Teachers' Awareness of the School Nutrition Environment in the Champlain Region

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Abstract (English)

After the introduction of the Ontario School Food and Beverage Policy (PPM150), Healthy Schools 2020 was initiated to facilitate the policy's implementation in the Champlain region. Few studies have evaluated teachers' awareness of school nutrition policies. The purpose of this study was to explore teachers' awareness of the current activities in their school nutrition environment. A cross-sectional online survey was sent to elementary school teachers in the Ottawa and Renfrew school boards. Descriptive statistics were used to calculate the frequency of nutrition-related activities at schools. Pearson chi-square was used to test for associations between awareness of policies and school food practices, and the presence of nutrition committees and changes to catered lunches and fundraising activities. A total of 243 elementary school teachers completed the survey. Most teachers (83%) were aware of the PPM150 and 25% were aware of the Healthy Schools 2020 initiative. Those who were aware of the PPM150 were more likely to attend school meetings, work at a school where the policy was posted, learned about the policy through the school website, and heard about the policy during professional development days ($p<0.05$). There was no difference between being aware of the PPM150 or Healthy Schools 2020 with the use of food as a reward. Furthermore, the presence of a school nutrition committee was not associated with any changes to catered lunches; however, it was significantly associated with using food for fundraising ($p<0.001$). The results indicate that awareness of the PPM150 and the presence of a school nutrition committee did not result in changes in the school nutrition environment. There is a need for more communication about nutrition policies to school members, collaboration between partnerships and services, and training for teachers to improve school-based programs in the Champlain region.

Key words: *School nutrition policy, school environment, teachers*

Abstract (French)

Après l'adoption de la politique concernant les aliments et les boissons dans les écoles en Ontario (PPM150), le programme Écoles en santé 2020 a été introduit dans la région de Champlain pour en faciliter la mise en œuvre. Jusqu'à présent, il n'y a pas eu de recherche évaluant l'efficacité de la politique en Ontario du point de vue des enseignants et enseignantes. Le but de cette étude était d'explorer l'appréciation des enseignants et enseignantes au sujet des activités présentes dans l'environnement alimentaire scolaire. Au total, 243 enseignants et enseignantes au niveau primaire dans quatre commissions scolaires ont complété un sondage en ligne. Des statistiques descriptives ont été calculées et le test du chi-carré fut utilisé pour mesurer le degré d'association entre les méthodes de communications et la sensibilisation des enseignants et enseignantes à la politique et au programme. Ainsi, la plupart des enseignants et enseignantes (83%) étaient informés de la politique PPM150 alors que seulement 25% étaient informés de l'initiative des Écoles en santé 2020. La connaissance de la politique PPM150 était significativement associée à la présence des enseignants et enseignantes aux réunions scolaires, à l'affichage de la politique à l'école ou sur le site web, et aux discussions à ce sujet pendant les journées de développement professionnel ($p<0.05$). La présence d'un comité de nutrition n'était pas associée avec l'appréciation de la politique. Les résultats suggèrent que la connaissance de la politique n'était pas associée à l'implémentation de celle-ci dans les écoles. Plus d'efforts sont nécessaires afin de sensibiliser davantage les enseignants et enseignantes à l'initiative des Écoles en santé 2020 et pour améliorer les programmes scolaires en lien avec l'alimentation dans les écoles de la région de Champlain.

Mots-clés: *politique alimentaire scolaire, environnement scolaire, enseignants*

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Chapter 1

Background

Despite the numerous policies and programs targeting nutrition and healthy eating, children in Canada continue to make poor dietary choices (Health Canada, 2012; Moffat & Galloway, 2008; Mullally et al., 2010; St. John et al., 2008). Poor dietary habits can have several detrimental health consequences in childhood and throughout their lifetime. For instance, they can lead to overweight and obesity, which are associated with a multitude of long-term negative health outcomes such as insulin resistance, type 2 diabetes, hypertension, cardiovascular disease, and psychological issues (Biro & Wien, 2010; Health Canada, 2013). Moreover, those who are overweight or obese at a young age have an increased risk of cardiovascular morbidity or premature death in adulthood (Reilly & Kelly, 2011).

Childhood overweight and obesity continues to be a public health concern, affecting one third of 5 – 11 year olds in Canada (Roberts, Shields, de Groh, Aziz, & Gilbert, 2012). That being said, obesity is a multifaceted issue influenced by a variety of factors such as poor dietary habits, lack of physical activity, and socioeconomic status (Glanz & Bishop, 2010; McLeroy, Bibeau, Steckler, & Glanz, 1988; Veugelers, Fitzgerald, & Johnston, 2005). According to Bronfenbrenner's Social Ecological Theory (SET), behaviour is viewed as being affected by multiple levels of influence (Bronfenbrenner, 1977). The SET has been widely used in health promotion programs to understand how the influences of the environment affect behaviour (McLeroy et al., 1988). Within the school environment, this theory has been used to examine which factors most significantly contribute to a child's development of healthy dietary habits (Odum, Mckyer, Tisone, & Outley, 2013; Wechsler, Devereaux, Davis, & Collins, 2000).

Educating children about healthy eating can help establish healthy long-term dietary habits (Adamo, 2007; Birch & Ventura, 2009). A child's dietary behaviour begins to develop during the

critical or sensitive period during the first two to three years of life (Cashdan, 1994). The critical period is described as a certain time span where learning is at its prime with appropriate environmental stimuli and the sensitive period spans for a longer period of time where behaviour acquisition or learning becomes more difficult (Cashdan, 1994). Without appropriate environmental influences during this developmental period, children can develop long-term poor dietary habits (Cashdan, 1994). Thus, strategies used to promote healthy eating at an earlier stage in life are viewed as more successful than strategies that begin later on in life (Birch & Ventura, 2009).

Therefore, the school setting has been a widely accepted environment for health promotion (Clarke, Fletcher, Lancashire, Pallan, & Adab, 2013; Dadaczynski, 2012; Katz, 2009; Veugelers & Schwartz, 2010; Walton, Signal, & Thomson, 2013). Numerous studies have been published on the effectiveness of school-based programs on modifying children's weights and dietary habits (Day, Strange, McKay, & Naylor, 2008; Foster et al., 2008; Fung, D. McIsaac, Kuhle, Kirk, & Veuglers, 2013; Mullally et al., 2010). Healthy dietary habits not only reduce the risk of chronic diseases, but can also improve academic performance, school attendance, and concentration in school children (Kristjansson, Sigfusdottir, & Allegrante, 2010; Stroebele, McNally, Plog, Siegfried, & Hill, 2013).

In Canada, school nutrition policies fall under the responsibility of the provinces and territories. To date, school nutrition policies have been implemented in all provinces and in Yukon. However, Ontario was the last province to implement a school nutrition policy. In September 2010, the Ontario Ministry of Education introduced the Ontario School Food and Beverage Policy (PPM150) in all publicly funded schools (Ontario Ministry of Education, 2010). This school nutrition policy aims to increase access to healthier foods in order to ultimately

reduce students' risk for developing chronic diseases (Ontario Ministry of Education, 2010). As part of this policy, school boards are required to ensure that all foods and beverages sold at schools meet the nutrition standards found in the PPM150 (Ontario Ministry of Education, 2010). The Ontario Ministry of Education (2010) recognizes that the policy also reinforces that knowledge, skills, and attitudes regarding healthy eating are developed through the various subjects and disciplines in the Ontario curriculum.

To assist school boards in the successful implementation of the PPM150, the Champlain Cardiovascular Disease Prevention Network (CCPN) used the Comprehensive School Health (CSH) approach to implement this policy. The CCPN, a public health organization, has a goal to reduce the risk of cardiovascular disease of the population living in the Champlain region in Ontario. It facilitates stakeholder engagement and provides training resources to principals and teachers (CCPN, 2013). The CCPN and its partners developed the Healthy Schools 2020 initiative. This initiative focuses on three primary aspects of the school nutrition environment: 1) healthy catered lunches, which are foods offered to students through school lunch programs or food service programs; 2) healthy classroom rewards; and 3) healthy fundraising (CCPN, 2010).

To assess the impacts of the policy and identify areas for improvement, on-going evaluation is required (Deschesnes, Martin, & Hill, 2003; Perez-Rodrigo & Aranceta, 2003). In comparison to the United States and Europe, there has been limited research aimed at evaluating school nutrition policies in the Canadian context. To date, the majority of Canadian studies have been conducted in British Columbia, Prince Edward Island, Alberta, and Quebec (Downs et al., 2011; MacLellan, Holland, Taylor, McKenna, & Hernandez, 2010; Mâsse & de Niet, 2013; Morin, Demers, Gray-Donald, & Mongeau, 2012; Mullally et al., 2010; Taylor et al., 2011).

However, in order for a policy to be successfully implemented, members of the school community must first be aware and have a common consensus of the policy (Bertrand & Giles, 2010; Bertrand & Giles, 2012). If members of the target audience are unaware or unclear about the details of policies or programs, they will be less likely to change their behaviour or implement new activities (Bertrand & Giles, 2012). Throughout the literature, awareness has been used as an intermediate outcome to behaviour change or policy implementation (Capacci et al., 2012), yet there exists little research on the impacts of awareness and implementation of school nutrition policies and healthy school food practices. Since Ontario was the last province in Canada to implement a school nutrition policy, there exists little information on its implementation. To measure implementation activities, the CCPN conducted a baseline survey in 2010 and a follow-up survey in 2012 of the PPM150 and the Healthy Schools 2020 initiative with elementary and secondary school principals from nine different school boards in the Champlain region (CCPN, 2010; CCPN, 2012). The CCPN evaluated the implementation of catered lunches, fundraising activities, and classroom rewards before and after policy implementation. The results suggest that two years after the implementation of the PPM150, principals reported in increase in healthier foods used during catered lunch programs, fundraising activities, and classroom rewards. Although there were some positive changes to the foods offered in the school nutrition environment, there is room for improvement (CCPN, 2012).

Rationale

Previous research has examined the perceptions of school board members, superintendents, parents, principals, food service directors, and students on the influence of school nutrition programs on the environment and healthy eating behaviours (Agron, Berends, Ellis, & Gonzalez, 2010; Ardzejewska, Tadros, & Baxter, 2013; Brown et al., 2004; CCPN,

2010; CCPN, 2012; Devi, Surender, & Rayner, 2010; Dick et al., 2012). Teachers may have different views from other school members, as they are directly involved with the students. As such, this exploratory study focused on teachers' awareness of the PPM150 and Healthy Schools 2020. The goals of this research were to contribute to the Canadian literature on school nutrition policies, provide direction for health policy makers and school board members, and help identify facilitators and barriers for future school-based healthy eating programs.

Objectives

The objectives of this study were 1) to describe teachers' awareness of the on-going activities in the elementary school nutrition environment; 2) to determine if the implementation of the PPM150 is associated with teachers' awareness and nutrition-related activities at schools; and 3) to identify facilitators and barriers to achieving a healthy school environment. To address these objectives, the following research questions were explored through the use of the social ecological model:

a) Are teachers aware of different nutrition-related activities in the school environment?
b) Is teachers' awareness of the PPM150 or the Healthy Schools 2020 initiative associated with using food as a classroom reward?
c) Which methods of communication are most effective in raising awareness of the PPM150 and the Healthy Schools 2020?
d) Is the presence of a school nutrition committee associated with the implementation of PPM150 and the Healthy Schools 2020?
e) Are teachers aware of the nutrition activities in the school environment that can contribute to children's learning of healthy dietary habits?
f) What are the facilitators and barriers to achieving a healthy school environment?

Overview of Thesis

This thesis is organized into five chapters. The first chapter introduces the reader to the importance of healthy eating and the school nutrition environment. Chapter 2 provides readers with an in-depth background of school nutrition policies, as well as evidence supporting why the research is needed. Chapter 3 describes the methods and research design, as well as data collection and data analysis methods. Findings from the study are presented in chapter 4. Finally, chapter 5 contains a discussion of the findings along with a conclusion containing implications for future research.

Chapter 2

Literature Review

This literature review will provide an overview of the importance of school nutrition policies. It successively addresses the following topics: 1) health promotion in schools; 2) role of school nutrition policies; 3) outcomes of healthy eating programs; 4) factors associated with policy implementation 5) the role of teachers in fostering a healthy learning environment; 6) the need for on-going policy evaluation; 7) school nutrition policies in Canada; and lastly, 8) the different theoretical models used in school nutrition research.

Health Promotion in Schools

For years, schools have been deemed as ideal settings for health promotion (Clarke et al., 2013; Dadaczynski, 2012; Katz, 2009; Veugelers & Schwartz, 2010; Walton et al., 2013). The school setting provides a platform where health information can be delivered to students, and relayed to their home and to the community (Clarke et al., 2013; Hoxie-Setterstrom & Hoglund, 2011; Veugelers & Schwartz, 2010). Children spend a substantial amount of time in the classroom where they can be provided with nutrition education and the opportunity to practise making healthy choices in that environment (Katz, 2009).

Recognizing the importance of the school environment, international organizations have developed various initiatives focused on better integrating health policies through health promotion activities in schools. In 1995, the World Health Organization (WHO) launched the Global School Health Initiative. The initiative aims to foster a healthy school nutrition environment using the Health Promoting Schools (HPS) concept, which was based on the 1986 Ottawa Charter for Health Promotion (WHO, 2013a; WHO, 2013b). The HPS approach is widely used in European countries and in Australia. This approach is used to address the health and well-being of students, staff, and the community by engaging the whole school community

in health promotion activities (Deschesnes et al., 2003; WHO, 2013b). HPS addresses the following domains: 1) the school health curriculum, which provides school-aged children with the essential skills and knowledge to make healthy choices; 2) the school environment, which refers to the physical and social aspects of the environment as well as the health services and policies; and, 3) the interaction between the school and the community (Deschesnes et al., 2003).

In Canada, the HPS approach is frequently referred to as Comprehensive School Health (CSH). Similar to the HPS, CSH is an internationally recognized approach used to support the students' educational and health outcomes (Joint Consortium for School Health, 2013). CSH is built on four pillars: teaching and learning; social and physical environment; partnerships and services; and healthy school policy (Joint Consortium for School Health, 2013; Veugelers & Schwartz, 2010). The following components are defined based on the Joint Consortium for School Health (Joint Consortium for School Health, 2013).

