

**An Exploration of Context, Food and Diet among Indigenous Youth Across
Canada**

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.

I understand that my thesis may be made electronically available to the public.

Abstract

Introduction

Adolescence is a critical stage in the life course and inadequate cognitive, physical and social development during this time can have long-term, adverse effects on individuals, groups, and societies. The prevalence of overweight and obesity among adolescents is rising globally; in Canada, the 2012/2013 Canadian Health Measures Survey estimated that almost one in five 10 – 17-year-olds have obesity.

The 20th century saw an extraordinary shift in lifestyle for Indigenous Peoples: from physically active to less active, and from traditional foods to market foods. This is part of the phenomenon known as the ‘nutrition transition’ and has been shown to affect access to healthy foods and rates of obesity and chronic disease. Consistently, Indigenous peoples in Canada are reported to have poorer health than non-Indigenous Canadians, including youth, who are at greater risk of type 2 diabetes due to higher rates of obesity than youth in the general population. Many of these documented health challenges in Indigenous communities can be linked to this ‘nutrition transition’ and associated determinants, including colonisation. The sustained impact of injustices associated with colonisation has been linked to contemporary inequities, including the higher prevalence of both low incomes and food insecurity, and reduced access to health services. Indigenous communities are concerned about the health of their youth, the reclamation of traditional skills, and long-term food sovereignty among their people.

Evidence suggests that diet quality among the general population of school-aged children living in Canada needs improvement - many do not meet the national dietary guidelines for milk and alternatives, or fruit and vegetables. Dietary intake can be influenced by community-based healthy eating programmes, including those focused on school communities. Schools can

facilitate nutrition education and health promotion and can influence dietary behaviours, for example through school gardens, or breakfast, school meal or snack programmes. Many Indigenous communities value school-based nutrition programmes and such programmes among Indigenous schools have shown moderate success. However, community-led approaches integrating the Indigenous holistic concepts of wellness along with what is considered ‘Western’ scientific approaches are lacking.

‘Learning Circles: Local Healthy Food to School’ (LC:LHF2S) was an innovative community engagement practice that worked at individual and community levels with a collective aim to promote partnerships between community members with a common interest in food. In each of four participating communities, a Learning Circle Evaluation Facilitator (LCEF) was employed to initiate community meetings in which matters relating to local, healthy and traditional foods were discussed. The LCEF worked with diverse stakeholders to plan and implement a range of activities aimed at enhancing access to local, healthy and traditional foods in school communities. The model could be adapted according to the wishes of the community and was therefore able to accommodate diversity in context.

Objectives

The thesis research was supported by a grant from CIHR’s Pathways to Health Equity for Indigenous Peoples Initiative. The study examined the growth of the LC:LHF2S initiative within Haida Gwaii – the exemplar community, and extension of the model to three new, diverse First Nations (FN) contexts. This thesis aimed to examine the process and outcomes of the Learning Circle (LC) model within each of the four diverse Indigenous communities in the LC:LHF2S partnership (2016-9). The thesis is organised in two main sections. **Study 1** used a case study methodology to: a) describe the four contexts; document changes in the food system of each

across the study period; and b) synthesise and summarise themes and lessons relating to the LC model and influences on local food systems. Using the socio-ecological model, comparisons were made across communities. In addition, Haida Gwaii, B.C., and Ministikwan Lake, SK assessed the dietary intake and eating behaviours of students aged 12-18 and in **study 2**, findings were presented and compared with diet and food behaviour data from the 2017 Cancer Risk Assessment in Youth Survey (CRAYS) of self-identifying Indigenous youth versus non-Indigenous youth aged 12 – 18 across Canada.

Methods

Study 1: Data for case studies was summarised from annual interviews with key project community members and partners, end-of project community interviews, reports, minutes, photographs and food procurement data. The case studies are synthesised across the FN contexts, framed by the socio-ecological model.

Study 2 assessed dietary data collected from web-based surveys (24h recall, food frequency questionnaire (FFQ), self-reported source of breakfast and/or lunch, and perception of traditional foods) conducted among school children in two of the communities: Haida Gwaii, B.C., and Ministikwan Lake, SK. These data were compared with dietary data (FFQ and self-reported source of breakfast and lunch) from the cross-Canada CRAYS survey, 2017.

Qualitative data were coded, managed and analysed thematically in NVivo® 12 Pro (QSR International). Member checking and duplicate coding supported methodologic rigour. Survey data were analysed in MS Excel and SAS® Studio according to the 2015 Canadian Nutrient File (CNF) serving size specifications and nutrient analysis database, and the 2007 version of Canada's Food Guide (CFG) for First Nations, Inuit and Métis. Macro- and micronutrient intakes were compared with the Dietary Reference Intakes, Estimated Average Requirements,

Adequate Intake, and Acceptable Macronutrient Distribution Range; food group intakes were compared with CFG recommendations specific to age and sex, and dietary quality was assessed using a 2009 version of the Canadian Healthy Eating Index. Associations between dietary intake and/or behaviours and selected sociodemographic characteristics were calculated using p-values, Chi-squared tests and adjusted for differences in key variables using logistic regression. A p-value of < 0.05 was considered to indicate statistical significance.

Results

Across all four communities, 52 interviews, 39 activity tracking reports, 11 LC reports, 44 summaries of meeting minutes, and dietary data from two school surveys were collected and analysed.

Study 1: Haida Gwaii, B.C. (HG) has a rich food environment, a vibrant local and traditional food culture and a long history of protecting the land and culture. A variety of local food-related activities had been taking place in HG prior to the establishment of the LC initiative in 2013, and by 2016, the LC work was firmly established and included the new initiative of the local food pantries. Under the CIHR funding, the LC activities in HG focused on three main areas: schools, hospitals, and the work of the local food pantries. Within this work, LC participants worked towards increasing access to local and traditional foods, building knowledge and skills, fostering relationships, and transitioning to Haida leadership within the project. While the Hazelton/Upper Skeena region, B.C. (HZ) had some local food activities prior to 2016, there had been no organised community-wide commitment to the food culture and environment and so the LC initiative in this community focused on partnership development, gardens, community-wide skills work, and youth activities. Traditional food, knowledge and practices were prioritised in youth-based programmes. The Ministikwan Lake (MK) community in Saskatchewan is a small,

remote community located an hour's drive from the nearest well-stocked grocery store. Some local food-based activities were happening prior to 2016 but there had been no organised efforts towards local and healthy food work. The LC initiative focused on building knowledge and skills, gardening activities and the school lunch programme. Developing youth leadership was prioritised here, and connections between the youth and elders were fostered; the importance of a local champion and challenges related to reliance on local champions were noted. Black River, MB, (BR) had prior involvement with the Heart and Stroke Foundation Healthy Communities Initiative implemented over three school years from 2014 – 2017 and joined the initiative in 2017. While they have not had an “official” LC with others in the community, local food activities in BR have centred around the school. Activities involving youth have included berry picking, wild rice harvesting and fishing.

Study 2: The school surveys conducted in HG (n=92) and MK (n=79) show that, at the time of the survey, 33% of students in HG and 34% of students in MK did not eat breakfast the previous day; 17% of MK students did not eat dinner the previous day. This could, in part, reflect food insecurity which was noted frequently in open-ended survey feedback. Data from the national-level CRAYS survey indicates that Indigenous youth in this sample (n=1,284) appear to purchase food from convenience stores more frequently than non-Indigenous youth (n=11,267); encouragingly, the number of students from both HG and MK reporting consumption of meals from restaurants and fast-food outlets is low.

Dietary quality was suboptimal among students in both communities: based on the data available, the dietary intake of students attending both the school on the MK reserve and the schools in HG (outside of the reserves) appears to be energy dense and low in fruits, vegetables, milk and alternatives, and fibre. Sugary drink intake was high and seemed higher among

students in MK: 17% and 6% of students report consuming at least once a day in MK and HG, respectively. Data from the national-level CRAYS survey affirm that Indigenous youth frequently consume sugary drinks and found that sugary drinks, energy drinks and foods high in fat and sugar were more frequently consumed by Indigenous than non-Indigenous youth. Rural Indigenous students were more likely to consume higher levels of “other” foods and sugary drinks than Indigenous students living in urban environments.

In HG, more than half of survey respondents for each of game, wild fish and locally grown vegetables ate them at least twice a week or more frequently. In MK, half of survey respondents ate locally grown vegetables at least twice a week and 41% ate game, though fish was consumed less frequently. Traditional foods (e.g., wild fish, moose meat) were enjoyed by students in both MK and HG, and in both communities, students indicated that they would eat more if these foods were served more frequently at home or in school.

Discussion

Results from these studies support other findings showing that Indigenous youth appear to have diets low in fruits and vegetables, milk and alternatives, and high in energy dense foods. While this is not unique to Indigenous youth populations in Canada, comparative data suggest that Indigenous youth more frequently consume sugary drinks. Moreover, open ended feedback from youth and community members point to concerns about food insecurity and even hunger in remote and rural Indigenous communities, suggesting that food access, availability and affordability are among the environmental factors that may contribute to the suboptimal diet quality. Community findings also point to strengths, including preference for nutrient-dense traditional foods and limited exposure to ‘fast’ foods and restaurant meals. The findings also

underline the importance of school programmes. Students reported frequent consumption of lunch in school, and also enjoy eating and learning about traditional foods and culture.

The inherent flexibility of the LC model means that communities can prioritise activities of interest to them and tailor evaluation processes accordingly. Indigenous leadership and local champions are essential to the success of such initiatives. Consideration should be given to amount of funding available, and to funding timescales for projects that require a high level of community engagement. Recommendations based on community input may help to enhance uptake of the model in other contexts and ongoing local food initiatives in these and similar communities across Canada.

This study documents a large amount of work carried out by the four communities over three years and celebrates their creativity, commitment to youth and great achievements. There were many examples of a reclamation of traditional food culture and a transition to greater food sovereignty. Many unique Indigenous school food-related initiatives were debuted here that may serve as an inspiration for other communities.

Conclusion

The LC approach is a feasible and appropriate way of engaging community to support access to local and traditional foods and associated knowledge and practices among Indigenous youth, and support food sovereignty among Indigenous communities in rural and remote locations. A reliance on school lunch and a desire to eat more traditional foods should be considered when programmes are developed in similar communities.

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“In ordinary life we hardly realise that we receive a great deal more than we give, and that it is only with gratitude that life becomes rich. It is very easy to overestimate the importance of our own achievements in comparison with what we owe others.”

Dietrich Bonhoeffer

It is with thankfulness (and some relief!) that I am concluding this final chapter of my postgraduate education. It has been an extended journey that has taken me to three countries and three universities, allowed me to work with many valued mentors, and has required much time, learning and growth. I know that I am privileged to have had the opportunity, and grateful for those who made it possible.

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∞

The land on which the University of Waterloo is situated is the traditional Territory of the Attawandaron (Neutral), Anishnaabeg, and Haudenosaunee Peoples. It encompasses the Haldimand Tract, land promised to Six Nations that includes six miles on either side of the Grand River.

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List of Abbreviations

AI:	Adequate Intake
ALM:	Agnes L. Mathers Elementary, Hazelton/Upper Skeena, B.C.
AMDR:	Acceptable Macronutrient Distribution Range
BR:	Black River Community, Manitoba
CBPR:	Community-based participatory research
CFG:	Canada's Food Guide
CHN:	Council of the Haida Nation
CIHR:	Canadian Institutes for Health Research
CNF:	Canadian Nutrient File
CRAYS:	Cancer Risk Among Youth Survey
DRI:	Dietary Reference Intake
EAR:	Estimated Average Requirement
F2CC:	Farm to Cafeteria Canada (http://www.farmtocafeteriacanada.ca/)
FAO:	Food and Agriculture Organisation of the United Nations
FFQ:	Food Frequency Questionnaire
FN:	First Nation
FNRHS:	First Nation Regional Health Survey
GGC:	Gitksan Government Commission, Hazelton/Upper Skeena, B.C.

GTN:	<i>Gudangaay Tlaats' gaa Naay</i> Secondary School, Haida Gwaii, B.C.
GKNS:	<i>GidGalang Kuuyas Naay</i> Secondary School, Haida Gwaii, B.C.
HFC:	Haida Foods Committee
HG:	Haida Gwaii, British Columbia
HSF:	Heart and Stroke Foundation of Canada
HSS:	Hazelton Secondary School, Hazelton/Upper Skeena, B.C.
HZ:	Hazelton/Upper Skeena Community, British Columbia
LC:	Learning Circle
LCEF:	Learning Circle Evaluation Facilitator
LC:LHF2S:	Learning Circles: Local Healthy Food to School
MGA:	Majagaleehl Gali Aks School, Hazelton/Upper Skeena, B.C.
MK:	Ministikwan Lake Community, Saskatchewan
MLTC:	Meadow Lake Tribal Council (https://www.mltc.net/)
MMA:	Mount Moresby Adventure Camp, Haida Gwaii, B.C.
NHES:	New Hazelton Elementary School, Hazelton/Upper Skeena, B.C.
NSC:	Nourishing School Communities
NWAC-PEKE:	Native Women's Association of Canada-Partner in Engagement and Knowledge Exchange
OCAP:	Ownership, Control, Access and Possession
OMVC CA:	Old Masset Village Council Culinary Association, Haida Gwaii, B.C.

PCE:	Port Clements Elementary, Haida Gwaii, B.C.
RDA:	Recommended Daily Allowance
SEM:	Socio-Ecological Model
Senden:	Senden Sustainable Agricultural Resource Centre, Hazelton/Upper Skeena, B.C.
SES:	Socio-Economic Status
SNES:	<i>Sk'aadgaa Naay</i> Elementary School, Haida Gwaii, B.C.
TE:	<i>Tahayghen</i> Elementary, Haida Gwaii, B.C.
WEB-Q:	Web-Based Eating Behaviour Questionnaire

Chapter 1: Background and Literature Review

Note: This literature review has been adapted and extended from background papers prepared as part of the comprehensive examination of the author.

1.1 Chronic Disease and the Nutrition Transition

The global prevalence of obesity-related chronic disease such as cardio-vascular disease and type 2 diabetes, is increasing rapidly (International Diabetes Federation, 2013; Reeds et al., 2016).

The 20th century has seen large shifts in the structure of the global food system: food during this time has become viewed as a commodity instead of from the perspective of nutrition or culture (MacRae, 2011), and the ‘food system’ has changed from many people growing their own food, or hunting and/or fishing, to the majority of people accessing food through markets and shops. Overproduction has been encouraged, food waste given little attention (MacRae, 2011), and a distance allowed to grow between field and plate with an associated increase in the use of chemicals, loss of biodiversity, and soil erosion, among other environmental impacts. These unprecedented changes - in technology, economic development, rural to urban living, (MacRae, 2011) and social patterns - have led to a decrease in physical activity levels and an increase in the consumption of foods high in starch, sugar, saturated fat and salt. Known as the ‘nutrition transition’, these changes have resulted in the relatively recent surge of nutrition-related chronic disease (Anand et al., 2001; Damman, Eide, & Kuhnlein, 2008; Kuhnlein, Receveur, Soueida, & Egeland, 2004; Popkin, 1998; Uauy & Kain, 2002; World Health Organization, 2003; Yusuf, Reddy, Ounpuu, & Anand, 2001a; Yusuf, Reddy, Ounpuu, & Anand, 2001b).

Noted worldwide, this transformation in lifestyle was originally observed among low-income countries and continues to occur at a more rapid rate among these populations (Anand et al., 2001). These 20th century food system changes have tended to increase dietary diversity for

wealthy urbanised groups and reduce dietary diversity for rural and remote populations and urban dwellers living in poverty (Stephens, Nettleton, Porter, Willis, & Clark, 2005). This has led to malnutrition in which rates of obesity and chronic disease are increasing in communities that also have higher-than-average rates of micronutrient undernutrition (Damman, 2005; Damman et al., 2008). This seemingly incongruous association between poverty and obesity is likely to be mediated by the increased consumption of low-cost, low-nutrient foods (Drewnowski & Specter, 2004; Lambden, Receveur, Marshall, & Kuhnlein, 2006).

1.2 Health of Indigenous Peoples in Canada

The health patterns of Indigenous peoples in high-income countries are frequently different from national norms (Kuhnlein et al., 2004; Young, 1996a; Young, 1996b; Young, Bjerregaard, & Fortuine, 1999) and are on a parallel with general health patterns in low-income countries (Gracey & King, 2009; Young, 1996; Young, 1996). In Canada, 1.4 million people (approximately 4%) identify as Indigenous, and of this, 60.8% are First Nations (FN) people, 32.3% Métis, and 4.2% Inuit. Almost half (49.3%) of FN people with registered Indian status live in a rural or remote setting, with many of the remaining living in urban centres (Statistics Canada, 2016). The Indigenous population in Canada is young; the average age in 2016 was 32.1 years, approximately 10 years younger than that of the non-Indigenous population at 40.9 years (Statistics Canada, 2016), and more than half (51.6%) of FN people are under the age of 30 (First Nations Information Governance Centre, 2018).

Consistently, Indigenous peoples within Canada are reported to have poorer health than non-Indigenous Canadians (Gracey & King, 2009; Lambden et al., 2006) across many diet-related measures including chronic disease and anaemia (Schaefer, 1977; Taylor, J. P., Evers, &

McKenna, 2005). The prevalence of diabetes among Indigenous peoples in Canada has increased over the past 25 years (Fox, Harris, & Whalen-Brough, 1994; Piro, Dyck, & Gillis, 1996; Skinner, Hanning, & Tsuji, 2006), and in 2011 was estimated to be 17.2% among FN individuals living on-reserve, 10.3% among FN individuals living off-reserve, and 7.3% among Métis, compared to approximately 5.0% in the non-Indigenous population (age-standardised rates) (Health Canada, 2012a). A 2001 study among 301 Indigenous people from the Six Nations of the Grand River in Hamilton, Ontario, and 326 people of European ancestry from Hamilton, Ontario, Toronto, Ontario, and Edmonton, Alberta, showed that Indigenous people had significantly higher rates of risk factors for cardio-vascular disease, and more carotid atherosclerosis compared with those of European ancestry (Anand et al., 2001).

1.3 The Nutrition Transition in Canadian Indigenous Communities

The prevalent health problems in Indigenous communities are complex. They are linked to colonisation, including persistent social and potentially epigenetic influences associated with the abusive conditions and inadequate diets of Indian residential schools (Wilk, Maltby, & Cooke, 2017). They are also linked to nutrition transition, as used by Kuhnlein and colleagues to describe the diet and associated lifestyle changes over the 20th century (Kuhnlein et al., 2004; Lambden et al., 2006; Receveur, Boulay, & Kuhnlein, 1997). This time period saw an extraordinary shift in lifestyle for Indigenous Peoples: from physically active to less active (Guyot, Dickson, Paci, Furgal, & Chan, 2006), and from traditional-style foods to modern (Reeds et al., 2016). Diets high in sugar, salt, and saturated fat, and low in fibre and micronutrients have been found to increase risk for diabetes among Indigenous populations in Canada (Gittelsohn et al., 1995; Sharma et al., 2010), and many studies have documented a

change from traditional micronutrient-rich diets to a reliance on manufactured, pre-processed and packaged foods rich in refined carbohydrates, sugars, salt, and saturated fats, with a concurrent decrease in physical activity levels (Bersamin, Luick, Ruppert, Stern, & Zidenberg-Cherr, 2006; Damman et al., 2008; Ebbesson et al., 2005; Kuhnlein et al., 2004; Nobmann et al., 2005; Power, 2008; Reeds et al., 2016; Sharma et al., 2010; Uauy, Albala, & Kain, 2001). A study among 44 representative communities, including FN, Dené/Métis and Inuit communities in Yukon, noted dietary change over time using two measures: (i) approximately 10 – 36% of adult dietary energy was from traditional foods (as compared with 100% dietary energy from traditional foods in pre-colonial times), and (ii) by comparison of people aged over 40 and people aged under 40: individuals aged over 40 consumed consistently more traditional foods than those aged under 40 (Kuhnlein et al., 2004). In a 2010 study of 87 men and women aged between 19 and 87 in two communities in Nunavut, intakes of dietary fibre, and vitamins and minerals, were below recommendations and non-nutrient-dense processed foods were consumed more frequently than nutrient-dense traditional foods, with traditional foods contributing 40% and 42% to protein and iron intakes, respectively. The same study reported very low intakes of fruits and vegetables, and low physical activity levels among the participants (Sharma et al., 2010).

1.4 The Nutrition Transition in Remote Communities

For Indigenous peoples in remote areas, food system changes have tended to decrease dietary diversity resulting from lower intake of traditional food and a greater reliance on limited types of market food (Kuhnlein & Receveur, 1996). Environmental dispossession: loss of access to land and associated natural resources, as well as climate change, have contributed to the shift in dietary and lifestyle practices (Islam, Zurba, Rogalski, & Berkes, 2017; Ohmagari & Berkes,

1997; Reading, J., 2009; Richmond & Ross, 2009). Environmental contaminants in the food supply have led to restricted intake of traditional foods by some (Deutch, Dyerberg, Pedersen, Aschlund, & Hansen, 2007; Egede, 1995). Resource exploitation has reduced the number of animals for food close to Indigenous settlements leading to the need to travel further to hunt; the increased cost of hunting can also be prohibitive (Damman, 2005; Jull, 2001). Climate change has influenced food procurement practices (hunting, gathering, fishing) through changing migration patterns and, in the far north, causing changes in ice cover and thickness (Ford, Pearce, Duerden, Furgal, & Smit, 2010). This loss of access and availability of traditional foods has contributed to the increased dependence on processed and store-bought foods demonstrated by various studies (Gracey & King, 2009; King, M., Smith, & Gracey, 2009a).

Food prices in remote communities are significantly higher than in urban areas, with a recent study showing that the average price of 1 litre of reduced fat milk in an Indigenous community with no access to an all-weather road was, compared with a price in Winnipeg, an estimated 84% higher with a government subsidy, and 181% higher without the subsidy (Wendimu, Desmarais, & Martens, 2018).

Many community members migrate to urban areas, leading to a reduction in the number of youth in remote communities. As a result of migration, traditional knowledge and skills do not get passed on to younger generations in these remote communities, further influencing the decrease in the consumption of traditional foods.

1.5 The Nutrition Transition in Urban Communities

A large proportion of Indigenous people live in urban environments, i.e., more than half (51.8%) of the Indigenous population (Statistics Canada, 2016). The effects of urbanisation – worldwide

and not necessarily limited to Indigenous peoples – include dietary change, decreased physical activity, overcrowding and pollution (Gracey, 2002; Gracey & King, 2009). Community mapping reveals that food availability and food access (particularly to fresh fruit and vegetables at affordable prices) is low in urban centres, and the advertising, marketing, and proximity of fast-food outlets has an effect on the increased consumption of poor nutrient foods (Companion, 2010; Companion, 2013; Engler-Stringer, Shah, Bell, & Muhajarine, 2014; Minaker, L. M., 2016; Ni Mhurchu et al., 2013; Richmond et al., 2020). For Indigenous urban dwellers, the lack of access to land, and also residential instability (i.e., high frequency of journeys back and forth to family living on reserve) weakens social cohesion, which is critical for maintenance of culture (King et al., 2009). This is a major challenge for urbanised Indigenous populations, as improved social cohesion can enhance Indigenous cultural identity, values, and health (Subramanian, Smith, & Subramanyam, 2006). While reduced access to cultural foods can be addressed by gifts from relatives that dwell rurally (Cidro, Adekunle, Peters, & Martens, 2015), residential instability can also be associated with familial instability, social difficulties, and poor dietary quality (King et al., 2009).

1.6 The Importance of Traditional Foods

Traditional food patterns (including fresh and minimally processed locally-procured foods such as fish, game, fowl, eggs, fruits, berries, roots, etc.) have been shown to be protective against chronic disease, with a ten-year prospective study among 492 participants in Sandy Lake First Nation in Northern Ontario showing that traditional foods, along with balanced market foods (characterised by higher intake of vegetables and whole wheat carbohydrates) were not associated with increased risk of type 2 diabetes. In contrast, a 38% increase in diabetes among

people consuming diets characterised by high intakes of processed foods was seen over the study period (Reeds et al., 2016). In a study conducted among 44 representative FN, Dené/Métis and Inuit communities in Yukon, Inuit that consumed more traditional foods had higher intakes of vitamins A and E, and iron and zinc than those consuming more store-bought, processed foods (Kuhnlein et al., 2004). ‘Health’ in Indigenous communities has a much broader definition than merely ‘lack of disease’. Physical, emotional, mental, social and spiritual health are considered of equal importance and are illustrated in the varying medicine wheels of Indigenous communities (King et al., 2009; Wilson, K., 2003). Culture, and access to cultural activities is also a determinant of health, and eating traditional foods, hunting, and connecting to the land by camping have been shown to positively affect mental health and healing (King et al., 2009; Kirmayer & Valaskakis, 2009). Traditional foods and the skills associated with procuring, preparing, and storing the foods help maintain social relationships, improve household economies and skill sets, and facilitate knowledge transfer through community-based harvesting and food preparation (Deutch et al., 2007; Egede, 1995; Kuhnlein & Receveur, 1996; Lambden, Receveur, & Kuhnlein, 2007; Schuster, Wein, Dickson, & Chan, 2011).

1.7 Factors Contributing to the Reduced Consumption of Traditional Foods

Indigenous peoples have undergone a nutrition transition as a result of many complex and inter-related factors (Figure 1.1). Historically, environmental dispossession removed access to traditional hunting and fishing grounds, leading Indigenous people to be dependent on settlers for food – often unfamiliar and of poorer quality than what they were used to (Gracey & King, 2009). In Canada, Indigenous reserves were created, usually smaller than the traditional territorial lands; these have contributed to the loss of hunting grounds and dependency on market

foods (Kelm, 2004). The residential school system (1880 – 1996) (Miller, 2019) separated children from their parents, families, and communities, preventing children from learning their Indigenous language and becoming familiar with traditional practices such as hunting, and food procurement and preparation (Angel, 2000; Gracey & King, 2009; Hackett, Abonyi, & Dyck, 2016). Conditions in the schools were poor, and hunger resulting from inadequate food provision has consistently been reported by residential school attendees (Mosby & Galloway, 2017; Wilk et al., 2017).

In the present day, Indigenous peoples remain politically and socially marginalised (Stephens et al., 2005). Indigenous people tend to be poorer than non-Indigenous people (Damman et al., 2008) and less likely to live in high-income districts; this leads to fewer options in terms of food choice and a higher exposure to fast-food restaurants in urban settings (Smoyer-Tomic et al., 2008). This results in the purchase and consumption of poor-quality foods, limited dietary diversity and high dietary intakes of simple carbohydrates, fat and salt (Companion, 2008; Companion, 2013; Halpern & Regier, 2007; Taylor, C. A., Keim, & Gilmore, 2005).

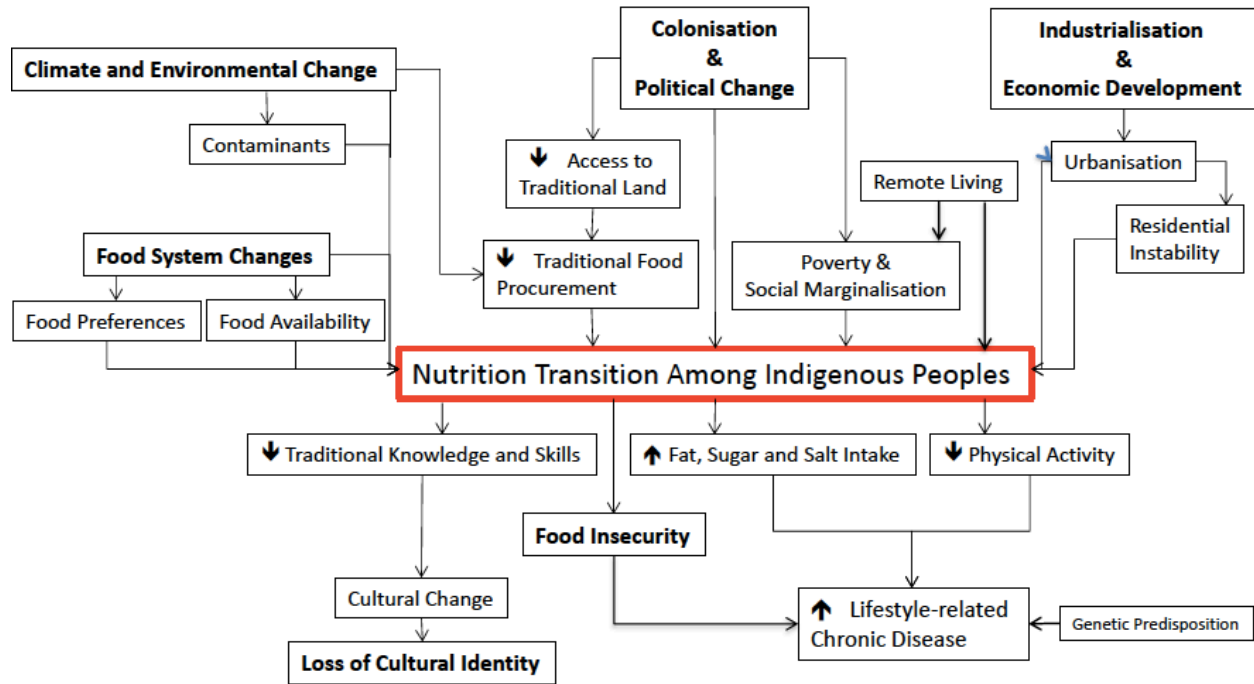


Figure 1.1: Factors influencing, and outcomes resulting from, the nutrition transition among Indigenous Peoples in Canada.

In addition to all of the above factors, familiarity with traditional knowledge and skills has decreased over the past 30 to 40 years in Indigenous communities (Islam et al., 2017; Mead, Gittelsohn, Kratzmann, Roache, & Sharma, 2010; Ohmagari & Berkes, 1997). An emphasis on non-traditional food in schools, media campaigns and public health programmes has had an unplanned and indirect impact on Indigenous children (Kuhnlein & Receveur, 1996).

Differences in the desire to consume branded foods - these being associated with ideals of ‘the good life’ through advertising and peer pressure - have been noted between Indigenous youth and older members of the Indigenous community. In some previous studies, traditional foods can be seen to have a negative association: that of being backward and un-modern (Companion, 2013; Damman et al., 2008). Current momentum towards cultural reclamation may be shifting

this perception. Traditional food knowledge is intimately connected with food security and food sovereignty, and therefore consumption patterns and health outcomes (Berkes, 2012; Islam et al., 2017).

1.8 Health, Nutrition and Diet Among Indigenous and non-Indigenous Canadian Youth

Adolescence is a critical stage in the life course, and poor cognitive, physical and social development during this time can have adverse/negative long-term effects on individuals, groups, and societies (Ki-moon, 2016; Sheehan et al., 2017). The prevalence of overweight and obesity among adolescents is rising globally (Bhutta, 2017; Hanning et al., 2009; Potischman, Cohen, & Picciano, 2006), and in Canada, the 2012/2013 Canadian Health Measures Survey estimated 23.0% (95% CI: 16.4–29.6) of 10 – 14-year olds, and 17.1% (95% CI: 12.5–21.7) of 15 – 17 years olds are overweight, and 12.9% (95% CI: 7.2–18.6) of 10- to 14-year-olds and 18.2% (95% CI: 12.5–24.0) of 15- to 17-year-olds have obesity – almost one in five (Rao, Kropac, Do, Roberts, & Jayaraman, 2016). Evidence suggests that diet quality among all school-aged children living in Canada is poor (Garriguet, 2009; Tugault-Lafleur, Black, & Barr, 2017); many do not meet the national dietary guidelines for milk and alternatives, or fruit and vegetables (Gu & Tucker, 2016; Serra-Majem et al., 2004; Tugault-Lafleur et al., 2017; Vereecken, De Henauw, & Maes, 2005). In 2014, just 44% of 12 – 19-yr old Canadians reported consumption of at least five fruits and vegetables per day (Statistics Canada, 2015).

Indigenous youth share the health, nutrition and diet concerns of youth in general, though data suggests the concerns are more pronounced. Youth in Indigenous communities are at greater risk of type 2 diabetes due to higher rates of obesity than non-Indigenous youth (Finegood, Merth, & Rutter, 2010; Katzmarzyk, 2008; Pruszynska, 2017). The Public Health Agency of

Canada reports that 20% of FN and 16.9% of Metis youth living off-reserve have a BMI of greater than 30, compared with 11.7% of non-Indigenous Canadian youth. These data are corroborated by the 2009 – 2011 Canadian Health Measures Survey which reports approximately one-third of Canadian children and adolescents between the ages of 5 and 17 years are classified as overweight, with Indigenous youth of the same age twice as likely to be classified as having obesity in comparison (Bhawra, Cooke, Guo, & Wilk, 2017; Hodgson et al., 2011; Roberts, Shields, de Groh, Aziz, & Gilbert, 2012). The First Nations Regional Health Survey (FNRHS) 2008/10 reported 43% of on-reserve FN youth aged 12 – 17 years are overweight or have obesity (self-reported), far greater than the prevalence rate of 26% measured among adolescents of a similar age in the general population (First Nations Information Governance Centre, 2018). An analysis of the 2012 Aboriginal People's Survey (off-reserve FN, Métis children and youth) showed that 22% of off-reserve Métis and FN youth aged 6 to 17 years were overweight, and 15% have obesity (Statistics Canada, 2016). Youth experiencing low (9%) and severe (7%) food insecurity were more likely to be overweight or have obesity, although this finding was not independent of household socio-economic status. A school environment where the child was exposed to racism, bullying, or drugs also significantly predicted obesity risk (Bhawra et al., 2017).

In a review of diets of school-aged Indigenous adolescents across Canada, including 24 studies published between 2004 – 2014, dietary intake was seen to be low in nutrients and high in sugary drinks, fast and snack foods (Gates, Skinner, & Gates, 2015). Nutrient-rich traditional foods, while remaining important to the youth, were not consumed with high frequency by this age-group (Gates et al., 2015; Health Canada, 2012b; Ng, Young, & Corey, 2010).

1.9 The Role of Schools in Healthy Eating

Dietary habits and weight status established in adolescence are likely to continue over time and predict adult lifestyle-related disease (Craigie, Lake, Kelly, Adamson, & Mathers, 2011; Marshall, Burrows, & Collins, 2014; Patterson, Wörnberg, Kearney, & Sjöström, 2009), thus making adolescence an important target for initiatives to improve diet quality (Acton, Nguyen, & Minaker, 2018). Initiatives within school communities that support healthy eating can result in an improvement in academic achievement as well as children's health - compared to less healthy counterparts, healthy children have an increased capacity to learn (Bassett-Gunter, Yessis, Manske, & Gleddie, 2016; Belot & James, 2011; Florence, Asbridge, & Veugelers, 2008; King, M. H. et al., 2014). Despite research that indicates many nutrition interventions aimed at adolescents have little benefit (Bhutta, 2017), dietary intake has been shown to be positively influenced by community-based healthy eating programmes, including those focused in school communities (Lau et al., 2007). For example, the 'Healthy Buddies' programme, a peer-based mentorship approach among elementary school students in Manitoba, Canada, showed an improvement in self-efficacy, healthy living knowledge, and dietary intake in the intervention group relative to the control, and a reduction in waist circumference in the intervention group was seen to be more effective among students in FN schools (Eskicioglu et al., 2014; Santos et al., 2014).

International health agencies have long promoted the value of nutrition and food education in schools (Tugault-Lafleur et al., 2017; World Health Organization, 2017) as the school environment can play an important role in fostering healthy diets and lifestyles (Veugelers & Fitzgerald, 2005). Schools can facilitate nutrition education and health promotion and can influence dietary behaviours by altering the school environment, for example through school

gardens (Caballero et al., 2003; Going et al., 1999; Hanbazaza et al., 2015; Public Health Agency of Canada, 2016), or breakfast, school meal or snack programmes (Lee & Gortmaker, 2012; Pérez-Rodrigo & Aranceta, 2001; Storey et al., 2009; Tugault-Lafleur et al., 2017).

1.10 Dietary Assessment Methods for Adolescents

The assessment of general dietary intake, rather than individual nutrients, is fundamental for nutrition research, for developing appropriate nutrition programmes, planning, and policy development (Marshall et al., 2014). However, achieving accurate measurements of intake is difficult (Kirkpatrick et al., 2017; Thompson & Subar, 2013; Thompson et al., 2015) as intake varies, seasonally, and from day-to-day, and individuals eat and drink fluctuating amounts of foods and drinks in addition to consuming dietary supplements (Garriguet, 2010). Dietary assessment methods using a self-report approach (i.e., 24HR recall, food frequency questionnaire (FFQ)) are commonly used as these frequently have a lower burden on the participant as well as a lower cost for the research team (Gibson, 2005). Self-report measurement tools are subject to various types of bias and measurement error (Beaton, 1994; Freedman, Schatzkin, Midthune, & Kipnis, 2011; Freedman et al., 2015; Hébert et al., 2014; Kipnis et al., 1997; Kipnis et al., 2003; Kirkpatrick et al., 2017; Lachat et al., 2016; Subar et al., 2015); however, a large body of research relating to the understanding and mitigation of this measurement error exists, including the use of statistical techniques (Freedman et al., 2011; Freedman et al., 2015; Kipnis et al., 2003; Lissner et al., 2007; Prentice et al., 2011; Subar et al., 2003). In general, ‘observed’ methods are more accurate and not as likely to be affected by certain types of bias (Gibson, 2005). However, these methods of assessment are expensive, and are difficult to carry out accurately outside of a controlled environment (Gibson, 2005).

As children spend more time away from home during school years, foods available outside of the home, including school-based foods, become important. In 2004, close to one third of total energy consumed by Canadian children aged 6 – 17 years was consumed between 9 am – 2 pm on a school day (Tugault-Lafleur et al., 2017). Schools can be a useful place to assess the general diets of adolescents: most children eat at least one meal at school, on school days, and dietary assessments can reach a large number of children from a community of interest (Lee & Gortmaker, 2012; Pérez-Rodrigo & Aranceta, 2001; Tugault-Lafleur et al., 2017). The accurate assessment of the diets of children and adolescents in schools, however, can be challenging, so choosing an approach can be difficult. Many factors should be considered: food may come from many different sources; children and adolescents have varying literacy abilities and can have difficulty estimating portion size and conceptualising the frequency of food consumption (Burrows, Martin, & Collins, 2010; Livingstone, Robson, & Wallace, 2004). Peer influence, and social desirability bias — the wish of participants to give an answer that will please others — can influence the accuracy of the data, and, depending on the circumstances of the dietary assessment, not all adolescents are willing participants (Gibson, 2005). The age whereby children are considered able, in general, to complete self-report methods of assessment adequately is judged to be about 12 years old, varying by dietary assessment method (Sharman, Skouteris, Powell, & Watson, 2016). When assessing the diets of Indigenous adolescents, many of whom live in remote communities, access, and therefore greater time and expense, must be taken into account, and sensitivity to the possibility of food insecurity in the community should also be considered. Culturally appropriate measurement tools (i.e., the assessment methods that include language appropriate to the population, and foods relevant to the community) developed

in partnership with community leaders are critical (Cidro et al., 2015; Cidro, Martens, Zahayko, & Lawrence, 2018).

1.11 Nutrition Interventions Among Indigenous Communities

Many Indigenous communities value school-based nutrition programmes (Hanbazaza et al., 2015; Skinner et al., 2006), and such programmes among Indigenous schools have shown moderate success (Gates et al., 2015; Hanbazaza et al., 2015). However, research, and nutrition and health programmes involving Indigenous people have, historically, caused pain and disruption (Castellano, 2004; Getty, 2010; Schnarch, 2004; Singh, M. & Major, 2017). Research and related community health programmes involving Indigenous people have usually been carried out from the perspective of Western scientific thought, with little regard for the perspective of the communities involved. Indigenous communities have felt as objects of scrutiny and interest, rather than treated respectfully as community partners and the end-users of the study results or programme goals (Wilson, S., 2008). In many cases communities were not given access to their own data and study results were not shared with those who gave of their time and information to take part (Castellano, 2004; Getty, 2010; Schnarch, 2004). The OCAP Principles (Ownership, Control, Access, and Possession) have been developed as a response to inappropriate research practices carried out in the past and pertain to all aspects of the research process. These principles are a helpful guide to enable both researchers and community members to establish mutually agreeable terms for data use from the beginning of any collaborative initiative (Schnarch, 2004).

1.12 Food Security and Food Sovereignty Among Indigenous Nations

Food security is defined by the Food and Agriculture Organisation of the United Nations (FAO) as “exist[ing] 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 in order to lead a healthy and active life.” (FAO, 2006). Food security is a useful indicator (Cidro et al., 2015; Power, 2008; Reading, C. L. & Wien, 2009b; Willows, 2005), but it has been criticised for lacking a strength-based perspective. In contrast, food sovereignty is a different concept, one linked to the autonomy and sovereignty of a people and that considers the cultural, political and environmental aspects of food systems (Masioli & Nicholson, 2010). Food sovereignty has been defined by Food Secure Canada as ‘...the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems’ (Peoples Food Policy, 2011).

Referenced more frequently in published literature in the past five years, as well as by Indigenous community groups, food sovereignty recognises both the people and the power inherent in food systems, aims to link production to consumption, and is linked with the OCAP principles (Wittman, Desmarais, & Wiebe, 2010). The principles of Indigenous food sovereignty, as proposed by the Indigenous Food Systems Networks, are: 1) food is sacred; 2) active participation in land-based food activities; 3) self-determination of food systems; and 4) supportive policy reform (Morrison, 2011).

1.13 Canada’s Food Policies

Canada has no comprehensive national food policy, and instead, the country’s food concerns are divided among a range of agencies and government departments (Levkoe & Sheedy, 2017; MacRae, 2011), with most Canadian food regulations remaining focused on food safety and

fraud prevention. The latest policy (renewed in 2008/9) attempts to look at the system more broadly but fails to address all the necessary issues, such as the integration of health, and social and cultural concerns, particularly of Indigenous Peoples in Canada (MacRae, 2011). Multiple domestic and international agreements have ensured the right of Indigenous peoples to access traditional food, a right reinforced through the Canadian legal system's general recognition of Indigenous title (Loring & Gerlach, 2015; Rideout, Riches, Ostry, Buckingham, & MacRae, 2007). The most recent version of Canada's Food Guide, published in 2019 (Health Canada, 2019), considers the cultural, social and historical context of Indigenous Peoples and is intended to be relevant to all Canadians (Ellis, 2021); Indigenous consultation was included as part of the broad development process. 'Distinction-based healthy eating tools' are being developed with Indigenous populations in mind but have not yet been released (Brake, 2019). Currently, dietary guidelines for FN, Inuit, and Métis date from 2010 (Health Canada, 2007).

1.14 Complex Interventions and Scale-up

Complex interventions, for example, those used for chronic disease prevention, aim to tackle deeply rooted, complicated problems (Coffman, 2007). They contain many programme elements, employ many people, involve many intertwined relationships, and are targeted at more than one level of the system; these many and varied system components must aim to work together coherently in order to see the desired benefit of the programme (Edwards, 2010).

Research shows that a clear mandate, trusting partnerships, and engagement with all relevant stakeholders before and during the intervention are essential hallmarks of a successful programme (Edwards, 2010).

However, there is increasing recognition that creative, and effective, multi-component interventions are not sufficient. An intervention might be effective, but if it is implemented in just one community (low reach), it will not touch very many of the people who need it (low impact). Thus, scaling-up is necessary (Mangham & Hanson, 2010; Willis et al., 2016). The aim of scaling up any intervention is to expand its coverage while maintaining the quality of the intervention so as to enable more people to access its benefits; scale-up can be horizontal (increasing the reach of an effective intervention to different contexts or to different target groups (Simmons & Shiffman, 2007; Uvin & Miller, 1996)) or vertical (the implementation of a more secure or sustained intervention by organisations, regions, or at a national level, requiring policy, legal, or systemic changes, incorporating the original context (Simmons & Shiffman, 2007)). Due in part to the multifaceted nature of complex interventions, funding challenges, and the prospect of managing more moving parts particularly within remote communities, many seemingly successful complex interventions are not being scaled-up (Mangham & Hanson, 2010).

1.15 Promising Practices

Looking forward, a number of approaches have been suggested to address the health issues that are outcomes of the nutrition transition among Indigenous Peoples in Canada. The Kahnawake and Sandy Lake diabetes prevention projects, plus the U.S. Pathways initiative are examples of school nutrition education and physical activity initiatives with positive outcomes (Caballero et al., 2003; Kakekagumick et al., 2013; Macaulay et al., 1997). Attempts have been made by various Indigenous communities to combine Indigenous and Western values and to encourage self-determination, aiming to reduce vulnerability and increase resilience by focusing on food

sovereignty (Cidro et al., 2018; Gates, Hanning, Gates, & Tsuji, 2016), traditional skills and climate change adaptive response efforts such as that trialled in Kakisa, Northwest Territories (Spring, Carter, & Blay-Palmer, 2018). School-based interventions such as gardening projects and skills-based classes have seen some success in improving diet quality (Gates et al., 2015; Hanbazaza et al., 2015; Hanning, Skinner, Gates, Gates, & Tsuji, 2011; Naylor et al., 2010; Skinner et al., 2006), and environmental interventions along with behaviour change components might be useful for addressing obesity at the community level (Kumanyika, 2001; Sharma, Gittelsohn, Rosol, & Beck, 2010). However, Canadian FN and Métis communities are located in highly variable environments and little is known about scaling up interventions that encourage the consumption of local and traditional foods among school communities in such differing contexts.

1.16 Summary and Implications

The nutrition and health-related challenges affecting Indigenous adolescents result from a complex mix of intertwined factors. However, traditional knowledge and culture, including the consumption of locally procured traditional foods, are integral to Indigenous concepts of wellness and health.

