able to sustain many people overall, it could be used as a place to germinate seeds and cultivate seedlings to support home-based gardens and community gardening. The greenhouse could also be further incorporated into the classroom curriculum to teach students about cultivating plants and the value of producing locally grown produce.

These findings also may have important relevance for the implementation of community food security projects and initiatives that can have broad community reach and impact and for future research on programs and policies addressing food security issues. Both programs could be seen as avenues for building individual and community empowerment, whereby program champions and community members are able to take control over initiatives that they feel are worthwhile. The longevity and continued improvement of the school snack program over more than two decades is evidence that internal community-driven solutions are more sustainable and may work better than externally imposed initiatives.

4. Evidence of the inadequacy of the HFSSM for measuring food security in on-reserve and remote First Nations households.

Two studies in this thesis (Study I, Objective #2 [relevance of the HFSSM] and Study V [measuring food security in FN households]) are the first, to the author's knowledge, to document the limitations of the HFSSM from the perspectives of FN people, a population for which the HFSSM had not previously been validated. Respondents felt that the HFSSM did not capture an accurate picture of food security for their situation. Understanding the context of the

determinants of food insecurity specific to northern FN households is imperative for developing a food security measurement tool that is culturally appropriate and valid for FN populations.

Topics important to understanding the context of food security in FN households from the viewpoints of Fort Albany participants included: traditional food acquisition and accessibility; the extremely high cost of market food; the high cost of living, and reduced availability of healthy foods from both the traditional food and market food systems.

5. Suggested directions for a culturally appropriate food security measurement tool for First Nations populations.

A culturally appropriate and valid food security assessment tool must be developed for FN populations as they are one of the most vulnerable and food insecure groups and also have unique food security challenges related to their culture. From Study V, a pilot food security questionnaire was drafted for FN populations with the following considerations: incorporating topic areas from the findings from Fort Albany respondents (Study I, Objective #2 [relevance of the HFSSM]); the current question format of the HFSSM; existing food security questions from the literature, particularly those that have been designed for, and used with, Aboriginal populations; and input from key informants. The pilot questionnaire is a first step towards creating a supplement to the HFSSM with enhanced relevance for diverse First Nations populations. Although further research and development of the questionnaire is necessary, survey responses from FN people using a fully developed tool would enable practitioners and policy-makers to work with FNs to better address relevant food security issues in on-reserve FN households and communities. Limitations to the development of this tool include the following:

the diversity of Aboriginal populations across Canada and even between FN communities would make it difficult to design a tool that could encompass the range of food security challenges faced by different groups and it is not possible to measure all of the constructs that impact on food security. Generally, traditional food consumption patterns seem to vary by age (Kuhnlein & Receveur, 1996; Kuhnlein et al., 2004), between men and women, and for those living in urban cities versus remote and isolated communities (Brown et al., 2008). Further development of the FN-specific food security questions would help to determine whether it is possible for a single tool to capture the scope of food security issues experienced by distinct FN communities.

9.3 Recommendations for Future Research

Power (2007; 2008) and Willows (2005a) identified numerous food security issues in Aboriginal populations that had not been studied in-depth. These included: prevalence or severity of food insecurity in on-reserve populations, how this varies by season or time period; concerns about contamination of traditional food; traditional food systems and food security; how food pricing influences food choice; how traditions of sharing and reciprocity of food contribute to food security; how families cope internally with food shortages; how individuals within families experience or cope with food shortages differently; how communities cope with widespread food insecurity; and what solutions or strategies have worked (or not worked) in the past and what new strategies are suggested by community members (Power, 2007; Power, 2008; Willows, 2005a). More qualitative research is needed to better understand conceptualizations of food security by Aboriginal people (Healey & Meadows, 2007; Power, 2008; Willows et al., 2009).

This dissertation contributes knowledge towards several of these research gaps. The studies included in this thesis provide an overall picture of many aspects of food security in the remote,

on-reserve FN community of Fort Albany. Specifically, research findings were shown in the following areas: the prevalence and severity of food insecurity on-reserve, the importance of traditional food systems for food security, the tradition of sharing as a coping mechanism for food insecurity, the various coping strategies used by households to address food insecurity, and strategies towards food security suggested by community members.

While data on the prevalence and severity of food insecurity in on-reserve populations are now available from this thesis, 14 Manitoba communities (Thompson et al., 2012) as well as more provincial data forthcoming from the First Nations Food Nutrition and Environment Study (FNFNES, 2012), there remains no information available on how food insecurity status varies by season or time period. Food insecurity is a dynamic phenomenon that can be transient or chronic. In on-reserve communities it is common to have seasonal employment and many households that rely on social assistance. Thus, variable employment throughout the year and the timing of social assistance payments may have transitory effects on the prevalence and severity of food insecurity. Future research on food security status and food purchasing behaviour during different seasons and in relation to the arrival of pay cheques or social assistance cheques in relation to other bills is warranted.

Nearly half of the homes surveyed in Fort Albany had more than one family living under the same roof (Study I). Overcrowding in on-reserve households is common (Larcombe et al., 2011). Household dynamics may play a role in food security in multigenerational and multi-family homes. Future research should consider whether household dynamics influence food security in First Nations households.

Findings from Study IV allude to the possibility that a successful community or school greenhouse project may increase motivation for local food production. This outcome was not

directly evaluated in this thesis and is an area that would benefit from further research. Findings from this dissertation and other studies (Fieldhouse & Thompson, 2012; Thompson et al., 2012) suggest that local food production in remote and northern communities is a potential avenue for improving food security. However, there is still very little information known about how to develop, revitalize, and support sustainable local food systems in remote and northern First Nations communities. Nor is it clear whether re-building and maintaining traditional harvesting and food acquisition practices such as hunting, fishing, gathering, gardening, and farming are critical to improving food security and re-establishing sustainable local food systems to work towards greater self-sufficiency in these communities. Future research questions regarding northern local food systems could be: (1) What are the factors that help a community collectively move towards greater food security by their improvement of local food systems?, (2) Can more sustainable local food systems in remote and northern First Nations communities be developed? If so, how?, (3) How can local food systems in these communities be supported by government policies?, (4) Does a successful community or school greenhouse project increase motivation for local food production?, and (5) Is it possible to have an economically viable and commercially successful greenhouse that produces food in a northern, remote community?

9.4 Concluding Remarks

Given the very high prevalence of food insecurity in Fort Albany, and the emerging data showing high prevalence of food insecurity in other on-reserve FN households, the urgency remains for designing and implementing policies and programs to combat food security in these communities. Community-driven initiatives to improve northern food systems should be recorded and disseminated as promising case examples for other communities. Culturally relevant tools for monitoring food security in FN communities will help to provide a clearer

picture of the unique factors effecting food security for FN populations and will help to direct and inform targeted policy strategies that are appropriate and specific to promoting food security in remote FN communities.

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APPENDIX A: CCHS Household Food Security Survey Module (HFSSM)

The following questions are about the food situation for your household in the past 12 months.

Q1. Which of the following statements best describes the food eaten in your household in the past 12 months, that is since [current month] of last year?

1. You and other household members always had enough of the kinds of foods you wanted to eat.
2. You and other household members had enough to eat, but not always the kinds of food you wanted.
3. Sometimes you and other household members did not have enough to eat.
4. Often you and other household members didn't have enough to eat.

