

Comprehensive School-based Nutrition Interventions for Indigenous Children in Canada

by

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Abstract

Indigenous communities in Canada (First Nations, Inuit, and Métis) face significant social and environmental barriers to healthy eating. Due in large part to these barriers, Indigenous children are disproportionately affected by nutrition-related chronic diseases such as obesity and diabetes. Comprehensive school-based nutrition interventions that integrate multiple components of the school environment (e.g., social and physical environments, teaching and learning, policy, and partnerships and services) offer a promising strategy for improving children's access to healthy foods and sustaining positive eating behaviours. However, little is known about comprehensive school-based nutrition interventions for Indigenous children. The purpose of this thesis was to describe the current status of school-based nutrition interventions for Indigenous children, and to uncover the principles underlying their development, implementation, and evaluation.

For this present thesis, two studies were conducted related to school-based nutrition interventions in Indigenous communities. Study 1 was a process evaluation of school nutrition policy implementation using a community-based participatory research approach. The evaluation was conducted using an explanatory sequential mixed methods design. Students in grades 4–12 (n=94) and parents of students attending the school (n=83) completed cross-sectional surveys to capture their perceptions of the policy. Survey data informed semi-structured interviews with students (n=20) and parents (n=10) to further identify barriers and facilitators to policy implementation. Study 2 was a scoping review that broadly searched the scientific and grey literature to identify school-based interventions that have been implemented to improve the nutrition of Indigenous children in Canada and to describe their components.

Study 1 showed that facilitators of school nutrition policy implementation included parent and student support, student food preferences for healthy foods, and student interest in health education. The barriers to policy implementation identified included a lack of communication between students and their teachers and parents, lack of parent support for guidelines concerning celebrations and fundraisers, inadequate communication between the school and parents, and the broader socioeconomic conditions in the community. Study 2 found that few school-based nutrition interventions for Indigenous children in Canada are comprehensive, as there are limited examples of interventions that integrate multiple aspects of the school food environment. Although most interventions include components related to the social and physical environment (e.g., food programs) and engage in partnerships with the local community, few integrate teaching or policy components. Furthermore, few interventions have been evaluated to understand the factors influencing their implementation or effectiveness.

Overall, the two studies discussed in this thesis indicate that school-based nutrition intervention in Indigenous communities require community engagement and evaluation components that involve a variety of stakeholders – including parents and students – to ensure interventions are relevant and sustainable. Comprehensive school-based nutrition interventions may benefit from incorporating two or more components (e.g., school food programs, classroom education, nutrition policies, and partnerships with local businesses) to improve student access to healthy foods. Moving forward, it is important that communities and researchers aim to disseminate knowledge about their interventions broadly. Increasing evidence-based knowledge concerning comprehensive school-based nutrition interventions may assist communities – and health promoters working with communities – to improve the school nutrition environments and health outcomes of Indigenous children in Canada.

Preface

This thesis is an original work by Christina Gillies and includes two research projects: 1) an evaluation research project, and 2) a scoping review. The school nutrition policy evaluation research project discussed in this thesis received research ethics approval from the University of Alberta Research Ethics Board 1 (Project name: The Adoption of a First Nation School's Nutrition Policy, ID: Pro00051837). The scoping review discussed in this thesis did not require ethics approval.

This is a multi-paper thesis and the three papers included in Chapters 4-6 have either been published or submitted for publication in peer-reviewed journals. The first paper (Chapter 4) has been published as Gillies, C., Alexander Research Committee, Farmer, A., Maximova, K., & Willows, N. D. (2018). First Nations students' perceptions of school nutrition policy implementation: A mixed methods study. *Nutrition & Dietetics*, 75(5), 533–540. All authors were involved in study design. I was responsible for quantitative and qualitative data collection, quantitative and qualitative data analyses, data interpretation, and writing of the manuscript. ARC, A. Farmer, and K. Maximova contributed to the manuscript edits. N. D. Willows was the supervisory author, and was involved with concept formation, quantitative data analysis, and manuscript edits.

The second paper (Chapter 5) has been accepted for publication as Gillies, C., Alexander Research Committee, Farmer, A., Maximova, K., & Willows, N. D. Alexander First Nations parents' perceptions of a school nutrition policy in the *Canadian Journal of Dietetic Practice and Research*. All authors were involved in study design. I was responsible for qualitative data collection, quantitative and qualitative data analyses, data interpretation, and writing of the

manuscript. ARC, A. Farmer, and K. Maximova contributed to the manuscript edits. N. D.

Willows was the supervisory author, and was involved with concept formation, quantitative data analysis, and manuscript edits.

Finally, the third paper (Chapter 6) has been submitted for publication and is currently under review as Gillies, C., Blanchet, R., Gokiert, R., Farmer, A., Thorlakson, J., Hamonic, L., & Willows, N. D. Indigenous school-based nutrition interventions in Canada: A scoping review in *BMC Public Health*. I contributed to conception formation and review design and was responsible for the grey literature search, selecting sources of evidence, charting sources of evidence, summarizing the results, and writing of the manuscript. Thorlakson, J. and L. Hamonic performed the electronic database search. R. Blanchet contributed to review design, selecting sources of evidence, and manuscript edits. Gokiert, R., and A. Farmer contributed to review design and manuscript edits. N. D. Willows was the supervisory author and was involved with selecting sources of evidence and manuscript edits.

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I would also like to thank my family and friends for their unwavering support and unconditional love over the past four years. During difficult times, it was your understanding and encouragement that allowed me to continue on this journey. I especially thank my incredible husband Kevin, whose belief in me has allowed me to reach my goals.

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List of Abbreviations

AFN: Alexander First Nation

AFNE: Alexander First Nation Education

ARC: Alexander Research Committee

APPLE Schools: A Project Promoting healthy Living for Everyone in schools

APS: Aboriginal Peoples Survey

AYMP: Aboriginal Youth Mentorship Program

BMI: Body Mass Index

CCHS: Canadian Community Health Survey

CDC: The Centers for Disease Control and Prevention

CBPR: Community-based Participatory Research

CHMS: Canadian Health Measures Survey

CSH: Comprehensive School Health

ISC: Indigenous Services Canada

JCSH: Pan-Canadian Joint Consortium for School Health

KEC: Kipohtakaw Education Centre

KSDPP: Kahnawake Schools Diabetes Prevention Project

PRISMA-ScR: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension
for Scoping Reviews

RHS: The First Nations Regional Health Survey

SEM: Social Ecological Model

SES: Socioeconomic Status

SDH: Social Determinants of Health

SNP: School Nutrition Policy

WHO: World Health Organization

ZATPD: Zhiiwapenewin Akino' maagewin: Teaching to Prevent Diabetes

CHAPTER 1: Introduction

Indigenous children in Canada are disproportionately affected by nutrition-related health issues such as obesity, diabetes, and cardiovascular heart disease (Pigford & Willows, 2010). Although the factors determining food choice and nutrition are complex, Indigenous communities face distinct barriers to healthy eating at multiple levels of social and environmental influence, including low income, food insecurity, and poverty (Smylie & Firestone, 2016; Willows, 2005a). Effectively promoting and supporting healthy eating for Indigenous children requires an understanding of these complex factors, as well as the development of interventions to address them. Comprehensive school-based nutrition interventions offer a promising strategy to improve Indigenous children's food environments and promote healthy eating behaviours. However, there is little evidence concerning comprehensive school-based nutrition interventions for Indigenous children in Canada.

This thesis consists of two research projects related to understanding school-based nutrition interventions in Indigenous communities. The first research project evaluates the implementation of a school nutrition policy (SNP) in a First Nations school. The second is a scoping review that describes the current state of knowledge concerning school-based nutrition interventions in Indigenous communities. Together, these projects aim to identify principles that can be used to develop, implement, and evaluate comprehensive school-based nutrition interventions for Indigenous children.

Indigenous Peoples in Canada

Currently, there is considerable debate within national and international communities on the appropriate definition and description of "Indigenous peoples" (United Nations - Indigenous

Peoples, n.d.). However, one of the most common and accepted working definitions from Martinez Cobo (1986) reads:

Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal systems (Document E/CN.4/Sub.2/1986/7/Add.4, para. 379)

This definition preserves the sovereign right of Indigenous peoples to decide what and who belongs to them without external interference (Martinez Cobo, 1986). The use of the plural “peoples” recognizes that more than one distinct group comprises the Indigenous population (First Nations Studies Program, 2009). Although there is a lexicon of words that relate to Indigenous peoples (e.g., Aboriginal, Indian, and Native), the term Indigenous is used throughout this thesis – except in reference to statistical sources – as it is perceived to more clearly indicate a relationship to a current or historic land base, is not derived from colonial legislation, and better reflects the diversity of populations within both national and international contexts (Smylie & Firestone, 2016). Furthermore, while there is no formal consensus regarding the capitalization of the term, I have chosen to capitalize Indigenous as a sign of respect.

Within a Canadian context, the term Indigenous is often used interchangeably with Aboriginal, and collectively refers to the original inhabitants of Canada and their descendants as defined in Section 35(2) of the *Canadian Constitution Act, 1982* (National Collaborating Centre for Aboriginal Health [NCCA], 2013; Smylie & Firestone, 2016). Indigenous peoples include three distinct groups: First Nations, Inuit, and Métis. The Indigenous peoples of Canada are culturally, linguistically, and geographically diverse, and often refer to themselves by their

specific tribal (i.e., community or social group) affiliation (e.g., Cree, Blackfoot, and Mi'kmaq) (Smylie & Firestone, 2016). In the 2016 Census, more than 600 unique Indian bands (i.e., governing bodies of Indians) were recognized, and more than 70 Aboriginal languages were reported (Statistics Canada, 2017).

First Nations peoples are the descendants of the original inhabitants of Canada, who do not recognize themselves as ethnically Inuit or Métis (NCCAH, 2013). The term First Nations came into common use in the 1970s to replace Indian; however, 'Indian' still refers to the legal identity of a First Nations person who is registered under Canada's federal *Indian Act* and continues to be used within a lawful context (Smylie & Firestone, 2016). Status Indians are registered under the *Indian Act* and are eligible for a range of social programs and services, whereas non-status Indians are not (NCCAH, 2013; Smylie & Firestone, 2016). While First Nations refers to the ethnicity of First Nations peoples, the singular "First Nation" may also be used to refer to band or reserve-based community and the status Indians who live in them (First Nations Studies Program, 2009). Inuit peoples traditionally lived above the tree line and are the original inhabitants of the Arctic regions of Canada (NCCAH, 2013; Smylie & Firestone, 2016). Finally, the Métis are a group of Indigenous peoples whose ancestry can be traced back to the intermarriage of European men and First Nations women (Smylie & Firestone, 2016).

Current census data emphasizes that the Indigenous population in Canada as a whole is rapidly growing in number. In 2016, Aboriginal peoples accounted for 4.9% of the total population of Canada (Statistics Canada, 2017). This was an increase of 42.5% since 2006; more than four times the growth rate of the non-Aboriginal population in Canada over the same ten year period (Statistics Canada, 2017). First Nations comprise the largest population of Indigenous Peoples (977,230 people), followed by Métis (587,545 people), and Inuit (65,025

people) (Statistics Canada, 2017). This rapid increase has been attributed to increased life expectancy and high fertility rates among Indigenous peoples, as well as to changes in self-reported identification of ethnicity (Statistics Canada, 2017).

Census data also indicate that the growing Indigenous population is young in age and increasingly urbanized in Canada. In 2016, the average age of the Aboriginal population was 32.1 years, which was significantly younger than the non-Aboriginal population (40.9 years). Indigenous children and youth are the fastest growing demographic in Canada, with roughly one-third of First Nations (29.2%) and Inuit (33.0%) populations being 14 years of age or younger, and almost one-quarter (22.3%) of Métis being 14 years of age or younger (Statistics Canada, 2017). Among First Nations with Indian status (744,855 people), 44.2% lived on-reserve (i.e., a tract of land set apart by the Federal government for the collective use of an Indian band) with the majority living off-reserve. Consistent growth has been observed in the Indigenous population living in urban areas, and, in 2016, more than half of the Aboriginal population lived in a metropolitan area (Statistics Canada, 2017).

Indigenous children's health. In Canada, Indigenous children experience significant health inequalities, including higher rates of overweight and obesity, as compared to the non-Indigenous population. Health inequalities (or disparities) are differences in health status experienced between groups in society that can be the result of individual biological factors, individual choices, or chance (Government of Canada, 2018). Health inequalities may also be attributable to social and environmental factors that influence health, which are largely beyond the control of individuals (Government of Canada, 2018). Where inequalities in health status exist in the presence of unfair and avoidable or remediable differences among social groups, they are deemed health inequities (World Health Organization [WHO], 2019).

Although no single source offers a comprehensive and longitudinal assessment of obesity prevalence among all Indigenous populations in Canada, several studies and region-specific surveys provide health estimates and highlight the significant health inequalities that Indigenous children experience (Kolahdooz, Sadeghirad, Corriveau, & Sharma, 2017; Young et al., 2015). A systematic review of studies reporting the prevalence of overweight and/or obesity based on body mass index (BMI) among Indigenous populations in Canada found that overweight ranged from 16.7 to 42.2% and obesity ranged from 15.8 to 47.3% among individuals less than 18 years old (Kolahdooz et al., 2017). Girls had a higher prevalence of overweight (27.6%) and obesity (28.6%) than boys (24.7% overweight and 25.1% obese) (Kolahdooz et al., 2017). The review also found that the prevalence of overweight and obesity increased over time in the studies that spanned 1990-2013 (Kolahdooz et al., 2017). As the majority of studies and surveys are cross-sectional and region-specific, there are limited available data to examine changes in overweight and obesity prevalence in Indigenous populations over time. Current data also fail to account for the diversity in Indigenous populations, as prevalence data for Inuit and Métis children are lacking. Furthermore, the use of BMI to measure the prevalence of obesity has limitations, as BMI cannot account for individual and/or ethnic differences in fat distribution or body composition (Borga et al., 2018). In spite of this limitation, BMI provides a common reference point and readily available, low-cost, and noninvasive measurement for comparing data within and between populations (Hoelscher, Kirk, Ritchie, & Cunningham-Sabo, 2013) and this review provides a picture of the overall high prevalence of obesity among Indigenous children.

The First Nations Regional Health Survey (RHS) is the only Canadian national survey that provides estimates of obesity based on self-reported data among First Nations populations living on-reserve in all provinces and territories (except Nunavut). The 2008/10 RHS found that

62.5% of First Nations children (aged two to 11 years) were overweight (20.3%) or obese (42.4%). It also found that 42.7% of First Nations youth (aged 12-17 years) were overweight (29.9%) or obese (12.8%) (First Nations Information Governance Centre [FNIGC], 2012). As self-reported overweight and obesity are often lower than measured rates (Himes, 2009; Public Health Agency of Canada, 2011), it is possible that the prevalence of obesity in on-reserve First Nations populations is even higher than found in the RHS. In comparison, the 2009/11 Canadian Health Measures Survey (CHMS) – an ongoing cross-sectional national survey, excluding on-reserve First Nations populations and some remote regions, that objectively measures BMI data in the population – found that 31.5% of youth (aged 5-17 years) were overweight (19.8%) or obese (11.7%) (Roberts, Shields, De Groh, Aziz, & Gilbert, 2012). The RHS and CHMS collected data using different methods and age groups and are thus not directly comparable; however, they provide insight into the considerable inequalities in national obesity prevalence between on-reserve First Nations children and children in the general population.

The high prevalence of obesity among Indigenous children is an alarming trend with adverse life-long consequences. Obese children are more likely to develop physiological health issues, including type 2 diabetes, cardiovascular disease, hypertension, asthma, and obstructive sleep apnea (Gurnani, Birken, & Hamilton, 2015). For instance, the 2008/10 RHS found that a higher proportion of First Nations youth that reported having been diagnosed with diabetes were obese (First Nations Information Governance Centre [FNIGC], 2012). Obese children are also more likely to develop psychological and emotional health problems – including low self-esteem, depression, and anxiety – and to encounter social problems such as bullying and poor school performance (Gurnani et al., 2015). Furthermore, there is compelling evidence that

obesity and its comorbidities continue from childhood into adulthood (Academy of Nutrition and Dietetics, 2013; Gurnani et al., 2015).

Although childhood obesity is a complex condition – influenced by a range of biological, socioeconomic, and environmental factors – diet plays an important role in obesity prevention and nutrition is a key modifiable determinant of diet-related disease (Academy of Nutrition and Dietetics, 2013; Hoelscher et al., 2013; Story, Kaphingst, Robinson-O’Brien, & Glanz, 2008). Information regarding food and nutrition intake in Indigenous communities is limited due to a lack of consistent data gathered at the national level that is inclusive of all Indigenous populations; however, some research has provided insights into the diets of Indigenous children (Gates, Skinner, & Gates, 2014). In the 2008/10 RHS, 58.6% of First Nations children and 23.7% of First Nations youth were reported to have “always” or “almost always” ate a nutritious, balanced diet. The RHS also found that the majority of First Nations children consumed soft drinks and fast food (e.g., burgers, pizza, and French fries) at least once a week (65.3% and 75.7%, respectively) (FNIGC, 2012). A systematic review of articles reporting the dietary intakes of Indigenous youths of school age residing in Canada also found that diets were high in store-bought processed foods, sugar-sweetened beverages, and fast foods, while being low in vegetable, fruit, and milk intake (Gates et al., 2014).

While these studies provide insight into the dietary patterns of Indigenous children, more research is needed to understand the factors that influence food choice and the relationships between them. It is generally accepted that a relationship exists between individual, social, and environmental factors in relation to food choice, yet there are few comprehensive studies documenting the complexity of and interactions between these factors within Indigenous populations (Willows, 2005a; Willows, Hanley, & Delormier, 2012). For example, children may

make food choices based on their taste preferences or knowledge of food properties; however, these choices are simultaneously dependent on the types of foods readily available and accessible to them. As such, interventions to improve the dietary patterns of Indigenous children are needed that understand and recognize the multiple determinants of healthy eating in Indigenous communities.

Social Determinants of Health

To understand and appreciate differences in nutrition status and the health inequalities experienced by Indigenous children, it must be acknowledged that the social determinants of health (SDH) have a significant influence on the health of Indigenous peoples (Bhawra, Cooke, Guo, & Wilk, 2017). The SDH refer to the economic and social conditions that shape the health of individuals and communities (Raphael, 2016). Within a Canadian context, the SDH include early life events, education, employment, food security, gender, geography, housing, and income (Raphael, 2016). As compared to an individualized or ‘lifestyle’ approach – which focuses solely on biomedical and behavioural risk factors for disease – the SDH approach emphasizes understanding the social, political, and economic factors that shape health behaviours and access to resources that influence health (Raphael, 2016).

The SDH have been consistently demonstrated to have a far greater influence on health and the incidence of illness and disease than individual biomedical risk factors (e.g., genetic susceptibility) and behavioural choices (e.g., diet and physical activity) (Raphael, 2016). For example, there is compelling evidence that in Western countries a socioeconomic gradient of obesity exists in which obesity risk for adults and non-adults increases as socioeconomic status (SES) – a measure of individual or family education, employment, and income – decreases, especially among females (Devaux & Sassi, 2013; Due et al., 2009; Ng, Corey, & Young, 2011;

Shrewsbury & Wardle, 2008). Several studies using data from the Canadian Community Health Survey (CCHS) – a cross-sectional survey that collects information related to health status and health determinants for the Canadian population, excluding those living on-reserves – have demonstrated the independent influence of socioeconomic factors on obesity in the general Canadian population.

In 2005, an analysis of the CCHS showed that low education levels, low household income, and moderate levels of food insecurity were each independently associated with significantly higher rates of obesity among women in the general population (Slater, Green, Sevenhuysen, O’Neil, & Edginton, 2009). Similarly, an analysis of the CCHS conducted in 2004 demonstrated that obesity in children and youth was negatively associated with household income and household education level (Shields, 2006). Finally, a study assessing the relationship between obesity status and three indicators of SES – employment, education and income – in off-reserve Indigenous respondents of the 2004 CCHS found that both education and employment were negatively associated with obesity status among Indigenous men and women (Ng et al., 2011). A negative association between income and obesity was also observed among Indigenous women (Ng et al., 2011). Although these studies rely on cross-sectional data analysis, they provide evidence for the considerable effects that the SDH have on obesity status in both the Indigenous and general population.

Research has also provided empirical evidence for the associations between the SDH and obesity status in Indigenous children. A cross-sectional, school-based study conducted in two Indigenous communities in Canada explored the relationship among children’s food environment, diet quality, and weight status (Downs et al., 2009). Using three 24-hour dietary recalls and a food availability questionnaire, the researchers found that the majority of children’s

diets were high in energy-dense market foods (e.g., potato chips and soda pop) and low in nutrient-rich foods (e.g., fruits and vegetables) (Downs et al., 2009). By measuring the heights and weights of children in grades 4 to 6 and calculating their BMI, it was also found that the majority of children (64.2%) were overweight (29.9%) or obese (34.3%) (Downs et al., 2009). However, statistical analysis indicated that child weight status was not associated with restaurant meal frequency or the home food environment. The authors surmised that SDH – such as food insecurity and poverty – limited children’s access to healthy foods and likely contributed to the high childhood obesity prevalence (Downs et al., 2009). Another study utilized data from the 2012 Aboriginal Peoples Survey (APS) – a national survey of First Nations people living off-reserve, Inuit, and Métis aged 6 years and over in Canada – to examine the association between household food security status and obesity among First Nations and Métis children and youth. The researchers found that household income and negative perceptions of school environment (e.g., exposure to racism, bullying, or violence) were associated with weight status among Indigenous children (Bhawra et al., 2017).

Overall, there is growing evidence that demonstrates a relationship between the SDH and obesity status in Indigenous populations. However, as most studies rely on cross-sectional data, it is challenging to uncover the causal pathways between various SDH and obesity status, or to ascertain the individual effects of individual SDH on obesity status. For example, it is unclear whether employment influences obesity status in Indigenous populations, or vice versa (Ng et al., 2011). These relationships are particularly difficult to detect in children, whose individual health behaviours are highly influenced by the social and economic conditions of their parents or caretakers. Despite the complexities underlying health inequalities experienced by Indigenous

children, the SDH approach can assist in understanding and addressing the development of obesity and obesity-related chronic disease in Indigenous populations.

The Social Ecological Model

The social ecological model (SEM) – also known as the ecological model – is a theoretical framework that accounts for the multiple, reciprocal interactions between individual behaviours and the broader determinants of health (Stokols, 1996). The SEM recognizes there are numerous interacting spheres of influence (e.g., physical, social, and cultural) that impact human behaviour and health outcomes, and emphasizes the dynamic interconnections between people and their environments (Stokols, 1996). With respect to obesity, the SEM suggests that individual eating behaviours must be situated and contextualized within people’s broader environments. Although levels of influence vary according to the model, SEMs generally include considerations of individual (e.g., personal beliefs, behaviours, and motivations), interpersonal (e.g., family, friends, and peers), physical environment (e.g., schools, home, and work sites), and macro-level (e.g., health policy, food marketing, and social norms) variables (Story et al., 2008).

Each level of influence in the SEM is an important level of influence on eating behaviours as well as a key point for health promotion more broadly. As such, the SEM can be used to describe the factors affecting an issue, understand how levels influence one another, and guide the development of comprehensive, multi-level interventions (Sallis & Owen, 2015). The SEM offers a framework to help researchers and health professionals to analyze and contextualize factors that influence eating behaviours and to uncover a deeper understanding of the relationships and interactions between factors (Willows et al., 2012). In addition, the SEM can provide guidance for research and planning comprehensive diet-related behaviour interventions

(Sallis & Owen, 2015; Zheng, Mancino, Burke, & Glanz, 2017). Consideration of the multiple levels of influence on eating behaviours broadens the perspective of researchers, increases the options for interventions, and extends the potential influence of interventions beyond the individual level.

Several SEMs specific to eating choices have been published (Story et al., 2008; Townsend & Foster, 2013), including one specific to obesity in Indigenous children (Willows et al., 2012). Although all of the SDH apply to Indigenous populations, there are also key Indigenous-specific SDH – including colonization, racism, and self-determination – that need to be considered and incorporated in an Indigenous SEM (Smylie & Firestone, 2016). In recognition of this complexity, Willows and colleagues (2012) have developed a SEM to address childhood obesity in Indigenous populations that incorporates a multitude of SDH experienced by Indigenous peoples (Figure 1). The authors recognize several levels of influence, including: 1) individual (e.g., biological factors, knowledge, and motivations), 2) interpersonal (e.g., family feeding practices and peer and family support), 3) community, home, and sociocultural environments (e.g., socioeconomic status, school food environments, geographic location), 4) built environment (e.g., availability of health foods and proximity of fast food restaurants), and 5) society (e.g., food policies, and media influences). Each of these five levels is placed within the larger macro-context of historical colonization and assimilation policies and practices, which are unique to Indigenous peoples. This SEM is innovative in its consideration of a comprehensive range of empirically recognized SDH influencing obesity in Indigenous children – including a level specific to this population – and holds great promise in guiding the development and evaluation of health interventions in Indigenous communities.

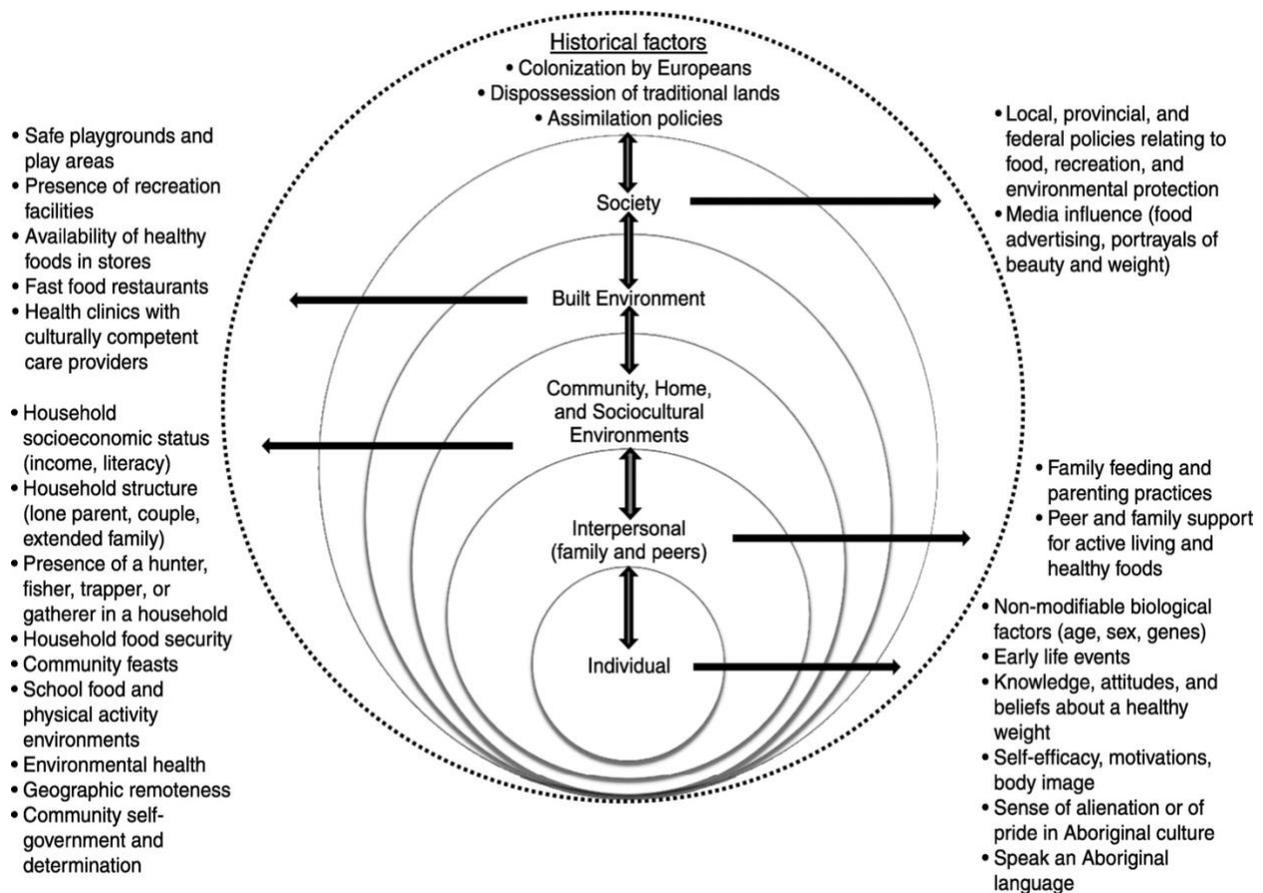


Figure 1. Ecological model for understanding obesity in children, which illustrates the reciprocity among levels that influence active living, the consumption of healthy foods, and weight status, and which recognizes that historical factors encompass and influence all ecological level. Reprinted from Willows, N. D., Hanley, A. J. G., & Delormier, T. (2012). A socioecological framework to understand weight-related issues in Aboriginal children in Canada. *Applied Physiology, Nutrition, and Metabolism*, 37(1), 1–13. © Canadian Science Publishing or its licensors.

A fundamental strength of all SEMs is that their focus on multiple levels of influence expands the range of determinants considered and broadens options for interventions (Sallis & Owen, 2015). Interventions that target multiple levels of influence are expected to reach a greater proportion of the population and to establish settings that result in sustainable behaviour changes (Sallis & Owen, 2015). However, the SEM also has limitations as it does not necessarily specify the variables that are most influential at each level (Sallis & Owen, 2015; Story et al., 2008). The implementation of multi-level interventions also presents considerable challenges, as it may be

impractical to simultaneously target all levels of influence or to control for certain variables (Sallis & Owen, 2015). Given these issues with practicality, it has been recommended that interventions begin by focusing on at least two levels of influence to create the most sustainable health improvements (Golden & Earp, 2012). Finally, interventions using the SEM are difficult to evaluate as they simultaneously address multiple levels of influence on eating behaviours and there is a lack of valid, reliable environmental measures for use in evaluation studies in diverse settings (Story et al., 2008).

Despite its potential limitations, the widespread acceptance and promotion of SEMs is reflected in recommendations and authoritative documents that guide health programs nationally and internationally (Sallis & Owen, 2015). For example, the World Health Organization (WHO) Global Strategy on Diet, Physical Activity and Health emphasizes that obesity prevention requires policy and environmental change (WHO, 2004). Empirical evidence for the SEM has accumulated for nutrition behaviours, and research indicates that there are indeed multiple levels of influence on individual eating choices that must be considered in nutrition interventions (Story et al., 2008). Accordingly, the SEM has been widely endorsed as a foundation for the development of diet-related interventions in children (Zheng et al., 2017). Overall, SEMs that recognize and account for the unique SDH experienced by Indigenous communities have considerable potential for health promotion through school-based nutrition interventions.

School-Based Nutrition Interventions

Health promotion is defined as the process of enabling people to increase control over their health and supporting them to improve their health (WHO, 2018). This process moves beyond a focus on individual behaviours, emphasizing the SDH and a diverse range of social and environmental interventions. Health promotion interventions – or activities undertaken with the

objective of improving human health – that aim to address the eating behaviours of Indigenous children may take place at any level of the SEM. However, at the level of community, home, and sociocultural environments, schools have been internationally recognized as logical and ideal settings in which to promote healthy eating and reduce childhood obesity (Jaime & Lock, 2009; Veugelers & Schwartz, 2010).

Children spend approximately half of their waking hours and can consume up to one third of their calories in school during the week (Browning, Laxer, & Janssen, 2013; Kehm, Davey, & Nanney, 2015). As schools serve a large number of students from diverse backgrounds (i.e., different socioeconomic status, ethnicity, and culture) they also offer inherent opportunities to reach all children during critical periods of development, including under-served communities that may experience greater health inequalities (Lee & Gortmaker, 2018; Mâsse, Naiman, & Naylor, 2013; McIsaac, Mumtaz, Veugelers, & Kirk, 2015). This reach can extend beyond children, as schools provide a point of contact with parents, staff, and other community members who may also influence child eating behaviours (Nelson & Breda, 2012; Veugelers & Schwartz, 2010). Finally, schools offer a cost-effective and resource-efficient setting to promote health as they reach a greater number of people with less resources and time compared to individual interventions (Vecchiarelli, Takayanagi, & Neumann, 2006).

School-based nutrition interventions can be defined as programs and strategies implemented within a school setting independently, or as part of a larger multi-setting intervention, which are intended to improve healthy eating behaviour at school. School-based nutrition interventions can target multiple levels of the SEM through health promoting policies (e.g., setting food standards), environmental change strategies (e.g., gardening), health education messages (e.g., classroom-based nutrition curricula), and health programs and services (e.g., school food service)

(Lee & Gortmaker, 2018). Health promoting policies – formal documents that outline priorities, rules, and guidelines for action intended to promote health – hold a particularly important role in school-based nutrition interventions as they offer a framework by which schools can plan, implement, and evaluate all nutrition-related aspects of the school environment (Hogan et al., 2014; McKenna, 2010). Furthermore, establishing a nutrition policy creates a standard against which to hold the school community accountable for making changes to the school food environment to improve students' eating behaviours and diet quality (Schwartz et al., 2012).

Nutrition interventions may take place at a single level of the SEM (e.g., targeting a child's knowledge of healthy foods), or they may take a multi-level approach (e.g., targeting child and parent knowledge of healthy foods, implementing a school nutrition policy, and providing healthy foods through school food programs). Although multi-level approaches are more time and resource intensive, there is also strong evidence that they promote and reinforce greater and longer-lasting changes in health behaviours than single-level interventions (Godin, Leatherdale, & Elton-Marshall, 2015; Sallis & Owen, 2015). As such, recommendations emphasize comprehensive, multi-level approaches to nutrition interventions that incorporate two or more levels of the SEM (WHO, 2004).

Given the unique and significant barriers to health faced by Indigenous communities, it is particularly important to develop holistic and comprehensive nutrition interventions that address the wider SDH to improve children's access to healthy foods. However, very little is known about comprehensive school-based nutrition interventions for Indigenous children as most interventions are single-level approaches that have demonstrated limited success in improving students' eating behaviours (Godin, Leatherdale, et al., 2015). Identifying school-based nutrition interventions, their components, and the factors influencing their success may contribute to the

development of effective school-based nutrition interventions to improve child nutrition in Indigenous communities.

Research Purpose

The overarching purpose of the two research studies described in this thesis is to identify principles that can be used to develop, implement, and evaluate school-based nutrition interventions for Indigenous children in Canada.

Research Questions

This research aimed to address three research questions across two studies:

Study 1: School nutrition policy evaluation research

1. What are students' and parents' perceptions of the facilitators of and barriers to school nutrition policy (SNP) implementation in an Indigenous community?

Study 2: Scoping review

2. What school-based nutrition interventions exist in Indigenous communities?
3. What are the main components of school-based nutrition interventions in Indigenous communities?