Recognising that the Western biomedical approach differs from Indigenous beliefs about health, and cultural shifts connected with the perception of what is considered ‘traditional’ food among modern-day Indigenous peoples (Luppens & Power, 2018), it is vital that all Indigenous peoples – both rural and urban – have access to fresh, nutrient-dense, and culturally appropriate foods. Community-based approaches initiated and run by Indigenous champions, emphasising the importance of healthy lifestyles, emotional and mental wellness, and promoting physical activity

and traditional food consumption are essential to address the negative health outcomes resulting from the nutrition transition among Indigenous communities. This research will evaluate one such approach, Learning Circles, and describe the effects on the local foods systems within four diverse First Nations contexts.

Chapter 2: Theoretical Framework

A number of frameworks and models have been described to identify connections between the many factors that lead to poor nutritional outcomes such as obesity and chronic disease in children and young people (Egger & Swinburn, 1997; Victora, Huttly, Fuchs, & Olinto, 1997; Willows, 2005; Willows, Veugelers, Raine, & Kuhle, 2011; Willows, Hanley, & Delormier, 2012). Obesity and related chronic disease, whilst frequently blamed on diet and exercise, are complex problems and are influenced by linked factors as wide-ranging as social norms, geographical context and related food access, the surrounding physical environment and economic factors. Deeply rooted, complex problems such as these require multifaceted programmes that incorporate many elements, involve intertwined relationships and are targeted at more than one level of the system (Coffman, 2007; Meadows, 2008). Factors linked on many levels should be considered to address the higher rates of obesity and related chronic disease seen among Indigenous youth in Canada (Wilkinson & Marmot, 2003).

This thesis uses the framework proposed by Willows et al (Willows et al., 2012), adapted to focus on access to local, healthy and traditional foods. Willows' Indigenous-specific framework is based on the socio-ecological model (SEM) and the adaptation integrates factors that influence food access and chronic disease from the individual level to that of the historical and global, indicating that health status is shaped by more than merely the balance (or lack of balance) between energy intake and expenditure. The model illustrates the two-way relationship among and between levels and recognises the historical context within which all ecological relationships sit.

Figure 2.1 depicts the model, indicating the different levels of influence. These include the individual level, interpersonal, community, family and sociocultural influences; the built environment; broader society and finally, historical factors.

Individual, Interpersonal, and Community/Family/Sociocultural Levels: At the individual level, nutrition-related chronic disease is the result of a sustained positive energy balance caused by eating too much or exercising too little, or both. Individual behaviours such as diet and exercise are influenced by individual knowledge, attitudes and perceptions as well as interpersonal and broader community/sociocultural factors such as early childhood development, household income, education, food-related skills in the household (such as the presence of a hunter or a trapper in the family). As seen in Chapter 1:, Indigenous communities have distinct determinants when compared with the general Canadian population – poverty, food insecurity, and access to healthcare (King et al., 2009; Reading, C. L. & Wien, 2009a; Willows, Veugelers, Raine, & Kuhle, 2009). These are also affected by present and historical government policies, and all have been documented to contribute to obesity and chronic disease risk.

Built Environment: The built environment relates to human-made physical structures such as walkable neighbourhoods, location of grocery stores and restaurants, recreation areas and school/workplace meal programmes. Research has shown that relationships exist between the built environment and health-enhancing behaviours such as physical activity (Duncan, Spence, & Mummery, 2005; Engler-Stringer et al., 2014; Minaker, 2016); limited studies have explored the relationship between built environments and chronic disease in Indigenous communities (Smoyer-Tomic et al., 2008). In Edmonton, Alberta, urban Indigenous residents were more

likely to live in low-income areas and as a result be exposed to more fast-food restaurants than residents of higher-income areas (Smoyer-Tomic et al., 2008).

When compared to the general Canadian population, Indigenous communities frequently live in more remote geographic locations; such locations are less likely to have adequate infrastructure such as roads, grocery stores and recreation areas (Kuhnlein et al., 2004; Wendimu et al., 2018). Traditional practices for food procurement in rural and remote areas (hunting, gathering, fishing) are also negatively affected by climate change (Ford et al., 2010; Gracey & King, 2009; King et al., 2009).

Historical Context: Due to colonisation, Indigenous peoples were dispossessed of traditional lands and were subjected to various assimilation policies such as the Indian Act and residential schools (Duncan et al., 2005; King et al., 2009; Reading & Wien, 2009). Access to traditional hunting and fishing grounds was limited or lost, leading Indigenous people to be dependent on the market system for food – often unfamiliar and of poorer quality than what they were used to (Gracey & King, 2009). The residential school system prevented children from learning their Indigenous language and becoming familiar with traditional practices such as hunting, and food procurement and preparation (Angel, 2000; Hackett et al., 2016). Ongoing Treaty negotiations focus on access to land, including land-based resources from traditional food practices, access to clean drinking water, advocacy for national policies to support school food provision, and efforts amongst food security advocates for basic income provision; many of these actions aim to address the outstanding Truth and Reconciliation Commission Calls to Action (2015).

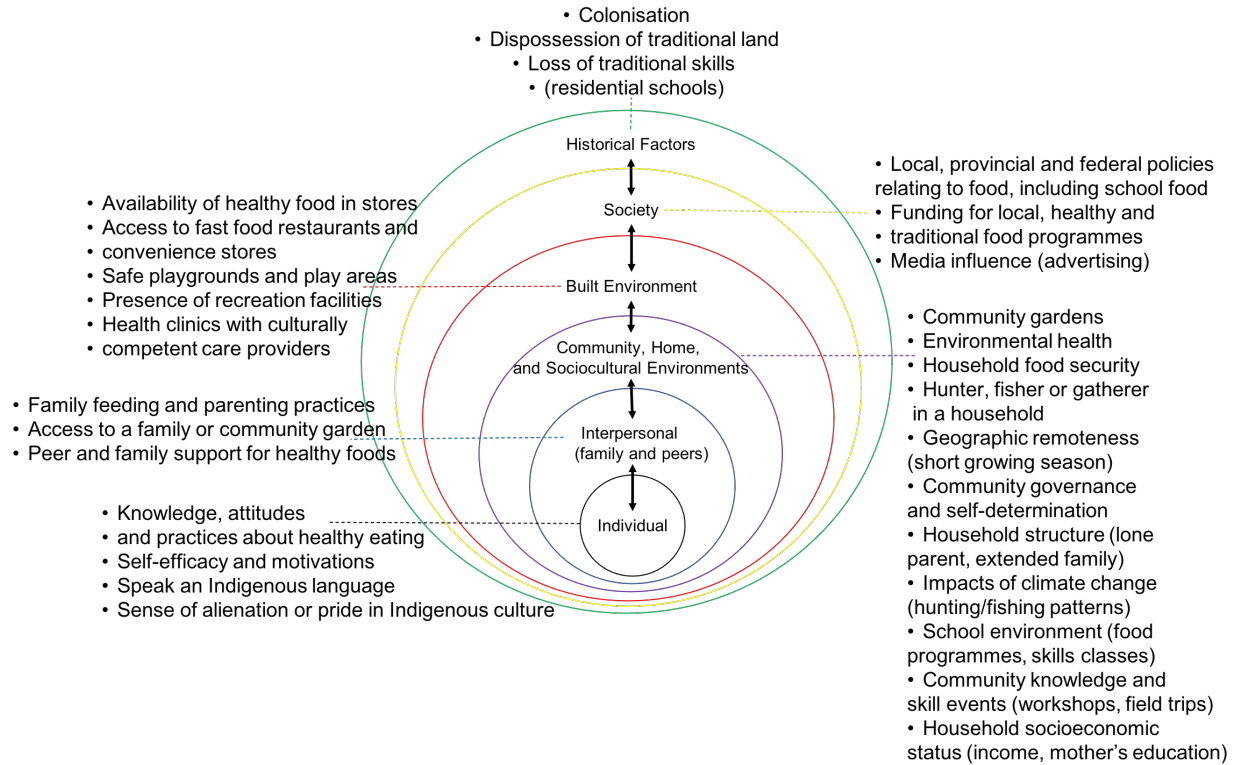


Figure 2.1: Socio-ecological model for understanding factors that contribute to local, healthy and traditional food access in Indigenous youth (adapted from (Willows et al., 2012)).

When developing strategies to address nutrition-related chronic disease, the multiple determinants that have an effect at each level of the framework should be considered (Willows et al., 2012). Multi-level, complex public health strategies incorporating Indigenous wellness should be considered to promote healthy lifestyles.

Chapter 3: Study 1. “Implementation of the Learning Circle: Local Healthy Food to School Initiative - Four Descriptive Case Studies”

3.1 Introduction and Study Rationale

Chronic disease prevalence rates among Indigenous communities remain higher than those among the non-Indigenous population, for all age ranges including adolescents (Reading, J., 2015; Reeds et al., 2016). The causes of chronic disease are deeply rooted and complicated (Coffman, 2007); programmes to tackle such problems therefore require many elements, employ many people, involve many intertwined relationships, and often target more than one level of the system. In such ‘complex interventions’, the many and varied system components must aim to work together coherently in order to see the desired benefit of the programme (Edwards, 2010). Research shows that a clear mandate, trusting partnerships, and engagement with all relevant stakeholders before and during the intervention are essential hallmarks of a successful programme (Edwards, 2010; WHO, The Government of South Australia, 2010).

Research and related community health programmes involving Indigenous people have in the past been carried out from the perspective of Western scientific thought, with little regard for the viewpoint of the communities involved. Indigenous communities have felt ‘researched’ rather than treated respectfully as community partners and end-users of the study results or programme goals (Singh & Major, 2017). Many communities have not been given access to their own data, and in some circumstances, study results have not been shared (Castellano, 2004; Getty, 2010; Schnarch, 2004). In addition, the over-researching of particular communities has led to ‘research fatigue’. In the words of one community member: “*we’ve been researched to death, and need to be researching back to life*” (Castellano & Reading, 2010; Moore, Castleden, Tirone, & Martin,

2017). The principles of ownership, control, access and possession, or OCAP, have been developed as a response to inappropriate research practices carried out in the past, and pertain to all aspects of the research process. These principles are a helpful guide to enable both researchers and community members navigate a process through establishing shared ownership over group data (Schnarch, 2004).

‘Health’, and health promotion for Indigenous communities is based on the concept of wellness, a balance between physical, spiritual, emotional and mental health (Battiste, 2011; Cochran et al., 2008; Edge & McCallum, 2006; Getty, 2010) in contrast to the traditional focus of Western science on physical health. A return to a culture of healthy local foods and greater food sovereignty is fundamental to the prevention of chronic disease and the promotion of health in Indigenous and remote school communities (Battiste, 2011; Kawagley, 2001). Indigenous knowledge and Western science can be complementary in their approach to promoting health and wellness. The ‘two-eyed seeing approach’ underlines the need to *‘Learn...to see from one eye with the best in....Indigenous ways of knowing, and from the other eye with the best in Western (or mainstream) ways of knowing...and to learn to use both these eyes for the benefit of all’* (Albert Marshall, Mi’kmaq Elder) (Iwama, Marshall, Marshall, & Bartlett, 2009). Rebecca Thomas, 2016 – 2018 Poet Laureate for Halifax, N.S., puts it thus in her poem ‘Etuaptmumk’ (Two-Eyed Seeing): *‘..we ask that you understand that we are the experts on what we need. Don’t feed us your good intentions...We plan out our actions for the next seven generations and we ask that you do that same. Open your other set of eyes; Recognize the pain you have caused; Take a pause and start breathing. Welcome to the world of Two Eyed Seeing.’* (Thomas, 2016). Using this approach, the goal of the Learning Circles: Local Healthy Food to School

(LC:LHF2S) initiative has been to collaboratively enhance holistic health in partnering remote Indigenous school communities.

The Learning Circle (LC) approach is a community engagement practice that worked at individual and community levels with a collective aim to promote partnerships between community members with a common interest in food. The model stemmed from the ‘learning labs’ of the Farm to School programmes that began in the United States and transitioned to Canada under Farm to Cafeteria Canada (F2CC) (Farm to Cafeteria Canada, 2019). The approach began as a strategy to enhance the provision and inclusion of local healthy food in schools. Promising results from the United States, and the Canadian pilot community, Haida Gwaii, B.C. (Farm to Cafeteria Canada, Nourishing School Communities & SPARC BC, 2016), motivated the wider project team to scale the approach up by including three new communities. While the goal was to encourage sustainable change and increase the impact and reach of the approach (Simmons, Fajans, & Ghiron, 2007), little was known at the outset of the project about scale-up in remote First Nation (FN) communities and remote school communities (Mangham & Hanson, 2010; Paina & Peters, 2011). Since each LC is adapted according to the wishes of the community, the project team thought that the model could accommodate the diversity in context between communities (Roussos & Fawcett, 2000; Trickett et al., 2011).

The four communities involved in the partnership have very different contexts and cultures, including government, community food systems, geographical locations, and readiness for change.

This chapter is organised as follows:

The **methods** used to carry out the study are followed by the **case studies** of each of the four communities: Haida Gwaii, B.C., Hazelton/Upper Skeena, B.C., Ministikwan Lake, SK, and Black River, MB. Each case study is organised and presented by **context, activities, and thematic analysis**; some descriptive and qualitative results from **school surveys** conducted by two communities are presented as part of the case studies in HG and MK. An **integrative summary of findings** follows the four case studies; this compares the LC work in each community by context, goals, activities and themes, and considers how the LC work is informed by the socio-ecological model. Finally, an **interpretive discussion** compares the findings from this study to the wider literature and reflects upon lessons for future research.

3.2 Objectives and Research Question

This case study describes the food, nutrition and health related transitions (activities, influences, outcomes) of the LC:LHF2S initiative in each of four diverse FN communities: Haida Gwaii, B.C., Hazelton/Upper Skeena, B.C., Ministikwan Lake, SK, and Black River, MB from January 2016 – December 2018. Using the socio-ecological model (SEM) to frame the contextual influences on community food systems over the time of the LC:LHF2S initiative, each community was then compared with other participating FN communities.

Objective 1: Describe the context and process of the establishment and growth of the LC in each community.

Objective 2: For each FN community, explore the story of change in the school food communities over the period of the LC:LHF2S initiative as described by community members and other partners and augmented by quantitative data, including on the availability, acceptability and consumption of local, healthy and traditional foods. Quantitative data including procurement data, menu plans, tracking data and workshop/food skills class data, were used when available from each community.

Objective 3: For each community, explore the perceived effects of the LC as described by community members and other partners.

Objective 4: Synthesise similarities and differences across the four communities, framed by the SEM.

3.3 *Methods*

3.3.1 Study Design

This descriptive case-study (Baxter & Jack, 2008) with mixed-method design was carried out using community-based participatory research (CBPR). CBPR provides an alternative to traditional research methods and emphasises partnering with communities, recognising community participants as experts in research rather than subjects (Holkup, Tripp-Reimer, Salois, & Weinert, 2004). In this approach, the strengths and resources of the community are built upon and used, the community is consulted regarding what they perceive as challenges, and knowledge is gleaned from the project (Holkup et al., 2004; Jacquez, Vaughn, & Wagner, 2013). CBPR enables the adaptation of existing resources and uses local knowledge, thus giving community members agency, and control over their own circumstances (Israel, Schulz, Parker, Becker, & Community-Campus Partnerships for Health, 2001; Stevens & Hall, 1998).

A descriptive case study is useful to describe an intervention in the context in which it occurred (Yin, 2017). The concept of a case study allows for the exploration of a complex ‘case’ using a variety of data sources, such as those described below. A case study approach is useful in certain circumstances: (i) when the focus of the study is to answer ‘how’ and ‘why’ questions; (ii) when the behaviour of those involved in the study cannot be manipulated by the research, and (iii) when the context is relevant to the case in question (Baxter & Jack, 2008; Yin, 2017); all three circumstances are met in this study. This multiple case study enables different phenomenon or ‘cases’ to be compared and contrasted within their individual context (Baxter & Jack, 2008; Yin, 2017). In these case studies, the ‘Case’ = work of Learning Circle, and the ‘Context’ = community within which Learning Circle operates.

The context of each community, including location, past community food system projects, governance and a history/timeline of the project, is described below in consultation with key community partners/ informants.

3.3.2 The Learning Circle

The LC was a community engagement practice that worked at the community level with a collective aim to promote partnerships between community members with common interest. The model evolved from the ‘learning labs’ of the Farm to School programmes that began in the United States and transitioned to Canada under Farm to Cafeteria Canada (Farm to Cafeteria Canada, Nourishing School Communities & SPARC BC, 2016). The name ‘Learning Circle’ started in Indigenous communities and was used to reflect the co-operative nature of the practice, and the importance of grounding the practice in local knowledge, traditions and culture.

For the LC:LHF2S initiative discussed here, partnerships were generated around a shared interest in increasing the availability, acceptability and consumption of local, healthy and traditional foods by school-aged youth and adolescents in each community. Haida Gwaii, B.C. pioneered the first LC in an Indigenous community and acted as an exemplar community for this initiative.

A Learning Circle Evaluation Facilitator (LCEF) was employed in each community and given responsibility to initiate community meetings in which matters relating to local, healthy and traditional foods were discussed. Community members with an interest in local food were invited through formal and informal networks, and invitations. Priorities for that community were agreed upon over the course of a workshop, usually day-long, needs and activities were discussed and goals set. The core group met several times between 2016 - 2019 to re-evaluate the aims of the group and discuss progress.

A gathering of the Project Stakeholders Advisory Council (the ‘Annual Gathering’) took place each year in one of the communities: Haida Gwaii B.C. (HG) in 2015, Hazelton/Upper Skeena B.C. (HZ) in 2016, Ministikwan Lake S.K. (MK) in 2017, and Black River M.B. (BR) in 2018, focusing on training, sharing stories and evaluation activities and relationship building within and across participating communities.

3.3.3 Project Advisory Structure

The LC:LHF2S partnership was managed on three levels. The *Project Stakeholders Advisory Council* (PSAC) included representation from all communities (usually the evaluation facilitator and one other community member) as well as members of the research team, partnering NGOs and the project manager from the University of Waterloo. The PSAC oversaw decisions about evaluation, and knowledge translation and exchange within each community.

In each community, a *local LC Council* was made up of individuals representing various community organisations such as community health agencies, government, and schools, as well as youth and other local interested individuals. Each LC Council was responsible for hiring a suitable evaluation facilitator from the community and maintaining the social and cultural integrity of the LC:LHF2S project for the duration of funding, as well as supporting communities to obtain approvals, implement activities and gather material for evaluation.

The *Research Council* included the applicant research team and knowledge user/decision maker partner representatives, and at least two community members, and supported knowledge translation and exchange between the local LC Councils and other broader stakeholders such as the funder (CIHR) and other partners (i.e., Heart and Stroke Foundation).

3.3.4 Ethics

Ethical clearance was received from the Office of Research Ethics at the University of Waterloo, as part of the evaluation activities for the LC:LHF2S study (ORE# 30819). An initial spirit of collaboration document written in plain language was given to each LCEF to share as appropriate with community leadership. This document covered how OCAP was integrated into the project and plans for knowledge sharing. An agreement, '*Isda ad dii gii isda (S) - Isdaa 'sgyaan diiga isdii (M)*' Spirit of Collaboration Protocol was later established with the University of Waterloo and the Secretariat of the Haida Nation (SHN) in 2018 to demark ethical codes and principles governing the conduct of research activities. For this, the Council of the Haida Nation (CHN) communications department provided support in reviewing, revising and finalising the collaboration agreement.

For the other communities, the conduct of evaluation activities was established in a less formal way. Local decisions of each community regarding what information was desired, and which processes were used for collecting information, reflect how OCAP and principles of respect and reciprocity were honoured in this research.

3.3.5 Overview of Data Sources and Collection

Multiple sources of evidence were analysed to describe the context of each community and the story of change resulting from the work of the LC; evaluation methods were guided by community priorities. Semi-directed interviews conducted by the research team and community-based research assistants, documentation of process including reports written by LCEFs, conference call summaries, emails, photographs, video footage, procurement data, menu plans, tracking data and descriptions of workshop/food skills classes were used to develop an

understanding of the activities and changes in each community (Creswell & Clark, 2017; Creswell & Poth, 2017).

3.3.6 Interviews

Annual interviews (four sets in total conducted between 2016 - 2018) were conducted with LCEFs, community members and other key partners using a semi-structured interview script (Appendix A). Participants were purposively selected based on their connection with the initiative (for example, attendance at the annual project gathering), and were recruited by email. Interviews took place in person, by phone, and on Skype; between 6 to 10 participants were interviewed each year. Interviews were carried out by the same interviewer each year (LM) and lasted between 25 – 60 minutes; signed and/or verbal consent was obtained prior to the interview taking place. Interviews were recorded with the permission of the interviewee. Participants had the opportunity to withdraw from the interview at any time and could also decline to answer any question that they wished.

Interviews with LC participants and other community members were carried out in HG and HZ at the close of the project (2018/2019) using a semi-structured interview script (Appendix B). Participants were purposively selected based on their involvement in the community LC and were recruited by personal email. Interviews were carried out in person by a local research assistant, trained by the project manager at the University of Waterloo; 18 interviews were conducted in HG, and 7 in HZ. Interviews lasted between 20 – 60 minutes and were recorded with the permission of the interviewee. Signed and/or verbal consent was obtained prior to the interview taking place. Participants had the opportunity to withdraw from the interview at any time and could also decline to answer any question that they wished.

In-person interviews were conducted with each person who attended the final Annual Gathering of the project in October, 2018. Each interview was conducted by same interviewer (LM).

Verbal consent was obtained prior to the interview taking place, and participants had the opportunity to withdraw from the interview at any time and could also decline to answer any question that they wished. Questions focused on the experiences of participants at the Annual Gatherings where appropriate, the goals of the LC, experiences of participants connected to the LC and associated activities (challenges, things that are working well), local foods and food systems in their respective communities, and developments in the community as a result of the LC.

3.3.7 Reports and Written Documentation

The LCEF of each community developed a report (Appendix C) after each LC describing the events of that meeting. The report was sent to the research team. Written documentation included notes taken during conference calls between project partners, and emails, which took place and were exchanged throughout the duration of the LC:LHF2S initiative. Food procurement data (including receipts), menu plans, activity and other tracking data, timesheets and journals from Learning Circle Evaluation Facilitators, teleconference minutes and descriptions of workshop/food skills class were collected throughout the initiative and emailed to the research team at the University of Waterloo. These documents also contributed to annual reports to the funder (CIHR).

3.3.8 Photograph and Video Documentation

Digital photographs and videos were taken by LCEFs, community members, and the research team at each of the four communities throughout the initiative. A [video](#) was filmed at the final annual gathering to give an overview of the project; it included photographs and interviews with key community members and other partners attending the gathering.

3.3.9 Photovoice

Photovoice is a research method based on the CBPR approach that combines photographs and discussion to gain a deeper understanding of participants' perspectives and increase engagement within initiatives (Adams et al., 2012). Participants take photos to identify and record their perceptions and experiences, and by doing so have more control over the accuracy of the data and thus bias is reduced. Once the photographs are taken, participants reflect on them in discussion with others (Castleden & Garvin, 2008); the photographs and reflections are then shared with other partners in the initiative.

One of the four communities, HZ, carried out a photo-voice project with school students. Students were instructed to take photographs of things they thought were important to telling their story about the foods that are available in their community, using the following points as their guide:

- Where: Places that affect what you eat
- Who: People that affect what you eat
- Why: Information that helps you decide what to eat
- Other: like price of foods you might choose

Students were instructed to take as many photographs as they liked, and to select 15 for discussion in class. They were also given guidelines regarding appropriate behaviour (see Appendix D).

3.3.10 Data Analysis

In contrast with researchers who follow a positivist approach (Green & Thorogood, 2018), researchers who take an interpretive perspective do not look for objective truth – they consider truth and reality to be socially constructed. In a study such as this one, participants are viewed as active contributors and joint creators of the new knowledge that is produced as a result of the study. In addition, researchers acknowledge that their own biases influence the study and recognise these as a factor in the findings. As such, the position of the current researcher as a Caucasian, Irish woman of Protestant Christian background should be considered. A relative newcomer to Canada, her knowledge of conflict related to colonisation in Canada was initially cursory, but her understanding of the deeper issues has increased considerably. For Irish people, the relationship with British colonists has been contentious for hundreds of years, even after the establishment of the Irish Republic in 1949. Of course, in recent years, the relationship between the Republic of Ireland and the U.K. has improved considerably, partly as a result of the Good Friday Agreement in 1998. Despite this, Irish people often feel a solidarity with people of other nations who were similarly colonised. With this background, the researcher must acknowledge her biases that arise from being a citizen of a formerly colonised nation that has reconciled with its colonisers, whilst also being of general ‘European’ Caucasian ethnicity, from where the colonisers of Canada originated.

Qualitative research methods, when carried out optimally, produce information that is rich and full of detail. Qualitative research allows participants to communicate freely and enter into the research process in a way that quantitative methods are unable to accommodate, and it allows researchers to access material relating to experiences and viewpoints of the participants, which may have impact for programme and policy design (Green & Thorogood, 2018; Morse & Field, 1995). Grounded theory, a type of methodology that follows a systematic process to collect and code data, make connections and allow theories to come out of the data is frequently used when conducting qualitative studies (Green & Thorogood, 2018). This study was carried out using an interpretivist approach, following the principles of grounded theory in order to fully understand the outcomes of the LC initiative in the four communities. The large variety of data sources included in this study allowed for triangulation of data, contributing to methodological rigour (Creswell & Miller, 2000; Creswell & Poth, 2017; Stewart, Makwarimba, Barnfather, Letourneau, & Neufeld, 2008).

An adapted version of the socio-ecological model for understanding obesity in Indigenous children (Willows et al., 2012), described in Chapter 2:, was integrated into the codebook and analysis. Reports of LCEF activities were coded and summarised by one coder (BZ), and coding of interviews was carried out in duplicate (LM and RV); the codebook verified by both in discussion with the project research team. Due to the COVID-19 pandemic, main themes are being discussed remotely, as part of a ‘sense-making’ session.

All interviews were audio-recorded, and audio files were transcribed verbatim; pseudonyms were assigned to each participant to protect anonymity. Transcripts, field notes, reports and all other written documentation were reviewed and coded using the following steps. A draft coding framework (Appendix E) was developed using activity tracking documents and early participant

interviews. These codes were established using both a deductive approach (exploring the data for themes relating to wider project research objectives) and an inductive approach (observing themes emerging from the data). Data were then coded line-by-line and analysed for emerging themes by comparison across the documentation, and within and across communities. NVivo® 12 Pro (QSR International) was used for data processing and analysis. A table was constructed showing the differences among the contexts; for example, location, governance, population, food systems etc., and the SEM was integrated into the analysis and used as a structure against which to compare case studies.

3.4 Results

The following case studies are presented from West to East as this follows the timeline of engagement; Haida Gwaii was the exemplar community. This orders the communities from largest to smallest for both population and school size and also follows the direction of the annual project gatherings.

3.5 Implementation of the Learning Circle: Local Healthy Food to School Initiative in the Island Communities of Haida Gwaii, British Columbia - A Descriptive Case Study.

3.5.1 Objectives and Research Question

This case study aims to describe the food, nutrition and health related transitions (activities, influences, outcomes) of the LC:LHF2S initiative in Haida Gwaii, B.C. (HG) from January 2016 – December 2018.

Objective 1: Describe the context and process of the establishment and growth of the LC in HG.

Objective 2: For HG, explore the story of change in the school food communities over the period of the LC:LHF2S initiative as described by community members and other partners, augmented by quantitative data, including those on the availability, acceptability and consumption of local, healthy and traditional foods, e.g., procurement data, menu plans and tracking data.

Objective 3: For HG, explore the perceived effects of the LC as described by community members and other partners.

3.5.2 Context

The archipelago of Haida Gwaii is located 100 kilometres west of the northern coast of British Columbia and comprises over 200 islands totalling approximately 9700 square kilometres (Haida Nation, n.d.). The two largest islands are Graham Island (*Kiis Gwaay*) and Moresby Island (*T'aawxii Xaaydaḡa Gwaay.yaay linaḡwaay*) and there are two general sections – north and south. The islands are remote, 720 km north of Vancouver, and accessed only by ferry or

aeroplane; the closest city to HG is Prince Rupert, an 8-hour ferry ride. The population of HG is approximately 5,000 people with the majority living in the main communities of Masset, Village of Masset, Village of Port Clements Skidegate, and the Village of Queen Charlotte (Haida Nation, n.d.).

The islands of HG are located on the traditional, unceded, territory of the Haida Nation, which encompasses parts of southern Alaska, the archipelago of HG and its surrounding waters. Haida people make up approximately 50% of the islands' population with the majority of the remainder of West European descent. The Haida Nation hold the cultural and intellectual property rights of the Haida people. The Council of the Haida Nation (CHN) is the governing body of the Nation and upholds the principles embodied in the Haida Accord as enacted by the hereditary chiefs, CHN, Old Masset Village Council (OMVC), and Skidegate Band Council (Haida Nation, n.d.). The Secretariat of the Haida Nation (SHN) manages the programmes and staff of the Haida Nation and receives and administers funds on behalf of the Council.

HG makes up B.C. School District #50 (SD #50) and has six schools: four elementary (*Sk'aadgaa Naay* Elementary School (SNES), Port Clements Elementary (PCE), *Tahayghen* Elementary (TE) and Agnes L. Mathers Elementary (ALM)) and two secondary schools (*GidGalang Kuuyas Naay* Secondary School (GKNS) and *Gudangaay Tlaats'gaa Naay* Secondary School (GTN)) (Table 3.1). In addition, HG has a Band-run school called Chief Matthews School, and an alternative school called Living and Learning. Nutrition interventions were included in the 'components' section of the 2010/2011 logic model for SD #50 and included hot lunch, snack and pizza programmes and time for nutrition breaks during the school day. Outputs are listed as: "Nutrition programmes exist at each school in HG to provide breakfast, snacks and hot lunches. All of our students participate and benefit from these

programmes as a large number of students attend school without eating breakfast and often do not have a lunch’ and the short-term outcome is listed as ‘Improved nutritional intake’ (accessed January 2020, now archived. Available at: <https://ahscloud.uwaterloo.ca/url/50documents>).

Table 3.1 Haida Gwaii (SD #50) Schools

School Name	Grades	Community	Region
Agnes L. Mathers Elementary	K – 7	Sandspit	South
Port Clements Elementary	K – 7	Port Clements	North
<i>Sk'aadgaa Naay</i> Elementary School	K - 7	Skidegate	South
<i>Tahayghen</i> Elementary	K – 7	Masset	North
<i>GidGalang Kuuyas Naay</i> Secondary School	8 – 12	Queen Charlotte	South
<i>Gudangaay Tlaats'gaa Naay</i> Secondary School	8 - 12	Masset	North

The island has a wet, temperate climate (between 120 – 140 cm of rainfall annually), with a mild winter, cool summer and a long growing season. The nutrient-rich waters of the north Pacific provide a wide variety of seafood. There is an established and vibrant local and traditional food culture in HG that is highly seasonal, and foods traditionally eaten in this region include seafood such as fish (e.g., halibut, salmon) and shellfish (e.g., Dungeness crabs, cockles, razor clams), wild meats (e.g., venison) and wild plant foods such as berries, seaweed, wild mushrooms/chanterelles, and sea asparagus. Grocery stores on the islands are well stocked, and a large number of farmers and growers (including some Mennonite farmers) provide a wide range of food for the local community; vegetables such as brassicas, potatoes and other roots, legumes, and hearty greens are grown in local gardens. There is a long history of gardening on HG (Moyles, 2018).

Poverty and other systemic barriers to health were identified in interviews as general challenges that affect the communities on HG, and nutrition-related chronic illness was recognised to be a health issue amongst all age-groups (Hsu, 2017). A chronic medical condition was reported by 12 % of school students in 2018, although, 80% of school students reported their health to be ‘good’ or ‘excellent’ in the same survey (McCreary Centre Society, 2020a)

HG was the “pilot” community for the CIHR-funded, Local Healthy Foods to School initiative that began in 2016 and is evaluated in this study. A Learning Lab (later called Learning Circle) began in HG as part of the Nourishing School Communities (NSC) initiative 2013 - 2016 (funded by the Canadian Partnership Against Cancer (CPAC)) and under the CPAC funding, stakeholders came together for three LCs: May 2014, November 2014 and May 2015. The final NSC report was published in 2017 (Farm to Cafeteria Canada, 2017). As part of the CPAC funded initiative, the community had also participated in developing a [video](#) about local food. Following an expression of interest to evaluate scale-up of the LC:LHF2S project, representatives from four Indigenous communities and other interested partners met with the research team at the University of Waterloo in October 2014, supported by seed grant from the Waterloo Chronic Disease Prevention Initiative. Additional funding from the University of Waterloo, Propel Centre for Population Health Impact and Native Women’s Association of Canada-Partner in Engagement and Knowledge Exchange (NWAC-PEKE) (Canadian Institutes of Health Research, 2017) supported a gathering of community representatives and partners in HG, July 2015. As part of the formative work leading to the submission of the CIHR proposal, a Haida community member was hired in 2015, through the University of Waterloo, to conduct 6 interviews with community members relating to the existing LC. Haida community members

who were interviewed, noted that although they benefited in some ways they did not actively participate in the LC or its activities, and that the LC was not principally their initiative.

The LCs from 2014 - 2015 brought together schoolteachers, administrators and those involved in procuring, growing, processing and preparing foods. While there was some Haida involvement and the focus was on island schools which serve predominantly Haida students, the LC mainly brought together non-Haida members of the community. The goals of this initiative ranged from building capacity and ensuring the economic stability of the programme, to integrating wild harvested, foraged and locally preserved food into school menus, e.g., the donation of deer culled through the 'Restoring Balance' (*Llgaay gwii sdiihlda*) project to community food programmes (Parks Canada, 2020). A food-safe meat processing system was established to enable hunted meat to be donated to the project. A local food pantry was established in the north end of the island at the end of this initiative (2015), through funding from the Gwaii Trust, that aimed to increase year-round access to local foods by providing a 'local food hub' where food is purchased or otherwise received (i.e., donated), processed and stored for distribution to schools and other participating public organisations. Not only were foods stored at this pantry, but it became a community focal point for field trips and opportunities to learn about traditional, local foods. Further funding for a pantry in the south part of the island was received in early 2016.

3.5.3 Results

With approval from the community, the LC coordinator hired by the NSC initiative took on the role of LCEF for the CIHR-funded initiative, beginning in March 2016. This person was employed by Farm to Cafeteria Canada (F2CC) for the first few months of 2016 as part of their in-kind contribution to the project as a project partner. She was then hired by the University of

Waterloo until a partnership agreement with the Secretariat of the Haida Nation (SHN) in June 2017 transferred the administration of local project costs and staffing to SHN. There was a time of transition from the CPAC funded Nourishing School Communities to CIHR funded LCs, and in that time of transition, the LCEF continued to support local food related activities, such as the pantry, food procurement for the pantry and schools, and supporting local food in schools. A Learning Circle Advisory Group (LCAG) called the Haida Foods Committee was formed in November, 2016. It was comprised of Haida representatives and leaders known for their connection to local foods, including representation from the school board, and aimed to support greater involvement of the Haida in the LC initiative, and to ensure that appropriate Haida Protocols were adhered to when it came to food being gathered, prepped and served. The HFC also provided direction regarding programming and the evaluation process with respect to Haida laws and protocols.

Over the period of the CIHR funding one LC was held, in November 2017. Attendees of the LC included the LCEF, the community dietitian, the local food pantry coordinators (north and south), members of the HFC, schoolteachers, other school staff, famers and other growers, hunters, and Elders.

3.5.3.1 Case Sample and Source Documents

Between 2016 and 2018, 20 participants gave 24 interviews; of these participants three acted in a facilitatory role and one acted in an advisory role as related to the LC (Table 3.2); 16 were community members. One comprehensive LC report was written after the LC, 10 activity tracking reports were completed by the LCEF, and the minutes of 17 meetings were analysed. A school-based student survey, including 24HR diet recall, a food frequency questionnaire, and

questions specific to local food and food-related initiatives and planning, was completed in December 2019 – January 2020 by 93 participants. Food procurement tracking data were provided for local food pantries and four schools for the years 2016 - 2018; these data covered workshops, field trips and food served on school premises. Five articles about the initiative were published online, and in local newspapers between 2016 – 2018 (Appendix F) and 75 photographs are available for use.

Table 3.2: Source Documents

Source Category	Total number of sources/respondents
Interviewees/Informants	20
Interviews	24
Photographs	75
Activity tracking reports	10
LC reports	1
Food procurement tracking data	29
School survey	92
Articles	5
Meeting minutes	17

3.5.3.2 Goals and Funding

The aim of the LC for the new, CIHR phase of funding, was to align the programme direction with Haida values and current priorities of the LC group. The following goals were decided upon by the participants of the LC in HG, as a focus for the new phase of the project:

1. Support meal programmes in schools five days per week
2. Support sustainability of both a) HG food environments/sources and b) LC:LHF2S initiative.

3. Support access to Haida traditional and locally farmed foods through greater coordination, communication and culturally appropriate ways of growing, harvesting, preparing and trading among schools and beyond.
4. Promote youth engagement and leadership in LC:LF2S programming; bring youth and Elders together to support knowledge sharing around food and stories.
5. Support curriculum development about traditional and other local foods and food literacy through workshops and mentorship opportunities in schools and community.
6. Support collaboration among all island community organisations through public outreach, sharing resources and learning culturally appropriate food practices, and skills.

The CIHR Pathways funding was directed to programme evaluation and not programme implementation. Hence, funding was required to support food and other priorities of the LC. GTN Secondary School received approximately \$5,000 in 2017, and a further \$9200 in 2018, from Mazon Canada to help pay for school food. Three schools received salad bar funding from Farm to Cafeteria Canada: *Sk'aadgaa Naay* Elementary School (SNES), *Gid Galang Kuuyas Naay* Secondary School (GKNS), and *Gudangaay Tlaats'gaa Naay* Secondary School (GTN) in 2017. In addition, Farm to Cafeteria Canada's "Sustain Farm to School in BC and Ontario" provided \$30,000 as a part of a cluster grant to support and sustain Local Foods to School activities in all HG Schools for a two-year period (2016 – 2018). An extra \$5,000 was received from F2CC to continue the work into the 2018 - 2019 school year. \$3000 was secured from Whole Kids to develop garden beds at *Tahayghen* Elementary, and \$44,000 was received in 2017 from Gwaii Trust Society, a local grant organisation, to fund two part time Pantry Coordinator positions.

3.5.3.3 Activities

The work of the LC in HG focused on three main areas: the local food pantries, school food work, and hospital food. Within each of these areas a variety of activities took place, described below.

The Local Food Pantries

One of the outcomes of the NSC ‘Learning Lab’ in HG was the establishment of two local food (LF) pantries; one for the north end of the island and one for the south. The vision of the pantry was “To collectively shift culture on the islands back to a healthy life-centred on our connection to locally grown, seasonal food by growing, gathering, harvesting, preparing, preserving, eating and sharing” (Hammond, 2019), and thus, to increase year-round access to local foods by providing a point of focus where local food is purchased or donated, processed and stored for distribution to schools and other participating public organisations.

During the period of CIHR funding, the LF Pantries continued to support schools and community organisations to source local food, coordinate LF learning, make connections, create LF curriculum, and minimise food waste. The pantry implementation team included the community dietitian, the LCEF, and two local food pantry coordinators. The pantries were heavily involved in building capacity within the community by organising workshops, field trips, and garden activities in addition to preserving, storing and distributing seasonal purchased and donated food. The pantries also supported hands-on learning and accessing traditional and local foods in schools; they worked directly with school staff, including cooks, at the north and south end of the island to find out what they need to support the vision of including more local and traditional foods in their schools.

Pantry Activities

The following data are summarised from food procurement data sent to the research team by the LCEF in HG. Data were available for 2016, 2017, and January – July of 2018.

South end workshops focused on food skills (e.g., fruit and vegetable, and meat and/or fish processing) (Figure 3.1). The overall number of events (5 in 2016, 15 in 2017, 5 in 2018, Jan - Jul) and number of local partner organisations involved, for example, ALM school and local day care (3 in 2016, 6 in 2017, 5 in 2018) remained steady, and the attendance at workshops remained high (184 participants; 154 youth (2016) to 313 participants; 242 youth (2017)) increased across the years 2016 – 2018. North end workshops focused on food skills, gardening, family dinners and wild harvesting. These workshops maintained a high number of participants (204 participants; 69 youth (2016) to 196 participants; 113 youth (2018, Jan – Jul) and involvement of local partner organisations (12 in 2016, 13 in 2017 and 2018), for example, Wellness Warriors, a programme aiming to promote compassion among community members and remove the stigma of addiction, remained involved for all three years.

Field trips in the South end focused on farms and fishery visits. Field trips remained steady in terms of participants (51 participants; 37 youth (2016) to 40 participants; 27 youth (2018)) and number of events (3 field trips each year) from 2016 – 2018. The number of partner organisations involved went from 1, to 4 to 2 (2016 – 2018). North end field trips focused on harvesting traditional foods (e.g., digging razor clams) and some included outdoor cooking. The numbers of field trips increased from 3 – 7 events in 2018 and increased from 39 participants (31 youth) in 2016 to 110 participants (71 youth) in 2018. The number of partner organisations also

increased over the same times, from 2 – 5. The field trips in both North and South end were connected mostly with the local schools and day care centres.

South end garden activities remained steady over the three years with committed involvement from two elementary schools.

North end garden activity frequency was steady (10 – 12 events per year) with a large number of partner organisations (10) involved.



Figure 3.1: Images from field trips and food skills workshops in Haida Gwaii. Clockwise from top left: Children searching for shellfish on a beach; Canned salmon; Processing dried seaweed; A crab; Processing smoked salmon.

Local Pantry Food Purchases

Table 3.3 details the purchases made by the local food pantries between the years 2016 and 2018.

Table 3.3: Local Food Purchases, Pantries 2016 – 2018

Food item	2016	2017	2018
<i>South Island Local Food Pantry</i>			
Berries and Fruit	47 kg	77 kg	88 kg
Vegetables	76 kg	16 kg	9 kg
Meat	132 kg	97 kg (plus seafood)	54 kg
<i>North Island Local Food Pantry</i>			
Berries and Fruit	120 kg	109 kg	116 kg*
Vegetables	122 kg	318 kg	111 kg*
Meat		73 kg	151 kg*
Eggs		15 dozen	
Soup stocks	185 L	220 L	

*recorded from Jan – Jul 2018

Food Distributed by North End Pantry

Food distribution data was available for the North End pantry only.

The North End Local Food (NELF) Pantry either processes local food for future distribution or distributes it directly to the cooks in schools and other public food programmes. Many organisations already receive food donations; however, one of the roles of the NELF Pantry is to streamline donations, which minimises waste, maximises distribution and guarantees that Food Safety Plans are followed. They work with the following organisations: [Old Masset Village Council Culinary Association](#) (OMVC CA), the ‘Old Masset Adult Day Program’, Haida Gwaii Hospital and Health Centre, Haida Health Centre, Haida Gwaii Society for Community Peace,

Haida Gwaii Recreation, the Old Masset Youth Centre, ReDiscovery Camp, Mount Moresby Adventure (MMA) Camp, Sharing and Caring, and the Masset Soup Kitchen. The pantry also distributes donations from other organisations.

Some of the main highlights are listed below and in Table 3.4:

- Distributed over \$11,000 in fresh and processed local foods to OMVC CA, over \$2500 to schools and \$1255 to other organisations (2016 - 2018).
- Organised processing and distribution of 2 local cows (\$1117 worth of beef) from local herd for OMVC CA and GTN Secondary School (2018).
- Organised hunting, processing, and distribution of 10 deer to school food programmes through external funding (2017).
- Received, processed and distributed over 2300 pounds of seafood from Haida Fisheries, OMVC, Department of Fisheries and Oceans, and personal donors (2017).
- Through the development of a food-safe system for delivering deer meat to schools and public food programmes, over 700 lbs of introduced deer that was culled from several islands on HG to aid in the recovery of native flora and fauna was donated by Gwaii Haanas National Park Reserve and Haida Heritage site to the pantries for use in the community.
- When the Department of Fisheries and Oceans and local seafood processors have extra inventories, they direct it to public food programmes through the local food pantries.

Table 3.4: Value of Food Distributed by the North End Local Food Pantry 2017 – 2018*

Recipient Organisation	Value in \$
Schools (GTNS, TE, PCES, GTNS; GKNS)	1531.00
OMVC CA	2874.42
Haida Health Centre and ‘Adult Day Program’	582.00
Summer Camps (MMA, Rediscovery, Haida Gwaii Rec)	200.00
Northern Haida Gwaii Hospital and Health Centre	620.00

*not including fish and deer donations

Hospital Food

The Northern Haida Gwaii Hospital and Health Centre, operated by Northern Health, has four acute care beds, four long term care beds and an emergency department as well as hosting four assisted living units. The foodservice for patients and residents currently operates using a ‘re-therm menu’: individual meals are prepared elsewhere and reheated before service. Northern Health acknowledges that providing local food that is nutritious and culturally acceptable is essential for increasing patient satisfaction and improving patient health.

Since 2017, the community and hospital dietitians, and other stakeholders from the LC in HG have participated in the [Nourish Project](#). This project had three different approaches:

1. Change the re-therm hospital food back to ‘from scratch’ cooking and include local fish on the menu almost weekly. The past 3 years have been focused on one meal at the hospital per month with 80-100% local ingredients. The head chef at the OMVC’s culinary arts programme prepares these meals.
2. Allocate 1% of the budget of the south-end hospital to purchasing local food.

3. Participate in a meeting in Six Nations in October of 2018 to gather Indigenous voices from across Canada to gain a deeper understanding of why of traditional food is important in hospital settings. Three Elders and knowledge keepers travelled from HG for this event.