- Don't know / refuse to answer (Go to end of module)

STAGE 1: Questions 2–6 — ask all households

Now I'm going to read you several statements that may be used to describe the food situation for a household. Please tell me if the statement was often true, sometimes true, or never true for you and other household members in the past 12 months.

Q2. The first statement is: you and other household members worried that food would run out before you got money to buy more. Was that often true, sometimes true, or never true in the past 12 months?

1. Often true
2. Sometimes true
3. Never true

- Don't know / refuse to answer

Q3. The food that you and other household members bought just didn't last, and there wasn't any money to get more. Was that often true, sometimes true, or never true in the past 12 months?

1. Often true
2. Sometimes true
3. Never true

- Don't know / refuse to answer

Q4. You and other household members couldn't afford to eat balanced meals. In the past 12 months was that often true, sometimes true, or never true?

1. Often true
2. Sometimes true
3. Never true

- Don't know / refuse to answer

IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q5 AND Q6; OTHERWISE, SKIP TO FIRST LEVEL SCREEN

Now I'm going to read a few statements that may describe the food situation for households with children.

Q5. You or other adults in your household relied on only a few kinds of low-cost food to feed the child(ren) because you were running out of money to buy food. Was that often true, sometimes true, or never true in the past 12 months?

1. Often true
2. Sometimes true
3. Never true

- Don't know / refuse to answer

Q6. You or other adults in your household couldn't feed the child(ren) a balanced meal, because you couldn't afford it. Was that often true, sometimes true, or never true in the past 12 months?

1. Often true
2. Sometimes true
3. Never true

- Don't know / refuse to answer

FIRST LEVEL SCREEN (screener for Stage 2): If AFFIRMATIVE RESPONSE to ANY ONE of Q2-Q6 (i.e., "often true" or "sometimes true") OR response [3] or [4] to Q1, then continue to STAGE 2; otherwise, skip to end.

STAGE 2: Questions 7–11 — ask households passing the First-Level Screen

IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q7; OTHERWISE SKIP TO Q8

Q7. The child(ren) were not eating enough because you and other adult members of the household just couldn't afford enough food. Was that often, sometimes or never true in the past 12 months?

1. Often true
2. Sometimes true
3. Never true

- Don't know / refuse to answer

The following few questions are about the food situation in the past 12 months for you or any other adults in your household.

Q8. In the past 12 months, since last [current month] did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?

1. Yes
2. No (Go to Q9)

- Don't know / refuse to answer

Q8b. How often did this happen?

1. Almost every month
2. Some months but not every month
3. Only 1 or 2 months

- Don't know / refuse to answer

Q9. In the past 12 months, did you (personally) ever eat less than you felt you should because there wasn't enough money to buy food?

1. Yes
2. No

- Don't know / refuse to answer

Q10. In the past 12 months, were you (personally) ever hungry but didn't eat because you couldn't afford enough food?

1. Yes
2. No

- Don't know / refuse to answer

Q11. In the past 12 months, did you (personally) lose weight because you didn't have enough money for food?

1. Yes
2. No

- Don't know / refuse to answer

SECOND LEVEL SCREEN (screener for Stage 3): If AFFIRMATIVE RESPONSE to ANY ONE of Q7-Q11, then continue to STAGE 3; otherwise, skip to end.

STAGE 3: Questions 12-16 - ask households passing the Second Level Screen

Q12. In the past 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?

1. Yes
2. No (IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q13; OTHERWISE SKIP TO END)

- Don't know / refuse to answer

Q12b. How often did this happen?

1. Almost every month
2. Some months but not every month
3. Only 1 or 2 months

- Don't know / refuse to answer

IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q13-16; OTHERWISE SKIP TO END

Now, a few questions on the food experiences for children in your household.

Q13. In the past 12 months, did you or other adults in your household ever cut the size of any of the children's meals because there wasn't enough money for food?

1. Yes
2. No

- Don't know / refuse to answer

Q14. In the past 12 months, did any of the children ever skip meals because there wasn't enough money for food?

1. Yes
2. No

- Don't know / refuse to answer

Q14b. How often did this happen?

1. Almost every month
2. Some months but not every month
3. Only 1 or 2 months

- Don't know / refuse to answer

Q15. In the past 12 months, were any of the children ever hungry but you just couldn't afford more food?

1. Yes
2. No

- Don't know / refuse to answer

Q16. In the past 12 months, did any of the children ever not eat for a whole day because there wasn't enough money for food?

1. Yes
2. No

- Don't know / refuse to answer

END OF MODULE

APPENDIX B: Information / Recruitment Letter for Studies I and II

University of Waterloo letterhead

[Date]

Dear [name of participant]:

This letter is an invitation to consider participating in a study I am conducting as part of my PhD degree in the Department of Health Studies and Gerontology at the University of Waterloo under the supervision of Professors Rhona Hanning and Len Tsuji. I would like to provide you with more information about this project and what your involvement would entail if you decide to take part.

Canada's Aboriginal population, especially those living in remote First Nations communities are particularly vulnerable to food insecurity and the related negative consequences for health and well-being. The food security challenges faced by remote First Nations communities are unique and reflect their geographic isolation and specialized food systems that combine both traditional and market foods. Despite evidence that food insecurity is prevalent in Aboriginal communities, little information is known about the characteristics of the individuals or households experiencing this problem and the determinants of their food insecurity. The purpose of this study, therefore, is to explore the perceptions of food insecurity and coping strategies used by families and community members in Fort Albany, Ontario. As you may know, there are issues about the accessibility, availability and cost of food in Fort Albany. Because you are a resident of Fort Albany, your opinions may be important to this study. Thus, I would appreciate the opportunity to speak with you about this.

There are two parts to this project. The first part involves an 18-item questionnaire called the Household Food Security Survey Module (HFSSM) developed by Health Canada. The HFSSM asks questions about the food security situation in your household over the previous 12 months. The second part involves an interview with you with questions about your perceptions of food insecurity in Fort Albany and the coping strategies that you use to deal with food insecurity. The questions are quite specific (for example, could your family afford to buy all the food it needs from the store?) and have been developed through consultation with members of your community in the form of a Community Advisory Committee.

Participation in this study is voluntary. Both the questionnaire and interview combined will take approximately 1.5 hours and will take place in a mutually agreed upon location. You may decline to answer any of the questions during the questionnaire or interview if you so wish. Further, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher. With your permission, the interview will be audio recorded to facilitate collection of information, and later transcribed for analysis. Shortly after the interview has been completed, you will receive a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish. All information you provide is considered

completely confidential. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. Data collected during this study will be retained indefinitely in a locked office and then confidentially destroyed once all analyses and reports are complete. Only researchers associated with this project (i.e., Rhona Hanning, Len Tsuji and Kelly Skinner) will have access to the data that contains personal identifiers. There are no known or anticipated risks to you as a participant in this study. A Cree interpreter will be provided if you prefer to conduct the interview in Cree and in this case the transcript that we use to confirm your responses will be in Cree.

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at 519-888-4567 x36631 or by email at kskinner@uwaterloo.ca. When I am in Fort Albany, I can be reached locally at 278-3383 (Edwards' Bed & Rest). You can also contact my supervisor, Professor Rhona Hanning at 519-888-4567 ext. 35685 or email rhanning@uwaterloo.ca.