Summary

Indigenous children in Canada experience higher rates of overweight, obesity, and obesity-related chronic disease compared to non-Indigenous children. As diet is the key modifiable determinant of obesity, prevention through improved food environments is an essential goal in improving the health of children in Indigenous communities. The diets of

Indigenous children are closely linked to the SDH within social, environmental, and historical levels of influence, and the SEM offers a framework by which to understand how these SDH interact. Within the SEM, schools offer a favorable point of intervention for nutrition promotion and obesity prevention. In this thesis, school-based nutrition interventions implemented in Indigenous communities will be identified to describe the current status of school-based nutrition interventions in Indigenous communities, and to uncover the principles underlying their development, implementation, and evaluation.

CHAPTER 2: Literature Review

This section provides an overview of essential concepts and components included in this thesis, as well as an understanding of the current state of knowledge concerning school-based nutrition interventions in the general population and Indigenous communities. First, Comprehensive School Health (CSH) is discussed and situated within the context of Indigenous communities. This is followed by a discussion of SNP – an essential component of CSH – and the seven domains included in the policy process. Finally, the current state of SNP implementation in Canada and in schools educating Indigenous children more specifically is discussed. Overall, this literature review outlines the background knowledge and context for the SNP evaluation research and scoping review described in this thesis.

Comprehensive School Health

The Comprehensive School Health (CSH) framework (synonymous with Health Promoting Schools and Coordinated School Health) is an internationally-recognized school-based health promotion approach which connects and supports the education and health outcomes of children by addressing school health in a planned, integrated, and holistic way (Centers for Disease Control and Prevention [CDC], 2018; Pan-Canadian Joint Consortium for School Health [JCSH], 2016; WHO, 2004). CSH recognizes that health and education are interdependent and mutually reinforcing, as healthy students are better prepared to learn and better educated students are healthier individuals (JCSH, 2016). While school-based health promotion interventions have traditionally focused on individual, behavioural approaches, there has been an ongoing shift to refocus efforts on targeting broader social and physical environments as reflected in the SEM (McIsaac et al., 2017; Veugelers & Schwartz, 2010). In recognition of the important influence of the broader SDH, the CSH framework incorporates

individual, interpersonal, community, and organizational factors and attempts to holistically address them in a school setting (Storey et al., 2016).

Although the expression of a CSH framework varies based on context, the underlying principles are always based on the WHO's *Ottawa Charter for Health Promotion* (1986) which emphasizes the importance of combining multiple strategies for health promotion (JCSH, 2016; WHO, 2018). The Pan-Canadian Joint Consortium for School Health (JCSH) – a partnership of health and education representatives from federal, provincial, and territorial governments across Canada – recognizes four distinct but interrelated components of CSH: 1) social and physical environment, 2) teaching and learning, 3) healthy school policy, and 4) partnerships and services.

The social and physical environment component concerns the quality of the relationships among staff, students, and families, the emotional well-being of students, and environmental factors that support physical health (JCSH, 2016). Examples include peer-support programs, student cooking classes, and positive health messaging displayed within the school (Veugelers & Schwartz, 2010). The teaching and learning component concerns both formal and informal curricula, enhancing the knowledge and skills of students to improve their health and learning outcomes, and professional development opportunities for staff related to health (JCSH, 2016). Examples include classroom-based nutrition curricula and professional development for teachers who do not feel comfortable teaching nutrition (Veugelers & Schwartz, 2010).

Policy refers to the policies, guidelines, and practices that promote student health and achievement, and shape a supportive school environment (JCSH, 2016). Written school nutrition policies are an integral component of CSH interventions, as they establish formal standards for all nutrition-related aspects of the school environment and coordinate other aspects of the CSH intervention (Hogan et al., 2014; McKenna, 2010). Policies hold a particularly powerful role in

school-based interventions, as they support changes to the school food environments and may encourage healthy preference learning while also increasing opportunities for healthier food choices for all students (Hawkes et al., 2015). An example may include a SNP that outlines the types of foods and drinks that can be served and sold within a school and addresses the integration of nutrition education within the curriculum.

Finally, partnerships and services refers to the connections and working relationships among schools, students' families, and community organizations and sectors, as well as the health services available to support and promote student health (JCSH, 2016). Examples include collaboration with dietitians or nutritionists, allowing access to the school facilities after school hours, and BMI screening (Veugelers & Schwartz, 2010). In order for CSH to be realized, elements from each of the four components must be implemented within a school. While working toward this goal, it has been recommended that schools begin by addressing a minimum of two components (Rowling & Jeffreys, 2006).

There is considerable variability in the ways in which CSH has been implemented in schools in Canada, and few studies have identified or examined interventions that incorporate all elements of CSH (Bassett-Gunter, Yessis, Manske, & Stockton, 2012; Veugelers & Schwartz, 2010). However, there is evidence that CSH approaches are effective in fostering healthy habits among students, resulting in increased physical activity, improved dietary habits, and decreased rates of obesity and chronic disease (APPLE Schools, 2018; Stewart-Brown, 2006; Veugelers & Schwartz, 2010). For example, in the province of Alberta, A Project Promoting healthy Living for Everyone in schools (APPLE Schools) is one example of CSH that has been successfully implemented in elementary schools (serving kindergarten through grade six) in over 50 communities. Launched in 2008, APPLE Schools aims to incorporate all four aspects of CSH to

promote healthy body weights among children. APPLE Schools programs are tailored to and delivered in individual schools with the assistance of full-time health facilitators that engage multiple stakeholders (e.g., staff, students, and parents) (Fung et al., 2012). An outcome evaluation of the program over a two-year period showed that children attending APPLE Schools had increased consumption of fruits and vegetables, decreased energy consumption, increased physical activity, and less obesity compared to students attending non-APPLE Schools (Fung et al., 2012). A study on the life course impact of APPLE Schools also showed that the prevalence of obesity was lower among APPLE School students than the general population (Tran, Ohinmaa, Kuhle, Johnson, & Veugelers, 2014).

Despite these promising findings, there remains a paucity of studies concerning the effectiveness of CSH. This gap in the literature is due in large part to the complexity involved in CSH interventions. As with the SEM, comprehensive, multi-component approaches such as CSH are challenging to evaluate as they address multiple layers of influence and address complex interrelationships among many factors influencing health behaviours and health outcomes. Evaluations require numerous types of evaluation processes, the involvement of many stakeholders, and considerable time and resources (Godin, Leatherdale, et al., 2015). Furthermore, identifying a causal path between CSH interventions and health outcomes is unrealistic as experimental designs (e.g., randomized-controlled trials) are often not possible and may be viewed as unethical as they would involve denying certain children access to an intervention (Alberta Health Services, 2012a).

Although CSH interventions hold the potential to benefit students' health, improved research methods for evaluating CSH implementation and additional research on CSH interventions in diverse contexts is needed to further demonstrate effectiveness and

transferability. Rigorous, longitudinal evaluations utilizing both quantitative and qualitative data are needed to demonstrate how well and to what extent CSH interventions are implemented in practice, as well as to provide evidence for their effectiveness on influencing desired health outcomes following their implementation. CSH interventions also need to be fully described to allow health promoters to assess the appropriateness of interventions in other settings, or to consider ways in which they may be adapted to target different populations (e.g., cultural adaptations to teaching and learning components). Increased research and evidence-based knowledge in these areas is needed to improve the development and implementation of effective CSH interventions for Indigenous children.

Comprehensive school health for Indigenous children. Comprehensive school-based nutrition interventions like CSH may be effective in increasing Indigenous children's access to healthy foods and supporting and sustaining positive eating health behaviours (Assembly of First Nations, 2008; Godin, Leatherdale, et al., 2015). However, Indigenous education systems (e.g., First Nations band-operated schools) face unique challenges with their delivery of CSH related to their broader economic and social environments. Indigenous education systems experience chronic underfunding and inadequate educational infrastructure (NCCA, 2017). Numerous population-level barriers also exist in Indigenous communities that may affect the success of delivering CSH programs, including the cost, accessibility, and availability of healthy foods (Godin, Leatherdale, et al., 2015). Finally, there are considerable differences in the conceptualization of health and learning perspectives between Indigenous and mainstream populations that may influence the way that the components of CSH are emphasized and adapted (Tagalik, 2010).

While education for the general population in Canada is governed under provincial jurisdiction, the federal government retains responsibility for the elementary and secondary education of First Nations students ordinarily living on-reserve, as per section 91(24) of the *Constitution Act, 1867* (Government of Canada, 2019b; Standing Senate Committee on Aboriginal Peoples [SSCAP], 2011). Indigenous Services Canada (ISC) continues to operate seven federal schools on-reserve and First Nations (and other Indigenous) children may also attend provincially-funded and operated schools off-reserve (Government of Canada, 2019c).

Since the 1970s, however, there has been an ongoing shift towards transferring jurisdiction of education systems from provincial/territorial governments to on-reserve Indigenous peoples (SSCAP, 2011). ISC now funds over 500 band-operated First Nations schools (also referred to as locally-operated schools) on-reserve and many First Nations and Inuit communities are developing and delivering their own educational services in provincial or territorial jurisdictions in which the school is located (NCCA, 2017). For example, Kativik Ilisarniliriniq– the school board of Nunavik – is a concrete expression of Inuit control of and jurisdiction over Inuit education (Kativik Ilisarniliriniq, 2019). This shift in control provides Indigenous communities the opportunity to choose language of instruction, develop culturally relevant curricula, and build local capacity for education provision (NCCA, 2017).

Substantial gaps exist concerning interventions to improve healthy eating and health outcomes for Indigenous children. The majority of school-based nutrition interventions for Indigenous children described in the literature have mainly focused on improving healthy eating knowledge and intentions, rather than incorporating the multiple strategies for broader health promotion (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Towns, Cooke, Rysdale, & Wilk, 2014). The small number of interventions described in the published literature have

demonstrated limited positive changes in healthy eating behaviours (Towns et al., 2014). For example, Action Schools! BC – a 7-month intervention that included healthy eating education – found an increase in the variety of fruits and vegetables consumed by children, but not a significant change in the number of servings (Tomlin et al., 2012). Studies further indicate that Indigenous nutrition interventions have not had a significant or sustained impact on weight or BMI (Towns et al., 2014).

Although there are limited examples of CSH for Indigenous children in Canada, one prominent example is the Kahnawake Schools Diabetes Prevention Project (KSDPP). KSDPP is one of the first community-based diabetes interventions in an Indigenous community in Canada. In 1994, the KSDPP was implemented in the Kanien'kehá:ka (Mohawk) community of Kahnawake, located in the province of Quebec (Paradis et al., 2005). Within the band-operated school, KSDPP developed a health education curriculum and a SNP. It also used community activities and promotional events (e.g., cooking courses, radio and newspaper advertisements, and walking clubs) to support the changes occurring at the school. The program met with limited success in terms of improved diet quality and reduced BMI, which researchers attributed to adverse social and environmental factors (e.g., introduction of satellite television and increasing availability of fast-food restaurants) overwhelming the behavioural and educational strategies implemented at the school level (Paradis et al., 2005). Despite these issues, the project nonetheless resulted in positive social outcomes, such as creating awareness in the community, building community capacity, and establishing long-standing collaborative relationships among community organizations (Tremblay, Martin, McComber, McGregor, & Macaulay, 2018).

Several other studies have attributed the limited impact of school-based nutrition interventions for Indigenous students to the wider social, economic, and environmental

challenges faced by Indigenous communities (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Towns et al., 2014). In particular, interventions that target individual behaviours and do not implement multiple components of CSH may be met with limited success as Indigenous students and their families often face challenges with issues like the availability and access to healthy foods (Rice et al., 2016). CSH programs are needed in schools that serve Indigenous children by targeting not only student eating behaviours, but also the broader components of CSH (i.e., physical environment) to ensure children are able to access nutritious foods. The limited number of school-based nutrition interventions for Indigenous children described in the published literature emphasizes the need for additional research and evaluation in this area to better understand the effectiveness of CSH interventions in Indigenous communities and the factors influencing their success.

School Nutrition Policies

A written SNP is an integral component of a broader CSH approach and is internationally recognized to be a particularly promising strategy for school-based health promotion (Hogan et al., 2014; McKenna, 2010; Veugelers & Schwartz, 2010; WHO, 2008a). A policy is a deliberate plan of action to guide decisions, priorities, rules, guidelines, and/or procedures for action intended to achieve a set goal (Hogan et al., 2014; Spitters, Schwartz, & Veugelers, 2009). SNPs establish formal standards for nutrition-related aspects of the school environment and can include five components: 1) foods available in schools, 2) food environment, 3) health education, 4) health services and counselling, and 5) community and family involvement. SNPs can guide nutrition standards, food programs, and contracts with food vendors and producers (McKenna, 2010). With respect to the food environment, SNPs can outline acceptable food and beverage marketing, influence the availability of food near schools, and guide the types of foods served at

celebrations and fundraisers (McKenna, 2010). As part of health education, SNPs can guide the health curriculum as well as required staff qualifications and ongoing training. Policy guidelines concerning health services and counselling can support healthy eating by ensuring access to information, as well as including nutritional health screening and establishing referral systems based on screening results (McKenna, 2010). Finally, community and family components can specify strategies for involving parents and the community-at-large in SNPs (McKenna, 2010).

Current evidence suggests that SNPs may be an effective strategy in modifying the school environment to improve students' eating habits and diet quality. Reported outcomes include increased intake of fruits and vegetables, in addition to reductions in intake of total and saturated fat, sugar-sweetened beverages, and overall energy (Chriqui, Pickel, & Story, 2014; Jaime & Lock, 2009; Stylianou & Walker, 2018). However, some studies have found that implementation of SNPs had little to no effect or, in some cases, led to unintended negative consequences. For example, students may compensate for the lack of access to restricted foods by buying them and consuming them outside of school (Jaime & Lock, 2009). Evidence concerning the influence of SNPs on health outcomes is also inconsistent, as some studies have found positive associations with health-related outcomes (e.g., BMI) while others have not (Mâsse et al., 2013; Vine, Elliott, & Raine, 2014).

The lack of consistent findings on SNPs indicates that more long-term research is needed to understand the factors influencing successful SNPs and their impact on child diet quality and overall health outcomes. Researchers have proposed that SNPs are prone to be undermined if inadequately designed and are unlikely to be successful in creating change if they are not reinforced by environmental factors (Hawkes et al., 2015). To create effective and sustainable SNPs, policymakers should follow a policy process that considers a range of complimentary and

reinforcing policy elements that create a healthy-preference learning environment as well as establish a supportive eating environment.

The Policy Process

The policy process outlines and explains the procedures of making a policy, and guides the phases in which researchers, policymakers, and other stakeholders may be involved in actions that lead to the creation of SNPs. Although there are many examples of policy processes, the stages model has emerged as a particularly useful framework for the development and analysis of policy. The stages model presents the policy process in a simple manner while recognizing the dynamic, complex, and non-linear procedures that occur throughout the policy process. Several authors have developed stages models, with the number of stages (or domains) ranging from five to seven (Benoit, 2013). Although these domains may be interpreted as succeeding one another, in practice the policy process is iterative and often requires policymakers to return to previous domains before progressing.

The Centers for Disease Control and Prevention (CDC) (2012) has developed a policy process “to foster common language and understanding around policy and the process by which it is conceptualized, developed, adopted, implemented and evaluated” (p.3). The CDC policy process includes five specific domains (problem identification, policy analysis, strategy and policy development, policy enactment, and policy implementation), as well as two overarching domains (stakeholder engagement and education, and evaluation) (Figure 2). The CDC Policy process is innovative in its integration of both stakeholder engagement and evaluation directly throughout the policy process. As such, this model has been chosen for use in contextualizing the SNP process in this thesis. In the following sections, the seven elements of the CDC policy process are discussed in terms of how they may be applied to SNPs.

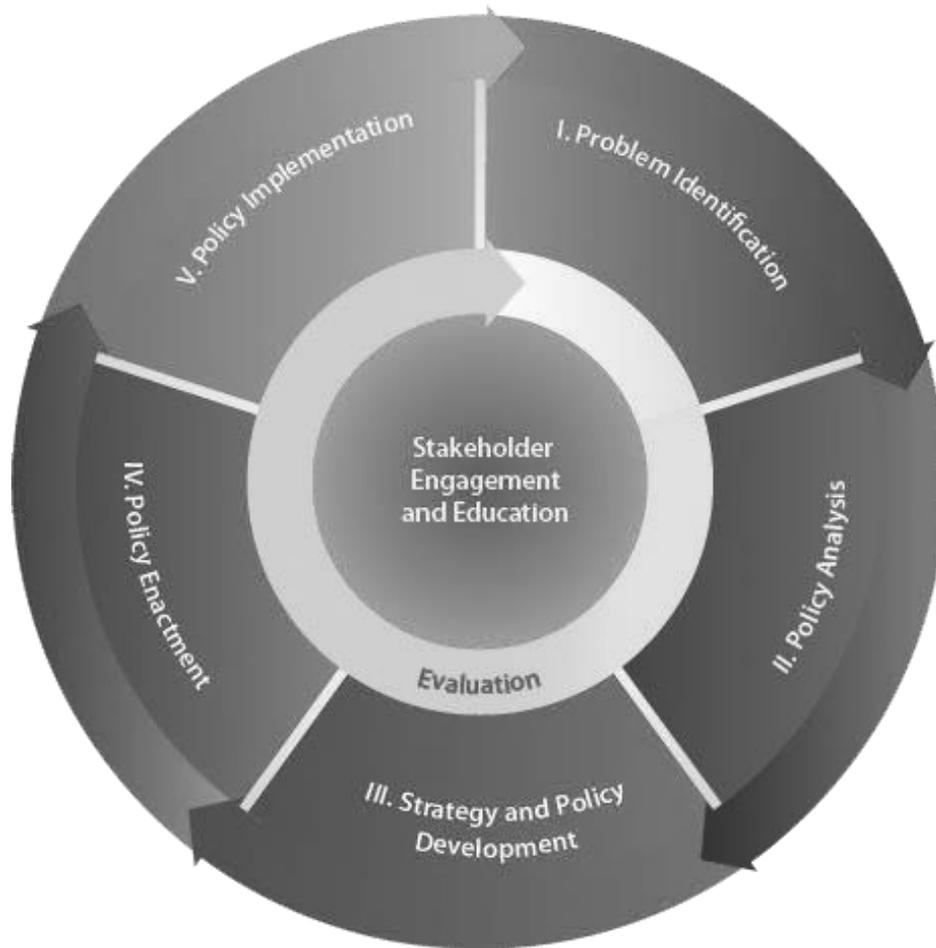


Figure 2. CDC Policy Process. Reprinted from Centers for Disease Control and Prevention. (2012). Overview of CDC's policy process. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services. Retrieved from <https://www.cdc.gov/policy/analysis/process/docs/cdcpolicyprocess.pdf>

Stakeholder engagement and education. The first overarching domain in the policy process seeks to identify and connect with key stakeholders, solicit and gather feedback, and communicate with stakeholders by delivering relevant messages and materials (CDC, 2012). Stakeholders are those who have important information about an issue, who will be affected by a policy decision, or who may be able to affect a policy decision (WHO, 2008b). At the school level, stakeholders may include local, provincial, and federal governments, principals, teachers and other school staff, students, parents, and the community-at-large (Spitters et al., 2009).

Research has consistently shown stakeholder engagement and communication (e.g., newsletters, assemblies, and public meetings) to be essential to the successful implementation of SNPs (Downs et al., 2012; MacLellan et al., 2010; Mâsse et al., 2013; Quintanilha et al., 2013; Taylor et al., 2011; Veugelers & Schwartz, 2010; Vine & Elliott, 2013). The most successful SNPs engage and involve as many stakeholders in the school community as possible throughout the policy process (Alberta Healthy School Community Wellness Fund, 2013). In a “top down” approach to the policy process, a SNP is developed and implemented by a restricted group of policymakers with little to no engagement of the wider school community. In contrast, a “bottom up” approach elicits input from stakeholders in an early, inclusive, and ongoing process, which increases their support and feelings of ownership of the SNP (Alberta Healthy School Community Wellness Fund, 2013; MacLellan et al., 2010; Taylor et al., 2011).

The involvement of parents, caregivers, and families in the “bottom up” approach to the policy process is particularly important, as they largely determine what their children eat and hold the capacity to promote healthy eating (JCSH, 2010). Involving parents in the policy process results in children being less likely to experience inconsistencies between nutrition-related practices occurring at home and their school as a result of a SNP (WHO, 2008b). Furthermore, the involvement of parents in the policy process can help ensure that barriers to parent support are identified and solutions are developed before problems occur (JCSH, 2010). For example, one study found that SNP implementation was hindered by inadequate communication with parents about policy changes and role/responsibility conflict concerning the feeding of children (MacLellan et al., 2010).

Student engagement and communication in the policy process is also particularly important as they are the ultimate beneficiaries of SNPs (JCSH, 2010). Students possess

considerable potential for developing creative strategies to improving diet behaviours in school, can provide insight into the needs and interests of the student population, and can provide candid feedback on existing and proposed nutrition interventions (WHO, 2008a). By involving students in the policy process, SNPs are also more likely to be acceptable to the student population because they were involved in shaping it (WHO, 2008a). This is particularly important given that student support for healthy eating at school has been recognized as the main facilitating factor for successful SNP implementation (MacLellan et al., 2010). Overall, consultation and consistent communication between all stakeholder groups – particularly parents and students – throughout the policy process is integral to the success of SNPs. Stakeholders must be given the opportunity to meaningfully participate in all stages of the policy process, from the identification of problems through to the evaluation of SNPs.

Evaluation. The second overarching domain in the policy process is evaluation, or the formal and systematic assessment of the steps of the policy process. As an overarching domain, evaluation crucially informs all other domains of the policy process by making judgements about contexts, activities, or outcomes of one or more domain(s) (CDC, 2014). Policymakers may consider the needs, purpose and intended users of an evaluation, as well as disseminate evaluation results among stakeholders and facilitate the use of results (CDC, 2012). Throughout the policy process, it is critical to conduct evaluation to improve policy content and ensure policies are meeting their objectives (Taylor, McKenna, & Butler, 2010). Evaluation provides information on resource utilization, intended and unintended consequences, and the extent of policy implementation (Taylor et al., 2010). Furthermore, policy evaluation promotes and provides school accountability and strengthens evidence for future policy initiatives (Taylor et al., 2010).

Although there are several types of evaluation, the most commonly discussed in the policy literature that may be used in evaluating SNPs are: formative, process, and summative. Formative evaluation is intended as the basis for the development of policy, and it is useful in the problem identification, policy analysis, or policy development domains. Formative evaluations can uncover whether proposed policies are likely to be needed and accepted by stakeholders, and can be useful in maximizing the likelihood that a policy will succeed (CDC, 2007). For example, Agron and colleagues (2010) conducted a national research study to assess the readiness and capacity for school boards in the United States to develop, implement, and evaluate nutrition wellness policies. Barriers identified included inadequate funding, competition priorities, and the need to educate and involve key stakeholders.

The second form of evaluation – process evaluation – assesses, monitors, and documents all policy-related activities. Process evaluations may be conducted periodically throughout development, enactment, implementation, or community engagement domains of the policy process to identify how well a policy is working (CDC, 2014; WHO, 2008b). As the effectiveness of SNPs depends on their successful implementation (Mâsse et al., 2013; Schwartz et al., 2012), it is particularly important to conduct process evaluations to identify the extent to which a policy is implemented as written, and to uncover factors that support or impede its implementation. Process evaluations are also useful in providing an early warning for any problems that may occur in the policy process, so that barriers and challenges may be addressed before they undermine policy success (CDC, 2014). Process evaluation was used by Murray and colleagues (2017) in their study of the staff perceived barriers and facilitators of a SNP in a band-operated First Nations school in Canada. The study found inconsistent policy

implementation among staff members, lack of communication with parents about the policy, and student food preference were barriers needing to be addressed to improve SNP implementation.

Finally, summative evaluation is used to examine whether the intended outcomes and impacts of the policy occurred, and to judge the merit of a policy (CDC, 2014). Summative evaluations are conducted within the enactment, implementation, or community engagement domains of the policy process. In evaluation, outcomes refer to the demonstrable and often measurable effects on specifically defined goals (e.g., increase in fruit and vegetable consumption), whereas impacts refer to fundamental changes that occur following policy implementation on a much broader and more distal scale (e.g., decrease in BMI) (CDC, 2016). Fung and colleagues (2013) used summative evaluation to assess population-trends in students' dietary intake and weight status before and after the implementation of a SNP in schools in Nova Scotia, Canada. By recording dietary behaviour and nutrient intake and BMI prior to and following implementation of the SNP, the authors demonstrated that the policy had a positive influence on diet quality and energy intake.

The WHO has identified indicators that may be used in formative, process, and summative SNP evaluation (WHO, 2008a). Process and output indicators (which measure progress in the processes of policy change and the products resulting from the policy process, respectively) may include foods available in schools (e.g., the proportion of fruit and vegetables included in food programs), school health curriculum (e.g., the number of health education sessions focusing on healthy diet per year in classroom curriculum), and community and family involvement (e.g., the number of programs that involve families and community members in promoting healthy eating) (WHO, 2008a). Outcome indicators (which measure the ultimate outcomes of policy action) have also been identified, including the percentage of students whose

school food intake meets national dietary guidelines and the percentage of students who are overweight or obese (WHO, 2008a). Indicators can be collected by a range of methods, including observations of foods and beverages in schools, food intake surveys, and direct measures of student height and weight (Taylor et al., 2010). It is important for schools to have the resources and research capacity to identify indicators and create evaluation plans from the outset of the policy process to provide evidence-based knowledge concerning their outcomes and impacts.

Problem identification. In addition to the two overarching domains discussed above – which are integral to each stage of the policy process – the CDC includes specific domains that guide the policy process. The first specific domain is problem identification, or the stage in which problems or issues are clarified and framed in terms of their effect on health (CDC, 2012). Within this initial domain, school communities can collect information relevant to a problem or issue (e.g., low intake of fruits and vegetables) and frame this information in a way that lends itself to potential policy solutions (CDC, 2012). At this stage of the policy process, school communities should discuss why a SNP is important and consider the potential impacts that it may have on the school environment (Alberta Health Services, 2012b). It is also important that schools contextualize problems or issues within their local environment and consider local culture and priorities in order to ensure that a policy will have a meaningful influence on the school environment (Veugelers & Schwartz, 2010).

Policy analysis. After identifying and framing a problem, schools must identify different options to address the issue and assess policy options to determine the most appropriate, effective, and feasible choice (CDC, 2012). At this point, schools can consider how a SNP will influence student health, the costs associated with policy changes, and the social and operational factors associated with different policy options. Schools may find assistance assessing their

school nutrition environments and retrieving policy options by following locally, nationally, and/or internationally produced guidelines or tools. For example, the JCSH has produced the Healthy School Planner; a free tool that helps schools assess their current health environments (JCSH, n.d.). After using the Healthy School Planner, schools receive feedback from JCSH along with a list of additional resources that assists them take action in priority areas and to develop initiatives to address them based on current capacity.

Policy development. After identifying and selecting a policy option, schools must define a strategy for getting the policy enacted, identify how the policy will operate in practice, and draft the written policy document (CDC, 2012). As with the previous domain, schools may refer to local, national, and/or international guidelines to assist with policy development. For example, the WHO has developed a school policy framework to help guide the development of national SNPs (WHO, 2008a). Alberta Health Services – a province-wide integrated health system in Canada – has also created a step-by-step toolkit which helps local schools create a SNP (Alberta Health Services, 2012b).

When developing SNPs, it is important for schools to identify and include specific goals and objectives to clarify the intended aim of the policy and use clear, strong language when writing the policy itself (Schwartz et al., 2012; WHO, 2008a). The policy may also use and reflect local and/or national resources and recommendations. For example, the Alberta Nutrition Guidelines for Children and Youth (Government of Alberta, 2012) and Canada’s Food Guide (Government of Canada, 2019a) may be used by schools to help determine permissible foods in the school environment, including the foods served at celebrations and sold at school fundraisers. Finally, the development of the policy must reflect the problems, priorities, and contextual factors identified in the previous domains. Research has shown that factors such as availability of

resources, funding, time, education, personnel, and appropriate facilities are all barriers to successful SNPs (Agron, Berends, Ellis, & Gonzalez, 2010; Downs et al., 2012; MacLellan, Taylor, & Freeze, 2009; MacLellan, Holland, Taylor, McKenna, & Hernandez, 2010; Taylor et al., 2011). As such, it is important for these factors to be considered and addressed during policy development.

Policy enactment. After a written policy has been developed, schools must follow internal and/or external procedures for getting a policy put into place (CDC, 2012). The required procedures will vary according to place but may include getting approval and support from school principals, superintendents, and school districts. Within the context of a band-operated school, it may be necessary to seek approval from local governing bodies (e.g., Chief and Council) and local Education Boards. When enacting (or adopting) a policy, it is important that schools consider and allow time for all individuals and groups involved to adapt to policy changes. For example, schools may have existing contracts with food vendors that will need to be honoured, and staff may need time to receive the necessary education to carry out new policy defined curricula.

Policy implementation. Within this final main domain, an enacted policy is translated into operational practice, and policy is fully implemented through the coordination of resources and personnel involved in the school environment (CDC, 2012). In order for the policy to reach its target audience and fulfil its intended purpose, the policy must be widely disseminated through formal and informal communication channels (WHO, 2008a). For example, an official memo can be sent to and discussed with all staff within a school, and key messages from the policy can be disseminated through print and electronic media to students, parents, and other community members. The success of SNPs is contingent on their implementation (i.e., to the

extent that policies are translated into action in a real-world setting) which can be highly influenced by the support of members of the school community.

School Nutrition Policies in Canada

Although SNPs have been identified as an integral component to school-based nutrition interventions, their use in schools in Canada is inconsistent and highly variable. In Canada, the *Constitution Act, 1867* declares that education be governed under exclusive jurisdiction of provincial governments and there are no federally enacted guidelines, programs, and policies affecting the school system (Government of Canada, 2019b; Mâsse et al., 2013). The federal government of Canada has promoted SNPs for the past several decades, and it recently has declared its commitment to developing a national food policy that would include a national school food program (Government of Canada, 2019d). Despite this progress, federal policies concerning healthy eating in schools currently do not exist and SNPs vary widely within and across provinces and territories (McKenna, 2010).

In the absence of federal standards, Canadian SNPs are determined by provincial and territorial governments (Spitters et al., 2009). Mandatory province-wide SNPs currently exist in British Columbia, New Brunswick, Nova Scotia, Ontario, and Prince Edward Island (Government of New Brunswick, 2018; Government of Ontario, 2010; Prince Edward Island Eastern School District, 2011; Province of British Columbia, 2013; Province of Nova Scotia, 2013). Governments may also encourage individual schools and/or school districts to develop local policies using the recommended provincial/territorial guidelines as a minimum standard. For example, schools in Alberta are encouraged by the Government of Alberta to develop SNPs based on the Alberta Nutrition Guidelines for Children and Youth (Government of Alberta, 2012). Finally, individual schools, school districts, and/or classrooms may develop their own

SNPs, which may be as simple as deciding that teachers must use only healthy or non-food items as classroom rewards (Veugelers & Schwartz, 2010).

Current evidence from evaluations of SNPs in Nova Scotia, British Columbia, and Prince Edward Island show that SNPs have resulted in short-term positive changes in the school food environment and student eating behaviours. Evaluations conducted in Nova Scotia demonstrated increased diet quality following SNP implementation, including increased consumption of milk products and decreased consumption of sugar-sweetened beverages (Fung et al., 2013; McIsaac et al., 2015). In Prince Edward Island, an evaluation found that students were more likely to consume fruit and vegetables and less likely to consume low nutrient-dense foods (e.g., potato chips, candy, and sugar-sweetened beverages) following the province-wide adoption of a SNP in elementary schools (Mullally et al., 2010). Similarly, an evaluation in British Columbia found improvements in student access to fruits and vegetables and decreased availability of low nutrient-dense foods following the implementation of guidelines that provided minimum nutrition standards for food and beverages sold in schools (Watts, Mâsse, & Naylor, 2014). Overall, these studies have demonstrated positive changes in school food environments and modest yet encouraging changes in student diet quality in accordance with the introduction of provincial SNPs.

Although these studies have demonstrated positive findings, there remains a gap in knowledge concerning the effectiveness of Canadian SNPs or studies of factors influencing the policy process. Few studies have investigated the complex process of policy implementation or examined the extent to which Canadian schools are able to implement SNPs (Browning et al., 2013; McIsaac, Shearer, Veugelers, & Kirk, 2015; Taylor et al., 2011, 2010). As such, there is a limited body of knowledge concerning stakeholder engagement in the development and

implementation of Canadian SNPs. Research exploring SNP implementation from the perspective of students and their parents is particularly limited (MacLellan et al., 2010), with current studies emphasizing the perspectives of school administrators and teachers (Downs et al., 2011, 2012; Mâsse et al., 2013; McKenna, 2003; Taylor et al., 2011; Vine & Elliott, 2013; Watts et al., 2014). The views of these stakeholders may not reflect the beliefs, attitudes, and experience of all stakeholders involved in the SNP process.

The lack of knowledge concerning SNPs in Canada is due in large part to the complexity involved in evaluation and general lack of resources and research capacity. Currently, there are no standardized tools or consistent nutrition indicators to guide consistent SNP evaluations in Canada (Taylor et al., 2010). The conduct of evaluations to determine long-term policy implications also demands substantial human and financial resources (Taylor et al., 2010). Finally, there is a lack of research capacity in this area, as there is a relatively small pool of researchers with expertise in the area of nutrition policy evaluation in Canada (Taylor et al., 2010). Further research is needed to overcome these barriers and add knowledge concerning the SNP process in Canadian schools.

School nutrition policies in Indigenous schools. As with schools in the general population, no mandated SNP exists that applies to all schools attended by Indigenous children in Canada and there are substantial gaps concerning the use of SNPs to improve healthy eating and health outcomes for Indigenous children. As Indigenous children may or may not attend provincially-run off-reserve schools, there is considerable variability regarding whether mandated provincial policies apply to schools attended by Indigenous students. In 2008, the Assembly of First Nations conducted an environmental scan of nutrition programs and policies in schools in First Nations communities (Assembly of First Nations, 2008). Evidence was

gathered from schools, communities, government and non-governmental organizations, scientific journals, and grey literature (Assembly of First Nations, 2008). A survey was also sent to all First Nations communities with the purpose of identifying whether schools had school nutrition programs or policies or not (Assembly of First Nations, 2008). The scan found that nearly two-thirds (63.0%) of First Nations schools had a SNP; however, no evidence was collected concerning the content, scope, or strength of these policies.

Within the peer-reviewed literature, there are very few examples of SNPs in schools serving Indigenous communities that are described or evaluated. One of the strongest examples that has been made publicly available is the *Wellness Policy for Kahnawake Elementary Schools: Nutrition* implemented as part of the KSDPP (Kahnawake Elementary School, 2016). This policy is comprehensive, encompassing a wide range of elements in the school nutrition environment and it includes educational resources to support and reinforce policy guidelines. However, the specific process of policy development, implementation, and evaluation of this policy has not been published or otherwise made available.