“When our Elders come to the hospital, they’re lonely, and to have something [to eat] you aren't accustomed to adds to the lonely feeling inside. When traditional foods are served, it's soul food. You go 'mmm' when you eat and it nourishes and feeds your spirit and makes you stronger.” (LC Participant)

Work in Schools

In schools, the work of the LC focused on lunchtime salad bar initiatives across a number of schools, and other, school-specific activities such as breakfast smoothie programmes, kitchen equipment purchases and gardening activities.

Salad Bars

Four schools (GTNS, SNES, GKNS and TE) ran a free lunchtime salad bar initiative for students, once a week for 10 weeks in the 2016 - 17 school year, and for 20 consecutive weeks in 2017 – 2018. Funding was received from F2CC for the initiative to continue into the 2018 – 2019 school year but the frequency of salad bars offered for this time period is unknown. These offered a choice of at least three fresh fruits or vegetables with a target of including at least 20% local ingredients. Offerings in salad bars included food grown and harvested on school grounds,

purchased carrots/turnips/green etc. from local farmers and school-made salad dressings, including the students in the preparation when possible. In addition to this, berries were purchased from traditional food harvesters through the LF pantries and incorporated into the salad bar as one self-serve option.

The following text box summarises tracking data sent by the LCEF to the University of Waterloo as part of the documentation of the HG local food activity.

Box 1: Summary of Salad Bar Activities from Haida Gwaii Schools, Spring 2017 – Autumn 2018.

Spring 2017

Sk'aadgaa Naay Elementary School

Weekly salad bars were provided for 120 students attending the school as a part of their lunch programme; the salad bars were provided nine times. As part of the meal, a hot lunch such as soup, bread, tacos; a vegetable dip and a mix of fruits and vegetables were available. Students helped chop veggies and fruit at recess each day.

From the perspective of the school principal, as told to the LCEF, this was a positive initiative. Students had access to a wider variety of foods and realised that they like them. There was an increased awareness of locally grown foods and discipline issues appeared to have reduced since the food programme was begun. Students were also active and enthusiastic participants in the associated gardening programme. However, there was not enough local salad bar food available year-round and it is difficult to justify the extra cost of buying local food. Volunteer help was inconsistent.

Gudangaay Tlaats'gaa Naay Secondary School

Salad bars were offered for eight weeks to approximately 90 students alongside a lunch programme that was usually hot food; a local protein (salmon/halibut/venison) was always

served. A large proportion of the seasonally appropriate vegetables were local. Many volunteers were involved with the preparation. Over 50% of plates had vegetables covering half of the plate, as observed by volunteers.

Winter 2017/2018

Gudangaay Tlaats'гаа Naay Secondary School

School lunches including salad bars were served weekly for 20 weeks to approximately 70 students each time. The menu is usually a hot meal (i.e., pizza, chilli, fish tacos or soup) and a salad bar. The majority of vegetables and fish (halibut and salmon) were local from HG, and wild cranberries were bought from the North End pantry. Homemade salad dressings were commonly served and popular with students. Home Economics students were frequently involved with preparation and a Christmas feast included Elders and other community members.

Donations of fish and venison were secured towards supporting free monthly whole school lunches at GKNS. Support came from the 'Haida Fisheries Program', Department of Fisheries and Oceans, Haida Wild, Band Councils and individual donations.

Quotes from GTNS students:

"I love the venison and the bread is so fresh" (School student)

"I love venison because it is from the land, who knows what would be in meat from the grocery store" (School student)

"At least we know where this meat came from" (School student)

Spring 2018

Sk'aadgaa Naay Elementary School

A weekly or twice weekly lunch was served during this school term; 26 lunches in total. The food served varied from a hot or substantial lunch (i.e., macaroni & cheese, soft tacos or shepherd's pie) plus salad, to soup plus salad. Salad options usually consisted of one prepared salad that included some protein (quinoa) or carbohydrate (millet) with optional toppings like

chopped vegetables or seeds. Local and donated items included greens, fresh and dried berries, quinoa, seeds, beef and bread doughs.

Autumn 2018

Gudangaay Tlaats'ga Naay Secondary School

Salad bars were offered ten times alongside the hot lunch programme serving up to 80 high school students each time. The range of food served included vegetables (local when possible plus some from the school garden); local proteins such as halibut, salmon and venison, some purchased, some donated; salads, and fry bread made by students. Teachers attended salad bar training and maintained the connection between school garden and kitchen.

Tahayghen Elementary School

A salad bar was served to up to 80 elementary students for 12 weeks in the Autumn term, 2018. A high proportion of the vegetables were locally sourced, with the non-local usually not normally grown in HG (e.g., peppers). Children participated in preparation.

100 lb salmon was donated in December from CHN and the grocery store donated a turkey to the Christmas meal. Potatoes for the Christmas meal came from the school garden and a fruit salad served in December included fruit picked by children earlier in the term.

Other School Activities

Port Clements Elementary School purchased equipment and hired a co-ordinator to offer healthy local breakfast smoothies made with local berries to students two mornings per week (2017). A number of schools put on family nights where families were invited to enjoy a meal of local food and participate in student-led activities. Other schools purchased equipment such as kitchen appliances, gardening equipment or went out on field trips, such as seaweed harvesting. Skills workshops were held in schools – for example, fish filleting or pickling (beets).

A teacher in the GTNS high school was an example of a local champion and kept records of the activities he took part in with his students. Between February and June 2018, he organised 49 garden activities (i.e., planting, composting, maintaining the gardens and hydroponic towers), 22 food preparation activities, and 9 community activities.

3.5.3.4 School Survey

The online survey was adapted from a similar survey used in MK by members of the HG community advisory committee and administered between June 2019 and January 2020. Ninety-two students from Masset Elementary (n=32), GTN High school (n=20), SNES elementary (n=13) and GKNS High School (n=27) had complete surveys. Age ranged from 11 – 17 years with a mean age of 13.6 years. 48% of the sample was female (Table 3.5).

Table 3.5: Sociodemographic Characteristics of the Sample (n=92)

Respondent Characteristics	
Age (y)	Mean 13.6, median 14 (range 9 – 17)
Sex M/F/Other (n)	48/44/0

School Programmes

A school-provided lunch was consumed by 55% of students more than twice per week. The school lunch was rated by 69% of students to be ‘good’ to ‘excellent’; 23% of students rated it ‘fair’, and 8% ‘poor’ (Figure 3.2).

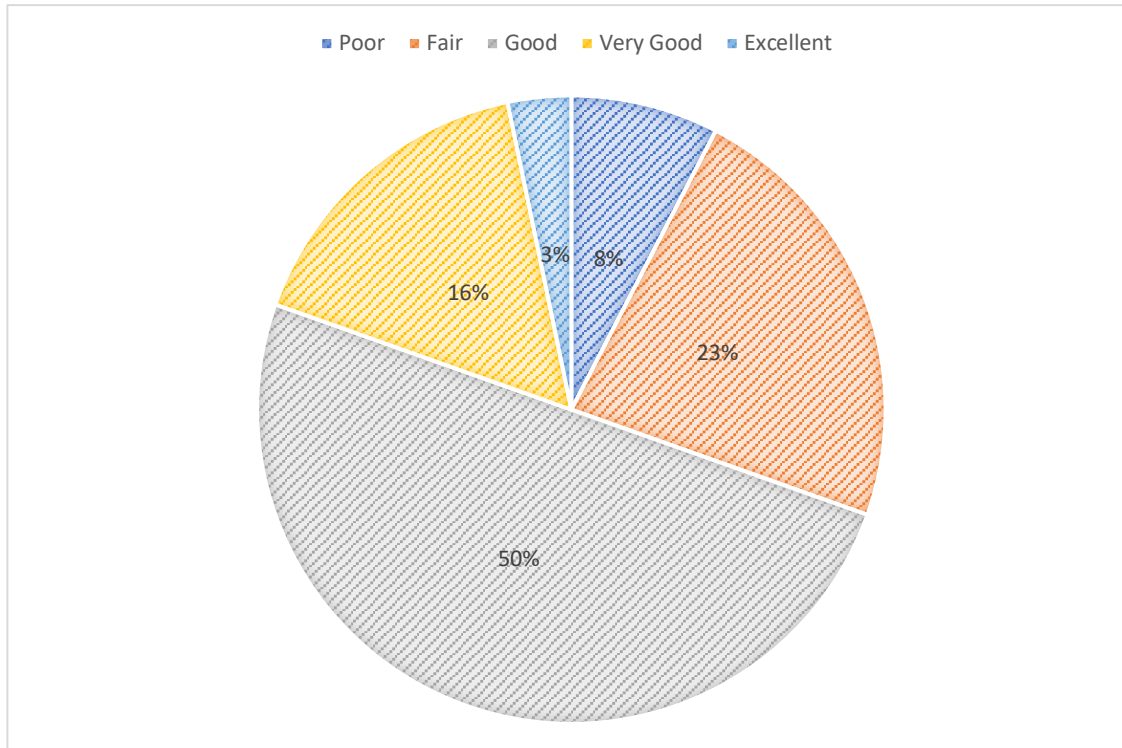


Figure 3.2: Students were asked “Overall, how would you rate the school lunch programme?” (n = 92).

The vast majority (91%) of students were aware that their school had a gardening project and 67% reported eating food from there (Table 3.6).

Table 3.6: Proportion of Students Participating in School Food Programmes (n=92)

Programme	Proportion
School Lunch Programme:	11% consume every day 44% consume >2 d/w
Recommend School Lunch Programme	74% (n = 92)
Gardening Project	91% were aware 30% had helped plant 25% had watered and weeded 43% had picked food grown there 67% had eaten food from there

When asked open-ended questions such as ‘what do you like about the lunch programme?’ ‘What would you change about the lunch programme?’ ‘Would you recommend the lunch programme/why?’ some students responded with answers that referred to ideas such as:

- Plenty of variety:

“They provide both plant-based (example soup) with the meat-based food”

“That they have choices so if you don’t like one thing you can have the other”

“I like that it has many options for students in case they don't like something. It's nutritional and it's also welcome for every student” (quotes from school students)

- Conversely, a lack of variety:

“It is good food, but we have the same thing every week and sometimes it tastes bland. It isn't really that amazing.”

“The school lunch is great and helps a lot of people, but it can sometimes be a little plain and bland sometimes can also be repetitive every week being the same thing.” (quotes from school students)

- The good quality and healthy nature of the food provided:

“I like that they are able to provide food for us.”

“Because it is good and healthier for you”

“The food that is made at school is healthy and is overall good food.”

“It usually looks and smells good” (quotes from school students)

- The need that the free school food addresses:

“Because what if he/she [is] hungry”

“Because they might be hungry or not eat breakfast at home”

“It's useful to know that food will be provided for you if you need it, even if it's just toast and fruit.”

“If you didn't eat then it's a nice thing to have instead of learning on an empty stomach.”

(quotes from school students)

- How much they enjoy the food:

“Because it is free and nutritious”

“When it does finally happen the food is priced fairly, also ingredients are usually local”

(quotes from school students)

- How well organised the programme is:

“A lovely planned schedule; because it's a good programme and I think that most students could benefit from it.” (quote from school student)

- A number of students appreciate the fact that the food is made and served by students:

“It is freshly prepared by students every day”

“I like the idea that we also get to learn how to cook and provide free food to everyone at the same time”

“I like that it is prepared by students and that it is free for the students.” (quotes from school students)

3.5.3.5 Themes

“Good things happen when you start something” (LC Participant)

Four main themes relating to the story of the local foods emerged from the data in HG. See Table 3.7; sub-themes will be explained in detail in the text. Supplementary quotes are provided in Appendix G.

Table 3.7: Themes Arising from the Case Study Documentation

Theme	Subtheme
Increasing access to healthy, local and traditional foods	Traditional foods were emphasised more than local foods
	Description of the rich food culture in HG
	Increasing access to local, healthy and traditional foods
	Funding and donations have been essential to the local food work
	LC participants play an essential, active role
	Behaviour change noticed among school children
	Economic impact of the programme seen within the community
	Price of local vs non-local food
	Food safety regulations
	Logistics that are necessary for the programmes to run (i.e., volunteers, suitable transport)
Sustainability of the initiative	
Building knowledge and skills	Workshops and skills classes – a focus on practical learning
	Learning from Elders' knowledge
	Making use of existing community skills
	Importance of protocol
	A reliance on volunteer time
	Engaging leadership and empowerment/ownership
Transitioning to Haida leadership	Memorandum of understanding between the University of Waterloo and SHN
	Food sovereignty
	Use of appropriate language/protocol
Fostering relationships	Food as a 'point of connection'
	Connectedness within community members
	Concerns with evaluation methodology
	Role of the local champion

Increasing Access to Local and Traditional Foods

Despite the fact that ‘local’ food was considered an inherent part of the initiative from the beginning, with the term being built into the project name, ‘traditional’ food was discussed more frequently as time passed. The connection and direction of the project towards Haida values and leadership was acknowledged in this way.

“The hospital is starting to serve traditional foods. Before they were serving foods that came all the way from Toronto in packages. We didn’t like it when food was coming all the way from Toronto. Traditional foods are healing for our people.” (Community Elder 2018)

Local Indigenous culture and traditions featured highly in these interviews and emerged as a theme. The importance of traditional knowledge and its transmission from one generation to another was discussed by many interviewees.

‘Traditional foods are our identity’ (LC Participant 2017)

“[I am] proud of the work we are doing at the school, making healthy food ‘cool’ working for pride in the culture” (LC Participant)

The richness and variety of the food supply in HG was acknowledged and described by many interviewees and in sources. The privilege of living in such an environment, plus the opportunity it presented, was discussed, for example, the bounty from the sea and the large number of community members of all types having some connection to food.

“When the tide is low the table is set” (Late Dempsey Collinson, Chief Skidegate)
(Council of the Haida Nation, 2008)

The rich cultural traditions of the Haida people were seen as being priceless and thought to enhance health within the community.

“Our food is our medicine” (Community Elder)

“Take only what you need” (Haida Law)

A large proportion of the activities of the LC in HG revolved around providing more local and traditional foods to children in schools, to hospital patients, and to community members. More local and traditional food was incorporated into school menus, i.e., the high school students had a wider variety of locally sourced proteins served such as venison and halibut, not just salmon. There is a ‘grab and go’ snack option for the high school students also, which is easy to make and access. The ability of the community in HG to apply for and receive funding was critical to these programmes going ahead, as was the receipt of donated food from local Indigenous hunters and farmers. LC participants took an active role in getting food into schools, whether this meant chopping vegetables for school meals, donating food or helping with the garden.

“One of our goals for today is to review past goals and visions – are they still relevant? Are local foods cost efficient, enjoyed, and easy to use...Do they strengthen traditions and connection to land/sea, and can we figure out ways to incorporate them into curriculum?” (LC Participant - as part of an introduction to the 2017 LC)

Despite the remote location of HG, local grocery stores were considered to be well stocked and easily accessible, and there were a number of farmers' markets. The impact of the seasons could be clearly seen as the activity shifts in the summertime, when the majority of time is spent gathering and processing food. Outcomes of this included indications of behaviour change with teachers perceiving healthier food choice habits and the apparent link of consumption of healthier food with improved behaviour in class.

“So, I think the kids are eating more healthier, now, with all this good food that is presented to the school from this farm to school programme.” (Community Elder 2018)

An economic impact on the community as a result of investment in local foods has also been noted.

‘As idyllic as we make Haida Gwaii seem, there is also poverty here and health problems. So, giving back means that you fund the positions that support harvesting from the land, and you bring meaningful work to the community. Poverty and unemployment is less of an issue when you have a robust local food system. The local hunters, farmers and gatherers benefit from this because their time working is valued by our purchasing. These are the ripple effects: local people gathering foods, processing the foods, distributing it on the island, cooking the food. This all weaves together into what is healthy for us and the community.’ (LC Participant)

In spite of the perceived benefits of local and traditional food, some concerns were raised. The price of local food versus non-local market food was noted as a challenge – local food tends to be much more expensive and, with a concern about food insecurity and poverty among some

members of the community, a steady supply of healthy food for school children was seen as a priority over supporting local producers.

“But the cost for the produce from a farmer opposed to the Coop is a huge difference. And when I buy a \$20 bag of carrots, I can get, you know, five bags of carrots, you know what I mean.” (LC Participant)

Infrastructure for cooking and for feeding children, and greenhouse and garden maintenance over the summer were issues that were raised as being difficult to manage. In addition, safety and legislative issues relating to food programmes in schools (e.g., serving wild meats) were at times a challenge, although a number of these issues became resolved as a result of the HG safe abattoir policies. The sustainability of the LC initiative, for example, ongoing funding for school food and the LCEF positions, remains a challenge.

Building Knowledge and Skills

A large focus of the LC in HG was the sustainability of the initiative (this was ‘Goal 2’) and developing food skills and building knowledge was seen as a way to accomplish this.

“I am impressed with what is being done already-educating kids about growing, gathering, and preserving wild and locally grown foods”. (LC Participant)

Skills classes were built into the school curriculum, for example, the development of a calendar in conjunction with local Elders, with names of Haida foods, and what and where to gather each month. Workshops were run by the local food pantries, and, as a result, the LC has led to the

development of new skills within the community with a focus on practical learning and traditional food, knowledge and practices.

“I’m also lucky to have our First Nations Resource Worker, and she’s been very active with coordinating... going berry picking with kids; or we had another Haida role model come and teach our kids how to butcher and deal with some beef – some local had donated a cow - and canning salmon, and just some of those skills that some of our kids have active parents and family members that help teach them, but not all of them.” (LC Participant)

Existing community knowledge and skills, particularly that of the Haida Elders in the community, was seen as being there to be learned and was incorporated into the many workshops and skills-classes that were run over the funding period.

“We are all there for the kids – [we] all live on Haida Gwaii and harvest traditional foods, all looking to gather and share knowledge” (LC Participant)

Following local protocol has been emphasised and Elders were consulted as to where to go and how to harvest respectfully. When dealing with traditional foods, protocol is important, as is the incorporation of the Haida language and making sure workshops are done in a culturally appropriate way. Giving thanks to the food item in gratitude for giving and providing life is an important Haida principle.

“Then I give thanks to salmon - thanks and ask that it be sustained in the future - sometimes the future for the oceans looks bleak - prayers are powerful - go to the ocean with a prayer - we can all do this over and over to protect it” (LC Participant)

Logistics relating to field trips and workshops in schools, for example, the reliance on volunteer time and transport for workshops and school field trips, were a challenge over the period of time.

“Then there’s logistics within the programme, okay do we have enough shovels; do we have enough activities; do I have enough knowledge to be able to provide programming for a year, a full year? What do you do in November, December, January, February, March? So that’s, barriers that you know, some semesters are better overcome than others.” (LC Participant)

Funding was required for field trips (for example, seaweed harvesting) to take place and this was a challenge due to lack of resources. LC participants also felt that they needed more support in learning about traditional protocols.

In addition, research capacity was built, for example, a research assistant was trained and hired to conduct community interviews, and the LCEF and one community member attended and presented at each of four ‘annual’ gatherings. The HG community hosted the first annual gathering in 2015.

Transitioning to Haida Leadership

HG had established local and traditional food work connected with the Learning Lab/Circle before the 2016 CIHR funding, but engagement of the Haida community and leadership became a large focus of the work between 2016 – 2018.

“Nothing happens in a void – the fight for lands has been important and is ongoing; title case, land stewardship, Haida language – it all contributes to taking ownership of our own health.” (LCEF)

The LC work had begun in 2013 with general support from Haida community members, but Indigenous direction and getting visionary and practical support from the Council of the Haida Nation was seen as a priority as the work continued under the CIHR funding period. Haida leadership was seen as critical to the success of the work and its longevity. As a result, no LCs were held until the community was further along the path of transitioning to Haida leadership.

The CIHR grant was housed at University of Waterloo but an agreement with the SHN in 2016 transferred funding to SHN to manage the HG budget and provide administrative support. The Haida Foods Committee was established in 2016 and a memorandum of understanding called the “Spirit of Collaboration” (*Isda ad dii gii isda (S)- Isdaa 'sgyaan diiga isdii (M)*) was co-developed and signed between the HFC and the University of Waterloo in 2017 to guide evaluation. As a result of this work, there has been a shift towards increased Indigenous representation at the LC over time.

‘Food is medicine’ in Indigenous culture and this principle served as a focus for connection.

“It’s been wonderful to see people who don’t normally connect with each other, like farmers and Elders and teachers and administrators and cooks, all in one room, and

they're able to see each other's perspectives much more clearly, not through policy... but just around food and kids.” (LCEF)

The incorporation of appropriate and local language into LC events and a focus on empowerment and ownership of the project by the Haida community aligns around food sovereignty which is a Haida priority.

“I think it's really important how you package it. We could package it in a way where we create champions and foodies in the communities, whether it's externally or internally, with the Indigenous people, or we can really focus it and sell it in a way where the community becomes more sovereign in their thought process and their actions, and they actually own this, and this is for them, by them, with them, and really taking control of their health, their lives, their quality of life. It was something that was done generations ago. Our ancestors did it all along.” (LC Partner 2018)

Fostering Relationships

Despite the fact that the LC work had been ongoing for a number of years in HG, developing confident partnerships between the variety of stakeholders (Indigenous community members, non-Indigenous community members and researchers) continues. The concept that connections were made 'because of food' came out in the community and facilitator interviews.

“We all have an interest in local and traditional food...We all like to laugh, we all love cooking, eating and sharing”. (LC Participant)

“When you add dried berries to something-they add sweetness-it represents laughter-laughter got us through hard times-like to place it on last-then put on a fire and say thanks”. (LC Participant)

An improvement in community connectedness as a result of the work in HG during 2016 – 2018 was discussed as a distinct and positive outcome by a number of sources.

“I like the way it connects our kids to the greater community. So often the younger classes will go over to the greenhouse a couple times a year and help and learn from the older kids in there; and help pick some food and talk about it. And they just love it, they just look up to those kids and it’s a nice kind of leadership opportunity for the older students.” (LC Participant)

Connections were built within community as a result of LC work. Partnerships were built, and the trust for teachers improved; the commitment to follow Haida protocol was an important factor in this regard.

HG had concerns about evaluation from early on in the project regarding data sharing, types of evaluation, measurement indices, etc. In general, concerns with research and collaboration with universities were raised more frequently by those from HG, compared to other communities. Over time, trust has been developed through open communication, signed agreements, and, in part, discussion at the annual gatherings.

The role of the local champion was critical to the building of relationships within the community, and between HG and other communities. Selecting an established school food champion as LCEF facilitated the activities of the LC and relationships to support the initiative. In addition,

passionate local food champions were critical, for example the role of the community dietitian and the relationship with programmes like ‘Wellness Warriors’.

“I would say a major theme is like looking at where there’s excitement. Like there’s just it seems like there’s always a keen parent, a keen teacher, a keen somebody in the community that’s like just riled up about health and if you can kind of harvest their energy, I feel like that’s where we can go with the momentum. ... Like there’s some key people here and there but really I feel like what we’ve built this on are a whole bunch of champions, right?” (LC Participant)

These people work to promote a local food culture, and work with the administration to promote obtaining funds for local food. This ensures that local food becomes part of the structure and food system, and as people are using local food, they are looking for new ways to obtain it, thus promoting a local food culture. However, champions can become overworked and burnt out, and consideration needs to be given to encouraging and enabling new champions to come forward.

In addition to the development of connections within HG, connections between HG and the LC in HZ were developed, with a visit to HG by some of the students from HZ, and visits to HZ by HG food champions. A school principal from HG attended the second LC at HZ and shared her insights and experience with starting a local food to school programme and building gardens and a longhouse greenhouse.

In HG, LC:LHF2S was scaled up vertically. Many of the activities that had begun prior to the CIHR evaluation continued to flourish. In some ways, it seemed like the work of the former LCs had become a co-operative enterprise with aspects, like the pantries, expanding. Other aspects, like the transition to more Haida Leadership, were more specific to the 2016-9 project and the

associated LC. HG continues to have a vibrant local and traditional food culture and places importance on traditional foods.

3.6 Implementation of the Learning Circle: Local Healthy Food to School Initiative in the Northerly Community of Hazelton/Upper Skeena, British Columbia - A Descriptive Case Study.

3.6.1 Objectives and Research Question

This case study aims to describe the food, nutrition and health related transitions (activities, influences, outcomes) of the LC:LHF2S initiative in Hazelton/Upper Skeena, B.C. (HZ) from January 2016 – December 2018.

Objective 1: Describe the context and process of the establishment and growth of the LC in HZ.

Objective 2: For HZ, explore the story of change in the school food communities over the period of the LC:LHF2S initiative as described by community members and other partners, augmented by quantitative data, including those on the availability, acceptability and consumption of local, healthy and traditional foods.

Objective 3: For HZ, explore the perceived effects of the LC as described by community members and other partners.

3.6.2 Context

Hazelton/Upper Skeena (HZ) is located in the upper Skeena River region in Northwest British Columbia, approximately 300 kilometres inland from Prince Rupert. The region is located on the traditional territories of the Gitksan First Nation¹ and encompasses 14 distinct communities (Gitksan Government Commission, 2011). About 5,000 people live in two municipalities:

¹ Alternative spelling: Gitksan First Nation

Hazelton, and New Hazelton; seven reserves; two nonincorporated settlements, and three valleys. The Gitksan First Nation makes up almost 80% of the population with most of the remainder being of Western European descent; there is some representation also from the Wet'suwet'en Nation in the region (Gitksan Government Commission, 2011). The land is mountainous, covered with spruce, subalpine fir, hemlock, cedar and pine forests, and fed by the salmon-rich Skeena river. Foods traditionally eaten in this region include salmon, oolichan, wild meats (such as moose), berries, vegetables such as root vegetables, and traditional medicinal plants. Greens such as spinach and salad leaves are not traditionally eaten in the community.

The LC in this community received administrative support from Storytellers' Foundation, a non-governmental organisation based in the community since 1994, and visionary direction and advisory support from the [Gitksan Government Commission](#) (GGC) – a form of tribal council to support four of the six Gitksan Band Councils in Upper Skeena.

A number of food-related initiatives (i.e., school-based food programmes, food security work and youth-based land programming) had been taking place in the region prior to the beginning of the LC Initiative in 2016. A Wellbeing Model had been developed by the GGC that aimed to depict the balance between personal, political, social and spiritual aspects of life links healthy people, healthy communities, and healthy lands (Gitksan Government Commission, 2015). This model includes a photovoice mural project and aims to provide a way for community members to engage with Gitksan culture. Chronic illness and health, along with food security, had been identified by the community as key issues that need to be addressed in a Community Planning process prior to 2016.

Poverty and other systemic barriers to health were identified in interviews as general challenges that affect the communities in this region. In a survey conducted among students in the school

district (SD #82) in 2018, 21% of students ($n = >500$, age 12 to 18 years) reported never eating breakfast on school days with 6% never eating lunch; 35% reported sometimes eating breakfast, 35% sometimes eating lunch and 11% sometimes eating dinner; and 10% reported sometimes/often/always going to bed hungry due to insufficient money for food at home (McCreary Centre Society, 2020b). The same survey asked students which of the following foods they had eaten on the previous day. Foods reported as eaten ‘once or twice’ were: fruit (59%); vegetables or salad (62%); traditional foods (19%); food grown/caught by the student or their family (18%); sweets (60%) and fast food (43%) (McCreary Centre Society, 2020).

The Upper Skeena River region is part of the B.C. School District #82 and has eight schools: one secondary school and seven elementary schools. Four of the elementary schools are located on-reserve (Table 3.8) and are independent schools, administered by the separate Bands. Of these schools, three (HSS, MGS, NHES) became involved in the LC initiative.

Table 3.8: Hazelton/Upper Skeena (SD #82) Schools

School Name	Grades	Community
Off Reserve		
Hazelton Secondary School (HSS)	8 – 12	Gitanmaax/Old Hazelton
Majagaleehl Gali Aks (MGA)	K – 7	Gitanmaax/Old Hazelton
New Hazelton Elementary (NHES)	K – 7	New Hazelton
Kitwanga Elementary (KE)	K – 7	Kitwanga
On Reserve		
Kispiox Community School	K – 7	Kispiox
Gitsegukla Elementary School	K – 7	Gitsegukla
Gitwangak School Elementary	K – 7	Gitwangak
Gitanyow Independent School	K – 7	Gitanyow

The LC in this community received administrative and advisory support from the Storytellers' Foundation; the organisation was responsible for advertising for and hiring the LCEF. A service agreement in 2016 with Storytellers' enabled the University of Waterloo to send funds directly to the community for certain project related costs including the salary of the LCEF and honoraria, e.g., for Elders.

3.6.3 Results

The LCEF position in HZ was advertised in the community and appointed by Storytellers' Foundation with input from representatives from the GGC and began work in the Fall of 2016. This LCEF went on leave in 2017 and was replaced by another for the duration of the project funding. Five LCs were held in HZ between Feb 2017 and Nov 2018.

The consistent attendees of the LC in HZ included representatives of local Indigenous governance (GGC, Band Council), staff members from four local schools (one nursery school: Gitanmaax Nursery School; two elementary: MGA and New HZ Elementary; one high school: Hazelton Secondary School); locally-based NGOs (Storytellers' Foundation (Storytellers'; Skeena Watershed Conservation Coalition (SWCC); Senden Sustainable Agricultural Resource Centre (Senden); North West Food Action Network (NWFAN)) and local farms (Wood Grain Farm; Dancing Bee Farm).

The second Annual Gathering of the full LC:LHF2S initiative was held in HZ, close to the community of Smithers. A visit to the various communities was arranged and some cultural activities for the group to experience were facilitated, such as local singing and drumming, and a tour of Senden and market gardens.

3.6.3.1 Case Sample and Source Documents

Between 2016 and 2018, 12 informants gave 18 interviews; of the 12 participants, two acted in a facilitatory role and two acted in advisory role as related to the LC. Eight were community members. A LC report was written after each LC leading to 5 in total, 13 activity tracking reports were submitted by the LCEF, and the minutes of 15 meetings between the LCEF and the University of Waterloo research team were analysed. A photovoice project was conducted among some of the youth in 2017 with 15 entries submitted, and 9 photographs are available for use (Table 3.9).

Table 3.9: Source Documents

Source Category	Total number of sources/respondents
Interviewees/Informants	12
Interviews	18
Photographs	9
Photovoice documents	15
Activity tracking reports	13
LC reports	5
Meeting minutes	15

3.6.3.2 Goals and Funding

The LC in HZ decided upon five main areas of focus for the first 3 years:

1. Seek funding
2. Value local food (and work to increase its value among community members)
3. Purchase more local food and provide growers, harvesters and school staff with the tools to make healthy food options viable

4. Every school has a garden and a greenhouse to get kids outside on curriculum-based projects that broaden students' knowledge, experience and skill with local food.
5. Connect kids with a healthy food culture on the territories.

Activities of the LC in HZ are listed in Table 3.10.

At each LC these goals were revisited and progress towards them assessed. By the end of the funding period, 5 grants (F2CC x 2, Northern Health, Mazon Canada, Whole Kids Foundation), were applied for by three schools and 4 received. These grants were used for building and expanding gardens and greenhouses, purchasing tower gardens and a vermicomposter for use in school, and local food procurement for school food programmes. A further \$6,000 was raised at a community-based Mid-winter gala in 2018, with the funds allocated for schools to bring students out onto territories for food-related activities adhering to traditional protocol.

Three of the eight schools in the area had their own gardens/greenhouse by 2018.

3.6.3.3 Activities

The Gitksan Wellbeing model provided a baseline focus for the LC meetings. Activities of the LC focused on partnership building; gardening, developing food skills, and connecting youth to traditional food activities and the land. The LC was also used to showcase local products and foods (Table 3.10).

Table 3.10: Activities of the LC and partners in Hazelton/Upper Skeena

Organisation	Work	Activities
Gitksan Government Commission	Focused on increasing awareness of local, traditional food in the community and its link to wellness via: <ul style="list-style-type: none"> - Youth - Food security - Partnership development 	<ul style="list-style-type: none"> - Connecting youth: ‘Brighter Futures’ programme that organised youth trips onto the land for berry and medicine picking. - Food security: organised Community Christmas Hampers filled with produce from community gardens. - Partnership development: Provided support to all (Indigenous) communities to enable them to have greenhouses, gardens and smokehouses; organised ‘Wellness Food Festival’ in Winter 2017/8.
Skeena Watershed Conservation Coalition	Food work focusing on: <ul style="list-style-type: none"> - Food security - Youth - Developing skills - Gardens 	<ul style="list-style-type: none"> - Food security work with communities of Gitanyow and Gitwangak: development of the Gitwangak Food Security Partnership where \$8,000 of organic produce was delivered to the community of Gitwangak. - Skills and connecting youth through the ‘Youth on Water’ (YOW) river rafting programme: teaching skills and connecting youth to river and culture. - Gardens: development of community gardens in Sik-e-dakh and Gitwanyow communities.
Storyteller’s Foundation	A variety of food activities focusing on: <ul style="list-style-type: none"> - Gardens - Food security - Youth - Supporting local partner organisations 	<ul style="list-style-type: none"> - Gardens: focus on community and school gardens. - Food security: Kids Get Food programme. - Support for Senden, and MGA and HSS school gardens. - Connecting youth: Facilitating the inclusion of local food into the YOW river rafting programme (SWCC); also running Youth Works Social Programme, a supported youth employment programme that offers catering in the local community

Organisation	Work	Activities
Hazelton Secondary School	A variety of food activities focusing on: <ul style="list-style-type: none"> - Gardens - Developing skills - Partnership development - Traditional events 	<ul style="list-style-type: none"> - Gardens: Tower gardens (used to grow traditional foods), school gardens; building of a root cellar; smokehouse; vermicomposter; planting of a heart garden to assist with grief - Skills development through the ‘Back to the Land’ programme. Foods classes go to Senden Agricultural Resource Centre once a week and workshops with local Elders were held to learn about traditional foods. Filleting/butchering lessons with local fish and moose took place. - Partnership development: Senden, MGA Elementary School; Visit to Haida Gwaii - Indigenous People’s Celebration Day - Tower gardens and vermicomposter purchased with a Farm to School BC grant
Majagalehl Gali Aks School (MGA)	A variety of food activities focusing on: <ul style="list-style-type: none"> - Gardens - Developing skills - Food security - Partnership development 	<ul style="list-style-type: none"> - Gardens: building of garden boxes and greenhouse - Skills: Gardening skills developed in school gardens plus community gardens (‘Tomato challenge etc.). Berry picking and food preservation/ dehydration workshops - Food security: school food programmes such as the salad bar - Partnership development: Senden Agricultural Resource Centre, Hazelton Secondary School, Wood Grain Farm; Esther’s Chickens - Curriculum activities: Art projects with food - Grants: Farm to Cafeteria Canada for salad bars and school gardens; Mazon Canada for local food procurement
Wood Grain Farm	Agriculture	<ul style="list-style-type: none"> - Providing local food via the Farmer’s Market; Milling grain; saving seeds

Organisation	Work	Activities
New Hazelton Elementary School	A variety of food activities focusing on: <ul style="list-style-type: none"> - Gardens - Developing skills - Partnership development 	<ul style="list-style-type: none"> - Gardens: Garden beds - Skills: Seed planting workshop and field trips to farm and greenhouse (harvesting and seed saving skills); soup-making classes. Chicks were purchased, incubated and hatched. - Partnership development: Storytellers’ Foundation; Wood Grain Farm; Sky High Green House; Senden Agricultural Resource Centre - Grants: Whole Kids Foundation grant for garden expansion project; Received funds from Mid-Winter Gala for cultural visit to Senden Agricultural Resource Centre
Gitanmaax Nursery School	Incorporated local and traditional foods into their curriculum	<ul style="list-style-type: none"> - Gardens: Flower and vegetable gardens and involvement in the community garden. - Incorporating local and wild foods in children’s snacks
Senden Sustainable Agricultural Resource Centre	Agricultural activities focusing on: <ul style="list-style-type: none"> - Gardens - Youth - Developing skills - Partnership development 	<ul style="list-style-type: none"> - Gardens: Community-Supported Agriculture box programme - Connecting youth: land-based education for youth. Gitksan language incorporated into programme - Skills: beekeeping; traditional food processing workshops (fish smoking and canning); medicine workshop with Elders - Partnership development: Hazelton Secondary School; MGA bought greens for salad bar programme
Northwest Food Action Network	Developing skills	<ul style="list-style-type: none"> - Skills: ‘Better Together’ conference (2018)
Dancing Bee Farm	Agriculture	<ul style="list-style-type: none"> - Providing local food via the Farmer’s Market

Partnership Development

Partnership development as a function of the LC was focused on particularly at the beginning but continued throughout. Connections were made between the LCEF and various community stakeholders such as Gitksan Health, First Nations Health Authority (FNHA), Northern Health, SWCC, schools, and Senden. Relationships were developed with farmers in order to procure local foods for school food programmes and community events.

These connections were used to put on a number of community-wide events, such as the Wellness Food Festival (partnership between Storytellers' and GGC) in the winter of 2017/2018. A community-based Mid-Winter Gala was held in January of 2018 and featured local foods donated by farmers and prepared by local chefs, students as food service staff and vendors of their artwork; this gala raised over \$6,000 and was instrumental in increasing the visibility of the work of the LC. A weekly 'Intergenerational Community Kitchen' programme that aimed to build food skills and literacy between Elders and youth was begun in the Autumn of 2018, as well as a 6-week 'Kids Get Food' course that took place at Storytellers' Foundation.

Partnerships between schools and Senden resulted in visits from staff and students to Senden for community days and skill-development (Table 3.10). A mentorship programme was set up between HSS and MGA school, with elementary students visiting the HSS garden and root cellar.

Connections were also built with other communities involved in the project, particularly the LC in HG. Students from HSS visited HG in the Spring of 2018 to exchange knowledge, food, and medicines.

Gardens

Two elementary schools developed gardening programmes for their students. Children attending the Gitanmaax Nursery School became involved in the local community garden in Gitanmaax, learning to tend the flower and vegetable portions of the garden. At MGA, garden boxes were built, and funding obtained for a greenhouse. Garden beds were built at NHES. Funding was obtained by HSS to purchase tower gardens, which were used to grow traditional foods, and a vermicomposter was purchased (Figure 3.3). Work continued at a root cellar and a smokehouse that had been built at HSS prior to the LC funding.

The school gardens were used as a mental health support for some students - a place to go to calm themselves or work out problems - and a memory garden was planned for HSS and MGA to assist with grief and be used as a place where students could go to be quiet in remembrance of family members that have passed away.

SWCC was involved in the continuance of community gardens in Sik-e-dakh and Gitanyow communities, and a focus of activity at HSS was the 'Back to the Land' programme for youth, in which they learned to grow vegetables for a CSA box programme. Storytellers' organised a Back-Yard Gardening programme that met once a week and focused on assisting with community and school gardens in the region.



Figure 3.3: Images from Hazelton/Upper Skeena. Clockwise from top left: MGA school garden; Senden Farm; Sign outside HSS smokehouse; Developing goals during a LC in 2017.

Building Knowledge and Skills

A number of programmes focusing on skills development were built up on or developed during the course of the LC initiative. At HSS, the ‘Back to the Land’ cultural programme focused on developing traditional knowledge and skills through experiential learning, for example hunting, gardening, maintaining the root cellar and smokehouse. Students involved in this programme visited HG in the Spring of 2018 for knowledge exchange. Foods classes went to Senden once a week, and workshops were organised with local Elders to learn about traditional foods. Students could participate in filleting/butchering lessons for fish and moose. Seed planting workshops and field trips to local farms and greenhouses were organised by NHES, and chicks were

incubated and hatched in the school in 2017. MGA initiated food skills classes (for example soup-making, dehydration and food preservation) and developed the gardening skills of their students in the school and community gardens.

At Senden, youth attending the programme participated in traditional food processing workshops, for example fish smoking and canning, as well as medicine workshops with the Elders. Beehives at Senden allowed youth to develop bee-keeping skills. SWCC ran skills courses that aimed to connect youth to the Skeena river and to their culture, and the NWFAN ran a skills-based conference called ‘Better Together’ in 2018.

A weekly Intergenerational Community Kitchen programme that built food skills and literacy in Elders, youth, adult, and families had begun prior to the LC project, and work continued from 2016 – 2019.

In addition, research capacity was enhanced, for example, a community advisor attended CIHR’s annual gathering of all Pathways-supported projects; a research assistant trained and hired to conduct community interviews, and the LCEF and one community member attended and presented at each of four ‘annual’ gatherings. The HZ community hosted the annual gathering of 2016.

Connecting Youth to the Land and to Traditional Food Activities

The GGC ‘Brighter Futures’ programme organised trips for youth onto territorial land for berry and medicine picking. The ‘Youth on Water’ river rafting programme run by SWCC focused on connecting youth to their culture, and local food was included into this programme, facilitated by Storytellers’. The land-based education for youth at Senden focused on culture and traditional

ways and as part of this the Gitksan language was incorporated into all aspects of the programme.

At HSS the 'Back to the Land' cultural trips aimed to connect youth to the land and traditional activities, and the school instituted an 'Indigenous People's Celebration Day' in 2018. Each school was encouraged to invite Elders and traditional knowledge holders into the classrooms and teach children the Gitksan words for food and plants in the garden.

Programmes in HZ were developed with the thought of encouraging youth to connect with the community. Students became involved in picking extra apples from the community trees and made apple sauce which was brought as gifts to Elders. Students were brought to community events celebrating local or traditional foods, for example the Kispiox Salmon Bake, Senden Community Days, and All Clans Feasts.

Food Security

Several organisations had been involved in strengthening food security in the community prior to the LC initiative beginning; the LC initiative strengthened by building connections between these organisations and providing time to build a coordinated approach. Food security was a focus for the SWCC who worked with the communities of Gitanyow and Gitwangak. The Gitwangak Food Security Partnership was formed, where \$8,000 of organic produce was delivered to the community of Gitwangak. The GGC organised Community Christmas Hampers filled with produce from community gardens, and Storytellers' ran a 'Kids Get Food' programme that taught school children nutrition and food skills. Provision of school food programmes (e.g., the salad bar) at MGA aimed to help address food security challenges among students attending the school.

3.6.3.4 Themes

Four main themes relating to the story of the local foods emerged from the data in HZ (Table 3.11). Supplementary quotes are provided in Appendix H.

Table 3.11: Themes Arising from the Case Study Documentation

Theme	Subthemes
Traditional food, knowledge and practice; local food	Using existing community knowledge keepers to develop skills Integration of traditional foods into the initiative Protocol and inclusion of local language Changing the food environment in HZ Impact of residential schools and the history of agriculture in this region Sustainability of the initiative
Building relationships; from the school to the community	Connecting because of food Developing trust between community members Relationships with other communities Developing a collective community vision Procurement of local and healthy foods
Focus on youth: importance of healthy food for young people	Learning traditional ways School food programmes for food security Gardens as mental health supports Value of investing in youth – the importance of a healthy start Building purpose within youth Learning from youth
Learning	Food and nutrition skills Personal growth
Local food	Procurement and cost Funding Value placed on local food

Traditional Food, Knowledge and Practice; Local Food

A major theme that emerged from the data was that of the importance of culture and tradition as a bedrock for the LC work in HZ. The first LC introduced the Gitksan Wellbeing Model, newly developed by the GGC, that illustrates the interconnectedness of land/knowledge, spirit and learning and aims to connect young people to wellbeing through relationship with their culture, family, food and land.

“...having the teachers involved, and ... just seeing the little ones excited about good healthy food – and the high school students, and just taking pride in Gitksan culture, and learning, or connecting to Elders that have such a rich understanding of their homelands, and I think that’s a really, really important aspect of learning that we often don’t see in the school, so I just think that’s so valuable.” (LC Participant and GGC representative)

One of the LC goals focused on this (‘Connect kids with a healthy food culture on the territories’) and the role that traditional food, skills and knowledge plays in food security was also acknowledged. ‘*That strengthens our lives!*’ is a translation of a slogan displayed in HSS: “*ent si daxgyat ga gandidilst’m*”, referring not only to healthy food, but traditional culture and the importance of the land (Figure 3.3).

“I think it’s a combination of the two. You can’t talk about local food, without talking about Gitksan traditional food systems. That’s just part of who we are.... We also have [teacher] she comes in and if we get fish or we get oolichan, or even get bear or whatever. She’ll come into the class then we learn how to either smoke it or process it or whatever. Bear was a really interesting one because in our community people from different house groups and different families have different beliefs on bear meat. So,

some families say that's totally fine, in other families it's a sacred animal. So, it became a really interesting place for conversation about tradition and about culture and how it can be different even within the same nations.” (LC Participant)

The inherent sustainability of traditional ways was discussed in a number of sources. In addition, the language used for and around food was considered important, and traditional protocols were carefully considered.

“[Participant] spoke about the value of food in relationship to the land and to being a Gitksan person. She talked about everything having value, that some parts of the salmon considered a delicacy are sometimes wasted by people. All parts that are not used must go back into the river to continue to feed the river. She talked about fish strips feeding children and allowing them to continue playing and learning. She mentioned that it is important to always have enough to share with all the children. “Use everything,” she said, “everything has value.” (Report)

There was a tension between the concept of ‘local foods’ and that of ‘traditional foods’, with ‘traditional’ foods being the preferred term for Indigenous community members. Engaging the region’s predominantly Indigenous schools was found to be difficult, due, in part, to the LCEF being a relatively new non-Gitksan community member and not having the time to build necessary relationships, and in general, challenges relating to colonisation, i.e., the school system, agriculture and gardening were part of this theme.

“Our whole relations with agriculture, with farming, has obviously been a strained one since [colonial] contact. You know our people have been displaced from the land by

farmers, and you know the government giving away land or selling land. So, you know our people have been displaced. And so, there is a bit of a strain there. a bit of historical relations piece that needs some work or attention. That could be through reconciliation, that could be through you know working together.” (LC Participant and GGC representative)

However, connection with the land using traditional ways is seen as important to community members as it brings healing from past traumas.