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. However, the final decision about participation is yours. If you have any comments or concerns resulting from your participation in this study, please contact Dr. Susan Sykes of this office at 519-888-4567 Ext. 36005 or ssykes@uwaterloo.ca.

I hope that the results of my study will be of benefit to the community of Fort Albany, as well as to the broader research community.

I very much look forward to speaking with you and thank you in advance for your assistance in this project.

Yours Sincerely,

Kelly Skinner
Student Investigator
PhD Candidate
Health Studies and Gerontology
University of Waterloo
519-888-4567 x36631
kskinner@uwaterloo.ca

Contact information in Fort Albany: 278-3883 (Edwards' Bed & Rest)

APPENDIX C: Interview Questions for Documenting the School Nutrition Program

History and Description

1. When did you start the program?
2. How did you get started? And maybe why?
3. Where did you initially get your funding?
4. Has it changed/increased/decreased?
5. What is your yearly budget?
6. Where does the money come from?
7. What percentage goes to transportation vs. cost of food?
8. How much food do you go through in 1 school year?
 - types of food
 - menu (weekly)
9. What is a typical day for you in relation to the program?
10. How many hours per day/ per week would you say you spend running the program?
11. What are the tasks that you need to do (e.g. planning, ordering, transporting food, cooking, cleaning, etc.)?
12. How many students are registered in the school?
13. Offered 5 days per week? Every week of the school year?
14. Do you report to any other school personnel regarding the program (E.g. principal)?
15. Are special days celebrated with food?
16. How are the teachers involved in the program?
17. Do the teachers think that the students like the food and can concentrate better because of the breakfast and snacks?
18. What are some of the logistics of ordering food, etc?
19. Do you ever collaborate with the grocery store?
20. Do you have to write reports for your funders? Can I access these?

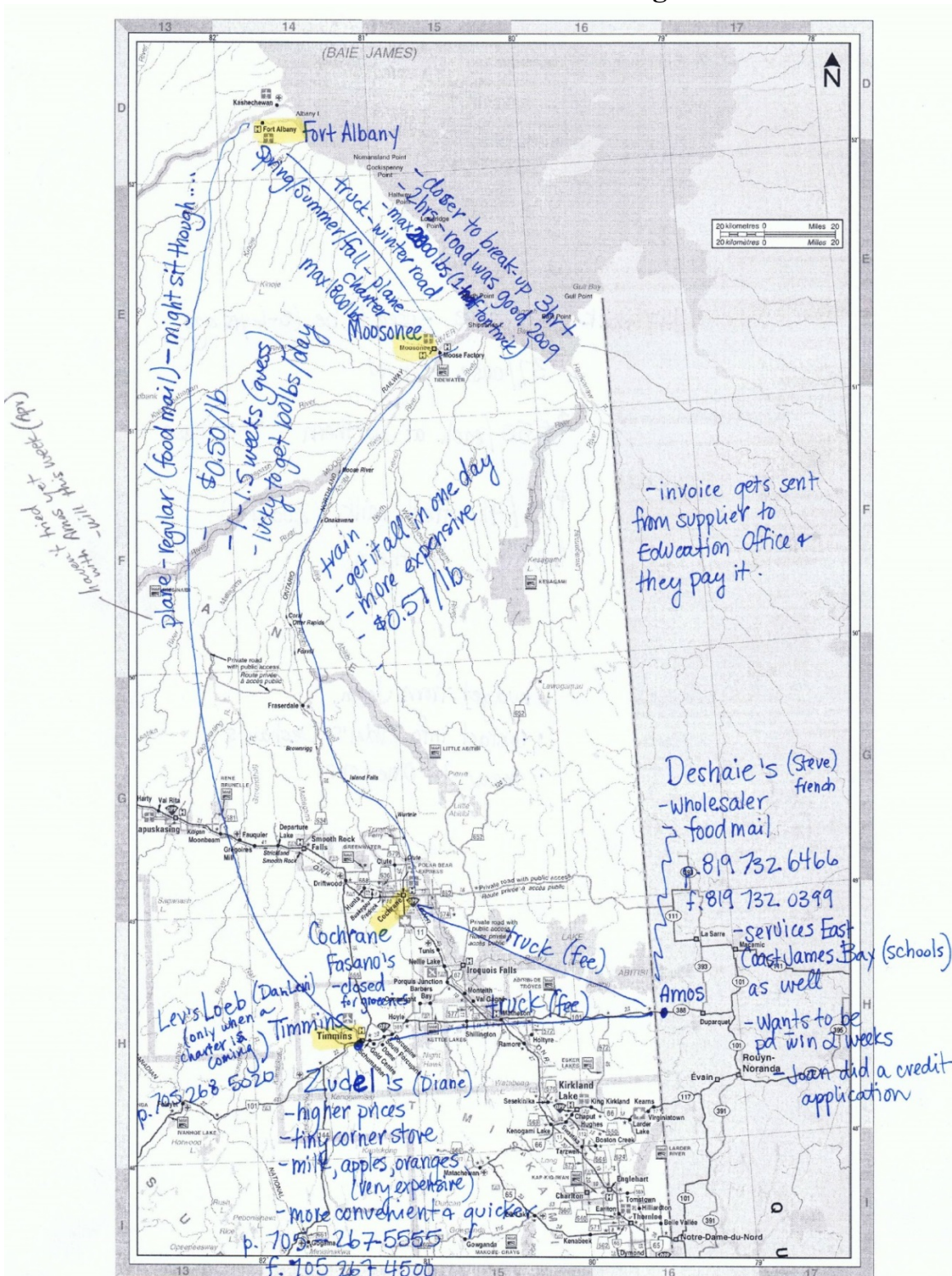
Volunteers

21. Do you have volunteers? If yes, how many people help with the program? Who volunteers? How do the volunteers help out? If no, have you ever tried to get volunteers? How did you try to recruit volunteers? Who else is involved with the program? What are the reasons why people may not be helping with the program?

Needs

22. What do you or would you really need?
 - to sustain the program
 - to expand/ enhance the program
 - to offer a lunch program

APPENDIX D: Food Suppliers and Transportation Routes for the School Nutrition Program



APPENDIX E: Calculations for the School Nutrition Program

SNACK PROGRAM

2 snacks day x 170 students

\$1000⁰⁰ - week
 \$200⁰⁰ - day
 \$1.18 - per student

ITEM	Weekly Quantity	Cost ^{FR}	EXTENDED Cost	Daily
Milk	17 bags/6cs	20.00 10.00	\$200 ⁰⁰ OR \$250 ⁰⁰	15L.
Cereal	12 boxes Jumbo 15 boxes single	\$8.50 box	\$110 ⁰⁰	20 cans /1.
Juice	4 1/2 cs	\$35 ⁰⁰ cs	\$160 ⁰⁰ OR	20 cans/1
Bread	2 cs.	40 ⁰⁰ cs	\$80 ⁰⁰ OR	10 loaves
Eggs	1 cs		\$40 ⁰⁰	
Digestive/ Ritz	1 cs			10 boxes
Fruit	3 cs.	\$65 ⁰⁰ cs	\$200 ⁰⁰	1/2 to 3/4 cs
Incidentals		\$250 ⁰⁰	\$250 ⁰⁰	
<u>Totals</u>			<u>\$1000⁰⁰</u>	<u>\$200⁰⁰</u>

200
 110
 160
 80
 200
 250

 \$1000⁰⁰

Fresh Milk = \$3.99 + \$5.00 freight

12L(cs) = 12.00 + 15.00
 = \$27.00 cs

shelf milk - 12L(cs) = 27.00 + 15.00
 = \$42.00 cs

Juice - cs = 25.00 + 10.00 freight
 = \$35.00

Cereal - cs = 87.00 + 14.00
 = \$101.00

APPENDIX F: Wawatay News Article

Wawatay News Online. <http://www.wawataynews.ca/>

Snack program delivers the goods

What pops up from a two slice toaster? Two pieces of toast and a program which has blossomed into a federally funded, student centered nutritional food provision at the Peetabeck Academy in Fort Albany.

by: Kelly Skinner - Special to Wawatay News

April 30, 2009: Volume 36 #09, Page A14

The initial support funding was for a toaster and a box of apples for St. Anne's school. A teacher at the school, Joan Metatawabin, noticed the students at the school were tired and unfocused; unable to concentrate in their classrooms.