Due to the general lack of knowledge concerning SNPs in Indigenous communities, little is known about the facilitators or barriers to SNPs. One study evaluated the SNP at Kipohtakaw Education Centre (KEC) to determine school staff perceptions of the facilitators of and barriers to SNP implementation (Murray et al., 2017). This research found that foundational health programming and student, parent, and staff support facilitated the SNP. In contrast, staff education about nutrition education, staff uncertainty regarding their role in delivering the SNP, and lack of communication with parents about the policy were identified as barriers. More research is needed, however, to determine the role of parents and students in SNP

implementation and their perceptions of the barriers to and facilitators of SNP implementation in KEC and other schools in Indigenous communities.

Overall, there is little knowledge concerning the school-based nutrition interventions for Indigenous children currently implemented in Canada. As with the general population, community engagement is an important aspect of development and evaluation of these interventions, including SNPs. Research concerning the views of stakeholders in the SNP process is needed to help form an evidence-base for school-based policy efforts to improve health among Indigenous children.

Summary

This literature review has provided the foundational knowledge needed to understand the two studies described in this dissertation. CSH is an internationally recognized school-based health promotion approach that holds great potential to improve the health of Indigenous children. Each of the four components (social and physical environment, teaching and learning, policy, and partnerships and services) must be implemented in order for CSH to be realized. Policy is a particularly important component, as SNPs guide all aspects of the CSH to establish healthy nutrition environments and improve the diet and overall health of students. Although SNPs have been mandated in some provinces in Canada, their content is variable and the extent to which they have been implemented is inconsistent within and between provinces and territories.

Currently, there are significant gaps in knowledge concerning school-based nutrition interventions – including CSH and their SNP component – in schools for Indigenous children. No studies have researched the extent to which the components of CSH have been developed and implemented in Indigenous communities, and there is a paucity of studies on the role of

Indigenous stakeholders in the policy process. This is concerning, given the overarching and integral role of both stakeholder engagement and evaluation in the policy process. This research aims to fill these gaps by involving parents and students in the evaluation of a SNP and describing the components of school-based nutrition interventions that currently exist in Indigenous communities. This information may provide the knowledge needed to move policy action forward within schools.

CHAPTER 3: Methodology

The research questions guiding this thesis were addressed by conducting two studies: 1) a process evaluation of a SNP, and 2) a scoping review of school-based nutrition interventions for Indigenous children. The first research question asked: What are students' and parents' perceptions of the facilitators of and barriers to SNP implementation in an Indigenous community? To answer this question, a process evaluation was conducted using a mixed methods design. A community-based participatory research approach (CBPR), which involved close collaboration with community members at all stages of the research, was used to guide the research. The second and third research questions asked: What school-based nutrition interventions exist in Indigenous communities and what are their main components? To answer these questions, a scoping review was conducted using both scientific and grey literature to identify the components of CSH in school-based nutrition interventions for Indigenous children. This chapter describes and provides justification for the methods used to carry out both of the research studies.

Study 1: School Nutrition Policy Research

Research setting. The SNP evaluation research took place in Alexander First Nation in central Alberta, Canada. Located in a rural area, the Nation is approximately 40 kilometres (25 miles) from the urban city of Edmonton and about 25 kilometres (16 miles) from the town of Morinville. The Nation is comprised of an area which covers over 7,000 hectares of land with over 60% of this being utilized for agricultural and grazing purposes (Alexander First Nation community profile, unpublished). A small convenience store – stocked with a limited selection of perishable food – is the only place to purchase food in the community. The registered

population of the Nation as of January 2019 was 2,266 members, of which approximately half live on the reserve and the remainder reside in surrounding communities (Indigenous and Northern Affairs Canada, 2019). The members are Cree peoples of the Treaty Six Territory (Alexander First Nation community profile, unpublished). Cree is acknowledged as the official language, but the English language was adopted and chosen as the language to be used for communication with non-Indigenous people (Alexander First Nation community profile, unpublished). In 2016, the average total income for all persons with income was \$30,637, less than half of the provincial average (\$62,778) (Indigenous and Northern Affairs Canada, 2019). This income information contextualizes later comments made by study participants about food insecurity in the community.

KEC is the kindergarten to grade twelve school in Alexander First Nation. It is locally-controlled and band-operated; as such, AFNE holds sole jurisdiction to develop and deliver education for the community. KEC has a universal food program and a fully equipped kitchen where a hired cook prepares breakfast and hot lunch meals at no cost to students or parents. Wild game meat, such as moose, is donated to the school by community hunters when possible and included in the hot lunch program. The school also has a canteen run by volunteer staff members where snacks purchased by the school (e.g., milk boxes, juice boxes, and packaged low-fat and low-sugar snacks like pretzels) are sold to students.

With a focus on CSH, AFNE has promoted health and education in KEC through several programs. In 2011, KEC began participating in a Canadian CSH program called APPLE Schools that promotes healthy eating, physical activity, and mental health (APPLE Schools, 2018). Additional health promotion efforts at the school have included Earthbox Kids – a classroom

gardening program – and a vegetable and fruit snack program (Hanbazaza et al., 2015; Triador, Farmer, Maximova, Willows, & Kootenay, 2014).

Policy background. In 2014, KEC implemented its first SNP (See Appendix 1) to guide school initiatives occurring as part of its ongoing CSH approach to health promotion. The policy process was initiated by AFNE due to concerns over high rates of obesity, overweight, and diabetes documented in the community (Director of Education, personal communication, March 2018). The school was also encouraged by a dietitian to develop a SNP to guide school cooking staff in preparing healthy meals for students (Education director, pc, March 2018). The SNP was intended to support school initiatives occurring as part of their participation in APPLE Schools and research findings that the school was seeing in Alexander First Nation from ARC (Education director, pc, March 2018).

In October 2013, the SNP was developed by AFNE and the school principal using a template provided by APPLE Schools, which provided guidance on the components of a written SNP. Additional stakeholder groups – such as parents and students – were not initially consulted or otherwise involved in policy development. However, the intention to work with parents, students, and other stakeholders to ensure that the policy met everyone’s expectations was meant to be evolutionary. In December 2013, the SNP was approved by Chief and Council (the local unit of government) and formally adopted by KEC (Director of Education, pc, March 2018). In March 2014, the SNP was implemented by being disseminated to all school staff and teachers. Almost one year following implementation, parents were formally notified about the SNP at the school’s annual parent conference in February 2015; however, students were still to provide their feedback (Director of Education, pc, March 2018). Policy objectives and outcomes were not

written or formally stated at any point in the policy process. However, policymakers intended for the SNP to improve student access to healthy foods, as well as ripple into the broader community to improve community member health and wellbeing (Murray et al., 2017).

Research approach. A community-based participatory research (CBPR) approach was utilized throughout this study and guided the way in which the research was conceptualized and conducted. CBPR is a collaborative approach to research that equitably involves community, academic, and other stakeholders in the research process and builds on the strengths and priorities of the community to develop strategies to improve health (N. Wallerstein, Duran, Oetzel, & Minkler, 2018). Community is described as a group with shared identity or interests that has the capacity to express itself as a collective (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2014).

Community members of the Alexander Research Committee (ARC) (Gokiert, Willows, Georgis, Stringer, & Alexander Research Committee, 2017) worked in close collaboration with university researchers on all stages of the research. Established in 2007, the ARC oversees and participates in all research occurring in the community school (Gokiert et al., 2017; Pigford, Ball, Plotnikoff, Arcand, Dyck Fehderau, et al., 2013). Although the committee membership fluctuates in size and composition, it has always included staff working at the school, the community's education department, and academic researchers (Gokiert et al., 2017). At the time of the research (2015-2019), the ARC included staff working at the school, staff from Alexander First Nation Education (AFNE) and the Alexander First Nation Health Department, Elders, and academic researchers from the University of Alberta and their trainees (PhD and MSc students).

A growing number of systematic reviews and meta-analyses have found compelling evidence of the positive impacts of CBPR on a range of research outcomes (e.g., behavioural and clinical outcomes, self-efficacy, and knowledge translation) (N. Wallerstein et al., 2018). By integrating the knowledge, skills, and experience from community members and academic researchers, CBPR can enhance the quality, validity, and practicality of research instruments as well as improve participant recruitment and retention (Minkler, Salvatore, & Chang, 2018). The involvement of community members in data analysis and interpretation can also help to contextualize and add deeper understandings of study results while preventing misrepresentation of local knowledge (Castleden, Morgan, & Lamb, 2012; Minkler et al., 2018). Furthermore, CBPR facilitates applied research that results in tangible and beneficial changes, such as closing the gap between discovery and application of knowledge into community change efforts (Castleden et al., 2012; Minkler et al., 2018).

CBPR has been recognized as a useful approach in guiding the evaluation of childhood obesity prevention initiatives at the community level in Indigenous communities (Pigford et al., 2013; Potvin, Cargo, McComber, Delormier, & Macaulay, 2003). The CBPR approach is also particularly important when conducting research in Indigenous communities as they have historically been excluded from the research process, resulting in discrimination, misrepresentation, and misallocation of Indigenous knowledge (Castleden et al., 2012; Pigford et al., 2013). Indeed, CBPR has been called a decolonizing methodology that addresses ethical concerns and power imbalances in research within Indigenous communities, and it is recognized as a mechanism for addressing social issues that lead to health inequalities (Gokiert et al., 2017; Minkler et al., 2018; Ritchie et al., 2013). In Canada, engagement and collaboration with community is often recommended – and in some cases required – by government agencies,

funding bodies, and academic institutions when engaging in health research in Indigenous communities (Canadian Institutes of Health Research et al., 2014).

Although CBPR offers many strengths, it also presents considerable ethical and methodological challenges. In terms of practical concerns, disadvantaged or underserved communities may lack the capacity and/or infrastructure to collaborate with researchers due to having inadequate spaces, outdated technology, and poorly maintained environments (Minkler et al., 2018). A ‘proximity paradox’ has also been identified in which CBPR is more challenging to carry out in underserved, remote communities where needs for health research and CBPR approaches are greatest (Ritchie et al., 2013). CBPR also requires the investment of significant time and energy from all partners due to the need to build strong and trusting relationships and jointly develop and conduct all phases of a research project (Castleden et al., 2012; Gokiert et al., 2017). Furthermore, methodological issues may arise as research methods may not be culturally appropriate, and community members may make recommendations that weaken the rigour of study instruments or research designs (Minkler et al., 2018). Ethical issues with data reporting may also arise if findings are deemed to cast a community unfavourably (Minkler et al., 2018). The creation of and regular review of CBPR partnership agreements (e.g., guiding principles) can assist with some of these challenges by outlining research processes and procedures as well as key expectations and responsibilities for all partners (Gokiert et al., 2017; Pigford et al., 2013).

Despite the challenges and limitations of CBPR, engagement and collaboration with the community remains an integral part of ethical research involving Indigenous peoples and the CBPR approach was vitally important in this research. The CBPR approach employed in this study ensured that the research reflected local context and priorities, built on community

strengths, and integrated knowledge and action. By engaging community members, this approach ensured that the research topic was locally relevant and likely to yield beneficial and useful results (Minkler et al., 2018). The collaborative partnership also facilitated co-learning and a reciprocal transfer of knowledge, skills, and resources to make the research successful (Sallis & Owen, 2015). Knowledge was created in a bidirectional process whereby community members shared information about the local cultural and social contexts (e.g., cultural protocols and ethics) and Indigenous ways of knowing, and academic partners contributed knowledge of research approaches (Castleden et al., 2012; Sallis & Owen, 2015). Furthermore, evidence-based knowledge was mobilized within community as it became available, allowing policymakers to incorporate research findings into policy changes and identify dissemination channels for the wider community (Minkler et al., 2018).

Research design. In following the CBPR approach, the research aimed to conduct a pragmatic evaluation focused on the priorities of community members (Patton, 2015). To evaluate the KEC SNP, a process evaluation was conducted using a mixed methods design. In mixed methods research, both quantitative and qualitative data are collected, analysed, and integrated within a single study (Ivankova, Creswell, & Stick, 2006). Integration – the critical feature of mixed methods designs – refers to the stage(s) in the research process in which quantitative and qualitative methods are mixed (Ivankova et al., 2006). Integration may occur at a range of study stages, including participant sampling, instrument development, data analysis, and/or data interpretation and discussion (Creswell, 2014).

Mixed methods designs draw on the strengths of qualitative and quantitative methods, while minimizing the limitations of both approaches (Creswell, 2014). The gaps in qualitative research – such as a lack of generalizability – can be offset by quantitative methods. Conversely,

the gaps in quantitative research – such as lack of detail and context – can be filled by qualitative methods. In the explanatory sequential mixed methods design, quantitative data provide a general understanding of the research question, while qualitative data help to explain quantitative results in greater detail by exploring participants' views in greater depth (Ivankova et al., 2006). In evaluation research, mixed methods designs are particularly useful as the inclusion of perceptions and experiences of policy stakeholders illuminate the people behind the numbers to deepen understanding and better inform policy decisions (Patton, 2015). However, mixed methods designs present practical challenges as they are time and resource intensive, requiring extensive data collection and analysis of both qualitative and quantitative data (Creswell, 2014). Furthermore, their complexity necessitates researchers to have skills and familiarity with different forms of quantitative and qualitative research (Creswell, 2014).

This evaluation research specifically used an explanatory sequential mixed methods design in which quantitative and qualitative data were collected and analyzed in two consecutive phases (Figure 3) (Creswell, 2014). Data integration occurred at the stage of development of the qualitative data tools. Given the significant knowledge gaps in SNP implementation research in Indigenous contexts, this design was chosen as it allowed for an in-depth and robust exploration of the research question. Mixed methods research designs are particularly effective in process evaluation research because of their ability to yield richer detail about implementation than quantitative and qualitative methods alone (Linnan & Steckler, 2002). Accordingly, this research design has been identified as being most likely to provide insight into the complex process of SNP implementation (Taylor et al., 2010). Furthermore, mixed methods research has been used successfully in the exploration of the barriers associated with the awareness and adoption of nutrition guidelines in schools in Alberta, Canada (Downs et al., 2012; Quintanilha et al., 2013),

as well as in a study of principals' perceptions of the factors influencing policy implementation in Prince Edward Island (Taylor et al., 2011).

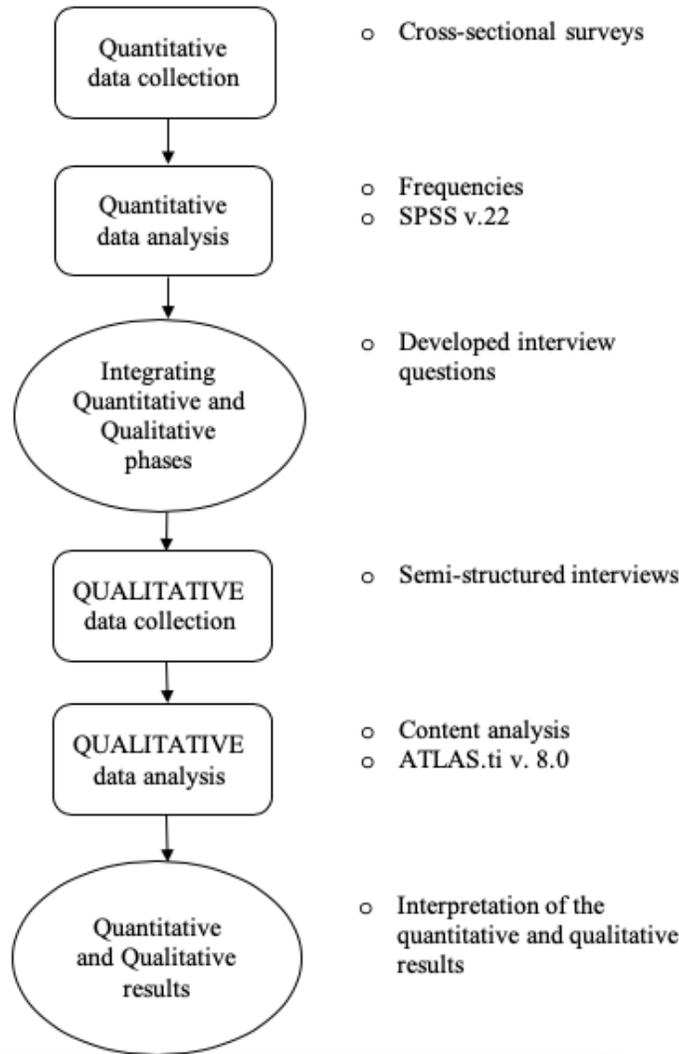


Figure 3. Visual model of the explanatory sequential mixed methods design procedure

Phase 1: Quantitative instruments, data collection, and data analysis.

Survey instrument development. In the initial quantitative phase of the study, two cross-sectional surveys were developed and administered to parents and students, respectively, following implementation of the SNP. The purpose of the surveys was to capture a broad and general understanding of parents and students' perceptions of the barriers to and enablers of SNP implementation. In accordance with CBPR, the survey instruments were developed using a community-driven approach such that original questions were determined by the community in collaboration with academic researchers (Mayberry et al., 2013; Minkler et al., 2018). The use of original questions ensured that the survey was relevant to the local community and reflected content found in the SNP. This process also ensured that the survey was culturally and linguistically appropriate to students and parents of KEC, and that survey results would be of use to AFNE in evaluating the SNP implementation process.

The two surveys were developed using an iterative process requiring several revisions and communication between members of the ARC. First, the community members of the ARC identified questions that would of greatest value to the school in evaluating the implementation of the SNP. Next, academic partners of the ARC drafted both a parent survey and a student survey based on their technical expertise in survey development (i.e., appropriate types of questions and sequence) and brought them back to the research committee to review. Community partners then provided culturally relevant guidance and critiques of the instrument's usefulness and appropriateness. For example, two questions that had a third "I don't know" option were shortened to two options ("yes-no") based on community members recommendations. The surveys were refined until all partners were satisfied and no further changes were deemed necessary. Face validity was determined by members subjectively viewing the survey questions as capturing the intended information (Minkler et al., 2018). Content validity was established as

the instruments were developed in partnership with the community and reflected the content of the policy that was implemented.

Parent survey. The parent survey (See Appendix 2) consisted of 19 closed-ended questions, including: five dichotomous questions (“yes-no”); four five-point Likert scales; five five-point semantic differential scales; two determinant-choice scales with one free response item; and three five-point frequency scales. The parent survey was intended to collect information regarding: awareness of the nutrition policy, level of support for various aspects of the policy, whether children had discussed the policy at home, the importance of healthy eating, perceived barriers to healthy eating, perceptions of eating habits, and how often children consumed the meals offered at school. The survey asked parents to consider their oldest child when answering the survey questions and took parents less than 15 minutes to complete.

Student survey. The student survey (See Appendix 3) consisted of one open-ended question (“what is your grade?”) and 16 closed-ended questions, including: four dichotomous questions; one four-point Likert scale; three three-point interval scales; two five-point semantic differential scales; and six four-point frequency scales. The student survey was intended to collect information on: students’ level of support for the policy, whether the student had engaged with their parents and teachers about healthy eating, whether students liked the foods served and sold at school, student utilization of the school food programs, whether students perceived certain foods as healthy or unhealthy, and whether students desired to have certain foods served and sold at school. The survey took students less than 15 minutes to complete.

Parent survey administration. All households with at least one child attending the school (n=125) were eligible to participate in the survey, which was administered door-to-door by a

community member and graduate student in May and June 2015. The two researchers were provided a list of parent addresses and phone numbers by the school and drove and/or walked from door-to-door over the course of three weeks, making note of who they contacted (and whether or not they filled out a survey) and who was not home. The researchers returned to homes for a second follow-up at a different time of day to maximize success. After the second in-person attempt, the researchers called parents to see if they were interested in taking part in the survey and to arrange a time to visit. In total, homes were visited up to four times in-person if the researchers were not able to contact parents via phone or arrange a time to visit.

One parent from each household completed the survey, and parents were asked to consider their oldest child attending KEC when answering questions. Participating parents had the option of completing the survey independently, or verbally answering the survey questions with one of the survey administrators. Parents were given an information sheet (See Appendix 4) and told that if they completed the survey, they would be given a \$10 grocery store gift card as compensation for their time. Completion of the survey implied consent. Demographic information was not collected along with surveys to retain anonymity of participants given the small community size.

Student survey administration. All students in grades 4-12 (n=126) were eligible to participate in the student survey. Although there is no lower age limit at which children can participate in research (Shaw, Brady, & Davey, 2011), the ARC decided that children in kindergarten to grade 3 should not be included in the survey due to time and resource constraints (e.g., short attention spans may have necessitated multiple data collection sessions). KEC does not require ongoing consent to complete surveys that inform school policy and programming;

rather, parents are asked to sign a waiver indicating their understanding of this during registration. As KEC is a band-operated and locally-controlled, AFNE holds sole jurisdiction to make decisions concerning the development and evaluation of school policy. AFNE's authority includes making decisions regarding the appropriate involvement of students in surveys that inform KEC programs and policies. In this case, members of AFNE on the ARC agreed that it was acceptable for survey information to be for research purposes under the waiver of consent signed by parents given that: 1) identifying information was not collected on the survey to protect the anonymity of students, 2) none of the information collected was deemed sensitive in nature, and 3) the survey would be used in its entirety by AFNE for the purpose of policy evaluation. The University of Alberta Research Ethics Board agreed with this approach following the submission of a written explanation from the AFNE Director of Education and AFNE's approval for survey findings to be used for this project. In following the principles of CBPR, academic researchers respected this decision made by AFNE; as such, neither student nor separate parental consent was required to collect, analyse, and report student survey data.

In June 2016, the survey was administered in individual classrooms by the same researcher (Gillies, C.). Survey administration began with an explanation of the purpose of the survey and the principles of anonymity and confidentiality. The survey was administered aloud in classrooms by the researcher to students in grades 4-6. Students in grades 7-12 self-administered the survey with a researcher present to answer questions. Survey packages were left behind for absent students to complete.

Parent and student survey data analysis. Parent and student survey data were entered into the Statistical Package for the Social Sciences (SPSS) version 22.0 software and data were

cleaned three times to ensure there were not any input errors. Descriptive statistics (frequency counts) were used to describe responses.

Phase 2: Qualitative instruments, data collection, and data analysis.

Interview guide development. Findings from parent and student surveys informed the semi-structured interviews, which were used to explain the quantitative results in greater detail. In this way, quantitative data were directly used to develop the qualitative instruments. Semi-structured interviews were used because there is structure in the interview process that is consistent, but also permits for a flexible investigation of individual perspectives by allowing the interviewer to change question sequence or ask further questions in response to significant or interesting answers (Bryman, Bell, & Teevan, 2012). This ensured that the qualitative phase would allow for the investigation of diverse perspectives among students and parents concerning the SNP.

The interview guides were developed in an iterative process. First, the ARC discussed the results of the surveys to identify areas that were of interest and warranted further investigation. Community members of the ARC also suggested additional questions that could be of use to the school in evaluating SNP implementation that were not captured by the survey. For example, community members asked that a question be added that would capture if and how parents would like to increase their involvement in improving the SNP. Academic partners drafted the interview guides based on their expertise in interviewing (e.g., question sequences and probes) and brought them back to the ARC for approval. Community members on the ARC then provided culturally relevant guidance on the questions and ensured that they would be of use in evaluating and potentially revising the SNP implementation process. For example, the ARC

asked that questions about traditional food preferences include specific examples (e.g., moose, deer, rabbit, duck, or bush chicken). Interview guides were revised until no further changes were requested. Both the final parent and student interview guides consisted of 11 questions (See Appendix 5 and 6, respectively).

Parent interviews. All parents who filled out a survey were asked if they would be interested in taking part in an interview about the SNP. Interested parents had provided their contact information on the survey consent form (n=53). These forms were numbered and drawn using simple random selection in Microsoft Excel to be selected for an interview, and parents were contacted by phone up to three times. Due to issues contacting parents (e.g., disconnected phone numbers, no-response, and scheduling conflicts), convenience sampling was used at a parent-teacher interview night where parents were asked if they would be interested in participating in an interview about the SNP that night or at a later scheduled date and time.

In March 2016, the same researcher (Gillies, C.) conducted each of the one-on-one, in-person parent interviews in a private room in the school office. Interviews were recorded with participants' consent using 2 digital voice recorders. Each interview began with the interviewer explaining the purpose of the interview and having the participant read an information letter (or have it read out loud if preferred) and complete a written consent form (see Appendix 7). Field notes documenting noteworthy aspects of the interview context, such as participant behaviours, and the researcher's personal thoughts and ideas regarding the interview were recorded following each interview. Interview recruitment continued until theoretical saturation was reached, which is the point at which no new information emerges and the researcher is confident in the quality and scope of data obtained (Patton, 2015). Specifically, interview recruitment ceased when the

researcher conducting the interviews found that there was no new or relevant data emerging, and that collected data was well developed yet demonstrated natural variation. The researcher's subjective interpretation of saturation was later confirmed through the process of member checking with the ARC.

Student interviews. For the student interviews, consent forms were sent home with all students in grades 4 to 12 for them and their parents to sign (see Appendix 8). Signing of the consent form was voluntary, and incentives (e.g., gifts) were not offered to parents to complete the form. Students who brought back a signed consent form were eligible to be chosen to participate in an interview. The sample was divided into grades 4-6 and 7-12, each form was assigned a number, and numbers were drawn using simple random sampling in Microsoft Excel. This sampling procedure was followed to ensure that each student who brought back a consent form would have an equal opportunity to be interviewed, while also ensuring that different age groups would be interviewed.

From September to December 2016, the same researcher (Gillies, C.) conducted one-on-one, in-person student interviews in a private room in the school office. Additional interviews were conducted in May 2017 because the researcher was not confident in the level of data saturation following data analysis. Interviews were recorded with participants' verbal consent using 2 digital voice recorders. Each interview began with the interviewer explaining the purpose of the interview, demonstrating the digital recorders, and ensuring that the student understood they could refuse to take part in the interview or answer any question. All interviewed students received a \$25 gift card for their participation.

Parent and student interview data analysis. Qualitative interviews of parents and students were transcribed verbatim (with identifiable information removed), loaded into ATLAS.ti version 8.0 software and analyzed by the same researcher who conducted the interviews (Gillies, C.) using the qualitative content analysis method. Qualitative content analysis is a method by which the context of text data is subjectively interpreted through the classification process of coding and identifying themes (Hsieh & Shannon, 2005). Specifically, conventional content analysis was used to inductively explore data and generate knowledge based on participants' perspectives as opposed to using preconceived categories or theoretical perspectives (Hsieh & Shannon, 2005; Mayan, 2009). By deriving codes, categories, and themes directly from the interview data, this method of content analysis facilitated a rich and broad investigation of the research questions and generated knowledge based on participants' actual perspectives and experiences.

Guided by the approach outlined by Creswell (2014), the content analysis process included: 1) organizing and preparing transcripts and field notes, 2) reading each transcript to gain familiarity with the data, as well as reviewing field notes, generating initial impressions, and making memos, 3) line-by-line open coding using codes derived from the actual language used in the data (*in vivo*), 4) generating themes, or major findings, 5) describing themes and supporting them through transcript excerpts, and 6) making interpretations of the findings. During the final stage of analysis, it was decided that themes that naturally emerged from the data would be organized according to the SEM proposed by Willows and colleagues (2012). This theoretical framework was used to determine the different levels of influence on SNP implementation.

Trustworthiness of the data. Trustworthiness of qualitative data was established through the principles of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). To establish credibility, the researcher's subjective interpretations of qualitative interview data underwent a process of member checking with community members of the ARC and a group of Elders. The researcher prepared comprehensive reports for both the parent and student interviews that included all themes and supporting and discrepant quotations. Community members reviewed these reports and concluded that the analysis was accurate and representative of the community. Credibility was further established through peer debriefing with academic committee members and other academic researchers on the ARC and by including discrepant information in results. Detailed description of the study setting, methodology, and data interpretations will allow other researchers to determine if and how findings may be transferable to other school and community contexts. Reliability was established by the researcher checking transcripts several times to ensure that they did not contain mistakes, and by defining codes to ensure that they were used consistently. Finally, confirmability was established by maintaining an audit trail that included ARC meeting minutes to document discussions and decisions regarding the research. These meeting minutes – taken at every ARC meeting by a designated member – were shared among ARC members following each meeting and stored long-term on a shared Internet drive accessible by only ARC members. Raw qualitative and quantitative data and data analysis files were kept on password protected computers at the University of Alberta.

Study 2: Scoping Review

The objective of the scoping review was to identify school-based interventions that have been implemented to improve the nutrition of Indigenous children in Canada and to describe their components. A scoping review is a form of knowledge synthesis that addresses an

exploratory research question by systematically and comprehensively searching, selecting, and summarizing existing knowledge related to a defined area with the aim of informing practice, programs, and policy and providing direction to future research priorities (Arksey & O'Malley, 2005; Colquhoun et al., 2014; Peters et al., 2015). Unlike systematic reviews – which seek to answer precise research questions using quality appraised literature – scoping reviews aim to capture breadth of understanding and discuss characteristics of the existing evidence base without making quality assessments (Arksey & O'Malley, 2005; Peters et al., 2015). As such, scoping reviews are well-suited to consolidate the extent, range, and nature of the literature on a particular topic, or to identify research and evidence gaps to aid in the design of future research studies (Peters et al., 2015; Tricco et al., 2018).

As discussed in Chapter 2, comprehensive school-based nutrition interventions hold promise for improving the food environments and eating behaviours of Indigenous children; however, there is little knowledge concerning what is currently being done in schools to improve nutrition. Several reviews concerning health interventions for Indigenous children have focused primarily on interventions for obesity and obesity-related chronic disease in Indigenous communities and the outcomes of such interventions (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Towns et al., 2014). Furthermore, although an outdated environmental scan investigated school nutrition policies and programs in First Nations schools (Assembly of First Nations, 2008), there have not been any recent published reviews concerning school-based nutrition interventions in Indigenous communities in Canada.

Given the lack of knowledge concerning the scope and content of school-based nutrition interventions in Indigenous settings and the heterogeneous nature of Indigenous communities, scoping review methodology was chosen as it would provide a comprehensive overview of the

current status of and principles underpinning the development of school-based nutrition interventions to optimize health outcomes for Indigenous children. A scoping review allowed for the search to capture a diverse range of sources of evidence, rather than just those described in the peer-reviewed literature, as well to collect evidence on interventions beyond those related to the effectiveness or experience of an intervention (Peters et al., 2015). It also allowed for the identification of gaps in the research knowledge base and reporting on the types of evidence that inform current and future interventions in the field (Peters et al., 2015). Although scoping reviews may have limitations related to lack of quality assessment and depth of information (e.g., quantity of data extracted) (Arksey & O'Malley, 2005), this review was more concerned with achieving breadth of understanding and describing the characteristics of the existing literature in an understudied research area.

Although the first framework for scoping reviews was published in the mid-2000's (Arksey & O'Malley, 2005), scoping reviews are still a relatively new methodology and there is lack of consensus among researchers on how to define, conduct, and report scoping reviews (Colquhoun et al., 2014; Peters et al., 2015). To ensure methodological rigour, this scoping review was conducted following the original methodological framework developed by Arksey and O'Malley (2005) and reported following the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018). First, the research questions were identified. In the second stage, relevant sources of evidence were identified by searching scientific databases and the grey literature. Next, sources of evidence were selected by two reviewers by applying *a priori* eligibility criteria to determine relevancy and inclusion of sources of evidence. To organize data, the characteristics of the included sources of evidence and key information relevant to the review objectives were then

extracted and charted independently by one reviewer (Gillies, C.). Finally, the interventions were summarized and presented by drawing upon the eight components of comprehensive school-based nutrition interventions considered in the review. Full methodological details can be found in Chapter 6.

Ethical Considerations

A number of formal and informal ethical considerations were important in conducting the evaluation research described in this thesis. Before beginning any research activities, the research underwent an external evaluation of the ethics of the proposed research study that included special considerations of the ethical implications of working with Indigenous peoples. Specifically, Study 1 received research ethics approval from the University of Alberta Research Ethics Board 1 (Pro00051837). However, there was also a need to balance formal university ethical requirements with the local community's values, interests, and concerns, and the research for Study 1 required approval from Chief and Council (the local governing body) prior to beginning.

Collaboration with the ARC assisted in negotiating the everyday ethics within an Indigenous community that were not necessarily addressed in the formal institutional review process. At every stage of the research process, community members of the ARC openly discussed implications of the research and provided ethical guidance that reflected the needs of the community and ensured the welfare of participants. For example, it was important to the ARC that interview responses were fully anonymous and not accompanied by any potentially identifiable and/or sensitive information (gender, grade, socioeconomic status, etc.). Although peer-reviewers in the process of reviewing research manuscripts requested this information, the

needs of the community took precedence over the potential scientific implications of excluding this information.

The ethical implications of including children as participants in the research were of particular importance. Children are often viewed as an inherently vulnerable group, as they have varying degrees of cognitive maturity and may lack the decision-making capacity to decide whether or not to participate in research (Canadian Institutes of Health Research et al., 2014). As such, the perspectives of the ARC were integral in ensuring the welfare of children while still enabling them to participate meaningfully in the research. With respect to data collection, for example, the ARC felt that children would be most open and comfortable in the presence of an outsider as opposed to a recognized community member. Although students began participation in the interview based on consent from a parent, an individual's wish to participate (i.e., assent) was established before beginning each interview. In addition, if any forms of dissent or reasons to discontinue an interview (e.g., verbal or physical signs of distress) from a child had been detected, the interview would have immediately stopped. This eventuality did not occur. Similarly, although students began participation in the survey based on parental consent and school protocol, they independently chose whether or not they wanted to fill out the survey. Overall, the ARC was instrumental in navigating all ethical concerns in this research and mitigating any potential risks to participants and wider community reflected in the research findings.

Positionality

In all research, the person doing data collection and analysis is the key instrument and their skills, experiences, and background have a meaningful impact on the way that research is conducted, interpreted, and translated (Patton, 2015). In reflecting upon my position in the

research process, I am aware that my personal beliefs and experiences had an inextricable influence on every phase of the research process, beginning from my decision to complete a PhD project on the research described in this thesis and ending with the ways in which the resultant knowledge is presented and published.

I personally identify as a white Canadian woman of European descent, as my family history can be traced back to England, Denmark, Austria, and Romania. I am heterosexual, married, childless, and able-bodied. I grew up in a middle-class suburb of Edmonton, and have never lived in poverty, faced food insecurity, or experienced overt racial discrimination. With a strong motivation to succeed academically, I am the first person in my family to attend university and have earned several scholarships and grants throughout my career to assist me in paying for the majority of my education. The culmination of these personal attributes and experiences has afforded me social and economic privileges in life which carry the potential to impact the research process, including my personal beliefs and relatedness to study participants.

I also possess an inherent interest in diverse cultures and human experiences which impacts my personal research interests and motivations. My natural inclination toward these areas of inquiry has taken me on backpacking trips to diverse countries including Peru, Thailand, and India. Through these travel experiences, I have gained real-world experience of the challenges faced by people less privileged than myself as well as a sense of empathy and responsibility toward underserved communities. My experiences have also led to a strong conviction that the SDH play an integral role in worldwide health inequalities, and an inclination towards theoretical frameworks such as the SEM that recognize the dynamic interplay between individual behaviours and the wider social and environmental contexts of people's lives. These beliefs have contributed to my passion of conducting qualitative research in understanding the world, as well

as to my desire to work closely with communities to learn from them and experience life through a lens different from my own.