“The land offers us medicine and healing, when we harvest from the land we are healing ourselves.” (Photovoice entry, accompanied by a photograph of drawers containing dried plants and herbs for medicines)

Systemic barriers related to food safety and legislative issues of serving traditional foods in schools, plus logistical issues related to school programmes were noted. They lack a processing and storage facility in the community for local and wild game. Community members were interested to learn of the processing and storage facility in HG that enables safely bringing traditional food like moose and venison into schools for consumption by student.

Building Partnerships

HZ had some local and traditional food work happening prior to the establishment of the LC and building relationships between interested stakeholders was a high priority. Connections resulted in community events such as the mid-winter gala which as a result brought a large number of community members together in support of the initiative.

“I think one of the biggest things was just that, that big fundraiser that we held. That was a huge thing for us because we informed the community around the project, we had huge support from all over. And not only that, but it really helped other people within the community see ... how many people are actually doing this kind of stuff” (LCEF)

“[the LC] is building relationships in the community and it is connecting places like Senden to the elementary school, which is a really beneficial relationship. It helps both programmes sustain themselves, so I think those things are really great successes that we have seen. I know my own kids being in the school get really excited. You know they brought home produce last year and were super excited that it was from their garden boxes.” (LC Participant)

Developing trust between community members and different stakeholders remains a work in progress but the principle of ‘food is medicine’ served as a focus for connection with the development of a number of skills-based initiatives. The improved community connectedness led to a number of successful grant applications that furthered the work of the L.C.

“...the history of colonialism means that in this community there's quite - there's a difference in the way that Gitksan and non-Gitksan organisations work. There's a lack of trust. With good reason.” (LCEF 2017)

“I really feel like, with reconciliation, there is work that both Indigenous and non-Indigenous people need to do. And some of that work non-Indigenous people need to do is hard and it's uncomfortable” (LC Participant)

The hinge around which LC partnerships and activities swing is the LCEF. However, a heavy reliance on volunteer time and parent education was found to be necessary to keep community

and school-based programmes running, and a need to build a wider network of support for projects was acknowledged.

In addition to the development of connections within the HZ region, connections between HZ and the LC in HG were developed after annual gatherings, with a visit to HG for some of the students, and a visit from LC participants in HG.

“It’s an awesome project and I am really glad that we had the opportunity to work with other communities from Saskatchewan and from Haida Gwaii because being isolated and trying to do this on our own would have been a lot. I learned a lot from [both] so that’s been really important ... for sure (LC Participant)

“Yeah, I think it is a powerful working with other nations because there’s a lot of similar challenges and approaches.” (LCEF)

Focus on Youth: Importance of Healthy Good for Young People

The Indigenous philosophy of having a ‘seventh generation’ view of the future by having an eye to the importance of valuing and focusing on youth was a prominent theme in the data.

“The children are flowers that need to be cared for and fed. It is our responsibility to work together as a community to care for them so they are valued each as the unique life that they are, so that they are not damaged. Gitksan women are the foundation of raising the next generation of children. Gitksan are a matrilineal people and the relationships on the mother’s side are very important.” (Community Elder)

Discussions relating to the refocus of the school curriculum towards learning about and celebrating traditional ways took place at the LC meetings, and organisations such as Senden that

facilitated hands-on learning for youth were partnered with. In addition, the LC was framed by the worldviews and traditional food practices and knowledge of Gitksan LC participants and others engaged with the initiative.

“My experience working with children and families and schools is to get people outside of the classroom. So, getting them out on the land or out on the water with our people. And that's where our people shine, that's where we're the most confident, where we're the most alive is when we are out on the land. So, if we can get our teachers and our kids outside. I think that's the most beneficial thing we could do. I don't know how much of that has happened over the last two years.” (LC Participant)

School food programmes such as hot lunch and salad bars were built upon, with the understanding that youth should have access to plentiful and healthy food, and that schools can play a part in food security for the children of the community. This links to food sovereignty.

“HSS school administration has begun to come up with creative solutions to support students to eat well at school, connect with Senden, and build ongoing community based financial support for healthy food options in the school.” (LC Report)

School gardens were expanded and/or built, and in the case of two schools, it was reported by communities that these spaces provided a refuge for students who had undergone difficult experiences. Similarly, the pre-existing programme at Senden provided a chance for youth experiencing challenges to learn and share their skills with others and heal.

“Many youth have and are experiencing trauma in their day to day lives - the opportunity to connect while being on the land is vital to supporting them to build resilience and the qualities that will help them address these challenges.” (LC Report)

Tied into this was the importance of youth being outside and on the land. Land-based learning is important as it encompasses culture, family, food and land. In reports from the LCEF, youth were found to be proud of the work they did outside on the land and valued the effort taken in growing and providing food for themselves, their families, and communities. A sense of purpose was seen to be fostered in youth as a result of these programmes, and Elders and older adults involved in the LC considered it a blessing to be able to do work on behalf of the children.

“I think the most important impact it would have on youth would be just knowing who they are, to the core; having strong grounding in their Indigenous ways of knowing, ... and I think when we see our youth struggle...it's just not knowing – it's struggling with who you are and kinda floundering around and floating out there; that all of our cultural traditions and ways of knowing are really grounding for us, and we're really comforted in our own shoes, so it's important. I think it's a big piece – it's a big piece of who we are, and it grounds us in who we are, and it grounds us to the land around us. That's, uh, the strongest grounding that we can possibly have.” (LC Partner 2018)

Learning From One Another: Knowledge Sharing

A number of interviewees spoke of an ‘increase in knowledge’ gained by community members during the course of the initiative. ‘Learning’ was mentioned regularly in reports, interviews and other documents, whether it was learning about nutrition and choice, or practical hands-on learning at workshops and farm visits.

“...there are things happening. There are lots of really good successes, lots of really good involvement from the schools.... It’s good, we are off to a really good start and hopefully this is something that will keep going and develop into the wider sort of food bank. Not the salvation army food bank, but the idea of having a bank of local plants that grow well in this area. ... Just trying to really get local, because climatically we have things that are really well adapted to the area.” (Community Member)

Stakeholders discovered that they were learning from each other and acknowledged that everyone had knowledge and experience to share, even the younger members of community.

“We did a photo voice project with our Senden Agricultural Resource Centre youth, and they’re a little bit older – a lot of them are high school students or in their early twenties – and the way that they view local food, and especially traditional foods, is quite phenomenal. Their knowledge of the culture and the protocol and the amount of respect that’s needed around traditional foods is huge, and they’re quite passionate... about it.”
(LCEF)

Learning wasn’t just limited to issues of food and nutrition, but a number of community members spoke about what they had learned personally about the history of the Indigenous people in the region, and how challenges within the community were frequently framed.

“And so, I just felt a lot of personal growth and that’s why I feel this work is really important” (Research Team Member)

Participants felt that the provincial school curriculum could be updated, in part to shift the value around local foods, and in part to encourage openness and knowledge sharing about the history of Indigenous people in the area; the opportunities to link curriculum-based activities to food and garden activities were seen to be endless.

Local Food

‘Local’ food was considered an inherent part of the initiative from the beginning, with the term being built into the project name. In HZ there were challenges with accessing an affordable supply of local food for school food programmes as it was found to be much more expensive than non-local food.

Funding for food to school programmes is unreliable and often does not support local food procurement. A further concern about this is that it is difficult to think about local food when poverty and food insecurity remains an issue for many families in the community.

“..how hard it is to think about local food when there are so many families with limited access to any food and kids are coming to school hungry. A PAC parent was very concerned that there are not enough resources in school as is and wondered about how we would afford local food.” (LC Participant)

Relating to procurement, local food in this region is seasonal. The development of a directory to connect children and teachers to knowledge keepers and farmers helped with procurement of local foods for school food programmes and community events.

The concept of ‘shifting value’ towards local foods was built into the goals of the LC with the aim of encouraging the community as part of the learning process to make choices for local food in preference to non-local.

“I’m hoping to see a more robust food system here in terms of how everyone is able to access food, I’m really inspired by how much traditional and local food there is, but also the other side of the coin we have you know supermarkets that are full of garbage and imported stuff that we could pretty easily replace” (LC Participant)

Using local meat and fish in schools was difficult, as legislation relating to food safety prevented these foods being served in schools. In addition, value gaps were identified around food security and local and healthy food. For example, the local high school gives \$50 monthly gift cards for student to spend at the Gitanmaax Market for lunch, but the money often doesn’t last a whole month and the students frequently buy energy drinks and unhealthy food with the money.

3.7 Implementation of the Learning Circle: Local Healthy Food to School Initiative in the Remote First Nation Community of Ministikwan Lake, Saskatchewan - A Descriptive Case Study.

3.7.1 Objectives and Research Question

This case study aims to describe the food, nutrition and health-related environment and transitions (activities, influences, outcomes) of the LC:LHF2S initiative in Ministikwan Lake, SK (MK) from January 2016 – December 2018.

Objective 1: Describe the context and process of the establishment of the LC in MK.

Objective 2: For MK, explore the story of change in the school food communities over the period of the LC:LHF2S initiative as described by community members and other partners, augmented by quantitative data, including those on the availability, acceptability and consumption of local, healthy and traditional foods.

Objective 3: For MK, explore the perceived effects of the LC as described by community members and other partners.

3.7.2 Context

The community of Ministikwan Lake Cree Nation (MK) is located in north western Saskatchewan on Ministikwan Lake and has an on-reserve population of approximately 1,300 people (*Meadow lake tribal council: About MLTC.2020*); the majority of the community members are Indigenous. The community is a part of the Meadow Lake Tribal Council (MLTC), a cooperative council, formed in 1981, and comprised of nine local Meadow Lake First Nations,

5 Cree, and 4 Dene. MLTC provides administrative support and delivers a variety of business and family programmes and services for the nine First Nations.

MK is located in a sub-arctic climate, with long cold winters and a short growing season. The lake is a source of fish, and the surrounding land is part of a boreal forest that provides opportunity for hunting. The community is remote, with high unemployment; nutrition-related chronic illness was recognised by community members to be a health issue amongst all age-groups. An election in 2017 became a focus for the community and resulted in a change of chief and staff, including the health director who had served as an advisor to the project. Over the time of the election and transition of leadership, some family and political tensions were noted by LC members.

Access to healthy food can be challenging; whilst the community has its own convenience store, the nearest grocery store is approximately 100 km away in the city of Meadow Lake. However, some food-related activities had been taking place in the community and general region prior to the beginning of the LC initiative in 2016. A community dietitian, based out of the MLTC, serves the surrounding area and provides support for food-related activities. Records indicate that the community had a long history of gardening, but many traditional skills were lost due to the impacts of colonisation; in the time of the Indian Agent (prior to the 1960's) government rations were based on a perception of how much food a community had access to, and fewer rations were given to families that grew their own food (Irwin, 2018). Despite this, gardening activities had been taking place in MK on an *ad hoc* basis for a number of years. Kâniyâsihk Cultural Camps (Cree Culture) had been established in the region in the early 2000s with the purpose of preserving the Cree language and promoting traditional Indigenous culture, land-based teaching and healing. MK has one school, Island Lake School, that aims to provide a free

daily lunch for its students. The school runs from kindergarten to Grade 12 and includes nursery and adult education. It has approximately 350 students that come from the local and surrounding communities; the majority of the students identify as First Nation, with some Caucasian, and some Métis.

The initial contact in this community was the community dietitian who was invited to attend a planning meeting at the University of Waterloo in October 2014. Three community members attended a gathering in HG in 2015 to help develop the proposal for the project. The LC in this community received administrative and advisory support from the MLTC; the organisation was responsible for advertising for and hiring the LCEF. A service agreement in September 2016 with the MLTC enabled the University of Waterloo to send funds directly to the community for certain project related costs including the salary of the LCEF and honoraria, e.g., for Elders who participated in the Ministikwan project gathering of 2017.

3.7.3 Results

The LCEF in MK was hired by the MLTC and began work in the Fall of 2016. The LCEF, who has expertise in permaculture, had been involved in gardening projects at the Island Lake School and was known to community members. A Learning Circle Advisory Group (LCAG) was formed in late 2016 and was made up of the community dietitian from MLTC, the school principal, the director of Health, a community health representative, the LCEF and local Elders. Two meetings of the LCAG were held in the 2016, and three LCs were held between June 2017 and 2018.

Consistent attendees of the LC included the LCEF, the Island Lake school principal, representatives from the Island Lake Student Council, the school cook from Island Lake School,

representatives from the nearby Flying Dust FN school, the community dietitian, the Director of Health from MK, a community health worker, a number of local Elders, representatives from the Flying Dust Market Garden, and other interested community members. MK was the only community to have consistent involvement from youth in the LC.

The third Annual Gathering of the full LC:LHF2S initiative was held in Saskatchewan at FireSong Resort close to the community of MK. The LCEF coordinated some cultural activities for the group to experience such as local singing and drumming, and a visit to Kâniyâsihk Cultural Camps and market gardens.

3.7.3.1 Case Sample and Source Documents

Between 2016 and 2018, four participants gave eight interviews; of these participants, one acted in a facilitatory role (LCEF), two acted in advisory role (community health worker and local dietitian) and one was a LC participant (Table 3.12). A LC report was written after each LC and meeting of the advisory group leading to five in total; 16 activity tracking reports and three progress reports were completed by the LCEF, and 18 photographs are available for use. A school survey, including 24HR diet recall, a food frequency questionnaire, and questions specific to local food and food-related initiatives and planning, was pilot tested in 2017 and completed in 2018 by 84 participants.

Table 3.12: Source Documents

Source Category	Total number of sources/respondents
Interviewees/Informants	4
Interviews	8
Photographs	18
School survey participants	79
Activity tracking reports	16
LC reports (including LCAG reports)	5
Progress reports	3
Meeting minutes	12

3.7.3.2 Goals and Funding

The motivation of the work in MK was to invest in the health of children and Elders and the long-term health of the community, and to build upon the foundation of traditional knowledge that the community already had. The LC in MK decided upon the following major areas of focus for the first three years of the initiative:

1. Focus on the lunch programme at the school
2. Seek funding to support the initiative
3. Engage with other groups in the community and plan for increased [community] involvement in upcoming LCs.

At each LC, these areas of were revisited and progress towards them assessed. By the end of the funding period, the community had applied for a number of grants (Rivers West, SaskCulture, Mazon Canada) and had been successful in receiving a grant of \$5,000 from Mazon Canada in 2017 for the purposes of supporting food programmes in Island Lake School. This grant was

used for school food. A grant was also received from the MLTC to enable the community health worker to start up a gardening programme among the MK community.

3.7.3.3 Activities

Activities of the LC in MK focused on developing youth leadership skills, gardening programmes and workshops, the school lunch programme, and capacity building within the community. The LC was also used to showcase local products and foods.

Developing Youth Leadership Skills

To build capacity within the youth, the Island Lake School Student Council was invited to the LC meetings and encouraged to become involved in the decision-making process. The purpose of this was twofold: to build capacity and foster motivation within the youth themselves by giving them leadership opportunities, and to learn their thoughts regarding the food-related needs within the school. The Student Council was asked for their opinions on the current lunch programme and was influential in the development and implementation of the quantitative school survey in 2017. Their input was useful for focusing LC activities.

Youth in the community collaborated with Elders to develop a community-specific medicine wheel-style seasonal harvesting calendar in 2018.

Gardening Activities

The community in Ministikwan had a long history of gardening that was disrupted in part by the impacts of colonisation and an increased dependence on welfare. This resulted in a culture

change and a reliance on market food that was not locally sourced. A number of community members expressed that it was important to bring back this tradition and re-teach these skills.

A variety of gardening activities were expanded and developed during the LC initiative. At the school, an existing garden was enlarged in conjunction with the LC, the school, and other interested community members (Figure 3.4). The focus of this was to introduce the concept of permaculture gardening to the students and maximise the resources, and growing season, available to the community. A variety of vegetables on raised beds were grown, including plantings based on the principles of the “three sisters” (corn, peas/beans, and squash). The garden was sustained by volunteers over the summer months, with mentorship by the LCEF. Produce from the garden was harvested in the autumn and served, when possible, as part of the school lunch programme.

“You can see the excitement among the students when they bring their hard-grown seed-planted vegetables to the school café and serve it to their peers.” (LC Report)

Vegetables from the school garden were used in a canning workshop led by the community dietitian. While there was a focus on traditional gardening techniques outdoors, new technologies such as aeroponics were introduced to the school to supplement the food available for school lunch and to teach the students useful skills.

A number of other gardening activities happened in the community. The community health worker has a passion for gardening and ran programmes teaching community members how to plant gardens, as well as food preservation workshops. She also ran gardening meetings to motivate her neighbours and was instrumental in the planting of fruit trees in front of the school.



Figure 3.4: Development of the school garden in Ministikwan Lake. Clockwise from top left: Preparing the raised beds; Filling the raised bed; Vegetables almost ready for harvest; School youth harvesting vegetables; Preparing a meal from the harvested vegetables.

School Lunch Programme

Prior to the beginning of the LC initiative, the Island Lake school had a fledgling school lunch programme that focused on addressing hunger and aimed to provide a free, nutritious lunch to all of the students in the school. Lunch is served in the classrooms for elementary students and the high school portion of students come to the cafeteria and receive their food via a buffet style service. The school was fortunate to have a cook who was extremely passionate about the food that was provided to students in the school; her aim was to increase the proportion of healthy

food that the students in the school had access to. Providing meals that included soup, bannock, salads, pastas and rice, she tried to stay away from processed foods as much as possible.

There were a number of challenges associated with the lunch programme, however. Frequently the cook had to prepare and serve the food alone, and with the distance from the nearest grocery store, it was difficult to keep a sufficient supply of fresh food. The availability of a vehicle to transport the food was sporadic, and facilities in which to store the purchased/prepared food, along with facilities within which to prepare and serve the food, were lacking. To mitigate these challenges, the LCEF applied for funding from various sources (grants as mentioned previously, and the MLTC), and attempted to source a regular supply of delivered food to the school. In addition, funding was secured for the purchase of new kitchen facilities (e.g., a new refrigerator). The community dietitian for Meadow Lake Tribal Council provided support to the programme by drafting a 2-week rolling menu and helping with menu planning and food sourcing. The school lunch programme was the focus of the survey that took place in June 2018.

The LC facilitated teacher and student engagement with the school garden and supported the preparation and serving of harvested produce from the garden. The LC also supported a number of cultural events at the school that celebrated traditional knowledge and included traditional food.

Building Knowledge and Skills

Building and enhancing capacity within the community was a focus of the LC work throughout all three years. A number of these activities related to support provided to the school lunch programme by the community dietitian, who facilitated meal planning and provided other

resources such as strategies for food storage. Subsidies were sought from MLTC to provide a workplace experience programme in the school to help with food preparation.

Partnerships were initiated with a wide variety of people including local Hutterite communities, the Flying Dust Market Garden, as well as farmers and local Indigenous hunters and fishers.

However, there were food safety barriers to accepting donations of wild game and fish from local hunters and fishers. A partnership was formed with Flying Dust school to understand the regulations and determine what might need to be done to meet the health inspection requirements to serve traditional meat at the school. A large amount of sucker fish (a fish that some local First Nations groups eat) was donated, but due to cultural preferences, this fish is not appealing to the local Cree community and was not used. This underlines the importance of allowing community members to select culturally appropriate traditional foods.

In addition, research capacity was built. For example, the LCEF and community health worker attended CIHR's annual gathering of all Pathways-supported projects (2018), the LCEF and community dietitian edited and administered the school survey, and the LCEF and at least one community member attended and presented at each of four 'annual' gatherings. MK hosted the annual gathering of 2017.

Seeking funding was a big challenge for MK. In order to enhance their skills, the community LCEF and community health worker attended a grant-writing seminar in 2017 at a local resort led by SaskCulture. Grant proposal review sessions were held with the school principal, and planning meetings were held with staff at the Ministikwan Health Centre to bring together people in the community who are involved with community work and might benefit from funding. A partnership with the Flying Dust reserve school was formed in order to apply for grants together.

3.7.3.4 School Survey

The survey in MK was administered in May 2018 and complete data were available from 79 students. Demographic characteristics can be seen in Table 3.13. Ages ranged from 11 – 18, with a mean age of 14.2; 48% of the sample was female.

Table 3.13: Sociodemographic Characteristics of the Sample

Respondent Characteristics (n=79)	
Age (y):	14.2 ± 2.0 (range 11-18)
Grade:	8.2 (range 6-12)
Sex M/F/other (n):	40/40/4

School Programmes

A school-provided lunch was offered every day and consumed by 69% of students more than twice per week. The school lunch was rated by 34% of students to be ‘good’ to ‘excellent’; 40% of students rated it ‘fair’, and 26% ‘poor’ (Figure 3.5).

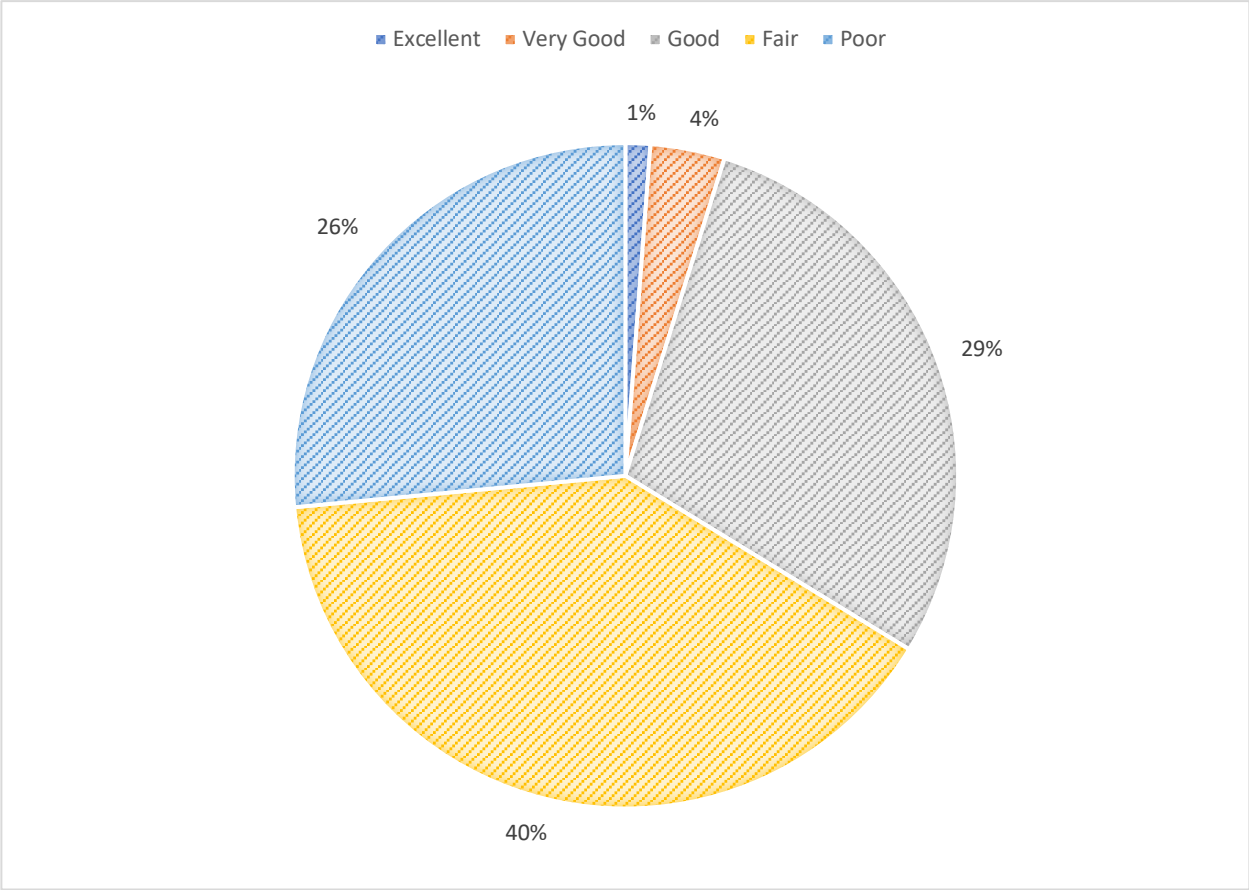


Figure 3.5: Students Were Asked “Overall, How Would Rate the School Lunch Programme?” (n = 79)

50% of students were aware that their school had a gardening project and 24% reported eating food from there (Table 3.14).

Table 3.14: Proportion of Students Participating in School Food Programmes

Programme	Proportion of Students (n=79)
School Lunch Programme:	49% consume every day 69.4% consume >2 d/w
Recommend School Lunch Programme	61%
Gardening Project	50% were aware 34% had helped 24% had eaten food from there

When asked open-ended questions such as ‘what do you like about the lunch programme?’ ‘What would you change about the lunch programme?’ ‘Would you recommend the lunch programme/why?’ students responded with answers that referred to ideas such as:

- A lack of variety:

“We eat the same thing all the time”

“It’s mostly the same food – ‘sandwiches’”

“...because all we eat is sandwiches and soup, I’m sure no one wants to eat that every single day.” (quotes from school students)

- Unhealthy food

“Some foods can be unhealthy or not enough”

“’cuz it’s cheat[ing] for our body we need more for our body” (quotes from school students)

- An insufficient volume of food

“because we [get] given small lunches”

“because you don’t get full from the lunch.” (quotes from school students)

- Some students thought the quality of the food was good.

“We don't have to pay; our food is free and it's really good”

“because it's delicious”

“we get the same thing but I still like it”

“it's good, fairly healthy”

“...that we get like a half hour break and our cook ... makes good food” (quotes from school students)

- and liked the convenience of being able to get lunch at school:

“I like they drop it off”

“I like the fact they bring the food to our classroom.” (quotes from school students)

- Others indicated that there is food insecurity among some of the students attending the school.

“I don't really like nothing about it but I'm glad they do this so that kids that don't bring food don't have to starve.”

“because the person might be hungry” (quotes from school students)

- A number talked about how the free food indicated that adults in their lives cared for their welfare.

“I like that they put love in it.” (quotes from school students)

- A number of students would like to see increased amounts of healthy and traditional foods served in school.

“Provide more food for students and make healthier choices.”

“...better foods, or and something that the kids will get full off of”

“traditional food or animals like moose deer elk beaver etc.”

“more traditional food” (quotes from school students)

3.7.3.5 Themes

Three main themes relating to the context of the local foods story emerged from the data in MK (Table 3.15).

Table 3.15: Themes Arising from the Case Study Documentation

Theme	Subtheme
The local champion	Community health worker
	School cook
	Challenges
Fostering relationships between youth and Elders	Youth and Elders currently appear to be disconnected.
	Learning skills and consuming traditional foods.
	Development of skills among youth
	Relationships as a route to wellness
	Capturing knowledge from the older generation
	How these connections benefit community Elders
Increasing community togetherness	Hope and vision for the community
	Connections leading to local foods in the school

The Local Champion

A strong theme that emerged from the data was the importance of ‘the local champion’ to the success of this type of community work. The community of MK had a number of such individuals who worked alone prior to the establishment of the LC, and without whom the project would not have been successful.

The Ministikwan community health worker played a key role in the initiative from the beginning. She attended all of the annual gatherings and worked tirelessly to promote health and healthy eating among the community.

“...in Ministikwan, she has been, I think the greatest help with adapting people. Um, the health clinic is kind of the communication hub of the community in Ministikwan. And...she’s a health worker there and um, she’s always willing to help people and bring people together for different healthful reasons. Um, and she’s been indispensable, I will say um, in many endeavours, I think she, she’s a champion of her community.”
(Community Dietitian)

Her motivation was to see people healthy and to make a difference in the community.

“Even little things like that it means a lot. That I’ve made a difference in the community. ... this other lady, she had the best garden in the community because she lives right by the lake.... she gave me her biggest potato and her biggest zucchini and yeah...that was special too. She was excited to bring me this as a gift” (Community Health Worker)

The school cook was also a healthy eating champion in this community. She took on the job of feeding 350 children by herself without support, and while she did well and the support from the dietitian was helpful, she found this challenging and at times wasn’t able to continue.

“Well I think it was really nice to see the community prioritise the school lunch program.” (LC Participant)

“...what is expected of the school cook is just unbelievable. It’s not something your average person could accomplish, just cause there’s so many students, one person. And

so I just thought that would be such a hard job and so I was glad to see them choose to prioritise that.” (LC Participant)

The school principal, who had experience in writing grants proposals, and the LCEF, a permaculture expert, were also important local champions. Their specific skills were invaluable to the success of the LC in this community, and this emphasises, that for sustainability, a community needs more than one champion.

There are a number of challenges relating to a small number of champions carrying out a large proportion of the work. Champions tend to be visible in the community, and motivated, and are frequently asked to volunteer their time and skills for many projects; this can lead to burn out. In Ministikwan, the school cook was overwhelmed by the amount of work required to provide food for 350 students and was unable to continue in the job. Another challenge related to a small number of champions was the community election that happened that affected the role of Director of Health in the community. A different person was appointed to the role halfway through the funding period and this impacted the amount of influence that the previous Director of Health had in the local government.

“Yeah like um, there were elections, you know like the project kind of got started and it felt like there was really good momentum, and we had a community engagement meeting and then there were new elections and it was a kind of a pretty big change to the community. Then you know just due to some politics, it seemed like that momentum was a little bit halted.” (LC Participant)

The LC in Ministikwan aimed to use the community strengths (i.e., cultural camps, availability of wild game and other edibles, and engaged community members) as potential avenues to overcome some of the barriers to healthy eating in the community.

Fostering Relationships Between Youth and Elders

A number of community members talked about how local resources were used to sustain their families in the past. They expressed the view that there was a disconnect between youth and Elders in the community and that this was different to how things had been in previous generations.

“There was a general consensus that there is a great importance for Elders in the community. Many in the group felt there is a disconnect between youth and Elders in the community.” (LC Report)

“[Community member] recounted days when her father ... [brought] home Caribou, Moose and Deer. She light-heartedly spoke of how the children would fool around with the game meat while her father butchered. She watched her Mother cut and boil and fish while she looked on. She remarked that she loved to learn, and remembers strawberries in spring, saskatoons, choke cherries and blueberries. She said she feels privileged to have been a part of her parents’ traditions.” (LC Report)

Community members felt that this focus on youth and Elders, resulting from the LC, was leading to a development of skills among the youth.

“When with a group of students in the forest [LCEF] often asks them what they see. Most of them say ‘we see trees’. However, once you get into the different layers of the forest

and explain what it offers you can see their minds expand – ‘there are resources right here’.” (LC Report)

Culture is highly important among Indigenous people and there was concern that traditions would be lost over time due to this lack of connection.

“But when you ... there is a bit of a physical connection there, because we’re all in the same room together. Um, and almost spiritual as well too, I think which is another aspect. But having the youth together with the Elders and providing the means to make that happen where before there wasn’t the means.” (LCEF)

Regaining a connection to the land and to traditional roots is considered important to health and wellness and given the challenges that young people in the community face, it was felt that reconnection with Elders and traditions could be a route to wellness.

As a result of the concerns relating to loss traditional skills among youth, effort was made to develop some connections. A seasonal harvesting calendar based on the medicine wheel was developed by youth and Elders with the aim of capturing the rapidly disappearing knowledge in a way that would be enable youth to connect with their traditions, and also help to improve their dietary intake.

“It’s a – this old wheel style seasonal calendar ...this is a connection between the youth and the Elders coming together um, where the Elders are expressing their knowledge about traditional gathering and hunting, based on seasons and this also includes a respect for the earth.” (LCEF)

“And also passing this knowledge onto the youth, which is I think the most important thing.” (LCEF)

This process was also perceived as benefitting the Elders, as well as youth.

‘Well, I just feel it kinda lifted the spirits up of the children, and even the adults, the Elders, they were all excited about gardening, even though they’re so limited, like, physically, but they still – they brought them good memories of how they grew up, uh, with their parents, and they gardened a lot back then, and it used to be such a happy time for them, so I think that’s one of the successes, and also the skill of gardening is, um, something that we all learned, yeah’ (LC Participant, 2017)

Increasing Community Togetherness

MK is a small and remote community and residents have a number of difficult social challenges to navigate. As such, developing connections and building a sense of excitement and energy within the community for food-related activities was an important part of the establishment of the LC in this community.

“Well, I think what it’s done is given community members, uh, a voice, um, and also a method to put out that voice into action, so they’re no longer just ideas. Uh, I think we know that we have the ability to bring these ideas to fruition, and to – to bring them into action...” (LCEF)

Cultivating these relationships remains a work in progress, but the importance of food to Indigenous culture (‘food is medicine’) served as a focus for connection with a number of initiatives such as the community gardens.

“[there is] not much opportunity for work or employment so it is difficult to maintain traditional ways (i.e., hunting as mentioned earlier). The LC project has helped draw money into the community and give hope to the potential within the community.” (LC Report)

“We are seeing more activities that are centred around food. ML is a remote community where access to healthy foods is limited. Resources currently are - convenience store and a 45 min drive to nearest proper grocery store. Access to healthy foods is poor and so having the focus in this community has allowed people’s vision to adjust. Now there is more support and partnership development. People coming together that normally wouldn’t have met together are doing so. Lots of people have good ideas but without the support of the LC these ideas wouldn’t get off the ground. The LC has brought momentum. People have been identified and are identifying themselves as healthy food champions – interested in the health of children and Elders, and fostering long-term health of the community” (LC Report)

The LCEF and other LC members spent a lot of time building partnerships within the community and between MK and other nations, e.g., the Flying Dust reserve and nearby Cree Culture Camps. Exploratory connections were made with local hunters, trapper, fishers and foragers for the purpose of bringing that food into the school. There are a number of Hutterite colonies nearby and tentative partnerships were developed with them in order to provide food for the school.

“The LC has brought the work of the school and health centre together and the strengths of both are making a difference. For example: The health centre dietitian hosted a canning workshop with school students – they used vegetables that they had grown

themselves in the school garden. This only happened because of the connections and communications between health centre and school as a result of the LC.” (LCEF)

“And um, so yeah I think it’s, and our partnerships are slowly expanding, as well too, because we’re in a very – I don’t want to say very remote area, because it’s almost a regular area for Saskatchewan, but we’re very spaced apart from cities and towns. So to look at local partnerships our idea of a local is very expansive I guess.” (LCEF)

3.8 Implementation of the Learning Circle: Local Healthy Food to School Initiative in the Remote Community of Black River First Nation, Manitoba - A Descriptive Case Study

3.8.1 Objectives and Research Question

This case study aims to describe the food, nutrition and health related transitions (activities, influences, outcomes) of the LC:LHF2S initiative in Black River First Nation, MB (BR) from January 2016 – December 2018.

Objective 1: Describe the context and process of the establishment of the LC in BR.

Objective 2: For BR, explore the story of change in the school food community over the period of the LC:LHF2S initiative as described by community members and other partners.

Objective 3: For BR, explore the perceived effects of the LC as described by community members and other partners.

3.8.2 Context

BR (also Little Black River, ‘*Makadewaagamijiwanong*’ in Ojibwe) is located on the bank of the O’Hanly and Black Rivers and on the east shore of Lake Winnipeg, 138 km northeast of Winnipeg and approximately 36 km north of the community of Powerview/Pinefalls. The First Nation has, as its reserve, the 809.3 ha Black River 5 Indian Reserve, and the majority of residents are Ojibwe (Statistics Canada, 2016). The total population of the community is approximately 1,500 people, with around 1,000 people living on-reserve (Statistics Canada, 2016).

The community is governed by a Chief and three Portfolio Councillors, and the primary language used is Ojibwe. BR is part of the [Southeast Resource Development Council Corporation](#) (SERDC), which is akin to a tribal council and provides support and delivery for programmes such as health, economic development and education.

The community has a health centre, a Head Start Programme and a basic general store/gas bar.

The community is accessible year-round by a paved road. The main food-related activities in the community are trapping, wild rice harvesting, agricultural work, hunting, and commercial fishing.

BR has one school, Black River Anishinabe School, that includes students from nursery to Grade 10. A school garden, and an ‘On-the-Land’ programme, where students are introduced to traditional foods through cultural excursions, was running in association with the school prior to their association with the LC initiative. Students at the school are bussed home for lunch and back for afternoon classes.

BR was invited to participate in the LCs initiative by virtue of prior partnerships with the research team. The community had been one of ten communities in rural Manitoba that took part in the Heart and Stroke Foundation Healthy Communities Initiative, implemented over three school years from 2014 – 2017. This initiative aimed to support the growth and development of school children by modifying the school community’s physical and social environments. A ‘Healthy Community Facilitator’ worked in partnership with the communities to guide and support their chosen actions.

A photovoice evaluation was conducted to capture the impact of the initiative and consider lessons learned (Abramowicz, A., Yessis, J., 2017). Pictures submitted by participating Black River Anishinabe School students contained themes of active play (i.e., youth running, playing

basketball), nutrition (i.e., meal preparation, fishing activities), connection to Indigenous culture (i.e., students involved in a musical performance) and the physical environment (i.e., trees, and natural landscapes). The community facilitator commented that students enjoyed participating in physical activities and were aware of the positive benefits of being healthy.

Due to their involvement with this project, it was thought that BR was a natural candidate for the LCs initiative.

3.8.3 Results

Black River First Nation joined the LCs initiative in February 2017 after another Manitoba community that had been part of activities leading up to the proposal submission, and included in the proposal submission, was unable to continue. A service agreement was completed between the University of Waterloo and Black River First Nation Chief and Council allowing for project funds to be transferred to the community for project costs. An LCEF was hired in May 2017, and this person divided his time between the LCEF role and the *Aboriginal Diabetes Initiative*.

A new LCEF was hired in June 2018 as the initial LCEF did not prove to be a good fit for the project. The new person had experience and teaching skills related to harvesting traditional foods and had been the ‘On-the-Land-Coordinator’ at the BR school. He gathered an advisory council of Elders to support the work, with representatives from the school, the health centre and the band council.

Interested community stakeholders in BR included health workers, teachers, members of the band council, local food gatherers, representatives from Wild Life and Moose Management organisations, and the ‘[Lighthouses Program](#)’ (a Manitoba crime prevention programme oriented towards youth). Partners on the LC:LHF2S project, including the Heart and Stroke Foundation

and Food Matters Manitoba , had offered support to the two LCEFs in holding a LC; however, no formal meeting was convened. In 2017, the Heart and Stroke Foundation (HSF) and a member of the research team met with a member of the band, LCEF, the on-the-land coordinator and a teacher at the school to discuss ways the community might further the work started in the HSF project to bring local healthy foods to the school community including fishing, on the land expeditions and possible gardening. Members of the group expressed interest in working together at this time.

The fourth and final Annual Gathering of the full LC:LHF2S initiative was held in Manitoba at an Indigenous Retreat Centre close to the community of BR. The LCEF coordinated a visit to the Black River First Nation and facilitated some cultural activities for the group to experience, such as local singing and drumming, a visit to culturally important sites and a community lunch.

3.8.3.1 Case Sample and Source documents

Between 2017 and 2018, the second LCEF gave two interviews. The minutes of three meetings were analysed (Table 3.16).

Table 3.16: Source Documents

Source Category	Total number of sources/respondents
Interviewees/Informants	1
Interviews	2
Meeting minutes	3

3.8.3.2 Activities

While they have not had an “official” LC with others in the community, local food activities in BR have centred around the school. Several meetings were held between members of the community to discuss advancing efforts in the community (Figure 3.6).

Activities involving youth have included berry picking, wild rice harvesting and fishing. A breakfast programme, providing cereal and fruit each morning, was started because some children did not eat at home before coming to school. School-based courses were planned to teach the students to prepare wild rice, bannock, berries, jam, and smoked meats, as well as fishing and a food handling course. The school has a full kitchen to support these activities and as many as 18 students can be cooking at the same time.



Figure 3.6: Clockwise from left: Entrance sign to Black River First Nation; By the shore at Lake Winnipeg; Excerpt from a community planning exercise

The LCEF conducted a community survey to determine who in the community had traditional knowledge related to foods and in which areas. He interviewed and developed a list of hunters, trappers, fishermen, gardeners and gatherers, and these Elders were invited to become involved with the local food activities.

An ‘On the Land’ project focusing on traditional knowledge and practices continued over the course of the LC:LHF2S initiative in conjunction with the school, and students in grades 4 – 10 (approximately 180 students) were invited daily to after school cultural activities. The school purchased 12 canoes to facilitate fishing and wild rice harvesting. The school also planned a

cultural week for 2018 and was able to obtain a multi-year lease on a hunting lodge. A ‘hunting safety course’ was required before students were allowed to handle firearms.

Connections between Elders and students were supported and encouraged. Elders and youth went blueberry picking, providing an opportunity for Elders to share stories from their youth and how things have changed over the years. The Cultural Exploration School Initiated Course, a Manitoba-supported programme that recognises curricula developed by schools and school divisions to meet local needs and interests, provides an opportunity for students to learn more about their traditional heritage and culture while at the same time earning high school credits. Students were required to spend 110 hours with local Elders participating in traditional activities, to get the credits. The programme has reportedly been especially good for students who were quiet or shy and it helps students develop confidence and leadership skills.

Fishing nets were procured from the Ministry of Natural Resources, and plum trees and cranberry bushes were planted near the school to replace wild fruit areas that have been destroyed by development. The LCEF was involved in supporting and encouraging youth to tend the school garden.

The community holds a ‘Fish Fry’ twice a year, and the Cultural Lodge Camp and Wallace Lake Camp are nearby fishing resources, shared with other schools and used for traditional activities.

The programmes run in BR were perceived by the interviewee to have grown in popularity, with more students taking part in the traditional activities. The opportunity to participate in traditional outdoor activities was dependent on good behaviour in the classroom, and school staff have reportedly noticed a change. Older (non-school age) youth and parents were also getting involved. Elders were becoming more connected with the younger members of the community

with their opportunities in the school. These activities were seen to be benefitting the youth, but also the Elders, as they are getting more physical activity and social interaction.

The LC format provided some direction to BR for working on goals of providing cultural activities and healthy lifestyles to students and community members. Being part of the LC project also provided an opportunity to learn from other communities, what they were doing and to share funding sources.

3.9 Integrative Summary of Findings

3.9.1 Overall Summary

The path of the LC:LHF2S in each of four distinct FN contexts is varied, though some common themes and influences were identified. In summary, Haida Gwaii (B.C.) (HG) has a rich food environment, due, in part to its temperate climate, a vibrant local and traditional food culture and a long history of protecting the land and culture. A variety of local food-related activities had been taking place in HG prior to the establishment of the LC project in 2013, and by 2016, the LC work was firmly established and included the new initiative of the local food pantries. Under the CIHR funding, the LC activities in HG focused on three main areas: schools, hospitals, and the work of the local food pantries. Within this work, LC participants worked towards increasing access to local and traditional foods, building knowledge and skills, fostering relationships, and transitioning to Haida leadership within the project.

While the Hazelton/Upper Skeena (HZ) region (B.C.) had some local food activities prior to 2016, there had been no organised community-wide commitment to the food culture and environment and so the LC initiative in this community focused on partnership development, gardens, community-wide skills work, and youth activities, with a specific emphasis on schools. Traditional food, knowledge and practices were prioritised in youth-based programmes.

The MK community in Saskatchewan is a small, remote community located an hour's drive from the nearest well-stocked grocery store. Some local food-based activities were happening prior to 2016 but there had been no organised efforts towards local and healthy food work. The LC initiative focused on capacity building, gardening activities and the school lunch programme. Cultivating youth leadership was prioritised here, and connections between the youth and Elders

were developed; the importance of local champions and challenges related to reliance of local champions were noted.

Black River, MB, had prior involvement with the Heart and Stroke Foundation Healthy Communities Initiative, implemented over three school years from 2014 – 2017. They joined the LC initiative in 2017 and while they have not had an “official” LC with others in the community, local food activities in BR have centred around the school. Activities involving youth have included berry picking, wild rice harvesting and fishing.

LC:LHF2S is a flexible initiative that aims to engage the broader community in planning and implementation and as such, incorporates some of the best practice recommendations for community-based initiatives in Indigenous communities (Bhutta, 2017; Ki-moon, 2016; Sheehan et al., 2017) . The multi-faceted potential of the initiative was compared with the image of a crab: “*A Crab has many arms, [is] grasping for many ideas and learning many ways*” (LC Participant, HG), and this study documents the large amount of work carried out by partners within the four communities in this project. A LC uses an engaged scholarship or action research approach to engaging community in action while collecting evidence, and the results indicate that a LC is a feasible venture in Indigenous communities and one that can facilitate building of partnerships and contribute to increased access to local and traditional food among school-aged youth.

3.9.2 Summary of the Work Across Communities

3.9.2.1 Context

The communities are compared by context in Table 3.17.

Table 3.17: LC:LHF2S Communities Compared by Context

	Haida Gwaii	Hazelton/Upper Skeena	Ministikwan Lake	Black River
Population	5,000	5,000	1,300 (on-reserve)	1,000 (on-reserve)
Location	Remote, island	Remote, mountainous	Remote, lakeside	Remote, river and lakeside
Climate	Temperate	Temperate, cold	Sub-Arctic	Humid continental
Governance	Haida Nation	Gitxsan Government Commission	Meadow Lake Tribal Council	Southeast Resource Development Council Corporation
Schools	4 elementary, 2 high school	7 elementary, 1 high school	1 school: K – Grade 12	1 school: nursery – grade 10
Partner Organisation	Secretariat of the Haida Nation	Storytellers' Foundation	Meadow Lake Tribal Council	Black River First Nation Chief and Council

The population size of HG and HZ were similar, at approximately 5,000 people, and the population sizes of Ministikwan and BR were also similar, ranging from 1,000 to 1,300 people.

The number of schools differed in a similar way across communities, with HG and HZ having six and seven schools respectively, and MK and BR having one school each. With the exception of HZ, the administrative agreements made between the University of Waterloo and the community were with Indigenous leadership organisations.

3.9.2.2 Goals

The goals articulated by the LC in each community are compared in Table 3.18.