She suspected that their dietary requirements were not being met and this was having a great effect on their overall student performance.

Faced with this situation Joan applied for help with the purchase of a two slice toaster and began the school snack program which now can provide not only a "snack" but also breakfast, lunch, after school activity and field trip food supplies. The program has been going strong for over a decade. The key to the success of the program is Joan Metatawabin.

Metatawabin, the champion of the program, mother of four children, grandmother of seven, wife of former chief Edmund Metatawabin is the school nutritionist and oversees all aspects of the program. Beginning with the assessment of dietary needs she plans the meals, orders and prices the food maximizing resources, co-ordinates and expedites the transportation to the community via the airport or the winter road. Finally the snacks are delivered to the school kitchen and prepared for the students.

"Prepared for the students," as simply as that sounds, it is far from easy. How would you create a meal for upwards of 200 hungry youth, five days a week, for every single week of the school year?

Here's how she does it. First, all classrooms have sinks, spoons and cereal bowls at the ready to receive Joan's breakfast menu which can include hot or cold cereal, milk, cut-up fruit, juice and toast. Secondly, the food is then placed on carts and delivered to each classroom according to numbers, needs, and because of Metatawabin's personal touch, individual wants.

She knows that students don't like mushrooms on their pizza, the younger children love applesauce, and who has food allergies.

Leftovers are returned to the cafeteria by the students to be utilized for the following days breakfast and dishes are done in the classroom by the students and teachers emphasizing the educational value of food preparation, conservation and clean-up.

That's breakfast - now let's cover snacks. The snack program is offered in two locations; in the classroom and delivered in the same fashion as breakfast and in the school cafeteria. Here the food fare is arranged on the counters ready for student selection and pick-up.

Healthy afternoon tidbits may include, pieces of fruit, biscuits, whole grain crackers, cheese, boiled eggs, juice and milk. If time and extra hands permit, fancier fare could include, grilled cheese, muffins, pancakes and jam sandwiches. Unsweetened cereal and whole wheat bread are among Metawabin's personal healthy preferences for the student body.

No one goes hungry as food is always available. During the day, students, teachers and staff often stop by the cafeteria for a snack.

Students and teachers are involved and help to make the program run smoothly. Students often transport the food carts between the kitchen and the classrooms.

During recess, some students offer to help in the kitchen with dishes and some food preparation. This provides an opportunity for students to learn about kitchen and food safety.

Conservation is another valuable lesson taught in the kitchen as many items are re-used for other purposes and food is purchased in bulk sizes to make funds stretch further.

For example, large cans are washed and used for storing cutlery and pancake syrup bottles are cleaned to hold squirtable dish soap. Occasionally the teachers do home-economics with the elementary classes where teachers and students spend time baking in the kitchen.

The teachers often use this as an incentive, so if the kids are good then they can have a home economics class. The students can take some of the food home and they get a copy of the recipe so they can make it at home with their family. The kitchen provides the students with an alternate learning atmosphere while still covering subjects from the curriculum, such as measuring, counting, and reading.

Special occasion foods are also provided from the kitchen such as a monthly award party for all the students who receive an attendance award, improvement award, or student of the month award. Birthday cakes are also baked and decorated to celebrate student birthdays.

What other great things does the snack program do? Well, students who eat breakfast and snacks at school seem to concentrate better, appear more motivated and energetic and cause less disruptive behaviour. The program is valued by everyone in the community: the school board, teachers, parents, and students. All this grand success started out small with just one box of apples, a toaster, and a teacher who wanted to make a difference.



submitted photos

ABOVE: Student Drew Metatawabin cleans romaine lettuce to make a salad for other youth at Peetabeck Academy in Fort Albany.

BELOW: Joan Metatawabin prepares the snacks and then placing them on carts to be delivered to the classrooms.



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APPENDIX G: Poster on the Impact of the School Snack Program on Dietary Intake

The Impact of a School Snack Program on the Dietary Intake of Grade Six to Ten First Nation Students



Kelly Skinner¹, Rhona M. Hanning¹, Ruby Edwards-Wheesk² & Leonard J.S. Tsuji¹
¹University of Waterloo, Waterloo, Ontario, ²Peetabeck Health Services, Fort Albany, Ontario

BACKGROUND and RATIONALE

- Alarming prevalence of obesity and overweight in Aboriginal youth
- Type 2 diabetes diagnosed in Aboriginal children as young as 5-8 years
- Rapid cultural change and departure from traditional food patterns
- Limited information on community-level barriers / opportunities and food behaviours of Aboriginal youth
- School nutrition policies and programs are one possible avenue for improving eating habits and dietary intake
- Access to nutritious food during school hours has been shown to contribute to both the quality and quantity of dietary intake for school-aged children. A recent literature review demonstrated that breakfast improves scholastic performance.
- School snack programs may be especially important in remote northern communities like Fort Albany where fresh produce and other nutritious perishable foods are generally either not available or extremely expensive

OBJECTIVE

The objective of this study was to:

- examine the **impact of a school snack program** on the **dietary intake** of grade six to ten First Nation students living in a remote community in northern Ontario.

POPULATION and SETTING

- Fort Albany FN, Ontario, Canada (Figure 1)
- Population of ~850, 38% of population <14 years
- Geographically remote (52° 15' N; 81° 35' W)
* only accessible by plane year-round
- 1 grocery store and 2 convenience stores
- School from kindergarten to Grade 12



Figure 1: Location of Fort Albany

METHODS and ANALYSIS

- 24-hour dietary recall data collected with school computers using the *Food Behaviour Questionnaire* (FBQ), a web-based survey which can be accessed at www.uwaterwell.com using "fnat" as login and password
- This version of the FBQ was adapted for First Nation communities based on community input, e.g. traditional foods added to the list of ~800 food items
- Dietitian-administered interviews were conducted with Fort Albany First Nation students and compared to the web-survey for the same 24-hour recall period. There was good agreement for energy and key nutrient intakes (intraclass correlation coefficients >0.67, n=25, grade 6-10)
- Students are provided with immediate age- and gender-specific feedback based on *Eating Well with Canada's Food Guide*
- Food group consumption and nutrient intake of students participating in the school snack program on the previous day were compared to students who did not participate
- ANOVAS were used to assess differences between groups and by gender