In the context of the evaluation research presented in this thesis, I was an “outsider” academic researcher as I am not a member of the participating community. As such, I collected and analyzed data about participants’ lived experiences from an outsider’s point of view (or an emic perspective) (Headland, Pike, & Harris, 1990). I also lacked commonalities with participants in terms of age, culture, and lived experiences. However, my close collaboration with “insiders” on the ARC at every stage of the research helped to minimize the influence of my positionality by emphasizing the perspectives and interests of community members. My collaboration with community members also ensured that I was aware of important cultural protocols (e.g., beginning ARC and other meetings with a prayer and/or smudging ceremony and the offering of tobacco) to complete research in a culturally safe and respectful manner.

My education and research experience also had an influence on the underlying assumptions and methodological decisions made in this research. Prior to starting my PhD program, I achieved both an undergraduate and graduate degree in anthropology. My training in this field has afforded me skills in qualitative research methods, an understanding of the influence of culture and SDH on health, and an interest in the SEM. In my work as a graduate student and a research assistant, I worked closely with immigrant and refugee communities and developed an even deeper understanding of and appreciation for the complex factors surrounding food choice (Davey & Vallianatos, 2018; Higginbottom, Vallianatos, Shankar, Osswald, & Davey, 2016; Higginbottom, Vallianatos, Shankar, Safipour, & Davey, 2018). In addition to influencing my research interests, these experiences further developed my interviewing skills and fed my passion for qualitative research and inquiry.

Through this doctoral research experience, my passion for conducting CBPR with underserved communities to address their health concerns has only grown stronger. I am very passionate about using my position as a researcher to help develop interventions and contribute to policy changes that broadly address the SDH to improve dietary habits. At the time of writing, I have accepted a post-doctoral research position in the area of nutrition equity and disparity at Wageningen University & Research that I hope will help me to gain further understanding of diet-related inequalities and the relationships between levels of the SEM, as well as acquire additional research skills to achieve these goals in my career.

Summary

This multi-paper thesis includes two research studies: a SNP evaluation and a scoping review. In the first study, a CBPR approach and process evaluation using a mixed methods design was used to understand Indigenous parent and students' perceptions of the enablers and barriers to SNP implementation. Using a CBPR approach to the research was integral to ensuring that the research was completed in an ethical way. Collaboration with community members also helped to offset any potential biases related to my positionality as an individual researcher. In the second study, a scoping review was conducted to identify the components of CSH in school-based nutrition interventions for Indigenous children. Together, the studies described in this thesis will help to create recommendations while also identifying gaps in knowledge concerning the development, implementation, and evaluation of school-based nutrition interventions for Indigenous children.

**CHAPTER 4: First Nations Students' Perceptions of School Nutrition Policy
Implementation: A Mixed Methods Study**

The following manuscript has been published as a research article in *Nutrition & Dietetics*. The style and spelling of the manuscript are in accordance with journal requirements, although citations have been changed from Vancouver to APA style and Tables and Appendices have been re-numbered to maintain consistency for this thesis.

Abstract

Aim: School nutrition policies can improve healthy food access for Indigenous First Nations children in Canada. This study explored First Nations students' perceptions of a school nutrition policy.

Methods: The research was a process evaluation of school nutrition policy implementation using a mixed methods design. Students in grades 4–12 (n = 94) completed a 17-question survey to capture their perceptions of the policy. Survey data informed an 11-question semi-structured interview guide. Transcripts from interviews with students (n = 20) were analysed using content analysis to identify barriers and facilitators to policy implementation.

Results: Key facilitating factors to policy implementation were student support for the policy and taste preferences. Most students (87%) agreed that only healthy foods should be served at school and, in interviews, expressed a preference for healthy food choices. Barriers to policy implementation included foods available at school and lack of communication between students and their teachers and parents. Half (50%) of surveyed students reported that their eating habits at school were average; interviews explained that their diets could be improved by consuming more fruit and vegetables at school. Both surveys and interviews found that communication between students and their parents and teachers about what they ate and drank at school was low.

Conclusions: To support children's healthy eating at school, the school nutrition policy could provide clear guidelines on foods permissible in the school, while considering social and environmental barriers to healthy eating. The involvement of First Nations children in the implementation and evaluation of school nutrition policies is recommended.

Introduction

In Canada, Indigenous children (First Nations, Métis, and Inuit) often have poor dietary behaviours putting them at a higher risk for obesity and obesity-related chronic diseases compared to their non-Indigenous counterparts (Pigford & Willows, 2010; Willows, 2005b). First Nations communities face barriers to healthy eating at multiple levels of influence (i.e., community, built environment, social policy), including poverty, food insecurity, and geographic isolation (Willows et al., 2012). Effective strategies to promote healthy eating behaviours among First Nations children are needed that recognize the multiple factors that constrain their access to healthy food.

A comprehensive school health (CSH) framework (also known as health promoting schools) is a multi-factored approach that supports improvements in both health and education through improved social and physical environments (McIsaac, Storey, Veugelers, & Kirk, 2015). A school nutrition policy (SNP) is an integral component of the broader CSH approach as it establishes formal standards for nutrition-related aspects of the school environment, including foods available, health education, and community and family involvement (McKenna, 2010). By implementing SNPs, schools have the opportunity to create environments that enable and encourage healthy eating behaviours, which may support lifelong health behaviours and improved health outcomes for First Nations children (Nelson & Breda, 2012).

In 2014, Kipohtakaw Education Centre (KEC) adopted a SNP intended to promote healthy food choices in the school (Appendix 1). KEC is a locally-controlled, band-operated Cree (one group of First Nations peoples) kindergarten to grade twelve school located on reserve lands. Following adoption of the SNP, the school's administrators sought to explore the SNP implementation process through an evaluation that included key stakeholders to identify areas for

improvement. As the main recipients and beneficiaries of SNPs, it is important to understand students' perceptions of the policy and of the school food environment. Students have the potential to identify their self-perceived barriers to healthy eating at school and can provide ideas to overcome challenges associated with SNP implementation; thus, their participation in policy evaluation may result in increased feasibility, acceptance, and overall success of SNPs (WHO, 2008a). The purpose of this study was to explore students' perceived barriers to and facilitators of a school nutrition policy in a First Nations community.

Methods

A community-based participatory research (CBPR) approach was adopted in which community members of the Alexander Research Committee (ARC), a well-established research committee in Alexander First Nation, Alberta, Canada (Gokiart et al., 2017) worked in close collaboration with university researchers on all stages of the research. The use of a CBPR approach ensured that the research followed cultural protocols, reflected local context, and worked to address needs identified by community educators. Ethics approval was obtained from Research Ethics Board 1 at the University of Alberta (Pro00051837).

The research was a process evaluation that focused on finding areas to improve the current SNP implementation process (Bowen, 2012). The evaluation was conducted using an explanatory sequential mixed methods design, which is recognized as particularly effective in process evaluation research due to its ability to yield richer detail about implementation than quantitative and qualitative methods could alone (Ivankova et al., 2006). In the first phase, a cross-sectional survey was used to capture a broad understanding of students' perceptions, attitudes, and experiences. Community members and academic researchers collaboratively developed a 17-question survey consisting of 1 open-ended question ("what is your grade?") and

16 closed-ended questions, including: 4 dichotomous questions; 1 Likert scale question; 3 interval scale questions; 2 semantic differential scale questions; and 6 frequency scale questions. The survey collected information on students': gender (1 question); grade level (1 question); perceptions of the policy and personal eating habits (3 questions); desirability of foods served and sold at school (3 questions); utilization of the school food programs (3 questions); communication with parents and teachers (4 questions); perception of the healthiness of foods (1 question); and desire to be served and sold certain foods (1 question).

All students in grades 4-12 (n=126) were eligible to complete the anonymous survey. As per school policy, parental consent was not required because the survey had been developed to inform school programming. Students in kindergarten to grade 3 were not eligible due to time and resource constraints. The survey was read out to students in grades 4-6, while students in grades 7-12 completed the survey on their own with the same researcher (CG) present to answer questions.

Response frequencies (%) were calculated using Statistical Package for the Social Sciences version 22.0. Community members and academic partners discussed the results of the surveys and identified findings that were of interest and warranted further investigation. Thus, the quantitative results were used to develop the qualitative follow-up questions. Academic partners drafted the initial interview guide based on their expertise in interviewing and brought it back to the community members for approval, resulting in an 11-question semi-structured interview guide (Appendix 3).

All students in grades 4-12 were eligible to be interviewed if they had parental consent. To identify students to be interviewed, each consent form was assigned a number, and numbers were drawn from each grade level using Microsoft Excel random selection. Interviews were

conducted by an experienced interviewer (CG) in a private room at the school. To reduce social desirability bias, the interviewer began each interview by explaining to students that they were not being tested. Students were also told that the interview was confidential, and that their responses would not be shared by name with their teachers, parents, or friends. The interviews were audio-recorded with participants' consent. The interviewer had no previous formal relationship with participants; however, she may have been recognized by them as the same person responsible for survey administration. All interviewed students received a \$25 (CAD) gift card for their participation. Interview recruitment continued until theoretical saturation, or the point at which no new information emerged, was reached (Patton, 2015).

All interviews were transcribed verbatim with identifiers removed and analysed using ATLAS.ti version 8.0. Transcripts were analysed by the same researcher who conducted the interviews (CG) using content analysis to generate knowledge based on participants' perspectives (Creswell, 2014). Guided by the approach outlined by Creswell (2014), the analysis process included: 1) organizing and preparing transcripts and field notes, 2) reading each transcript to gain familiarity with the data, 3) line-by-line open coding using codes derived from the actual language used in the data (*in vivo*), 4) generating themes, 5) describing themes and supporting them through transcript excerpts, and 6) making interpretations of the findings.

Facilitators and barriers to SNP implementation were organized using the socioecological framework (Willows et al., 2012) during the final step of analysis, as a way to bring together the themes that naturally emerged from the data and establish the different levels of influence that each factor had on SNP implementation. Individual factors refer to the influence of students' knowledge, attitudes, and beliefs on SNP implementation. Interpersonal factors refer to the influence of family and school staff on SNP implementation. Community, home, and

sociocultural environment factors refer to the influence of the school, community, and household food environments on SNP implementation.

The researcher who administered and interpreted the interviews (CG) is an anthropologist with experience using qualitative methods to explore how people think about food and health within local contexts (Davey & Vallianatos, 2018; Higginbottom et al., 2016, 2018). These characteristics may have influenced the interpretation of results and methodological decisions, including the use of the socioecological framework to organize results. To mitigate the effects of individual researchers, trustworthiness of qualitative data was established through the principles of credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). To establish credibility, academic interpretations of the data were corroborated by community members on the ARC and a group of community Elders. Descriptions of the study setting, methodology, and data interpretations will allow other researchers to determine if and how findings may transfer to other school contexts. Dependability was established by the researcher checking transcripts several times and defining codes to ensure that they were used consistently. Finally, confirmability was established by maintaining an audit trail including minutes of ARC meetings and data analysis files.

Results

In total, 94 students in grades 4 to 12 completed the survey (response, 75%). Participants were 49% female and 51% male, and 44% were in grades 4-6 and 56% were in grades 7 to 12.

Student responses to questions about healthy foods aligned with national dietary recommendations (Health Canada, 2007). For example, all students responded that leafy greens and fruit were healthy and that candy and chocolate bars were unhealthy. When asked their preferred food and drinks to be served and sold in school, students' choices aligned with national

dietary recommendations guidelines (Health Canada, 2007) (Table 1). Preferred foods also included traditional foods of their Cree culture, such as berries (e.g., raspberries, saskatoon berries), baked bannock (a quick bread and staple food in many First Nations communities), and wild game meat (e.g., moose and deer). An exception was fish, which less than half of students chose to be served or sold. Although healthy foods were popular, many students still also chose unhealthy foods like sports and energy drinks, French fried potatoes, and soda pop to be served or sold at school.

Table 1. Survey responses: students' desire to be served and sold certain foods

	Yes, n (%)	No n (%)
Would you like the following food and drinks sold and served at KEC?		
Unprocessed, minimally processed, or processed food		
Fruit	88 (100)	0 (0)
Berries	86 (98)	2 (2)
100% fruit juice like apple and orange juice	84 (97)	3 (3)
Milk	83 (94)	5 (6)
Cheese and yogurt	78 (89)	10 (11)
Leafy greens	78 (89)	10 (11)
Vegetables	74 (84)	14 (16)
Whole grain breads and pasta	69 (79)	18 (21)
Whole grain, low sugar breakfast cereal	67 (76)	21 (24)
Low fat meat and chicken	61 (70)	26 (30)
Baked bannock	58 (66)	30 (34)
Wild game meat	56 (64)	31 (36)
Fish (not breaded)	37 (42)	50 (58)

Ultra-processed snack food and fried food		
Fried bannock	53 (61)	34 (39)
Low fat snack foods	54 (61)	34 (39)
Sports and energy drinks	52 (59)	36 (41)
French fries	42 (48)	46 (52)
Ice cream	40 (46)	47 (54)
Soda pop	37 (43)	49 (57)
Potato and nacho chips	33 (37)	55 (63)
Cakes and cookies	33 (37)	55 (63)
Candy and chocolate bars	25 (29)	62 (71)

Most students agreed (68%) or strongly agreed (19%) with the policy stating that “only healthy foods will be served or sold at KEC.” Fewer than half of students indicated that they liked the foods served for breakfast (41%) and lunch (37%), yet most utilized the breakfast (56%) and hot lunch (53%) programs daily. In contrast, most students (72%) liked the healthy snacks offered in the school canteen (e.g., chocolate milk, nuts, and low-fat snack foods such as pretzels) and just over half of students (54%) purchased them every day (12%) or a few days each week (42%).

Although most students were utilizing the school food programs and canteen, they perceived their current eating habits to be only average or unhealthy. When asked to reflect on what they usually ate every day at KEC, over half (55%) of students responded that their eating habits were average, unhealthy or very unhealthy, while the remaining students (45%) indicated

their eating habits were very healthy or healthy. Fewer students (34%) considered their eating habits at home and other places outside of school to be very healthy or healthy. Over half (57%) of students responded that they had asked their parents to buy healthy foods based on what they had learned about nutrition at school; however, most students did not communicate regularly with their parents or teachers about healthy eating or their nutrition at school (Table 2).

Table 2. Survey responses: communication with parents and teachers

	Never, n (%)	A few days each month, n (%)	A few days each week, n (%)	Every day, n (%)
How often do you talk with your parents about what you eat and drink at KEC?	32 (34)	30 (32)	26 (28)	6 (6)
How often do you ask your teachers about healthy foods to eat and drink?	44 (47)	26 (28)	20 (21)	4 (4)
How often do your teachers talk with you about healthy food choices?	22 (23)	27 (29)	42 (45)	3 (3)

Following survey administration, a total of 20 students participated in the interview, including 11 (55%) girls and 9 boys (45%) from all grades, except for grade 11. Interviews ranged from 8 to 27 minutes in length, averaging 14 minutes. Facilitators and barriers to SNP implementation are organized at the individual, interpersonal, and community, home, and sociocultural environment levels.

Individual facilitators

Health knowledge All students provided examples of healthy and unhealthy foods. Students perceived healthy foods and drinks as being natural, low in sugar, and containing vitamin and nutrients. Examples of healthy foods included wild game meat, fruit, and vegetables. In contrast, students perceived unhealthy foods as being processed and having high sugar and fat content.

Examples of unhealthy foods included candy, soda pop, and pizza. Students also understood that food preparation and cooking methods influenced the healthiness of foods. For example, one student responded that fish is healthy '*[depending] on how you cook it in and what it has in it*' (Student 9).

Food preferences Students expressed considerable interest in having healthy choices like fruit, vegetables, and wild game offered to them at school. For example, when asked which foods they would serve for hot lunch, one student explained, '*I think I would make like some salad or like soup...Because it's more healthier*' (Student 7). Students also liked traditional Cree foods, and most identified berries and moose meat as their favourites. One student suggested that the hot lunch include, '*[Moose meat] ...and put some other vegetables on the side that most kids like. It seems a little more healthier because the vegetables are healthy and the meat*' (Student 15). An exception was fish, which most students did not have an interest in consuming because they did not enjoy the taste. One student was also concerned about the safety of fish consumption, explaining '*maybe it's just my superstition, I don't know if they keep their lake clean*' (Student 1).

Many students also expressed enjoying and wanting to consume foods like French fried potatoes, soda pop, and candy that they knew were unhealthy. For example, when asked to describe favourite foods, one student replied, '*pizza and pop...I know they're not healthy but it's good, tastes good*' (Student 4).

Interest in health education Nearly all students were interested in learning more about healthy foods at school. One student replied, '*Yes I would, honestly. What I would want to know is how to prepare healthy meals*' (Student 11). Another student specifically expressed interest in learning about healthy foods in their non-health classes, saying '*Yes because when we go to our*

health class with [teacher] we mostly talk about social studies...so we never talk about health' (Student 10). Students were also interested in having after-school programming such as cooking classes offered.

Interpersonal barriers

Lack of communication with teachers Although the SNP encourages all staff to incorporate health education and positive food messaging into the classroom, students indicated that they do not speak with their teachers about healthy eating. Students were unsure of or unable to articulate a reason for this lack of communication, although one thought it may be due to time, explaining, *'because maybe she is really busy...she has to teach three classes'* (Student 13). In one exception, a student discussed having effective communication with a teacher who made a concerted effort to discuss healthy eating and active living with students: *'I talk to one teacher about living like a healthy lifestyle...we're trying to get a fitness group, like with a bunch of other kids in high school...he said that that would be like an all-around thing, we would like workout and exercise and then we would also talk about eating healthy...I hope he really does that though it's a really good idea and everybody likes him at school'* (Student 1).

Lack of communication with parents Students also revealed that they do not speak with their parents about what they eat at school, or healthy eating in general. For instance, one student responded *'there's not a particular reason why but I don't usually talk about that. I usually forget'* (Student 17), and another explained, *'I just talk about like what I did at school and what I worked on and not really about the food'* (Student 4). Other students indicated that the lack of communication was a result of lack of parent involvement or interest. One student responded that they do not talk about what they eat and drink at school because *'no one asks'* (Student 18). Another student said, *'I would talk about it, but it seems like my parents are busy'* (Student 5),

and another student explained that parent involvement needed to be improved, saying *‘I think with the parents it would be nice to have the parents more involved, so they can ask their kids when they get home “what did you eat today?”’* (Student 1).

Community, home, and sociocultural environment barriers

Food served and sold in the school environment Most students believed that the quality and variety of foods served and sold in the school could be improved. Specifically, students believed that the school’s food environment could be made healthier by serving and selling more fruit and vegetables. One student explained *‘I think we should have more fruit and more vegetables...I feel like it should just be mandatory to take’* (Student 1). One student recommended incorporating more fruit and vegetables into the hot lunch saying, *‘they could have like sides with some vegetables or fruits’* (Student 14), and another student suggested *‘apples, oranges, and bananas for like little snacks between breaks’* (Student 17).

In addition, students explained that they were served or sold foods and drinks at school that they did not think were healthy. One student perceived the pizza served at hot lunch as being unhealthy, and some students perceived unhealthy food options being available in the school canteen. For example, one said, *‘they sell those [processed, flavoured rice chips], I eat those a lot. My teacher tells me that it’s bad, but I still eat it’* (Student 2). Many students also reported bringing nutrient-poor processed foods from home with them as snacks, including granola bars, cookies, and pudding. One student felt that unhealthy foods brought by other students from home should be banned, saying, *‘Some foods should be banned like energy drinks. I see that a few times in the school’* (Student 5).

Lack of healthy foods at home Most students believed that their eating habits at home and other places outside of school could be improved. Specifically, students felt that they should be

consuming more fruits and vegetables and less convenience and pre-packaged foods. For instance, one student responded they should eat '*less fatty products and more vegetables and fruits*' (Student 5). In addition, two students disclosed relying on the food programs at school to supplement their diets as they did not have access to many healthy food choices at home.

Discussion

Very few studies in Canada have explored the factors influencing nutrition policy implementation in First Nations schools. We surveyed and interviewed First Nations students, and their self-perceived barriers and facilitators in SNP implementation were organized within the context of the socioecological framework (Willows et al., 2012). The key individual facilitating factors identified in this study were student support and taste preference for healthy foods. Previous research has determined both student support for healthy eating and student taste preference to be significant factors influencing policy implementation (MacLellan et al., 2010; Vine et al., 2014). Although students admitted to enjoying unhealthy foods, they provided many examples of healthy foods that they desired to have at school. Echoing finding in previous studies (Downs et al., 2012), this suggests that students will make healthy choices if the availability of unhealthy foods is reduced and availability of healthy foods is increased at school. Elders in the community were unsurprised by this finding, explaining that most students are aware of what foods are good for them but experience barriers that prevent them from consuming healthy foods. As such, the SNP may play a significant role in ensuring students receive nutritious meals that they may otherwise not receive due to barriers experienced outside of school.

Survey and interview data also demonstrated students' interest in consuming traditional foods of their Cree culture. This is an important facilitator of policy implementation in this

context, as the school has a focus on incorporating education on traditional foods, as well providing traditional foods in the school food programs. However, surveys suggested that students were not interested in being served or sold fish. Interviews explained that this finding was due to students' distaste for fish and food safety concerns. Elders affirmed this concern, explaining that contamination caused by pollution and environmental degradation has affected fish populations as well as traditional wild game such as moose and deer. Elders suggested that students' disinterest in fish may also be due to unfamiliarity and lack of exposure to diverse types of fish, as traditional food sharing practices are deteriorating in the community and many families cannot access fish to prepare at home for their children. Given these issues, students may benefit from education on environmental contamination and being exposed to foods that they may not have had an opportunity to try.

Interpersonal barriers to SNP implementation included the lack of communication between students and their teachers and parents. Survey and interview results confirmed that most students do not speak to their teachers about healthy foods, despite staff being encouraged to incorporate nutrition education in their classrooms regardless of the subject being taught. An evaluation completed with staff from KEC indicated that the policy was implemented inconsistently by staff due to their limited knowledge of the policy, competing priorities, and perceived role as nutrition policy facilitators (Murray et al., 2017). These findings indicate a need to encourage and support staff to improve the embedding of policy-driven nutrition education into the classroom as part of a broader CSH approach. This may require explicit policy guidelines that specifically outline staff responsibilities in addition to the provision of appropriate resources and support (Mâsse et al., 2013).

Survey and interview findings corroborated that students rarely speak with their parents about what they eat and drink at school. As students have been identified as drivers of change in the home environment (Nelson & Breda, 2012; Storey et al., 2016) and parents control most of the food choices at home (WHO, 2008a), parent engagement through communication with their children is an important means of extending the SNP intentions beyond the school environment. Lack of communication is also of concern because parents may be unaware of the school's food programs, their child's eating habits at school, or the SNP in general. Lack of parental awareness may be a reason why children were sent to school with snacks that did not comply with policy guidelines, potentially undermining successful SNP implementation. Addressing this barrier may involve strategies and resources to increase parent awareness of the policy and engagement in the SNP implementation process through ongoing consultation. It is important to consider, however, that parents may be aware of policy guidelines but are unwilling or financially unable to provide healthy food choices for their children to bring to school.

Finally, foods available to students at home and at school presented a barrier at the community, home, and sociocultural environment level. Surveys indicated that most students believed that their eating habits at school were average or unhealthy; interviews explained that this was due, in part, to their belief that they should consume more fruits and vegetables at school. As a SNP provides the foundation for coordinating other elements of CSH, including food programs, it is essential that guidelines are specific, consistent, and mutually reinforcing (Nelson & Breda, 2012). These findings indicate that there may need to be clearer guidelines surrounding foods served and sold to students in the school environment. However, ensuring that food menus better adhere to SNP guidelines may be challenging, especially within First Nations contexts due to underlying issues of food access and affordability. For instance, access to fresh

fruits and vegetables is an ongoing barrier for KEC due to its rural location and issues with finding suitable and affordable fresh produce providers. Furthermore, some students indicated having limited healthy foods at home, which may be due to their parents being unable to afford healthy foods like fruit, as reported by previous qualitative research at KEC (Genuis, Willows, Alexander First Nation, & Jardine, 2014). When implementing SNPs in First Nations contexts, it is essential to take into account the local environment and consider multiple levels of the socioecological framework, including considerations of healthy food availability, accessibility, and cost, local conceptualizations of health, and cultural foods (Godin, Leatherdale, et al., 2015; Rice et al., 2016).

A strength to our study lies in the CBPR approach, which facilitated community control and involvement of community members, including Elders, in the evaluation of the SNP. However, as data collection took place in only one community, the results may not be transferable to other First Nations schools. The school in which the research took place is in a rural (but not remote) community with limited access to off-site fast food and convenience stores. The school also has a canteen where healthy foods are sold and a kitchen where a hired cook prepares free breakfast and hot lunch meals. These characteristics may in themselves be important facilitators of SNP implementation in this school. Regardless, the barriers and facilitators identified in this research offer key factors for other First Nations schools to consider when developing and implementing SNPs.

To our knowledge, this is the first study to involve students in evaluating a SNP in a First Nations community in Canada. Future research will benefit from continuing to involve First Nations students to understand their perceptions of the impact of SNPs as well as identify barriers and enablers to their success. With this knowledge, it may be possible to optimize the

successful implementation of SNPs to improve food environments and eating behaviours to decrease obesity risk for First Nations children.

CHAPTER 5: Alexander First Nations Parents' Perceptions of a School Nutrition Policy

The following manuscript has been accepted for publication in the *Canadian Journal of Dietetic Practice and Research*. The style and spelling of the manuscript are in accordance with journal requirements, although citations have been changed from Vancouver to APA style and Tables and Appendices have been re-numbered to maintain consistency for this thesis.

Abstract

Purpose

A school nutrition policy (SNP) is one promising school-based health promotion strategy to improve the food environments of First Nations children. The aim of this study is to explore First Nations parents' perceptions of a SNP.

Methods

A process evaluation of policy implementation was conducted using a mixed methods design. Parents (n=83) completed a 19-question survey to capture their perceptions of the policy. Survey responses informed questions in an 11-question semi-structured interview guide. Transcripts from interviews with parents (n=10) were analyzed using content analysis to identify barriers and facilitators to policy implementation.

Results

Parents were supportive of the SNP and the school's food programs, which they perceived as helping to address community concerns related to nutrition. However, some parents opposed the restriction of unhealthy foods at school celebrations and fundraisers. In addition, despite being aware of the SNP, parents were unable to demonstrate an understanding of the SNP content.

Finally, parents struggled to provide their children with healthy foods to bring to school due to lack of affordable and accessible food in the community.

Conclusions

Although SNPs may be well-received in First Nations communities, their implementation must be supported by parent involvement and consideration of wider socioeconomic conditions.

Introduction

In Canada, First Nations communities face significant obstacles to healthy eating due to sociocultural and environmental barriers (i.e., education, income, and geographical location) as well as historical factors (i.e., colonization, removal from traditional lands, and assimilation policies) (Willows et al., 2012). The diets of many First Nations children are energy-dense and nutrient poor, putting them at an increased risk of nutrition-related diseases such as obesity, diabetes, and cardiovascular disease (Gates et al., 2014; Willows, 2005b). The identification of effective strategies to improve the food environments and eating behaviours of First Nations children is an essential goal to ensure healthy body weights and overall good health.

A written school nutrition policy (SNP) is one promising school-based health promotion strategy to improve the nutrition of First Nations children (Hogan et al., 2014). SNPs are fundamental aspects of a broader comprehensive school health (CSH) approach, as they establish formal standards for nutrition-related aspects of the school environment (McKenna, 2010). SNPs can establish school food environments that promote and enable children to make healthy food choices, which may further support lifelong health behaviours and health outcomes (MacLellan et al., 2009). Successful implementation of a SNP is dependent on the involvement of diverse stakeholders, including parents and caregivers (Kehm et al., 2015; MacLellan et al., 2010). The purpose of this study was to explore parents' perceived barriers to and facilitators of a nutrition policy in a First Nations community school.

Methods

The study took place in Alexander First Nation, a rural Cree Treaty 6 community in Central Alberta, Canada. Kipohtakaw Education Centre (KEC) is the community kindergarten to grade twelve school. It is locally-controlled and band-operated; as such, Alexander First Nation

Education (AFNE) holds sole jurisdiction to develop and deliver education for the community. Since 2011, KEC has been involved in the Alberta Project Promoting Active Living & healthy Eating Schools (APPLE Schools) program; a comprehensive school health promotion program aimed at improving healthy living habits of students (APPLE Schools, 2018). Previous health promotion efforts at KEC have included a school gardening program and snack program (Hanbazaza et al., 2015; Triador et al., 2014). KEC has a kitchen where a hired cook prepares free breakfast and hot lunch meals, and a canteen where healthy snacks are sold. Wild game meat, such as moose, is donated to the school by community hunters when possible.

In October 2013, KEC developed its first SNP (Appendix 1) to guide school nutrition initiatives. The policy was developed by AFNE and the school principal using a template provided by APPLE Schools. The SNP was approved by Chief and Council – the community’s governing body – and implemented in KEC in March 2014. Parents were first notified about the SNP at the school’s annual parent conference in February 2015. It is normal practice for AFNE to develop policies and subsequently seek feedback, as opposed to involving all stakeholders in policy development.

Following implementation of the SNP, AFNE sought to conduct an evaluation that included key stakeholders to monitor the effects of the policy and identify areas for improvement. Using a community-based participatory research (CBPR) approach, community members of the Alexander Research Committee (ARC) (Gokiart et al., 2017) worked in close collaboration with university researchers on all stages of the research. Ethics approval was obtained from Research Ethics Board 1 at the University of Alberta.

A process evaluation (Linnan & Steckler, 2002) was conducted using an explanatory mixed methods design with two sequential phases (Creswell, 2014). In the first phase, a cross-

sectional survey was used to capture a broad understanding of parents' perceptions of the SNP and healthy eating. Community members and academic researchers collaboratively developed an original 19-item paper-based survey (Appendix 2). All households with at least one child attending the school (n=125) were eligible to participate in the survey, which was administered door-to-door by a community member and university researcher. One parent from each household completed the survey, and they were asked to consider their oldest child attending KEC when answering questions. Parents who completed the survey were given a \$10 grocery store gift card as compensation for their time, and completion of the survey implied consent. All parents who completed the survey were asked if they would like to take part in an interview about the SNP and interested parents (n=53) provided their contact information on the consent form.

Response frequencies (%) were calculated using SPSS Statistics [version 22.0, IBM Corp., Armonk, NY, 2013]. Community members and academic researchers then co-designed an original 11-question semi-structured interview guide based on survey responses that were deemed as needing further explanation (Appendix 5).

In phase two, semi-structured interviews were conducted in a private room at the school. Interview consent forms were chosen using random number generation to be selected for an interview. Due to challenges contacting parents (e.g., disconnected phone numbers), convenience sampling was used to recruit additional participants (n=3) who agreed to participate after visiting a SNP information booth at a parent-teacher interview night. Interviews were digitally recorded, and all participants provided written consent prior to the interview. Interview recruitment continued until theoretical saturation was reached, or the point at which the researcher was confident in the quality and scope of data obtained (Patton, 2015).

Interviews were transcribed verbatim, loaded into ATLAS.ti qualitative analysis software [version 8.0, ATLAS.ti Scientific Software Development GmbH, Berlin, 2017], and analyzed by the same researcher who conducted the interviews using content analysis (Creswell, 2014). Guided by the approach outlined by Creswell (2014), the process included: 1) preparing transcripts and field notes, 2) reading each transcript to gain familiarity with the data, 3) line-by-line coding using codes derived from the actual language used in the data (*in vivo*), 4) generating themes, 5) describing themes and supporting them through transcript excerpts, and 6) making interpretations of the findings. The researcher who conducted the interviews and subsequent analysis is an anthropologist with experience using qualitative methods to explore how people think about food and health (Davey & Vallianatos, 2018; Higginbottom et al., 2016, 2018). These characteristics may have influenced not only methodological decisions, but also the interpretation of results.

Several techniques were used to establish trustworthiness of qualitative data (Lincoln & Guba, 1985). Member checking with the ARC and a group of community Elders ensured that academic interpretations of the data were accurately representative of the community. Descriptions of the study setting will allow other researchers to determine if and how findings may transfer to other school and community contexts. The researcher also checked transcripts several times to ensure that they were accurate and defined codes to ensure that they were used consistently. Finally, electronic copies of ARC meeting minutes and data analysis files were maintained for confirmability.

Results

Survey

A total of 83 parents completed the survey (response, 66%). Most parents (83%) were aware that the school had a nutrition policy, and more than half agreed (52%) or strongly agreed (8%) that the school was doing a good job of letting parents know about its health programs and activities. Most parents (95%) responded that they thought it was a good idea for the school to have a nutrition policy. Nearly all parents (93%) responded that it was important that their children have healthy food choices at school, including fresh fruit, vegetables, and traditional Cree foods like moose meat, bannock (a quick bread), and berries (Table 3).

Table 3. Parent responses related to the foods served to students

	Very unimportant, n (%)	Unimportant, n (%)	Neither important nor unimportant, n (%)	Important, n (%)	Very Important, n (%)
<i>How important is it to you that...</i>					
Your child has healthy food choices at school?	1 (1)	0 (0)	5 (6)	37 (45)	40 (48)
Fresh fruits and vegetables are served to children at school?	0 (0)	0 (0)	3 (4)	30 (36)	50 (60)
Traditional food is served to children at school?	1 (1)	3 (4)	20 (24)	27 (32)	32 (39)

Most parents (82%) agreed that the school should serve only healthy food and drinks in the school breakfast and hot lunch programs; however, they were less supportive of restricting unhealthy options at school and classroom celebrations (Table 4). Most parents (59%) indicated that their child had talked with them about the changes in food and drinks offered at school because of the policy, and more than half (56%) responded that their child had suggested that they buy healthy foods or drinks based on what they had learned about nutrition at school. Finally, most parents responded that their child's eating habits at school, at home, and other places were average (64%), and that their own eating habits were also average (61%).

Table 4. Parent responses related to policy guidelines

	Strongly disagree, n (%)	Disagree, n (%)	Neither agree nor disagree, n (%)	Agree, n (%)	Strongly agree, n (%)
<i>Do you agree with this sentence?</i>					
“Only healthy food and drinks will be served at the school breakfast and hot lunch.”	1 (1)	6 (7)	8 (10)	35 (42)	33 (40)
“Only healthy food and drinks will be sold at school fundraisers, for example, to raise money for field trips.”	1 (1)	9 (11)	8 (9)	37 (45)	28 (34)
“Only healthy food and drinks will be served at school and classroom celebrations. These include talent shows, birthday parties, parent teacher interviews, Christmas concerts, and graduations.”	4 (5)	9 (11)	14 (17)	38 (46)	18 (21)

Interviews

A total of 10 parents participated in an interview. Parent’s support for the policy and school’s role in food provision were the facilitating factors to SNP implementation. Barriers included lack of support for certain guidelines, inadequate school communication, and limited access to healthy food.