1. Teaching and Learning: The teaching and learning component is dependent on the provincial or territorial curriculum. Schools can provide students with resources and age-appropriate knowledge and experiences to help build skills to improve their health and well-being.
2. Social and Physical Environment: The social environment is defined as the quality of relationships between staff and students, as well as relationships influenced by their families and the community. The physical environment includes basic amenities such as kitchen facilities, cleanliness, play space, and the surroundings of the school.
3. Healthy School Policy: This component includes policies at all levels that promote the health and well-being of students.

4. Partnerships and Services: Partnerships and services include connections between the school and students' families, a supportive network within and between schools, and connections between schools and community organizations.

The overall goals of CSH and HPS are to shift the focus from the classrooms to the whole school environment. This holistic approach requires the simultaneous integration of all pillars in order to achieve its goals (Deschesnes et al., 2003; Veugelers & Schwartz, 2010).

In Canada, many provincial programs have effectively applied CSH. In 1997, the Annapolis Valley Health Promoting Schools (AVHPS) in Nova Scotia was one of the first CSH programs to be developed. The program was first implemented in 7 regional schools. After the 2003 evaluation, children from the AVHPS were 59% less likely to be overweight and 72% less likely to be obese compared to children who did not attend intervention schools (University of Alberta, 2011; Veugelers et al., 2005). As a result, the program expanded to all schools in the Annapolis Valley region school board in 2005. Since then, the AVHPS program has been identified as a model for other Canadian schools. In 2008, the Alberta Project Promoting Active Living and Healthy Eating (APPLE) schools, which was based on the AVHPS model, was launched in 10 Alberta schools. Schools participating in the APPLE schools program were equipped with a full-time facilitator to aid with the implementation of the program. Participating schools were also required to create an "APPLE core committee," which was comprised of parents, students, administrators, teachers, and community stakeholders (Schwartz, Karunamuni, & Veugelers, 2010). The APPLE schools program was identified as one of the most engaging CSH programs in Canada according to the Best Practices Portal (Public Health Agency of Canada, 2013).

CSH is frequently used in school programs, but few studies have examined its effectiveness (Beaudoin, 2011; Schwartz et al., 2010; Wang & Stewart, 2013). There is emerging evidence that suggests that the successful implementation of a CSH approach can improve students' knowledge and attitudes towards healthy foods, reduce caloric intake, increase the consumption of fruits and vegetables among students, and slow the progression of obesity (Ardzejewska et al., 2013; Foster et al., 2008; Fox, 2010; Mâsse & de Niet, 2013; Rideout, Levy-Milne, Martin, & Ostry, 2007; Van Ansem, Schrijvers, Rodenburg, Schuit, & Van De Mheen, 2013; Vereecken, Bobelijn, & Maes, 2005; Veugelers et al., 2005; Wang & Stewart, 2013). In Canada, three programs have successfully incorporated the CSH approach: British Columbia's Action Schools! BC program; AVHPS in Nova Scotia; and APPLE schools in Alberta (Day et al., 2008; Fung et al., 2012; Naylor et al., 2010; Schwartz et al., 2010; Veugelers et al., 2005). For instance, students who participated in the AVHPS Program were 59% less likely to be overweight and 72% less likely to be obese; were 1.23 times more likely to consume fruits and vegetables; and were 1.29 times more likely to have an overall better diet quality compared to those who attended non-intervention schools (Veugelers et al., 2005). Likewise, students who attended APPLE schools in 2010 consumed 237 kcal/day less; had a significant increase in fruit and vegetable consumption by 0.39 serving/day; and were 16% less likely to be obese than students attending APPLE schools in 2008, which was prior to the program's implementation (Fung et al., 2012). These results suggest that the CSH approach has the potential to improve dietary intake and weights of school-aged children.

School Nutrition Policies

Healthy school policy is one of the essential components of CSH (Veugelers & Schwartz, 2010). In general, public health policies are strategies aimed to reduce the exposure to health

risks and unhealthy behaviours by targeting the environment and the individual. These include laws, mandates, regulations, standards, and guidelines (Vecchiarelli, Takayanagi, & Neumann, 2006). Thus, school nutrition policies are implemented with the hopes to provide students with access to a healthy school environment. In turn, the successful implementation of these policies can foster healthy dietary behaviours and decrease the chance of chronic diseases later in life.

One way school nutrition policies can be effective in changing the school environment is by increasing the availability and accessibility to healthy foods (Veugelers & Schwartz, 2010), which can allow students to make healthier choices on a daily basis. Based on the literature, nutrition policies often target catered lunch programs and canteens by increasing the availability of foods that have better nutritional quality while reducing the availability of low nutrient-dense foods (Ardzejewska et al., 2013; CCPN, 2012; Downs et al., 2012; Haroun, Harper, Wood, & Nelson, 2011; Mâsse & de Niet, 2013; Mendoza, Watson, & Cullen, 2010; Morin et al., 2012). For example, one year after the implementation of the Alberta guidelines, a cross-sectional telephone survey was conducted with principals from Alberta schools and over half (66%) of them reported improvements in the nutritional quality of foods in their lunch programs and canteens (Downs et al., 2012). Similarly, after the implementation of a school nutrition policy in Quebec, 71% of elementary schools stopped offering cold-cut lunches, stuffed pasta, or deep-fried foods and offered more milk-based or fruit-based desserts (Morin et al., 2012). From these findings, it is evident that the presence of a school nutrition policy had an influence on the decision-making regarding foods offered in catered lunches. However, these studies relied on the principals' views, which may not fully capture all of the activities in the school environment (Downs et al., 2012; Mâsse & de Niet, 2013; Morin et al., 2012).

In addition to catered lunch programs, food rewards, fundraisers, and other school events are occasions where students can have ready access to food. To ensure that students are receiving consistent messaging, fundraising and classroom rewards should align with nutrition education and policies in schools (Downs et al., 2012; Vereecken et al., 2005). The sale of foods with minimal nutrition value for fundraising has been widely practiced to generate revenue for school programs and activities (Kubik, Lytle, & Story, 2005b; Kubik, Lytle, Farbakhsh, Moe, & Samuelson, 2009; Rideout et al., 2007). Not surprisingly, school nutrition policies are less stringent towards the types of foods that can be used for fundraisers (Turner, Chriqui, & Chaloupka, 2012a). For example, most schools in British Columbia do not have a policy in place for fundraising with food; thus, less healthy foods were most often sold at these events (Rideout et al., 2007). On the contrary, nutrition guidelines are available in Alberta to help inform members of the school community of which foods should be sold for fundraising activities. Despite these guidelines being available, there was resistance from parents and teachers to pick the healthier options as opposed to the unhealthy options since it is believed that these would not generate greater revenue (Downs et al., 2012). However, there is evidence that suggests the replacement of unhealthy foods with healthy foods in cafeterias and vending machines resulted in purchases of healthier foods with no revenue loss (Fiske & Cullen, 2004; French et al., 2001; Hannan, French, Story, & Fulkerson, 2002; Messier, Cloutier, & Rowe, 2008; Wharton, Long, & Schwartz, 2008). Altogether, it appears that school nutrition policies are most often implemented for catered lunch programs and less often implemented during fundraising activities. Further research is necessary to understand why policies around foods and beverages being sold at fundraising or at special events are not always in place.

Similar to fundraising events, policies around classroom food rewards are not often implemented (Downs et al., 2011; Kubik, Lytle, Hannan, Story, & Perry, 2002; Lanier, Wagstaff, DeMill, Friedrichs, & Metos, 2012; Turner, Chriqui, & Chaloupka, 2012b). Classroom rewards are frequently used for learning engagements or for behaviour management (Hoffmann, Huff, Patterson, & Nietfeld, 2009). Despite the efforts of policies discouraging the use of food rewards, school-level data indicate that food continues to be used as a reward (Hoffmann et al., 2009; Kubik et al., 2002; Kubik, Lytle, & Story, 2005a; Lanier et al., 2012; Rossiter, Glanville, Taylor, & Blum, 2007; Turner et al., 2012b). It was proposed that the continued use of food rewards encouraged children to eat for reasons other than hunger (Roberts, Pobocik, Deek, Besgrove, & Prostine, 2009). Given that there is very limited research available on why teachers reward their students with food (Kubik et al., 2002; Turner et al., 2012b); this area of research should be explored.

Outcomes of Policy Implementation

Multicomponent interventions targeted at increasing the access to healthy foods at schools can present children with the opportunity to make healthier food choices, thus slowing the progression of overweight and obesity (Raczynski, Thompson, Phillips, Ryan, & Cleveland, 2009; Story, Nanney, & Schwartz, 2009). In general, multicomponent interventions include a combination of nutrition education, physical activity, and a behavioural component which have been shown to be more effective than single interventions that focus on one component (Day et al., 2008; Evans, Goto, Wolff, Frigaard, & Bianco-Simeral, 2012; Foster et al., 2008; Fung et al., 2012; Story et al., 2009; Wang & Stewart, 2013).

One of the outcomes used to measure the success of multicomponent interventions is Body Mass Index (BMI). BMI classifies an individual as underweight (< 18.5), normal weight (18.5 –

24.9), overweight (25 – 29.9), or obese (>30) using a formula – weight (kg) / height (m^2) (Health Canada, 2004). For children aged 5 – 19 years, their height and weight are plotted on growth charts to determine their BMI percentile. Those who have a cut-off of >+1 standard deviation (SD) (equivalent to BMI 25kg/m^2) are classified as overweight and those with a cut-off score of >+2SD (equivalent to BMI 30kg/m^2) are considered obese (WHO, 2007). Those in the overweight or obese classification may have a higher percentage of body fat, putting them at risk for some long-term health problems (e.g., diabetes, heart disease, high blood pressure, and some cancers) (Health Canada, 2004). Due to its clinical implications, many researchers have attempted to quantify the influences of the school environment on children's BMI (Foster et al., 2008; Fox, Dodd, Wilson, & Gleason, 2009; Fung et al., 2013; Gonzalez-Suarez, Worley, Grimmer-Somers, & Dones, 2009; Jaime & Lock, 2009; Kubik et al., 2005a; Phillips, Ryan, & Raczynski, 2011; Raczynski et al., 2009).

Children attending schools that have successfully implemented school nutrition policies tend to have more favourable BMI results (Fox et al., 2009; Fung et al., 2012; Veugelers & Fitzgerald, 2005). Cross-sectional studies have suggested that children who attended schools that sold low-nutrient dense foods have greater BMIs compared to children who attended schools that limited the availability of such foods (Fox et al., 2009; Story, 2009). In addition, having frequent opportunities for students to snack on high calorie and low nutrient dense foods throughout the school day (i.e., food in the classroom, fundraising activities, classroom rewards) were also associated with a higher BMI in students (Kubik et al., 2005a). Yet, there have been few studies that have evaluated the long-term outcomes of nutrition policy on children's BMI. Among the studies that have demonstrated the long-term outcomes of a nutrition policy on BMI, baseline and follow-up BMI measurements remained consistent in interventions that were two years in

length (Foster et al., 2008; Fung et al., 2013; Gonzalez-Suarez et al., 2009; Jaime & Lock, 2009; Raczynski et al., 2009; Sahota et al., 2001). These findings suggest that programs that are a minimum of two years in length can delay the progression of obesity. Nevertheless, in one Canadian study, the researchers found a slight increase in obesity in children living in Nova Scotia from 2003 to 2011 after the implementation of a school nutrition policy (Fung et al., 2013). Though a high BMI is one of the many risk factors for chronic disease, using BMI as an indicator in program evaluation is not always reflective of body composition or risk as it does not take into consideration bone density and muscle mass (Prentice & Jebb, 2001). Therefore, other outcome measures such as dietary behaviour have been used to evaluate multicomponent interventions.

A multitude of studies have examined the outcomes of school nutrition policy on students' dietary behaviours (Ardzejewska et al., 2013; Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Day et al., 2008; Fung et al., 2013; Jaime & Lock, 2009; Mendoza et al., 2010; Mullally et al., 2010). Based on these studies, specific changes to students' dietary behaviour include a reduced consumption of unhealthy foods, overall decline in caloric intake, and small increases in fruit and vegetable consumption (Ardzejewska et al., 2013; Briefel et al., 2009; Day et al., 2008; Fung et al., 2013; Jaime & Lock, 2009; Mendoza et al., 2010; Mullally et al., 2010). Previous findings on dietary behaviour were quite variable (Fung et al., 2013; Mulally et al., 2010). For example, Mullaly and colleagues (2010) reported students in Nova Scotia schools were more likely to consume fruits and vegetables compared to students in the same school before policy implementation. Yet, students still did not meet the daily-recommended fruit and vegetable intake (Mullally et al., 2010). Further, no significant increases in fruit and vegetable intake was noted in a more recent study of Nova Scotia students (Fung et al., 2013). Other intervention

studies have found no changes to very modest increases in fruit and vegetable consumption (Evans, Christian, Cleghorn, Greenwood, & Cade, 2012; Kipping et al., 2014; Prelip, Slusser, Thai, Kinsler, & Erausquin, 2011). Altogether, these findings suggest that the combination of a nutrition policy and other nutrition-related activities in schools (i.e., fruit and vegetable programs) may have a positive impact on children's dietary choices. Future research is required to further assess the extent to which the implementation of nutrition policies play on improving children's' dietary behaviours.

Factors Influencing the Implementation School Nutrition Policies

There are many barriers and facilitators that can influence policy implementation. Awareness is one of them (Brown et al., 2004; Budd, Schwarz, Yount, & Haire-Joshu, 2012; Downs et al., 2011; Lanier et al., 2012; MacLellan et al., 2010). Research evaluating the implications of awareness on school nutrition policy implementation, particularly among teachers, is limited (Kubik et al., 2002; Lanier et al., 2012; Storey, Spitters, Cunningham, Schwartz, & Veugelers, 2011). To date, only one study has evaluated the relationship between teachers' awareness of food and physical activity policies and its implementation. The authors found that awareness was positively associated with the implementation of school nutrition policies in American schools (Lanier et al., 2012). They also found that several factors were associated with teachers' awareness of school policies: Involving teachers in policy development, knowing the location of the school's written policy, as well as being continuously reminded of the specific components of the policy (Lanier et al., 2012). Moreover, Budd, Schwarz, Yount, and Haire-Joshu (2012) found that awareness of policies, among other factors, such as having a school nutrition committee, were associated with higher implementation of

school nutrition policies. There are thus many factors, including awareness, that contribute to policy implementation.