RESULTS

- 24-hour dietary recall data were collected November 2004 (n=63)
- A comparison of students participating in the snack program on the previous day 40% (n=25) to those who did not participate had significantly higher median intakes of:
 - **vegetables and fruit:** 7.7 vs. 2.6 servings
* Note: the majority of the 7.7 servings were fruit juice consumption
 - **fibre:** 16 vs. 6g
 - **folate:** 333 vs. 212µg
 - **Vitamin A:** 632 vs. 461µg
 - **calcium:** 778 vs. 602mg
 - **iron:** 3.6 vs. 3.3mg
 - **zinc:** 8.8 vs. 6.0mg
- Differences in intake occurred by gender for calories, carbohydrates, protein, fat, fibre, Vitamin A, calcium, iron and zinc
- There were no interaction effects between snack participation and gender



SUMMARY

- Findings show the school snack program had a **positive impact on the food group and nutrient intakes of the students who participated**, and support its continuation
- The **importance of school snack programs in remote First Nation communities** who are at high risk for food insecurity cannot be underestimated

NEXT STEPS

- To **train local community members to write funding applications** to sustain the program
- To **document the history** (since the program began in 1995) and current day-to-day functioning of the program. To use this documentation to disseminate and share experience/learning with other First Nation communities in the region.
- To **expand the program to provide lunch** and to evaluate the nutritional contribution it makes.

ACKNOWLEDGEMENTS

We would like to thank Fort Albany Chief and Council, personnel from the Mundo Peetabeck Education Authority, Peetabeck Health Services, and all the Fort Albany community members who participated in this project. This study was funded by the Canadian Institutes of Health Research and the Ontario Ministry of Research and Innovation. Current seed funding for the "Next Steps" of the school snack program is from the Indigenous Health Research and Development Program.



APPENDIX H: Parental Passive Consent/Information Letter

[University of Waterloo Letterhead]

Dear Parent or Guardian,

Dr. Rhona Hanning and Dr. Len Tsuji of the University of Waterloo are working with Joan Metatawabin, Mundo Peetabeck Education Authority, and Peetabeck Academy in Fort Albany to evaluate and expand the school snack program. We would like to provide you with some information about a school survey we are conducting to assess the nutritional benefits of the school snack program.

An internet survey from the University of Waterloo has been developed for grade 6 to 12 children. The children would use the computer at Peetabeck Academy and complete a 45 minute survey about their eating habits. This internet computer survey is CONFIDENTIAL. Your child is given a number and not identified by name on the survey. Once the surveys are completed, the information goes to the University of Waterloo where the data are summarized. Len Tsuji will then bring a report to Chief and Council, Mundo Peetabeck Education Authority, Peetabeck Academy and give a community presentation. The results will help your school and community to apply for more funding for the school snack program.

This survey has been used with more than 50 schools across Ontario and Alberta and with over 150 First Nation students in Ontario and Quebec.

The survey will:

- Take one class period to complete; The survey will be completed at a time deemed appropriate for the teacher
- Ask students to recall what they ate on the previous day; Students may omit questions
- Provide immediate feedback on students' diet when they finish the survey

The survey is confidential

- The survey is completely anonymous and confidential and poses no risk to your child
- Students will have a unique ID and password and are not identified by name; only the university researchers will have access to individual surveys
- Results are published in group format; no individual results are shared
- Teachers and other members of the community will have access to group results only within one month of completing the survey
- Information will be stored in locked computer files
- These computers are located in locked offices at the Population Health Research Group, University of Waterloo.
- The data will be permanently stored on CD in electronic form.

What if you change your mind about your child's participation?

- The final decision to participate in this survey must be made by the student and the parent(s) or guardian(s). Your cooperation in permitting your child to take part in this is greatly appreciated. However, participation is voluntary and there is no penalty if your child does not participate.
- If you and your child agree now to participate, but either of you change your minds later, your child can withdraw at any time.

- A student will not be included in the study if a parent or guardian indicates that he or she does not want the student to participate, or if the student does not agree to take part. Students not participating will remain in their classroom with their teacher and participate in normal classroom activities.
- If you do NOT want your son or daughter to participate, please contact Kelly Skinner, Population Health Research Group, University of Waterloo, at 519-888-4567, ext 36631, kskinner@uwaterloo.ca or Joan Metatawabin at 278-3340.
- If we have not been contacted we will assume that you are willing to have your son or daughter participate.

Partnerships between researchers at the University of Waterloo and Fort Albany First Nation groups

- The study is a partnership between the University of Waterloo, Chief and Council, Mundo Peetabeck Education Authority, and Peetabeck Academy
- We have received ethics clearance from the Office of Research Ethics, University of Waterloo. If you have any questions or ethical concerns about your child's participation in the study, please call Dr. Susan Sykes of the Office of Research Ethics at (519) 888-4567 ext. 36005, or email: ssykes@uwaterloo.ca

The results of the survey will be presented at a community meeting.

Should you have any further questions, please do not hesitate to contact one of the team members below. Thank you very much for your time.

Joan Metatawabin
Peetabeck Academy
278-3340

Len Tsuji
Assistant Professor
University of Waterloo
(519) 888-4567 x32762
ljtsuji@uwaterloo.ca

Kelly Skinner
PhD Candidate
University of Waterloo
(519) 888-4567 x36631
kskinner@uwaterloo.ca

Rhona Hanning, Dietitian
Associate Professor
Population Health Research Group
University of Waterloo
(519) 888-4567 x35685
rhanning@uwaterloo.ca

APPENDIX I: Support Letter for CFDR Grant

MAR-03-2008 MON 03:35 PM FORT ALBANY FIRST NATION

FAX NO. 17052781045

P. 02



FIRST NATION COUNCIL

P.O. Box 1, Fort Albany, Ontario P0L 1H0
Telephone (705) 278-1044
Fax (705) 278-1193

February 27, 2008

Dear CFDR Review Committee,

have been working with our community, Fort Albany First Nation, for a number of years on many health research projects that have benefited us. Recently, their work with our school snack program has been an important contribution to the nutritional health of our students. Our partnership has developed into a strong relationship of trust and respect for each other.

Our community has valid concerns about rising obesity and type 2 diabetes rates. Contributing factors, such as nutrition, traditional food issues and the broader context of food insecurity are important health problems that we face. Many of our food security problems are unique to our culture and our geographic location. This is one reason that we feel the need for context specific information that can benefit our people and future generations of our children.

With grant funding from CFDR we will be able to provide evidence on food security specific to remote on-reserve First Nations populations. We will be able to use this information to learn how to work towards increased community and household food security. Reliable information will help us to make informed decisions when planning in the present and dealing with policy issues in the future.

This project will allow us to share our experiences with other communities in the Mushkegowuk Territory so that they may also benefit from this information and knowledge on food security.

As in the past, we will carry on our in-kind support to this group of researchers (for example, supplying access to vehicles, meeting space, phones, etc.) because these issues are so important to Fort Albany First Nation and all the communities of the Mushkegowuk Territory. We fully support this CFDR funding application and will help with all facets of the project to be certain that we can meet the projects goals and objectives and develop community capacity.