Table 3.18: Goals as Articulated by the Learning Circle Participants in Each Community*

Goal†	HG	HZ	MK	BR‡
Connection between Elders and youth	✓			✓
Curriculum development	✓	✓		✓
Funding/sustainability	✓	✓	✓	
Increased access to healthy foods	✓	✓	✓	
Increased access to traditional foods; learning traditional skills	✓	✓	✓	✓
Partnership development in-community	✓		✓	

* Red check marks indicate goals that while not mentioned explicitly in community documents, were seen in the activities of the work in that community. †Goals have been paraphrased according to the theme of the goal. ‡While BR never held a formal LC meeting, a range of community members worked with the Learning Circle Evaluation Facilitator on these implicit goals.

Three communities: HG, HZ, and MK, recognised the need to obtain supplementary funding in order to support the action plans prioritised by the LC. This funding was used to purchase school food and kitchen equipment such as refrigerators and freezers, and also for gardening equipment such as materials for raised beds, tower gardens and greenhouses. HG, being the exemplar community and the most established in terms of having programmes in place and prior relationships with funders and other community support organisations, received the most funding of all four communities. HZ applied for five grants (F2CC x 2, Northern Health, Mazon Canada, Whole Kids Foundation) and received four; a further \$6,000 was raised at a community-based Mid-winter gala in 2018, with the funds allocated for schools to bring students out onto territories for food-related activities adhering to traditional protocol. MK was successful in receiving a grant of \$5,000 from Mazon Canada in 2017 for the purposes of supporting food programmes in Island Lake School; a grant was also received from the Meadow Lake Tribal

Council (MLTC) to enable the community health worker to start up a gardening programme among the MK community.

Increased access to local and traditional foods for school children was a focus for HG, HZ and MK, and increasing connections between Elders and youth was specifically articulated by HG, although carried out in HZ, MK and BR. The local food pantries in HG provided activities that incorporated local foods into the school curriculum, and skills classes were built into the curriculum by a number of teachers. In HZ, one of the elementary schools brought food into the art classes to incorporate it into the lesson, and discussions relating to the refocus of the school curriculum towards traditional practices took place at the LC; areas of the curriculum that could be refocused to include traditional ways were identified. In BR, the Cultural Exploration School Initiated Course required high school students to spend 110 hours with local Elders participating in traditional activities to learn more about their heritage and culture.

The development of partnerships was a specific goal of HG and MK, and although not identified by them as a goal, was a large focus of the activities of HZ. The purpose of this in all communities was to extend the reach of the LC and make it a 'whole community' initiative, include as many knowledge-holders as possible, build economic relationships with growers, share resources (including food plus learning), build capacity, and further establish efforts to build food security and food sovereignty.

Black River did not articulate any goals, although their activities focused on developing connections between Elders and youth, traditional foods and skills, and curriculum development.

3.9.2.3 Activities and Themes

The activities carried out by each community are compared in Table 3.19 below, along with the main themes emerging from the work in each community.

Table 3.19: LC:LHF2S Communities Compared by Activity and Theme*

	Haida Gwaii	Hazelton/Up per Skeena	Ministikwan Lake	Black River
Activities†				
Gardening	✓	✓	✓	✓
Hospital food	✓			
Local food pantry	✓			
School food	✓		✓	✓
Skills development and capacity building	✓	✓	✓	✓
Youth leadership	✓	✓	✓	✓
Themes				
Access to healthy food; local food	✓	✓	✓	✓
Building partnerships and community togetherness	✓	✓	✓	
Connections between youth and Elders	✓	✓	✓	✓
Knowledge exchange; developing skills	✓	✓	✓	
Local champions	✓	✓	✓	
Traditional food, knowledge and practices	✓	✓	✓	✓
Transitioning to Indigenous leadership	✓			

*Red check marks are used to indicate activities and themes that, while not mentioned explicitly in community codes, were seen as throughout the work in that specific community. †Activity and theme titles have been paraphrased from those presented in each individual case study.

Activities

Gardening activities were carried out by all four communities and mostly took place in schools; HZ and MK also had some community gardens that were a focus of the LC work. Gardens were used as a tool for engaging youth, and, in HG and MK, the food produced in the gardens was incorporated into the school lunch menu. The provision of food for schools was a focus of HG, MK and BR, and was offered as either a breakfast (some schools in HG, BR) or a lunch programme (MK, some schools in HG). Skills development and capacity building was a focus of the LC activities in all four communities, and included activities as disparate as grant-writing workshops in MK, school menu planning by the community dietitians in HG and MK, to children's cooking classes in HZ. Developing youth leadership skills was a specific aim and focus of the LC in MK; youth were included as members of the school council in the LC meetings and were asked to provide feedback on the final school survey. However, contributions to youth development were included in all four communities. For example, youth were a focus of leadership activity workshops in HZ (i.e., 'Youth On Water' leadership programme) and in BR the Cultural Exploration School Initiated Course helped to develop youth skills and encourage the development of youth-elder relationships.

The provision of food for hospital meals was a focus of the LC in HG only, as was the development of the local food pantry within this community. HG was the exemplar community and as such, had more time for the LC:LHF2S model to scale up vertically. Many of the activities that had begun prior to the CIHR evaluation were given time to establish themselves in the community and continued to flourish.

Themes

Elements of emerging themes were evident in almost all of the communities, even if, as stated in Table 3.19, they weren't stated explicitly as codes but were seen as examples. Increasing access to healthy and local foods within the community was a strong theme that came through in the documentation and interviews of each community, for example, school food programmes and the focus on gardening. The local champion was also an important theme – notable as much by the absence of a champion as the presence. Multiple committed champions were key to the work in HG, HZ and MK, but the lack of a sufficient number of champions in BR could have contributed to the challenges in fully engaging this community in the LC model.

Building partnerships and community togetherness was seen as important in all four communities, as was the importance of increasing access to traditional food, and building traditional knowledge and practices.

Indigenous leadership was a very important component of the LC development in HG, and was integral to the community in MK where there were very few non-Indigenous community members. Despite Indigenous leadership and support for the initiative in BR, no specific LC was held, so Indigenous leadership may not be sufficient on its own. The lack of Indigenous leadership of the LC model was a challenge in HZ, contributing to community tensions and influencing which schools became involved in the initiative. This could potentially suggest that a model introduced by those external to a community, for example, researchers, is not initially seen as belonging to the community, as expressed in Haida Gwaii through the 2015 formative research, and the slow transition over the course of the initiative. The colonial structures, like agriculture and schools, embedded in the project could have been another aspect that affected uptake. Nevertheless, the model is aligned with Indigenous emphases on relationships, youth,

traditional foods, culture and sustainability and, where these were emphasised, there were many examples of Indigenous engagement and positive action.

3.9.3 Socio-Ecological Model

The Indigenous-focused socioecological model of Willows and colleagues (2012) is adapted (Figure 3.7) to focus on access to local healthy foods and integrates factors from the level of the individual to that of the historical and global, indicating that access to local healthy foods is shaped by a large number of factors. The model illustrates the two-way relationship among and between levels and recognises the historical context within which all of the relationships sit.

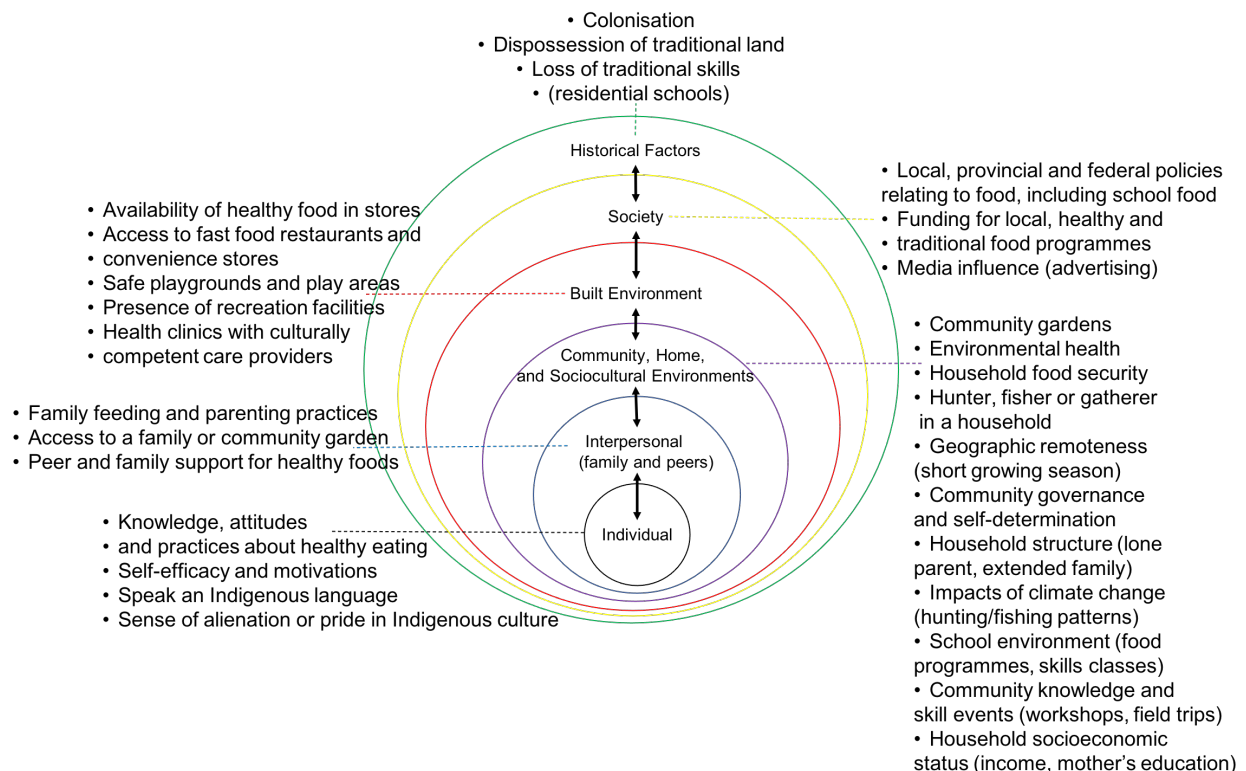


Figure 3.7: Socio-ecological model for understanding factors that contribute to local, healthy and traditional food access in Indigenous youth (adapted from Willows et al, 2012).

Multi-level public health strategies incorporating concepts of Indigenous wellness should be considered when promoting healthy lifestyles, using this framework as a guide. The LC model is an approach that communities can use to enhance local food access, and is seen to have an impact at every level of the SEM, as discussed below.

3.9.3.1 Individual and Interpersonal Levels

As described in the results, members of each community have voiced their concern about levels of food insecurity and poverty among some families in their community. Building upon this information, the McCreary Survey in both HG and HZ report that 13% and 9%, respectively, of children who completed survey identified that they go to bed hungry ‘sometimes’ because there is insufficient money for food at home; 1% of children in HZ report going to bed hungry ‘often.’ Breakfast was reported to have been eaten ‘never’ by 21% of students in HZ, and 18% of students in HG (McCreary Centre Society, 2020). In MK, 34% of students report not consuming breakfast the day before and 17% report not consuming dinner the day before; feedback on lunch programmes, especially in MK, often highlighted the importance of providing free food as ‘kids were hungry’.

Nutrition insecurity was also seen as a challenge among some of these communities (Slater & Yeudall, 2015). In MK, 45.8%, 32.5% and 26% report consuming non-diet pop, diet pop, and energy drinks >2 per week (Study 2, section 4.5.2) and 24-hr diet recalls (Study 2, section 4.5.5) among students in the on-reserve school of MK and the off-reserve schools in HG show that dietary intake, as reported, appears to be energy dense and low in fruits, vegetables and fibre. As a consequence, a large proportion of the goals and activities of the LCs across all communities were aimed at the individual and interpersonal levels.

Gardening activities were directed at this level and emphasised the development of individual knowledge, skills and emotional support. Some of the school garden spaces in HZ were turned into memory gardens and became refuges for students who had undergone difficult experiences, demonstrating the reciprocal interaction of individual emotional needs and connection to the physical environment.

Some strong partnerships were built by the end of the initiative. Partnerships between schools, farmers and hunters, and local NGOs were directed at the interpersonal level of the model and were seen to be an essential part of the initiative. In addition, skilled members of the community such as Elders were able to pour their knowledge into the lives of the local youth and whilst doing so, expressed that they benefitted themselves from the social interaction and the sense of being useful, thus having an impact on the interpersonal level. The added presence of the Elders as mentors in the lives of the children also had a positive effect. While knowledge was transmitted and such relationships contributed to mental wellness, physical activity levels among both age-groups increased as a result of the outdoor work such as hunting, harvesting and fishing. The experience of being outside and on the land is a critical component of Indigenous concepts of wellness; land-based learning is important as it encompasses culture, family, food and land. This points to the reciprocal nature of individual and interpersonal factors and social environments.

“Getting our Elders and children connected together in the school system, getting people out on the land, getting in touch with our culture, one of the best things we can do”
(Annual Gathering Attendee, 2018)

A focus on traditional food, knowledge and practices contributed to a sense of pride in the Indigenous identity of the students and using Indigenous language in descriptions of food and practices added to this further.

“[I am] proud of what we are achieving here, such a short time and all of a sudden, the tree has leaves, and that my son is doing this for his community. That we are doing this for the students at the school, that students will learn the traditional way of life, that I met all of you.” (LC Participant)

Building relationships and partnerships was a common thread running through the progress of the initiative in each of the communities and also the entire project and was addressed at a number of the annual gatherings. It was recognised by many participants that the difficult work of reconciliation and developing trust was necessary in order for the local food work to happen.

3.9.3.2 Community/Family/Sociocultural Levels

On a community level, farmers, gatherers and hunters benefited economically from being able to contribute to the school food system. Community feasts in HG and HZ contributed to a community-level response, as did school food programmes which aimed to address food insecurity and unhealthy food choices on a daily or weekly basis by increasing access to more healthy, local and traditional food. The remote nature of many of the communities is a challenge to the access of local, healthy foods; a long winter and cold climate is also a factor in HZ, MK and BR. To mitigate this, initiatives such as permaculture gardens, greenhouses, tower gardens and root cellars were introduced.

School food programmes in all communities aimed to address food insecurity and unhealthy food choices on a daily or weekly basis by increasing access to more healthy, local and traditional food.

‘I’m proud that... the kids are used to getting fish and venison at school and come to expect it’ (LC Participant)

3.9.3.3 Built Environment

Compared to the general Canadian population, Indigenous communities are frequently situated in more remote geographic locations; such locations are less likely to have adequate infrastructure such as roads, grocery stores and recreation areas (Kuhnlein et al., 2004; Wendimu et al., 2018). Climate change has reduced the availability of land for traditional food procurement practices in rural and remote areas, for example hunting, gathering, fishing (Ford et al., 2010; Gracey & King, 2009; King et al., 2009). Research shows that relationships exist between the built environment and health-enhancing behaviours such as physical activity (Duncan et al., 2005; Engler-Stringer et al., 2014; Minaker, 2016) but limited studies have explored the relationship between built environments and nutrition-related chronic disease in Indigenous communities (Smoyer-Tomic et al., 2008).

The LC initiative impacted the built environment in different ways in each community. In HG, the setting up of the local food pantry augmented the available grocery options and provided an alternative source of local food to what had already been there. This source of food was accessible by schools, hospitals, and other community organisations. In HZ where market food was easily accessed and plentiful, a number of root cellars were constructed by schools to teach

traditional skills and support food sovereignty. In other communities such as BR and MK, access to well-stocked grocery stores was much less convenient, and in the case of MK, was a significant challenge to the food getting from store to school. A number of approaches were attempted to mitigate these challenges, for example developing a delivery service from the grocery store to the school, but the lack of funding for these initiatives made their development slow.

A challenge noted in all of the communities was the cost of local food relative to market food. Given the context of food insecurity affecting some of the youth and also the difficulty in obtaining extra funding to pay for food as a result of school budgets, this cost challenge did impact the possibility of prioritising local food. All of the communities were relatively remote, and the children would not have had access to fast food restaurants. However, as demonstrated in Study 2, they did have access to gas station-type stores and sugary drinks were popular, as well as energy drinks.

The development of school gardens incorporated extra physical activity into the school day, as students were involved in planting, tending the gardens, and harvesting. Gardens became part of the built environment that changed under the LC project and also interacted reciprocally with individual factors such as knowledge and physical activity. An example of this in HZ is Senden – an excellent example of a built environment (garden, kitchen) that interacted with individual needs (mental health, emotional support, personal skills) and interpersonal support (access to a master gardener, cooks, counsellors).

3.9.3.4 Historical: Colonisation

The consequences of past acts echo into the future and the history of Indigenous people in Canada is no exception. Various assimilation policies such as the Indian Act and residential schools (King, M., Smith, & Gracey, 2009b; Reading & Wien, 2009; Royal Commission on Aboriginal Peoples, 1996) limited access to traditional hunting and fishing grounds leading Indigenous people to be dependent on the market system for food – often unfamiliar and of poorer quality than what they were used to (Gracey & King, 2009). The residential school system prevented children from learning their Indigenous language and becoming familiar with traditional practices such as hunting, and food procurement and preparation (Angel, 2000; Hackett et al., 2016). While community gardens were popular in MK, LC participants in HG and HZ emphasised the importance of acknowledging and discussing the injustices of residential schools before considering how to approach school and community gardens in a good way.

The LC initiative with its open format and structure has allowed for the process of rebuilding of trust and establishment of reconciliation processes to begin and continue in communities. Food has been more than nourishment in this regard and has become a point of connection around which community members of diverse backgrounds can come together, build relationships and connect to the land.

At the last evening of the final Annual Gathering attendees were asked to share what they were most proud of with the work done together. One Indigenous attendee stated the following:

“[I am most proud that in our work together] we have been planting seeds of hope for our people.” (AG Attendee)

The results of historical happenings had different outcomes in different communities. In HG and MK, gardens were very popular with the community. In HZ, gardens were connected with agriculture, and schools were seen as structures from colonial occupation and thus weren't seen as the optimum way of approaching local and traditional food.

The inclusion of Indigenous languages and practices has been seen as a way to reclaim some that which was lost. The focus on connecting Elders to youth for the purpose of passing traditional knowledge and practice down through the generations has been critical, as has the use of Indigenous Wellness models to inform LC activities, for example the use of the Gitksan Wellbeing model in HZ. The emphasis on Indigenous leadership is a part of this.

Indigenous leadership, and enabling self-determination, are critical components of the success of strategies to enhance access to healthy, local and traditional foods in Indigenous communities.

3.9.3.5 Conclusion

When considering strategies to tackle deeply rooted and complex problems, such as nutrition-related chronic disease and promoting healthy lifestyles, multi-level, complex public health approaches incorporating Indigenous wellness should be considered. The LC model is a strategy that has been shown to have an effect at every level of the SEM, and the inherent flexibility of the LC model means that communities can prioritise activities of interest to them and tailor evaluation processes accordingly.

3.10 Interpretive Discussion

The purpose of this section is to analyse and discuss the changes in the food system of each of these communities as a consequence of the LC:LHF2S initiative.

3.10.1 Analysis

3.10.1.1 Traditional Food

The title of the project focused on local food, but, for communities, incorporating traditional food into the diets and lifestyles of community youth was a major focus of the initiative. This was especially true in HG, HZ and Black River and seen to a lesser extent in MK. Traditional food patterns have been shown to be protective against chronic disease (Kuhnlein et al., 2004; Reeds et al., 2016), but, residential school policies forbade cultural practice and hence, traditional food knowledge and skills among Indigenous youth decreased over the past 30 to 40 years in Indigenous communities (Islam et al., 2017; Mead et al., 2010; Ohmagari & Berkes, 1997). Older Indigenous community members from all communities were concerned about the levels of traditional food intake among their youth and the resulting impacts on their long-term health; this is in line with other research (Macaulay et al., 1997; Reeds et al., 2016; Kuhnlein et al., 2004; Naylor et al., 2010). Reclamation of traditional food knowledge and skills became a priority. The importance of a holistic view of health, culture and connecting with the land for Indigenous communities has been widely documented (Wilson, 2003) and is demonstrated by Indigenous wellness wheel and other comparable wellness models (Kakekagumick et al., 2013; King et al., 2009; Wilson, 2003).

3.10.1.2 Link to Food Security and Food Sovereignty

Traditional food knowledge is intimately connected with food security, and therefore consumption patterns and health outcomes (Berkes, 2012; Islam et al., 2017). The inclusion of traditional foods and associated knowledge and skills in the diet has been shown to contribute to food security in other studies (Lambden et al., 2006; Schuster et al., 2011); food insecurity was identified as a concern by community members in all communities. Student voices from the two school surveys conducted in MK and HG, along with quantitative data from the McCreary survey in HG and HZ, tell us that some students in these communities are coming to school hungry, and that this is recognised by their peers. Unfortunately, the literature demonstrates the unplanned impacts that public health programmes and a lack of emphasis of traditional food in Indigenous schools have on Indigenous children (Kuhnlein & Receveur, 1996), and the desire to consume branded foods/association of ‘branded’ foods with the ideals of ‘the good life’/negative association of traditional foods as being ‘backward’ and un-modern (Companion, 2013; Damman et al., 2008). Encouragingly, as reported in the results, >80% of students in HG and >60% of students in MK enjoy eating game, wild fish and locally grown vegetables and ~ 40% of students in both communities would eat more traditional foods if they were available at school, and one LC participant from HG reported that she was “*Proud of the work we are doing at the school, making healthy food ‘cool’ working for pride in the culture*” (Section 3.5.3.5). This presents a significant opportunity for these communities. Comments expressing the need for the inclusion of traditional ways of knowing into the school curriculum echo similar themes in other studies (Naylor et al., 2010).

All of the above leads us to reflect on the original aims of the project plus the original focus on local food rather than traditional. Food sovereignty will be discussed in more detail in Chapter

5:, but the movement from discussion of food security to that of food sovereignty was noted in the data from HG and HZ over time. This could, in part, be connected with the orientation of the exemplar project since the focus of NSC and some of the partners (e.g., F2CC) was likely influenced by F2S in US and focused on farmed food and salad bars. With a greater transition to Indigenous community leadership this shift in emphasis makes sense. The concept of Indigenous food sovereignty emphasises ownership and control of Indigenous food systems by Indigenous people, in part as a way of addressing food insecurity, and this common thread has been seen to strengthen over the course of the course of the project. This follows a pattern seen in other literature of projects that aim to encourage self-determination, aiming to reduce vulnerability and increase resilience by focusing on food sovereignty (Cidro et al., 2018; Gates et al., 2016), and traditional skills (Spring et al., 2018).

For Indigenous peoples in remote areas, food system changes have tended to decrease dietary diversity as a result of a lower intake of traditional food and a greater reliance on limited types of market food (Kuhnlein & Receveur, 1996). The goals of the LC initiative included actions that would lead to increased dietary diversity among these school children, and the story of the LC across these four communities is one that includes changes to the food system, e.g., through changes in school meals to emphasise more local and traditional foods, to changes in student skills in procuring and processing foods from the land. For the three new communities, people involved in the existing food work in each community were brought together and the work was thus strengthened, and important groundwork was carried out with respect to partnership development and relationship building. The LC provided a focus for all of this work, giving an opportunity for ideas to be discussed and connections to be made in order for new food activities to be carried out – i.e., new gardens being developed, distribution of food from local suppliers,

sharing of food/traditional skills. For the exemplar community, HG, the LC became less important. The work here had already been established and the further funding of the LCEF through CIHR provided the support to enable the work to diversify into a co-operative style operation – developing into two food hubs (north and south) with different components and multiple champions.

3.10.1.3 Funding and Other Resources

Finding resources beyond the research funding (from CIHR) for implementing the initiative was difficult for all communities – for example, procuring a bus to take children onto the traditional land to participate in a workshop with local knowledge keepers. Added to this, it was challenging to source reliable funding that would provide food for school programmes; a number of communities lacked the research capacity to develop successful grant applications and were given assistance on a number of occasions by other communities and the project manager of the research team. Local food was frequently found to be unaffordable within the school budget, despite the efforts made to build partnerships with local farmers and growers in order to support the local economy, and there were no funds through the project to invest in foods, infrastructure and other needs to get the project going and build trust (research being seen, historically, as an activity of taking information from the community but not of giving back to enhance community). Food safety legislation relating to the consumption of hunted meats in schools was also a challenge, although steps taken by the community in HG (Section 3.5.2) has provided a template for other communities to follow.

The LC at HG has illustrated that these issues, e.g., securing stable funding, require time, effort and partnership development beyond the scope of this project. As mentioned previously (Section

1.13), Canada has no comprehensive national food policy, and instead, the country's food concerns are divided among a range of agencies and government departments (Levkoe & Sheedy, 2017; MacRae, 2011), with most Canadian food regulations remaining focused on food safety and fraud prevention. The latest policy, renewed in 2008-9, attempts to look at the system more broadly but fails to address all the necessary issues, such as the integration of health, and social and cultural concerns, particularly of Indigenous Peoples in Canada (MacRae, 2011). Despite concerted efforts over the years, no national school food programme is in place in Canada (Peoples Food Policy, 2011), nor has there been federal government support for Indigenous-led efforts to enhance their food system priorities.

3.10.1.4 Schools

The successful adoption of the LC approach in schools in three communities (HG, MK, BR) supports research that indicates the value that Indigenous communities place on school-based food programmes (Gates et al., 2015; Hanbazaza et al., 2015; Hanning et al., 2011; Skinner et al., 2006). However, the focus on schools in HZ appeared to be a barrier to the success of the LC. None of the on-reserve schools became involved with the LC and there were challenges at times with engaging the wider Indigenous community. It was suggested that aversion to agriculture and gardening in this community is strong, tied to persistent effects of residential school trauma (Angel, 2000; Miller, 2019) and colonisation. Using the medium of a Western-style school as the focus of this initiative was also raised as a barrier. In addition, while there was engagement and support from the Gitksan Government Commission, leadership of the LC remained with Storytellers' throughout the course of the initiative and this made us on the research team consider whether 'two-eyed seeing' – the lens of both perspectives – was

implemented successfully in this community. This contrasts with other communities, for example MK, where the integration of the two-eyed seeing approach was evident; permaculture and aeroponics gardening methodology was added to traditional approaches to planting, akin to the synergy of the three sisters, and ceremonial tobacco. In HG too, two-eyed seeing was seen through the emphasis on ownership of the initiative by Haida people through the HFC.

3.10.1.5 Learning

‘Learning from one another’ became an important feature of the initiative. The cultural importance of sharing of traditional knowledge from Elders and other knowledge keepers with youth was significant, and from a research perspective acted as an extended version of successful ‘peer mentoring’ programmes as reported elsewhere (Eskicioglu et al., 2014). Youth were encouraged to mature by being given leadership roles in MK, and through the student council were able to learn from older people in the community and teach those younger than themselves at the same time. A number of non-Indigenous community members discussed their own personal growth as a result of learning about the past and understanding more about reconciliation. *‘We plan out our actions for the next seven generations and we ask that you do that same. Open your other set of eyes; Recognize the pain you have caused.’* (Thomas, 2016) The journey of the LC in HZ reflects the words of this poem – at many times in the process, work had to be done to develop relationships and overcome a lack of trust between the Indigenous and non-Indigenous groups that co-exist in the community, before food work could be addressed.

3.10.2 Indigenous Leadership, Ownership, and Self-Determination

Despite evidence that many components (e.g., multiple local champions) are necessary for the success of the LC initiative, it is impossible to overstate the importance of Indigenous ownership and leadership of the project. Building trust, a critical component of relationship building, takes time, particularly when ideas come from outside the community; the timeframe may well extend beyond a three-year funding window. The progression of the initiative in HG presents a useful contrast to this. Interviews conducted by a Haida representative in 2015 identified that the Haida didn't see the project, in its current format, as belonging to them. However, extensive relationship building was carried out by Indigenous and non-Indigenous community members, resulting in the emergence of the HFC that gave direction regarding programming and the evaluation process with respect to Haida laws and protocols. One of the resulting pieces of work was the 'Spirit of Collaboration' agreement with the HFC, which served as a guide to the work that was done between the research team and the community in a way that was appropriate. Such an agreement can be seen as a legacy from this initiative, that could encourage others to approach research or evaluation processes in a similar way.

3.10.3 Implications

Looking to the future, the results from this study highlight a number of things that could be considered when thinking about local or traditional food work in predominantly Indigenous communities. First, consideration should be given to the funding timescale. The local food to school process has been as '*a tree whose leaves are 'food procurement' but the roots are 'relationship', which must come first*' (HG LC Participant). Three years is a short time to see progress in a newly begun community-based participatory research project; a significant

proportion of time was spent building community engagement and developing relationships and such progress is difficult to measure. The location and context of the community contributes to this; a short growing season further limits the time available. Increasingly, research funding is being directed to communities themselves. However, not all communities have the human resources to capably apply for funding and conduct a range of evaluation activities. Hence, there may be a need to decolonise research processes or enhance access to research allies who can work well with communities to support their needs.

As well as the timescale, the amount of money available for such projects should be reflected upon, as well as budget allocation, so that there is other money available for practical aspects of the projects in remote communities with challenging infrastructure. The initial vision of the Pathways funding in supporting project evaluation and not implementation was to ensure sustainability beyond the time of research project funding. This limited success in contexts such as ours where there was insufficient community or external partner funding to support local priorities. Thinking more broadly, it is worthwhile noting that no model of community engagement can overcome food insecurity when its roots are due to poverty and lack of other resources.

It is beyond the scope of this study to examine long-term outcomes of the initiative. In the new communities, participants felt that some relationships and initiatives would continue while others might be more dependent on external funding and the availability of a local champion.

Evaluation of the continued progress of the work begun here would be an interesting future project.

3.10.4 Strengths and Limitations

This study has a number of strengths. The CBPR methodology enabled the communities to very much guide the implementation and evaluation process according to their own wishes and decide on evaluation strategies that would most benefit their communities. From this perspective, the principles of ownership, control, access and possession were fully adhered to in line with guidelines for research with Indigenous communities. The research team walked alongside the communities, providing guidance and support where necessary and assisting the community with methodological expertise. The evaluation that emerged can be considered as a part of the LC model.

Methodologically, all interviews and reports were independently coded by two coders (LWM and RV, LWM and BZ, respectively); member checking further supported methodologic rigour. The variety of data collected and included allowed for the triangulation of themes and the inclusion of voices from many different parts of the community. Also, being able to compare and contrast four individual case studies provided depth, nuance and a rich holistic description of the LC initiative across all communities.

The study has a few limitations. For the school survey, methodological rigour was balanced with feasibility, and due to the size of the schools and difficulties with completing the surveys at specific times, (i.e., infrastructure problems leading to an early closure in May) we have a small sample for both communities that took part in the survey. In addition, the survey was completed once in each community providing a snapshot rather than any ability to view change over time. Communities did not choose to assess household food security directly, hence, any suggestions about the presence or effects of food insecurity are based on community member perceptions through interviews or open-ended questions.

Due to the CBPR approach, we do not have consistency in types of data from across each of the four communities leading to an inability to compare communities directly. In addition, the brevity of the study (3-year funding), particularly with the new communities, precludes any possibility of seeing changes in behaviour and certainly no change in anthropometry for those communities with potential interest in such markers. This was magnified in the MB community as they joined the project late.

3.10.5 Conclusion

In conclusion, the LC approach is a feasible and appropriate way of engaging community and promoting local and traditional foods, knowledge and practices among Indigenous youth in rural and remote locations such as the communities included here. The inherent flexibility of the model meant that each community could prioritise activities of interest to them and could identify what success of the initiatives would look like and tailor evaluation processes accordingly. Indigenous leadership and ownership of the initiative is essential to the success of such initiatives, and thought should be given to amount of funding available, and to funding timescales for projects that require a high level of community engagement. Recommendations based on community input may help to enhance uptake of the model in other contexts and ongoing local food initiatives in similar communities across Canada.

A video was created at the last annual gathering to summarise the work of the initiative and can be viewed [here](https://www.youtube.com/watch?v=A6oIk7-bMKA) (<https://www.youtube.com/watch?v=A6oIk7-bMKA>). This study documents a large amount of work carried out by the four communities over three years and celebrates their creativity and many great achievements over a few, brief years. Many connections and unique initiatives were debuted here that may serve as an inspiration for other communities.

Chapter 4: Study 2. “Dietary Patterns, Intakes, and Perceptions of Healthy Eating Among Indigenous Adolescents Nationally, Using the Cancer Risk Among Youth Survey, and Among Students in Haida Gwaii, B.C. and Ministikwan Island Lake School, SK”

4.1 Introduction and Study Rationale

Dietary habits established in adolescence are likely to continue over time and predict adult lifestyle-related disease (Craigie et al., 2011; Marshall et al., 2014; Patterson et al., 2009). The prevalence of overweight and obesity among adolescents is rising (Rao et al., 2016) and evidence suggests that diet quality among all school-aged children living in Canada is poor (Garriguet, 2009; Tugault-Lafleur et al., 2017); many do not meet the national dietary guidelines for milk and alternatives or fruit and vegetables (Gu & Tucker, 2016; Tugault-Lafleur et al., 2017). As stated in Chapter 1; a review of diets of school-aged Indigenous adolescents across Canada shows that the dietary intake of Indigenous adolescents was also seen to be low in nutrients and high in sugary drinks, fast and snack foods (Gates et al., 2015). Nutrient-rich traditional foods, while remaining important, were not consumed with high frequency by this age-group (Gates et al., 2015). As children spend more time away from home during school years, foods available in other environments, including school-based foods, become important; in 2004, close to one third of total energy consumed by Canadian children aged 6 – 17 years was consumed between 9 am – 2 pm on a school day (Tugault-Lafleur et al., 2017). International health agencies have long promoted the value of dietary education and intervention in schools (World Health Organization, 2017) as they can play an important role in fostering healthy diets and lifestyles (Veugelers & Fitzgerald, 2005). Schools can facilitate nutrition education and health promotion and can influence dietary behaviours. for example, breakfast, school meal or snack programmes

(Lee & Gortmaker, 2012; Pérez-Rodrigo & Aranceta, 2001; Storey et al., 2009; Tugault-Lafleur et al., 2017). Schools can also be a useful place to assess the overall diets of adolescents; most children eat at least one meal at school, on school days, and dietary assessments can reach a large number of children from a community of interest (Lee & Gortmaker, 2012; Pérez-Rodrigo & Aranceta, 2001; Tugault-Lafleur et al., 2017).

The accurate assessment of the diets of children and adolescents can be challenging. In schools, food may come from many different sources (Graziose, 2017; Tugault-Lafleur, Black, & Barr, ; Tugault-Lafleur et al., 2017). Children and adolescents have varying literacy abilities and can have difficulty estimating portion size and conceptualising the frequency of food consumption (Livingstone & Robson, 2000; Livingstone et al., 2004; Marshall et al., 2014). Peer influence, and social desirability bias — the wish of participants to give an answer that will please others — can influence the accuracy of the data, and, depending on the circumstances of the dietary assessment, not all adolescents are willing participants (Gibson, 2005). The age whereby children are considered able, in general, to complete self-report methods of assessment adequately is judged to be about 12 years old, varying by dietary assessment method (Sharman et al., 2016). Meal-specific prompts built into the questionnaire, reduced retention intervals, and chronological reporting order can help mitigate some reporting errors in these younger adolescents (Graziose, 2017; Tugault-Lafleur et al., ; Tugault-Lafleur et al., 2017). When assessing the diets of Indigenous adolescents, many of whom live in remote communities, access, and therefore greater time and expense, must be taken into account, and sensitivity to the possibility of food insecurity in the community should also be considered. Culturally appropriate measurement tools (i.e., assessment methods that include language appropriate to the population

and foods relevant to the community) developed in partnership with community leaders are critical (Cidro et al., 2015; Cidro et al., 2018).

Diet quality indices can be used to measure the quality of diets at the population level and use a scoring system to assign points for following a dietary pattern (Jessri, Ng, & L'Abbé, 2017).

Many diet quality indices exist; most have common elements but there is no standardised indicator (Kant, 1996). The population under study must be considered in order to choose a suitable index. The Canadian Healthy Eating Index 2009 (HEIC-2009) was based on Canadian modifications to the 1995 US Healthy Eating Index (Kennedy, Ohls, Carlson, & Fleming, 1995) and developed, using the online WEB-Q (Hanning et al., 2009), with children and adolescents in mind (Woodruff & Hanning, 2010). Scores range from 0 – 100, with 100 being a perfect diet quality; diets can be categorised as 'poor' (HEI-C score: ≤ 50), 'needs improvement' (HEI-C score: 50 to 80) or 'good' (HEI-C score: ≥ 80).

Prior to the start of the current project, no dietary data specific to the study communities were available. In a survey conducted among students in the HG school district (SD 50) in 2018, 18% of students ($n = \sim 200$, age 12 to 18 years) reported never eating breakfast on school days with 6% never eating lunch; 42% reported sometimes eating breakfast; 42% sometimes eating lunch and 13% sometimes eating dinner; and 13% reported sometimes/often/always going to bed hungry due to insufficient money for food at home (McCreary Centre Society, 2020). The same survey asked students which of the following foods they had eaten on the previous day. Foods reported as eaten 'once or twice' were: fruit (68%); vegetables or salad (61%); traditional foods (34%); food grown/caught by the student or their family (38%); sweets (66%) and fast food (34%) (McCreary Centre Society, 2020).

The Learning Circle (LC) approach, described in detail in Section 3.3, is a community engagement practice that works at individual and community levels with a collective aim to promote partnerships between community members with common interest; the LC can be adapted according to the wishes of the community and can therefore accommodate diversity in context between communities (Roussos & Fawcett, 2000; Trickett et al., 2011). The LC:LHF2S project aimed to enhance access to local, healthy and traditional foods within four participating Indigenous communities. Each partner community in the LC:LHF2S initiative was free to choose their own methods of evaluation, and two communities, Haida Gwaii, B.C., and Ministikwan Lake, SK chose to conduct a community survey based on the online WEB-Q survey (Hanning et al., 2009), adapted to explore student views on the gardening and lunch programmes available in their schools. The survey also aimed to assess dietary intakes and perceptions of healthy eating among students at the school using a 24-hour recall of the previous school day, a FFQ including frequency of consumption of traditional foods, meal frequency questions, questions about social aspects of eating, and likes/dislikes of certain foods.

The Cancer Risk Among Youth Survey (CRAYS, 2017) was a survey of a range of health risks, including diet, carried out in all Canadian provinces with the exception of Manitoba, New Brunswick, Prince Edward Island, and the 3 territories. Results from CRAYS are included in this thesis to provide a national context regarding dietary intake and location of consumption and sources of food for breakfast and lunch among Indigenous Canadian adolescents as compared with Canadians in the general population (Propel Centre for Population Health Impact, 2018). This will provide context for the community-specific data from the WEB-Q surveys.

This chapter is organised as follows:

The **objectives** and **methods** for the study are followed by the **results** from the two surveys (school surveys and CRAYS) and a **discussion**, which compares the findings of this study to the wider literature, presents some **limitations**, and reflects upon **lessons for future research**.

Throughout, the school surveys from Haida Gwaii and Ministikwan Lake are presented first, in that order, followed by the national-level CRAYS data.

4.2 Objectives

For the analysis of community-specific school surveys conducted in Haida Gwaii (HG) and Ministikwan Lake (MK):

- Objective 1: To assess dietary intakes using 24-hour recall and food frequency questions among students in grades 6 – 12 at included schools.
- Objective 2: To describe food preferences and perceptions of healthy eating among these students.
- Objective 3: To investigate the frequency of consumption of traditional foods and likes/dislikes of traditional foods among these students.

For the analysis of Cancer Risk Assessment in Youth Survey (CRAYS):

- Objective 1: To assess the dietary habits and eating behaviours of self-identifying Indigenous youth aged 12 – 18 years in Canada (other than those attending reserve-based schools), specifically, self-reported food frequency of healthy and unhealthy foods and beverages over the previous day, self-reported source of breakfast and lunch, and self-reported consumption of energy drinks.
- Objective 2: To compare dietary habits and eating behaviours of Indigenous youth with youth who identify as non-Indigenous matched for age/grade and sex.
- Objective 3: To explore regional differences (West, Central and Eastern Canada) in the patterns of dietary behaviour among self-identifying Indigenous adolescents compared with non-Indigenous adolescents.

- Objective 4: To investigate socio-demographic factors (for example socio-economic status, urban/rural setting and mother's education) associated with dietary intake.

Final Objective: To compare the dietary behaviours of students attending schools in HG and MK, using data from the school surveys, with those of off-reserve Indigenous students across Canada, using data from the CRAYS study.

4.3 Methods

The study design and sampling, survey development and data collection, and data analysis for each survey (school surveys and CRAYS) are presented separately in this section, beginning with the school surveys in HG and MK.

4.3.1 School Surveys in Haida Gwaii and Ministikwan Lake

4.3.1.1 Study Design and Sampling

The school survey used is a cross-sectional survey designed to explore student views on the school gardening and lunch programmes available in Ministikwan Island Lake School, SK, and four schools in HG as part of the LC:LHF2S partnership in the school community. The survey also aims to assess dietary intakes and perceptions of healthy eating among students at the school using a 24-hour recall of the previous school day, a FFQ including frequency of consumption of traditional foods, meal frequency questions, questions about social aspects of eating, and likes/dislikes of certain foods.

Ministikwan Island Lake School is located in the remote Cree speaking community of Ministikwan First Nation, situated in North-western Saskatchewan nearly one hundred kilometres west of Meadow Lake. Ministikwan Island Lake School includes students from Kindergarten to Grade 12, as well as adult learners; approximately 340 students were registered in the 2017 – 2018 school year. The students that attend the school are from the local and surrounding communities; the majority of students in the school identify as Indigenous. All 150 students in grades 6 – 12 (aged 9 to 18) were invited to participate in the survey and all students (n=84) attending on the day of the survey participated.

In HG, four schools were invited to attend: Masset Elementary, *Gudangaay Tlaats'гаа Naay* Secondary School (GTN), *Sk'aadгаа Naay* Elementary School and *GidGalang Kuuyas Naay* Secondary School (GKNS). All students in grades 6 to 12 in these schools were invited to participate and all students (n=93) attending on the day that the survey took place completed the survey.

4.3.1.2 Parental Consent

Passive parental consent was obtained by sending an information letter and contact information home with each student. For MK, assenting students in grades 6 - 12 attending school on Wednesday, 16th May 2018 completed the survey in class. For HG, assenting students in grades 6 - 12 attending school on Thursday 27th June 2019, Tuesday 17th December 2019, Friday 17th January 2020 and Tuesday 17th January 2020 completed the survey in class. It was important that the survey was not scheduled on a Monday due to the 24-hour recall component of the survey. Ethical clearance was received from the Office of Research Ethics at the University of Waterloo, as part of the evaluation activities for the Learning Circles: Local Healthy Food to School Study (ORE# 30819).

4.3.1.3 Survey Development and Data Collection

The survey was adapted from the Waterloo Web-Based Eating Behaviour Questionnaire (WEB-Q), an on-line 24-hour dietary recall, previously validated with students aged ≥ 12 years (grade 6)⁴. Additional questions included food frequency questions and questions about food preferences adapted from those used in the Nourishing School Communities Study, University of Waterloo and the Cancer Risk Assessment in Youth Survey (CRAYS). Open-ended questions

about food preferences, and the school lunch and gardening programmes identified by a committee of students from Ministikwan Island Lake School (facilitated by the Learning Circle Evaluation Facilitator (LCEF), Island Lake First Nation), and by a the Haida Foods Committee (assisted by the HG community dietitian) were also included (Appendix I).

In MK, the survey was pretested by the School Principal, LCEF, and members of the Student Council using school iPads. The survey was adapted based on the feedback, and the school logo added to the survey. A pilot test of the survey was carried out on 22nd June, 2017 (n=22).

The survey was completed using iPad tablets provided by the schools. Each student was given a unique login and password to maintain confidentiality. The survey is managed and supported by PeaceWorks Technology Solutions, Waterloo (<https://peaceworks.ca/web-q>), and data from the survey, including nutritional content of the foods selected, were directly transferred electronically to PeaceWorks Technology solutions. Extracted data were summarised on an Excel spreadsheet and e-mailed to the University of Waterloo.

4.3.1.4 Data Analysis

MS Office Excel for Mac (Version 16.43) was used for data processing and analyses.

Reported energy intakes were checked and those below 500 kcal/d and above 5,000 kcal/d were reviewed for plausibility. Some participants (n=5) were excluded from further analysis due to implausible energy intakes (<200 kcal/d, >6000 kcal/d, n=3) and incomplete survey completion that precluded accurate analysis (missing values relating to age and sex, n=2).

Descriptive statistics were used to summarise sociodemographic characteristics of the sample, along with food group and nutrient intake from 24-hour recall and FFQ, meal frequency,

frequency of consumption of traditional foods, food preferences, and student views on school lunch and gardening programmes. Means and standard deviations were calculated as appropriate, along with median and range.

Due to a lack of specific guidance on food group serving numbers in the 2019 Canada's Food Guide, results were compared with Canada's Food Guide (2007) recommendations for adolescents, by gender and age-group (Health Canada, 2007; Patte, Laxer, Qian, & Leatherdale, 2016). Twenty-four-hour recall data was analysed according to the 2015 Canadian Nutrient File (CNF) (Health Canada, 2015). The 2007 version of Canada's Food Guide for First Nations, Inuit and Métis (CFG) (Health Canada, 2007) and [CNF serving size specifications](#) were used to analyse servings of foods included in the survey. Vitamin, mineral and fibre intakes were compared with the Dietary Reference Intakes (DRI), Estimated Average Requirements (EAR), Adequate Intakes (AI), and macronutrient intakes according to the Acceptable Macronutrient Distribution Range (AMDR); food group intakes will be compared with CFG recommendations (Health Canada, 2010) specific to age and sex.

Diet quality was assessed using the HEIC-2009. Points were assigned based on the intake of nine food categories, and a score calculated from adding up the points (Appendix J). Scores range from 0 – 100, with 100 being a perfect diet quality and diets were categorised as 'poor' (HEI-C score: ≤ 50), 'needs improvement' (HEI-C score: 50 to 80) or 'good' (HEI-C score: ≥ 80).