Policy implementation can also be influenced by other factors such as clarity of the policy and having a school nutrition committee. In Alberta, the majority of principals who reported being aware of the *Alberta Nutrition Guidelines for Children and Youth* did not report an appropriate implementation of the school nutrition policy in their respective schools (Alberta Government, 2012; Downs et al., 2011). Principals also reported that they did not fully understand the specific components of the school nutrition policy (Downs et al., 2011). The lack of understanding of the policies, also evident in other studies, hindered the implementation process (Bertrand & Giles, 2010; MacLellan et al., 2010).

Empirical evidence demonstrates that the main barriers to policy implementation are insufficient community or parental support (Ardzejewska et al., 2013; Agron et al., 2010; CCPN, 2010; CCPN, 2012; Downs et al., 2012; Masse, Naiman, & Naylor, 2013;), lack of communication (MacLellan et al., 2010), lack of resources (Agron et al., 2010; MacLellan et al., 2010), the cost of healthy foods (Agron et al., 2010; CCPN, 2010; CCPN, 2012; Dick et al., 2012; Downs et al., 2012; MacLellan, Taylor, & Freeze, 2009; Masse et al., 2013; Mckenna, 2003), time constraints (Agron et al., 2010; Day et al., 2008; Maclellan et al., 2009; Naylor et al., 2010), competition with other school priorities (Agron et al., 2010; CCPN, 2010; CCPN, 2012; Devi et al., 2010; MacLellan et al., 2009), and unclear guidelines (Ardzejewska et al., 2013; Bertrand & Giles, 2010; Downs et al., 2012; Mckenna, 2003). In contrast, there are several facilitators that have been identified to support policy implementation such as optimism about school nutrition policies (Kubik et al., 2002), the presence of a school champion or a policy working group (Fung et al., 2012; MacLellan et al., 2009; Pettigrew, Pescud, & Donovan, 2012),

and having appropriate resources (CCPN, 2010; CCPN, 2012; Mâsse et al., 2013). Understanding the barriers and facilitators to having a healthy school environment can help identify areas of improvement for policy implementation. Therefore, awareness appears to be a mediating factor in policy implementation; understanding the key factors associated with policy awareness and implementation are essential to tailor specific components of healthy eating programs in schools

Teachers' Roles in Fostering a Healthy School Environment

Teachers spend the majority of their days interacting with students and thus are important "gatekeepers" in the classroom (Auld, Belfiore, & Scheeler, 2010; Rossiter et al., 2007). As gatekeepers, they have the ability to link the community and the school environment through their students by providing nutrition education, acting as a positive role model, encouraging healthy behaviour, and enforcing policy (Cargo, 2006; Day et al., 2008). The Action Schools! BC intervention program is a prime example of how teachers can influence children's dietary behaviours. As part of this program, teachers were provided with classroom training and resources to implement two weekly classroom nutrition activities and one monthly fruit and vegetable tasting. Over the 12-week intervention, grade 4 and 5 students showed a modest increase in the consumption of fruits and vegetables (Day et al., 2008). In parallel, other studies show comparable results such that students had a 47% increase in fruit and vegetable consumption following similar intervention programs (Kristjansson et al., 2010; Veugelers & Fitzgerald, 2005). These findings clearly demonstrate the importance of teachers in fostering healthy dietary behaviours among students. As such, their insights provide valuable feedback for program evaluation.

Although previous studies have examined teachers' roles in healthy eating interventions, there is limited research on teachers' classroom food practices and beliefs about the school nutrition environment (Arcan et al., 2013; Evans et al., 2012; Kubik et al., 2002; Prelip et al., 2011; Rossiter et al., 2007). Previous studies have suggested that teachers' beliefs and attitudes of the school environment are shaped by personal values (Kubik et al., 2002; Rossiter et al., 2007). Researchers found that those who did not support a healthy school environment or did not participate in previous nutrition training were more likely to use food as a reward (Arcan et al., 2013; Kubik et al., 2002; Rossiter et al., 2007). In contrast, teachers who were supportive of school nutrition policies felt empowered to shape children's eating behaviours and believed that school nutrition policies give students the opportunities to practice healthy living (Cleland, Worsley, & Crawford, 2004; Kubik et al., 2002; Lambert, Monroe, & Wolff, 2010). They also believed that their ability to convey nutrition knowledge, beliefs, and attitudes could potentially have an influence on a child's food habits early in life (Auld et al., 2010). Conversely, there were still some teachers who believed that the sale of low-nutrient foods as part of school fundraising was acceptable to generate revenue (Kubik et al., 2005b). These findings stress the importance of providing training for teachers on the implications of healthy eating and the importance of healthful classroom practices.

Teachers' views may differ from the views of other school community members. Most researchers evaluated policy implementation from the views of other school members (i.e., principals, students, and food service managers) (Beaudoin, 2011; CCPN, 2010; Devi et al., 2010; Downs et al., 2012; MacLellan et al., 2009; MacLellan et al., 2010; Mâsse & de Niet, 2013; Odum et al., 2013; Pettigrew et al., 2012; Taylor et al., 2011) and few studies focused solely on teachers' awareness of school policies (Kubik et al., 2002; Lanier et al., 2012). For

instance, in a study measuring the implementation of physical activity and nutrition policies, elementary school teachers reported much lower implementation of school policies than principals (Mâsse & de Niet, 2013). Food service managers also noted lower implementation levels than principals in a study conducted in the United States (McDonnell, Probart, Weirich, Hartman, & Bailey-Davis, 2006). Since teachers spend the majority of their time interacting with students and are less often studied, their input is of paramount importance for policy implementation as their experience can provide a different perspective of the school nutrition environment.

Importance of Evaluation

Evaluation is important to assess the impact of any health promotion program; however, studies aimed at evaluating school nutrition policies are limited in the Canadian literature. Data collected from evaluations can be used to improve programs and identify strengths and weaknesses. Nevertheless, evaluating these programs remains challenging (Ramanathan, Allison, Faulkner, & Dwyer, 2008). Some of these challenges include insufficient funding and resources, assessing policy without baseline measurements, lack of research capacity, and variation in design and implementation of policies (Ramanathan et al., 2008; Taylor, McKenna, & Butler, 2010).

In addition, there are other challenges to policy evaluation that are unique to the Canadian context. The absence of a national surveillance system presents a challenge to program evaluation (Ramanathan et al., 2008). Furthermore, Canada does not have national nutrition standards for school nutrition policies, which results in different indicators of measurement. This makes it difficult to collect national baseline provincial or territorial data and to compare the impact of future evaluation studies. Often, program evaluation is left to well-funded university

research groups (e.g., Safe Healthy Active People Everywhere (SHAPES), APPLE Schools) or smaller community organizations (Ramanathan et al., 2008). As there is only a small number of researchers in the field of nutrition policy evaluation in Canada (Taylor et al., 2010), there are few evaluation studies of the impacts of provincial or territorial school nutrition policies in the scientific literature (Downs et al., 2012; MacLellan et al., 2009; Mâsse & de Niet, 2013; Mullally et al., 2010; St. John et al., 2008; Taylor et al., 2010). In order to learn from and build upon other policies and programs, the evidence suggests that more evaluation research is needed in Canada.

The lack of available resources in the school setting presents another challenge to program evaluation. Often, Canadian elementary schools are not equipped with kitchen facilities (Downs et al., 2011), and schools rely on ordering catered lunches from food service programs. Again, these programs vary between province, territories, and school districts (Taylor et al., 2010). Some schools have contracts with large international catering companies with nutrition composition data available while others work with smaller, private caterers that do not have sufficient resources to provide detailed nutrient composition of foods and beverages (Fung et al., 2013; MacLellan et al., 2009; Mckenna, 2003; Naylor et al., 2010; Taylor et al., 2010). Since schools work with different catering companies, it becomes difficult to assess whether school meals are meeting the nutrition standards.

School Nutrition Policies in Canada

In 2005, the provincial and territorial governments across Canada began to recognize the impact of the school nutrition environment on students' learning and health (Dietitians of Canada, 2008). In order to support healthy eating in schools, most provinces and territories have developed and implemented school nutrition policies. These policies include specific standards for foods and beverages sold in the school setting. School nutrition policies were first

implemented in New Brunswick in 1991, followed by Nova Scotia and Prince Edward Island in 2006, Quebec and British Columbia in 2007, Newfoundland, Manitoba, Alberta, and the Yukon in 2008, and Saskatchewan in 2009. In 2010, Ontario was the last province to implement a school nutrition policy (Dietitians of Canada, 2008; Ontario Ministry of Education, 2010).

In 2004, the Ontario Ministry of Education released the Health Foods and Beverages in Elementary School Vending Machines policy/program memorandum no. 135 (PPM135). The policy provided standards for foods and beverages sold in vending machines only and targeted elementary school settings (Ontario Ministry of Education, 2010). The PPM135 was superseded in 2011 with the PPM150. The PPM150 applies to all publicly funded schools and was created to help diminish students' risk for developing chronic diseases such as heart disease or type 2 diabetes (Ontario Ministry of Education, 2010). This policy requires all foods and beverages sold in venues (e.g., cafeterias, vending machines, canteen/tuck shops), through catered lunch programs, and at all school events to meet the specific nutrition standards. Foods and beverages were classified in three categories: "Sell Most (>80%)" category, which includes foods with the lowest amount of salt, sugar, and/or fat; "Sell Less (<20%)" category includes foods or beverages that are slightly higher in salt, sugar, and/or fat content; and foods with criteria that exceed recommendations for salt, sugar, and/or fat such as deep fried foods or candy are not permitted for sale (Ontario Ministry of Education, 2010). Exempt from the policy are foods and beverages that are offered in schools at no cost, brought from home, purchased outside of school premises (i.e., during field trips), sold in staff rooms, sold in schools for non-school purposes (i.e., sold by an outside organization), or sold outside of school hours. In addition, schools are allowed up to 10 special-event days where they can sell foods and beverages that do not meet the nutrition standards (Ontario Ministry of Education, 2010).

To support the implementation of the PPM150, the Healthy School Aged Children Committee, which includes representatives from the CCPN, Ottawa Public Health, the Heart and Stroke Foundation of Ontario, the Healthy Active Living and Obesity (HALO) Research Group at the Children's Hospital of Eastern Ontario (CHEO), and the University of Ottawa Heart Institute, was formed. Together, these organizations developed the Healthy Schools 2020 initiative and established three major priority areas for this initiative: 1) healthy lunch programs and food service contracts; 2) healthy fundraising; and, 3) healthy classroom rewards in the Champlain Region. The Champlain Region covers a total of nine different school boards from Eastern Ontario, Renfrew, Ottawa, and Upper Canada. By using an integrated, evidence-based approach to cardiovascular disease prevention (CCPN, 2013), the CCPN and its partners work to engage stakeholders and facilitate the program including the delivery of online resources, tools, and training for school staff in the Champlain region.

In 2009, a milestone was reached when the Directors of Education of nine school boards and Medical Officers of Health of the four public health units convened in the Champlain region and signed the *Champlain Declaration: A Call to Action for Physically Active & Healthy Eating Environment in Schools* (CCPN, 2010). The Declaration represented a commitment to create healthy school nutrition environments for children. After the implementation of the PPM150, the CCPN administered a baseline and follow-up survey to principals in the Champlain region to assess policy implementation (CCPN, 2010; CCPN, 2012).

In 2010, 298 principals from both elementary and secondary schools completed the Healthy Schools 2020 baseline survey. The findings from the baseline survey showed few favourable results (CCPN, 2010). Moreover, 86% of principals reported using food as a fundraiser, with the most frequently reported fundraising items being pizza and bake sale items,

followed by chocolate and candy. Approximately, 42% of principals reported teachers rewarding their students with chocolate, candy or pizza. Over one third (37%) of elementary school principals reported having a school nutrition committee that oversees programs and policies concerning healthy eating and the school nutrition environment (CCPN, 2010). The baseline survey results suggest that there is room for improvement in the Champlain region.

In 2012, a follow-up survey was sent to principals in the Champlain school boards. A total of 415 elementary and secondary school principals completed the survey. Following the province-wide implementation of the PPM150, there were some positive changes to the school nutrition environment in the Champlain region. In 2012, principals reported several changes to catered lunches specifically changes to pizza crust from white flour to whole wheat, the replacement of white breads and pastas with whole grain varieties, and a switch to lower-fat cheese and yogurts. Compared to the 2010 survey, there was a slight decrease in the use of food as a fundraising item; however, fundraising with pizza increased approximately 40%, and milk and yogurt sales increased about 20%. Only 3% of principals reported a decrease in elementary school teachers using food as a reward after policy implementation. Moreover, there was an overall increase in school nutrition committees as a result of the policy, from 37% to 56% (CCPN, 2012). Overall, there were some improvements in the school nutrition environment from 2010 to 2012. Nevertheless, there is still work to be done to improve the school nutrition environment in the Champlain region.

Since there was previous work conducted with school principals, the researcher consulted with representatives from the CCPN, CHEO, and the Heart and Stroke Foundation to identify other research needs and gaps. The result of this meeting led to a proposal to evaluate teachers' awareness of the school nutrition environment.

Overview of Theoretical Models

In health research, theoretical models are useful in understanding the dynamics of health behaviour, the process of behaviour change, and the external influences that affect behaviour (Glanz & Bishop, 2010; Story, Neumark-Sztainer, & French, 2002). Theoretical models most often used in the school nutrition context are the Social Cognitive Theory (SCT), the SET, the Transtheoretical Model (TTM), and the Diffusion of Innovation (DOI) Theory. A common theme embedded in these theoretical models is the multiple environmental and personal factors that affect behaviour change (Story et al., 2002).