Facilitators

Support for the policy Parents unanimously vocalized support for the SNP and perceived it to be an important strategy to improve nutrition for children and address health issues (e.g., obesity and diabetes) in the community. Parents also made a connection between diet quality and school performance. As one parent explained:

‘It worries me a lot that there’s young kids that have heart attacks and stuff because they’re not getting a proper diet and nutrition. And I feel like [my child is] being affected

with his school work because [my child is] not getting the proper “brain food” like vegetables, right?’ (Parent 4)

Parents also acknowledged the promising role of the SNP in promoting nutrition in the broader community. As one parent said:

‘We have to take a stand somewhere because our kid’s future is at stake here [...] Hopefully the kids will catch on and they’ll take those ideas home to their parents and say, “I don’t want you to buy this, I want you to buy this.”’ (Parent 7)

Following implementation of the SNP, parents noticed an improvement in their child’s knowledge of healthy foods and eating behaviours. As one parent revealed, *‘I noticed my daughter’s starting to try more and more vegetables. She still likes her unhealthy snacks but she’s also trying different foods whereas before she’d be so fussy, so picky.’ (Parent 3).*

The positive impact of the SNP also extended to the home environment, as parents described purchasing healthier foods and changing their eating behaviours because of the SNP. As one parent revealed, *‘I just make sure to eat a little healthier. Like our chips and our pop will be maybe once or twice a week. It used to be just about every day [...] More vegetables. I started baking my food more than frying it’ (Parent 1).*

Support for school’s role in food provision Parents were supportive of the school’s role in providing and promoting healthy foods through their free daily breakfast and hot lunch programs. As some families may struggle to provide healthy foods for their children due to lack of affordability and availability, parents felt that the policy-driven food programs enabled children to have at least one nutritious meal per day. As one parent explained, *‘Not only is it a fantastic, wonderful thing that they have hot lunch and that they have breakfast, but that it’s healthy on top of that is just even better. Especially with a lot of people that can’t afford to buy*

lunch every day' (Parent 10). Parents also recognized and appreciated the school's provision of traditional Cree foods. As one parent explained, *'I like [the hot lunch program] because it has that cultural side where they're learning about it'* (Parent 8).

Barriers

Lack of support for guidelines concerning celebrations and fundraisers Parents voiced concern about the elimination of unhealthy foods such as cupcakes, cakes, and cookies at school celebrations and fundraisers. For example, one parent said, *'I think a cupcake won't hurt them [...] what's a birthday without a cake. Right?'* (Parent 1). Another parent expressed concern about taking away foods like cookies as rewards, saying *'kids work hard, and they look forward to their parties and their celebrations, you know. If you start denying them stuff like that then what are they celebrating?'* (Parent 5).

However, it is important to note that not all parents took issue with the policy guidelines concerning celebrations. As one parent explained, *'that policy being that you can't send sweets and stuff is what encouraged me to say "ok, I'm a parent and I have to send things for my kids. I might as well try something different that should be healthy"'* (Parent 10). Some parents were also quite supportive of the school only selling healthy options at fundraisers. As one parent said, *'I think it's really awesome. I did come to a couple of [fundraisers] and they do, they do have healthy choices'* (Parent 6).

Inadequate communication Although parents were aware and supportive of the SNP, none were able to demonstrate a comprehensive understanding of the SNP content. For example, one parent who was asked to elaborate on the SNP replied, *'The only thing that I'm aware of that has to do with the nutrition policy here is that they try and incorporate wild meat in the menu. That's*

about all I know' (Parent 4) and another said, *'The only thing I know is that they took out the canteen and they put in like vegetables and stuff like that'* (Parent 3).

Cost, availability, and accessibility of healthy food The high cost and low availability and accessibility of healthy foods in the community posed a barrier to parents' ability to provide healthy foods for their children at home and send with them to school. One parent explained, *'It's more expensive to eat healthy [...] and the grocery stores aren't convenient'* (Parent 2). Another parent explained that processed foods were more affordable, saying, *'You know the price of groceries has gone up so much and let's be completely honest here, processed food is way cheaper than the fruits and vegetables and everything else that's healthy, right?'* (Parent 4).

Discussion

This evaluation uncovered parent perceived facilitators and barriers to successful SNP implementation in a First Nations school. The findings that parents supported the SNP and the school's role in providing and promoting healthy foods are important, given that these are key facilitators to successful SNP implementation. In non-Indigenous contexts, parent resistance to changes associated with SNPs is a known barrier to implementation (McIsaac, Spencer, Chiasson, Kontak, & Kirk, 2018), and the school's role in feeding children has been perceived as inappropriate (Kehm et al., 2015; MacLellan et al., 2010; McIsaac et al., 2018). Successful SNP implementation requires collaboration, communication, and engagement with parents and the community-at-large (McIsaac et al., 2018).

Barriers to SNP implementation included parents' being more critical of guidelines concerning celebrations and fundraisers, lack of communication between the school and parents, and broader socioeconomic conditions. Both surveys and interviews demonstrated that although most parents were supportive of policy guidelines that restricted unhealthy foods at school

celebrations and fundraisers, there were parents who were critical of these aspects of the SNP. Previous research has found this to be a common area of resistance (Downs et al., 2012; Spitters et al., 2009). To address this barrier, the school may need to discuss SNP guidelines with parent stakeholders to better understand and address their concerns.

Although surveys indicated that most parents were aware of the SNP and agreed that the school was informing them about its health programs, interviews demonstrated that parents did not understand the SNP. Communication with parents about the SNP and their role in shaping healthy habits is an essential factor in effective SNP implementation (MacLellan et al., 2010). As such, implementation of the SNP may be optimized by increased consultation and engagement with parents about policy changes (MacLellan et al., 2010).

Finally, surveys indicated that insufficient money was a barrier to parents' ability to adopt good nutrition in their homes. In interviews, many parents revealed struggling with the affordability and accessibility of food in the community. Other school-based nutrition interventions in First Nations communities have also found that environmental conditions have constrained program success (Gates, Hanning, Gates, Isogai, et al., 2013; Gates, Hanning, Gates, McCarthy, & Tsuji, 2013; Paradis, 2005; Towns et al., 2014). Socioeconomic barriers to healthy eating may, by extension, have an influence on the successful implementation of the SNP as parents may struggle to adhere to the policy guidelines (e.g., sending fresh fruit platters for classroom celebrations). Although these barriers are beyond the school's control, they are nonetheless important to consider when implementing SNPs.

Study limitations

In following the CBPR approach, the research aimed to conduct a pragmatic evaluation focused on the priorities of community members (Patton, 2015). By drawing on the experience and

knowledge of community members, the CBPR approach helped to ensure face validity of survey and qualitative interview questions (Minkler et al., 2018). However, the construct validity of the survey instrument has not been established and some of the questions posed to parents were phrased in a positive rather than neutral way. Furthermore, as this research was an evaluation of one community SNP, the results may have limited transferability. KEC has kitchen facilities and has secured funding to provide free breakfast and lunch to students, and these are in themselves important aspects of the school's approach to health promotion. More research concerning the development, implementation, and evaluation of SNPs in diverse First Nations contexts is needed to contribute to this field and assist in situating the current findings.

Relevance to practice

Our study results demonstrate that a SNP was well-received and supported by First Nations parents and had a positive impact on the eating behaviours of children and their families. This suggests that SNPs may be an effective school-based health promotion initiative for First Nations communities to consider. However, it is important that SNPs be tailored to school, community, and culture-specific contexts by incorporating elements such as traditional healthy foods and community food preferences (Godin, Leatherdale, et al., 2015). Family and community involvement (e.g., community feasts and land-based and traditional food education with Elders) may be especially beneficial in facilitating social environments that reinforce and support the eating behaviours promoted in SNPs (Gates, Hanning, Gates, Isogai, et al., 2013; Naylor et al., 2010; Saksvig et al., 2005). Finally, SNPs must consider school resources, including funding, staff, and facilities (Gates, Hanning, Gates, Isogai, et al., 2013; Gates, Hanning, Gates, McCarthy, et al., 2013; Naylor et al., 2010).

The barriers identified in this study highlight the importance of involving and collaborating with parents at all stages of the policy process to ensure cultural appropriateness and sustainability of SNPs within First Nations communities (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Towns et al., 2014). Effective communication between schools and parents throughout the policy process may help facilitate SNP implementation by helping to uncover and address barriers early in the policy process (Vine & Elliott, 2013). Ongoing communication will also ensure that parents are well-informed about policy guidelines and the nutrition environment that their children are exposed to while at school.

Finally, our study revealed that SNPs have potential to promote healthy eating behaviours within and outside school settings. However, this positive progress is hindered by socioeconomic barriers including lack of affordable healthy foods in many First Nations communities (Godin, Leatherdale, et al., 2015). Policy makers must consider the wider social determinants of health, such as parent income and education on healthy eating, as well as local community environments, when developing SNPs and evaluating parents' perceptions of and adherence to SNP guidelines.

CHAPTER 6: School-based Nutrition Interventions for Indigenous Children in Canada: A Scoping Review

The following manuscript has been submitted for publication in *BMC Public Health*. The style and spelling of the manuscript are in accordance with journal requirements, although citations have been changed from Vancouver to APA style and Tables and Appendices have been re-numbered to maintain consistency for this thesis.

Abstract

Background

Indigenous children in Canada (First Nations, Inuit, and Métis) are disproportionately affected by nutrition-related chronic diseases such as obesity and diabetes. Comprehensive school-based nutrition interventions offer a promising strategy for improving children's access to healthy foods and sustaining positive eating behaviors. However, little is known about school-based nutrition interventions for Indigenous children. The objectives of this scoping review were to identify school-based nutrition interventions for Indigenous children in Canada and describe their components.

Methods

The scoping review consisted of searches in seven peer-reviewed databases and a general web search for grey literature. Eligibility criteria were applied by two reviewers, and data were extracted and charted by one reviewer using components of comprehensive school health (social and physical environment, teaching and learning, policy, partnerships and services) and additional components with relevance to Indigenous interventions (cultural content, Indigenous control and ownership, funding source, evaluation). Together, these components were used to summarize and present results.

Results

Sixty-five sources of evidence, representing 34 unique interventions met the inclusion criteria. The majority (97%) of interventions targeted the social and physical environment, most often by offering food programs. Over half of interventions also incorporated teaching and learning (56%) and partnerships and services (59%), but fewer included a policy component (38%). Many interventions included a cultural component (56%) and most (62%) were owned and controlled

by Indigenous communities. Finally, over half of interventions disclosed their source(s) of funding (59%), but less than half (41%) included an evaluation component.

Conclusions

The review suggests that school-based interventions for Indigenous children can be more comprehensive by incorporating culturally-relevant nutrition education and professional development opportunities for teachers, written school nutrition policies, and activities that actively engage families and community members. The continued focus on Indigenous control and ownership and incorporation of content specific to individual communities may enhance cultural relevancy and sustainability of interventions. Furthermore, there is a need to increase intervention evaluation and the sharing of resources related to funding. These recommendations may be used by communities, as well as by researchers and professionals working with communities, in developing comprehensive school-based nutrition interventions to improve the eating behaviors of Indigenous children.

Background

Indigenous communities in Canada (i.e., First Nations, Inuit, and Métis) face significant obstacles to healthy eating due to sociocultural and environmental barriers, including low income, a high prevalence of household food insecurity, and the expense of nutrient-dense foods (Bhawra, Cooke, Hanning, Wilk, & Gonneville, 2015; Skinner, Hanning, & Tsuji, 2006; Willows, 2005a). Unique to Indigenous peoples, these issues exist within a larger macro-context of historical colonization, assimilation policies, and forced removal from traditional lands (Willows et al., 2012). For instance, the dispossession and industrialization of traditional lands has resulted in the loss of knowledge and skills related to land-based food practices (e.g., hunting, gathering, and horticulture) and forced dependence on highly processed, nutrient poor market foods (Bagelman, 2018). Due in large part to these barriers, the diets of many Indigenous children are energy-dense and low in nutrient dense foods like fruits and vegetables (Downs et al., 2009; Gates, Hanning, Gates, et al., 2012; Gates et al., 2014). These poor dietary patterns contribute to a high risk of nutrition-related chronic diseases like obesity, diabetes, and cardiovascular disease (Pigford & Willows, 2010). Effective strategies to improve food environments and eating behaviors of Indigenous children that consider the multiple barriers that Indigenous communities face are needed to ensure that Indigenous children are able to attain optimal nutrition and health.

Schools are an important setting to target nutrition interventions to promote and support healthy eating, considering the time that children spend in schools during their formative years (Lee & Gortmaker, 2018). Research supports the positive impact that school-based nutrition interventions – such as breakfast or lunch programs – can have on the diet, learning, and health outcomes of Indigenous children (Assembly of First Nations, 2008; Gates, Hanning, McCarthy,

et al., 2012; Gates, Hanning, Gates, Isogai, et al., 2013; Saksvig et al., 2005). There is also evidence that comprehensive, multi-component school-based interventions hold greater potential in promoting and supporting positive health changes in the long-term than single-component nutrition interventions (Assembly of First Nations, 2008; Godin, Leatherdale, et al., 2015; Ho, Gittelsohn, Harris, & Ford, 2006; Hoelscher et al., 2013; Kulinna, 2016; Naylor et al., 2010; Steckler et al., 2003).

Comprehensive School Health (CSH) is an internationally recognized school-based health promotion approach that integrates multiple aspects of the school environment through four mutually reinforcing components into a single intervention (social and physical environments, teaching and learning, school policy, and partnerships and services). Evidence from evaluations in non-Indigenous populations have demonstrated that CSH interventions have resulted in increased physical activity, improved dietary habits, and decreased rates of obesity and chronic disease among children (Fung et al., 2012; Stewart-Brown, 2006; Tran et al., 2014; Veugelers & Schwartz, 2010). Comprehensive school-based nutrition interventions may also be effective in Indigenous settings by increasing children's access to healthy foods and sustaining positive eating behaviors (Assembly of First Nations, 2008; Godin, Leatherdale, et al., 2015). However, there is limited evidence concerning school-based nutrition interventions in Indigenous communities in Canada.

In 2008, The Assembly of First Nations performed an environmental scan of school nutrition programs and policies for children in First Nation community schools across Canada. Of the 47.9% of schools that responded to the survey (n=303), 86.7% had a school nutrition program (e.g., breakfast, snack, and/or lunch program) and nearly two-thirds (62.3%) had a school nutrition policy (Assembly of First Nations, 2008). More recent reviews have identified

school-based interventions that aim to improve nutrition knowledge, food preferences, and/or health in Indigenous communities; however, these reviews have largely focused on evaluating the effectiveness and impacts of interventions rather than describing their components (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Towns et al., 2014). Describing the content and scope of interventions is an important next step in developing evidence-based comprehensive school-based nutrition interventions to improve eating behaviors in Indigenous communities.

The primary objective of this scoping review was to identify school-based nutrition interventions for Indigenous children in Canada. The second objective was to describe the main components of the identified school-based nutrition interventions for Indigenous children. Overall, this review was intended to identify gaps and provide recommendations for the development of comprehensive school-based nutrition interventions to optimize nutrition and health outcomes for Indigenous children.

Methods

This scoping review was conducted following the methodological framework developed by Arksey and O'Malley (2005) which included identifying relevant sources of evidence, selecting sources of evidence, charting the data, and summarizing the data. The review is reported following the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018). Ethics approval was not required as the review relied solely on publicly available information.

Identifying relevant sources of evidence

With the assistance of a research librarian (JT) at the University of Alberta, an initial search was conducted to develop and refine the search strategy for the scientific literature. Searches were then conducted by two research librarians (JT and LH) using the following

databases: Medline (Ovid), ERIC (Ovid), CINAHL Plus with Full Text (EBSCO), Agricultural & Environmental Sciences (Proquest), Academic Search Complete (EBSCO), Bibliography of Native North Americans (EBSCO), and Dissertations and Theses Global (Proquest). Searches employed both controlled vocabularies, such as Medical Subject Headings (MeSH), and keywords representing concepts such as: (Indigenous or Amerindian) AND (schools or kindergarten) AND (nutrition or diet) AND (Alberta or British Columbia). The search for the scientific literature covered articles published between January 1, 2000 and February 25, 2019. No limiters or facets were used, and search strategies were adapted for each database (see Appendix 9).

In an effort to minimize the risk of omitting relevant sources of evidence, one researcher (CG) conducted a search of the grey literature on the Internet using different combinations of key search terms (Godin, Stapleton, Kirkpatrick, Hanning, & Leatherdale, 2015). Grey literature are documents not formally published in academic sources (e.g., peer-reviewed journals), and include information sources such as newspapers, websites, conference proceedings, and unpublished research (e.g., theses) (Godin, Stapleton, et al., 2015). First, a filter was applied to limit the Google search to the region of Canada and to the English language. Next, the first ten pages of each search's hits (representing 100 results) were reviewed, using the title and 2-3 lines of text underneath. This number of pages allowed the search to retrieve the most relevant hits while still being a feasible amount to review (Godin, Stapleton, et al., 2015). Potentially relevant records were 'bookmarked' in the web browser and later entered into an Excel spreadsheet for further screening. For each search strategy, the search terms, number of results retrieved and screened, and date of the search (January 30, 2019) were recorded (see Appendix 10). The

reference lists of all included sources of evidence were hand-searched by one reviewer (CG) to identify additional relevant sources.

Selection of sources of evidence

Basic eligibility criteria were defined *a priori* (Table 5) and were based on sources of evidence having a publication status that the reviewers considered recent enough to be relevant, being published in a language that both reviewers could read and containing information that specifically met the research objectives. To test reviewer agreement of eligibility criteria, two reviewers (CG and RB) independently reviewed a random selection of sources of evidence from the scientific (n=10) and grey (n=10) literature. Their level of agreement was 100%. At this stage, the reviewers determined that the date criteria would not apply to websites. The reviewers felt it was unlikely that a website would be running if it was outdated by over a decade, as many website hosting platforms require a fee for maintenance. Therefore, if a website was available at the time of the review, it was considered eligible for review and selection, whether it had a date listed on its pages or not (no website had a date listed that was prior to January 1, 2000).

Table 5. Scoping review eligibility criteria

Inclusion criteria	Exclusion criteria
Published after Jan 1, 2000 (except for websites)	Published before Jan 1, 2000 (except for websites)
Available in English	Unavailable in English
Targets one or more Indigenous populations in Canada	Does not target Indigenous populations in Canada
Evaluate or describe a school-based nutrition intervention that has been implemented	Does not evaluate or describe a school-based nutrition intervention that has been implemented

In the first stage of selection, two reviewers (CG and RB) applied the eligibility criteria to determine the relevancy of sources of evidence identified in the scientific literature. First, the reviewers screened the title and abstracts for relevancy and copies of the full text were obtained

for those that appeared to fit the eligibility criteria. If the relevance of a source of evidence was unclear from the abstract, or if reviewers had discrepant assessment at this stage, the full text was obtained. In the second step, each reviewer read the full text of each article to decide whether it should be chosen for inclusion in the review. Discrepancies between reviewers were discussed, and a third opinion (NDW) was sought for two of the scientific literature sources of evidence.

The grey literature search followed a one-step process whereby sources of evidence were screened by each reviewer in full to determine both relevancy and inclusion. This one-step determination was followed out of necessity, as the majority of sources of evidence were websites that did not have an abstract or table of contents to screen. There was 100% agreement between the reviewers for all grey literature sources of evidence.

Charting the data

The extraction form was developed by one reviewer (CG) in excel and reviewed by the study team for relevance and appropriateness. The extraction fields included an identifier, intervention type (e.g., single school or multiple school), intervention name, author and year, location, school name, grade(s) served, and target cultural group (i.e., First Nations, Inuit, Métis). The extraction fields also included eight school-based nutrition interventions components: four components of CSH (JCSH, 2016; Veugelers & Schwartz, 2010) and four additional components that may be important to interventions in Indigenous communities (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Tagalik, 2010; Towns et al., 2014) as described in Table 6.

Table 6. School-based nutrition intervention components

Comprehensive school health (CSH) intervention components		
Component	Description	Examples
Social and physical environment	The quality of the relationships between students and staff, as well as with families and the wider community.	Peer-support and mentoring programs, student cooking classes and community feasts, staff and peers modelling healthy behaviors, healthy

	The facilities, amenities, and equipment in and surrounding the school, and the presence of safe, accessible, and supportive healthy food choices for students and community members.	eating messages in newsletters and other forms of communication. Food programs that increase access to healthy foods, vending machines and canteens stocked with healthy options, school or community garden, nutrition awareness campaigns or contests, healthy foods offered at celebrations and fundraisers, visual displays of healthy messages.
Teaching and learning	Formal and informal curriculum and resources, instilling knowledge and skills for students to improve their eating behaviors and health outcomes, and professional development opportunities for staff related to nutrition.	Incorporating healthy diet and nutrition knowledge into classes and curriculum, gardening program, offering professional development opportunities for teachers.
Policy	Policies, guidelines, and practices that promote and support student nutrition.	Written nutrition policy, offering foods that are consistent with local, provincial, or national guidelines, and prohibiting certain foods from the school environment.
Partnerships and services	The connections between a school and students' families, and supportive relationships among schools and other community organizations and sectors to advance student nutrition.	Working with local food services and businesses, partnerships among education and health sectors, and the use of community facilities.
Additional intervention components		
Component	Description	Example
Cultural content	Elements that recognize the diversity of Indigenous communities and are relevant to local cultures and contexts.	Incorporation of traditional foods, practices, and ways of learning.
Indigenous control and ownership	Community-driven and community-led elements that promote self-determination.	Community driven programs and equitable collaboration with researchers and other non-community members.
Funding source	The source providing funding to	Donations, grants, and research funds.

	develop, implement, and/or sustain an intervention.	
Evaluation	The collection and analysis of an intervention.	Formative evaluation, process evaluation, and outcome evaluation.

The extraction form was pilot tested by two reviewers (CG and RB) with a random sample of 5 sources of evidence from the scientific and grey literature to ensure all relevant data were captured. As the goal of this review was to provide an overview of the existing literature regardless of quality, a formal appraisal of the methodological quality of sources of evidence included in the review was not performed (Arksey & O’Malley, 2005; Peters et al., 2015; Tricco et al., 2018).

To organize the data, characteristics of the included interventions and key information relevant to the review objectives were extracted and charted independently by one reviewer (CG) using the extraction form. Only data that were relevant to nutrition were extracted (i.e., information about physical activity interventions was not extracted), consistent with the *a priori* objectives of the review. Data extracted about the same intervention described in multiple articles were combined.

Summarizing the results

Having charted characteristics of the interventions, a numerical and descriptive summary of the charting results was used to present findings. The comprehensiveness and scope of the interventions was described by drawing upon the four components of CSH and the four supplementary components of Indigenous school-based nutrition interventions that were included as extraction fields.

Results

A total of 65 sources of evidence were included in the review, representing 34 unique nutrition interventions (Figure 4). Of these, 14 (41%) were implemented in a single school and 20 (59%) were implemented in more than one school. Nine interventions (26%) included each of the four aspects of CSH, and five interventions (15%) included the four supplementary components identified as important in school-based nutrition interventions for Indigenous children. Four interventions (12%) included all eight components. Twenty-four interventions targeted First Nations populations (70%), four targeted Inuit populations (12%), and one targeted Métis populations (3%). One intervention (3%) targeted more than one Indigenous population (First Nations and Métis). Four interventions (12%) did not specify a target group; rather, they broadly indicated being implemented in Indigenous or Aboriginal communities. Fifteen interventions (44%) were implemented in provinces in Eastern Canada (Newfoundland and Labrador, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec), 13 interventions (38%) in provinces in Western Canada (Alberta, British Columbia, Manitoba, and Saskatchewan), and four (12%) in the Territories (Northwest Territories, Yukon, and Nunavut). One was a national intervention in several provinces, and one was in an unspecified location.

Findings related to the four components CSH (social and physical environments, teaching and learning, school policy, and partnerships and services) and the four supplementary components of Indigenous school-based nutrition interventions that were examined (cultural content, Indigenous control and ownership, funding source, evaluation) are described in detail below.

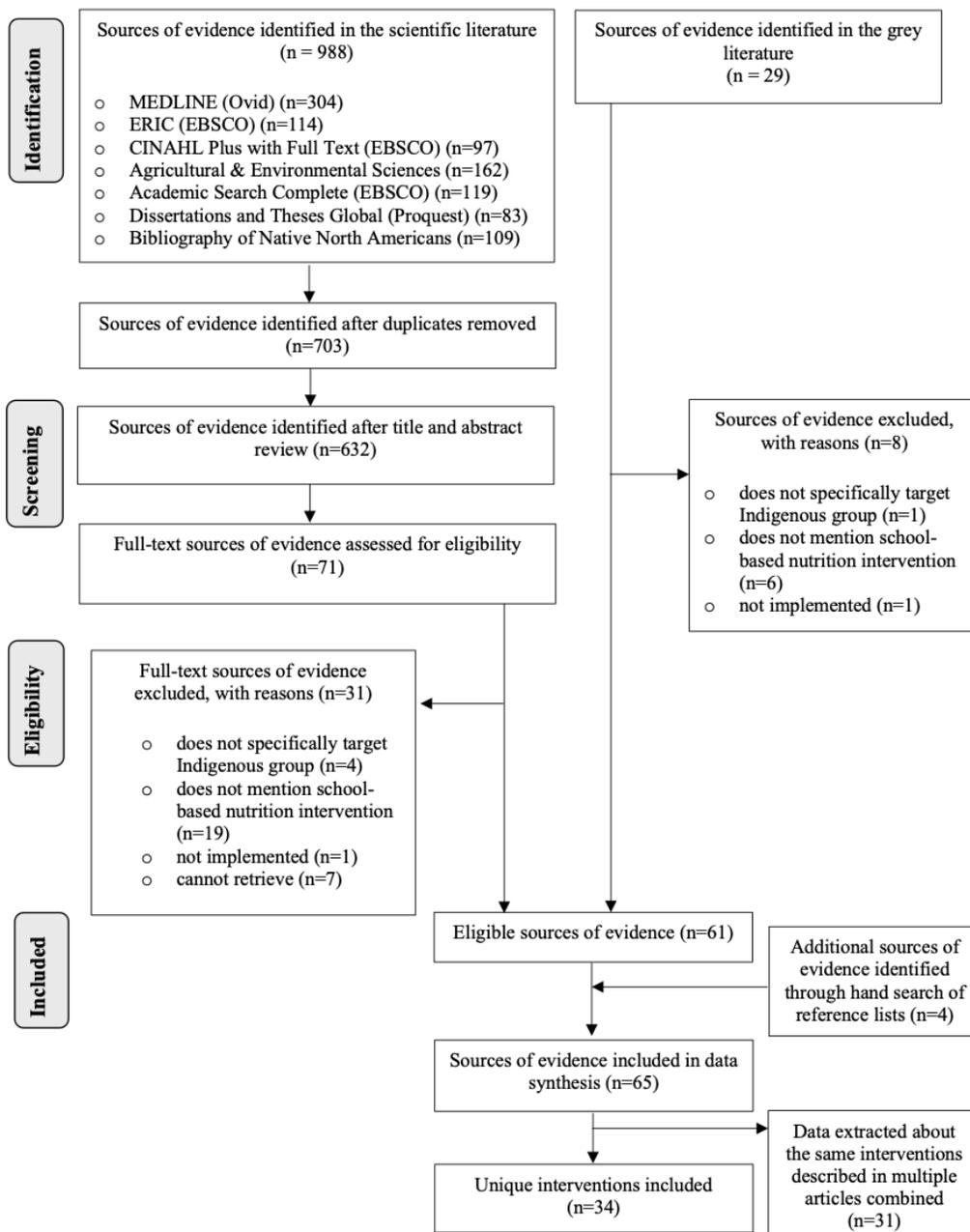


Figure 4. PRISMA flow diagram

Social and physical environment

Thirty-three interventions (97%) included one or more social and physical environment component. Seven interventions (21%) contributed to the social environment by providing healthy eating messages in newsletters or websites, or by displaying posters in the school that promoted healthy eating. For example, the Hillside Elementary School and Greenwood Elementary School Active Schools programs displayed posters in classrooms that promoted healthy lifestyles and sent newsletters home that included healthy recipes (Matsumura, 2009). To encourage both healthy relationships and healthy eating, three interventions (9%) included community feasts. Three interventions (9%) offered student cooking classes or community kitchens, where children learned about healthy eating, practiced cooking skills, and enjoyed nutritious meals. In addition, four interventions (12%) included a peer-mentoring component in which younger students learned about healthy eating from older peers. For example, the Aboriginal Youth Mentorship Program (AYMP) was an after-school peer mentoring program that included healthy snack and nutrition education components (Carpenter, 2009; Eskicioglu et al., 2014). Staff modelling was also recommended by one intervention (3%), which specifically encouraged staff to portray and model healthy eating and positive attitudes towards healthy eating.

Most interventions also included physical components that increased students' access and exposure to healthy food choices. The majority of interventions (n=25, 74%) offered food programs, with some of them offering breakfast, lunch, and snack (n=6, 24%), breakfast solely (n=4, 16%), breakfast and snack (n=1, 4%), breakfast and lunch (n=3, 12%), lunch solely (n=1, 4%), lunch and snack (n=1, 4%), and snack solely (n=8, 32%). One intervention (3%) mentioned offering student nutrition programs but did not specify the meal(s) that were included. Three

interventions (9%) mentioned student access to a canteen stocked with healthy snacks, and two schools (6%) had vending machines with healthy options. Six interventions (18%) included a school or community garden, and five interventions (15%) included a nutrition awareness campaign or contest. For example, Elsipogtog First Nation School in New Brunswick hosted a healthy snack challenge, in which students who ate a fruit or vegetable during snack time were entered into a draw and had a chance to win a fruit basket (Elsipogtog First Nation School, 2017).

Teaching and learning

One or more teaching and learning components were used in 19 interventions (56%). Fifteen interventions (44%) included a classroom education component in which discussions of healthy food choices were incorporated into the curriculum. The Kahnawake Schools Diabetes Prevention Project (KSDPP) in Quebec, for example, implemented a comprehensive education program for diabetes prevention that included lessons on balanced meals and healthy snacks, the benefits of healthy eating, factors that influence eating habits, and food label reading (Adams, Receveur, Mundt, Paradis, & Macaulay, 2005). Two interventions (6%) incorporated Indigenous land-based learning (i.e., hunting and fishing) into the curriculum. Four interventions (12%) offered a gardening program in which students learned to plant and harvest vegetables and fruits in the community or school gardens. Finally, three interventions (9%) offered professional development opportunities to teachers and staff related to providing nutrition education.

Policy

Thirteen interventions (n=13, 38%) included a policy component; however, the scope and content of policies was highly variable. Five interventions (15%) banned or actively discouraged

junk food items (e.g., high fat and high sugar foods) from being brought to school. For example, Chief Harold Sappier Memorial Elementary School in New Brunswick discouraged parents from packing foods like potato chips, candy, and pop in student lunches in an effort to eliminate junk food from the school environment (Tombs, 2004). Four interventions (12%) included food policy guidelines that outlined appropriate foods to serve in school food programs or sell in school vending machines. For example, the Kashechewan snack program in Ontario included written guidelines that outlined categories and frequency of foods to be served in the school (Gates, 2010). Two interventions (6%) stated that they were compliant with national and/or provincial guidelines, and one intervention (3%) mentioned having a healthy food policy but did not provide any details about the policy content. Finally, the nutrition policy implemented as part of KSDPP targeted a wide range of social and environmental factors to promote healthy food choices, including recommendations for staff, classroom celebrations, and eating environments (Kahnawake Elementary School, 2016).

Partnerships and services

Twenty interventions (59%) included one or more partnerships and services component(s). Six interventions (18%) included a parent and community engagement component in which school nutrition activities were reinforced and supported by activities that engaged families and the community-at-large. For example, Yukon Food for Learning encouraged volunteer involvement in delivering school nutrition programs (Yukon Food for Learning, 2016). Two interventions (6%) also specifically mentioned engaging with Elders – or persons recognized for their wisdom, experience, and knowledge – who played a role in delivering nutrition education curricula by sharing their knowledge of cultural activities and traditional foods.

Sixteen interventions (47%) included partnerships with local health and social organizations, local businesses, and national health promoting agencies. For example, Zhiiwapenewin Akino'maagewin: Teaching to Prevent Diabetes (ZATPD) in Ontario was implemented in partnership with several schools, local stores, and health and social services in order to extend its reach in the community (Ho, 2007; Ho et al., 2008; Rosecrans et al., 2008). Three interventions (9%) also specifically connected with dietitians or nutritionists, who assisted in planning school food program menus or provided individualized counselling for staff, students, and parents.

Cultural content

Nineteen interventions (56%) included one or more cultural components. Ten interventions (29%) included traditional foods – such as bannock (a quick bread) and wild game meat – in the schools' food programs or the education curriculum. Four interventions (12%) incorporated traditional Indigenous ways of learning, such as learning through observation and practice, storytelling, and role modeling. Six interventions (18%) mentioned making culturally appropriate adaptations to education curricula and/or having community members review education materials for cultural sensitivity and relevance. Cultural adaptations included using Indigenous characters in stories and incorporating traditional stories and foods in lessons.

Indigenous control and ownership

Twenty-one interventions (62%) included a component in which the local community was actively involved in developing, implementing, and/or evaluating interventions. Seven interventions (21%) included information regarding programs or services being community initiated, driven, and/or developed. For example, the National Aboriginal Nutrition Program

followed a community-led approach in which key stakeholders – including teachers, school staff, parents, and community members – collaboratively coordinated school nutrition activities (Canadian Feed the Children, 2019). Fourteen interventions (41%) specified using participatory models of research (i.e., participatory action research and community-based participatory research) in which academic researchers and community members worked in collaboration. For example, Kipohakaw Education Centre in Alberta developed, implemented, and evaluated both a school nutrition policy and gardening intervention through a community-based participatory research approach involving an equitable collaboration between community members and University researchers (Gillies, Alexander Research Committee, Farmer, Maximova, & Willows, 2018; Hanbazaza et al., 2015; Murray, 2016; Murray et al., 2017; Pigford, Willows, Holt, Newton, & Ball, 2012; Triador, 2013; Triador et al., 2014).

Funding source

Twenty interventions (59%) reported one or more sources of funding. Twelve interventions (35%) received funding from donations, sponsorships, or funding from diverse organizations (e.g., corporations, companies, and charitable foundations). Examples included the Heart and Stroke Foundation of Canada, the Danone Institute of Canada, Canadian Feed the Children, ONEXONE, and Breakfast for Learning. Nine interventions (26%) were supported by research grant funding, including the Canadian Institutes of Health Research and University Departments. Regional and federal funding (e.g., Health Canada's First Nations and Inuit Health Branch, Yukon Government Department of Education, and the Health and Wellness fund through the Government of the Northwest Territories) supported six interventions (18%). Finally, one intervention (3%) was supported by the operational budget of the local school board.

Evaluation

Fourteen interventions (41%) performed evaluations to understand the feasibility of interventions, the barriers and enablers of their implementation, and/or their impact and outcome on student knowledge, behavior, and health. For example, the Sandy Lake Health and Diabetes Project (SLHDP) in Ontario completed two evaluations to determine changes in students' knowledge, skills, and self-efficacy and behaviors related to diet by collecting anthropometric data and having students complete a questionnaires and dietary recalls (Kakekagumick et al., 2013; Saksvig et al., 2005).