4.3.2 Cancer Risk Among Youth Survey (CRAYS)

4.3.2.1 Survey Description and Funding

CRAYS was a cross-sectional, provincially generalisable, cross-Canada survey of health behaviours associated with cancer risk that was conducted, in class, in a sample of secondary school students between January – December 2015, and January – December 2017. The data used in this study was taken from the 2017 survey.

CRAYS was funded by the Canadian Cancer Society Research Institute and the Canadian Institutes of Health Research, and implementation was coordinated by the Propel Centre for Population Health Impact at the University of Waterloo. Ethical clearance was received from the Office of Research Ethics at the University of Waterloo. Application for access to the dataset was made to the Propel Centre in February 2018, and granted in July 2018 (Appendix K)

4.3.2.2 Study Design, Sampling and Recruitment

CRAYS was a cross-sectional study of a number of factors related to cancer risk, such as tobacco use and nutrition, as well as core influences that might encourage youth to engage in such behaviours: bullying; mental health; and school connectedness (Bhawra et al., 2017) . Data relevant to this study include demographic data, and those related to nutrition (see Appendix L) (Propel Centre for Population Health Impact, 2018).

In 2017, schools from British Columbia, Alberta, Saskatchewan, Ontario, Quebec, Nova Scotia and Newfoundland were randomly selected using simple random sampling and invited to participate in the survey. The same provinces participated in 2015. All participating schools

received a school-specific profile, two summaries of their survey results, and a \$100 honorarium in appreciation of participation (Propel Centre for Population Health Impact, 2018).

The target population for CRAYS was Canadian youth and adolescents aged approximately 14 - 18 attending private, public, and Catholic secondary schools and registered in grades 9-12 in Ontario, Saskatchewan, British Columbia; grades 10-12 in Newfoundland, Nova Scotia, and Alberta; secondary III-V in Quebec. Schools in Manitoba, New Brunswick, Prince Edward Island and the three territories were not included in the study; schools with < 20 students in one eligible grade (grades 9-12 in ON, SK, BC; grades 10-12 in NL, NS, and AB; secondary III-V in QC) and students attending special schools (i.e., those for visually- and hearing-impaired, special needs, First Nation Reserve schools and schools located on military bases) were also excluded (Propel Centre for Population Health Impact, 2018).

To obtain a sample of students, a cluster design was used in which schools were selected based on simple random sampling, by province, without any additional strata. Once a school was selected (n=483), the relevant school board was then approached for permission to carry out the survey (n=173) (Figure 4.1). A sampling frame was developed by the Propel Centre using the Propel School Database which is revised yearly and provides an up-to-date list of schools for the sampling frame (n=2459) (Propel Centre for Population Health Impact, 2018).

School boards and schools were recruited through several methods, including email and follow-up calls. Once a school board had been successfully recruited (n=99), randomly identified schools within that board were approached to participate. Schools without school boards were approached directly, and within recruited schools, all eligible students, with permission, who attended school that day were invited to participate. A standard invitation package was used to invite selected schools. A total of 50 school boards, 80 schools and 15,191 students participated

in CRAYS 2017 across all participating provinces (Propel Centre for Population Health Impact, 2018) (Figure 4.1).

School boards and schools were responsible for determining methods for obtaining consent, and a mix of active permission protocols and active information-passive permission methods were used. Students were able to decline to participate on the day of the survey. At the school level, 18% required active permission, and 82% active information-passive permission. The student response rate ranged from 34% - 81%, with an average of 56% (Propel Centre for Population Health Impact, 2018).

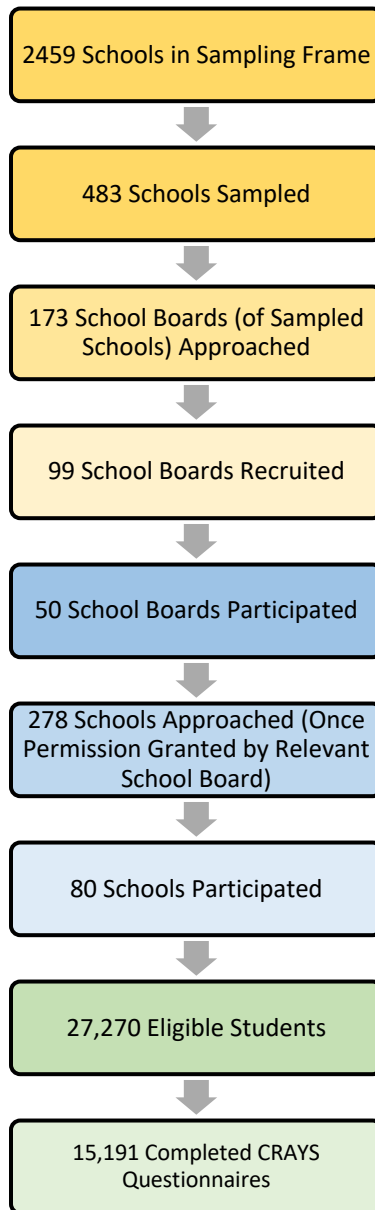


Figure 4.1: Recruitment and participation numbers of school boards, schools, and individual students in CRAYS 2017, shown chronologically.

4.3.2.3 Survey Development and Data Collection

CRAYS 2017 was based on CRAYS 2015 with some updated content. CRAYS 2015 was developed in consultation with experts in the field, using selected questionnaire items from current and past versions of national and provincial surveys (e.g., Canadian Student Tobacco,

Alcohol and Drugs Survey (CSTADS; formerly the Youth Smoking Survey) to facilitate comparisons, pilot tested and revised where appropriate. Food frequency questions were developed through a strong, multistage process involving cross-Canada consultation with dietitians, public health and education that included an inspection of other Canadian health surveys (national and provincial), an evaluation of past reports and indicators developed by Canada's National Advisory Group on Monitoring and Evaluation, and reliability and validity (face and criterion) testing of the question items (unpublished data). The questions are also used in other school-based surveys in Canada (Cameron et al., 2007).

Data were collected between January and December 2017 (N=15,191). The (paper) surveys were administered by teachers during class, and administration, including detailed instructions, took approximately 35 minutes. Students placed their surveys into envelopes, which were then sealed and sent to the University of Waterloo. Surveys were machine-scanned using Optical Mark Recognition (OMR) technology, and incomplete surveys (390 surveys - 2.6%) removed (Propel Centre for Population Health Impact, 2018).

4.3.2.4 Data Analysis and Statistical Procedures

The dataset was received from Propel in July 2018. SAS® Studio version 3.7, Toronto, Canada was used for data processing and analyses.

Descriptive statistics were used to summarise sociodemographic characteristics of the total sample, by province, ethnicity, and rural/urban place of dwelling. Students were asked 'Do you consider yourself an Indigenous person (First Nations, First Nations Non-Status, Métis, Inuk [Inuit])?'. Urban/rural designations were obtained from each school's postal code, as defined by the Government of Canada (Statistics Canada, 2018), and a socio-economic status (SES)

variable was derived from the median household income of the area where the respondent's school was located according to Canadian 2016 census data, divided into quintiles as done previously by Statistics Canada.

Dietary behaviours were obtained in part from responses to two, multiple component FFQ survey questions; Mondays were not avoided, hence data represented Sunday to Thursday intakes. Each student was asked, 'Yesterday, from the beginning of the day to the very end of the day, how many times did you eat any of the following foods?' for the following: a) salty snacks; b) French fries or fried potatoes; c) pizza or pizza snacks; d) chocolate bars and other sweetened items like pastries and squares; e) ice cream, an ice cream bar, frozen yoghurt, a popsicle etc.; f) fruit, not including juice; g) dark green vegetables; h) dark orange vegetables; and i) other vegetables. Each student was also asked, 'Yesterday, from the beginning of the day to the very end of the day, how many times did you drink any of the following?' for the following drinks: a) plain milk or soy beverage; b) flavoured milk or soy beverage; c) 100% fruit juice or vegetable juice; d) fruit-flavoured drinks; e) regular (non-diet) pop, soft drinks, or sports drinks; f) diet pop or soft drinks; and g) high energy drinks. Examples were provided for most categories of food and drinks, but not portion sizes. Variables based around the food groups listed as part of Canada's Food Guide (2007) (Health Canada, 2007) were derived from responses to these questions; 100% fruit juice or vegetable juice was included in the 'Fruits and Vegetables' variable as per Canada's Food Guide 2007.

- Other Foods variable was derived from responses to foods (a), (b), (c), (d) and (e).
- Fruits and Vegetables variable was derived from responses to foods (f), (g), (h), (i), and drinks (c)
- Milk and Alternatives variable was derived from responses to drinks (a) and (b)

- Sugary Drinks variable was derived from responses to drinks (d) (e) (f) and (g)

Other dietary behaviour variables included questions about where the participant obtains and consumes breakfast and lunch and the last time the participant consumed an energy drink.

Response options for dietary variables (0, 1, 2, up to 6+) were treated as continuous when assessing their associations with sociodemographic characteristics. When estimating their associations with region, SES and urban/rural locale, response options were defined dichotomously as 'high intake' (\geq median) and 'low intake' ($<$ median).

Means, 95% confidence intervals (CIs) and standard errors were calculated using the command 'PROC SURVEYMEANS' for sociodemographic characteristics and dietary behaviours.

Standard error was included to estimate how far the sample mean is from the true population mean. Associations between dietary intake and/or behaviours and selected

demographic/sociodemographic characteristics were calculated using p-values, Chi-squared tests (PROC SURVEYREG command) and adjusted for differences in key variables (grade, sex and mother's education) using logistic regression (PROC SURVEYLOGISTIC) (Objectives 3 and 4).

Adjustment was made for sampling design using the recommended variables for strata, cluster, and weight (Propel Centre for Population Health Impact, 2018), and a p-value of < 0.05 was considered to indicate statistical significance.

4.4 Results

4.5 Study 1: Haida Gwaii and Ministikwan Lake

4.5.1 Sociodemographic Characteristics

The online survey in HG was adapted from a similar survey used in MK by members of the HG community advisory committee and administered between June 2019 and January 2020. Ninety-two students from Masset Elementary (n=32), GTN High School (n=20), SNES Elementary (n=13) and GKNS High School (n=27) completed the survey. Age ranged from 11 – 17 years with a mean age of 13.6 years. 48% of the sample was female.

The survey in MK was administered in May 2018 and completed by 79 students. Demographic characteristics can be seen in Table 4.1. Ages ranged from 11 – 18 years, with a mean age of 14.2; 48% of the sample was female.

Table 4.1: Sociodemographic Characteristics of the Sample

	Haida Gwaii (n=92)	Ministikwan Lake (n=79)
Age (y)	Mean 13.6, median 14 (range 9 – 17)	14.2 ± 2.0 (range 11-18)
Sex M/F/Other (n)	48/44/0	37/38/4

4.5.2 Where Do Students Procure Food?

In HG, the majority of students procure their food from home, or at school. Morning and afternoon snacks were consumed at school by 48% and 20%, respectively (data not shown); Less than 2% report accessing any meals from a restaurant or fast-food outlet, and 33% of students reported not eating breakfast on the day before the survey (Table 4.2). In MK 35% percent of students reported not eating breakfast on the day before, and 17% reported not eating dinner

(Table 4.2). Three percent or less report accessing any meals from a restaurant or fast-food outlet, and almost one in five students consume morning and afternoon snacks at school (data not shown) (Table 4.2). Thirty percent procure food from a convenience or corner store more than 5 times a week, with 43% more than twice a week and 68% at least once a week (data not shown).

Table 4.2: Students Were Asked: ‘Where Did You Eat Yesterday?’

	n	Home	Another Home	In Transit	School	Restaurant or Fast Food	Other	Did not Eat
Haida Gwaii								
Breakfast	92	61%	0%	0%	3%	0%	1%	33%
Lunch	90	13%	1%	0%	68%	2%	3%	10%
Dinner/Supper	91	96%	5%	0%	0%	0%	1%	2%
Ministikwan Lake								
Breakfast	77	54%	4%	0%	6%	0%	0%	35%
Lunch	75	24%	1%	1%	60%	0%	3%	11%
Dinner/Supper	76	68%	8%	0%	3%	3%	1%	17%

4.5.3 Traditional Foods

Students were asked which about a range of traditional food-related activities had they taken part in through school in the past year. In HG, 82% of students reported being involved in at least one traditional food-related activity; 42% reported preparing wild game and fish, 60% of students reported taking part in cooking activities, and 74% reporting eating traditional foods. In MK, 87% of students reported being involved in at least one traditional food-related activity (Table 4.3). For both communities, as can be seen in Chapter 3:, activities that occurred at school, versus off site, were most common.

Table 4.3: Students Were Asked: ‘In the Past Year, Through School, Have You Observed or Participated in any of the Following Traditional Food-Related Activities?’

Activity	Students engaging with activity in Haida Gwaii (n=92)	Students engaging with activity in Ministikwan Lake (n=79)
Harvesting seafood	17%	10%
Hunting	11%	22%
Fishing	17%	29%
Gathering wild plants	25%	4%
Preparing wild game or fish (i.e., skinning, butchering, filleting, drying, canning, preserving)	42%	28%
Preparing wild plants (i.e., drying, canning, preserving)	20%	2%
Cooking	60%	47%
Eating	74%	63%

4.5.4 Consumption of Traditional and Locally Grown Foods, and Food Preferences

In HG, at least one form of traditional foods such as game, wild fish, and locally grown vegetables was reportedly eaten by 93% of the students; 33% would eat more game and fish if it was served in school and 49% would be willing to eat more locally grown vegetables if they were served as part of the school lunch programme (Table 4.4).

In MK, at least one form of traditional foods such as game, wild fish, and locally grown vegetables was reportedly eaten by 86% of the students; 32% would eat more game if it was served in school and 60% were willing to eat more locally grown vegetables (Table 4.4).

For these communities, environmental contamination was not a major barrier to the consumption of traditional foods as reported by students (85% and 72% answered ‘no’ to the question, ‘Do you have any concerns about environmental contaminants in locally grown, harvested or hunted foods?’ in HG and MK, respectively).

Table 4.4: Frequency of Consumption of Traditional and Locally Grown Foods

	Game	Wild Fish	Locally Grown Vegetables
Haida Gwaii			
How often do you eat	n=88	n=84	n=89
At least once a day	6%	4%	12%
5 or 6 times per week	17%	12%	17%
2 to 4 times per week	28%	36%	28%
2 to 4 times per month	31%	32%	25%
Rarely/never	18%	17%	18%
I would eat more if	n=82	n=79	n=82
My parents ate more	38%	22%	43%
My friends ate more	6%	6%	7%
My school provided this food at lunch	33%	33%	49%
I do not like this food	12%	11%	1%
Ministikwan Lake			
How often do you eat	n=79	n=74	n=77
At least once a day	15%	4%	22%
5 or 6 times per week	13%	8%	12%
2 to 4 times per week	13%	7%	16%
2 to 4 times per month	25%	12%	14%
Rarely/never	34%	67%	36%
I would eat more if	n=71	n=73	n=74
My parents ate more	34%	17%	23%
My friends ate more	1%	5%	9%
My school provided this food at lunch	32%	17%	60%
I do not like this food	23%	57%	4%

It was positive to note the acceptance of traditional and healthy foods. In both communities, berries, salad, and venison were popular. In HG, students reported that they enjoy eating Jum (fish soup) and wild fish, and students in MK enjoy eating moose meat – with the exception of salad, all of these are traditional foods in the regions under study (Table 4.5).

Table 4.5: Students Were Asked: ‘What Do You Think About These Foods?’

Food	n	Like	Not Sure	Don't Like	Never Tried
Haida Gwaii					
Berries	89	96%	3%	1%	0
Salad	89	73%	17%	10%	0
Fish Soup or Jum	90	57%	22%	15%	5%
Deer Meat -Venison	90	67%	15%	5%	2%
Bannock	90	55 %	14%	7%	23%
Wild fish	90	72%	15%	9%	4%
Ministikwan Lake					
Berries	76	97%	4%	0%	0%
Salad	75	71%	15%	7%	8%
Moose Meat	76	64%	24%	9%	3%
Deer Meat	77	32%	26%	22%	19%
Bannock	75	95%	5%	0%	0%
Hamburger Soup	77	71%	18%	5%	5%
Wild Fish	77	28%	18%	35%	18%

4.5.5 Dietary Intake

Encouragingly, healthful foods appear to be eaten frequently by these students. In HG, students reported green vegetables, orange vegetables, ‘other’ vegetables and fruit were eaten >2 times per week by 88%, 79%, 53% and 85%, respectively. However, some unhealthy foods were also eaten frequently. Salty snacks were eaten >2 times per week by 54% of students, candies and chocolate by 53%, and non-diet pop by 23% (Appendix M). In MK, green vegetables, orange vegetables, ‘other’ vegetables and fruit were eaten >2 per week by 62%, 53%, 59% and 70% of students, respectively. However, unhealthy foods were also eaten frequently. Salty snacks and French fries and other fried potatoes were eaten >2 times per week by 50% of students, pizza by 35%, candies and chocolate by 45%, non-diet pop by 46% and energy drinks by 26%.

(Appendix M).

For students in HG, food group intakes fell below 2007 Canada’s Food Guide recommendations for ‘Vegetables & Fruit’ (recommendation is 7/8 servings/day depending on age) and ‘Milk and Alternatives’ (recommendation is 3/4 servings/day depending on age). Target servings/day were met by all age groups except boys aged 14 – 18 for ‘Grain Products’ and ‘Meat and Alternatives’. Students in MK reported food group intakes also fell below 2007 Canada’s Food Guide recommendations for Vegetables & Fruit, Milk and Alternatives and Meat and Alternatives and that the largest number of servings of any food group consumed by these students was ‘Other’ – nutrient poor, energy-high foods and beverages (Table 4.6).

Table 4.6: Servings/Day of Food Groups for Adolescents Aged 9 – 18 Years.

Food Group*	Mean (SD) servings/day	Median servings/day	Range servings/day	Intake relative to target for age range (mean)
Haida Gwaii (n=92)				
Vegetables and Fruit**	3.24 (2.56)	2.8	0 – 11	Below target
Grain Products	6.68 (4.86)	6.0	0 – 23.5	Meets target†
Milk and Alternatives	1.85 (2.22)	1.3	0 – 14.9	Below target
Meat and Alternatives	2.23 (2.23)	1.9	0.1- 15.3	Meets target‡
Other	3.91 (3.78)	3.0	0 - 22	Above guideline§
Ministikwan Lake (n-79)				
Vegetables and Fruit	2.5 (2.7)	2.0	0 - 12.4	Below Target
Grain Products	5.4 (3.8)	5.0	0 - 15	Below Target¶
Milk and Alternatives	1.4 (1.6)	1.0	0 - 10.9	Below Target
Meat and Alternatives	1.5 (1.8)	1.1	0 - 9	Below Target
Other	4.6 (4.6)	3.4	0 - 21.5	

*2007 CFG; ** V&F includes 100% F&V juices; †With the exception of boys aged 14 – 18 where the target is 7 servings/day; ‡With the exception of boys aged 14 – 18 where the target is 3 servings/day; § Eat well by limiting food and beverages high in calories, fat, sugar or salt (2007); ¶ Grain target met by 9 – 13 M

On the day of the survey, the proportion consuming below the Estimated Average Requirement (EAR) for age and sex in HG was as follows. For adolescents aged 9 – 13 y, >70% of males (n=23) consumed below the EAR for vitamin A, D, calcium, potassium; >50% for vitamin B6, vitamin C, and >25% for vitamin B2, B12, folate, iron; >95% of females (n=23) consumed below the EAR for vitamin D and calcium, >40% for vitamin A, B6, B1, iron and folate, and >25% for vitamin B3, B12, C and zinc. For adolescents aged 14 – 18 y, >70% consumed below the EAR for vitamin A, D, calcium and potassium; >50% for vitamin B1, B6, C and folate; >25% for vitamin B2, iron and zinc (males n=22), and >70% for vitamin D, iron, potassium; >50% for vitamin A, B6, folate, calcium; >40% for vitamin B1, B12; and >25% for vitamin B2, vitamin C and zinc (females n=23). The fibre intake among these students was low on the day of the survey (11% above 26 g/day) and the saturated fat and total sugars intake was high (Table 4.7).

Table 4.7: Consumption Mean, Standard Deviation and Range of Macronutrients as Reported by Students in Haida Gwaii Compared with Reference Values for Age and Sex (n=92)

Nutrient (units)	Mean (SD) % of energy	Range	Recommended DRI	Meet recommendation?
Cals (kcal)	1841 (1071)	343- 5537	≥ 95% TEE*	N/A
Cal from fat (kcal)	598 (433) 32%	34 – 2119	25-35% of energy	27% below range, 35% above range
Cal from sat fat (kcal)	225 (165) 12%	12 – 787	Generally, <10% of energy	65% above recommendation
Protein (g)	75 (52) 16%	12 – 328	10-30% of energy	10% below range, 4.3% above range, majority within range
Carbs (g)	232 (124) 50%	25 – 695	45-65% of energy	31% below range, 22% above range
Fibre (g)	16 (9)	2 – 60	AI: 31 g/day (9-13 M); 38 g/d (14-18 M); 26 g/day (9-18 F)	6% all M above 31 g/d 11% F above 26 g/d
Total sugars: added & free (g)	83 (60) 18%	2 – 335	Sugars - added and free WHO: <10% energy†	80% > 10% of energy

*No height, weight or body composition data were collected to identify energy needs

AI = Adequate Intake – used when there is not enough information for an RDA

† (Liu, Munasinghe, Ohinmaa, & Veugelers, 2020)

On the day of the survey, the proportion consuming below the EAR for age and sex in MK was as follows. For adolescents aged 9 – 13 y, >70% reported consuming below the EAR for vitamin D, calcium and potassium; >50% for vitamins A, B3 and C, and >40% for folate (males n=17); >70% reported consuming below the EAR for vitamins A and D, calcium, potassium and zinc and >40% for vitamins B1, B2, B6, B12, C and folate (females n=14). For adolescents aged 14 – 18 y, >80% reported consuming below the EAR for vitamin D, potassium and calcium, >50% for vitamins A, B6 and C, and >25% for vitamin B1, folate, iron and zinc (males n=20); >80%

reported consuming below the EAR for vitamins A, B1, D, folate, calcium, iron and potassium; >60% for vitamins B2, B3< B6, B12, C and zinc (females n=24). The fibre intake among these students was low on the day of the survey (13% above 26 g/day) and the saturated fat and total sugars intake was high (Table 4.8).

Table 4.8: Consumption Mean, Standard Deviation and Range of Macronutrients as Reported by Students in Ministikwan Lake Compared with Reference Values For Age and Sex (n=79)

Nutrient (units)	Mean (SD) % of energy	Range	Recommendation DRI	Meet recommendation
Cals (kcal)	1749 (1210)	113 - 5416	≥ 95% TEE*	N/A*
Cal from fat (kcal)	583 (477) 33.3%	0.25% – 127%	25-35% of energy	23% below recommendation, 38% above recommendation
Cal from sat fat (kcal)	223 (194) 13 %	0.05% - 53%	Generally, <10% of energy	71% above recommendation
Protein (g)	61 (50) 14%		10-30% of energy	24% low; 1% high; majority in range
Carbs (g)	221 (152) 50%		45-65% of energy	28% low, 18% high, 54% in range
Fibre (g)	13 (9)		AI: 31 g/day (9-13 M); 38 g/d (14-18 M); 26 g/day (9-18 F)	13% (all) above 26 g/day; 6% (all) above 31 g/day
Total sugars: added & free (g)	77 (68) 18%		Sugars - added and free WHO: <10% energy†	High = 78.5%

*No height, weight or body composition data were collected to identify energy needs

AI = Adequate Intake – used when there is not enough information for an RDA

† (Liu et al., 2020)

4.5.6 Diet Quality

Using the Canadian Healthy Eating Index (2009) (HEIC-2009) as a diet quality index, in HG, 85% of the students were graded ‘poor’ or ‘needs improvement’; 15% of the student were graded ‘good’ with over 80 points. In MK, 99% of the students were graded ‘poor’ or ‘needs improvement’; 1% of the student were graded ‘good’ with over 80 points (Table 4.9).

Table 4.9: Proportion of Students Graded According to the Canadian Healthy Eating Index 2009*

Grade	Haida Gwaii (n=92)	Ministikwan Lake (n=79)
Poor: ≤ 50 pts	12%	40%
Needs Improvement: 50 – 80 pts	73%	59%
Good: ≥ 80 pts	15%	1%

*(Woodruff & Hanning, 2010)

4.6 Study 2: Analysis of Cancer Risk Assessment in Youth Survey (CRAYS)

4.6.1 Sociodemographic Characteristics

The socio-demographic characteristics of the survey participants are shown by ethnicity in Table 4.10. Approximately 10% of the sample self-identified as Indigenous, and of those, 43% were female, 50% male, and 7% chose the ‘other’ category. The highest proportion lived in Central Canada (Ontario and Quebec), with the majority of the remainder living in the western region; 57% lived rurally. Differences were seen between Indigenous respondents and non-Indigenous respondents for gender, rural/urban place of dwelling, and mother’s education.

Table 4.10: Sociodemographic Characteristics of the Sample, Stratified by Ethnicity (n=12724)*

	Indigenous (%)	Non-Indigenous (%)	P-Value
Gender (n)	1284	11267	
F	43.1	49.6	<0.001
M	50.2	48.6	
Other	6.6	1.8	
Age, years (n)	1284	11267	
13	0.2	0.7	
14	16.3	16.5	
15	23.3	25.2	
16	23.3	28.3	
17	26.2	22.6	
18	6.6	5.7	
19	3.4	0.8	
Grade (n)	1284	11267	
9	21.0	21.4	0.0627
10	26.2	27.0	
11	23.4	27.3	
12	29.4	24.2	
Region (n)	1284	11267	
East	3.0	3.2	0.0768
Central	59.6	70.2	
West	37.4	26.5	
Rural/Urban (n)	1284	11267	
Urban	43.5	68.5	<0.0001
Rural	56.5	31.4	
SES quintiles (n)**	1284	11267	
1	20.6	17.63	0.2781
2	5.7	9.4	
3	39.3	30.4	
4	7.5	7.3	
5	26.8	35.2	
Mother's education (n)	1256	11164	
High School or below	30.1	18.5	<0.0001
Some post-secondary education	8.1	5.2	
Completed post-secondary education	45.4	63.4	
I don't know or I don't have a mother	16.4	12.7	

* Adjusted for sampling design; p-value based on Chi-square analysis; **Derived from income variable DVHHINC (area-level)

4.6.2 Source of Breakfast and Lunch, and Food Purchasing Habits

Significant between-ethnicity differences were noted for source of breakfast and lunch reported by the sample. Indigenous students were less likely to consume breakfast at home, and were more likely to source breakfast at school, than non-Indigenous students, although the proportions consuming breakfast at school are relatively low. Similar patterns were seen for lunch:

Indigenous students were more likely to report never or infrequently consuming lunch at home and were more likely to source a free lunch at school, than non-Indigenous students Table 4.11.

Indigenous students were more likely to report purchasing food from a convenience store on a frequent basis (Appendix N).

Table 4.11: Reported Source of Breakfast and Lunch*†

Source	Indigenous	Non-Indigenous	Total	P-value
Breakfast Home	1270	11203		
Never	34.1	21.3	12644	<0.0001
Once or twice a week	21.2	14.7		
3-5 times a week	44.7	63.9		
Breakfast Free in School	1257	11016		
Never	80.0	89.3	12442	<0.0001
Once or twice a week	8.9	5.9		
3-5 times a week	11.1	4.7		
Breakfast Buy at School	1236	10909		
Never	81.9	89.4	12131	<0.0001
Once or twice a week	12.2	8.7		
3-5 times a week	5.9	1.8		
Breakfast Restaurant	1231	10926		
Never	81.3	85.1	12326	0.09
Once or twice a week	15.3	12.6		
3-5 times a week	3.4	2.3		
Lunch Home	1271	11156		
Never	35.6	22.4	12597	<0.0001
Once or twice a week	20.6	14.8		
3-5 times a week	43.8	62.8		
Lunch Free in School	1264	10903		
Never	78.9	91.3	12336	<00001
Once or twice a week	11.1	3.9		
3-5 times a week	9.9	4.7		
Lunch Buy at School	1264	10998		
Never	64.9	64.5	12262	0.4599
Once or twice a week	21.0	23.5		
3-5 times a week	15.1	12.0		
Lunch Restaurant	1268	11037		
Never	56.6	61.1	12305	0.0160
Once or twice a week	24.8	27.2		
3-5 times a week	18.5	11.7		

* Adjusted for sampling design; p-value based on Chi-square analysis. †Question asked participants about the school week only.

4.6.3 Dietary Intake

Significant differences were observed between ethnic groups for dietary variables (Table 4.12).

Indigenous students reported more frequently consuming sugary drinks on the previous day than non-Indigenous students. No significant differences were noted between groups for other food

categories. It is important to recognise that the number of times eaten is not the same as servings eaten.

These patterns were seen when the data were examined regionally – Indigenous students in all three regions were more likely to frequently consume sugary drinks, and in the Central and West regions, Indigenous students were more likely to frequently consume ‘other foods’ (Appendix N). However, no significant differences were seen between regions for any other food group. Higher frequency of sugary drink consumption was more likely for rural than urban Indigenous youth (‘high’ consumption urban = 62.8% (SE: 2.28) high consumption rural = 73.4% (SE: 2.39), $p < .0001$; $n = 1188$) (data not shown).

Table 4.12: Mean Frequency of Intake of Food groups (95% CI) [Times eaten the previous day*]

	Indigenous (n=1284)	Non-Indigenous (n=11267)	P-value
Other Foods¹	4.81 (3.94 - 5.68)	3.40 (3.21 – 3.58)	0.0017
Fruit and Vegetables²	7.12 (6.22 – 8.02)	6.56 (6.26 – 6.86)	0.1984
Milk and Alternatives³	2.03 (1.82 – 2.25)	1.85 (1.76 – 1.94)	0.0973
Sugary drinks⁴	3.62 (3.17 – 4.06)	1.89 (1.67 – 2.11)	<0.0001

*Survey participants were asked the following two questions relating to dietary intake: 1) “Yesterday, from the beginning of the day to the very end of the day, how many times did you eat any of the following foods?” for: (a) salty snacks; (b) French fries or fried potatoes; (c) pizza or pizza snacks; (d) chocolate bars and other sweetened items like pastries and squares; (e) ice cream, an ice cream bar, frozen yogurt, a popsicle, etc; (f) fruit, not including juice; (g) dark green vegetables; (h) dark orange vegetables; and (i) other vegetables. 2) “Yesterday, from the beginning of the day to the very end of the day, how many times did you drink any of the following?” for the following beverages: (a) plain milk or soy beverage; (b) flavoured milk or soy beverage; (c) 100% fruit juice or vegetable juice; (d) fruit-flavoured drinks; (e) regular (non-diet) pop, soft drinks, or sports drinks; (f) diet pop or soft drinks; and (g) high energy drinks.

¹ Other Foods variable was derived from responses to foods (a), (b), (c), (d) and (e).

² Fruits and Vegetables variable was derived from responses to foods (f), (g), (h), (i), and drinks (c)

³ Milk and Alternatives variable was derived from responses to drinks (a) and (b)

⁴ Sugary Drinks variable was derived from responses to drinks (d) (e) (f) and (g)

A significant difference was seen between groups for the self-reported frequency of consumption of energy drinks (Table 4.13). Indigenous students were more likely to report consuming any energy drinks than non-Indigenous students (71% ‘ever’ vs. 56% ‘ever’, respectively), and more frequently (Table 4.13). A similar pattern was seen for the consumption of an alcohol and energy drink mix, with Indigenous students being more likely to report consumption (45% ever vs. 27% ever) and more frequent consumption (Appendix N).

Table 4.13: Self-Reported Consumption of Energy Drinks (%) Stratified by Ethnicity*

	Indigenous (n=1284)	Non-Indigenous (n=11267)	P-value
I have never	28.9	44.3	
In the last 24 hours	9.5	4.1	
In the last 7 days	15.0	8.3	
In the last 30 days	13.2	9.6	
In the last 6 months	16.7	13.8	<0.001
In the last 12 months	5.5	6.2	
More than 12 months ago	10.6	13.0	
NS	0.5	0.6	

* Adjusted for sampling design; p-value based on Chi-square analysis

4.6.4 Factors Associated with Dietary Variables

No associations were found among self-identifying Indigenous adolescents by region (West, Central and Eastern Canada) for any of the dietary variables examined. Rural and urban place of dwelling, adjusted for grade and sex, was associated with frequency of intake of fruits and vegetables for Indigenous students; rural Indigenous students were more likely to report a lower frequency of consumption of fruits and vegetables than Indigenous students living in urban environments (OR 0.79, 95% CI: 0.64 – 0.98). Mother’s education, adjusted for student grade and sex, was negatively associated with a more frequent intake of sugary drinks for both Indigenous and non-Indigenous youth: youth whose mothers had completed post-secondary

education were less likely to frequently consume sugary drinks than youth whose mothers had a high school education or below (OR 0.72, 95% CI: 0.53 - 0.97 and OR 0.58, 95% CI:0.51 – 0.65 for Indigenous and non-Indigenous youth, respectively) (Appendix N).

4.6.5 Comparison of Dietary Behaviours from School Surveys with Data from CRAYS

Results from the school surveys is not directly comparable with the results from CRAYS.

However, it would appear that there are some similarities in results across the two surveys. The dietary intake of students in the on-reserve school of MK and the off-reserve schools in HG is high in fat and sugar, and low in fruits, vegetables and fibre. Indigenous youth in the CRAYS sample appeared to be more likely to more frequently consumed ‘other foods’, sugary drinks and energy drinks than non-Indigenous youth. Indigenous students in this sample (CRAYS) consumed breakfast at home never, or less frequently, and were more likely to source breakfast at school, than non-Indigenous students (34% vs. 21%) and similar proportions of students report not eating breakfast on the previous day in HG and MK (33% and 35%). Indigenous students in the CRAYS sample also appear to purchase food from convenience stores more frequently than non-Indigenous youth; and 30% of students from MK procure food from a convenience or corner store more than 5 times a week.

4.7 Discussion

4.7.1 Summary

The school surveys conducted in HG and MK show that, at the time of the survey, 33% of students in HG and 34% of students in MK did not eat breakfast the previous day; 17% of students did not eat dinner the previous day in MK. Dietary quality was poor among students in both communities, with a HEIC-score below 80 points for 84% and 97% of students from HG and MK respectively. Based on the data available, the dietary intake of students in the on-reserve school of MK and the off-reserve schools in HG is energy dense, and low in fruits, vegetables and fibre. Sugary drinks appear very popular among students in MK. Traditional foods (e.g., wild fish, moose meat) are enjoyed by students in both MK and HG, and in both communities, students indicated that they would eat more if these foods were served more frequently at home or in school.

Data from the national-level CRAYS survey indicates that Indigenous youth in this sample appeared to have a higher frequency of unhealthful dietary behaviours than non-Indigenous youth: they more frequently consumed 'other foods', sugary drinks and energy drinks than non-Indigenous youth. Indigenous students in this sample also seem to purchase food from convenience stores more frequently than non-Indigenous youth. Indigenous youth in this sample appeared to be more likely to dwell in rural locations and have lower levels of maternal education; the only factor that achieved significance in associating with the higher sugary drink consumption was lower maternal education which, in this off-reserve population was more common than in the non-Indigenous sample.

4.7.2 Interpretation

4.7.2.1 Dietary Intake

The 24HR diet recall data from the school surveys supports a general trend seen in other studies among Indigenous youth (Gates et al., 2015; Kolahdooz et al., 2018). At the time of the survey, students in both HG and MK reported consumption below the target recommendation for fruits and vegetables and milk and alternatives and reported consumption above the recommended guidance for ‘other foods’ category, although it must be noted that the majority of HG surveys took place in winter; studies have shown that seasons can impact dietary intake (Gates et al., 2016). Looking in more detail, on the day of the survey, these students reported diets containing high levels of fats and sugars and low levels of fibre and many key micronutrients, particularly calcium, and vitamins C and D across all age and sex groups, thus reflecting the food group data. The 24HR diet recall data is supported by the FFQ data in both communities, the FFQ data from the study conducted among HG school district (SD#50) students in 2018 (McCreary Centre Society, 2020) and also by FFQ data from the Indigenous participants in the CRAYS study, with high intakes, or high frequency of intakes, of ‘other foods’ and ‘sugary drinks’ reported. A statistically significant difference was seen in the CRAYS data between Indigenous respondents and non-Indigenous respondents for the frequency of consumption of ‘other’ foods and sugary drinks - Indigenous students reported consuming these food categories more frequently than youth in the general population. No significant differences were seen between groups for frequency of intake of fruits and vegetables, and milk and alternatives, although both groups reported low frequency of intakes at the time of the survey. Nevertheless, these observations are common to youth across Canada: evidence suggests that diet quality among all school-aged children living in Canada is poor (Garriguet, 2009; Tugault-Lafleur et al., 2017) - many do not

meet the national dietary guidelines for milk and alternatives, or fruit and vegetables (Garriguet, 2009; Minaker, L. & Hammond, 2016; Tugault-Lafleur, Barr, & Black, 2019). For example, just 44% of 12 – 19-year-old Canadians reported consumption of at least five fruits and vegetables per day in 2014 and dietary quality was below national recommendations (Statistics Canada, 2015). Sugary drink consumption among Canadians remains above recommended intake levels, particularly among adolescents (Czoli, Jones, & Hammond, 2019; Jones, Kirkpatrick, & Hammond, 2019), and Indigenous youth (Hopping et al., 2010). Taking into account all of the dietary intake studies published among Indigenous youth (Gates et al., 2015), the patterns observed in the current sample appear to reflect what is seen on a broader scale among Indigenous youth across Canada.

4.7.2.2 Milk and Alternatives

The below-target intake of milk and alternatives for the students in HG and MK is supported by the data from the CRAYS survey, and results from other studies (Downs et al., 2009; Taylor, J. P. et al., 2007). Milk and dairy products are not a common source of calcium for Indigenous populations; many Indigenous groups do not like dairy products and, traditionally, calcium intake would have been met through traditional foods (i.e., fish bones). Studies suggest that dairy products are very expensive in remote communities, further adding to a lack of incentive to buy them (Wendimu et al., 2018). The consumption of dairy products, and foods rich in calcium and vitamin D are important for bone growth and development and become particularly important at northern latitudes where sun exposure is inadequate to support endogenous vitamin D production for at least 6 months each year (Zhang & Naughton, 2010), and thus, this finding is a concern to long-term health.

4.7.2.3 Diet Quality

Dietary quality indices evaluate the combination of different nutrients, foods or dietary constituents in relation to current dietary guidelines and/or specific health outcomes and can be a useful measure in addition to more specific recommendations. A number of other diet quality indices specific to Canadian dietary intake recommendations exist (Godonou, Bocoum, & Koräi, 2020; Jessri et al., 2017; Marshall et al., 2014), but the HEIC-2009 was chosen as it was targeted at children and adolescents and had been developed using the online WEB-Q survey used in this study (Woodruff & Hanning, 2010). The HEIC-2009 diet quality index calculated for HG and MK shows that overall, very few of these students have what would be considered a ‘good’ diet when compared with CFG 2007, or 2019 guidelines (Bacon et al., 2019). Evidence from other diet quality studies indicate that average diet quality scores fall around adolescence (Garriguet, 2009), and that the diet quality of Canadian adolescents is generally poor (Jessri, Nishi, & L’Abbe, 2016). The inclusion of the HEIC-2009 provides a simple message that can be used by the communities when applying for funding for their local food work.

4.7.2.4 Health Consequences

In Canada, recent surveys report that almost 1 in 5 adolescents has obesity, with the 2012/2013 Canadian Health Measures Survey estimated that 23.0% of 10 – 14-year-olds, and 17.1% of 15 – 17 years-olds, are overweight (Rao et al., 2016). The relationship between poor dietary intake and chronic disease risk is clear (Drewnowski & Specter, 2004), including convincing evidence for association between a decreased risk of cardio-vascular diseases with increased fruit and vegetable consumption (Boeing et al., 2012), would lead to concern given the quality of the

diets revealed in this study. Healthy dietary patterns developed in adolescence are shown to continue into adulthood (Herman, Craig, Gauvin, & Katzmarzyk, 2009; Singh, A. S., Mulder, Twisk, Van Mechelen, & Chinapaw, 2008), and this is especially concerning given evidence that youth, who in Indigenous communities are at greater risk of type 2 diabetes due to higher rates of obesity than youth in the general population (Katzmarzyk, 2008).

4.7.2.5 Access to Convenience Stores and Fast-Food Outlets

Access to convenience stores and fast food in rural and remote locations is usually lower than access in urban areas, and encouragingly, the number of students from both HG and MK reporting that they frequent restaurants and fast-food outlets for meals is very low. Indeed, the HG advisory group recommended against including a question about where students procure food outside the home and school as it was felt that youth in this area had very little access to food from retail sources of any sort (Luongo et al., 2020). In contrast, 30% of students in MK procure food from a convenience or corner store more than 5 times a week, with 42.6% more than twice a week and 68.5% at least once a week, and the CRAYS data indicates that Indigenous students appear to visit convenience stores more frequently than non-Indigenous students. In these remote communities, meeting at a convenience store could be seen to be a social activity and a ‘treat’ for these youth, as there aren’t many other social activities (i.e., shopping malls, cinemas, arenas etc.) for youth to congregate at (Willows et al., 2009). In addition, fast-food can be seen as an affordable luxury in remote communities (Willows et al., 2009).

4.7.2.6 Meal Skipping and Location of Meal Consumption

A large proportion of students in HG and MK (33% and 34% respectively) reported that they did not consume breakfast on the day before the survey, and among the youth who completed the CRAYS survey, it appears that more Indigenous students skipped breakfast (34%) than youth in the general population (21%). Meal skipping has been associated in other studies with household food insecurity (Beaumier & Ford, 2010; Hamelin, Beaudry, & Habicht, 2002), and community members reported food insecurity challenges in a number of the communities (Section 3.4). In MK, 25% of students reported that they didn't eat dinner the day before, supporting the qualitative data indicating that food insecurity is a challenge faced by many families in this community (Section 3.7.2). Meal skipping has implications for learning and behaviour in schools (Bassett-Gunter et al., 2016; Belot & James, 2011), and must be considered in the context of the study. Meal skipping can be a result of time constraints (for preparing meals), and parents can struggle to provide their children with healthy foods for the school day due to a lack of affordable and accessible food in the community (Gillies, Alexander Research Committee, Farmer, Maximova, & Willows, 2019); food can be more costly in these remote locations (Wendimu et al., 2018).

4.7.2.7 Associations of Dietary Intake with Sociodemographic Characteristics

Associations were found between urban/rural place of dwelling and frequency of fruit and vegetable intake among Indigenous students: rural dwellers were less likely to have a higher frequency of fruit and vegetable intake. Mother's education was also important with students whose mothers had completed post-secondary education had a lower frequency of intake of sugary drinks compared with students whose mothers had not completed post-secondary

education. Evidence suggests that mother's education is a determinant of dietary intake quality (Faught et al., 2019), and an association with rural/urban locale has been noted in other studies (Dean & Sharkey, 2011; Hall, Moore, Harper, & Lynch, 2009; Minaker, L. M. et al., 2006).

4.7.2.8 Importance of Traditional Foods

Diets high in sugar, salt, and saturated fat, and low in fibre and micronutrients have been found to increase risk for diabetes among Indigenous populations in Canada (Gittelsohn et al., 1995; Sharma et al., 2010). This characterises the diet associated with the change from traditional micronutrient-rich diets to a reliance on manufactured, pre-processed and packaged foods rich in refined carbohydrates, sugars, salt, and saturated fats, with a concurrent decrease in physical activity levels (Damman et al., 2008; Kuhnlein et al., 2004; Reeds et al., 2016). Traditional foods have been shown to contribute higher quality, nutrient-rich diets when included in the diet (Kuhnlein & Receveur, 2007), and, while there was no way of determining the contribution that traditional foods made to the diets of these students, students in HG and MK appear to enjoy eating traditional foods (e.g., wild fish, moose meat) and also report enjoying salads and traditional fruits such as berries; this has recently been reported elsewhere (Hanemaayer et al., 2020). They also report a high involvement in traditional food-related activities and in both communities indicated that they would consume more traditional and local healthy foods if these were served more frequently at home and in school. Given the evidence on the health benefits of traditional food patterns for Indigenous populations (Kuhnlein et al., 2004; Reeds et al., 2016), it would appear that there exists a considerable opportunity in these communities (Murdoch-Flowers et al., 2019). However, local and traditional foods can be more costly than market foods, and this is a noteworthy barrier to accessing these foods in rural and remote communities.

4.7.3 Implications

Of published studies among Indigenous youth in Canada, the majority are conducted among those living in remote, isolated communities in Ontario and Quebec (Gates et al., 2015). The present study provides some valuable insights into the dietary intake of Indigenous youth attending off-reserve schools (HG and CRAYS), Indigenous youth in other provinces (SK and B.C.), and Indigenous youth living in urban environments (CRAYS).

Targeting the diets of children/youth via school programmes is a popular approach for encouraging healthy eating and addressing overweight and obesity in the Indigenous communities as school-based programmes are generally accepted and well-liked (Skinner et al., 2006). The Indigenous population is young compared to the non-Indigenous population, and overweight in childhood tends to continue into adulthood (Singh et al., 2008). These results indicate that a large proportion of the surveyed students consume foods in school and confirm that schools are a worthwhile location upon which to focus nutrition-related programmes, particularly in rural and remote areas. Other studies have advised that nutrition-related programmes be made culturally relevant to Indigenous students (Gillies et al., 2020), and the preferences reported by the students surveyed in HG and MK certainly indicate that traditional foods would be welcome as part of school food programmes. In addition, traditional food skills programmes are enjoyed by students and add another layer of richness to school-based programming (Gillies et al., 2020).