Social cognitive theory (SCT). Bandura's (1986) SCT can be explained by three dynamic and reciprocal factors: personal factors, environmental influences, and behaviour. The SCT emphasizes that people learn from their previous experiences as well as through observing the actions of others (Bandura, 1986). The concepts of SCT, described in Table 1, include observational learning, reinforcement, self-control and self-efficacy (Bandura, 1986). The SCT has been widely used to determine gaps in programs and to predict behaviour change in populations (Berlin, Norris, Kolodinsky, & Nelson, 2013; Cole, Waldrop, D'Auria, & Garner, 2006; Glanz & Bishop, 2010; Nixon et al., 2012; Story et al., 2002). In a systematic review of effective behaviour change models in addressing pre-school obesity prevention programs, studies that incorporated the SCT yielded the most significant favourable changes in outcome measurements (Nixon et al., 2012). This is similar to other findings (Cole et al., 2006). Although the SCT was demonstrated to be an effective theory in intervention programs, Nixon et al. (2012) recommended that researchers move from interventions that are heavily based on behaviour at the individual level to developing interventions that focus on environmental, community, and policy influences on target groups.

Social ecological theory (SET). Bronfenbrenner's Social Ecological Theory seeks to understand how multilevel environmental and individual factors influence behaviour (Bronfenbrenner, 1977). McLeroy, Bibeau, Steckler, and Glanz (1988) developed a model based on Bronfenbrenner's (1977) SET that includes five levels that influence behaviour: intrapersonal, interpersonal, institutional/organizational, community, and social structure, policy and system. The SET can be used to measure behaviour or can be used as a lens to understand individual perceptions and the integration of the various environmental levels (Langille & Rodgers, 2010; Odum et al., 2013; Pigford, Willows, Holt, Newton, & Ball, 2012).

The transtheoretical model (TTM). Another common behavioural model used for health promotion is the TTM. The TTM measures one's readiness to change in five stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska & Velicer, 1997). Of the studies that did measure change after policy implementation, the TTM was used to assess the stages of change after the nutrition guidelines were implemented in Canada (Downs et al., 2011; Downs et al., 2012; Olstad, Downs, Raine, Berry, & McCargar, 2011). This model is often used to understand why people are resistant to change or to measure the adoption of guidelines (Story et al., 2002). However, the TTM ignores the social context in which change occurs and does not take into consideration socioeconomic status and income. The model also assumes that everyone goes through a fixed sequence of change without providing a timeframe for how long one should stay in the stage (Bandura, 1997).

Diffusion of innovation theory (DOI). The DOI theory aims to explain how a social system adopts a new idea, behaviour, or product (Rogers, 1995). Rogers developed the DOI theory in 1962 and identified five factors that influence the adoption of innovation: 1) relative advantage: the degree to which the innovation is seen as better than the previous idea, behaviour

or product; 2) compatibility: the consistency the innovation has with values, experiences, and needs of potential adopters; 3) complexity: how difficult the innovation is to use; 4) triability: testing out the innovation before fully adopting it; and 5) observability: the outcomes of the innovation (Rogers, 1995). In the context of nutrition, researchers have combined the DOI theory with the SCT or TTM to understand barriers to policy implementation (Downs et al., 2011; Downs et al., 2012; Olstad et al., 2011). A summary of the above mentioned theories are presented in Table 1.

Table 1. Description of theoretical models in nutrition research

Theory	**Factors/Stages**	**Use in a school nutrition program context**
Social Cognitive Theory (Bandura, 1986)	Observational Learning: people can observe a behaviour portrayed by others and reproduce these actions (i.e., modeling behaviours). Reinforcement: internal or external influences to a person's behaviour that can affect the likelihood of continuing or discontinuing a behaviour. Self-Control: refers to one's ability to set goals, problem solve, and monitor behaviour. Self-Efficacy: refers to one's level of self-confidence in his or her ability to perform a behaviour.	The three levels are used to describe human behaviour and learning. The factors are reciprocal of each other.
Diffusion of Innovation (Rogers, 1995)	Relative advantage: the degree to which the innovation is seen as better than the idea, program, or product it replaces. Triability: the extent to which the innovation can be tested before it is adopted. Compatibility: the consistency of the innovation with the values, experiences, and needs of the adopters. Observability: the tangible results of the innovation.	Addresses perceived attributes of an innovation that strongly affects its adoption and implementation.
Transtheoretical Model (Prochaska & Velicer, 1997)	Precontemplation: occurs when there is no recognition or no intention to change. Contemplation: occurs when one thinks about change. Preparation: when one prepares for change and takes small steps to adopt a behaviour. Action: when one adopts a behaviour. Maintenance: is the ongoing practice of the new behaviour.	Measures behaviour change occurring in five stages.
Social Ecological	Intrapersonal: includes knowledge, beliefs, attitudes, and skills of an individual.	Behaviour is affected by

Model (McLeroy et al., 1988)	Interpersonal: social networks or support systems including friends, family, and work groups. Institutional and organizational factors: include rules and regulations of a social institution. Community factors: relationships with organizations, institutions and networks outside the environment. Public policy: local, regional, provincial, and national laws and policies.	multiple interacting influences. For a more detailed explanation of the SET, please refer to the section “Theoretical Framework”.

Theoretical Framework

The SET encompasses broader aspects of the environment including policy and community factors, whereas other behavioural theories are more limited to individual influences and omits the influences of the social environment. In particular, the TTM and DOI theories do not consider the social context. Moreover, the DOI has been extensively applied to the adoption of information systems and technology (Kapooor, Dwivedi, & Williams, 2014; Rogers, 1995), which means little is known about its effectiveness in public health research. Lastly, the SCT emphasizes the individualized process of learning a behaviour (Bandura, 1986). Altogether, these theories are more focused on individual factors rather than the social, community, and policy influences (Glanz & Bishop, 2010).

Bronfenbrenner's (1976) SET emphasizes how human behaviour is influenced by the environment in which the individual lives in and the relationships the individuals relate (Bronfenbrenner, 1977). The SET is a complex model that focuses on how social environmental changes can lead to changes in an individual, as long as the individual is motivated and open to change (McLeroy et al., 1988). Throughout the years, the SET has been used as a framework for a multitude of public health issues such as smoking cessation, nutrition interventions, weight loss, injury prevention, and physical activity interventions (McLeroy et al., 1988). Most successful healthy eating interventions are based on the SET or the SCT (Glanz & Bishop, 2010; Sharma, 2006). In nutrition research, the SET has been commonly used to better understand the various factors that influence behaviour and food choices with the goals to develop more effective nutrition interventions (Kubik et al., 2002; McLeroy et al., 1988; Pigford et al., 2012; Story et al., 2002; Townsend & Foster, 2013). Moreover, this theory identifies what needs to be changed in the environment rather than how to change the environment (Brug, Oenema, &

Ferreira, 2005). In comparison to other behavioural theories, the SET was thought to be a best fit as behaviour change and implementation are influenced by factors other than the individual (Baranowski et al., 2003; Glanz & Bishop, 2010).

Therefore, the researcher used the adapted model proposed by McLeroy and colleagues (1988) who organized environmental factors into five levels: i) intrapersonal, ii) interpersonal, iii) institutional/organization, iv) community, and v) social structure, policy and system (Figure 1).

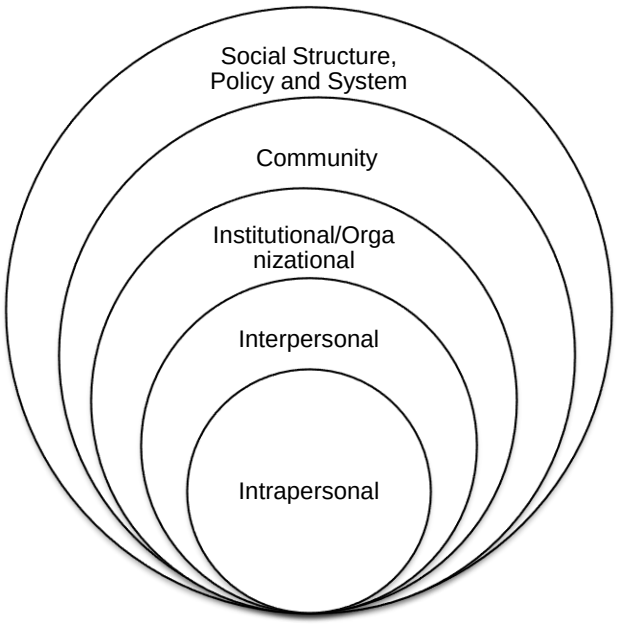


Figure 1. Levels of the social ecological model

The five levels of SET are defined as follows:

- Intrapersonal: Individual level factors are identified as personal factors that can influence behaviour such as age, education, income, knowledge, attitudes, and beliefs.
- Interpersonal: Most individuals belong in a group. Groups can encourage more healthful behaviours by providing support and knowledge.

- Institutional/organization: Organization includes schools, places of employment where people can make healthy choices through organization policies.
- Community: The community is similar to a large organization. They provide members greater access to healthy foods and places to be physically active.
- Social structure, policy and system: This final level encompasses all levels, intrapersonal, organizations, and communities working together to achieve change under policies.

In summary, many different theoretical models have been applied to health behaviour research and each theoretical model has its own strengths and limitations. Health promotion programs that were based on the SET, such as CSH, have been successful in changing individual behaviour and the environment (McLeroy et al., 1988; Wang & Stewart, 2013). CSH approach uses the SET to address the four pillars (i.e., teaching and learning, social and physical environment, school health policy, and teaching and learning) that influence the overall school environment and the health of students (Deschenes et al., 2003; Wang & Stewart, 2013). Since the CCPN employed a CSH approach for the implementation of the Healthy Schools 2020 initiative, the researcher decided to use the SET to understand the various levels of influence that can affect one's behaviour in order to create environmental conditions that are supportive to achieve sustainable change (Foster et al., 2008; Glanz & Bishop, 2010; Townsend, Murphy, & Moore, 2011).

Chapter 3

Methodology

Research Design

An online cross-sectional survey was sent to a convenience sample of elementary school teachers from the Ottawa Carleton District School Board (OCDSB), the Ottawa Catholic School Board (OCSB), the Renfrew County District School Board (RCDSB), and the Renfrew Catholic County District School Board (RCCDSB). Data collection took place from October 2012 to June 2013. There were two phases of recruitment: teachers were recruited through the school boards from October 2012 to March 2013 and then recruited through teachers' unions from March 2013 to June 2013. The University of Ottawa Research Ethics Board, the Ottawa Carleton Research Advisory Committee (OCRAC), and the RCCDSB school board approved this study (Appendices A, B, and C). Initially, the proposed study entailed a mixed-methods design with an online survey and a semi-structured interview component. After applying to the OCRAC, the interview component was not approved as interviews were thought to be a burden that may interfere with teachers' busy schedules. Hence, we used a cross-sectional survey for data collection.

Methods

In the process evaluation of school nutrition policies, surveys have been extensively utilized to capture current practices in the school environment (Briefel et al., 2009; Henry et al., 2010; Kubik et al., 2005b; Mâsse & de Niet, 2013; Mullally et al., 2010). With the advances in technology, web-based surveys have many advantages over paper surveys. Some advantages include: the elimination of manual data entry thus reducing entry errors, ease of accessibility, cost effectiveness, and the ability to reach a larger geographical area (Babbie, 2013). Not only are surveys useful to capture current practices, they can be used to assess attitudes, perspectives,

and barriers (Babbie, 2013). In addition to surveys, in-depth interviews can further identify perceptions of how individuals react with their new healthy eating environments (Fontana & Frey, 2005; McGraw et al., 2000). Previous research has used interviews to identify implementation of school programs and policies to promote healthy eating and physical activity among youth and how often they are carried out (McGraw et al., 2000). Research conducted by McGraw et al. (2000) also established that interviews are more appropriate for documenting policy implementation compared to observation methods, as well as more helpful in policy development and implementation.

Previously, the CCPN administered an online survey to principals from nine school boards in the Champlain region. After consulting with representatives from the CCPN, the Heart and Stroke Foundation, and CHEO, it was agreed that the current study would focus on teachers' awareness of the school nutrition environment in two of the targeted school boards in the Champlain region, the Ottawa-Carleton District School Board (OCDSB) and the Ottawa Catholic School Board (OCSB).

Teachers Recruitment

On September 11, 2012, Bill 115 *Putting Students First Act* was approved to ensure school contracts fit the government's financial and policy priorities, and to prevent labour disputes for 2013-2014 (Legislative Assembly of Ontario, 2012; Ontario Ministry of Education, 2012). The Bill affected rules around negotiations between local public school boards and unions; limited the legality of teachers' unions and support staff of going on strike; and affected their employment contracts and benefits (e.g., reduced number of sick days, pay freeze, etc.). During the fall of 2012, protests took place across Ontario and the Elementary School Teachers' Federation of Ontario suggested that their members take a pause from after-school activities. The

political activities during the data collection period resulted in two different approaches to recruitment (Legislative Assembly of Ontario, 2012; Ontario Ministry of Education, 2012).