Discussion

This scoping review provides an overview of school-based nutrition interventions for Indigenous children that have been implemented in Canada as well as a discussion of the components of identified interventions. Most of the interventions found in this review were for First Nations children, as few nutrition interventions were found for Inuit and Métis populations through the search strategy. In addition, most interventions were implemented in Western Canada, and few were found in the Territories. Other reviews have also noted the under-representation of Inuit and Métis within the scientific intervention literature (Godin, Leatherdale, et al., 2015; Rice et al., 2016), which inadequately reflects the demographic composition of Indigenous peoples in Canada and most likely the range of school nutrition interventions being implemented in Indigenous communities. This finding highlights the need for more evaluation and active knowledge dissemination concerning interventions implemented in Inuit and Métis populations in Canada to build the evidence base concerning the diversity of Indigenous nutrition interventions. Although most of the interventions identified in this review targeted First Nations

populations, they nonetheless provide insight into the current status of school-based nutrition interventions in Canada.

According to the CSH framework, school-based nutrition interventions should include components that promote health and improve access to healthy foods through social and physical environments, teaching and learning, school policy, and partnerships and services (JCSH, 2016; Veugelers & Schwartz, 2010). All of these components must be implemented for an intervention to be considered fully comprehensive and to have the most potential to create sustainable changes in the eating habits of children. In addition, school-based nutrition interventions for Indigenous children should include cultural content, community control and ownership, funding, and evaluation to ensure relevancy and sustainability. This review indicates that a minority of school-based nutrition interventions in Indigenous communities are comprehensive, as few included each of the four aspects of CSH and/or the four additional components identified as important in school-based nutrition interventions for Indigenous children.

All but one of the interventions included components related to the social and physical environment, which indicates that this component is important and relevant in Indigenous settings. Interventions targeted the social environment through community feasts, cooking classes, and peer-mentoring, which encouraged both healthy relationships and promoted healthy eating. With respect to the physical environment, the majority of schools offered food programs that supplemented children's diets with healthy foods. This finding supports previous research demonstrating that most band-operated First Nations schools offer food programs for students (Assembly of First Nations, 2008). Food programs may be especially important in Indigenous communities which face significant barriers related to healthy eating and child food insecurity (Gates, Hanning, McCarthy, et al., 2012). Although most schools provided breakfast, lunch,

and/or snacks, the absence of food programs in one-quarter of interventions may reflect the barriers to initiating and sustaining these initiatives in schools for Indigenous children, which include challenges with acquiring adequate infrastructure funding and accessing quality and affordable healthy foods (Assembly of First Nations, 2008; Gates, Hanning, McCarthy, et al., 2012). Comprehensive school-based nutrition interventions for Indigenous children should include a social and physical environment component to provide an environment conducive to healthy eating. However, schools require the resources, facilities, and funding to support such programs.

While the teaching and learning component was incorporated in most interventions, this remains an area for improvement in current and future school-based nutrition interventions for Indigenous children. Teaching and learning is an essential component, as the incorporation of healthy eating skills and knowledge in the classroom and involvement of teachers in promoting nutrition may serve to reinforce other components of nutrition interventions (Cargo, Salsberg, Delormier, Desrosiers, & Macaulay, 2006). Land-based learning (e.g., collecting, preparing and eating traditional food) has been recognized for its decolonizing role in revitalizing traditional food system knowledge and increasing access to healthy foods (Bagelman, 2018; Wesche, O'Hare-Gordon, Robidoux, & Mason, 2016). Although some interventions included curricula that allowed children to experience and understand traditional Indigenous subsistence practices such as hunting, fishing, and gathering, this review indicates that the incorporation of land-based learning in schools was seldom reported. The review also reveals a lack of adequate professional development opportunities and ongoing support related to teaching nutrition. In order to improve this component, teachers need the time and educational and professional resources to develop and integrate specialized nutrition education into the classroom (Cargo et al., 2003).

The partnerships and services component of CSH was included in approximately two-thirds of interventions. Parent and community engagement is key in the successful implementation of school-based interventions, as it increases the potential for nutrition-related activities at school to be supported at home and for the larger community to support the nutrition needs of children (Gillies et al., 2018). Thus, interventions benefit from including strategies that establish relationships with parents and the broader community. Elder involvement in interventions is also significant in schools that educate Indigenous children, as they are respected role models for younger generations and their involvement in nutrition education and the promotion of healthy eating can help ensure relevance and long-term sustainability of interventions (Oosman, Smylie, Humbert, Henry, & Chad, 2016).

Of the four components of CSH, policy was implemented by the fewest number of interventions. Written school nutrition policies are an integral component of CSH interventions, as they establish formal standards for all nutrition-related aspects of the school environment and coordinate other aspects of the CSH intervention (e.g., foods available, lessons included in classroom education, and strategies for community and family involvement) (McKenna, 2010). The most comprehensive and effective policies are written in clear language and consider all aspects of a school nutrition environment to create a standard against which to hold the school community accountable for nutrition-related changes (McKenna, 2010; Schwartz et al., 2012). With the exception of KSDPP, the policies identified and described in this review provided limited guidance and were focused mainly on describing the types of food that were allowed, or not allowed, in the school environment. As such, this is an area requiring particular attention by schools when developing comprehensive nutrition interventions.

In addition to the four recognized components of CSH, this review paid attention to four supplementary components (cultural content, Indigenous control and ownership, funding source, and evaluation) that should be considered when developing school-based nutrition interventions for Indigenous children (Godin, Leatherdale, et al., 2015; Rice et al., 2016; Tagalik, 2010; Towns et al., 2014). Given the considerable diversity that exists among Indigenous communities in Canada, interventions need to be tailored to local contexts by including specific cultural content such as traditional foods and Indigenous ways of learning (Oosman et al., 2016). As just over half of interventions described one or more cultural component, this indicates an area that may require more attention when developing school-based nutrition interventions. However, it is likely that interventions were also inevitably missed in the searches due to the heterogenous nature of Indigenous peoples, the diverse settings that Indigenous children are educated in Canada, and the limited number of interventions described in the scientific literature. As such, the lack of cultural components found in this review may also be related to an under-reporting of local interventions and description of their components in the scientific and grey literature.

Community control and ownership has also been recognized as an essential component of health interventions in Indigenous communities that can assist in ensuring that interventions are relevant to local contexts (Rice et al., 2016; Tagalik, 2010). Community control and ownership helps to ensure that interventions are adapted to the unique needs of individual communities, and there is evidence that this component results in more effective and sustainable interventions (Oosman et al., 2016; Rice et al., 2016). In this review, nearly two-thirds of interventions mentioned community involvement in the development, implementation, and/or evaluation of school-based nutrition interventions. Participatory research methods were used in many interventions, highlighting the shift from expert driven to community driven and engaged

approaches to intervention research that rely heavily on relational and equitable ways of working in partnership (Gokiert et al., 2017). The four interventions that included four CSH and four supplementary components used participatory methods of research that involved equitable collaboration between Indigenous community members and university researchers. This indicates that collaborative relationships between community members and researchers may further assist in creating and sustaining comprehensive school-based nutrition interventions by increasing intervention relevance, support, and resources.

Funding is also an important consideration when developing comprehensive school-based nutrition interventions as it takes extensive resources to implement and sustain multiple intervention components. Over half of the interventions mentioned funding from a diverse range of sources. Other research has similarly shown that school interventions in Indigenous communities are funded by a myriad of donors, and lack of funding has been identified as the main barrier to implementing nutrition interventions (Assembly of First Nations, 2008). Indigenous education systems – especially those in rural and remote areas – experience chronic underfunding and face numerous environmental barriers (e.g., facility and equipment limitations) that may affect their ability to deliver comprehensive school-based nutrition interventions (NCCA, 2017). This review further indicates a gap in the literature related to disclosure of sources of funding and resources to support the obtainment of ongoing intervention funding. To support the development of comprehensive nutrition interventions, schools need access to information and resources about funding opportunities.

Finally, evaluation has been identified as an important component of interventions to demonstrate effectiveness and support the sustainability of programs and policies. Fewer than half of the interventions in this review reported an evaluation component, which identifies an

important gap in the information currently available for school-based nutrition interventions for Indigenous children. The lack of evaluation of interventions limits the transferability of knowledge concerning their key components, and marginalizes Indigenous communities from the evidence regarding effective comprehensive school-based nutrition interventions (Godin, Leatherdale, et al., 2015; Saini & Quinn, 2013). Without the support of researchers or other professionals, school staff may lack the time, financial resources, or capacity to perform evaluations and transfer knowledge of their interventions beyond the community level. Overall, findings suggest that interventions are under-evaluated and that schools may need support in integrating evaluation into interventions and sharing knowledge of effective (and ineffective) intervention components in the scientific and/or grey literature.

Limitations

To minimize the risk of omitting relevant sources of evidence, this review included both scientific and grey literature. Although the inclusion of grey literature expanded our range of interventions, our descriptions of these interventions was nonetheless limited to the information as provided in sources of evidence. As such, it is possible that interventions had additional components that were not identified. A more robust review would necessitate identifying, contacting, and consulting all schools attended by Indigenous children to include all nutrition interventions and their components. A review of this nature would require considerable time and resources and was not possible in this case. Finally, although the review identified interventions that had been implemented, it did not include information on how well the interventions were implemented in practice. For example, an evaluation of KSDPP found that teachers implemented the curriculum and enforced the school nutrition policy to varying degrees (Paradis et al., 2005). Similarly, the Fort Albany comprehensive school nutrition program encountered challenges

associated with the remoteness of the school, which often necessitated healthy foods to be replaced with less healthy alternatives (e.g., apple juice in place of apples) (Gates, Hanning, McCarthy, et al., 2012).

Conclusions

The findings of this review provide recommendations for the necessary components that should be considered when developing comprehensive school-based nutrition interventions in Indigenous communities and highlights gaps that currently exist in intervention knowledge and practice. Although many current interventions provide supportive social and physical environmental elements, the review suggests that interventions can be more comprehensive by incorporating culturally-relevant nutrition education and professional development opportunities for teachers, written school nutrition policies to guide nutrition activities and environments, and activities that engage families and community members. Culturally-relevant and sustainable interventions must also be controlled and owned by Indigenous communities and include culturally-specific traditional foods and ways of learning. Finally, there is a need to increase intervention evaluation and the sharing of knowledge and resources related to funding. These recommendations may be used by communities, as well as by researchers and professionals working with communities, in developing comprehensive school-based nutrition interventions to improve the eating behaviors of Indigenous children.

CHAPTER 7: Summary

Overview

This thesis included two complementary studies concerning school-based nutrition interventions for Indigenous children in Canada. In Study 1, a process evaluation was conducted to uncover Indigenous students' and parents' perceptions of the facilitators and barriers to school nutrition policy (SNP) implementation. The study was guided by a community-based participatory research (CBPR) approach and used an explanatory sequential mixed methods design in which parents (n=83) and students (n=94) of Kipohtakaw Education Centre (KEC) participated in a survey to understand their general perceptions of the SNP. Parents (n=10) and students (n=20) then participated in an interview to further explain and expand survey findings. The results of the study showed that the facilitators to SNP implementation included parent and student support, parent support for the school's role in food provision, student food preferences for healthy foods (including traditional foods), and student interest in health education. The barriers identified included a lack of communication between students and their teachers and parents, lack of parent support for guidelines concerning celebrations and fundraisers, inadequate communication between the school and parents, and the broader socioeconomic conditions in the community.

In Study 2, a scoping review was conducted to determine what school-based nutrition interventions exist for Indigenous children in Canada and to describe their main components. A total of 65 sources of evidence were included in the review, representing 34 unique nutrition interventions. The study found that few school-based nutrition interventions for Indigenous children in Canada are comprehensive, as only one-quarter included each of the four components of comprehensive school health (CSH) (social and physical environment, teaching and learning,

policy, and partnerships and services). Nearly all interventions included components related to the social and physical environment, most often by offering food programs to supplement children's diets. The majority of interventions also incorporated partnerships and services by engaging with parents and the broader community. However, fewer interventions addressed teaching and learning, and a policy component was only included in about one-third interventions.

In addition to the four components of CSH, the scoping review looked at four supplementary components (cultural content, Indigenous control and ownership, funding source, and evaluation). Most school-based nutrition interventions for Indigenous children included local community involvement in intervention development and implementation, and many incorporated one or more cultural components (e.g., traditional foods, Indigenous ways of learning). Finally, although over half of interventions disclosed their source(s) of funding, fewer than half included a formative, process, and/or outcome evaluation.

Overall, the two studies included in this thesis have described the current status of comprehensive school-based nutrition interventions for Indigenous children in Canada and uncovered principles to guide their development, implementation, and evaluation. School-based nutrition intervention in Indigenous communities require community engagement and evaluation components that involve a variety of stakeholders – including parents and students – to ensure interventions are relevant and sustainable. Comprehensive school-based nutrition interventions may benefit from incorporating two or more components of CSH (social and physical environment, teaching and learning, policy, and partnerships and services) to create the most sustainable health improvements (Golden & Earp, 2012). Uniquely among schools for Indigenous children, interventions may also benefit from additionally including cultural content

(e.g., land-based learning and cultural foods). This knowledge may assist communities – and health promoters working with communities – to improve the school nutrition environments for Indigenous children in Canada.

Significance of Findings

This thesis has important implications for the local community that collaborated with researchers in the evaluation research as well as significance for the broader research community. Consistent with the CBPR approach, the process evaluation research was guided by a research question identified by and relevant to the community. Community members in the Alexander Research Committee (ARC) were the intended end-users of the knowledge generated from the evaluation. Due to their active involvement, policy stakeholders were able to continuously reflect on the school's current SNP throughout the research process and consider strategies for improvement. A policy meeting dedicated to reviewing study results and researcher recommendations was held on January 25, 2019 that involved policymakers from Alexander First Nation Education (AFNE), school staff, and an Elder. At this meeting, it was determined that the findings concerning barriers and facilitators to SNP implementation would be used by AFNE and school staff to improve the SNP implementation process in the 2019 school year. For example, AFNE recognized that school staff needed increased support and motivation to integrate nutrition education into the curriculum. AFNE also determined that the school needed to improve communication about the SNP with parents by utilizing a variety of communication channels (e.g., revitalizing an outdated social media page for KEC). By strengthening the policy implementation process, the research findings will assist the school in supporting children's access to healthy food choices while at school.

In addition to supporting the needs identified by an Indigenous community, this research contributes to the limited knowledge base concerning SNPs and comprehensive school-based nutrition interventions for Indigenous children. Evaluation of SNPs for Indigenous children is currently lacking, and few studies have investigated the complex process of SNP implementation from a variety of stakeholder perspectives within an Indigenous community. To our knowledge, the evaluation study described in this thesis is the first to involve students and parents in evaluating a SNP in a First Nations community in Canada. It complements previous research conducted in the same community to understand school staff perceptions of policy implementation (Murray, 2016; Murray et al., 2017). By including these important stakeholders, the research reported in this thesis has helped to fill a gap concerning the perspectives of students and parents – who are most directly affected by a SNP – as well as contributed knowledge of facilitating and barrier factors to SNP implementation in Indigenous contexts.

Finally, the scoping review described in this thesis was the first of its kind to focus on school-based nutrition interventions for Indigenous children and describe the components and comprehensiveness of interventions, rather than their effectiveness. The scoping review offers suggestions of multiple components that may be used in school-based nutrition interventions for Indigenous children to improve their access to healthy foods, which may be helpful given the lack of standardized resources and support for development of CSH for Indigenous children. The scoping review also uncovered and described remaining gaps in the literature (e.g., under-evaluation of interventions) which will help to focus priorities for future research. Overall, this research contributes to both local and global knowledge concerning comprehensive school-based nutrition interventions – including SNPs – to improve the nutrition environments of Indigenous children.

Research Strengths and Limitations

As with any research, the two studies included in this thesis have both strengths and limitations that must be taken into consideration when interpreting and applying findings. A strength of Study 1 was the mixed methods design, which allowed for a deep understanding of the barriers and facilitators of SNP implementation by using both quantitative and qualitative data to achieve depth and breadth by integrating data from a number of SNP stakeholders. Successful development and implementation of SNPs is dependent on the involvement of diverse stakeholders, including parents and students (Kehm et al., 2015; MacLellan et al., 2010; McIsaac et al., 2018). Research has demonstrated the particular importance of involving different stakeholder groups to inform and improve the implementation of school-based health interventions in Indigenous contexts (Oosman et al., 2016). By investigating and integrating the perspectives of students and their parents, this research ensured that AFNE was responsive to and reflective of the needs and opinions of the two stakeholder groups most affected by the SNP.

Another key strength to Study 1 was the use of the CBPR approach, which increased the relevance and quality of the research by focusing on the priorities of the community and integrating the perspectives and expertise of community members and researchers. As Indigenous communities face unique challenges related to historical practices of colonization, assimilation and inequality, the CBPR approach was particularly vital in demonstrating to community members that their opinions, expertise, and perspectives were acknowledged, respected, and valued by researchers (Oosman et al., 2016). The CBPR approach also led to integrated knowledge dissemination (or translation), which is the active and targeted approach of spreading of evidence-based knowledge to specific audiences (Bowen & Graham, 2013; Colditz & Emmons, 2018). Unlike knowledge diffusion (or transfer) – which is the passive, untargeted,

and uncontrolled spread of information – knowledge dissemination involves a dynamic process in which new knowledge is created and applied using planned strategies (Colditz & Emmons, 2018). Additional knowledge dissemination channels were also identified by community members to ensure that the research findings were spread throughout the broader community. For example, a policy information booth was set up at a parent-teacher interview night and a school health conference in the 2018-2019 school year.

Despite the strengths of the study approach and design, the evaluation research also had limitations due to issues with sampling, validity, and data collection methods that must be considered. The study used an explanatory sequential mixed methods design, which ideally uses a consistent sample in the quantitative and qualitative phases to expand upon survey responses (Creswell, 2014). However, a 9-month time lapse occurred between the parent survey (June 2015) and parent interview (March 2016) due to changes in research personnel, the time needed to analyze survey results and create a subsequent interview guide, and issues with recruiting interview participants. Due to these issues and the fact that the surveys were confidential, it cannot be guaranteed that parents who participated in an interview also completed a survey. It is also possible that the sample of parents who participated in an interview may have been more concerned with the SNP than parents who did not volunteer to participate.

The survey data collection for both parents and student may also have been limited by the inherent issues with self-reported methods (e.g., social desirability bias). Efforts to reduce social desirability bias included conducting interviews in a private room and explaining to interviewees that they were not being tested and that their responses were confidential and would not be shared by name with any other person. In addition, surveys and interview guides did not undergo formative evaluation (e.g., pre-testing) and survey instruments were not tested for reliability or

construct validity. However, questions were reviewed by the ARC which helped to offset this limitation by establishing face and content validity of survey and qualitative interview questions (Minkler et al., 2018). Furthermore, as the evaluation research was a single cross-sectional study, the school and community environment may have changed over time and additional facilitators and barriers to school policy implementation may not be captured by the study. Finally, as the evaluation research took place in one school, findings reflect the perceptions and experiences of parents and students from KEC and are only applicable to the particular context described in the study. Researchers may utilize the descriptive details of the school and community context, study design and methods, and discussion of results to determine the applicability and transferability of the findings to other settings.

With respect to Study 2, a key strength was the use of the scoping review methodology, which enabled the study to broadly summarize information about school-based nutrition interventions for Indigenous children. To date, review studies on school-based nutrition interventions for Indigenous children have focused primarily on their impact and effectiveness; this review, however, explored the components and comprehensiveness of interventions. However, the scoping review also had potential limitations due to the types of literature included in the study. Although the inclusion of grey literature expanded the range of interventions, the descriptions of these interventions were limited to the information as written and available on websites and other grey sources of evidence. In some cases, the information provided was quite minimal (e.g., mention of a nutrition policy but no information on its scope) and it is possible that interventions had additional components that were not identified through the available sources of evidence. In addition, although the review identified interventions that had been implemented, it did not include information on how well the interventions were implemented in

practice. Therefore, it is possible that components described as part of an intervention were not implemented in real world settings.

Despite the limitations of the studies included in this thesis, the research highlights the potential barriers and facilitators to SNP implementation, as well as describes the status of comprehensive school-based nutrition interventions for Indigenous children. With recognition of the potential limitations, the research has uncovered principles to guide policy, practice, and future research concerning school-based nutrition interventions for Indigenous children.

Recommendations

Policy recommendations.

Include SNPs in comprehensive school-based nutrition interventions. In this thesis, Study 1 demonstrated that a SNP was a well-received health promotion initiative in an Indigenous community. However, Study 2 indicated that SNPs are uncommon in schools for Indigenous students, and that existing SNPs are limited in depth and scope. Policy is the foundation for all other components of a comprehensive school-based nutrition intervention, as it can help to set standards and priorities for all nutrition-related strategies occurring in a school (McKenna, 2010). The most comprehensive and successful policies are written in clear language with specific requirements and consider all aspects of a school nutrition environment (McIsaac et al., 2018; McKenna, 2010; Schwartz et al., 2012). As such, it is important for Indigenous schools to develop comprehensive SNPs following a policy process that considers multiple nutrition-related components (e.g., guidelines for school food programs and education curriculum) and includes the overarching domains of community engagement and evaluation (see Chapter 2).

To follow the policy process and translate SNP guidelines and statements into action, Indigenous communities require appropriate support, guidance, and resources. Prior to initiating the policy process, both existing strengths and barriers to implementation must be identified and considered to ensure policy relevance and sustainability. For example, lack of funding, infrastructure, and staffing are identified as barriers in many Indigenous communities (Gates, Hanning, Gates, Isogai, et al., 2013; Gates, Hanning, Gates, McCarthy, et al., 2013; Murray et al., 2017; Naylor et al., 2010). The recognition and realistic consideration of both barriers and strengths in individual school communities will improve policy success.

Federal policy is needed to increase access to and affordability of healthy foods.

Although it is important for SNPs to be implemented within individual schools, it is also important for federal policy changes to occur to support policy action at the local level. Study 1 indicated that SNPs are effective only to an extent, as some students reported having limited access to healthy foods and parents mentioned the cost, availability, and accessibility of healthy foods posing a barrier to their ability to provide and consume healthy foods at home. Study 2 also indicated that most school-based nutrition programs for Indigenous children offer food programs to supplement children's diets with healthy foods, which may reflect the necessity of these programs to offset environmental barriers (e.g., high cost and limited availability) experienced by some Indigenous communities.

Indigenous communities face many complex barriers to healthy eating that go beyond the scope of school-based nutrition interventions that may constrain program success (Gates, Hanning, Gates, Isogai, et al., 2013; Gates, Hanning, Gates, McCarthy, et al., 2013; Paradis, 2005; Towns et al., 2014). Although school-based nutrition interventions for Indigenous children may result in positive changes in student knowledge, attitudes, and eating behaviours while at

school, they do little to address the broader population-level social determinants of health (SDH) (e.g., food insecurity and low income) (Rice et al., 2016). Comprehensive school-based nutrition interventions can help create conditions that support Indigenous students' diets and nutrition-related health; however, ensuring optimal long-term and sustainable health outcomes for Indigenous children ultimately requires provincial and national policy changes that ensure that all Indigenous peoples in Canada are able to access and afford safe, healthy, and culturally appropriate foods.

Recently, the Government of Canada announced its commitment to establishing a national food policy that has the potential to improve the SDH of Indigenous communities. As outlined in Budget 2019, the policy aims to improve community access to healthy food and increase food security in Northern and remote communities by funding community-led projects and offsetting the costs of equipment (e.g., community freezers and greenhouses) (Government of Canada, 2019d). The policy also includes a federal commitment to work with the provinces and territories towards the creation of a National School Food Program aimed at ensuring that all Canadian school children have access to healthy food before and during school (Government of Canada, 2019d). Although policy changes at national levels occur slowly, attention to this level of influence is necessary as individual behaviour changes are not enough to overcome the significant environmental influences on nutrition (Lee & Gortmaker, 2018). As such, the national food policy is a step in the right direction to support nutrition-related health outcomes for Indigenous children.

Practice recommendations.

Community engagement and control in the development, implementation, and evaluation of interventions. The findings of the studies included in this thesis have several implications for the ways in which comprehensive school-based nutrition interventions for Indigenous children may be developed, implemented, and evaluated by stakeholders, researchers, and health professionals. Study 1 demonstrated that Indigenous children and their parents have valuable perspectives and can contribute meaningfully to the evaluation of SNPs by uncovering barriers and facilitators to implementation. Indeed, research in the general population in Canada has shown that the engagement of the school community (e.g., students, parents, and staff) is an essential condition of CSH implementation (Storey et al., 2016). As such, it is vital that diverse stakeholders are continually engaged in decision-making processes to empower community members by honoring their perspectives, voices, and interests (Gokiert et al., 2017). Although children's viewpoints have seldom been used to inform interventions, the exploration of the context and perspectives of these important stakeholders may help to explain the successes and failure of school-based nutrition interventions (Oosman et al., 2016; Pigford et al., 2012). In addition, parent and Elder involvement in the development and implementation of interventions is key as these stakeholders hold important knowledge concerning real-world barriers to healthy eating and can act as positive role models for children (Godin, Leatherdale, et al., 2015; Oosman et al., 2016).

In Study 1, a CBPR approach that involved close collaboration between researchers and community members was also essential to the success and relevance of the research. Study 2 showed that most school-based nutrition interventions for Indigenous children are community controlled, but there is room for improvement in community engagement in intervention development, implementation, and evaluation. Indigenous community ownership of

interventions is widely recommended in Canada and the involvement of Indigenous community members is recognized as essential for intervention success (Rice et al., 2016). The unique historic and current social, economic, and political contexts of Indigenous peoples have had a profound and enduring impact on all aspects of the lives of Indigenous peoples, as well as Indigenous/non-Indigenous relations. The increasing transference of education and health services and programs to Indigenous peoples provides communities with the opportunity to develop and implement their own health promotion interventions (NCCAH, 2017). Increasing community control over services and programs is a positive step, as Indigenous leadership of interventions helps to ensure that they are culturally appropriate and more sustainable (Godin, Leatherdale, et al., 2015).

In the long-term, Indigenous control of interventions may also work to reduce the broader, structural barriers to healthy eating and create conditions to support future changes by increasing Indigenous peoples self-determination (i.e., the ability to freely pursue economic, social, and cultural development) (Loppie Reading & Wien, 2009); restoring and rebuilding a sense of cultural continuity (i.e., degree of social and cultural cohesion within a community) (Loppie Reading & Wien, 2009); and de-colonizing researcher-community relationships (Castleden et al., 2012; Gokiert et al., 2017). Although communities may choose to collaborate with researchers and other health professionals (e.g., through participatory research methods), it is essential that comprehensive school-based interventions be relevant to and controlled by Indigenous communities.

Develop comprehensive school-based nutrition interventions with at least two components. According to the CSH framework, school-based nutrition interventions should include components that promote health and improve access to healthy foods through several

complementary components (social and physical environments, teaching and learning, school policy, and partnerships and services). Each component must be implemented for an intervention to be considered fully comprehensive. While Study 2 found that few school-based interventions for Indigenous children are comprehensive, it also identified components that Indigenous schools may consider when developing new interventions or revising current ones to be more comprehensive in scope.

As discussed above, it is essential that a policy be developed to guide other aspects of a comprehensive school-based nutrition intervention. Interventions may also include a social and physical component by providing healthy meals or snacks through food programs and canteens, offering cooking classes and after-school peer-mentoring programs, or creating school gardens or nutrition awareness campaigns. The teaching and learning component may be incorporated through integrated classroom education on nutrition and healthy lifestyles, land-based learning and traditional teachings, and professional development opportunities for staff. The partnerships and services component can be fulfilled by offering parent and community members the opportunity to participate in food programs or holding meetings about school nutrition activities. Schools may also work with local and national partners to advance school health by offering farm-to-table programs or planning menus with a dietitian. Indigenous communities may consider developing or adapting each of these components to target their specific needs and reflect their unique languages, food preferences, and learning perspectives.

When choosing components to include in comprehensive school-based interventions, it is also essential to consider the entire range of SDH and the levels of influence on health and eating behaviours (Tagalik, 2010). In Study 1, the social ecological model (SEM) proposed by Willows and colleagues (2012) was used to analyze and present findings by uncovering the multiple

levels influencing SNP implementation. The SEM grounded in a CSH approach may be a useful theory-based framework to guide the development and implementation of comprehensive school-based interventions (Townsend & Foster, 2013). The SEM can help guide health promoters in determining the appropriate level(s) to target in helping students gain greater access to healthy foods. For example, health promoters can use the SEM to decide if and how they should intervene on the individual level (e.g., by improving knowledge of healthy foods), interpersonal level (e.g., by incorporating peer-mentoring strategies), community, home, and sociocultural environment level (e.g., by offering food programs at school), built environment level (e.g., by partnering with local food stores), and societal level (e.g., by influencing local food marketing campaigns). Decisions must be guided by local community priorities, as well as by its strengths, needs, and resources, to ensure that interventions are acceptable, feasible, and sustainable.

The use of a SEM as a theoretical framework may further assist stakeholders in evaluating interventions by considering the ways in which different levels of influence interact and influence one another in practice. For example, it may help school administrators to identify the interrelationships between the school environment and the home environment. The SEM proposed by Willows and colleagues (2012) may be particularly useful in this regard, as it uniquely recognizes the overarching and long-lasting impacts of historical factors on the health of Indigenous peoples. As others have noted, colonialism, racism, and social exclusion are fundamental SDH for Indigenous peoples that must be recognized in health promotion efforts for Indigenous peoples (Rice et al., 2016). The recognition of the multiple levels of the SEM – including the overarching and enduring impact of colonization, dispossession of traditional lands, and assimilation policies – may help health promoters to disentangle the complex web of factors influencing the success of interventions. For example, evaluations may consider how the

built environment influences the availability of healthy food in the community, and how that level, in turn, influences the foods that children have been exposed to, the foods that parents are able to send to school with their children, and the foods that schools are able to provide for students. Overall, school-based nutrition interventions that consider the SDH and integrate two or more components of CSH will assist in achieving measurable and long-lasting improvements in the nutrition environments of Indigenous children.

Future research.

In addition to informing policy and practice, the studies in this thesis have uncovered gaps in the literature and priority areas for future research. First, there remains significant knowledge gaps concerning the evaluation of school-based nutrition interventions for Indigenous children. Study 1 is one of the first to involve local stakeholders in a process evaluation of a SNP in a school for Indigenous children. Study 2 further suggested that current interventions are under-evaluated, as fewer than half of the interventions in the review reported an evaluation component. Subsequently, there is a gap in the literature concerning the development and implementation of comprehensive school-based nutrition interventions as well as the effectiveness of existing multi-component interventions. This lack of evaluation limits the transferability of evidence-based knowledge concerning the key components of comprehensive school-based nutrition interventions, and may further marginalize Indigenous communities from the evidence concerning effective multi-component strategies to improve child health (Godin, Leatherdale, et al., 2015; Saini & Quinn, 2013).

All forms of evaluation (formative, process, and outcome) are integral to program and/or policy intervention, as evaluations establish the feasibility of interventions, uncover barriers and

facilitators to implementation and sustainability of interventions, and provide evidence concerning the effectiveness (or ineffectiveness) of interventions on health and social outcomes (CDC, 2014; Taylor et al., 2010). Given the diversity of Indigenous peoples in Canada, the social and environmental factors influencing nutrition interventions are likely to vary widely among Indigenous communities. For example, schools serving Indigenous children located in rural and remote locations may face different barriers to the provision of healthy foods in school food programs than those located in major cities. As such, future evaluation research is needed to understand the range of factors influencing nutrition intervention development and implementation in diverse Indigenous contexts.

Improving the evaluation of comprehensive school-based nutrition interventions for Indigenous children will require improved methodologies as well as improve research capacity among academic researchers and community members. Given the limited and highly variable examples of evaluation in the peer-reviewed literature and the lack of standardized evaluation tools in Canada, it may be useful to utilize theoretical frameworks to guide evaluation efforts. For example, the RE-AIM framework focuses on five key elements of measuring success of interventions – reach, effectiveness, adoption, implementation, and maintenance (Lee & Gortmaker, 2018). The RE-AIM framework has been used successfully in guiding evaluation of interventions within the school context (Lee & Gortmaker, 2018) and applying it to evaluations of comprehensive school-based nutrition interventions may be prove useful as it can be used at all stages of research to understand how interventions work in real-world settings.

As evaluations of multi-component interventions can be particularly challenging, evaluations may also benefit from using longitudinal mixed methods designs that use quantitative data (e.g., surveys) and qualitative data (e.g., interviews or observations) to

determine how interventions are implemented in practice and their influence on health outcomes. Rather than focusing on specific health outcomes, evaluations may also consider complementary indicators of success such as the community perceived level of control of interventions, relationships between Indigenous community members and researchers, and building community knowledge, skills and expertise in health promotion (Tremblay et al., 2018). A focus on these forms of success is important as collaborative partnerships and enhanced capacity among Indigenous communities may result in long-term reduction of the broader social, economic, and political barriers to Indigenous health (Towns et al., 2014; Tremblay et al., 2018).

Although there is a need to improve evaluation of interventions for Indigenous children, it is important to acknowledge that the current knowledge gap may reflect barriers experienced by Indigenous communities. The complex social and economic problems experienced by many Indigenous communities may mean that limited local energy can be devoted to evaluation as there are more pressing priorities (Rice et al., 2016). Without the support of researchers, community members may lack the time, financial resources, or capacity to plan and perform evaluations. CBPR offers a solution to this issue, as collaborative partnerships between academic researchers and community members can establish the skills, knowledge, and resources needed to conduct evaluations. For example, community members can provide guidance on culturally acceptable evaluation methods while academic researchers can help to secure funding and provide recommendations on evaluation design. However, it is important that communities build capacity (e.g., by receiving training and using local resources) and retain control and ownership of interventions to ensure the sustainability and advancement of intervention evaluations (Godin, Leatherdale, et al., 2015).

In addition to the lack of evaluation concerning school-based nutrition interventions for Indigenous children, there remains a general knowledge gap concerning the types of interventions that schools in Canada are currently implementing – especially for Inuit and Métis populations. Although Study 2 attempted to identify and describe current school-based nutrition interventions for Indigenous children in Canada, many schools were inevitably missed due to the diverse ways that Indigenous children are educated (e.g., band-operated schools attended by Indigenous children and provincially operated schools attended by both Indigenous and non-Indigenous children). As other reviews have noted, it is also likely that community-level interventions are not documented in the scientific or grey literature and that many intervention studies have not been published (Godin, Leatherdale, et al., 2015; Rice et al., 2016).