APPENDIX J: Support Letter for IHRDP Grant

MAR-30-07 FRI 04:16 PM

MUNDO PEETABECK ED AUTH

FAX NO. 7052781049

P. 02



FIRST NATION COUNCIL

P.O. Box 1, Fort Albany, Ontario P0J 1H0
Telephone (705) 270-1044
Fax (705) 270-1042

March 27, 2007

Dear IHRDP Committee,

Dr. Len Tsuji has been working with our community, Fort Albany First Nation, for the past 20 years on many health research projects that have benefited us. Our partnership has developed into a strong relationship of trust and respect for each other.

Our community has valid concerns about rising obesity and type 2 diabetes rates. Contributing factors, such as poor nutrition and traditional food issues are important health problems that we face, especially in our youth population. This is one reason that we are very proud of our school snack program. We want to make sure that this program continues to contribute to the healthy eating of our children and youth over the long term. The sustainability of this program depends on dedicated volunteers, continued program funding, and evidence that it is working.

With seed funding from the IHRDP, we will be able to assess whether our school snack program is contributing to improved nutritional status and health of our young people. We will be able to use this information to learn how our current school nutrition program can be enhanced and expanded. Reliable information will help us to make informed decisions to ensure the program continues to succeed and improve.

This project will allow us to share our experiences with other communities in the Muskegowuk Territory so that they may also benefit from this information and knowledge on running a successful school snack program.

As in the past, we will carry on our in-kind support to Len and his group of researchers (for example, supplying access to vehicles, meeting space, phones, etc.). We fully support this IHRDP seed funding application and will help with all facets of the project to be certain that we can meet the projects goals and objectives and develop community capacity.

APPENDIX K: Selection of Food Security Questions from Existing Literature

Selection of questions used in other studies that might apply:

1. From the **First Nations Food Nutrition Environment Study (FNFNES)** – www.fnfnes.ca

5. During the past year, did you personally:

- a. Hunt or set snares for food? YES NO
- b. Fish? YES NO
- c. Collect wild plant food? YES NO
- d. Collect seafood? YES NO
- e. Plant a garden? YES NO

6. During the past year, did anyone else in your household:

- a. Hunt or set snares for food? YES NO
- b. Fish? YES NO
- c. Collect wild plant food? YES NO
- d. Collect seafood? YES NO
- e. Plant a garden? YES NO
- NOT APPLICABLE (participant lives alone)

7. a) What do you think are the most important benefits of traditional food? Please state as many as you wish.

b) What do you think are the most important benefits of market food? Please state as many as you wish.

8a. Would your household like to have more traditional food?

YES NO (if NO, go to Q. 8c)

8b. Can you tell me what prevents your household from using more traditional food?

8c. Some families might say, “We worried whether our traditional food would run out before we could get more.” In the last 12 months, did that happen often, sometimes, or never for your household?

- a. Often
- b. Sometimes
- c. Never
- d. Don't know or refused

8d. Some families might say, “The traditional food that we got just didn't last, and we couldn't get any more.” In the last 12 months, did that happen often, sometimes, or never for your household?

- a. Often
- b. Sometimes
- c. Never
- d. Don't know or refused

9a. Have you noticed any significant climate change in your traditional territory in the last 10 years?

YES NO DON'T KNOW (if NO or DON'T KNOW, go to Q. 10)

9b. Can you tell me one way how this has affected traditional food availability in your household?

10. Do any of the following affect (or limit) where you can hunt, fish or collect berries?

- | | | | |
|-------------------------------|------------------------------|-----------------------------|--------------------------------------|
| a. Mining | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| b. Forestry | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| c. Oil and gas | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| d. Hydro | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| e. Farming | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| f. Sports Outfitters/Lodges | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| g. Recreation boaters/fishers | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| h. Snowmobiles/ATV's | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| i. Roadways | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| j. Government restrictions | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |
| k. Other | YES <input type="checkbox"/> | NO <input type="checkbox"/> | DO NOT KNOW <input type="checkbox"/> |

if yes, please specify: _____

2. From the **First Nations Regional Health Survey (RHS 2008/2010)** – www.fnigc.ca

32. In the past 12 months, did you ever struggle to meet the following basic living requirements? (i.e. have to borrow money, miss bill payments to satisfy your basic living needs)

Basic Needs	No	A few times a year	Monthly	More than once a month	Non-applicable	Don't know	Refusal
Food							
Shelter							
Utilities (heat, electricity)							
Clothing							
Transportation							
Childcare							

101. In the past 12 months, how often have you eaten the following traditional foods?

Frequency of Traditional Foods	Not at all	A few times	Often
Land-based animals (moose, caribou, bear, deer, bison, etc.)			
Fresh water fish			
Salt water fish			
Other water based foods (shellfish, eels, clams, seaweed, etc.)			
Sea-based animals (whale, seal, etc.)			
Game birds (goose, duck, etc.)			
Small game (rabbit, muskrat, etc.)			
Berries or other wild vegetation			
Bannock/Fry bread			
Wild rice			
Corn soup			

102. Do you eat a nutritious balanced diet?

- Always / almost always
- Sometimes
- Rarely
- Never
- Don't know
- Refused

103. In the past 12 months, how often did someone share traditional food with your household?

- Often
- Sometimes
- Never
- Don't know
- Refused

3. **Friendship & Furgal (2012).** The role of Indigenous knowledge in environmental health risk management in Yukon, Canada, vol. 71. (online)

Table II. Selection of interview questions used with Health and Environment Decision-makers and Traditional Food Knowledge Holders

Interviewee	Question
Health and Environment Decision-makers and researchers	<ol style="list-style-type: none"> 1. Were you involved in the risk assessment/communications event that is being reviewed? (a) If yes, how were you involved? What role did you play? (b) If no, then what was your experience of the assessment/communications event? 2. What information was included in the risk assessment/risk communication event? 3. Did IK/local perspectives have a role in the risk management process? In what form was the knowledge that was included? (i.e. Technical risk assessment model, public perspectives, inclusion of perspectives from Indigenous community members?) 4. When, and for what stages was IK involved or Indigenous perspectives included? How? (i.e. Person providing information, focus groups in the community, existing Indigenous knowledge reports?) 5. Were there any challenges incorporating IK or perspectives? (a) What were they? (b) How were those challenges addressed? 6. Did you see value in the collaboration of IK/perspectives and conventional means of risk management for the specified case study? (a) If so, how? (b) If not, why? 7. Do you see value in the collaboration or involvement of IK/perspectives within conventional means of risk management for environment and health issues? (a) If so, can you explain the value you think it adds? (b) If not (you don't think it is a valuable inclusion), why?
Traditional Food Knowledge Holders	<ol style="list-style-type: none"> 1. Are you involved in the hunting, fishing, gathering, or preparation of traditional foods? (Traditional role in the food process). How often do you eat traditional foods? 2. Are there benefits/values to eating traditional foods? What are they? 3. Has anything changed about your traditional food eating habits in recent years? (a) Are there foods you eat more of? (b) Are there foods you eat less of? 4. Are there general rules or IK as to what you should and should not hunt or collect? Can you explain what the rules are/what the knowledge is? (e.g. Are there species you should not take at certain times of the year?) 5. Have you ever not taken an animal because you were concerned with its health or safety to eat? Please explain. (a) What was it? (b) Why/how did you know it was unsafe? 6. When do you make decisions about the safety of an animal for food and if it is appropriate to eat? (i.e. Before/during the hunt, while preparing). How do you tell? 7. Do you consider health advisories or warnings regarding traditional food safety or do you rely on your own judgments? Why/Why not? 8. Have you ever been approached or asked to share your knowledge about health or the environment? (e.g. the values or any concerns related to traditional food) If so, please elaborate. (a) Who asked you for this advice? (b) Do you know what was done with this knowledge that you shared? 10. Do you think that IK should be a part of decisions made by health and environment officials? How do you think this could be done? Or if it already is, how could it be done better?