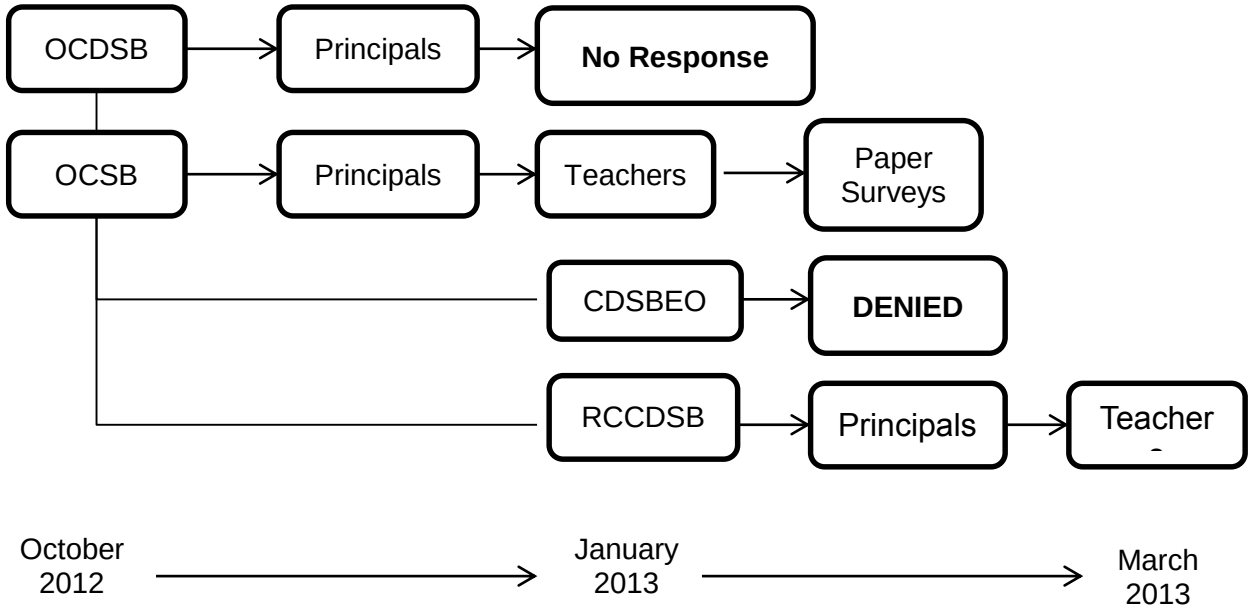


Figure 2. First phase of recruitment through school boards

First, teachers were recruited from the OCDSB and OCSB in October 2012. A recruitment e-mail (Appendix E), which included a link to the online survey (Survey Monkey ©), was sent to school board representatives to disseminate to the principals. Principals who were interested in having their teachers participate in the survey forwarded the recruitment e-mail (Appendix F) to the teachers. Three reminder e-mails were sent to the OCSB school board representatives to pass onto the principals at 2-week intervals; the OCDSB teachers did not complete any surveys. Two OCSB principals expressed interest and invited the researcher to recruit teachers during their staff meeting. Paper surveys were distributed as teachers have limited access to computer time during work hours.

Meanwhile, the researcher applied to ethics for the RCCDSB and the Catholic District School Board of Eastern Ontario (CDSBEO) because of the low response rates. Ethics applications were sent to Catholic school boards as they were not affected by Bill115. Ethics

approval was granted for RCCDSB and denied for CDSBEO due to the high number of activities taking place in the school environment. As a result, the recruitment e-mail was sent to school board members from the OCDSB, OCSB, and RCCDSB to disseminate to principals, and then to the teachers. Please refer to Figure 2 for a detailed description of the first phase of the

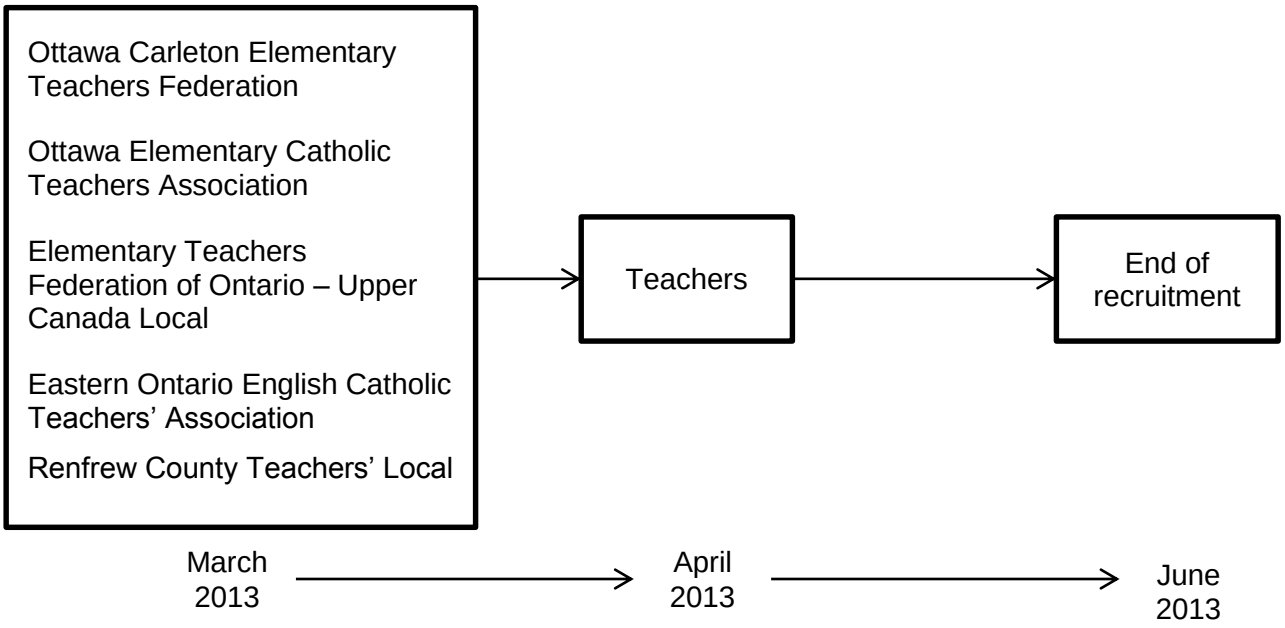


Figure 3. Second phase of recruitment through teachers' unions recruitment process.

During the second phase of data collection, the researcher recruited teachers from the teachers' unions from March 2013 to June 2013. The researcher contacted the University of Ottawa Research Ethics Board and it was determined that recruiting teachers through the teachers' union did not require school board ethics applications. The ethics amendment was sent to the University of Ottawa Research Ethics Board and approved. Following approval, the researcher sent the recruitment e-mail (Appendix E) to the president of the six teacher unions: Ottawa Carleton Elementary Teachers Federation, Ottawa Elementary Catholic Teachers Association, Elementary Teachers Federation of Ontario – Upper Canada Local, Eastern Ontario

English Catholic Teachers' Association, and Renfrew County Teachers' Local. The presidents of the Ottawa Carleton Elementary Teachers Federation and the Renfrew County Teachers' Local responded and disseminated the online recruitment e-mail to the teachers on their listserve (Figure 3). A final follow-up reminder to complete the survey was sent 2 weeks following the initial e-mail sent to the unions. Data collection concluded in June 2013.

Survey

The online survey was developed using Survey Monkey © (SurveyMonkey, 2014). The survey was designed to take approximately 20 minutes to complete and included 36 questions (Appendix D). Questions were developed based on the Healthy Schools 2020 principals' survey, PROPEL Centre for Population Health Impact's Healthy School Planner survey, and the literature (CCPN, 2010; CCPN, 2012; Joint Consortium School Health, 2013). The survey questions were pilot-tested for face validity by twenty OCSB teachers, three researchers, and a representative from the CCPN and a representative from the Heart and Stroke Foundation.

This study was not intended to directly measure behaviour. As such, the SET was used as a lens to understand the interaction of the various levels in achieving a healthy school nutrition environment from a teacher's perspective.

Data Analysis

Results were compiled in a password-protected database for data analysis. Surveys that were 95% to fully complete were included in the analysis. Surveys were excluded based on the following criteria: if the teacher taught grade 7 or 8 or if there was a substantial number of missing responses. Descriptive statistics were used to calculate frequencies for nutrition related activities such as catered lunches, fundraising items, and classroom rewards. Pearson chi-squared test was used to assess the association between awareness of the PPM150 and awareness of the

Healthy Schools 2020 with the use of food as a reward. The association between having a school nutrition committee and changes to catered lunches and using food for fundraising was also calculated. If a cell count was below 5, the p-value from the Fisher's Exact Test was used to provide a more conservative answer. A significant association was present if $p<0.05$. Comparison test results are reported following the descriptive statistics for each section. All data were analyzed using the Statistical Package for the Social Sciences (version 20.0; SPSS, Inc., Chicago, IL).

Chapter 4

Results

Characteristics of the Sample

A total of 243 completed surveys were included in the analysis. Response rate could not be determined due to the fact that the recruitment e-mails were sent to the school boards or teacher unions to forward to teaching staff. The results are organized according to the levels of the SET. Out of the total number of participants (n = 243), 89% were females and 11% were males. Over half (57%) of the teachers belonged to the 30 – 49 years age group. The majority (74%) of the teachers had more than 8 years of teaching experience. Specifically, 38% had 8 to 15 years of teaching experience and 36% had 16 years or more of teaching experience. Most teachers (81%) taught in the Ottawa school boards and 19% taught in the Renfrew school boards. As for teachers' nutrition education, a small proportion of teachers (15%) took a nutrition specific course in college or university. Awareness levels of the PPM150 were fairly high among teachers (83%). Compared to the awareness of PPM150, few teachers were aware of the Healthy Schools 2020 initiative, 83% vs. 25%, respectively. Characteristics of the study participants are summarized in Table 2.

Table 2. Characteristics of the sample population

Characteristics	**N = 243** **n (%)**
Sex[a]	
Female	216 (89%)
Male	26 (11%)
Age Group[b]	
21 – 29 years old	22 (9%)
30 – 49 years old	134 (57%)
50 years old and older	79 (34%)
Teaching Experience	
7 years or less	62 (26%)
8 – 15 years	93 (38%)
16 years or more	88 (36%)
Grades Taught[c]	
Single grade	131 (54%)
Two grades	55 (23%)
Mixed grades (3 or more)	56 (23%)
School Board	
OCDSB	122 (50%)
OCSB	75 (31%)
RCCDSB	20 (8%)
RCDSB	26 (11%)
Taken a nutrition course	
Yes	36 (15%)
No	207 (85%)
Awareness of PPM150	
Yes	202 (83%)
No	41 (17%)
Awareness of Healthy Schools 2020	
Yes	60 (25%)
No	183 (75%)

Notes: Numbers may not add to the total sample due to missing responses.
[a] One participant did not disclose his/her sex
[b] Age group missing 8 respondents
[c] One participant did not disclose the grade she/he taught

Teachers' Beliefs

When teachers were asked questions about their nutrition beliefs, 98% agreed that healthy eating is important. Three quarters (75%) believed that children's eating habits are developed and shaped during elementary school. As for teachers' influences on the behaviour of students, 72% believed that teachers have an influence on eating behaviour. A higher proportion of teachers (91%) believed that parents have a greater influence on their child's eating behaviour than teachers. Lastly, 22% of teachers agreed that students were bringing healthier lunches (i.e., foods containing all four food groups) since the adoption of the PPM150.

Teachers' Awareness of School Communication with Students, Staff, and Parents

Many teachers (41%) were unaware if anyone from their school has met with any parent organizations, such as school councils, to discuss healthy eating activities at school. However, 38% of teachers reported that their school had met with parents. In terms of collecting suggestions from parents/families/guardians about healthy food choices, half (50%) of teachers were not aware if their school had done so. Only a small number of teachers (17%) reported that their school met with students' parents, families or guardians. As for collecting suggestions from students about food choices at school, only 10% of teachers reported consulting with students. Almost half (46%) of teachers reported not having consulted with students about available food choices. When teachers were asked if staff provided suggestions about planning for healthy food choices, over half (56%) reported that staff were not consulted.

Table 3. Teachers' awareness of school communication with parents, staff, and students

	Yes n (%)	**No n (%)**	**Personally Unaware n (%)**
Met with any parents' organizations (e.g., school council) to discuss healthy eating activities at school?	91 (38%)	49 (20%)	101 (42%)
Formally collected suggestions from parents/families/guardians about planning for healthy food choices available at school	41 (17%)	81 (33%)	121 (50%)
Formally collected suggestions from students about planning for healthy food choices available at school	25 (10%)	110 (45%)	108 (44%)
Formally collected suggestions from school staff about planning for healthy food choices available at school	32 (13%)	136 (56%)	74 (31%)

Note: Numbers may not add to the total sample due to missing responses.

A wide range (31% - 50%) of teachers were personally unaware if their schools collected suggestions from organizations, parents, families or guardians, students, or school staff about various healthy eating activities at school (Table 3).

Teaching and Learning

When teachers were asked about learning opportunities for students, the most common learning activity was providing students with media literacy on special topics related to healthy eating (71%). Other activities such as cooking classes, gardening opportunities, field trips to farmer markets, and field trips to grocery stores were less common (Figure 4).