To add to the currently lacking evidence base concerning diverse school-based nutrition interventions for Indigenous children, researchers and communities should aim to disseminate knowledge concerning their interventions to intended (or potential) knowledge users, who are individuals who are likely to be able to use findings to make decisions about health interventions (Canadian Institutes of Health Research [CIHR], 2016). Depending on the focus of the intervention, knowledge users may include policymakers, health care workers, community leaders, or individuals in media outlets, academic institutions, or private sector organizations (CIHR, 2016). At the early stage of intervention conceptualization, researchers and communities should strategically plan to share knowledge concerning intervention development, implementation, and/or evaluation. Knowledge may be actively shared in academic journals – ideally open-access journals to allow for general accessibility – as well as academic conferences, seminars and workshops, or face-to-face meetings with knowledge users (Brownson, Eyler, Harris, Moore, & Tabak, 2018). Knowledge can also be shared through traditional media (e.g.,

newspapers, radio, and television) or social media (e.g., Facebook, Twitter, and blogs) (Brownson et al., 2018). However, these actions require time, skill, and resources, as well as awareness of knowledge dissemination opportunities.

As with intervention evaluation, CBPR provides an ideal solution to improve knowledge dissemination concerning community-level school-based nutrition interventions. In CBPR, community members and researchers collaboratively make decisions on knowledge dissemination and use their respective knowledge and expertise to share findings through diverse channels (Gokiert et al., 2017). For example, the ARC in Alexander First Nation (AFN) takes shared responsibility for disseminating knowledge within and beyond the community by sharing knowledge that has been created as a result of multiple research projects in AFN with their respective spheres of influence (Gokiert et al., 2017). This has taken the form of presenting to Chief and Council and other local stakeholders (e.g., school personnel and parents of students), co-presenting at conferences, and co-authoring papers published in academic journals (for example, Genuis et al., 2014; Genuis, Willows, Alexander First Nation, & Jardine, 2015; Gillies et al., 2018; Gokiert et al., 2017; Hanbazaza et al., 2015; Murray et al., 2017; Pigford et al., 2013). The sustainability of the ARC has been attributed to the relatively short-travel time between the University of Alberta and AFN, the existence of community champions, and continuous funding (Gokiert et al., 2017). Although it may be challenging and time-consuming to conduct CBPR, the ARC provides an example of how collaborative relationships can result in effective knowledge dissemination of local health promotion efforts.

Overall, additional research is needed to fill the literature gaps concerning comprehensive school-based nutrition interventions for Indigenous children. Moving forward, it is important that researchers and community members work in collaboration to not only develop comprehensive

school-based nutrition interventions, but rigorously evaluate them to understand the barriers and facilitators to their implementation as well as their effectiveness in achieving desired outcomes. It is also critical that knowledge concerning interventions is disseminated as broadly as possible to build the knowledge base concerning diverse nutrition interventions. This knowledge will assist communities and the broader scientific and health promotion community in developing evidence-based comprehensive school-based nutrition interventions to improve eating behaviours in Indigenous communities.

References

- Academy of Nutrition and Dietetics. (2013). Position of the Academy of Nutrition and Dietetics: The role of nutrition in health promotion and chronic disease prevention. *Journal of the Academy of Nutrition and Dietetics*, 113(7), 972–979.
- Adams, A., Receveur, O., Mundt, M., Paradis, G., & Macaulay, A. C. (2005). Healthy lifestyle indicators in children (grades 4 to 6) from the Kahnawake Schools Diabetes Prevention Project. *Canadian Journal of Diabetes*, 29(4), 403–409.
- Agron, P., Berends, V., Ellis, K., & Gonzalez, M. (2010). School wellness policies: Perceptions, barriers, and needs among school leaders and wellness advocates. *Journal of School Health*, 80(11), 527–535.
- Alberta Health Services. (2012a). *Framework for the comprehensive school health approach*. Retrieved from <http://www.albertahealthservices.ca/assets/info/school/csh/if-sch-csh-ahs-framework.pdf>
- Alberta Health Services. (2012b). *Steps to creating a school nutrition policy: A step by step toolkit*. Retrieved from <https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-school-nutrition-policy.pdf>
- Alberta Healthy School Community Wellness Fund. (2013). *Developing healthy school communities handbook*. Retrieved from <http://www.wellnessfund.ualberta.ca/~media/abhealthyschools/Handbook2013-FINAL-REVFeb2014.pdf>
- APPLE Schools. (2018). Alberta Project Promoting active Living & healthy Eating. Retrieved

from <http://www.appleschools.ca>

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework.

International Journal of Social Research Methodology, 8(1), 19–32.

Assembly of First Nations. (2008). *An environmental scan of nutrition programs and policies in*

First Nations schools. Ottawa, ON: Assembly of First Nations.

Bagelman, C. (2018). Unsettling food security: The role of young people in Indigenous food system revitalisation. *Children & Society*, 32(3), 219–232.

Bassett-Gunter, R., Yessis, J., Manske, S., & Stockton, L. (2012). *Healthy school communities*

concept paper. Ottawa, ON: Physical and Health Education Canada. Retrieved from

<http://www.phecanada.ca/programs/health-promoting-schools/concept-paper>

Benoit, F. (2013). *Public policy models and their usefulness in public health: The stages model*.

Montreal, QC: National Collaborating Centre for Healthy Public Policy.

Bhawra, J., Cooke, M. J., Guo, Y., & Wilk, P. (2017). The association of household food security, household characteristics and school environment with obesity status among off-

reserve First Nations and Métis children and youth in Canada: Results from the 2012

Aboriginal Peoples Survey. *Health Promotion and Chronic Disease Prevention in Canada:*

Research, Policy and Practice, 37(3), 77–86.

Bhawra, J., Cooke, M. J., Hanning, R., Wilk, P., & Gonneville, S. L. H. (2015). Community

perspectives on food insecurity and obesity: Focus groups with caregivers of Métis and Off-

reserve First Nations children. *International Journal for Equity in Health*, 14, 96.

Borga, M., West, J., Bell, J. D., Harvey, N. C., Romu, T., Heymsfield, S. B., & Leinhard, O. D.

- (2018). Advanced body composition assessment: From body mass index to body composition profiling. *Journal of Investigative Medicine*, 66(5), 1–9.
- Bowen, S. (2012). *A guide to evaluation in health research*. Retrieved from http://www.cihr-irsc.gc.ca/e/documents/kt_lm_guide_evhr-en.pdf
- Bowen, S., & Graham, I. D. (2013). Integrated knowledge translation. In S. Straus, J. Tetroe, & I. Graham (Eds.), *Knowledge translation in health care: Moving from evidence to practice* (2nd ed., pp. 14–24). West Sussex, UK: John Wiley & Sons, Ltd.
- Browning, H. F., Laxer, R. E., & Janssen, I. (2013). Food and eating environments in Canadian schools. *Canadian Journal of Dietetic Practice and Research*, 74(4), 160–166.
- Brownson, R. C., Eyler, A. A., Harris, J. K., Moore, J. B., & Tabak, R. G. (2018). Getting the word out: New approaches for disseminating public health science. *Journal of Public Health Management and Practice*, 24(2), 102–111.
- Bryman, A., Bell, E., & Teevan, J. J. (2012). *Social research methods* (3rd ed.). Don Mills, ON: Oxford University Press.
- Canadian Feed the Children. (2019). National Aboriginal Nutrition Program - Canada. Retrieved from <https://canadianfeedthechildren.ca/the-feed/national-aboriginal-nutrition-program-in-school-feeding-canada/>
- Canadian Institutes of Health Research [CIHR]. (2016). Knowledge translation. Retrieved from <http://www.cihr-irsc.gc.ca/e/29418.html>
- Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada. (2014). *Tri-*

council policy statement: Ethical conduct for research involving humans. Ottawa, ON: Secretariat on Responsible Conduct of Research. Retrieved from http://www.pre.ethics.gc.ca/pdf/eng/tcps2/TCPS_2_FINAL_Web.pdf

Cargo, M., Salsberg, J., Delormier, T., Desrosiers, S., & Macaulay, A. C. (2006). Understanding the social context of school health promotion program implementation. *Health Education, 106*(2), 85–97.

Cargo, M., Lévesque, L., Macaulay, A. C., McComber, A., Desrosiers, S., Delormier, T., & Potvin, L. (2003). Community governance of the Kahnawake Schools Diabetes Prevention Project, Kahnawake territory, Mohawk Nation, Canada. *Health Promotion International, 18*(3), 177–187.

Carpenter, A. (2009). *Rec and Read: Stories of an Aboriginal youth mentor program* (Unpublished master's thesis). University of Manitoba, Winnipeg, Manitoba.

Castleden, H., Morgan, V. S., & Lamb, C. (2012). “I spent the first year drinking tea”: Exploring Canadian university researchers’ perspectives on community-based participatory research involving Indigenous peoples. *The Canadian Geographer, 56*(2), 160–179.

Centers for Disease Control and Prevention [CDC]. (2007). *Types of evaluation*. Retrieved from [https://www.cdc.gov/std/Program/pupestd/Types of Evaluation.pdf](https://www.cdc.gov/std/Program/pupestd/Types%20of%20Evaluation.pdf)

Centers for Disease Control and Prevention [CDC]. (2012). *Overview of CDC’s policy process*. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services. Retrieved from <https://www.cdc.gov/policy/analysis/process/docs/cdcpolicyprocess.pdf>

- Centers for Disease Control and Prevention [CDC]. (2014). *Using evaluation to inform CDC's policy process*. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services. Retrieved from <https://www.cdc.gov/policy/analysis/process/docs/UsingEvaluationtoInformCDCsPolicyProcess.pdf>
- Centers for Disease Control and Prevention [CDC]. (2016). Indicators. Retrieved from <https://www.cdc.gov/eval/indicators/index.htm>
- Centers for Disease Control and Prevention [CDC]. (2018). CDC healthy schools. Retrieved from <https://www.cdc.gov/healthyschools/about.htm>
- Chriqui, J. F., Pickel, M., & Story, M. (2014). Influence of school competitive food and beverage policies on obesity, consumption, and availability: A systematic review. *JAMA Pediatrics*, *168*(3), 279–286.
- Colditz, G. A., & Emmons, K. M. (2018). The promise and challenges of dissemination and implementation research. In Ross C. Brownson, G. A. Colditz, & E. K. Proctor (Eds.), *Dissemination and implementation research in health: Translating science to practice* (2nd ed., pp. 1–18). New York, NY: Oxford University Press.
- Colquhoun, H. L., Levac, D., O'Brien, K. K., Straus, S., Tricco, A. C., Perrier, L., ... Moher, D. (2014). Scoping reviews: Time for clarity in definition, methods, and reporting. *Journal of Clinical Epidemiology*, *67*(12), 1291–1294.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: SAGE.

- Davey, C., & Vallianatos, H. (2018). Postpartum food traditions of Bhutanese refugee women: A qualitative study. *Journal of International Migration and Integration, 19*(3), 541–553.
- Devaux, M., & Sassi, F. (2013). Social inequalities in obesity and overweight in 11 OECD countries. *European Journal of Public Health, 23*(3), 464–469.
- Downs, S. M., Arnold, A., Marshall, D., McCargar, L. J., Raine, K. D., & Willows, N. D. (2009). Associations among the food environment, diet quality and weight status in Cree children in Quebec. *Public Health Nutrition, 12*(9), 1504–1511.
- Downs, S. M., Farmer, A., Quintanilha, M., Berry, T. R., Mager, D. R., Willows, N. D., & McCargar, L. J. (2011). Alberta nutrition guidelines for children and youth: Awareness and use in schools. *Canadian Journal of Dietetic Practice and Research, 72*(3), 137–140.
- Downs, S. M., Farmer, A., Quintanilha, M., Berry, T. R., Mager, D. R., Willows, N. D., & McCargar, L. J. (2012). From paper to practice: Barriers to adopting nutrition guidelines in schools. *Journal of Nutrition Education and Behavior, 44*(2), 114–122.
- Due, P., Damsgaard, M. T., Rasmussen, M., Holstein, B. E., Wardle, J., Merlo, J., ... Valimaa, R. (2009). Socioeconomic position, macroeconomic environment and overweight among adolescents in 35 countries. *International Journal of Obesity, 33*(10), 1084–1093.
- Elsipogtog First Nation School. (2017). Elsipogtog First Nation School. Retrieved from <http://www.elsipogtogschool.ca/>
- Eskicioglu, P., Halas, J., Senechal, M., Wood, L., McKay, E., Villeneuve, S., ... McGavock, J. M. (2014). Peer mentoring for type 2 diabetes prevention in First Nations Children. *Pediatrics, 133*(6), e1624–e1631.

- First Nations Information Governance Centre [FNIGC]. (2012). *First Nations Regional Health Survey (RHS) 2008/10: National report on adults, youth and children living in First Nations communities*. Ottawa, ON: FNIGC.
- First Nations Studies Program. (2009). Terminology. Retrieved from <https://indigenousfoundations.arts.ubc.ca/terminology/>
- Fung, C., Kuhle, S., Lu, C., Purcell, M., Schwartz, M., Storey, K., & Veugelers, P. J. (2012). From “best practice” to “next practice”: The effectiveness of school-based health promotion in improving healthy eating and physical activity and preventing childhood obesity. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 27.
- Fung, C., McIsaac, J.-L. D., Kuhle, S., Kirk, S. F. L., & Veugelers, P. J. (2013). The impact of a population-level school food and nutrition policy on dietary intake and body weights of Canadian children. *Preventive Medicine*, 57(6), 934–940.
- Gates, A., Hanning, R. M., Gates, M., Skinner, K., Martin, I. D., & Tsuji, L. J. S. (2012). Vegetable and fruit intakes of on-reserve First Nations schoolchildren compared to Canadian averages and current recommendations. *International Journal of Environmental Research and Public Health*, 9(4), 1379–1397.
- Gates, A., Hanning, R. M., McCarthy, D., Gates, M., McCarthy, D., & Tsuji, L. J. S. (2012). Inadequate nutrient intakes in youth of a remote First Nation community: Challenges and the need for sustainable changes in program and policy. *ISRN Public Health*, 2012, 1–5.
- Gates, A., Skinner, K., & Gates, M. (2014). The diets of school-aged Aboriginal youths in Canada: A systematic review of the literature. *Journal of Human Nutrition and Dietetics*,

28(3), 246–261.

Gates, M. (2010). *Investigation of milk and alternative intake and the impact of school nutrition programs in First Nations schoolchildren* (Unpublished master's thesis). University of Waterloo, Waterloo, Ontario.

Gates, M., Hanning, R. M., Gates, A., Isogai, A., Tsuji, L. J. S., & Metatawabin, J. (2013). A pilot comprehensive school nutrition program improves knowledge and intentions for intake of milk and milk alternatives among youth in a remote first nation. *Journal of Nutrition Education and Behavior*, 45(5), 455–459.

Gates, M., Hanning, R. M., Gates, A., McCarthy, D. D., & Tsuji, L. J. S. (2013). Assessing the impact of pilot school snack programs on milk and alternatives intake in 2 remote First Nation communities in northern Ontario, Canada. *Journal of School Health*, 83(2), 69–76.

Genius, S. K., Willows, N., Alexander First Nation, & Jardine, C. (2014). Through the lens of our cameras: Children's lived experience with food security in a Canadian Indigenous community. *Child: Care, Health and Development*, 41(4), 600–610.

Genius, S. K., Willows, N., Alexander First Nation, & Jardine, C. G. (2015). Partnering with Indigenous student co-researchers: Improving research processes and outcomes. *International Journal of Circumpolar Health*, 74(1), 1–9.

Gillies, C., Alexander Research Committee, Farmer, A., Maximova, K., & Willows, N. D. (2018). First Nations students' perceptions of school nutrition policy implementation: A mixed methods study. *Nutrition & Dietetics*, 75(5), 533–540.

Godin, K., Leatherdale, S. T., & Elton-Marshall, T. (2015). A systematic review of the

effectiveness of school-based obesity prevention programmes for First Nations, Inuit and Métis youth in Canada. *Clinical Obesity*, 5(3), 103–115.

Godin, K., Stapleton, J., Kirkpatrick, S. I., Hanning, R. M., & Leatherdale, S. T. (2015).

Applying systematic review search methods to the grey literature: A case study examining guidelines for school-based breakfast programs in Canada. *Systematic Reviews*, 4(1), 138.

Gokiert, R. J., Willows, N. D., Georgis, R., Stringer, H., & Alexander Research Committee.

(2017). Wâhkôhtowin: The governance of good community–academic research relationships to improve the health and well-being of children in Alexander First Nation. *The International Indigenous Policy Journal*, 8(2), 1–20.

Golden, S. D., & Earp, J. A. L. (2012). Social ecological approaches to individuals and their contexts. *Health Education & Behavior*, 39(3), 364–372.

Government of Alberta. (2012). *Alberta nutrition guidelines for children and youth: A childcare, school, and recreation/community centre resource manual*. Retrieved from <http://www.healthyalberta.com/NutritionGuidelines-Sept2012.pdf>

Government of Canada. (2018). Health inequalities data tool. Retrieved from <https://infobase.phac-aspc.gc.ca/health-inequalities/>

Government of Canada. (2019a). Canada's food guide. Retrieved from <https://food-guide.canada.ca/en/>

Government of Canada. (2019b). Constitution Acts, 1867 to 1982. Retrieved from <https://laws-lois.justice.gc.ca/eng/const/page-4.html>

Government of Canada. (2019c). Education. Retrieved from <http://www.sac->

isc.gc.ca/eng/1100100033601/1521124611239

Government of Canada. (2019d). Introducing a food policy for Canada. Retrieved from <https://www.budget.gc.ca/2019/docs/plan/chap-04-en.html#introducing-a-food-policy-for-canada>

Government of New Brunswick. (2018). *Healthier school food environment*. Retrieved from <https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/policies-politiques/e/711A.pdf>

Government of Ontario. (2010). Policy/program memorandum No. 150, school food and beverage policy. Retrieved from <http://www.edu.gov.on.ca/extra/eng/ppm/ppm150.pdf>

Gurnani, M., Birken, C., & Hamilton, J. (2015). Childhood obesity: Causes, consequences, and management. *Pediatric Clinics of North America*, 62(4), 821–840.

Hanbazaza, M. A., Triador, L., Ball, G. D. C., Farmer, A., Maximova, K., Alexander First Nation, & Willows, N. D. (2015). The impact of school gardening on Cree children's knowledge and attitudes toward vegetables and fruit. *Canadian Journal of Dietetic Practice and Research*, 76(3), 133–139.

Hawkes, C., Smith, T. G., Jewell, J., Wardle, J., Hammond, R. A., Friel, S., ... Kain, J. (2015). Smart food policies for obesity prevention. *The Lancet*, 385(9985), 2410–2421.

Headland, T. N., Pike, K. L., & Harris, M. (1990). *Emics and etics: The insider/outsider debate*. Newbury Park, CA: SAGE.

Health Canada. (2007). *Eating well with Canada's food guide: First Nations, Inuit and Métis*. Retrieved from http://publications.gc.ca/collections/collection_2007/hc-sc/H34-159-

- Higginbottom, G. M. A., Vallianatos, H., Shankar, J., Osswald, B., & Davey, C. (2016). Understanding South Asian immigrant women's food choices in the perinatal period. *International Journal of Womens Health Wellness, 2*(1), 1–7.
- Higginbottom, G. M. A., Vallianatos, H., Shankar, J., Safipour, J., & Davey, C. (2018). Immigrant women's food choices in pregnancy: Perspectives from women of Chinese origin in Canada. *Ethnicity & Health, 23*(5), 521–541.
- Himes, J. H. (2009). Challenges of accurately measuring and using BMI and other indicators of obesity in children. *Pediatrics, 124*(Suppl 1), S3–S22.
- Ho, L. S., Gittelsohn, J., Harris, S. B., & Ford, E. (2006). Development of an integrated diabetes prevention program with First Nations in Canada. *Health Promotion International, 21*(2), 88–97.
- Ho, L. S. (2007). *Diabetes prevention in Northwestern Ontario First Nations: A multi-institutional program to improve diet and increase physical activity* (Unpublished doctoral dissertation). John Hopkins University, Baltimore, Maryland.
- Ho, L. S., Gittelsohn, J., Rimal, R., Treuth, M. S., Sharma, S., Rosecrans, A., & Harris, S. B. (2008). An integrated multi-institutional diabetes prevention program improves knowledge and healthy food acquisition in northwestern Ontario First Nations. *Health Education and Behavior, 35*(4), 561–573.
- Hoelscher, D. M., Kirk, S., Ritchie, L., & Cunningham-Sabo, L. (2013). Position of the Academy of Nutrition and Dietetics: Interventions for the prevention and treatment of

pediatric overweight and obesity. *Journal of the Academy of Nutrition and Dietetics*, 113(10), 1375–1394.

Hogan, L., Garcia Bengoechea, E., Salsberg, J., Jacobs, J., King, M., & Macaulay, A. C. (2014). Using a participatory approach to the development of a school-based physical activity policy in an Indigenous community. *Journal of School Health*, 84(12), 786–792.

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288.

Indigenous and Northern Affairs Canada. (2019). First Nation profiles. Retrieved from http://fnppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNMain.aspx?BAND_NUMBER=438&lang=eng

Ivankova, N. V., Creswell, J. W., & Stick, S. L. (2006). Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods*, 18(1), 3–20.

Jaime, P. C., & Lock, K. (2009). Do school based food and nutrition policies improve diet and reduce obesity? *Preventive Medicine*, 48(1), 45–53.

Kahnawake Elementary School. (2016). *The wellness policy for Kahnawake Elementary Schools: Nutrition*. Retrieved from <http://www.neola.com/miamidade-fl/search/policies/po8510.htm>

Kakekagumick, K. E., Hayward, M. N., Harris, S. B., Saksvig, B., Gittelsohn, J., Manokeesic, G., ... Hanley, A. J. (2013). Sandy lake health and diabetes project: a community-based intervention targeting type 2 diabetes and its risk factors in a First Nations community. *Frontiers in Endocrinology*, 4(170), 1–9.

Kativik Ilisarniliriniq. (2019). About. Retrieved from <https://www.kativik.qc.ca/school->

board/about/

- Kehm, R., Davey, C. S., & Nanney, M. S. (2015). The role of family and community involvement in the development and implementation of school nutrition and physical activity policy. *Journal of School Health, 85*(2), 90–99.
- Kolahdooz, F., Sadeghirad, B., Corriveau, A., & Sharma, S. (2017). Prevalence of overweight and obesity among indigenous populations in Canada: A systematic review and meta-analysis. *Critical Reviews in Food Science and Nutrition, 57*(7), 1316–1327.
- Kulinna, P. H. (2016). School staff perceptions of factors influencing participation in a Whole-of-School initiative in an Indigenous community. *Health Education Journal, 75*(7), 869–881.
- Lee, R. M., & Gortmaker, S. L. (2018). Health dissemination and implementation within schools. In Ross C. Brownson, G. A. Colditz, & E. K. Proctor (Eds.), *Dissemination and implementation research in health: Translating science to practice* (2nd ed., pp. 401–416). New York, NY: Oxford University Press.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: SAGE.
- Linnan, L., & Steckler, A. B. (2002). Process evaluation for public health interventions and research: An overview. In A. Steckler & L. Linnan (Eds.), *Process evaluation for public health interventions and research* (1st ed., pp. 1–24). San Francisco, CA: Jossey-Bass.
- Loppie Reading, C., & Wien, F. (2009). *Health inequalities and social determinants of Aboriginal Peoples' health*. Prince George, BC: National Collaborating Centre for Aboriginal Health.

- MacLellan, D., Holland, A. I., Taylor, J., McKenna, M., & Hernandez, K. (2010). Implementing school nutrition policy: Student and parent perspectives. *Canadian Journal of Dietetic Practice and Research*, 71(4), 172–177.
- MacLellan, D., Taylor, J., & Freeze, C. (2009). Developing school nutrition policies: Enabling and barrier factors. *Canadian Journal of Dietetic Practice and Research*, 70(4), 166–171.
- Martinez Cobo, J. R. (1986). *Study of the problem of discrimination against Indigenous populations*. Geneva: UN Commission on Human Rights.
- Mâsse, L. C., Naiman, D., & Naylor, P.-J. (2013). From policy to practice: Implementation of physical activity and food policies in schools. *International Journal of Behavioral Nutrition and Physical Activity*, 10, 71.
- Matsumura, L. (2009). *The journey toward comprehensive school health within an Aboriginal community* (Unpublished master's thesis). Brock University, St. Catharines, Ontario.
- Mayan, M. J. (2009). *Essentials of qualitative inquiry*. Walnut Creek, CA: Left Coast Press, Inc.
- Mayberry, R. M., Daniels, P., Bazzell, A., Yan, F., Willock, R. J., & Mack, B. (2013). Survey planning and implementation in the context of CBPR. In D. S. Blumenthal, R. J. DiClemente, R. L. Braithwaite, & S. A. Smith (Eds.), *Community-based participatory health research: Issues, methods, and translation to practice* (2nd ed., pp. 131–156). New York, NY: Springer.
- McIsaac, J.-L. D., Chu, Y. L., Blanchard, C., Rossiter, M. D., Williams, P. L., Raine, K. D., ... Veugelers, P. J. (2015). The impact of school policies and practices on students' diets, physical activity levels and body weights: A province-wide practice-based evaluation.

Canadian Journal of Public Health, 106(2), e43-51.

McIsaac, J.-L. D., Mumtaz, Z., Veugelers, P. J., & Kirk, S. F. L. (2015). Providing context to the implementation of health promoting schools: A case study. *Evaluation and Program Planning*, 53, 65–71.

McIsaac, J.-L. D., Penney, T. L., Ata, N., Munro-Sigfridson, L., Cunningham, J., Veugelers, P. J., ... Kuhle, S. (2017). Evaluation of a health promoting schools program in a school board in Nova Scotia, Canada. *Preventive Medicine Reports*, 5, 279–284.

McIsaac, J.-L. D., Shearer, C. L., Veugelers, P. J., & Kirk, S. F. L. (2015). Moving forward with school nutrition policies: A case study of policy adherence in Nova Scotia. *Canadian Journal of Dietetic Practice and Research*, 76(4), 172–177.

McIsaac, J.-L. D., Spencer, R., Chiasson, K., Kontak, J., & Kirk, S. F. L. (2018). Factors influencing the implementation of nutrition policies in schools: A scoping review. *Health Education & Behavior*, 46(2), 224–250.

McIsaac, J.-L. D., Storey, K., Veugelers, P. J., & Kirk, S. F. L. (2015). Applying theoretical components to the implementation of health-promoting schools. *Health Education Journal*, 74(2), 131–143.

McKenna, M. L. (2003). Issues in implementing school nutrition policies. *Canadian Journal of Dietetic Practice and Research*, 64(4), 208–213.

McKenna, M. L. (2010). Policy options to support healthy eating in schools. *Canadian Journal of Public Health*, 101(Suppl 2), S14-17.

Minkler, M., Salvatore, A. L., & Chang, C. (2018). Participatory approaches for study design and

- analysis in dissemination and implementation research. In Ross C. Brownson, G. A. Colditz, & E. K. Proctor (Eds.), *Dissemination and implementation research in health: Translating science to practice*. (2nd ed., pp. 175–190). New York, NY: Oxford University Press.
- Mullally, M. L., Taylor, J. P., Kuhle, S., Bryanton, J., Hernandez, K. J., MacLellan, D. L., ... Veugelers, P. J. (2010). A province-wide school nutrition policy and food consumption in elementary school children in Prince Edward Island. *Canadian Journal of Public Health*, *101*(1), 40–43.
- Murray, K. (2016). *School staff identified barriers, facilitators, and perceptions of implementing a school nutrition policy in a First Nation community school* (Unpublished master's thesis). University of Alberta, Edmonton, Alberta.
- Murray, K., Alexander Research Committee, Farmer, A., Maximova, K., & Willows, N. (2017). “It’s huge in First Nation culture for us, as a school, to be a role model”: Facilitators and barriers affecting school nutrition policy implementation in Alexander First Nation. *International Journal of Indigenous Health*, *12*(2), 43–63.
- National Collaborating Centre for Aboriginal Health [NCCAHA]. (2013). *An overview of Aboriginal health in Canada*. Retrieved from <https://www.censa-nccah.ca/docs/context/FS-OverviewAbororiginalHealth-EN.pdf>
- National Collaborating Centre for Aboriginal Health [NCCAHA]. (2017). *Education as a social determinant of First Nations, Inuit and Métis health*. Retrieved from <https://www.censa-nccah.ca/docs/determinants/FS-Education-SDOH-2017-EN.pdf>
- Naylor, P.-J., Scott, J., Drummond, J., Bridgewater, L., McKay, H. A., & Panagiotopoulos, C.

- (2010). Implementing a whole school physical activity and healthy eating model in rural and remote First Nations schools: A process evaluation of Action Schools! BC. *Rural and Remote Health, 10*(2), 1296.
- Nelson, M., & Breda, J. (2012). School food research: Building the evidence base for policy. *Public Health Nutrition, 16*(6), 958–967.
- Ng, C., Corey, P. N., & Young, T. K. (2011). Socio-economic patterns of obesity among Aboriginal and non-Aboriginal Canadians. *Canadian Journal of Public Health, 102*(4), 264–268.
- Oosman, S., Smylie, J., Humbert, L., Henry, C., & Chad, K. (2016). Métis community perspectives inform a school-based health promotion intervention using participatory action. *Engaged Scholar Journal, 1*(2), 58–76.
- Pan-Canadian Joint Consortium for School Health [JCSH]. (n.d.). Healthy school planner. Retrieved from <http://healthyschoolplanner.uwaterloo.ca/>
- Pan-Canadian Joint Consortium for School Health [JCSH]. (2010). Stakeholder engagement for improved school policy: Development and implementation. *Canadian Journal of Public Health, 101*(Suppl 2), S20-23.
- Pan-Canadian Joint Consortium for School Health [JCSH]. (2016). Comprehensive school health framework. Retrieved from <http://www.jcsh-cces.ca/index.php/about/comprehensive-school-health>
- Paradis, G., Levesque, L., Macaulay, A. C., Cargo, M., McComber, A., Receveur, O., ... Potvin, L. (2005). Impact of a diabetes prevention program on body size, physical activity, and diet

among Kanien'keha:ka (Mohawk) children 6 to 11 years old: 8-year results from the Kahnawake Schools Diabetes Prevention Project. *Pediatrics*, 115(2), 333–339.

Patton, M. Q. (2015). *Qualitative research & evaluation methods* (4th ed.). Thousand Oaks, CA: SAGE.

Peters, M. D. J., Godfrey, C. M., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare*, 13(3), 141–146.

Pigford, A.-A. E., Ball, G. D. C., Plotnikoff, R. C., Arcand, E., Dyck Fehderau, D., Holt, N. L., ... Willows, N. D. (2013). Community-based participatory research to address childhood obesity: Experiences from Alexander First Nation in Canada. *Pimatisiwin: A Journal of Aboriginal & Indigenous Community Health*, 11(2), 171–185.

Pigford, A.-A. E., & Willows, N. D. (2010). Promoting optimal weights in Aboriginal children in Canada through ecological research. In J. A. O'Dea & M. Eriksen (Eds.), *Childhood obesity prevention: International research, controversies and interventions* (pp. 309–320). Oxford, UK: Oxford University Press.

Pigford, A.-A. E., Willows, N. D., Holt, N. L., Newton, A. S., & Ball, G. D. C. (2012). Using First Nations children's perceptions of food and activity to inform an obesity prevention strategy. *Qualitative Health Research*, 22(7), 986–996.

Potvin, L., Cargo, M., McComber, A. M., Delormier, T., & Macaulay, A. C. (2003). Implementing participatory intervention and research in communities: Lessons from the Kahnawake Schools Diabetes Prevention Project in Canada. *Social Science and Medicine*,

56(6), 1295–1305.

Prince Edward Island Eastern School District. (2011). *School nutrition*. Retrieved from https://www.princeedwardisland.ca/sites/default/files/publications/english_schools_nutrition_policy.pdf

Province of British Columbia. (2013). *Guidelines for food & beverage sales in B.C. schools*. Retrieved from https://www2.gov.bc.ca/assets/gov/education/administration/kindergarten-to-grade-12/healthyschools/2015_food_guidelines.pdf

Province of Nova Scotia. (2013). Healthy eating: Food and nutrition policy for Nova Scotia public schools. Retrieved from <https://novascotia.ca/dhw/healthy-communities/healthy-eating-schools.asp>

Public Health Agency of Canada. (2011). *Obesity in Canada: A joint report from the public health agency of Canada and the Canadian Institute for health information*. Retrieved from https://secure.cihi.ca/free_products/Obesity_in_canada_2011_en.pdf

Quintanilha, M., Downs, S., Lieffers, J., Berry, T., Farmer, A., & McCargar, L. J. (2013). Factors and barriers associated with early adoption of nutrition guidelines in Alberta, Canada. *Journal of Nutrition Education and Behavior*, 45(6), 510–517.

Raphael, D. (2016). Social determinants of health: Key issues and themes. In D. Raphael (Ed.), *Social determinants of health: Canadian perspectives* (3rd ed., pp. 3–31). Toronto, ON: Canadian Scholars' Press Inc.

Rice, K., Te Hiwi, B., Zwarenstein, M., Lavalley, B., Barre, D. E., & Harris, S. B. (2016). Best practices for the prevention and management of diabetes and obesity-related chronic disease

- among Indigenous peoples in Canada: A review. *Canadian Journal of Diabetes*, 40(3), 216–225.
- Ritchie, S. D., Jo Wabano, M., Beardy, J., Curran, J., Orkin, A., VanderBurgh, D., & Young, N. L. (2013). Community-based participatory research with Indigenous communities: The proximity paradox. *Health and Place*, 24, 183–189.
- Roberts, K. C., Shields, M., De Groh, M., Aziz, A., & Gilbert, J.-A. (2012). Overweight and obesity in children and adolescents: Results from the 2009 to 2011 Canadian Health Measures Survey. *Health Reports*, 23(3), 37–41.
- Rosecrans, A. M., Gittelsohn, J., Ho, L. S., Harris, S. B., Naqshbandi, M., & Sharma, S. (2008). Process evaluation of a multi-institutional community-based program for diabetes prevention among First Nations. *Health Education Research*, 23(2), 272–286.
- Rowling, L., & Jeffreys, V. (2006). Capturing complexity: Integrating health and education research to inform health-promoting schools policy and practice. *Health Education Research*, 21(5), 705–718.
- Saini, M., & Quinn, A. (2013). *A systematic review of randomized controlled trials of health related issues within an Aboriginal context*. Prince George, BC: National Collaborating Centre for Aboriginal Health.
- Saksvig, B. I., Gittelsohn, J., Harris, S. B., Hanley, A. J. G., Valente, T. W., & Zinman, B. (2005). A pilot school-based healthy eating and physical activity intervention improves diet, food knowledge, and self-efficacy for native Canadian children. *The Journal of Nutrition*, 135(10), 2392–2398.