APPENDIX L: Emailed Invitation Letter for Key Informants

Subject line text of email: Invitation to provide input on the development of food security questions for Aboriginal populations

Body of email:

Hello Ms. X,

If understanding food security in Canadian Aboriginal populations is relevant to your practice or to you personally, we would like your input!

You are invited to participate in a research study conducted by Kelly Skinner, under the supervision of Dr. Rhona Hanning in the School of Public Health and Health Systems of the University of Waterloo, Canada. The study is part of a doctoral thesis.

Title of Project: Towards Better Understanding and Measuring of Food Security in Canadian First Nations Households

As part of a larger research study we are conducting, people living in a First Nation community have told us that the 18 Household Food Security Survey Module (HFSSM) questions don't address all of their experiences and concerns related to food security. We asked them what aspects of food security for First Nations people they thought were missing from the HFSSM. Based on their responses, we have compiled a list of proposed questions that could be included in future food security questionnaires intended for First Nations respondents.

We are looking for your feedback on these proposed questions. Key informants working with Aboriginal groups regarding food issues, including food security, can provide valuable input in the development of survey questions for this population. Please forward this invitation to other key informants working in this field who may want to participate.

If you decide to volunteer, we ask that you complete a 10-15-minute online survey that is completed anonymously.

If you wish to participate, **PLEASE VISIT THE STUDY WEBSITE AT:**

<http://fluidsurveys.com/s/FNrelevance-hfssm/> .

PLEASE RESPOND BY FEBRUARY 22, 2013. The survey will remain open beyond this date, but we would prefer you respond as soon as possible.

If you prefer not to complete the survey on the web, please contact us and we will make arrangements to provide you another method of participation. Participation in this

study is voluntary. You may decline to answer any questions that you do not wish to answer and you can withdraw your participation at any time by not submitting your responses. There are no known or anticipated risks from participating in this study. It is important for you to know that any information that you provide will be confidential. All of the data will be summarized and no individual could be identified from these summarized results.

Should you have any questions about the study, please contact either Kelly Skinner at kskinner@uwaterloo.ca 519-888-4567 x36631 or Dr. Rhona Hanning at rhanning@uwaterloo.ca 519-888-4567 x35685. Further, if you would like to receive a copy of the results of this study, please contact either investigator.

Thank you for considering participation in this study.

APPENDIX M: Online Survey to Obtain Feedback from Key Informants

Towards Better Understanding and Measuring of Food Security in Canadian First Nations Households

We are requesting input from key informants --

If understanding food security in Canadian First Nations is relevant to your practice or to you personally, we would like your input into the development of a survey. Your participation will take 10-15 minutes and all responses are confidential.

Background

The Household Food Security Survey Module (HFSSM) is an 18-item questionnaire that was used in the 2004 Canadian Community Health Survey, Cycle 2.2 Nutrition. The HFSSM questions have been widely used to survey people across Canada and the U.S. to determine income-based food security status at the household level.

While the HFSSM allows data to be compared across surveys using similar questions, the HFSSM has not been validated with Canadian Aboriginal populations. As part of a research study we are conducting, Aboriginal people living in a First Nation community have told us that these questions don't address all of their experiences and concerns related to food security. We asked them what aspects of food security for First Nations people they thought were missing from the HFSSM.

The majority of the respondents in our study felt that the HFSSM did not capture an accurate picture of food security for their situation. Moreover, it did not incorporate some of the determinants of food insecurity specific to northern First Nations households that they felt were important to understand context, such as the extremely high cost of market food, high cost of living, and reduced availability of healthy foods. They also felt that traditional foods should be incorporated in measures of food security for northern First Nations populations. Such factors have the potential to inform programs and policy to address food insecurity. Based on these responses, we have compiled a list of questions that could be included in future food security questionnaires intended for First Nations respondents.

We are looking for your feedback on these proposed questions. Key informants working with Aboriginal groups regarding food issues, including food security, can provide valuable input in the development of survey questions for this population.

We plan to use input from ANN members and other key informants to draft a supplemental First Nations-specific component to the HFSSM. The purpose of creating such a supplement would be to enhance the relevance of the HFSSM for First Nations peoples with the intention of being able to better address relevant food security issues in on-reserve First Nations households and communities.

STEP 1: Familiarize yourself with the HFSSM.

The HFSSM is an 18-item questionnaire about the food security situation in the household over the previous 12 months, with ten of the 18 items specific to the experiences of adults, and eight items specific to the experiences of children under the age of 18 years. Each question specifies the ability to afford food as the reason for the condition or behaviour. The questions range in severity from worrying about running out of food to not eating for a whole day. (source: Health Canada, 2007).

If you would like to review the 18 HFSSM questions, the questionnaire can be accessed from the following link: http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/income_food_sec-sec_alim-eng.php#appa

STEP 2: Learn about how the questions were developed.

The process for drafting the questions was to: compile findings from the participants in our study; review food security questions from the literature, including questions that have been used with Aboriginal populations; consider what existing questions from the literature might be applicable to the themes from our study findings. Adopt or revise some of the questions from the existing literature, taking into account the question format from the HFSSM; create new questions to cover theme areas that had not already been addressed.

STEP 3: Provide input on the proposed questions.

It has been suggested that scales for measuring food insecurity in Canadian Aboriginal populations need to consider languages, cultural perceptions, unique life experiences, and traditional food attributes. Please reflect upon your own work with Aboriginal groups and their food security issues.

Ask yourself: What questions could be added or revised to improve the relevance of the HFSSM to the First Nation (or Aboriginal) context? What questions would be important to understand food (in)security in the Aboriginal populations you work with?

There are 10 proposed questions (including sub-questions, there are 15 total). On the following pages you will see each proposed question followed by the opportunity to provide feedback for each one. We are asking that you rate how important the question is to understanding food security in the population that you work with and then to suggest any changes to the proposed question. At the end there is also an opportunity to comment on whether you think there are any additional questions that should be included. We ask for your demographic information at the end of the survey.

10 PROPOSED QUESTIONS

Section A: Traditional Food (Questions 1-7)

Question 1a.

In the past 12 months, did you or anyone in your household eat any traditional food?
Traditional foods include wild plants or animals that come from the land or water and are harvested through hunting, trapping, fishing, or gathering.

- a. Yes --> go to 2.
- b. No --> go to 1b.
- c. Don't know or refused --> go to 2.

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		Yes		No	
Is the wording of this question clear?		<input type="radio"/>		<input type="radio"/>	
Is this question culturally appropriate?		<input type="radio"/>		<input type="radio"/>	

If you think changes should be made to question 1a (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 1b.

What was the main reason you or your household member(s) did not eat any traditional food in the past 12 months?

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>

If you think changes should be made to question 1b (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 2a.

In the past 12 months, did you have an active hunter or fisher in your household?

- Yes --> go to 2b.
- No --> go to 3.
- Don't know or refused --> go to 3.

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>

If you think changes should be made to question 2a, please suggest them here:

Question 2b.