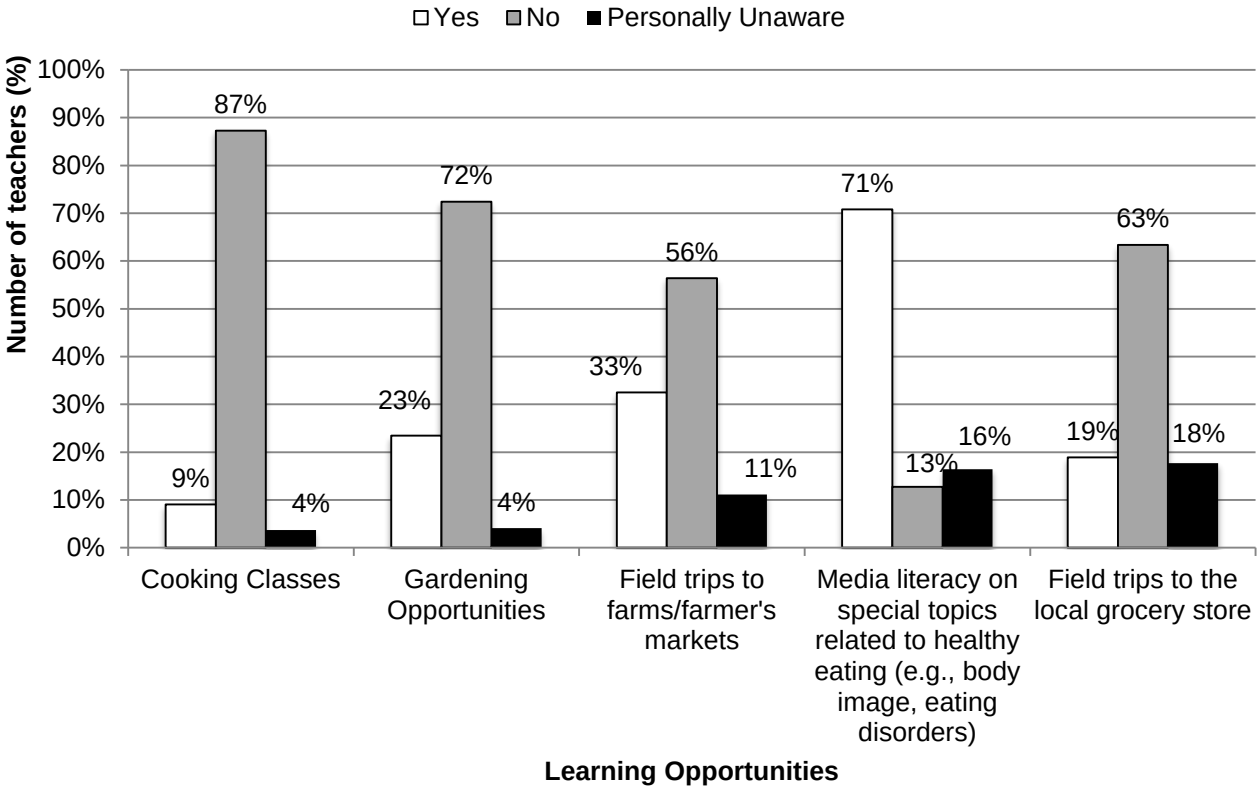


Figure 4. Teachers' awareness of learning opportunities for students

Awareness of Student Learning Opportunities

During the previous 12 months, the most common educational materials sent home from schools were healthy snacks and lunch suggestions (67%), followed by *Eating Well with Canada's Food Guide* (55%) (Health Canada, 2007). Approximately 40% - 49% of teachers were unaware if schools sent home educational materials on culturally diverse foods, material on the influence of screen time on a child's health, or materials on promoting positive self-body image (Figure 5).

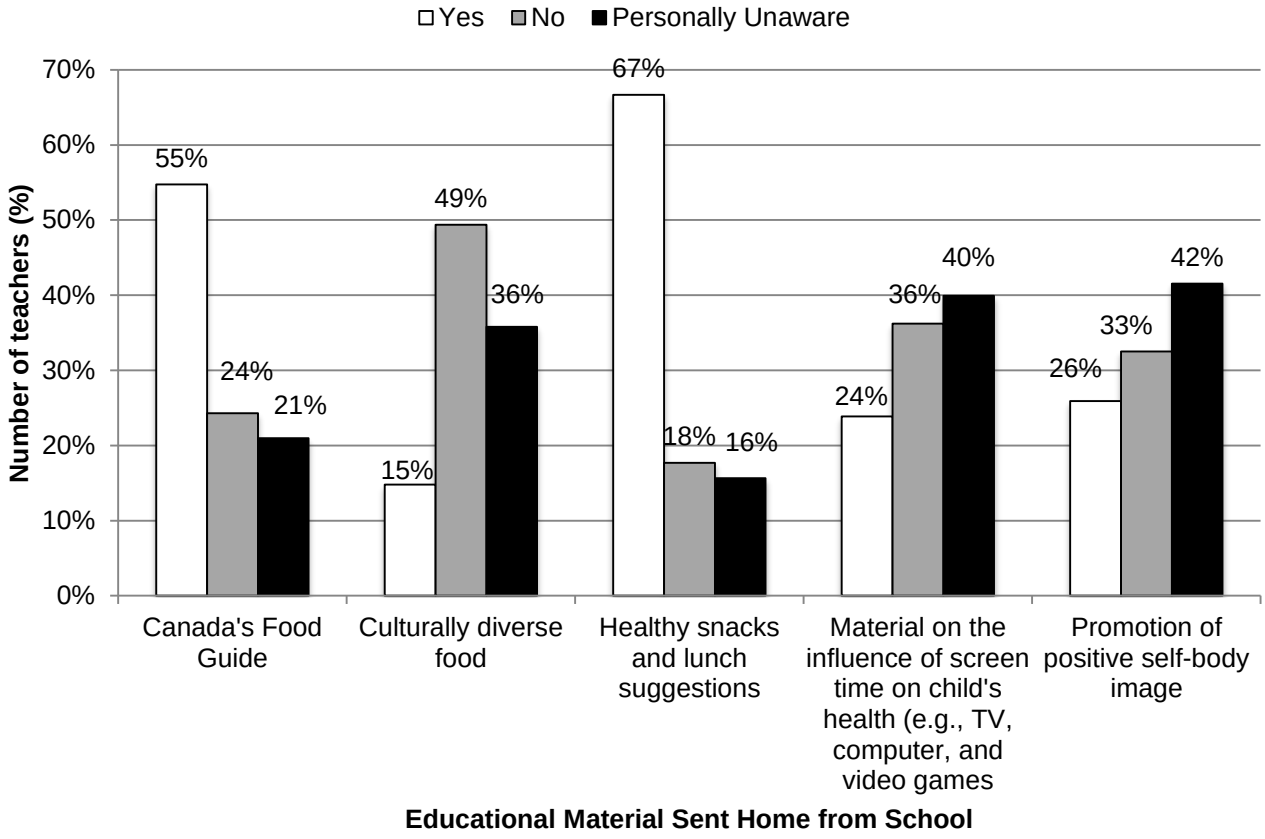


Figure 5. Teacher awareness of educational materials sent home in the previous 12 months

Physical Environment

Healthy foods can be offered through a variety of settings within the school environment: catered lunch programs, fundraising events, and classroom rewards. Catered lunches and school fundraising are common activities that take place in schools. Almost all participants (97%) reported that their schools offered catered lunches to students. Similarly, 94% of teachers reported that their schools held fundraisers that involved food. A small percentage of teachers (19%) reported that their schools have a committee that oversees programs or policies concerning healthy eating and the school nutrition environment.

Table 4. Teachers' beliefs of the Healthy Schools 2020 priority areas

Criteria	Healthy n (%)	Neither healthy or unhealthy n (%)	Unhealthy n (%)
Catered lunches	135 (63%)	27 (13%)	51 (24%)
Fundraising events	88 (39%)	40 (18%)	99 (44%)
Classroom rewards	59 (32%)	57 (31%)	67 (37%)
The overall school nutrition environment	158 (67%)	56 (24%)	22 (9%)

Note: Numbers may not add to the total sample due to missing responses.

Catered lunches. Over half of the teachers (63%) believed catered lunches as being healthy. (Table 4). Only a small proportion of teachers (3%) reported their schools never offered catered lunches to students. Catered lunches were most often offered once a week (37%) and almost a third (30%) reported having catered lunches less than once a week (Figure 6).

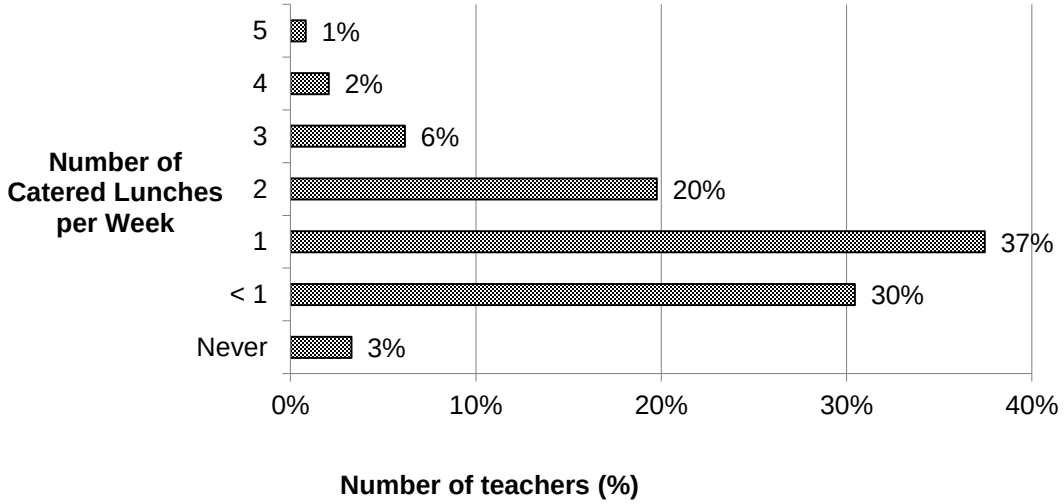
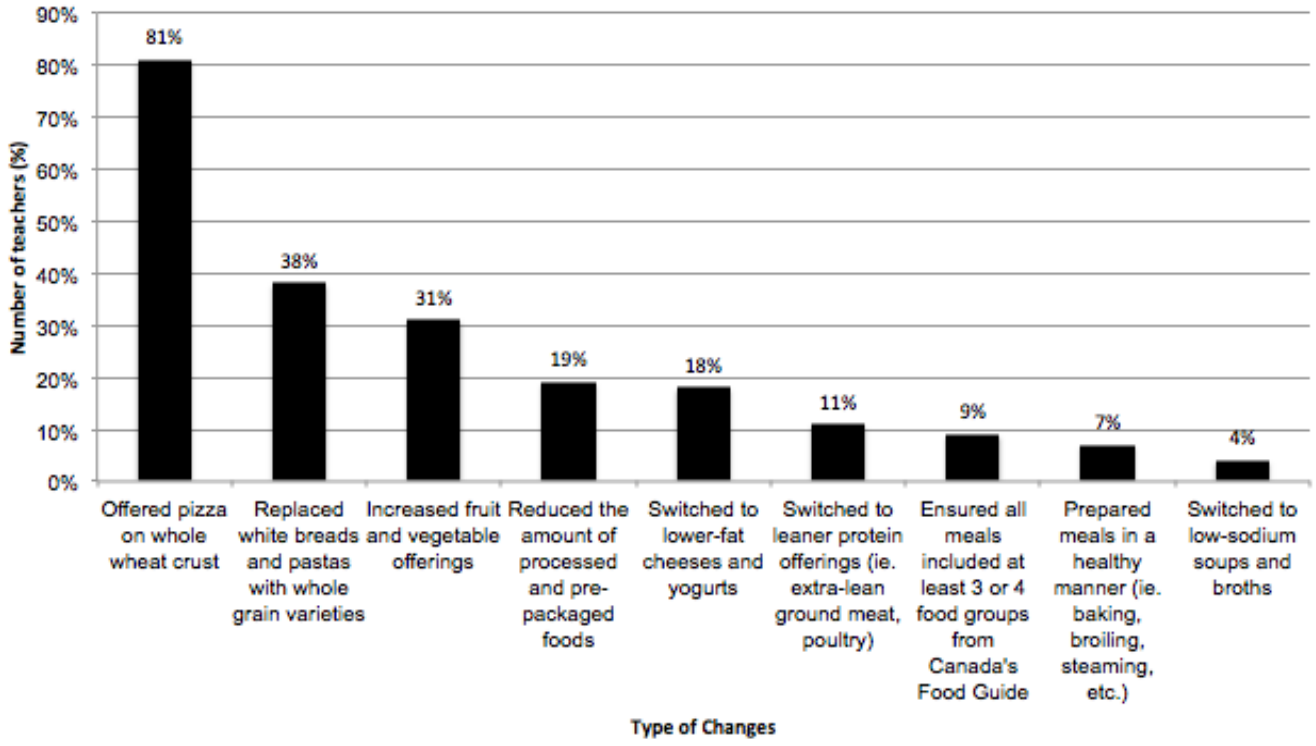


Figure 6. Frequency of catered lunches

Of those teachers who reported their school offering catered lunches (n = 235), over half (58%) believed changes to catered lunches were due to the policy, while 42% did not see changes to catered lunches. Of the teachers who perceived changes to catered lunches (n = 137),

the majority (81%) specified changes to pizza being offered on whole-wheat crust. The subsequent most frequently reported changes (38%) were the replacement of white breads and pastas with whole grain options followed by an increase in fruit and vegetable offerings (Figure 7).

When testing for the effect of having a nutrition committee on the changes in the catered lunches, no association was found between having a school nutrition committee and changes in catered lunches during the school year as a result of the Pearson test ($p > 0.05$).



Fundraising. In comparison to the perceived healthiness of catered lunches and classroom rewards, 39% of teachers who believed that the food used in fundraising activities at their school was healthy (Table 4). A slightly higher proportion of teachers (44%) reported fundraising activities with food as unhealthy (Table 4). Of those teachers who reported fundraising at their school (n = 228), three quarters (75%) reported food being used as a fundraiser item and 89%

reported non-food items being used as a fundraiser. Only a small proportion (10%) of teachers reported that their schools use only food as a fundraiser. Less than a quarter of teachers (24%) reported using non-food items only as a fundraiser. Almost two-thirds of teachers (65%) reported using both food and non-food items for fundraising.

Figure 8 presents details of the type of foods used for fundraising activities. For the teachers who reported using food as a fundraiser (n = 172), the most frequently reported fundraising food items were pizza (70%) and bake sale items (55%), followed by popcorn (43%). Other commonly reported foods included hot dogs and submarine sandwiches. The presence of a nutrition committee overseeing school nutrition policy was strongly associated with using food as a fundraiser ($X^2 = 11.879$ (1), $p \leq 0.001$).