The updated Canada's Food Guide was released in 2019 and, while it is intended to be relevant to all Canadians it does not include specific guidelines for Indigenous populations (Health Canada, 2019). Given the importance of traditional foods for Indigenous communities, more

detailed appropriate dietary guidance would be a valuable resource. Healthy eating tools, specific to First Nations, Inuit, and Métis have not yet been released (Brake, 2019).

This work includes some valuable data on student perceptions of existing programming in their school and community which is lacking in many other studies. This feedback has local importance and also serves to emphasise the importance of school food provision for vulnerable youth.

4.7.4 Strengths and Limitations

This study has a number of strengths and limitations. The online WEB-Q school surveys were completed once by students in each of the two communities, as opposed to the gold standard of 3 recalls (Gibson, 2005), and the tool itself includes a small bank of foods. However, methodological rigour was balanced with feasibility and, given the challenges connected with dietary intake surveys among school children, the user-friendly survey (conducted online with a youth-friendly layout) combined with opportunities given to the communities to identify foods that were common to them meant that this survey tool was a good option. In addition, it offered 24HR recall data for Indigenous youth, of which there are few studies in the published literature and provided some valuable information on student perceptions. It is recognised that the sample size for the school surveys is small – this affects the validity and generalisability of the results. However, comparison with other studies is helpful for drawing conclusions about Indigenous adolescents across Canada.

Data from the school surveys and CRAYS are not directly comparable as the questions are asked differently in both surveys (e.g., for FFQ, ‘servings’ in the school surveys and ‘times eaten’ in CRAYS); in addition, CRAYS did not collect 24HR recall data. However, CRAYS offered

generalisable, cross-Canada data with a large sample of self-identifying Indigenous youth and enabled a broad-based comparison of the community-specific dietary intake from the school surveys to national level data.

4.7.5 Conclusion

Results from this study support other findings showing that Indigenous youth appear to have diets low in fruits and vegetables, milk and alternatives, and high in energy dense foods. While this is not unique to the Indigenous youth population in Canada, comparative data suggest that Indigenous youth more frequently consume sugary drinks than adolescents in the general population. Food insecurity can be a challenge in remote and rural Indigenous communities, and students in HG and MK report frequent consumption of lunch in school which underlines the importance of school programmes.

Findings also point to community strengths, including preference for nutrient-dense traditional foods and limited exposure to ‘fast’ foods and restaurant meals; encouragingly, students report enjoying learning about and eating traditional foods.

Chapter 5: Final Discussion. “Learning Circles: An Adaptive Strategy to Support Food Sovereignty in First Nations Communities”

“When we strengthen our connection to food, it brings back the traditions –so many of the traditions and the knowledge that has been lost, so food sovereignty is really about revitalising culture, and it’s connecting to the land, which is the essence of any culture” (LC Participant, 2018)

This chapter is organised as follows:

Prior to a **definition of food sovereignty** in the Indigenous context, results from study 1 and study 2 are **summarised**. Findings from study 1 and study 2 are then used to **demonstrate** how the LC model might contribute to food sovereignty in communities similar to those included in this thesis. **Strengths and limitations** of the overall work are followed by a reflection on **future directions** for research, and a **final conclusion**.

5.1 Summary

This thesis explores the stories of four diverse FN contexts over the time (2016-9) that they participated in the Learning Circles, Local Healthy Foods to School (LC:LHF2S) initiative: activities, influences and outcomes resulting in changes to the food system of each were documented and themes and lessons relating to the Learning Circles (LC) model and influences on local food systems in these communities were summarised in **study 1**. In **study 2**, the dietary intake and eating behaviours of students aged 12-18 in two communities were presented and

compared with diet and food behaviour data from the 2017 Cancer Risk Assessment in Youth Survey (CRAYS) of self-identifying Indigenous youth versus non-Indigenous youth aged 12 – 18 across Canada.

The central concern that prompted this research was that Indigenous adolescent populations living in Canada are at higher risk of food insecurity, chronic disease, and poor nutritional intake than adolescents in the general population (Kuhnlein, Receveur, & Chan, 2001; Piroo et al., 1996; Taylor et al., 2005). There are many factors that contribute to this picture, among them the sustained impacts of colonisation, including relative socio-economic disadvantage, and reduced access to healthy and traditional foods (Kuhnlein et al., 2004; Lambden et al., 2006; Taylor et al., 2005). Indeed, findings from this research verified these concerns: the work presented in **Study 2** of this thesis shows that while many adolescents across Canada also have suboptimal diet quality and food patterns, some challenges, like high sugary drink consumption, seem especially pronounced among Indigenous youth, as the cross Canada data from Indigenous and non-Indigenous participants in CRAYS (2017) reveals. Not only do youth living in the First Nations (FN) communities described here report low quality diets, high in fat and sugar, but they also report high proportions of meal skipping, particularly breakfast. Many students appear dependent on the contribution of school lunch programmes to their daily calorie intake, e.g., in this thesis, feedback from students and community members pointed to the importance of school nutrition programmes to address hunger and help provide access to healthy and traditional foods. Food insecurity remains a daily reality for some families living in these rural and remote communities.

However, the studies also illuminate many sources of strength within these youth and the communities in which they live. Youth in these communities have limited exposure to ‘fast’

foods and restaurant meals, and voices from the surveyed youth indicate that they value their culture and have preference for nutrient-dense traditional foods. These youth enjoy learning traditional skills and eating traditional foods; many of them would choose to eat more if there were opportunities provided to them, for example, 33% and 49% of students in Haida Gwaii (HG) and 32% and 60% in Ministikwan Lake (MK) indicated that they would eat more game and locally grown vegetables, respectively, if they were served in school. These findings underline the importance of school-based food programmes in Indigenous communities. In addition, leadership skills are being developed by the capacity building activities within the communities.

The results from **Study 1** show that LC:LHF2S is a flexible initiative that engages the broader community in planning and implementation to build upon community strengths and consolidate local food efforts, previously happening in an *ad hoc* way within the community, among both Indigenous and non-Indigenous community members; the LC approach also reaches beyond individual communities and includes sharing across communities. Data from HG show that sustainable initiatives can emerge from grassroots movements given enough funding, time, and commitment. Data from Hazelton/Upper Skeena (HZ) and MK show that partnership development and relationship building are an essential early component of a successful LC; community togetherness (including Indigenous ownership of the initiative) and multiple local champions are vital, and capacity building is important in smaller communities that face a number of social challenges. Data from Black River (BR) show that strong internal and external support systems are necessary; for example, despite support from community leadership the LCEF was called upon to support a number of other aspects of health and education. Therefore, there may be a level of capacity within the community that is required for the model to be effective.

The LC approach has been shown to be a feasible and appropriate way of engaging community to support access to local and traditional foods and associated knowledge and practices among Indigenous youth. The next section will demonstrate how the LC model could support food sovereignty among Indigenous communities in rural and remote locations.

5.2 What is Food Sovereignty, and How is it Defined in the Indigenous Context?

As outlined in Chapter 1: of this thesis, food security is defined by the FAO as “exist[ing] 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 in order to lead a healthy and active life” (FAO, 2006). Food security is a useful indicator, but it has been criticised for its lack of a strength-based perspective (Cidro et al., 2015; Power, 2008). In contrast, food sovereignty is a different concept, one linked to the autonomy and sovereignty of a people and that considers the cultural, political and environmental aspects of food systems (Masioli & Nicholson, 2010). Food sovereignty has been defined by Food Secure Canada as ‘...the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems’ (Peoples Food Policy, 2011).

Food sovereignty recognises both the people and the power inherent in food systems, aims to link production to consumption, and is linked with the OCAP principles (Desmarais, 2008; Wittman et al., 2010). The principles of Indigenous food sovereignty, as proposed by the Indigenous Food Systems Networks, are: 1) food is sacred; 2) active participation in land-based food activities; 3) self-determination of food systems and 4) supportive policy reform. The formation of relationships is also seen as an integral part of food sovereignty (Wittman et al., 2010).

A review of conceptual frameworks linking Indigenous food sovereignty to health identified seven practical ‘domains’, recognised by others as being important for effective development (Ray et al., 2019). These domains are listed below, and retain the spirit of the four principles of Indigenous food sovereignty:

- Policies and procedures
- Local food production and consumption
- Local/cultural knowledge and practice
- Self-determination and governance
- Social justice and equity
- Health of the land
- Adaptability and resiliency

These domains will be used in the next section to illustrate how the LC:LHF2S model might support food sovereignty in Indigenous communities.

5.3 How Findings from LC:LHF2S Suggest that this Model Could Support Food Sovereignty

The core of the principles listed above is that Indigenous people should have control over what and how they eat. The concept of food sovereignty was explicitly discussed by LC participants in interviews and other documentation on very few occasions but nevertheless, can be seen as a thread woven through the data, strengthening over time. The goals set by both HG and HZ incorporate food sovereignty principles, and capacity building work carried out by all of the communities contributed to the development of a more autonomous food system.

5.3.1 Policies and Procedures

The development of national-level policies such as [school food policies](#) are necessary, but beyond the scope of the LC model. However, in communities that had the requisite capacity, policies and procedures at the community level were developed by the participants connected with the LC.

Refocusing the school curriculum towards traditional practices was an aim of the LC in HG and HZ. Changes to school curricula relating to traditional practices and foods were written into the goals of the LC in HG and HZ with the aim of developing traditional food literacy through practical and theoretical ways. In HG, skills classes were carried out in school including those led by local Elders, and a seasonal calendar was developed with local Elders including the Haida names of foods and what and where to gather each month. In HZ, traditional foods were incorporated into art classes, and skills were learned in the school gardens. In addition, organisations that partnered with schools in HZ, such as Senden, were instrumental in facilitating hands-on learning and adding to what adolescents were taught in the classroom. The LCs in MK and BR did not include curriculum changes in their goals, but they did carry out LC activities among their students. In BR, the Cultural Exploration School Initiated Course, a provincially supported programme that recognises curricula developed by schools and school divisions to meet local needs and interests, provided an opportunity for students to learn more about their traditional heritage and culture while at the same time earning high school credits. In MK, a seasonal calendar was developed between youth and Elders during school hours and traditional foods skills, such as butchery, were demonstrated in school workshops. In addition to adjustments to school curricula, adherence to traditional protocols and the use of appropriate

language when talking about and referring to food was an important component of the learning circle work in all four communities.

Food safety policies were seen as a barrier to incorporating traditional foods into school meals in HZ, MK and BR. Food safety legislation relating to the consumption of hunted meats in schools was the main challenge, although steps taken by the community in HG (Section 3.5.2) to develop a safe abattoir for the procurement of culled deer meat from Parks Canada, has provided a possible template for other communities to follow (Parks Canada, 2020).

The School District responsible for schools in HG (SD #50) had nutrition interventions written into the outputs and outcomes section of its 2011 logic model (Section 3.5.2). While not developed by the LC in HG, this is an example of policy work that could be carried out via advocacy by LC members, as it has potential for high impact on the community.

5.3.2 Local Food Production and Consumption, and Local/Cultural Knowledge and Practice

Increasing food access and changing the food environment was a theme of the LC-related activity in all communities, and each community included activities that contributed to the production and consumption of local foods, focusing on youth, the connections between youth and Elders, and in HG, hospital food. Hand-in-hand, for the communities studied here, were activities relating to traditional food knowledge and practice. These activities are critical for working towards food sovereignty.

With the exception of HG, work among the community schools was a major focus of the work carried out by the LCs relating to foods and cultural knowledge. MK and BR had daily school lunch or breakfast programmes, respectively, and MK focused on school and community gardens, aiming to use skills within the community, for example, with permaculture. In HZ,

school lunch programmes took place in Majagaleehl Gali Aks School and NH Elementary School, and all three schools connected to the LC initiative introduced gardening and skills workshops for their students.

LC goals in HZ and HG pointed very much towards food sovereignty (e.g., ‘value local food and work to increase its value among community members’; ‘connect kids with a healthy food culture on the territories’) and learning traditional skills was central to the work of their learning circle. Four partner organisations in HZ were connected with food-based projects and all of the schools had gardens in which students were able to learn skills; partner organisations such as Senden provided skills training, and the Storytellers’ Foundation provided workshops teaching food preparation and preservation skills to local children.

In HG, the local food pantries were the main hub of the production activities as they served as a central point for the collection (purchased or donated), processing and distribution of local foods. Pantry staff also organised field trips, workshops and garden activities that were attended by school children, parents and other community members. The teaching at these events was often carried out by Elders; this served the dual purpose of connecting generations and providing valuable traditional skills. HG also had a hospital food programme, which involved working towards removing the ‘re-therm’ food and including local and traditional food on the menu. The significance of this to community members went far beyond nutritional value – but extended to the inclusion of culture, family and a consideration of Indigenous ways of well-being into the experiences of those staying in a Western-style hospital.

Student voices from the surveys have an important illustrative role when considering how the LC model contributed to this aspect of food sovereignty. The significance of the school lunch programmes, particularly that in MK, cannot be overstated; students recognised that some of

their peers come to school hungry and that the provision of the food also had an emotional connection as they recognised food as an expression of the care of the lunch programme coordinator. The quality and healthiness of the food was noted by many students as positive, and a number of students not only appreciated the fact that the food is made and served by students but valued that they got to learn through the programme. Students also reported an interest in consuming more traditional foods. This demonstrate the importance of the role that traditions have in the lives of these students and was encouraging for the older people in the communities who are concerned about the loss of culture among youth.

The price of local foods was reported to be a barrier to the consumption of local foods, and this, in turn, could impact the success of food sovereignty efforts among FN communities. Logistics, such as the availability of suitable food preparation equipment in schools, was also listed as a barrier.

5.3.3 Self-Determination and Governance

Engaging leadership and empowerment of the local Indigenous population was considered as crucial to the continued development and success of the LC in HG; indeed, one of the community's goals under the period of the CIHR Pathways funding was to transition to Haida leadership. The development of a memorandum of understanding between the research team and the Haida Foods Committee was very important on a practical level, but also symbolic of a new relationship and new levels of understanding.

In MK, the Island Lake School Student Council was invited to the LC meetings and encouraged to become involved in the decision-making process. The purpose of this was twofold: to build capacity and foster motivation within the youth themselves by giving them leadership

opportunities, and to learn their thoughts regarding the food-related needs within the school. Members of the Student Council were asked for their opinions on the current lunch programme and were influential in the development and implementation of the quantitative school survey. Their input was useful for informing and focusing LC activities.

In HZ, inter-community tensions were identified as a legacy of residential schools. These long-standing tensions, whether through distrust of colonial structures like schools or gardens, external researchers or non-Indigenous project leadership, may have influenced the commitment of Indigenous community members to LC:LHF2S and acted as a barrier towards the realisation of Indigenous food sovereignty through the initiative in this community; this is an example of respectful relationships being integral to the development of food sovereignty (Wittman et al., 2010). However, as described in Section 3.7.3, bridges were built over the course of time between Indigenous and non-Indigenous community members.

The LC model did not gain traction in BR, whether through local capacity or some other barrier. Nevertheless, the school had embraced traditional teachings and connection to the land as a means to connecting youth with culture and local food systems.

5.3.4 Social Justice and Equity

This domain focuses on access to traditional territories and the equitable participation and sharing of food system benefits. Ensuring access to traditional lands was not the focus of the LC model, but the initiative took place at the same time as other events such as the [Wet'suwet'en demonstrations](#), which happened close to HZ.

Opportunities to bring youth out onto the land were important, with most of these incorporating skills opportunities and chances to interact with and learn from Elders. Land-based learning is

important as it encompasses culture, family, food and land. Youth were found to be proud of the work they did outside on the land and valued the effort taken in growing and providing food for themselves, their families, and communities. A sense of purpose was seen to be fostered in youth as a result of these programmes, and Elders and older adults involved in the learning circle considered it a blessing to be able to do work on behalf of the children.

In HZ, a lack of Indigenous engagement with the project was perceived to stem from the model and project management being external to the Gitksan and possibly colonial associations with agriculture and western research. As a result, a number of on-reserve schools chose not to engage with the initiative. Similarly, the LC in the exemplar community of HG had been established independent of Haida leadership. The Haida community, while valuing the work, did not feel it was ‘their’ initiative (Section 3.5.2). Transitioning to greater Haida leadership involved the building respectful relationships and trust and adhering to OCAP principles for programmes as well as research.

5.3.5 Health of the Land

This domain focuses on protecting the integrity of territories and natural environment and was discussed by a number of community members and interview participants in interviews and group meetings. A number of communities were reluctant to share traditional wisdom and especially source locations for traditional plants or animals out of concern that traditional protocols would not be followed, or plants harvested in ways that did not ensure sustainability. A programme, not connected directly with the LC, is underway to protect traditional plants by culling non-native deer in HG (Parks Canada, 2020), and the traditional emphasis on

sustainability, and the positive impact that traditional ways have on the environment was discussed by a number of LC members.

5.3.6 Adaptability and Resiliency

A focus on the long-term sustainability of the initiative was a theme seen across HG, HZ and MK. Funding availability for school food programmes was a concern, along with funding for the infrastructure connected with these programmes. However, an economic benefit to the community was seen, particularly in HG, as result of investment in local foods. Building and enhancing capacity within the communities was also an emphasis of the LC work in all three communities listed above. Additionally, investment in youth was seen to build sustainability, for example, the student leadership council in MK, the gardens as mental health supports in HZ, and the teaching of traditional food skills across programmes.

5.4 *Conclusion*

The formation of strong relationships is an integral part of food sovereignty and it advocates for new relationships not just among people, but between people and the land (e.g., Wittman et al., 2010). This theme can be traced through the stories of the communities in this study.

Developing trust and community connectedness was critical to the forming of a strong LC partnership, and is integral to many of the domains mentioned above. Relationship building was seen to be driven by strong community champions, and food became the focal point of connection within all of the communities, breaking trails towards reconciliation, acceptance and trust.

Food sovereignty is of growing importance to Indigenous communities and there have been increased references to it over the past numbers of years in published literature. Food sovereignty has an integral role, not only in food and nutrition security among Indigenous populations, but as a path to Indigenous self-determination and reconciliation between members of Indigenous communities and non-Indigenous Canadians. It is encouraging that the LC model appears to a useful and adaptable strategy to support the development of food sovereignty in rural and remote communities.

5.5 Strengths and Limitations of the Overall Work

Strengths and limitations specific to each study have been previously described. The LC:LHF2S study was primarily a work for and by the communities, and the evaluation was guided by the priorities of the communities. Communities were asked for their definition of success prior to the planning of evaluations to ensure that the information gathered would be as useful as possible to them. This was important from the perspective of OCAP, and also adhering to the spirit of community-based participatory research.

Ideally, had the evaluation been planned from a perfect methodological point of view, comparable data would have been collected from each community, including multiple time-points (or at the very least, pre and post) of the school survey so change could have been seen across time. However, given the challenges that many communities were facing, for example an election in MK, only some communities had the capacity and readiness to plan for evaluation from an early stage.

The research team provided substantial guidance on evaluation methodologies appropriate to community work, for example asset mapping and photovoice, but ultimately the communities decided for themselves which evaluation methods would suit them best; these reflect the capacity within the community and the priorities of the LCEF. The thesis therefore is not pristine from a research design perspective, but the evaluation methodologies and results reflect community priorities.

In addition, while various members of the research team had the opportunity to visit each of the communities during the annual gatherings, communities chose to have evaluation data collected by community members familiar with community, language and culture. The research benefitted from the local cultural familiarity, though transcripts indicated that the training provided on

western research approaches to conducting interviews was not always followed when it came to avoidance of interviewer bias or probing for detail. Connected to this were issues of distance, planning, connecting and communicating between researchers and community members, which were difficult at times.

5.6 Future Directions

Looking to the future, the results from this study highlight a number of things that could be considered when thinking about local or traditional food work in predominantly Indigenous communities. First, thought should be given to the funding timescale. Three years is a brief time to see progress in a newly begun community-based participatory research project; a significant proportion of time was spent building community engagement and developing relationships and such progress is difficult to measure. The location and context of the community contributes to this. For example, the short growing seasons in northerly communities further limits the time available for growing or accessing local foods. Increasingly, research funding is being directed to communities themselves. However, not all communities have the human resources to capably apply for funding and conduct a range of evaluation activities. Hence, there may be a need to adjust research processes or enhance access to research allies who can work well with communities to support their needs.

Second, the amount of money available for such projects should be considered as well as budget allocation so that there is other money available for practical aspects of the projects in remote communities with challenging infrastructure. The initial vision of the Pathways funding in supporting project evaluation and not implementation was to ensure sustainability beyond the time of research project funding. This limited success in contexts such as ours where there was insufficient community or external partner funding to support local priorities. Moreover, lack of implementation funding may have contributed to distrust of the research process; communities might well question what the benefit of participation was for them. Thinking more broadly, it is worthwhile noting that where food insecurity is high, small grass-roots programmes will be

insufficient to address it. There is still a role for those movements when thinking about long-term food sovereignty and advocating for larger changes, such as national food policies.

Third, community findings point to strengths, including preference for nutrient-dense traditional foods and limited exposure to “fast” foods and restaurant meals and the importance of school food programmes. Targeting the diets of children/youth via school programmes is a popular approach for enhancing health in the Indigenous communities. Consistent with the need for such programmes to be culturally relevant, (Gillies et al., 2020), the preferences reported by the students surveyed in HG and MK certainly indicate that traditional foods would be welcome as part of school food programmes. In addition, traditional food skills activities are enjoyed by students and add another layer of richness to school-based programming. The focus on youth aligns with the [seventh-generation principle](#) – yet schools were also perceived, by some, as colonial structures that may have limited the Indigenous engagement in the current project. Communities and LC may prefer other ways to engage youth.

It is beyond the scope of this study to examine long-term outcomes of the initiative. In the new communities, participants felt that some relationships and initiatives would continue while others might be more dependent on external funding and the availability of a local champion. The future progress of the work begun here would be an interesting further project.

5.7 Final Conclusion

In conclusion, the LC approach is a feasible and appropriate way of engaging community to support access to local and traditional foods and associated knowledge and practices among Indigenous youth, and to support food sovereignty among Indigenous communities in rural and remote locations. The inherent flexibility of the model meant that each community could

prioritise activities of interest to them and could identify what success of the initiatives would look like and tailor evaluation processes accordingly. Indigenous leadership and multiple local champions are essential to the success of such initiatives, and thought should be given to amount of funding available, and to funding timescales for projects that require a high level of community engagement. Recommendations based on community input may help to enhance uptake of the model in other contexts and ongoing local food initiatives in similar communities across Canada.

This study documents a large amount of work carried out by the four communities over three years and celebrates their creativity, commitment to youth and great achievements. There were many examples of a reclamation of traditional food culture and a transition to greater food sovereignty. Many unique Indigenous school food-related initiatives were debuted here that may serve as an inspiration for other communities.

Chapter 6: Author's Reflections

This thesis has been written during a time of great change for Indigenous people in Canada and as such, captures a moment in time that appears to be quite unique in the country's history. The author moved to Canada and began work on her PhD in 2015, at a time coinciding with the release of the Truth and Reconciliation Commission Report. In the time since, the University of Waterloo has been working to develop a background on Indigenous culture and safety for its students, and there have been many societal changes relating to the cultural safety of Indigenous people in Canada, and reconciliation between Indigenous and non-Indigenous peoples and governance. The CIHR grant that funded this initiative was applied for by the research team in 2015, and at the time the Pathways funding strategy was revolutionary with the inclusion of Partners in Engagement and Knowledge Exchange – in our case, the Native Women's Association of Canada (NWAC-PEKES) and the requirement of annual gatherings and community partnerships. Within each of the partner communities, there has been transition over time relating to issues of self-determination, and a move towards greater food sovereignty, to which this initiative may have contributed.

The author has seen parallels with the growing efforts towards self-determination among Indigenous communities with the movement for cultural nationalism in Ireland in the late 1800s, where the increased importance of Irish language and sports in the struggle for independence from Britain led to the establishment of the Gaelic League and the Gaelic Athletic Association. Over time, this cultural nationalism gave strength to the movement for independence. She does not compare her experiences to those of Indigenous Peoples in Canada, but with her background she understands the visceral nature of traditions and the past. Moving to a different country has

illustrated to her how family, and community, and the land upon which one was born, reaches down to the very essence of one's being and how it shapes identity. In light of this, the impact of the recent and not-so-recent past on the identity and connection of current generations of Indigenous people to previous generations is extraordinary. Looking to the future, the strengths that lie within these communities are to be supported and celebrated, and the potential for a bright future for the youth of these communities to be sustained and honoured.

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Appendix

6.1 Appendix A: Semi-structured Interview Guide for Annual Interview of LCEFs, Community Members and Other Key Partners (Study 1)

Interview Guide

1. Introductions
2. What role do you play in your community in relation to the Learning Circles:LHF2S project? What is working well with the LC in your community/with LC healthy food to school? What are you most proud of? Anything you wish was going better?
3. What are the relationships that you in your role/your community have with other partners in this project (i.e. other communities, and/or university/NGO partners)? Probes: Do you feel that you learn from other partners? Is the networking/knowledge exchange aspect of the project valuable? How?
4. What are your thoughts on how First Nations/Indigenous communities have been involved in the Learning Circles project in your community/the project in general (depending on participant)? Probes: making decisions about things that affect them, being provided information, etc.
5. a) Why did you go to the annual gathering in 2017? b) What did you expect from the meeting? c) How were those expectations met?
6. Describe your experience at the gathering in Ministikwan. What did you learn, and what were the most valuable things you took away from it?
7. How did it differ from the other annual gatherings (if the participant attended those)? Probes: Was feedback about other gatherings taken into consideration? Was the 2017 gathering appropriate to the stage of the project?
8. What was challenging about the meeting? Was there anything that concerned you, or anything that you wish had been done differently?
9. What went well? How could it be made even better? What are some lessons we should take away for the next meeting? Any lessons for everyone involved?
10. What stands out to you as the most significant memory of the meeting? Probes: Why this one? Is it positive/negative? What associations does it have?

11. As you know, we received funds to bring youth to the gathering this year. Do you have any comments or reflections on the inclusion of youth to the gathering?

Bridge: We are also interested in learning about how the learning circles work has influenced foods and nutrition in your community. I wondered if you might be willing to respond to a few more questions.

12. Briefly describe the range of foods that are available in your community (local and non-local).
13. Describe the access the community has to non-local foods (local store?). Are they fresh (if applicable), and/or plentiful?
14. Does food availability change over the course of a year (i.e. spring, summer, autumn, winter)? How? Has the learning circles project influenced this/does it aim to influence, and if so, how?
15. From the start of the day, until the end of the day, describe the food that children receive at school (elementary and high school). Probe: Is the food provided as part of a universal programme, or do the families pay?
16. Before this project, what were the main ways that local foods found their way into the community diet? Probes: Who ate them? What happened to food that was left over? Could it be bought? What was happening in schools/field of education and/or skill development? Does learning relating to foods happen outside of school?
17. Have there been any changes in the way people eat since this project began? Probes: What changes? Why do you think that happened (or didn't happen).
18. Of the local foods available in your community which have you been able to integrate into school? Have students learned any traditional (or other) food skills?
19. I understand that the goals of your learning circle are X (insert as appropriate to the community). How has your community progressed in the area of food systems since your learning circles have taken place? Which partners are working together, and how are they working together? Have your partnerships changed over time? How are indigenous people involved in these activities?
20. What are the barriers (i.e. what gets in the way of) to providing more local healthy foods in your community/communities you work with? What can be done to remove these/what are you doing (what can be done) to change this?
Probes: i.e. social/political/financial/geographical/time constraints/motivation/food regulations.

Is there something we haven't discussed that you would like to add?

6.2 Appendix B: Interview Guide for Learning Circle Participants and Community Members
(Study 1)

Guide for Community Feedback about LF2S Learning Circle

April 13, 2018 (To be read to the participants)

Purpose of the conversations:

This conversation is part of the evaluation of the Learning Circles: Local Healthy Foods to School project. The purpose of the conversation is to help those involved with the project understand how the Learning Circle process is working in each community.

As part of the evaluation learning, we wanted to talk with you to learn about your thoughts and experiences with the Learning Circle and the local food system in your community.

Consent Review: Have you had an opportunity to read the information letter about the ~~interview~~ conversation? [if no, go over it with them]

I want to remind you that it is up to you to decide whether or not to take part in the conversation; however, given your role in the community and/or with the Learning Circle, your thoughts and ideas are important. With your permission, I would like to record the ~~interview~~ conversation. All information you provide is anonymous, in other words your name won't be linked with your conversation. We will not use your name in any reports or publications from this evaluation and your name won't be linked to any quotes we may use.

Do you agree to participate in this conversation?

YES NO

Do you agree to have the ~~interview~~ conversation audio recorded?

YES NO

Do you agree to the use of anonymous quotations in any publication that comes of this research?

YES NO

Do you have any questions before we begin the ~~interview~~-conversation?

1. What role do you play in your community in relation to the Learning Circles:LHF2S project? In relation to local, traditional food? When did you first get involved in the local food system?
2. A) What is working well with the LC in your community/with LC healthy food to school? B) What are you most proud of? C) Is there anything you wish was going better?
3. What are your thoughts on how Haida communities have been involved in the Learning Circles initiative? What about the program in general?

4. What are the barriers (what gets in the way of) to providing more local healthy foods in your community/communities you work with?
5. Have there been any changes (for example, the way people eat, food related activities, relationships, etc.) since this project began?
6. What do you know or think about the role of other organizations and groups involved with the Learning Circle (i.e. U of W, Native Women's association of Canada, Heart and Stroke Foundation, Farm to Cafeteria Canada)?
7. Is there anything we have not talked about that you would like to share?

Thank you for your time today. We will share the notes from the interview with you to make sure that we represent your thoughts correctly.

Name: _____

Signature: _____

Date: _____

6.3 Appendix C: Learning Circles Report [Template]

LC: LHF2S Report on Deliverables
[Date]

This report describes deliverables from [date]. Please provide a point form description of your activities related to each deliverable in this reporting period, what worked well and suggestions for improvements. If you have not conducted a specific activity, please describe any steps you have taken to date to work toward the goal, plans for achieving the goal, or an explanation of how the direction has changed. This report will help to inform our overall reporting to CIHR thus the documentation can provide an overview but does not need to include day to day specifics.

Deliverables	Description of Activities
1. [Community specific]	Briefly describe how [supporting community partner] supported the Learning Circle Facilitator in the reporting period:
2. [Community specific]	Briefly describe key accomplishments during the reporting period:
	Please list the community members (i.e. principals, teachers, Elders, youth, council, etc.) schools, and organizations that have been engaged in the Learning Circle initiative in [community]:
	Please describe how community members (i.e. principals, teachers, Elders, youth, council, etc.) have been engaged in the Learning Circle initiative in [community]:

Deliverables	Description of Activities
3. [Community specific]	Please describe any activities resulting from the Learning Circle and the ways in which the Learning Circle Evaluation Facilitator supported those activities:
4. [Community specific]	Please describe any evaluation planning, tracking (e.g. food procurement, menu tracking, documenting), or other evaluation related activities you have engaged in for this reporting period:
5. What is working well?	Please share any thoughts you have on what is working well:
6. What might be improved?	Please share any thoughts you have on what might be improved or challenges you have faced:
7. Other activities?	Briefly describe any other activities not covered above. For example, funding received, partnerships developed:

Thank you!

6.4 Appendix D: Student Guidelines for Photovoice

Photovoice Project Guide

A group of people in your community are coming together in a Learning Circle to talk about ways to bring more local healthy food to your school community. The project is supported by [local partner organization] in partnership with the University of Waterloo. We are inviting you to participate in the evaluation of the Learning Circle by taking pictures of the food and your experiences with food in your school community.

The goal of the evaluation is to:

- Understand your experiences with food in your school community
- Understand your perspective on where food comes from in your school community
- Understand your perspectives about what needs to change with respect to food in your school community

We understand that many students have phones that they use; if you don't have a phone, a camera will be provided to you as part of the project. Just a reminder that for this project while you are taking pictures, you must:

- Always ask someone before you take a picture of them. If a person says they would not like you to take their picture, DO NOT take it.
- Never take pictures of someone who does not give permission to be photographed
- Never take pictures in private areas (bathrooms, change rooms)
- Ask yourself "Would I like my picture taken in this situation?" If the answer is no, DO NOT take the picture
- Do not go anywhere you would not normally go to take pictures
- Remember the goal of the project when taking pictures – look for things you think are important to telling your story about the foods that are available in your community

Selecting pictures for discussion (to be tailored to the selection method agreed upon by the teacher and facilitator)

Before next week's discussion, you will be asked to:

- Have your parents review your pictures. Ask them to delete pictures they feel are not appropriate for class.
- Arrange computer time with your teacher (at school or at home with parents)
- Upload your pictures onto the computer
- Select up to 15 pictures for sharing in the class
- When picking pictures, make sure:
 - The picture is appropriate (see guidelines above)
 - Pictures represent your experiences with food in your school community, your perspective on where food comes from in your school community, your perspective on what needs to change with respect to food in your school community.

- Where: Places that affect what you eat
- Who: People that affect what you eat
- Why: Information that helps you decide what to eat
- Other: like price of foods you might choose
- The picture can be easily understood (not blurry)
- You remember where, when and why the picture was taken. Write this down so you remember for class discussion!

Appropriate behaviour for class discussion:

- Before class, I will pick my pictures and give them to my teacher
- I will bring my notes with the information for my pictures (where, when and why I took each picture)

Please remember:

- All questions are allowed
- Be truthful and honest – we want to hear about your experiences, so don't be shy to share
- Be respectful to others' opinions and pictures during the discussion
- What is shared in discussion should not be shared with others outside the classroom

Posting photos to social media:

- If your class would like to post photos to your school's Facebook page you will need to talk about it as a class and agree on which photos to share.
- **DO NOT** share any photos on social media that your class has not approved
- **REMEMBER** that sharing certain kinds of photos on social media without permission may be against the law

6.5 Appendix E: Draft Coding Framework

Code/Theme	Sub-theme	Examples
Food Environment/ Food Culture	Menu/menu planning	
	Availability	Food service equipment, e.g., salad bar, gardening eqpt Existing infrastructure, e.g., school garden Liz Williams at Gitwangak Education Society” They have a garden onsite and the kids do hands-on learning about growing food in the garden. They also have a smokehouse and the students learn every year about processing and smoking salmon. If they can get a moose they also process and smoke moose and oolichan. They try to go out berry picking every year also, though often huckleberries are too early for school year.” ^f
	Supply chain	Need to consider effects of food initiatives on local food economy and environment, e.g. procurement of food from local growers may have an impact on the local, struggling grocery store.
	Procurement	Note: Cultural significance of sharing - “Beautiful local food procured for LC: honey donated by farmer, locally milled and stone ground wheat, potatoes, carrots, beets, cabbage. Berries sourced from YouthWorks. Relationships with farmers strengthened.” ^f
	Tracking, e.g. donations	“Work towards developing a list of local foods available to be purchased when schools have funds to purchase local foods. Connect with local farmers to let them know about LC work.” ^f (note also farms open to school visits)
	health	HZ Rep: “their Community Planning process they also heard in communities that food security, chronic illness and health are key issues that need to be addressed and Gitksan people want to see positive change in these areas” ^d What is the definition of healthy food?

	Food culture	<p>Community Engagement Coordinator for Gitksan and Wet'su'weten, FNHA (First Nations Health Authority) : “She stressed that for Gitksan people the kinds of vegetables included in food programmes like a good food box or in school have to be things they're familiar with (potatoes, turnips, corn, cabbage) or they will just be thrown out. She feels education about growing and eating foods is important as a lot of Gitksan people are not vegetable eaters.”^c</p> <p>HZ rep: “traditional foods might be better received than "local" food and salad bars because many Gitksan and Wet'suwet'en people don't eat "greens" and don't want to be asked to eat foods they're not familiar with”^d</p> <p>See ^e for rich words of chief – re cultural of sharing and not always being paid for what is important.</p> <p>Local food and traditional food not necessarily the same thing.</p> <p>The way food is harvested is very important – we heard this from an elder from Haida Gwaii and also from interviews. Just because there is food available on the land does not mean that it's okay to just go out and get it. There may be cultural aspects and protocols related to food gathering that non-Indigenous people have to be aware of.</p>
	Definition of “local”	<p>In Haida Gwaii, local is “on island”</p> <p>Principal MGA “talked about how hard it is to think about local food when there are so many families that don't have access to any food at all and kids are coming to school hungry.”^d“ We decided that local means first looking for things that are harvested or grown on the Gitksan Territories, then the Northwest and then BC. We talked about how what is local depends on what season it is and that it is primarily about understanding the relationships that went into the food. Trade relationships were also highlighted, particularly those that traditionally existed between Gitksan people and their neighbours^e</p>

Relationships/partnerships	Contact	<p>“you need direct contact with the people who are actually preparing the food.”</p> <p>Developing relationships requires hands-on involvement</p>					
	Establishing relationships with different partners	LCEFs have reached out to Band, local Health, FN health Authority, local school administration, local school food service, community organization ^a					
	Building on existing relationships	<p>Senden Advisory includes Gitksan Hereditary Chiefs, Gitksan agencies, local farmers and gardeners, Elders and teachers^b</p> <p>Gitksan Cultural Teacher at MGA has done traditional food education and gardening at the school^c</p>					
	Levels	<table border="1"> <tr> <td>Youth/student</td> <td>“Getting students on board was easy”^a</td> </tr> <tr> <td>School</td> <td> <p>“many staff were resistant to the "extra" work involved in salad bar and garden”^a</p> <p>Cultural teacher an asset(e.g., established program on traditional plants^a</p> <p>“complex relationships and structural racism in our schools that came up in my conversation with Sandra and the challenges of engaging parents at the community level”^d</p> <p>Reaching out to schools and identifying their priorities impt: e.g., Principal NHE: “She would like to see more garden space for all classes and work on having planter boxes for each class. Would like to see support for students to access breakfast program in the village before coming to school because of the way the bus systems work and the little amount of time available for kids when they arrive at school.”^d</p> <p>Impt to find points of interest, e.g., for NHE teachers school gardening, connecting food literacy to teaching^e</p> </td> </tr> <tr> <td>Food Provider</td> <td>e.g., “Woodgrain farm is located approx 30 minutes from Hazelton and is a mixed vegetable organic farm. They also raise and sell lambs and grow rye and wheat that they mill into flour. They sell their products at Bulkley Valley and Hazelton Farmers' Markets. They are interested in being involved in the LC process and in supporting farm 2 school activities and being involved in education around local farming. They have some </td> </tr> </table>	Youth/student	“Getting students on board was easy” ^a	School	<p>“many staff were resistant to the "extra" work involved in salad bar and garden”^a</p> <p>Cultural teacher an asset(e.g., established program on traditional plants^a</p> <p>“complex relationships and structural racism in our schools that came up in my conversation with Sandra and the challenges of engaging parents at the community level”^d</p> <p>Reaching out to schools and identifying their priorities impt: e.g., Principal NHE: “She would like to see more garden space for all classes and work on having planter boxes for each class. Would like to see support for students to access breakfast program in the village before coming to school because of the way the bus systems work and the little amount of time available for kids when they arrive at school.”^d</p> <p>Impt to find points of interest, e.g., for NHE teachers school gardening, connecting food literacy to teaching^e</p>	Food Provider
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			concerns about being stretched thin with existing markets and ensuring that they receive fair market prices for their goods but would like to see farm to school grow in our community.” ^d
		Community	<p>“We started to plan for the gardens and decided to put a call out in the newsletter to parents for donations of materials such as wood to build garden boxes and soil. Also to put the word out that we are planning a "Build the Gardens Week" hoping to bring together parents and community members with building skills with students and other parents who would like to learn to build garden beds together.”^e</p> <p>“There is a good chance [Northwest Community College] intro carpentry program will be able to help build garden boxes and involve parents and students in learning about building boxes. Program starts in February and I will meet with instructor when program starts.”^e</p>
		Band	<p>HZ: “Nikadeen is happy to come and say some words about the importance of food in Gitksan culture and supports this work happening on her territory.”^f Frances spoke about the value of food in relationship to the land and to being a Gitksan person. She talked about everything having value, that some parts of the salmon considered a delicacy are sometimes wasted by people. All parts that are not used must go back into the river to continue to feed the river. She talked about fish strips feeding children and allowing them to continue playing and learning. She mentioned that it is important to always having enough to share with all the children. “Use everything,” she said, “everything has value.”^g Frances also talked about asking permission from the Chiefs to harvest traditional foods on their territories. “Let them know you are going out,” she said, “they may want to come with you.”</p>
		Other LCEF	<p>Sharing tools, resources, approaches</p> <p>AL has benefitted from KD , e.g., “Kiku shared some great resources before the meeting to guide the LC planning process and provided more in-depth information about the agenda of a first LC meeting.”^e</p>

	Project Mgmt	A central facilitator is essential (BZ) Barb took and sent out notes from the [LCEF] meeting ^e
	CIHR	NWAK PEKE shared “spirit of Collaboration” document
	Champions	“Principal is very enthusiastic about this and will champion local and traditional foods in school and in community” ^a
	Existing Tensions	(may not want to share specifics but for documentation, “the tensions that exist between the high school and the Bands. The Bands withdrew their subsidies to the hot lunch program at the cafeteria at the high school because the high school would not work with them to respond to questions around health and the use of profits from the cafeteria to fund programmes” ^d
	Importance of the Annual Gathering	
Community readiness (might be a sub-thesis of context)		In Hazelton, there was concern about applying for Salad Bar funding before the LC had an opportunity to meet. “[Person] described the local food to school process as a tree where at one end is food procurement, but the very roots and foundation have to come first, which is the relationships. I am at the relationship building stage and maybe right now the community focuses more on having a few activities with community members and children in schools (i.e. field trip to fish camp) trying to focus on traditional foods rather than local foods. Maybe procurement comes way later?” ^d “Champions have to come forward for this work to happen. If they don't maybe the community isn't ready yet.” ^d
OCAP	Community priorities	In the past, the salad bar program was not well understood (Haz).
Outcomes	Behaviour change	
	Partnership development	In Haz: Planning team, LCEF
	Learning Circles held	Haz Feb 10, 2017 “There were twenty-four people in the room, including teachers from Hazelton Secondary, New Hazelton Elementary (NHE), and

		Majagaleehl Gali Aks Elementary (MGA). The Principal from MGA was also present, as were the cooks from both MGA and NHE. There were two people from Seaton Mountain View Farm and two people from Woodgrain Farm in the room as well as the Garden Coordinator and Coordinator from Senden Agricultural Resource Centre. Staff from the Gitksan Government Commission, Storytellers’ Foundation, and Skeena Watershed Conservation Coalition were also in attendance. – developed a vision
Adapting to community context/needs	Hazleton	In Hazelton, because lunch program is funded differently, F2CC grant could be “less of a salad bar and more local food into school menus” Unique governance structure with elected Band and Hereditary Chief system ^b “Try to find funds to reinstate funding for breakfast program that was recently lost” (Nov 29, 2016 ^d) Time for LC – gardeners/harvesters, farmers, etc. are busy from spring to fall so it can be difficult to take time away for LC.
	Haida Gwaii	
	MLTC	
	Black River	
“Wins”	Funding opportunities	CDPI grant to fund 1 youth per community to attend annual gathering F2CC salad bar grant in BC
	KTE	Haida Gwaii video developed through CLASP project/ CIHR in-kind inspired other communities
	Internal context:	“ Shifting value was a uniting theme among all of the visions. Most people felt that shifting value around local food in the school culture would happen by building capacity to create more opportunities for children and youth to connect with food in a hands-on way. Either out in schoolyard gardens, on the territories with Gitksan knowledge sharers, or out on local farms.” ^g

	External context	Shifting external environment: Re sustainable food systems: “Watched Sustain Ontario Webinar on food education” ^b Re food sovereignty: Re T & R
Timing/time		Time for LC – gardeners/harvesters, farmers, etc. are busy from spring to fall so it can be difficult to take time away for LC.
Learning Circles		What could be improved – the expectation that people have to “show up” to be involved. Tensions – community representation from Gitskan was non-existent Work that non-Indigenous people need to do to address colonialism and reconciliation Framing it around schools was a challenge – local food “helped with momentum that was already here” Hazelton LC 2018 Food sovereignty and food security are two different issues. Focus on schools and teachers can affect the way we regard learning, e.g. teacher has knowledge to pass on to learner/student rather than learning together. Indigenous culture and protocols are important parts of the local food system. Thus... how well does the Learning Circle model fit within a public school system?
Culture		
Challenges		“I think ultimately the frame around schools was the challenge. The educational institution I see the whole local food system just so...only a step away from getting local food into the schools...local and traditional foods. So recognizing that...I don’t think that many people would disagree around the idea that when kids have knowledge around food and where it comes from it is going to extend to...as the kids develop and grow as citizens, extend to being careful, or making choices, or caring about the land, about protecting it. I think the other thing is just that tension around,

		<p>yeah, we should get traditional food and local food knowledge into the schools. And then there is that tension around how does that traditional knowledge get taught and passed down and are we eroding a system of governance, of education, of leadership, of mentorship, of the Gitksan system that has been in place for so long by trying to pull that out and putting it in schools. And how do we talk about that? That's a tension because it's well-meaning having education around local and traditional foods inside a school, but what else does it do...it doesn't mean...so I guess that needs to be voiced and talked about. " (BD interview 2018)</p>
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6.6 Appendix F: Links to Articles about Haida Gwaii Learning Circle Work

- Haida Gwaii Observer: [Women Who Feed the Islands](#) (March 2018)
- BC Food Security Gateway: [Local Foods to School Reconnecting the Children of Haida Gwaii to their Food and their Land](#) (2016)
- Canadian Geographic: [Growing Food Security in First Nations Communities](#) (June 2020)
- Haida Gwaii Observer: [Inaugural Skidegate Food Gathering Fest Reels in 365 Donated Salmon](#) (June 2020)
- Haida Gwaii Trader: [Local Foods to School and Pantry Program – Learning and Growing](#) (September 2019)