In the past 12 months, was the cost of hunting or fishing a barrier for you or your household member(s) to be able to hunt or fish as much as they wanted to?

- a. Yes
- b. No
- c. Don't know or refused

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		Yes		No	
Is the wording of this question clear?		<input type="radio"/>		<input type="radio"/>	
Is this question culturally appropriate?		<input type="radio"/>		<input type="radio"/>	

If you think changes should be made to question 2b (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 3.

In the past 12 months, how often did someone from another household share traditional food with your household? (revised from this source: RHS, 2008/2010 <http://tinyurl.com/RHS-2008-10>)

- a. Often (Almost every month or more)
- b. Sometimes (Some months, but not every month)
- c. Never
- d. Don't know or refused

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- | | | |
|--|-----------------------|-----------------------|
| | Yes | No |
| Is the wording of this question clear? | <input type="radio"/> | <input type="radio"/> |
| Is this question culturally appropriate? | <input type="radio"/> | <input type="radio"/> |

If you think changes should be made to question 3 (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 4.

Some households might say, “We worried whether our traditional food would run out before we could get more.” Was that often true, sometimes true, or never true of your household in the past 12 months? (revised from this source: FNFNES, 2012

<http://www.fnfnes.ca>)

- a. Often true
- b. Sometimes true
- c. Never true
- d. Don’t know or refused

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- | | | |
|--|-----------------------|-----------------------|
| | Yes | No |
| Is the wording of this question clear? | <input type="radio"/> | <input type="radio"/> |
| Is this question culturally appropriate? | <input type="radio"/> | <input type="radio"/> |

If you think changes should be made to question 4 (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 5.

Some households might say, “The traditional food that we got didn’t last, and we couldn’t get any more.” Was that often true, sometimes true, or never true of your household in the past 12 months? (revised from this source: FNFNES, 2012

<http://www.fnfnes.ca>)

- a. Often true
- b. Sometimes true
- c. Never true
- d. Don’t know or refused

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Yes

No

Is the wording of this question clear?

Is this question culturally appropriate?

If you think changes should be made to question 5 (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 6a.

Would your household like to have more traditional food? (source: FNFNES, 2012

<http://www.fnfnes.ca>)

- a. Yes --> go to 6b.
- b. No --> go to 7.
- c. Don’t know or refused --> go to 7.

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>

If you think changes should be made to question 6a (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 6b.

Can you tell me what prevents your household from using more traditional food?

(source: FNFNES, 2012 <http://www.fnfn.ca>) _____

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>

If you think changes should be made to question 6b (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 7.

In the past 12 months, have you or your household members noticed any changes in the quality of the traditional food that you eat? If so, please explain these changes. (revised from this source: Lambden et al., 2007) _____

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

with?

- | | Yes | No |
|--|-----------------------|-----------------------|
| Is the wording of this question clear? | <input type="radio"/> | <input type="radio"/> |
| Is this question culturally appropriate? | <input type="radio"/> | <input type="radio"/> |

If you think changes should be made to question 7 (e.g., format, wording, cultural sensitivity), please suggest them here:

10 PROPOSED QUESTIONS

Section B: Market Food (Questions 8-10)

Question 8.

In the past 12 months, did your household ever struggle to get enough food to meet your needs? (i.e., have to borrow money for food, miss bill payments to satisfy your basic living needs, eat unsafe food). If so, how often did this happen? (revised from this source: RHS, 2008/2010 <http://tinyurl.com/RHS-2008-10>)

- a. Often (Almost every month or more)
- b. Sometimes (Some months, but not every month)
- c. Never
- d. Don't know or refused

- | | Not at all Important | Somewhat Important | Neutral | Important | Very Important |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Is this question important to understanding food security in the population you work with? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

- | | Yes | No |
|--|-----------------------|-----------------------|
| Is the wording of this question clear? | <input type="radio"/> | <input type="radio"/> |
| Is this question culturally appropriate? | <input type="radio"/> | <input type="radio"/> |

If you think changes should be made to question 8 (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 9a.

Some households might say, “We could not afford to buy all of the food that we needed from the store” Was that often true, sometimes true, or never true of your household in the past 12 months? (revised from these sources: Chan et al., 2006; Lambden et al., 2006)

- a. Often true
- b. Sometimes true
- c. Never true
- d. Don't know or refused

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
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Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
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Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>
--	-----------------------	-----------------------

If you think changes should be made to question 9a (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 9b.

How well does the store (or do the stores) in your community meet the food needs of your household?

- a. Very well
- b. Mostly well
- c. Mostly poorly
- d. Very poorly

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Yes	No
Is the wording of this question clear?	<input type="radio"/>	<input type="radio"/>
Is this question culturally appropriate?	<input type="radio"/>	<input type="radio"/>

If you think changes should be made to question 9b (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 9c.

Some households in other communities have told us about the issues listed below. Check any that apply to your household.

- the healthy foods we need are not always available
- foods that are available are poor quality
- the healthy foods we need are too expensive for us to buy
- the traditional or cultural foods we want are not available
- please list any other issues _____

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Yes

No

Is the wording of this question clear?

Is this question culturally appropriate?

If you think changes should be made to question 9c (e.g., format, wording, cultural sensitivity), please suggest them here:

Question 10.

If any time in the past 12 months you did not have enough food at home and you couldn't buy what you needed, what did you do to feed yourself and your family? (revised from these sources: Cohen, 2002; Hamelin et al., 2002)

	Not at all Important	Somewhat Important	Neutral	Important	Very Important
Is this question important to understanding food security in the population you work with?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Yes

No

Is the wording of this question clear?

Is this question culturally appropriate?

If you think changes should be made to question 10 (e.g., format, wording, cultural sensitivity), please suggest them here:

Additional Feedback Question

The 10 proposed questions were drafted based on the concepts that emerged from our qualitative research study. What questions could be added to improve the relevance of the HFSSM to the First Nation (or Aboriginal) context? What questions would be important to understand food (in)security in the Aboriginal populations you work with? Are there any aspects of food security for Aboriginal people that were not included in these questions and you think should be added? If so, please explain.

Demographic Questions

We would like to ask you a few questions about yourself for demographic purposes.

Question 1A

I work with Aboriginal individuals, groups, or communities:

- Yes
- No

Question 1B

If yes, the Aboriginal populations I work with are primarily:
(check all that apply)

- First Nations
- Métis
- Inuit
- Other, please specify... _____

Question 1C

The Aboriginal populations I work with live in: (check all that apply)

- Urban centres
- Rural areas
- Remote communities
- Other, please specify... _____

Question 2

The organization I work for is a:

- Government agency
- Non-government agency
- Health care provider
- University
- First Nations, Métis, or Inuit organization
- No affiliation
- Other, please specify... _____

Question 3

I am a/an:

(check all that apply)

- Academic/researcher
- Policy specialist
- Practitioner
- Clinician
- Administrator
- Other, please specify... _____

Question 4

I am an Aboriginal person, that is, First Nations, Métis or Inuk (Inuit)? First Nations includes Status and Non-Status Indians. (source: Aboriginal Peoples Survey, 2012)

- Yes
- No
- Don't know or refused

Please describe any additional comments about your experience completing this survey.

Thank you so much for providing input on this study. We appreciate your feedback. If you would like more information about the study, please contact Kelly Skinner at kskinner@uwaterloo.ca.