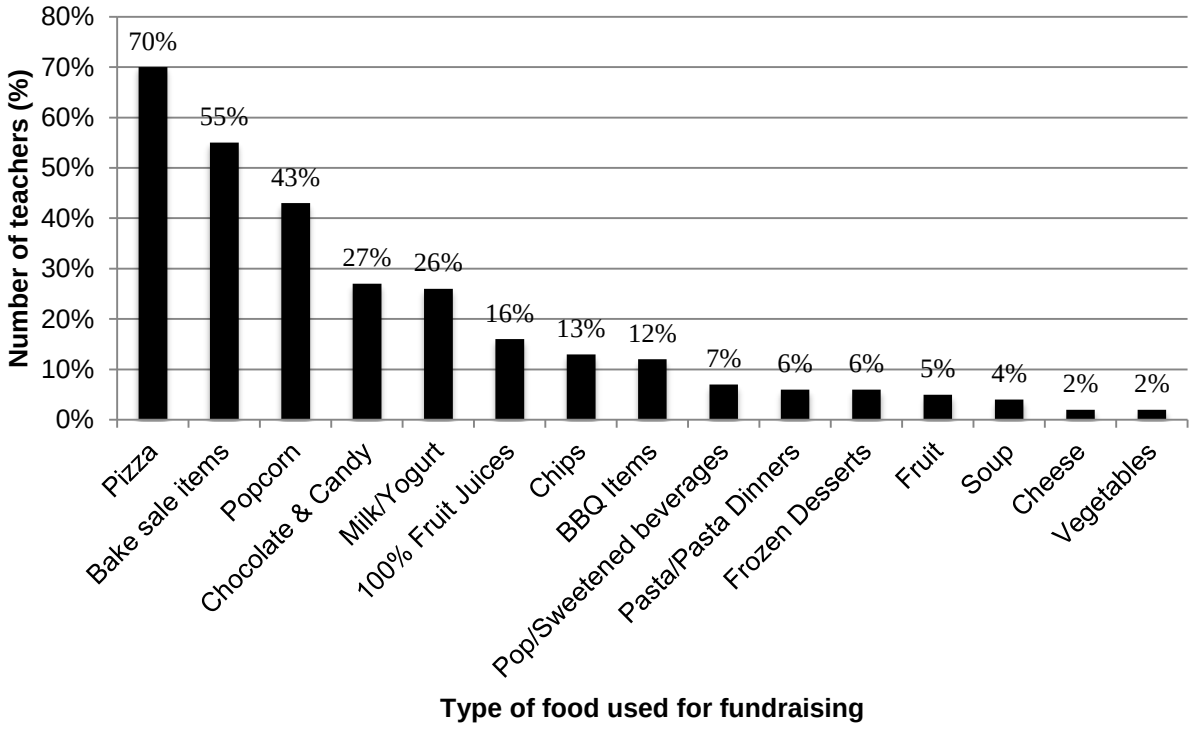


Figure 8. Frequency of reported food items used for fundraising

Classroom rewards. More than three quarters (79%) of the teachers use incentives to reward their students for positive behaviour in the classroom. A small number of teachers (20%) reported using chocolate or candy, baked goods, chips, or other foods (e.g., popcorn) for food rewards in the classroom. Out of those, 18% reported using candy or chocolate as a classroom reward. When teachers were asked about how frequently they used sweets, 51% reported using sweets between once or less per month to once a day. Those who did reward their students with sweets most often rewarded their students once or less per month (Figure 9). Teachers reported rewarding students with stickers, toys, and privileges more often than food items (Figure 10). For non-food rewards, 64% rewarded students with stickers, 78% used privileges and 41% use toys. Over half (57%) of the teachers reported using only non-food items as a reward.

One-third (32%) of the teachers believed classroom rewards were healthy, while 37% believed classroom rewards were unhealthy (Table 4). The remaining 31% of teachers believed classroom rewards were neither healthy nor unhealthy. There was no association between teacher's awareness of the PPM150 or the Healthy Schools 2020 and not using food as a reward ($p > 0.05$).

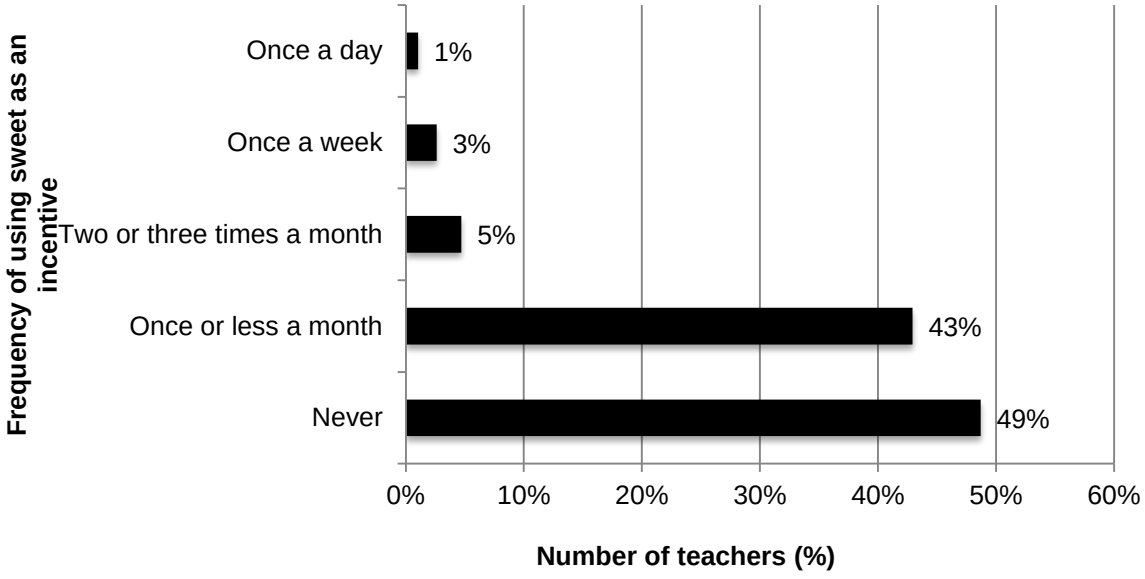


Figure 9. Frequency of rewarding students with sweets

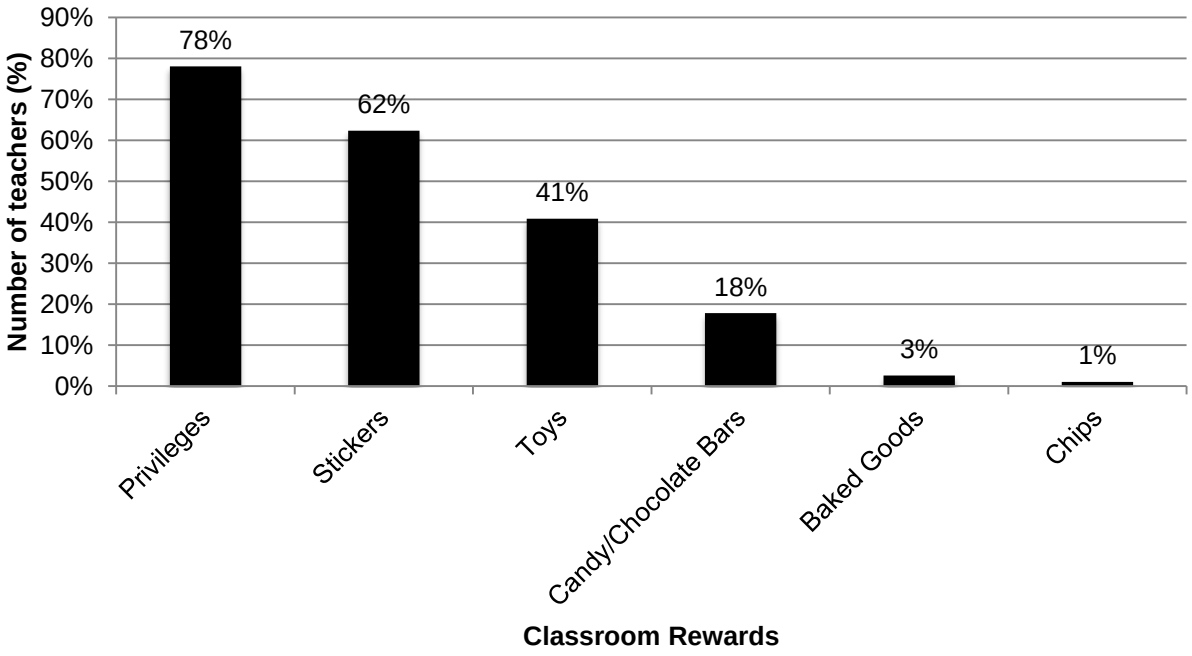


Figure 10. Frequency of reported food and non-food items used for classroom rewards

Partnerships and Services

Teachers reported that their schools have worked mostly with public health units (54%) and health organizations (45%) on healthy eating activities for students in the past year. Partnerships and services less often affiliated with the teachers' schools were parks and recreation departments (62%); youth organizations (e.g., YMCA, Boy Scouts) (60%); health and fitness clubs (63%); a consultant or specialist from the board/division/district (58.3%); and community health centres (56%). Partnerships and services reported by teachers are presented in table 5.

Table 5. Teachers' awareness of partnerships and services in the school community

	Yes n (%)	No n (%)	Personally unaware n (%)
Health organization (e.g., Heart and Stroke Foundation, Canadian Cancer Society, Canadian Diabetes Association)	98 (45%)	73 (34%)	45 (21%)
Parks or Recreation department	28 (13%)	134 (62%)	54 (25%)
Youth organization (e.g., YMCA/YWCA, Boys/Girls Clubs, Boy Scouts/Girl Guides)	30 (14%)	129 (60%)	57 (26%)
Health or fitness club	23 (11%)	135 (63%)	58 (27%)
Board/division/district itinerant teacher (e.g., consultant, specialist)	25 (12%)	126 (58%)	65 (30%)
Public health units	116 (54%)	59 (27%)	41 (19%)
Community health centres	21 (10%)	120 (56%)	75 (35%)

Note: Numbers may not add to the total sample due to missing responses.

Healthy School Policy

As for the number of "Special-Event Days" at school, over a third (34%) of the teachers stated that their school did not offer any special-event days; and 17% reported having 10 or more special-event days (Figure 11).

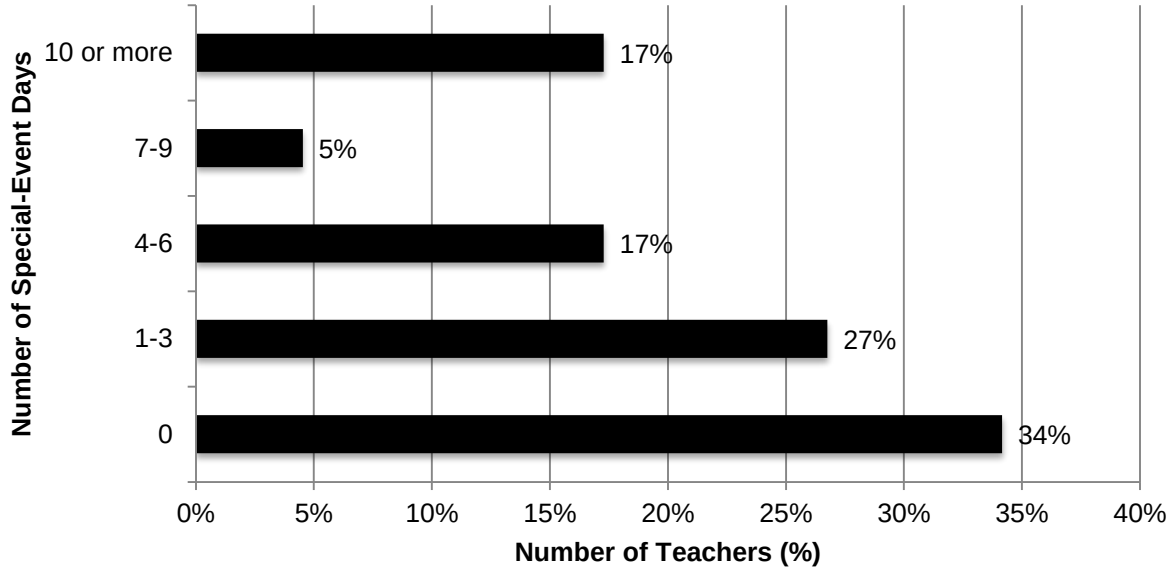


Figure 11. Frequency of reported "Special-Event Days"

Communication of school policies. Teachers were asked how healthy eating policies were communicated throughout the school community. School health policies were most frequently discussed at meetings (61%) and were less frequently written in a school/board/division handbook (21%) or in a student agenda provided by the school/board/division/district (21%). Over half the teachers (63%) were unaware if school health policies were written in a school/board/division/district handbook or posted on a school/board/division website (53%). The communication of school policies during staff meetings and professional development days was significantly associated with teacher awareness of the PPM150 ($X^2 = 9.605$ (1), $p<0.05$). The presence of school policies posted on school/board/division/district website(s) was significantly associated with teacher awareness of the PPM150 ($X^2 = 6.413$ (1), $p < 0.05$) (corrected with Fisher's Exact Test), but not significantly associated with the awareness of Healthy Schools 2020 ($p>0.05$). The presence of a school policy posted at school was also significantly associated with teacher awareness of the PPM150 ($X^2 = 3.924$ (1), $p < 0.05$). There was no association between the different communication methods and teacher awareness of Healthy Schools 2020 ($p>0.05$). Factors associated with awareness are described in Table 6.

Table 6. Methods of communicating healthy eating policies associated with awareness of PPM150 or Healthy Schools 2020

Method of Communication	**Awareness of PPM150**	**Awareness of Healthy Schools 2020**
Written in a school board/division/district handbook		
Yes	80 (88%)[a]	19 (21%)
No	11 (12%)	72 (79%)
Written in a school/board/division/district newsletter		
Yes	115 (89%)[a]	33 (25%)
No	15 (12%)	97 (75%)
Written in a student agenda provided by the school/board/division/district		
Yes	109 (87%)	28 (22%)
No	16 (13%)	97 (78%)
Discussed at meetings (e.g., staff meetings, professional development days, assemblies, school council)		
Yes	171 (85%)*	49 (24%)
No	30 (15%)	152 (76%)
Having a policy posted on school/board/division/district website(s)	103 (90%)[a]*	31 (27%)
Yes	12 (10%)	84 (73%)
No		
Having a policy posted at school		
Yes	125 (86%)*	35 (25%)
No	20 (14%)	108 (76%)
Distributing information about the policy through e-mail	125 (86%)	35 (24%)
Yes	20 (14%)	110 (76%)
No		

Note: Missing responses were excluded from analysis
*Significantly associated ($p < 0.05$)
[a]Fisher's exact test

School priorities. In regards to school priorities, 45% of teachers believed that principal or teacher training in physical activity or healthy eating was a low priority in their schools. More than a third of the teachers (35%) were unaware of school priorities on healthy food service contracts for food service providers. More than half (52%) of the teachers perceived their school's priority level on overall healthy eating to be medium (Figure 12).