6.7 Appendix G: Supplementary Quotes from Haida Gwaii Case Study

Theme	Subtheme	Document Excerpt
Increasing access to local and traditional foods	Description of the rich food culture in HG	“Food’s always been like a really important part of culture, and like language classes, one of the first things we learn are foods. I think...food is one of the most known parts of the Haida language. You know like land and culture have always been so intertwined.” (Community Member)
	Increasing access to local, healthy and traditional foods	<p>“.. more traditional ways, and you get more connected to it, if the people who took the food and eats the food, also found it and - you get to be more aware of the community and the ecosystem that way...Also I think that, you know the quality of the food has increased since we started this programme.” (Community Member 2017)</p> <p>“You know, the kids are happier knowing that they could get some of the traditional foods in too, like the dry fish, and fruit leathers and things, yeah, ‘cause I help them prepare the dry fish and the, uh, fruit leather, yeah, and the dry fruit is real good for you, compared to candies, yeah, so I’m happy about all what’s happening there at the school now.” (Local Elder, 2018)</p>
	Funding and donations have been essential	“[the adult day programme] is open five days a week from 7 to 3 o’clock. We give a breakfast, a lunch and an afternoon snack. And it’s pretty much open to anyone in the community. And I think it was about six years ago .. the Farm to School got us a chunk of money towards our greenhouse that’s outside. So I believe it was like \$10,000 they got us towards our greenhouse.” (Community Member)
	LC participants play an essential, active role	<p>“So I would consider this role to be a, partner or support person [for] the Learning Circle Coordinator. And I would say [I have] multi levels of involvement. hands on involved with schools, sometimes sourcing local food or working with food, or having meetings about like different programmes that we’re going to run.” (LC Participant)</p> <p>“Yeah. And it’s definitely different than going to the Coop, buying your food, because you can definitely go to Coop and buy salmon ... but to see the actual process and do it, the kids love it. (Community Member)</p>
	Behaviour change noticed among school children	“And so while they’re prepping it, they’re smelling it and they’re having little nibbles and then they still make some dips. And you know one kid was making a dill dip and just[said] ‘oh yeah, I

		<p>like dill.’ And then she made it and she said ‘well you’re going to taste it and see if it tastes okay.’ He tasted it and he’s like, ‘oh it needs more dill.’ (Community Member)</p> <p>“So a lot more healthy eating - and there’s a huge difference in attitude” (Community Member)</p> <p>“And there’s one little boy who is so fussy, and I’ve heard it from his mom before, he doesn’t eat this, he doesn’t that; he just likes this. And I told him, I said you have a little bite, he took it. ... He looked at it, he put it in his mouth. And I said chew it up, chew, chew, chew... And then he chewed it. ... And he said oh no that’s actually good. And I went yes, its good.” (Community Member)</p>
	Economic impact of the programme seen within the community	<p>“But I also feel like there’s this like economic impact on farmers and harvesters, like we have a system where we can consistently buy hundreds of dollars off berry pickers. And that’s money in their pocket. I think that’s a real impact in our community that farmers are making money and, and harvesters are making money.” (LC Participant, Community Dietitian)</p>
	Price of local vs non-local food	<p>“It’s still cheaper to buy like its pound-per-pound cheaper to buy turkey than hot dogs. I know right. But when you come to the – the hunting, the gas, the bullets, the deer in, the processing; the distribution; like its costly.” (Community Member)</p>
	Food safety regulations	<p>“There’s stricter rules of what foods are allowed to be donated, just because if it’s not prepared in like a safe food certified environment. Like if someone wants to donate fish to the school, whatever, you can’t do it unless its prepared in a certified environment because then it might be contaminated, even though like it’s from your uncle and you just eat it at home all the time.” (Community Member)</p>
	Logistics that are necessary for the programmes to run (i.e., volunteers, suitable transport)	<p>“It’s all about logistics - to go and do gardening with ten students in a meaningful way means you can’t have more than ten. Right so, is there the support in the schedule so that the other 80 or 90 students have something else to do during that time? So that’s logistics.”</p> <p>“Facilities is another challenge.”(Community Member)</p>
	Sustainability of the initiative	<p>It was noted during the Learning Circle that traditional ways are sustainable methods for food procurement because local foods support the community. (LC Report)</p>

Building knowledge and skills	Learning from Elders' knowledge	"I feel it's important – really important that they learn how to do these things, and it will take an elder to go into the schools to continue passing it on, and really encourage them to pass it on to one another, especially the younger ones ... That's how I learned – through my grandparents because we were brought up in a traditional way." (Local Elder, 2018)
	Importance of protocol	"[it's] Important to bring people together to make food in respectful ways." (LCEF)
	A reliance on volunteer time	<p>"...the kids come in the day before with parents, and again this is where volunteer parents are critical or, or caregivers, they come in the day before and they prep all the food." (Community Member)</p> <p>"I think as population decreases as well, [it puts] pressure on people who do things already for the community ... they have to extend what they're doing or spread it out over more activities and that can become challenging. (Community Member)</p> <p>"I do put in a lot of volunteer hours, I'm given four hours and that includes the shopping; the planning; the menu setting, cooking." (Community Member)</p>
Transitioning to Haida Leadership	Engaging leadership and empowerment/ownership	<p>"I think, as many people mentioned yesterday, food is medicine, and it's the essence of Haida culture and many other First Nations cultures, and when we strengthen our connection to food, it brings back the traditions – so many of the traditions and the knowledge that has been lost, so food sovereignty is really about revitalising culture, and it's connecting to the land, which, um, is the essence of any culture." (LCEF 2018)</p> <p>"I think it's a big part of reconciliation and revitalising our traditional ways of knowing. It's so important to have that – the traditional ways of harvesting and preparing, and nurturing ourselves and our families has been something that's been known for generations, and we've lost that, through colonisation and through the processes and policies that we live under today, so it's really inspiring to see people pick that up, and it's important to see the work that's needed to regain that knowledge for all our peoples." (LC Partner 2018)</p>
	Memorandum of understanding between the University of Waterloo and SHN	' <i>Isda ad dii gii isda (S)- Isdaa 'sgyaan diiga isdii (M)</i> ' Spirit of Collaboration Protocol was signed by the University of Waterloo and the Secretariat of the Haida Nation. The Protocols was developed by the HFC in collaboration with University of Waterloo. ... The agreement identifies

		the principles that underlie evaluation and knowledge translation activities related to the project.” (Report)
	Use of appropriate language/protocol	<p>“What I would like to see from the Haida communities is more Haida language in relation to our food. So labelling in the classroom and – and I just don’t have time to do it as a teacher.” (Community Member)</p> <p>“She’s made little place setting tags to go in front of each of the foods. So as the kids go through they can say the Haida word for what they are serving themselves. So you know we’re working on that kind of stuff. ...So we’re definitely working on making that connection between food and tradition, and the land, as much as we can.” (Community Member)</p>
Fostering relationships	Community connectedness	“..Really I feel like what we’ve built this on are a whole bunch of champions, right?” (LC Participant, 2016)
	Concerns with evaluation	<p>“It’s always important to represent it as the work that belongs to the community. And is not something that we, like we’ve done and taking credit for. That’s, that’s – that, that – that way of doing things is not according to protocol.” (LCEF)</p> <p>“I would say, um, that it-it seems like, um, there's a real awareness that it’s more of a research project-- and then it's focused on First Nation communities. And when you put those two words together, research for— I think some people, um, get into a cautious or sort of defensive world.” (LC Participant)</p>
	Role of the local champion	“I think the other barrier’s just like if there isn’t somebody’s who’s a champion, and like I said, my last school it was two teachers, if they weren’t interested and if I had parents that were interested and the parents moved on, and it was sort of now what?” (Community Member)

6.8 Appendix H: Supplementary Quotes from Hazelton/Upper Skeena Case Study

Theme	Subthemes	Document Excerpt
Traditional food, knowledge and practice; local food	Using existing community knowledge keepers to develop skills	<p>“.. it is important our people realise that our youth are going back to gardening and we as Elders need to show them, that yes, we can put a garden in. Yes we can do it!” (Elder)</p> <p>“There is a wealth of knowledge about local and traditional foods in the community” (Report)</p> <p>“That’s another reason why doing things on the territories and learning some skills. You are going to entice kids to be part of that conversation a lot more than saying “you want to come to a meeting where we talk about food?”. No kid is going to be really that interest in that unless they have already developed a real passion for that. You are definitely going to get youth involved if you say, “we are going to get out on the territory and do this” and then there are going to be these other conversations. They are more likely to want to do that.” (Community Interview)</p>
	Integration of traditional foods into the initiative	<p>“The youth were very proud of their Three Sisters-corn, squash and beans planted together are beneficial to each other when growing.’ Each youth had their own patch at Senden that they cared for and tended” (Report)</p> <p>“Comparing jarred salmon...highlighting the value people have for local and traditional foods” (Photovoice Entry)</p> <p>“Sometimes our traditional foods are treated like poison at school...” (Youth)</p>
	Protocol and inclusion of local language	<p>“The importance of following protocol when engaging with Elders, and when taking part in activities on traditional lands. This was addressed in the guidelines drawn up for the use of the money raised during the community feast.” (Report)</p>
	Changing the food environment in HZ	<p>“We're trying to link up into the schools and some [have gardens] and some don't. And we're trying to get the cooks trained up and to using more local foods. So they understand, you know, it's not just mac and cheese every day or chow mien.” (LC Participant)</p>

		<p>“..food growing activities inside the schools, and also connecting to growers [for] sourcing... I think that those activities have increased through this project. (LC Participant)”</p> <p>“it’s easy to say you should have local foods, then you sit down with the [grocery store] manager and he’s like ‘I’d love to have local food, local farmers can’t supply enough, and can’t supply when they say they will’, there’s not enough local food being produced actually when it comes down to it. And there’s not the local systems to get that food safely to market according to government standards, etc etc etc, and not the price we are looking for as well.” (LC Participant)</p>
	Sustainability of the initiative	<p>“We have lots of people especially in food preservation and Gitksan foods is a very strong, knowledge base there” (LC Participant)</p> <p>“The Mid Winter Gala Fundraiser showed huge community support for children and youth engaging in land based activities.” (Report)</p> <p>“School gardens built and maintained over the course of the project-building the infrastructure at the school and leaving a legacy of the project” (Report)</p>
Building relationships; from the school to the community	Relationships with other communities	<p>“[We] learn harvesting and hunting skills and protocol, and recently took a trip to Haida Gwaii to exchange food, medicines, and knowledge with community members there.” (Report)</p> <p>“Supporting the Back to the Land program at HSS to travel to Haida Gwaii, plant gardens behind the school, and engage with students to help support and promote the program to continue [was considered a major achievement]” (Report)</p>
	Developing a collective community vision	<p>“I think the collaboration in the group, people are very respectful of each other and outside of the learning circles themselves; we formed a committee and we managed to pull off a fundraiser that raised \$5000 for student opportunities to go outside of the learning circle and take trips say to Haida Gwaii. I think that’s the main one, the Haida Gwaii trip was the main one. Yea, none of us had ever done a fundraiser before, and thanks to the generosity</p>

		<p>of the whole community we made \$5000 in one night with about 100 people attending.” (Community Interview)</p> <p>“It was exciting to see all of the action, enthusiasm, and passion that everyone brought to the activities they were carrying out in the schools and on the farms. Many participants shared how inspiring it was to see all the work that had been done and the excitement generated to move forward.” (Report)</p>
	Procurement of local and healthy foods	<p>“..the LCEF, who in that initial role, had more of a connection or a relationship with growers, with farmers and so that was the easy group to engage. I mean sure there were some challenges around certain times of year, farmers are just flat out when they’re growing food and they’re not coming to meetings or you know whatever... Farmers always appreciate knowing what kind of food they can sell so that connection with supply and demand and filling that role was good. More difficult to build relationships I think with hunter gatherers and people out on the territories harvesting food for sure. I think there was that element that we’ve kind of already talked about regarding sharing knowledge and protocol and who’s teaching who.” (Community Interview)</p>
Focus on youth: importance of healthy food for young people	Learning traditional ways	<p>“Harvesting, labour time and connection are valued over store-bought convenience” (Report)</p> <p>“Umm, I think it’s a part of – I think it’s a big part of reconciliation and revitalizing our traditional ways of knowing. It’s so important to have that – the traditional ways of harvesting and preparing, and nurturing ourselves and our families has been something that’s been known for generations, and we’ve lost that, through colonization and through, um, the processes and policies that we live under today, so it’s really, uh, inspiring to see people pick that up, and it’s important to see the work that’s needed to regain that knowledge for all our peoples. (LC Partner)</p>
	School food programmes for food security	<p>“..this area was food secure of millennia and it’s only been between 40 and hundred years that it hasn’t been. Why are we always looking for outside solutions or new ideas, why aren’t we? There’s obvious things like abundance, lack of know-how, lack of regulations. Let’s not feel so defeated by the last few decades when we have millennia of intelligent management and food security. So yea working with the chiefs in Gitwangak , they are just as excited to try new farming techniques and integrate western colonial systems into their</p>

		<p>system so that they can take pressure of their hereditary systems and allow them to grow. I've been learning a lot, I've been really grateful for that perspective. Let's just use everything that we got and see where we get to" (Community Interview)</p> <p>"Housing is a huge challenge in our community. People often don't have safe place to stay where they could grow their food-- In their home, um, children are going to school hungry and the schools struggle to have funding to fund their breakfast and lunch programmes." (LCEF 2017)</p>
	Building purpose within youth	<p>"And I think it needs to be forefront again that the young people have a voice. They're the future, they have a voice. And many of them don't understand that they have a voice. They feel almost not equal to their chiefs. They almost feel inferior. And that is the wrong way for them to feel. ... I would go in and talk to them about responsibilities of us as Gitksan and that we can survive on the land. We don't need to go out and tear up the earth to be able to survive. Our creator gave us everything. All we have to do is have the intent, have the energy, have the courage..." (Community Interview)</p>
	Learning from youth	<p>"Youth are a huge wealth of knowledge – [they know] different ways to do fish..." (Report)</p>
Learning	Food and nutrition skills	<p>"[The LC] got schools interested in prioritizing having gardens and having their students spend time out on the land. I think that that's become a lot more prevalent in how the teachers are deciding what they are teaching their kids. The gardens that are...and the two elementary schools have been expanded and there is lots of support from the teachers anyways and working on building support from parents to keep them going. And now that there are salad bars and things like that happening, the teachers, especially with feedback from the learning circles, teachers are starting to think about, well if we get this grant to get some food in our classroom, where can we get food? Can we support Senden? Can we support local farmers? And it is linking students in with more people in the community" (Community Interview)</p> <p>"I think it's a combination of the two. You can't talk about local food, without talking about Gitksan traditional food systems. That's just part of who we are.... We also have [teacher] she comes in and if we get fish or we get oolichan, or even get bear or whatever.</p>

		<p>She'll come into the class then we learn how to either smoke it or process it or whatever. Bear was a really interesting one because in our community people from different house groups and different families have different beliefs on bear meat. So, some families say that's totally fine, in other families it's a sacred animal. So, it became a really interesting place for conversation about tradition and about culture and how it can be different even within the same nations." (Community Interview)</p>
	Personal growth	<p>"..for myself having a space and a process, and time to look at my own narratives, my own individual personal narratives; the community narratives, and our national narratives around settlers and Indigenous culture in Canada, and having a space and practice lab to name out those tensions and to do that in a way that doesn't uh take from Indigenous culture [was important]" (LC Participant)</p>
Local Food	Procurement and cost	<p>"We have many foods available locally and seasonally, yet our local stores offer produce from...Mexico" (Photovoice Entry)</p> <p>"...helping with local food procurement for MGA hot lunch program [was considered a large achievement]" (Report)</p>
	Funding	<p>"..the other thing that was really exciting was, in January of 2018, the community came together, and we had a big volunteer dinner, and it was basically like a big midwinter gala is what we called it, and the community came together. We had a silent auction, donations came in; we had an art show – student art show and student music show, and all the food was locally grown, and it was all donated, and then our local college had a chef's program, and they did all the cooking for it. So, we sold a 100 tickets in our community, which is, pretty good, and especially after Christmas, in January, our community, a lot of people live in poverty, so to see that support come out for schools, um, and for kids to get out on the territories and learning, um, through hands on activities on the land was huge. We raised \$6,000, which blew us away, and were able to give money to each of the schools and each of the classrooms involved in the Learning Circle, to get their kids out on the territory, so that – because that was a barrier was having funding to take the kids out of the classroom. So, to be able to support that was huge, and we're really proud of that." (LCEF)</p>

	Value placed on local food	“Experiential and skills-based food education correspond to new curriculum requirements and the group feels that advocacy needs to be done to shift the value around local foods within the larger school system.” (Report)
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6.9 Appendix I: School Survey Questions

1. What age are you?

[insert selection of ages]

2. What grade are you in?

- Grade 5
- Grade 6
- Grade 7
- Grade 8
- Grade 9
- Grade 10
- Grade 11
- Grade 12

3. Are you a boy or a girl?

- Boy
- Girl
- Other (e.g. two-spirited)

4. How often do you eat breakfast?

- Every day
- 5 or 6 days/week
- 2 to 4 days/week
- Weekends only
- Rarely or never

5. How often do you eat lunch provided by a school programme (including foods purchased through the school canteen)?

- Every day
- 2 to 4 days/week
- 2 to 4 times a month
- Rarely or never

6. Overall, how would you rate the school lunch programme?

- Poor
- Fair
- Good
- Very Good
- Excellent

7. Would you recommend the lunch program to a new student?
- Definitely not
 - Probably not
 - Probably yes
 - Definitely yes
8. Why did you respond this way? [open answer] _____
9. What do you most like about the lunch program? [open answer] _____
10. What are your favourite things to eat for lunch? [open answer] _____
11. Do you ever bring your lunch from home?
- Yes
 - No
12. How have school lunches changed in the past year, if at all? [open answer] _____
13. If your school was to change the lunch program, what changes would you like to see? [open answer] _____
14. Does your school have a gardening project?
- Yes
 - No
- If yes, can you tell us some of the foods that are grown in the garden? [open answer] _____
15. In the past year have you:
- Helped with planting in your school garden?
 - Looked after the school garden (e.g., watering, weeding)?
 - Picked the food grown in the school garden?
 - Eaten the food grown in the school garden?
16. In the past year, through school, have you observed or participated in any of the following traditional food-related activities?
- Trapping
 - Hunting
 - Fishing
 - Gathering wild plants
 - Preparing wild game or fish (e.g. skinning, butchering, filleting, drying, canning, preserving)
 - Preparing wild plants (e.g. drying, canning, preserving)
 - Cooking
 - Eating

17. How often do you purchase food from the following types of locations?

	At least once a day	5 or 6 times per week	2 to 4 times per week	Once a week	2 to 4 times per month	Rarely/never
Convenience or corner store, gas station						
Supermarket or grocery store						
Fast food restaurant, take-out or coffee shop						
Sit-down restaurant						

18. Yesterday, where did you eat the following meals?

	Home	Another Home	In Transit	School	Restaurant Fast Food	Other	Did not Eat
Breakfast							
Morning Snack							
Lunch							
Afternoon Snack							
Dinner/Supper							
Evening Snack							

19. How often do you eat the following foods?

	At least once a day	5 or 6 times per week	2 to 4 times per week	Once a week	2 to 4 times per month	Rarely/never
Salty snacks (e.g., chips, cheesies,						

nachos, pretzels)						
French fries or other fried potatoes (e.g., wedges, poutine, hash brown potatoes)						
Vitamin-mineral pills						
Pizza						
Sweet snacks (e.g., candy or chocolate)						
Green vegetables (e.g., broccoli, spinach, salad)						
Orange vegetables (e.g., carrots, squash)						
Whole grains (e.g., in breads, rice, pasta, cereal)						
Other vegetables (corn)						
Fruit (including fresh, frozen or packaged but not juice)						
Energy drinks (e.g., Redbull, Rockstar, Monster)						
Pop (non-diet, all types)						
Pop (diet, all types)						
Plain milk (white)						

Flavoured milk (e.g. chocolate or other flavour)						
--	--	--	--	--	--	--

20. When was the last time you had an energy drink (e.g., Red Bull, Rockstar, Monster)?

- I have never had an energy drink
- In the last day
- In the last 7 days
- In the last month
- In the last 6 months
- In the last year
- More than a year ago





21. What are the reasons you have used energy drinks? (choose any that apply)




- To stay awake or help concentrate for studying or work
- To stay awake or alert for driving
- To feel awake in general (not for a specific activity)
- For the taste
- To improve sports performance or physical activity
- To help lose weight or keep weight off
- For going out or partying
- To mix with alcohol
- To sober up after drinking alcohol
- To cope with a hangover
- I think they are cool
- My friends drink them
- Other

22. How willing are you to try new foods?

- Very willing
- Somewhat willing
- Not willing
- Not sure

23. Tell us what you think about these foods?

Food				
	Like	Not Sure	Don't Like	Never Tried

 <p>Berries</p>				
 <p>Salad</p>				
 <p>Moose Meat</p>				
 <p>Deer Meat -Venison</p>				
 <p>Bannock</p>				
 <p>Hamburger Soup</p>				
 <p>Wild Fish</p>				

24. Do you eat game (e.g., moose, venison, ducks or geese)?

- Yes
- No

25. How often do you eat game, including fresh, frozen, and preserved?

- At least once a day
- 5 or 6 times per week
- 2 to 4 times per week

- 2 to 4 times per month
- Rarely/never

26. I would eat more game if:

- My parents ate more
- My friends ate more
- My school provided game at lunch
- I do not like game

27. Do you eat wild fish?

- Yes
- No

28. How often do you eat wild fish, including fresh, frozen, and preserved?

- At least once a day
- 5 or 6 times per week
- 2 to 4 times per week
- 2 to 4 times per month
- Rarely/never

29. I would eat more wild fish if:

- My parents ate more
- My friends ate more
- My school provided fish at lunch
- I do not like fish

30. Do you have any concerns about environmental contaminants in locally grown, harvested or hunted foods?

- Yes
- No

31. If yes, what are those concerns? [open answer] _____

32. Do you eat fruits of vegetables grown or harvested in your community?

- Yes
- No

33. How often do you eat fruits or vegetables grown or harvested in your community, including fresh, frozen, or preserved?

- At least once a day
- 5 or 6 times per week
- 2 to 4 times per week

- 2 to 4 times per month
- Rarely/never

34. I would eat more fruits and vegetables grown or harvested in my community if:

- My parents ate more
- My friends ate more
- My school provided some at lunch
- I do not like fruits and vegetables

35. What did you eat yesterday from the time you woke up til the time you went to bed [FFQ – details on WEB_Q]? _____

6.10 Appendix J: Points Calculations for HEIC -2009

Table: Points Calculations for HEIC-2009

Food Category	Point Allocation*	
	Minimum score	Maximum score
Grains (10 pts)	0 servings	≥6 servings
Vegetables and Fruit (20 pts)	0 servings	≥6 servings
Milk and Alternatives (10 pts)	0 servings	≤1600 kcal: 3 servings; 1600 – 2200 kcal: 3.5 servings; ≥2200 kcal: 4 servings
Meat and Alternative (10 pts)	0 servings	≤ 1600 kcal: 1 serving; 1600 – 2200 kcal: 1.5 servings; ≥2200 kcal: 2 servings
Other (10 pts)	≤ 1600 kcal: >8 servings; 1600 – 2200 kcal: >11 servings; ≥ 2200 kcal: >14 servings	≤ 1600 kcal: ≤4 servings; 1600 – 2200 kcal: ≤6 servings; ≥2200 kcal: ≤8 servings
Total Fat (10 pts)	≥ 45% of energy from fat	≤30% of energy from fat
Saturated Fat (10 pts)	≥ 15% of energy from saturated fat	≤10% of energy from fat
Cholesterol (10 pts)	≥450 mg	<300 mg
Variety (10 pts)	Failure to eat a serving from any food group	At least one serving from each food group
Total	0	100

*Individuals with servings between the minimum and maximum cut-offs are assigned a proportional score for the category

6.11 Appendix K: Application for Access to the Cancer Risk Assessment in Youth Survey Data.

Cancer Risk Assessment in Youth Survey (CRAYS): What's in it for You?

CRAYS evaluates the impacts of provincial policies on **youth smoking, e-cigarettes, tanning bed use, and eating behaviours** via a school-based survey generalizable to high school students in 7 Canadian provinces. We also collect data on sexual orientation, immigration, energy drink use, and marijuana and alcohol use. We link CRAYS data to provincial policies to examine the effect of different policies on these cancer risk behaviours. Scientists worked with civil servants, advocates and practitioners to prioritize topics and questions.

Policy Evaluation

We plan to use CRAYS data to evaluate several policies, including:

1. Flavoured tobacco bans
2. Retail tobacco access policies
3. E-cigarette policies
4. Youth tanning bed use policies
5. Nutrition-related policies (for example, sugar sweetened beverage policies)

We are also interested in **health equity**. For example, how do effects of policy vary:

1. by students' sexual orientation?
2. across ethnic and linguistic groups?
3. between native-born and new Canadians?

Get Involved!

You can contribute to cancer prevention in Canada by:

- Identifying upcoming policies expected to change youth cancer risk behaviours (in tobacco, UV, nutrition, marijuana, alcohol or other risk behaviours);
- Identifying what questions we should be asking – is our questionnaire missing any indicators of youth behaviour you think are important? and,
- Participating in webinars, media releases, report writing, or other ways we can get the information to policymakers.

Request Answers to Questions

We want the data we have collected to be used by other researchers, citizen groups, and governments. Please take a look at our 2015 questionnaire and ask for data that would help move your work forward <https://uwaterloo.ca/cancer-risk-assessment-in-youth-survey/questionnaire>.

If you have an idea for how CRAYS data can provide evidence for a question that is a priority for you, please let us know. If you need a question answered, but do not have capacity to analyse data, we can help! We prioritize collaborations between researchers and non-researchers. Complete the following **Project Notification Template** to request support.

Project Notification

Each project planning to use CRAYS data must complete the Project Notification Template. This will help the CRAYS team to track the knowledge generated by our project. The Project Notification Template requires very little time on behalf of the person(s) requesting data, and will facilitate a coordinated approach to knowledge translation (ensuring the evidence has impact).

Project Notification Template	
Topic:	Eating behaviours among Indigenous Canadian Youth
Format:	Chapter in PhD thesis; Academic Paper; Conference Presentation
What question do you want to answer?:	In Canada, what are the dietary habits and eating behaviours of Indigenous youth, and how does this differ by region (if possible)? Is there any difference when compared with youth who are non-indigenous?
Brief outline (<200 words).	<p>I would like to request use of data from the 2016/2017 CRAYS survey to provide descriptive statistics relating to the eating behaviours of Indigenous Canadian youth. These data will set the scene for the remaining chapters of my PhD thesis, which will use a case study method to examine the influence of the Learning Circle approach on food and nutrition within and across four Indigenous communities.</p> <p>I would like access to the following questions from the 2016/2017 version of CRAYS: Demographics; and the section on Eating Behaviours – questions 57 – 61, and 64 - 66. I will not require questions relating to weight or weight perception/management. Demographic data will be presented as proportions or absolute numbers – whichever CRAYS investigators would prefer.</p>
Team members:	Louise Watson (PhD Candidate and applicant); Rhona Hanning (PhD supervisor); Jennifer Yessis (Propel)
To what extent do you anticipate involvement of Propel scientists or analysts?:	I anticipate that Jennifer Yessis may provide some feedback on work that I do as she is also a co-investigator on the Pathways project that will provide the majority of the data for my thesis. As per the CRAYS Data Use Agreement (below), CRAYS investigators will be involved as necessary.

Guidelines for Data Use

If you would like to use CRAYS data, please see the **Data Use Agreement** outlined below. For the presentations, reports and papers developed with CRAYS data, we expect users will follow these guiding principles:

- 1) Involve other CRAYS investigators and/or seek relevant policy/practice colleagues as part of the authorship team.
- 2) Use the following Acknowledgement:

Data used for this research were from the Cancer Risk Assessment in Youth Survey (CRAYS) which was conducted by the Propel Centre for Population Health Impact at the University of Waterloo. Funding for CRAYS included a Prevention Research Grant of the Canadian Cancer Society Research Institute (grant #703073) and the Canadian Institutes of Health Research - Institute of Cancer

- 3) Make use of the User Guide prepared by Propel to accompany CRAYS data. We also encourage data users to seek assistance from Propel for data analysis, planning, etc. when needed.
- 4) Notify Propel of papers using CRAYS data when papers / reports are submitted / accepted.

Data Use Agreement

We have taken great care to protect the identity of our participants and to safeguard the privacy and confidentiality of the information that these participants provide. Any secondary analyses that you perform using these data sets must also maintain the confidential nature of this data.

Confidential data are safeguarded by the application of various levels of both physical and electronic security measures. Data are stripped of identifiers that could permit a direct relation to be established between data holdings and specific respondents. Researchers may receive subsets of the data, consisting of the groups and variables required for their particular analyses.

Terms and Conditions

- The data provided are not for commercial use. These data may not be used for any other purposes without written approval from the owner of the data.
- Any information that relates the particulars obtained from any individual identifiable person, business or organization cannot be disclosed. Any discovery of this information must be made known to Propel. Links among datasets or among CRAYS data and other datasets that could identify individuals or organizations are strictly prohibited.
- Use of these data products in the pursuit of any commercial or income-generating venture is strictly prohibited. As well, the distribution, sale, donation, transfer or exchange of any portion of these data to anyone else is expressly prohibited.
- The acknowledgement outlined above must be used in all knowledge products associated with CRAYS data.

- Data obtained under this agreement remain the property of the owner of the data. Derivative data sets representing modifications to the data are also licensed unless otherwise stated. Any additional terms and conditions imposed by the owner of the data are also binding.
- Data will reside only in the secure location identified in the proposal. All copies of the data must be erased upon the completion of the research.
- The right to use the data may be revoked if there are violations of the above, or if the user is not making timely analyses available.

In order to receive the data you have requested, you must sign below to acknowledge that you have read, and agree to abide by the terms of the data use agreement.

Signature

Date

Please submit the Project Notification Template and signed Data Use Agreement to:

CRAYS Project Manager

CRAYS@uwaterloo.ca

*6.12 Appendix L: Questions from the Cancer Risk Assessment in Youth Survey (CRAYS) 2017
Included in Study 2.*

What grade are you in?

- Grade 7
- Grade 8
- Grade 9
- Grade 10
- Grade 11
- Grade 12

Quebec students only

- Secondary I
- Secondary II
- Secondary III
- Secondary IV
- Secondary V

2. How old are you today?

- 12 years or younger
- 13 years
- 14 years
- 15 years
- 16 years
- 17 years
- 18 years
- 19 years or older

3. What is the language that you first learned at home as a child and that you still understand (your mother tongue)?

- English
- French
- Other

4. What language do you speak most often at home?

- English
- French
- Other

5. I identify as...

- Female
- Male
- Non-binary (e.g., trans, intersex, genderqueer, gender neutral, gender fluid, two-spirited, ...)

6. Do you consider yourself an Indigenous person (First Nations, First Nations Non-Status, Metis, Inuk [Inuit])?

- Yes
- No

7. How would you describe yourself? (Choose the option that you feel best represents you)

- Indigenous/Aboriginal
- White
- Black
- West Asian/Arab
- South Asian (Indian, ...)
- East/Southeast Asian (Chinese, ...)
- Latin American/Hispanic
- Mixed
- Other

8. Where were you and your parents born?

- All of us were born in Canada
- All of us were born outside Canada
- I was born in Canada; both my parents were born outside Canada
- I was born in Canada; one of my parents was born outside Canada
- Other

9. What is the highest level of education that your mother has attained?

- Did not attend high school
- Attended but did not graduate high school
- Graduated high school
- Attended but did not graduate college or trade school
- Graduated college or trade school
- Attended but did not graduate university
- Graduated university
- I do not know
- I do not have a mother

10. Who do you live with most of the time? (Mark all that apply)

- Mother
- Stepmother
- Father

- Stepfather
- Other adults related to you
- Other adults not related to you
- I do not live with any adults

57. YESTERDAY, from the beginning of the day to the very end of the day, how many times did you eat any of the following foods?

Response options: 0, 1, 2, 3, 4, 5, 6+

1. Salty snacks (e.g., chips, cheesies, nachos, popcorn, pretzels)
2. French fries or fried potatoes
3. Pizza or pizza snack, other than pizza with whole wheat crust and one or more vegetables as a topping (e.g., a Pizza Pop[®], frozen pizza)
4. Chocolate bars and other sweetened items like pastries and squares
5. Ice cream, an ice cream bar, frozen yogurt, a Popsicle[®], etc.
6. Fruit, not including juice (e.g., fresh, dried, canned, or frozen fruit, no sugar added)
7. Dark green vegetables (e.g., romaine lettuce, spinach, broccoli, green beans)
8. Dark orange vegetables (e.g., carrots, squash, sweet potatoes, yams)
9. Other vegetables (e.g., other raw or cooked vegetables, like corn)

58. Thinking back over the last school week, on the days you ate BREAKFAST, on how many days did you...

Response options: 0, 1, 2, 3, 4, 5

1. Eat breakfast at home, or bring breakfast from home
2. Eat at a free breakfast program at school
3. Buy a partial or complete breakfast at school (e.g., cafeteria or vending machine)
4. Buy breakfast from another place (e.g., fast food restaurant, convenience store, etc.)

59. Thinking back over the last school week, on the days you ate LUNCH, on how many days did you...

Response options: 0, 1, 2, 3, 4, 5

1. Eat lunch at home, or bring lunch from home
2. Eat at a free lunch program at school
3. Buy a partial or complete lunch at school (e.g., cafeteria or vending machine)
4. Buy lunch from another place (e.g., fast food restaurant, convenience store, etc.)

60. How often do you purchase food from the following types of locations?

Response options: Never, Less than once a month, About 1-3 times a month, About once a week, Between 2-4 times a week, Almost every day or every day

1. Convenience or corner store, gas station, newsstand
2. Supermarket

3. Fast food restaurant or coffee shop
4. Sit-down restaurant

61. YESTERDAY, from the beginning of the day to the very end of the day, how many times did you drink any of the following?

Response options: 0, 1, 2, 3, 4, 5, 6+

1. Plain milk or soy beverage (including in your cereal)
2. Flavoured milk or soy beverage
3. 100% fruit juice or vegetable juice
4. Fruit-flavoured drinks (e.g., Kool-Aid®, Sunny D®, lemonade, etc.)
5. Regular (non-diet) pop, soft drinks, or sports drinks (e.g., slurpees, slushies, snow cones, or Gatorade®)
6. Diet pop or soft drinks
7. Energy drinks (e.g., one cup or can of Red Bull®, Rockstar®, Monster®, etc.)

64. When was the LAST TIME you had an energy drink (e.g. Red Bull®, Rockstar®, Monster®, etc.)?

- I have never had an energy drink
- In the last 24 hours
- In the last 7 days
- In the last 30 days
- In the last 6 months
- In the last 12 months
- More than 12 months ago

65. When was the LAST TIME you had alcohol and an energy drink (e.g. Red Bull®, Rockstar®, Monster®, etc.) mixed together or on the same occasion (for example, during a party)?

- I have never done this
- In the last 24 hours
- In the last 7 days
- In the last 30 days
- In the last 6 months
- In the last 12 months
- More than 12 months ago

66. What are the reasons you have used energy drinks (e.g. Red Bull®, Rockstar®, Monster®, etc.)?

Response options: Yes, No, Not applicable

1. To stay awake or help concentrate for studying or work
2. To stay awake or alert for driving
3. For the taste
4. To improve sports performance or physical activity
5. To help lose weight or help keep weight off

6. For going out or partying
7. To mix with alcohol
8. To sober up after drinking alcohol
9. To cope with a hangover
10. I think they are cool
11. My friends drink them
12. Other

6.13 Appendix M: Supplementary Results Tables from School Surveys.

Table 1: Haida Gwaii: How often do you eat the following foods?

	n	At least once a day	5-6 x/wk	2-4 x/wk	Once a wk	2-4 x/mth	Rarely or never
Salty snacks (e.g., chips, cheesies)	92	13%	14%	27%	19%	12%	15%
French Fries or other fried potatoes (wedges, poutine, etc.)	90	4.5%	4.5%	11%	29%	28%	23%
Vitamin-mineral pills	88	9%	2%	8%	3%	6%	72%
Pizza	91	7%	4%	10%	15%	46%	18%
Candy or chocolate bars	89	10%	16%	27%	26%	11%	10%
Pop (non-diet, all types)	90	6%	4%	13%	12%	16%	49%
Pop (diet, all types)	86	4%	5%	7%	10%	10%	64%
Milk (white, chocolate)	90	29%	22%	9%	9%	5%	26%
Green Vegetables (e.g., broccoli, spinach salad)	89	8%	2%	10%	11%	18%	51%
Orange Vegetables (e.g., carrots, squash)	89	40%	25%	23%	8%	1%	3%
Whole grains (e.g., in breads, rice pasta, cereal)	89	24%	22%	33%	8%	7%	7%
Other vegetables (corn)	88	41%	24%	18%	8%	2%	7%
Fruit (including fresh, frozen or packaged but not juice)	85	15%	14%	24%	13%	16%	18%
Energy drinks (e.g., Redbull, Rockstar, Monster)	88	42%	30%	13%	8%	2%	6%

Table 2: Ministikwan Lake: How often do you eat the following foods?

	n	At least	5-6 x/wk	2-4 x/wk	Once a wk	2-4 x/mth	Rarely or never
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		once a day					
Salty snacks (e.g., chips, cheesies)	78	15%	13%	22%	27%	10%	13%
French Fries or other fried potatoes (wedges, poutine, etc.)	78	14%	13%	23%	19%	22%	9%
Vitamin-mineral pills	71	11%	6%	6%	3%	8%	66%
Pizza	74	9%	13%	12%	15%	31%	19%
Candy or chocolate bars	76	12%	16%	17%	13%	9%	33%
Pop (non-diet, all types)	76	17%	25%	20%	12%	8%	18%
Pop (diet, all types)	74	11%	15%	7%	13%	9%	45%
Milk (white, chocolate)	77	35%	16%	10%	16%	6%	17%
Green Vegetables (e.g., broccoli, spinach salad)	76	20%	20%	22%	10%	8%	20%
Orange Vegetables (e.g., carrots, squash)	77	21%	16%	17%	17%	9%	21%
Whole grains (e.g., in breads, rice pasta, cereal)	66	18%	29%	27%	15%	6%	4%
Other vegetables (corn)	78	23%	18%	18%	14%	8%	19%
Fruit (including fresh, frozen or packaged but not juice)	77	36%	18%	16%	16%	9%	5%
Energy drinks (e.g., Redbull, Rockstar, Monster)	77	16%	4%	6%	5%	18%	51%

6.14 Appendix N: Supplementary Results Tables from CRAYS

Table 1: How often do you purchase food from the following locations (%)?*

Source	Indigenous (n=1284)	Non-Indigenous (n=11296)	P-value
Convenience or corner store, gas station			
Almost every day or every day	5.7%	1.9%	<0.0001
Between 2-4 times a week	12.5%	5.9	
About once a week	13.9	12.1	
About 1-3 times a month	27.1	20.6	
Less than once a month	23.7	30.1	
Never	16.1	28.4	
Supermarket or grocery store			
Almost every day or every day	4.9	3.7	0.1282
Between 2-4 times a week	13.9	12.6	
About once a week	23.1	28.9	
About 1-3 times a month	23.4	20.0	
Less than once a month	14.9	15.7	
Never	18.4	17.6	
Fast food restaurant, take-out or coffee shop			
Almost every day or every day	6.2	3.7	0.004
Between 2-4 times a week	14.5	12.2	
About once a week	17.5	20.9	
About 1-3 times a month	23.9	30.9	
Less than once a month	23.1	20.2	
Never	13.9	11.1	
Sit-down restaurant			
Almost every day or every day	2.8	0.8	0.0011
Between 2-4 times a week	3.3	2.2	
About once a week	9.5	9.3	
About 1-3 times a month	25.8	29.3	
Less than once a month	38.8	40.5	
Never	19.2	16.9	

* Adjusted for sampling design; p-value based on Chi-square analysis

Table 2: Self-reported frequency of consumption of alcohol and energy drink mix (%)*

	Indigenous (n=1284)	Non-Indigenous (n=11267)	Total n	P- value
I have never	55.24	72.81	8936	<0.001
In the last 24 hours	5.32	1.87	270	
In the last 7 days	8.88	5.37	784	

In the last 30 days	9.08	5.59	819
In the last 6 months	8.44	7.65	974
In the last 12 months	4.06	3.02	487
More than 12 months ago	8.50	3.21	462
NS	0.49	0.49	1224

* Adjusted for sampling design; p-value based on Chi-square analysis;

Table 3: Mean frequency ('times' eaten the previous day) of food group, by region (95% CI)*

Food Category	Indigenous (n=1284)	Non-Indigenous (n=11267)	P-value
EAST			
Other Foods	6.44 (3.64 – 9.25)	3.73 (3.30 – 4.15)	0.0654
Fruit and Vegetables	6.85 (4.67 – 9.03)	5.63 (5.12 – 6.14)	0.3100
Milk and Alternatives	1.14 (0.93 – 1.87)	1.70 (1.47 – 1.92)	0.1813
Sugary drinks	5.16 (2.98 – 7.34)	2.09 (1.53 – 2.65)	0.0094
CENTRAL			
Other Foods	4.93 (3.54 – 6.33)	3.35 (3.14 – 3.56)	0.0255
Fruit and Vegetables	7.36 (5.85 – 8.87)	6.31 (5.94 – 6.68)	0.1385
Milk and Alternatives	2.15 (3.11 – 4.41)	1.84 (1.71 – 1.96)	0.0850
Sugary drinks	3.76 (3.11 – 4.41)	1.87 (1.59 – 2.16)	<0.0001
WEST			
Other Foods	4.73 (3.77 – 5.18)	3.48 (3.06 – 5.91)	0.0052
Fruit and Vegetables	6.75 (6.21 – 7.29)	7.33 (7.04 – 7.63)	0.0330
Milk and Alternatives	1.89 (1.65 – 2.13)	1.90 (1.78 – 2.00)	0.9571
Sugary drinks	3.26 (2.69 – 3.84)	1.90 (1.56 – 2.23)	<0.0001

* Adjusted for sampling design; p-value based on Chi-square analysis

Table 4: Factors Associated with Frequency of Intake of Food Groups

	Indigenous OR (95% CI) n=1284	Non-Indigenous OR (95% CI) n=11267
High Frequency of Intake: 'Other' Foods		
Region		

	East *	1.00	1.00
	Central	0.64 (0.34 – 1.21)	0.82 (0.66 – 1.02)
	West	0.62 (0.33 – 1.19)	0.75 (0.55 – 1.02)
Mother's Education			
	High School or below*	1.00	1.00
	Some post-secondary education	0.65 (0.40 – 1.06)	1.01 (0.85 – 1.19)
	Completed post-secondary education	0.77 (0.56 – 1.06)	0.97 (0.80 – 1.00)
	I don't know or I don't have a mother	0.93 (0.64 – 1.34)	1.06 (0.86 – 1.31)
Urban/Rural Locale			
	Urban*	1.00	1.00
	Rural	1.27 (0.90 – 1.80)	1.06 (0.87 – 1.29)

High Frequency of Intake: Fruits and Vegetables

Region			
	East *	1.00	1.00
	Central	1.18 (0.63 – 2.21)	1.15 (0.94 – 1.41)
	West	1.18 (0.67 – 2.09)	1.52 (1.23 – 1.88)
Mother's Education			
	High School or below*	1.00	1.00
	Some post-secondary education	1.04 (0.63 – 1.72)	1.02 (0.82 - 1.27)
	Completed post-secondary education	1.39 (0.99 – 1.93)	1.43 (1.25 – 1.65)
	I don't know or I don't have a mother	1.16 (0.82 – 1.65)	0.89 (0.79 – 1.01)
Urban/Rural Locale			
	Urban*	1.00	1.00
	Rural	0.79 (0.64 – 0.98)	0.86 (0.69 – 1.07)

High Frequency of Intake: Milk and Alternatives

Region			
	East *	1.00	1.00
	Central	0.89 (0.52 – 1.53)	0.95 (0.76 – 1.18)
	West	0.80 (0.48 – 1.34)	1.02 (0.87 – 1.19)
Mother's Education			
	High School or below*	1.00	1.00
	Some post-secondary education	1.26 (0.80 – 1.95)	1.00 (0.81 – 1.23)
	Completed post-secondary education	1.20 (0.98 – 1.49)	1.23 (1.08 – 1.40)
	I don't know or I don't have a mother	1.03 (0.72 – 1.48)	0.92 (0.79 – 1.06)
Urban/Rural Locale			
	Urban*	1.00	1.00
	Rural	1.07 (0.77 – 1.47)	1.01 (0.86 – 1.18)

High Frequency of Intake: Sugary Drinks

Region			
	East *	1.00	1.00
	Central	0.68 (0.37 – 1.24)	0.81 (0.61 – 1.07)

	West	0.86 (0.51 – 1.46)	0.78 (0.56 – 1.01)
Mother's Education			
	High School or below*	1.00	1.00
	Some post-secondary education	0.94 (0.47 – 1.91)	0.70 (0.57 – 0.85)
	Completed post-secondary education	0.70 (0.53 – 0.94)	0.57 (0.50 – 0.65)
	I don't know or I don't have a mother	0.90 (0.61 – 1.33)	0.80 (0.66 – 0.99)
Urban/Rural Locale			
	Urban*	1.00	1.00
	Rural	1.34 (0.98 – 1.85)	1.27 (1.00 – 1.62)