- Sallis, J. F., & Owen, N. (2015). Ecological models of health behavior. In K. Glanz, B. Rimer, & K. Viswanath (Eds.), *Health behavior: Theory, research, and practice* (5th ed., p. 485). San Francisco, CA: Jossey-Bass.
- Schwartz, M. B., Henderson, K. E., Falbe, J., Novak, S. A., Wharton, C. M., Long, M. W., ... Fiore, S. S. (2012). Strength and comprehensiveness of district school wellness policies predict policy implementation at the school level. *Journal of School Health, 82*(6), 262–267.
- Shaw, C., Brady, L.-M., & Davey, C. (2011). *Guidelines for research with children and young people*. London: National Children’s Bureau (NCB) Research Centre.
- Shields, M. (2006). Overweight and obesity among children and youth. *Health Reports, 17*(3), 1–16.
- Shrewsbury, V., & Wardle, J. (2008). Socioeconomic status and adiposity in childhood: A systematic review of cross-sectional studies 1990-2005. *Obesity, 16*(2), 275–284.
- Skinner, K., Hanning, R. M., & Tsuji, L. J. S. (2006). Barriers and supports for health eating and physical activity for First Nation youths in Northern Canada. *International Journal of Circumpolar Health, 65*(2), 148–161.
- Slater, J., Green, C., Sevenhuysen, G., O’Neil, J., & Edginton, B. (2009). Socio-demographic and geographic analysis of overweight and obesity in Canadian adults using the Canadian Community Health Survey (2005). *Chronic Diseases in Canada, 30*(1), 4–15.
- Smylie, J., & Firestone, M. (2016). The health of Indigenous peoples. In D. Raphael (Ed.), *Social determinants of health: Canadian perspectives* (3rd ed., pp. 434–466). Toronto, ON:

Canadian Scholars' Press Inc.

Spitters, H., Schwartz, M., & Veugelers, P. (2009). Parent and student support for school policies that promote healthy eating and active living. *Physical and Health Education*, 75(2), 30–34.

Standing Senate Committee on Aboriginal Peoples [SSCAP]. (2011). *Reforming First Nations education: From crisis to hope*. Retrieved from <http://www.parl.gc.ca/content/sen/committee/411/appa/rep/rep03dec11-e.pdf>

Statistics Canada. (2017). *Aboriginal peoples in Canada: Key results from the 2016 Census. 2016 Census of Population*. Retrieved from <https://www150.statcan.gc.ca/n1/daily-quotidien/171025/dq171025a-eng.htm>

Steckler, A., Ethelbah, B., Martin, C. J., Stewart, D., Pardilla, M., Gittelsohn, J., ... Vu, M. (2003). Pathways process evaluation results: A school-based prevention trial to promote healthful diet and physical activity in American Indian third, fourth, and fifth grade students. *Preventive Medicine*, 37(6), S80-90.

Stewart-Brown, S. (2006). *What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting schools approach?* Copenhagen: WHO Regional Office for Europe. Retrieved from <http://www.euro.who.int/document/e88185.pdf>

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10(4), 282–298.

Storey, K. E., Montemurro, G., Flynn, J., Schwartz, M., Wright, E., Osler, J., ... Roberts, E. (2016). Essential conditions for the implementation of comprehensive school health to

- achieve changes in school culture and improvements in health behaviours of students. *BMC Public Health*, 16(1), 1133.
- Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health*, 29(1), 253–272.
- Stylianou, M., & Walker, J. L. (2018). An assessment of Australian school physical activity and nutrition policies. *Australian and New Zealand Journal of Public Health*, 42(1), 16–21.
- Tagalik, S. (2010). *A framework for Indigenous school health: Foundations in cultural principles*. Prince George, BC: National Collaborating Centre for Aboriginal Health.
- Taylor, J. P., MacLellan, D., Caiger, J. M., Hernandez, K., McKenna, M., Gray, B., & Veugelers, P. (2011). Implementing elementary school nutrition policy: Principals' perspectives. *Canadian Journal of Dietetic Practice and Research*, 72(4), 176.
- Taylor, J. P., McKenna, M. L., & Butler, G. P. (2010). Monitoring and evaluating school nutrition and physical activity policies. *Canadian Journal of Public Health*, 101(Suppl 2), S24–S27.
- Tombs, D. (2004). School gives a BOOST to student well-being. *Windspeaker Publication*, 22(8), 1–21. Retrieved from <http://www.ammsa.com/publications/windspeaker/school-gives-boost-student-well-being>
- Tomlin, D., Naylor, P. J., McKay, H., Zorzi, A., Mitchell, M., & Panagiotopoulos, C. (2012). The impact of Action Schools! BC on the health of Aboriginal children and youth living in rural and remote communities in British Columbia. *International Journal of Circumpolar*

Health, 71(1), 17999.

- Towns, C., Cooke, M., Rysdale, L., & Wilk, P. (2014). Healthy weights interventions in Aboriginal children and youth: A review of the literature. *Canadian Journal of Dietetic Practice and Research*, 75(3), 125–131.
- Townsend, N., & Foster, C. (2013). Developing and applying a socio-ecological model to the promotion of healthy eating in the school. *Public Health Nutrition*, 16(6), 1101–1108.
- Tran, B. X., Ohinmaa, A., Kuhle, S., Johnson, J. A., & Veugelers, P. J. (2014). Life course impact of school-based promotion of healthy eating and active living to prevent childhood obesity. *PLoS ONE*, 9(7), e102242.
- Tremblay, M.-C., Martin, D. H., McComber, A. M., McGregor, A., & Macaulay, A. C. (2018). Understanding community-based participatory research through a social movement framework: A case study of the Kahnawake Schools Diabetes Prevention Project. *BMC Public Health*, 18(1), 487.
- Triador, L. (2013). *The effect of school gardening and a healthy snack program on First Nations children's knowledge and attitudes about vegetables and fruit, and their consumption of these foods at home* (Unpublished master's thesis). University of Alberta, Edmonton, Alberta.
- Triador, L., Farmer, A., Maximova, K., Willows, N., & Kootenay, J. (2014). A school gardening and healthy snack program increased Aboriginal First Nations children's preferences toward vegetables and fruit. *Journal of Nutrition Education and Behavior*, 47(2), 176–180.
- Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., ... Straus, S. E.

- (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, 169(7), 467–473.
- United Nations - Indigenous Peoples. (n.d.). Indigenous Peoples at the UN. Retrieved from <https://www.un.org/development/desa/indigenouspeoples/about-us.html>
- Vecchiarelli, S., Takayanagi, S., & Neumann, C. (2006). Students' perceptions of the impact of nutrition policies on dietary behaviors. *Journal of School Health*, 76(10), 525–531.
- Veugelers, P. J., & Schwartz, M. E. (2010). Comprehensive school health in Canada. *Canadian Journal of Public Health*, 101(Suppl 2), S5-8.
- Vine, M. M., & Elliott, S. J. (2013). Examining local-level factors shaping school nutrition policy implementation in Ontario, Canada. *Public Health Nutrition*, 17(6), 1290–1298.
- Vine, M. M., Elliott, S. J., & Raine, K. D. (2014). Exploring implementation of the Ontario school food and beverage policy at the secondary-school level: A qualitative study. *Canadian Journal of Dietetic Practice and Research*, 75(3), 118–124.
- Wallerstein, N., Duran, B., Oetzel, J. G., & Minkler, M. (2018). On community-based participatory research. In Nina Wallerstein, B. Duran, J. Oetzel, & M. Minkler (Eds.), *Community-based participatory research for health: Advancing social and health equity* (3rd ed., pp. 3–16). San Francisco, CA: Jossey-Bass.
- Watts, A. W., Mâsse, L. C., & Naylor, P.-J. (2014). Changes to the school food and physical activity environment after guideline implementation in British Columbia, Canada. *International Journal of Behavioral Nutrition and Physical Activity*, 11, 50.
- Wesche, S. D., O'Hare-Gordon, M. A. F., Robidoux, M. A., & Mason, C. W. (2016). Land-based

programs in the Northwest Territories: Building Indigenous food security and well-being from the ground up. *Canadian Food Studies*, 3(2), 23.

Willows, N. D. (2005a). Determinants of healthy eating in Aboriginal peoples in Canada: The current state of knowledge and research gaps. *Canadian Journal of Public Health*, 96(Suppl 3), S32-36.

Willows, N. D. (2005b). Overweight in First Nations children: Prevalence, implications, and solutions. *Journal of Aboriginal Health*, 2(1), 76–86.

Willows, N. D., Hanley, A. J. G., & Delormier, T. (2012). A socioecological framework to understand weight-related issues in Aboriginal children in Canada. *Applied Physiology, Nutrition, and Metabolism*, 37(1), 1–13.

World Health Organization [WHO]. (2004). *Global strategy on diet, physical activity and health*. Geneva: World Health Organization.

World Health Organization [WHO]. (2008a). *School policy framework: Implementation of the WHO global strategy on diet, physical activity and health*. Geneva: World Health Organization.

World Health Organization [WHO]. (2008b). *WHO global strategy on diet, physical activity and health: A framework to monitor and evaluate implementation*. Geneva: World Health Organization.

World Health Organization [WHO]. (2018). The Ottawa Charter for Health Promotion. Retrieved from <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/>

World Health Organization [WHO]. (2019). Health equity. Retrieved from

https://www.who.int/topics/health_equity/en/

Young, N. L., Wabano, M. J., Usuba, K., Pangowish, B., Trottier, M., Jacko, D., ... Corbiere, R. G. (2015). Validity of the Aboriginal children's health and well-being measure: Aaniish naa gegii? *Health and Quality of Life Outcomes*, 13(1), 148.

Yukon Food for Learning. (2016). Schools & communities. Retrieved from <http://www.yukonfoodforlearning.ca/carmacks.shtml>

Zheng, Y., Mancino, J., Burke, L. E., & Glanz, K. (2017). Current theoretical bases for nutrition intervention and their uses. In A. M. Coulston, C. J. Boushey, M. G. Ferruzzi, & L. M. Delahanty (Eds.), *Nutrition in the prevention and treatment of disease* (4th ed., pp. 185–201). San Diego, CA: Elsevier Inc.

Appendices

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Appendix 1. Kipohtakaw Education Centre School Nutrition Policy

Written by Alexander First Nation Department of Education

Implemented March 2014

Policy Statement: Kipohtakaw Education Centre will promote and provide nutritious snacks and meals consistent with the First Nation, Inuit, and Métis (FNIM) Food Guide while promoting nutrition education and daily physical activity.

Guidelines:

1. All Kipohtakaw Education Centre Staff must ensure that strategies are in place to foster the knowledge, skills and attitudes that promote healthy eating. In fulfilling this expectation Kipohtakaw Education Centre staff will:
 - a. establish linkages between health education and foods available at the school,
 - b. promote nutrition education and positive food messages provided by Alberta Health Services Website and Canadian FNMI food guide,
 - c. limit the use of food items as rewards, e.g. no candy for cleaning desks or finishing work early.
 - d. All school and classroom celebrations will follow the FNMI food guide and Alberta Health Services Guidelines for healthy living. (for example, talent show, round dance, pow wow, birthday parties, Halloween, meet the teacher, parent teacher interviews, Christmas concert, Christmas parties, career fair, graduation, track and field, prom, Easter, year-end parties, 100th day of school celebration and in addition to any other school celebrations),
 - e. Hot lunch menu and canteen menu to be posted in the monthly newsletter.
2. Kipohtakaw Education Centre will promote healthy, reasonably priced food choices when food is sold or otherwise offered. In fulfilling this expectation, Kipohtakaw Education Centre Staff will plan to:
 - a. access expertise in the community through partnerships, programs, referrals, etc.,
 - b. offer foods that are from the FNMI Food Guide.

- c. All fundraisers must follow the FNMI Food Guide and Alberta Health Services guidelines for healthy living.
3. Kipohtakaw Education Centre school community will examine their nutrition practices and provide opportunities, support and encouragement for staff and students to eat healthy foods. In fulfilling this expectation staff may do things such as:
- a. create their own health and wellness team that includes staff, parents and students,
 - b. choose healthy fundraising options,
 - c. create an environment where healthy foods are available, affordable and promoted as the best choice,
 - d. review options with food suppliers to maximize the nutritional value of the items,
 - e. define the frequency of special celebrations in yearly calendars and ensure that healthy food items are available on those days.
 - f. will promote positive food messaging on lunch and snack items provided by parents (Kipohtakaw Education Centre staff are not responsible for unhealthy food choices brought from home)

Appendix 2: Parent survey

Parent School Nutrition Survey

If you have more than one child attending KEC, please fill out this survey for the oldest child only.

What grade is this child in? _____

Please circle the one best answer for each of the **18** questions.

1. Do you know that KEC has a nutrition policy? The policy promotes and provides healthy food for students and staff.
 - Yes
 - No

2. Do you think it is a good idea for the school to have a healthy nutrition policy?
 - Yes
 - No

3. Has your child talked with you about the changes in food and drinks offered at school because of the nutrition policy?
 - Yes
 - No

4. Has your child talked with you about nutrition activities occurring at school?
 - Yes
 - No

5. Has your child suggested that you buy healthy food or drinks based on what she or he has learned about nutrition at school?
 - Yes
 - No

6. Do you agree that the school is doing a good job of letting parents know about its health programs and activities?
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree
7. How important is it to you that that your child has healthy food choices at school?
- Very important
 - Important
 - Neither important nor unimportant
 - Unimportant
 - Very unimportant
8. How important is it to you that traditional food is served to children at school? These are foods such as moose meat, bannock, berries, deer, and rabbit?
- Very important
 - Important
 - Neither important nor unimportant
 - Unimportant
 - Very unimportant
9. How important is it to you that fresh fruits and vegetables are served to children at school?
- Very important
 - Important
 - Neither important nor unimportant
 - Unimportant
 - Very unimportant

The following 3 questions refer to statements directly from the KEC School Nutrition Policy.

10. Do you agree with this sentence? *“Only healthy food and drinks will be served at the school breakfast and hot lunch.”*

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

11. Do you agree with this sentence? *“Only healthy food and drinks will be sold at school fundraisers, for example, to raise money for field trips.”*

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

12. Do you agree with this sentence? *“Only healthy food and drinks will be served at school and classroom celebrations. These include talent shows, birthday parties, parent teacher interviews, Christmas concerts, and graduations.”*

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

13. Think about what your child usually eats every day at school, at home, and at other places. Do you feel their eating habits are...?

- Very healthy
- Healthy
- Average
- Unhealthy
- Very unhealthy
- I don't know

14. Think about what you usually eat every day at work, at home, and at other places. Do you feel your eating habits are...?

- Very healthy
- Healthy
- Average
- Unhealthy
- Very unhealthy
- I don't know

15. What would you describe as the biggest barrier to adopting good nutrition in your home?

- Knowledge of what it means to have “good nutrition.”
- Not enough money.
- Lack of community resources, such as dieticians or nutritionists.
- Lack of healthy food for sale in the community.
- Not liking the taste of healthy food.
- Other. *Please specify:* _____.

16. What would you describe as the second biggest barrier to adopting good nutrition in your home?

- Knowledge of what it means to have “good nutrition.”
- Not enough money.
- Lack of community resources, such as dieticians or nutritionists.
- Lack of healthy food for sale in the community.
- Not liking the taste of healthy food.
- Other. *Please specify:* _____.

The following 3 questions ask about your child’s eating behaviours at school. Please answer to the best of your knowledge.

	Every day	2-4 days each week	A few days each month	Never	I don't know
17. How often does your child participate in the breakfast program at school?					
18. How often does your child participate in the hot lunch program at school?					
19. How often does your child purchase food from the canteen at school?					

Thank you for completing this survey.

Appendix 3. Student survey

Student School (KEC) Nutrition Survey

Answer the 17 questions the best you can. Please choose the one best answer to each question.

1. What is your gender?
 - Female
 - Male

2. What grade are you in? _____

3. Do you agree with this sentence from KEC's nutrition policy? "*Only healthy foods will be served or sold at KEC.*"
 - Strongly agree
 - Agree
 - Disagree
 - Strongly disagree

4. Think about what you usually eat every day at KEC. Do you feel your eating habits are...?
 - Very healthy
 - Healthy
 - Average
 - Unhealthy
 - Very unhealthy

5. Think about what you usually eat every day at home and at other places outside of KEC.

Do you feel your eating habits are...?

- Very healthy
- Healthy
- Average
- Unhealthy
- Very unhealthy

6. Have you asked your parents to buy healthy foods based on what you have learned about nutrition at KEC?

- Yes
- No

7. Do you like the food served at the KEC breakfast?

- Yes, I like it
- It's okay
- No, I don't like it

8. Do you like the food served in the KEC hot lunch program?

- Yes, I like it
- It's okay
- No, I don't like it

9. Do you like the food and drinks sold at the KEC canteen?

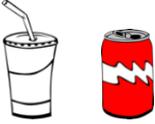
- Yes, I like them
- They are okay
- No, I don't like them

Please **check one box** that best answers each question for questions 10 to 15.

	Every day	A few days each week	A few days each month	Never
10. How often do you talk with your parents about what you eat and drink at KEC?				
11. How often do you ask your teachers about healthy foods to eat and drink?				
12. How often do your teachers talk with you about healthy food choices?				
13. How often do you buy food or drinks from the KEC canteen?				
14. How often do you eat the KEC breakfast?				
15. How often do you eat the KEC hot lunch?				

16. Do you think that the following foods are healthy or not healthy? Please check **one** box for each food

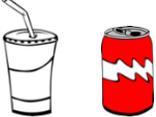
	Food or Drink	Healthy	Not healthy
	a) Leafy greens		
	b) Candy and chocolate bars		
	c) Fruit		
	d) Vegetables		
	e) French fries		
	f) Berries		
	g) Cakes and cookies		
	h) Wild game		
	i) Milk		

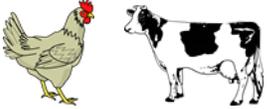
	Food or Drink	Healthy	Not healthy
	j) Pop		
	k) Fried bannock		
	l) 100% fruit juice like apple and orange juice		
	m) Sports and energy drinks		
	n) Baked bannock		
	o) Cheese and yogurt		
	p) Ice cream		
	q) Whole grain breads and pasta		
	r) Low fat meat and chicken <i>(not nuggets)</i>		
	s) Fish <i>(not breaded)</i>		

	Food or Drink	Healthy	Not healthy
	t) Whole grain, low-sugar breakfast cereal		
	u) Potato and nacho chips		
	v) Low-fat snack foods		

17. Would you like the following food and drinks sold and served at KEC? Please **check one box** for each food.

	Food or Drink	Yes	No
	a) Leafy greens		
	b) Candy and chocolate bars		
	c) Fruit		

	Food or Drink	Yes	No
	d) Vegetables		
	e) French fries		
	f) Berries		
	g) Cakes and cookies		
	h) Wild game		
	i) Milk		
	j) Pop		
	k) Fried bannock		
	l) 100% fruit juice like apple and orange juice		
	m) Sports and energy drinks		
	n) Baked bannock		

		Yes	No
	Food or Drink		
	o) Cheese and yogurt		
	p) Ice cream		
	q) Whole grain breads and pasta		
	r) Low fat meat and chicken (not nuggets)		
	s) Fish (not breaded)		
	t) Whole grain, low-sugar breakfast cereal		
	u) Potato and nacho chips		
	v) Low-fat snack foods		

Thank you for completing the survey.

Information Sheet

Project Title: Evaluation of KEC’s nutrition policy and nutrition activities

Investigator	Role
Mrs. Jody Kootenay [^]	Policymaker
Mr. Cory Arcand [^]	Community partner
Dr. Noreen Willows*	Principal Investigator

[^] Alexander First Nation Education

* Department of Agricultural, Food and Nutritional Science

Purpose of Research: Kipohtakaw Education Centre (KEC) has a Nutrition Policy. The aim of the policy is to ensure that children have healthy food at school. Alexander First Nation Education is working with researchers at the University of Alberta. Together, they are trying to improve school nutrition. We are asking you to complete a survey to help us.

- The survey will find out what parents know and think about the nutrition policy.
- The survey will find out what parents want their child to eat at school.
- The survey will find out from parents how often their child eats at school.

Study Procedure: The survey has 19 questions. It will take about 10 minutes to complete. You will receive a \$10 grocery store gift card for completing the survey. A student at the University of Alberta will include all surveys in a study about school nutrition policy. Survey findings might appear in a student thesis, papers, and talks. A report will be written for Alexander First Nation Education about survey findings. The study will help to improve the KEC nutrition policy.

Confidentiality: To ensure privacy, you will **not** write your name on the survey. This way, you will never be identified. All survey answers from parents will be combined. The only people who will have access to the surveys are researchers at the University of Alberta. Surveys will be

put in a locked cabinet at the University of Alberta. They will be kept for five years. They will then be destroyed. Survey answers will be put in computers at the University of Alberta. The computers will be protected with passwords.

Voluntary Participation: Doing this survey is voluntary. You can choose to complete this survey or not. You can decide to not participate once you start the survey. After you give your survey to Kris Murray, a student from the University of Alberta, you cannot take back your survey. This is because we will not know which survey belongs to you.

Approval: This study is approved by the Alexander Research Committee. Chief and Council approved it. It has been approved by a Research Ethics Board at the University of Alberta.

Risks: It is not expected that participation in this study will harm you in any way.

Benefits: The findings may help to improve the KEC nutrition policy.

Contact Information: If you have any further questions about the study, don't hesitate to contact:

Name	Email	Phone
Dr. Noreen Willows	noreen.willows@ualberta.ca	(xxx) xxx-xxxx
Ms Jody Kootenay	jodykootenay@gmail.com	(xxx) xxx-xxxx

If you have any questions or concerns regarding your rights as a participant, or how this study is being conducted, you may contact the Research Ethics Office at the University of Alberta, at 780-492-2615. This office has no affiliation with the study investigators.

By completing this survey, you consent to participate in this study.

Parent Interview Guide

Icebreaker questions

1. Please describe your favorite meal. What is it about this meal that makes it your favorite one?

Probe: Ask about types of food and drinks participants like to have for lunch or supper, and why.

Understanding food beliefs

2. What are some examples of food and drinks that you think are healthy? Why do you consider them to be healthy?

Probe: Biomedical beliefs, cultural beliefs, cultural significance (traditional foods)

3. Which types of snacks and food do you send with your child to school? Is there a particular reason why you choose those snacks and foods?

Probe: Child preference, health beliefs, affordability, availability

Broad questions about the school nutrition policy

KEC has a healthy nutrition policy to support students and staff to eat nutritious food and drinks. Because of the policy, all food and drinks offered or sold at school will be healthy foods. This means food and drinks served at breakfast, at the hot lunch and for school celebrations. It includes food and drinks sold at the canteen and for fundraisers.

4. Do you think the school should play a role in ensuring good nutrition and healthy eating for students? Why or why not?
5. How can parents support or promote children eating healthy foods and drinks at school?

Focused questions about the school nutrition policy

6. According to the nutrition policy, only nutritious foods will be served at classroom and school celebrations such as the talent show, birthday parties, holiday parties, and prom. Baking and sweets like cakes, cookies, and candy are replaced by foods like fruit and vegetable platters. What do you think of this part of the policy?

Probe: Healthy alternatives, importance of certain foods

7. According to the nutrition policy, only nutritious foods will be sold as school fundraisers. For example, a fried bannock burger sale is replaced by a healthy wrap sale. What do you think of this part of the policy?

Probe: Healthy alternatives, importance of certain foods

Questions about the relationship between the policy and home environment

8. Have any changes been made in your family and home as a result of the nutrition policy at school?

Probes: food purchases, cooking techniques

9. What things would make it easier for your family to eat healthier foods at home?

Final Questions

10. Do you think the school is doing a good job providing and promoting healthy food? In what ways could they improve?
11. In what ways could you as a community member and the school work together to improve the nutrition policy?

Probe: Feedback, suggestion box, volunteering

Student Interview Guide

Icebreaker Questions

1. If you could have anything to eat or drink at home, what would you want? Why would you choose these foods?

Probe: Types of foods and drinks child likes to have for breakfast, lunch, dinner, or celebrations; taste; social

Health Beliefs

Sometimes it is hard to think about what you normally eat and why, so I have brought some examples of different foods that you can look at while we are talking. These foods probably do not show everything you eat, but they might help you answer my questions.

2. Tell me about some food and drinks you think are healthy. Why do you think they are healthy?

Probes: Food preparation; bannock; meat; rabbit/moose/deer/duck/bush chicken; fish; sports and energy drinks

3. Tell me about some food and drinks you think are unhealthy. Why do you think they are unhealthy?

Probes: Food preparation; bannock; meat; rabbit/moose/deer/duck/bush chicken; fish; sports and energy drinks

4. Tell me about the food you usually eat and drink at school. *Probe: Breakfast; Hot lunch; Canteen; Are foods brought from home or outside the school?** Could the way you eat at school be healthier? Why or why not?

5. Tell me about the food you eat and drink when you are not at school. *Probe: At home or other places.*

Could the way you eat and drink at home and other places outside of school be healthier?
Why or why not?

Food Preferences

6. Think about the last meal you were served at KEC. Can you describe it for me? Did you like it? Why or why not?

Probe: Breakfast(4-6); hot lunch; taste

7. If you were in charge of making a healthy breakfast and hot lunch at school, what would you make? Why would you choose those foods?

Probes: Fish; taste; nutritional value

8. Does anyone in your life hunt for moose, deer, rabbit, duck or bush chicken? Do they fish, or pick for berries like saskatoons, chokecherries, gooseberries, blueberries, and raspberries?

If so, which of these foods do you like to eat? Why or why not?

Food Education

9. How often do you talk with your family about what you eat and drink at KEC? If often, what do you talk about? If not often, why not?

10. When you are at school, do you talk to your teachers about healthy foods? If so, what do you talk about? If not, why not?

11. Think about the classes you have where you learn about health. Would you like to learn more about healthy foods at school? How would you like to learn about healthy eating?

Probes: General nutrition information; cooking classes; shopping trips; field trips; visits from a nutritionist; after-school activities

Appendix 7: Parent interview information sheet and consent form

Information Letter and Consent Form

Study Title: Evaluation of KEC’s nutrition policy and nutrition activities

Investigator	Role
Mrs. Jody Kootenay [^]	Policymaker
Mr. Cory Arcand [^]	Community partner
Dr. Noreen Willows*	Principal Investigator
Ms. Christina Davey*	Graduate Student Investigator

[^] Alexander First Nation Education

* Department of Agricultural, Food and Nutritional Science, University of Alberta

Purpose: Alexander Education is trying to make sure that children eat healthy foods at school. As a parent of a student at Kipohtakaw Education Centre, we invite you to talk about healthy eating for children. The aims of the interview are to find out:

- what parents think about the school nutrition policy.
- what parents think is the school’s role in ensuring good nutrition.
- how parents can support children eating healthy at school.
- if parents are changing the foods served at home because of what is happening at school.

Procedure: You will participate in an individual interview for about 1 hour. Christina Davey will ask the questions in the interview. She is a student studying nutrition at the University of Alberta. You will receive a \$50 grocery store gift card. It is to thank you for your time and for sharing your thoughts.

The interview will be recorded. This way, Christina will know exactly what you said. The recording will be typed out. Christina will write a report for Alexander Education about what parents say. The report will help KEC make sure students have healthy food. Christina will also

put what she finds out in her thesis, and what she finds out will appear in papers and talks. The Alexander Research Committee will approve all of her reports and talks.

Benefits: You may not benefit from being in this study. However, the findings may help to improve the school nutrition policy.

Risks: It is not expected that participation in this study will harm you in any way. If answering some questions makes you feel uneasy, you can choose to not answer them.

Voluntary Participation: Participation is completely voluntary. Even if you agree to take part, you can change your mind during the interview or choose not to answer any questions. If you do not want what you say to be used in the study, you can change your mind, unless it has already been put in a paper or presentation. You can still keep the gift card.

Privacy: No names or any information that could identify you will be typed. Your name will only be on a consent form that you sign. It will be kept separate from what you say. Your name will never be used in papers or talks. What all parents say will be put into a computer at the University of Alberta. The computer will be protected by a password that only Christina knows. The typed notes, consent form, and recordings will be locked in file cabinets at the University for 5 years. They will then be destroyed.

Approval: Christina’s study is approved by the Alexander Research Committee. Chief and Council approved it. It is approved by a Research Ethics Board at the University of Alberta.

Contact Information: If you have any further questions about the study, don’t hesitate to contact:

Name	Email	Phone
Dr. Noreen Willows	noreen.willows@ualberta.ca	(xxx) xxx-xxxx
Mrs. Jody Kootenay	jodykootenay@gmail.com	(xxx) xxx-xxxx

If you have any questions or concerns regarding your rights as a participant, or how this study is being conducted, you may contact the Research Ethics Office at the University of Alberta, at 780-492-2615. This office has no affiliation with the study investigators.

Consent Statement

I have read this form and the study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have more questions, I have been told who to contact. I agree to participate in the study described above and will receive a copy of this consent form. I will receive a copy of this consent form after I sign it.

Participant's Name (printed) and Signature

Date

Name (printed) and Signature of Person Obtaining Consent

Date

Appendix 8: Student interview information sheet and consent form

Information Sheet

Project Title: Evaluation of KEC’s nutrition policy and nutrition activities

Alexander Research Committee Members

Role

Mrs. Jody Kootenay^

Policymaker

Mr. Cory Arcand^

Community partner

Dr. Noreen Willows, Associate Professor*

Researcher

Ms. Christina Davey*

Graduate Student

^ Alexander First Nation Education

* University of Alberta

Purpose: Alexander First Nation Education (AFNE) is trying to make sure that children have healthy food at school. We invite students in grades 4 to 12 to be interviewed about the school’s nutrition policy.

The aims of the interview are:

- To find out what students think about the food at school.
- To find out which healthy foods students want at school.
- To find out if students talk with their parents and teachers about what they eat.

Please complete the Consent Form. Have your child return it to their teacher by Friday November 25, 2016.

Procedure: All students that bring back a signed consent form will have the chance to be interviewed. 3 boys and 3 girls from grades 4-6 will be randomly chosen to participate. 5 boys and 5 girls from grades 7-12 will be randomly chosen to participate.

Students will take part in one interview. Christina Davey will interview each student. She is a student at the University of Alberta. She has worked with KEC and your child has met her. The interview will be audio recorded. This way, Christina will know exactly what each student said. Interviews will take place at KEC in a private room. They will take about 30 minutes. Students that do the interview will be given a \$25 gift card to Chapters. This is to thank them for sharing their thoughts.

Voluntary Participation: Participation is voluntary. Even if your child starts an interview, they can stop it at any time. Your child does not have to answer any questions they do not want to. You and your child are able to change your mind at any time about participating, unless the written interview analysis has started. In that case, the audio recording and typed notes will be destroyed. The gift card can be kept.

Privacy: Your child's name will never be typed or used in any way. Interview recordings and typed notes will be kept on a password-protected computer at the University. The consent forms will be kept in a locked file cabinet at the University. All files will be kept for 5 years after the study is over, and then will be destroyed.

Christina will write a report for AFNE about the results of the interviews. Interview answers will be used in her university thesis, papers, and talks. The Alexander Research Committee will approve all papers and talks first.

Approval: This study is approved by the Alexander Research Committee. Chief and Council approved it. It has been approved by a Research Ethics Board at the University of Alberta.

Risks: It is not expected that participation in this study will harm you or your child in any way.

Benefits: The findings may help to improve the school nutrition policy at Kipohtakaw Education Centre.

Contact Information: If you have any further questions about the study, don't hesitate to contact:

Name	Email	Phone
Ms. Christina Davey	cdavey@ualberta.ca	(xxx) xxx-xxxx
Mrs. Jody Kootenay	jodykootenay@gmail.com	(xxx) xxx-xxxx

“If you have any questions or concerns regarding your rights as a participant, or how this study is being conducted, you may contact the Research Ethics Office at the University of Alberta, at 780-492-2615. This office has no affiliation with the study investigators.” (University of Alberta guidelines)

Consent Form to participate in an interview about the KEC's nutrition policy

I have read and understood the information sheet. I understand that if I agree my child may be asked to do an interview. This interview will be used in a study at the University of Alberta. I understand that my **child's name will not be used.**

My child and I (*please choose one*):

Agree to allow my child to participate in an interview.

Do not agree to allow my child to participate in an interview.

Child's name (print):

Parent or guardian's name (Print):

Parent or guardian's signature:

Date: _____

Appendix 9. MEDLINE search strategy

Number	Search	Results
1	exp Indians, North American/	13760
2	(aboriginal* or first nation* or Premiere Nation or native* or Inuit* or Metis or Indigenous or FNIM or Amerindian or Indigenous or autochtone* or Mixed-blood* or Half Breed* or halfbreed* or Cree or Blackfoot or Blackfeet or Ojibwe or Ojibwa or Oji-Cree or Saulteaux or Anishinaabe or Assiniboin* or Anishinaabeg* or Mischif or Mitchif or Metif or Metchif or Dene or Wakashan or Athapaskan or Athapascan or Eskimo* or Esquimau* or Innu or Inuk or Innus or Montagnais or Maliseet or Naskapi or Mikmaq or Micmac or Mic mac or Migmaw or Micmaw or Beothuk* or "Gwich'in" or Inuvialuktun or Algonquin* or Algonquian* or Chipewyan or Tlingit or Mohawk or ((Native or Indian or Indians) adj1 (man or men or women or woman or boy* or girl* or adolescent* or youth or youths or person* or adult or people* or Indian or Indians or Nation* or tribe* or tribal or band or bands or population))).mp.	311225
3	1 or 2	311225
4	exp Schools/	109191
5	(kindergarden* or kindergarten* or elementary or primary school* or nursery school* or preschool* or pre-school* or pre school or pre-primary school or pre primary school or playschool* or secondary school* or high school* or senior high school* or "k-12" or junior high school* or middle school* or junior high school or residential school* or school*).mp.	1162659
6	4 or 5	1193968
7	exp Food/ or exp Eating/ or exp Diet/ or exp Food Habits/ or food services/ or menu planning/ or nutritional status/ or Energy Intake/	1504860

8	(nutrition* or food* or eat or eats or eating or diet or diets or dieting or nutrient* or feed or feeding or menu or menus or cafeteria* or confection?ry or canteen* or vegetable* or fruit or fruits or breakfast or lunch or meal or meals or garden* or snack or snacks).ti,ab.	1217544
9	7 or 8	2213559
10	canada/ or alberta/ or british columbia/ or manitoba/ or new brunswick/ or "newfoundland and labrador"/ or northwest territories/ or nova scotia/ or nunavut/ or ontario/ or prince edward island/ or quebec/ or saskatchewan/ or yukon territory/	148109
11	(canad* or canadian* or alberta* or british columbia* or saskatchewan* or manitoba* or ontario or ontarian* or quebec or quebecois or new brunswick* or nova scotia* or prince edward island or newfoundland* or labrador* or nunavut or nwt or northwest territories or yukon*).mp,in.	837346
12	10 or 11	837346
13	3 and 6 and 9 and 12	304

Appendix 10. Web Search Strategy

#	Search query	# of results retrieved	# of results screened	# of new potentially relevant records
1	"School" AND "Indigenous" AND ("nutrition" OR "food")	~79,000,000	100	7
2	“School” AND “First nation” AND (“nutrition” OR “food”)	~2,590,000	100	12
3	“School” AND “Aboriginal” AND (“nutrition” OR “food”)	~30,600,000	100	3
4	“School” AND “Native” AND (“nutrition” OR “food”)	~275,000,000	100	0
5	“School” AND “Indian” AND (“nutrition” OR “food”)	~388,000,000	100	0
6	“School” AND “Metis” AND (“nutrition” OR “food”)	~1,200,000	100	2
7	“School” AND “Inuit” AND (“nutrition” OR “food”)	~3,000,000	100	5
			Total	29