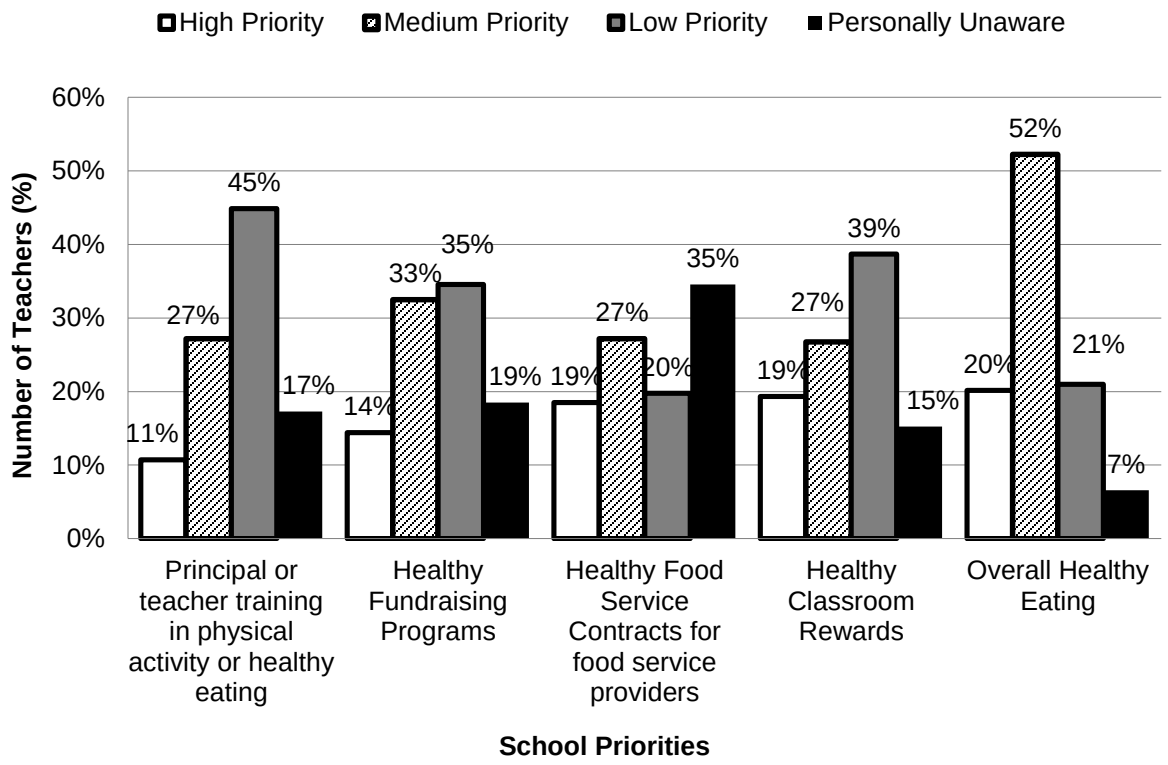


Figure 12. Teachers' awareness of school priorities

Facilitators and Barriers to Healthier Food Offerings in Schools

Facilitators. Teachers were asked to identify facilitators that would help schools increase offerings of healthy foods. The top three most frequently reported facilitators were having healthy affordable food options (60%), having support materials/training for students, parents, and staff (58%), followed by grant money/funding (37%). Only a small proportion (14%) stated

that no supports were needed. Facilitating factors for school nutrition policies are presented in Figure 13.

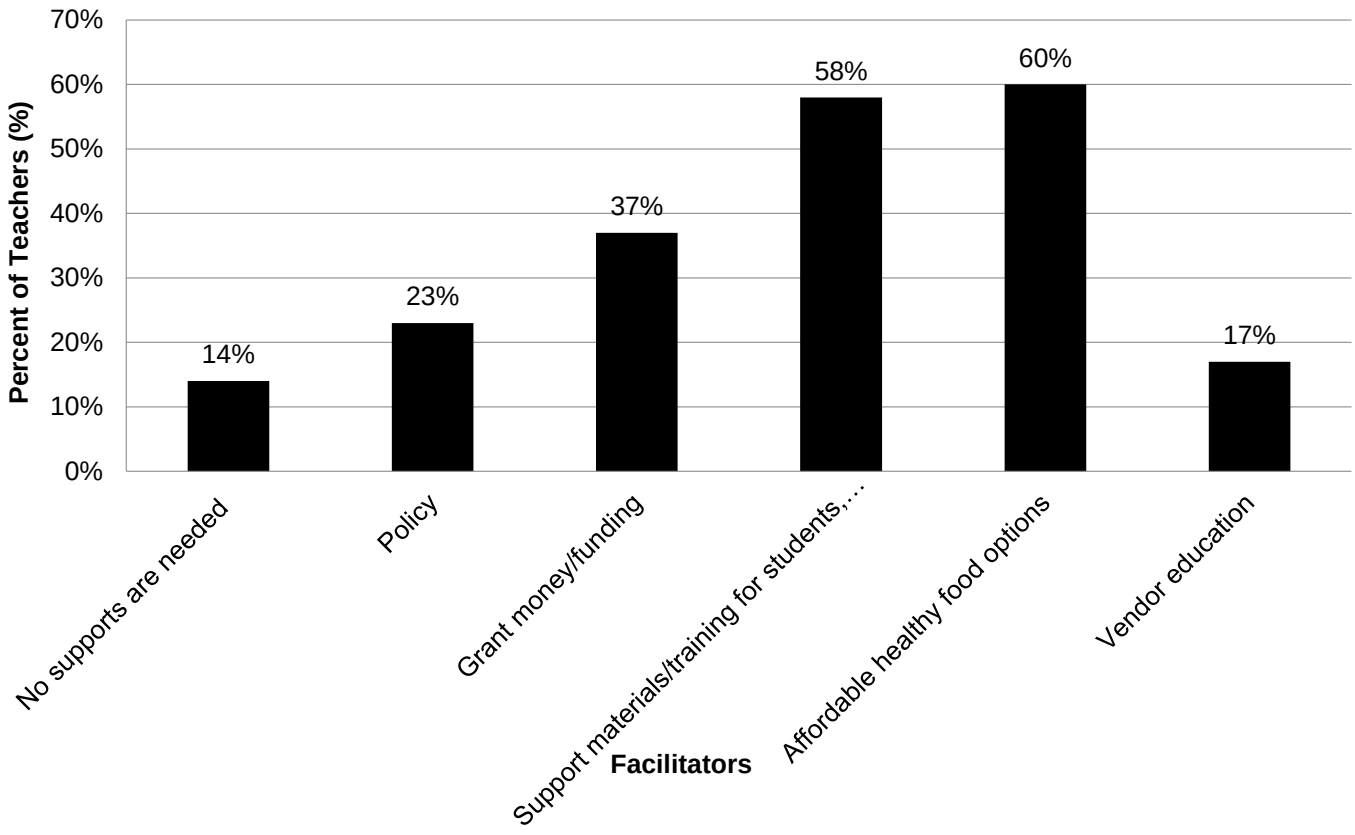


Figure 13. Frequency of reported facilitating factors for policy implementation

Barriers. The most frequently reported barrier to changing the food offerings in their school was push-back from parent (49%). The next most commonly reported barrier was the lack of time to understand and implement nutrition guidelines (30%), followed by the availability of vendors who can meet nutritional guidelines (26%), and lack of nutrition knowledge or training (26%). Almost a quarter (24%) of the teachers reported having no barriers. Barriers to policy implementation are presented in Figure 14.

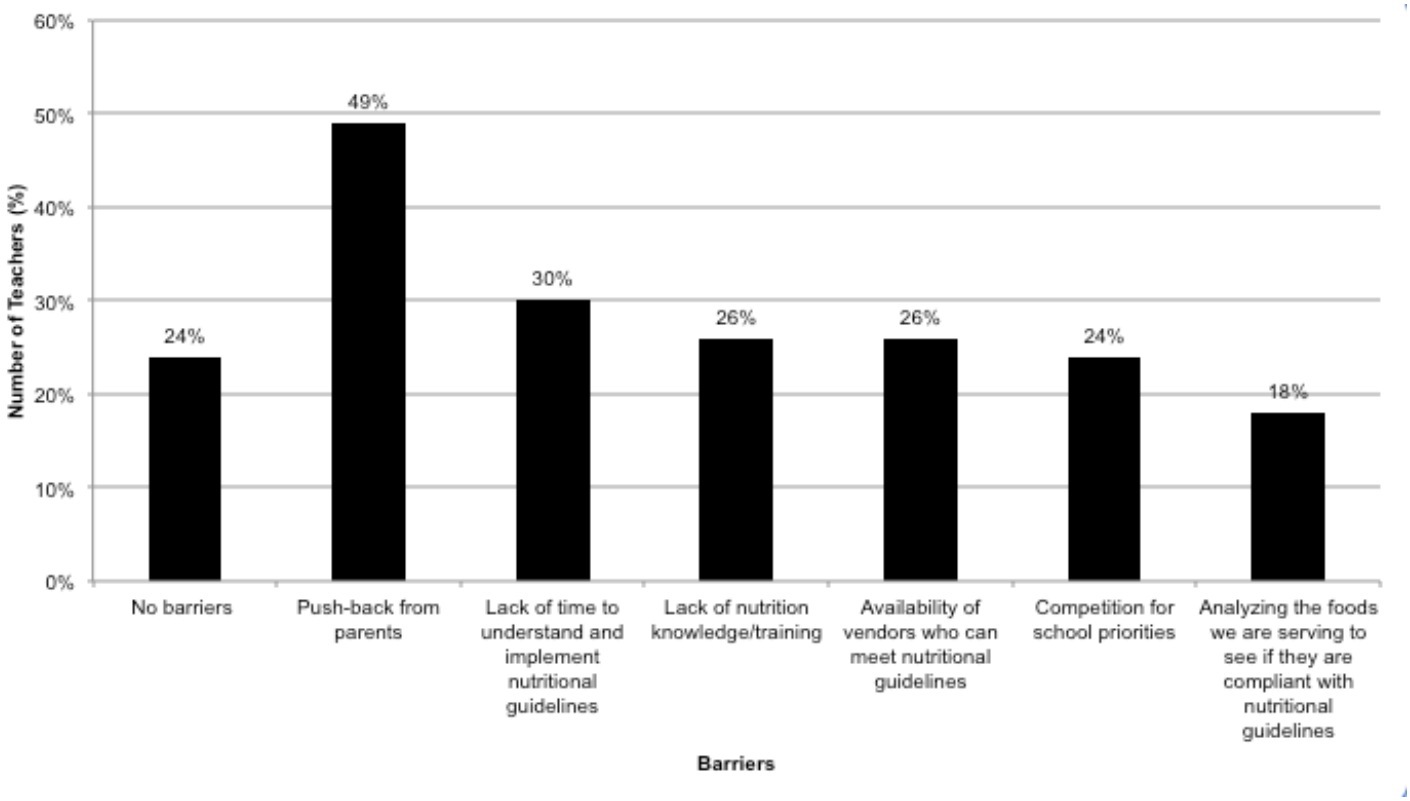


Figure 14. Frequency of reported barriers to policy implementation

Chapter 5

Discussion

This thesis aimed to identify elementary school teachers' awareness of various nutrition related activities in the school environment.

Teachers' Awareness of the PPM150 and Healthy Schools 2020

Compared to previous findings, the results of this current study indicate that teachers' awareness of the school policies or initiatives was not associated with implementation. More teachers were aware of the PPM150 than the Healthy Schools 2020 initiative, 83% vs. 25%, respectively. Although a large proportion of the teachers were aware of the provincial policy that states all foods and beverages sold in schools should comply with the nutrition standards (Ontario Ministry of Education, 2010), teachers continue to reward their students with food. The reasons why teachers continue to reward their students with food may be due to the substantial number of teachers who were unaware of the Healthy Schools 2020 priority areas and the resources available to them. Furthermore, the PPM150 is heavily focused on nutrition standards for foods and beverages sold in schools in comparison to the Healthy Schools 2020, which targets catered lunches, fundraising, and food rewards (CCPN, 2013; Ontario Ministry of Education, 2010). Studies that looked at the role of awareness in the implementation of school nutrition policies have found conflicting results. Some studies suggest that those who are aware of school nutrition policies are more likely to report implementation (Budd et al., 2012; Downs et al., 2011; Lanier et al., 2012). In addition, there is still a proportion of individuals who are aware of but do not implement policies (Downs et al., 2012; Lanier et al., 2012; MacLellan et al., 2010).

There are multiple channels through which teachers can learn about new policies and initiatives. Discussing school nutrition policies during meetings, having a school policy posted

on the school/district/board website, and having a policy posted at school were the most effective communication methods for raising awareness of the PPM150. Currently, there is little research on which tools or practices are most effective for raising awareness of school nutrition policies. Drawing from previous studies on healthy eating, public campaigns have been effective in raising awareness about healthy eating at a population level; although these campaigns are effective in raising awareness, they are rarely effective in changing behaviour (Brown et al., 2004; Perez-Rodrigo & Aranceta, 2003). In addition, nutrition education can contribute to awareness and motivate teachers to support healthy eating (Perez-Rodrigo & Aranceta, 2003). In the sample of teachers surveyed, only 15% had previously taken a nutrition education course. Therefore, more efforts are needed to raise awareness of the Healthy Schools 2020 initiative.

An interesting point to highlight is the difference in awareness of the Healthy Schools 2020 initiative between teachers and principals from the 2012 follow-up survey. In this study, a quarter of teachers were aware of the Healthy Schools 2020 initiative; however, in the follow-up survey commissioned by the CCPN, 95% of elementary school principals reported being aware of the Healthy Schools 2020 priority areas (CCPN, 2012). If the majority of the principals were aware of the initiative, more teachers should be aware of the Healthy Schools 2020 initiative. These results suggest that there may have been a gap in communication between the principals and the teachers. MacLellan, Taylor, and Freeze (2009) identified principals as catalysts for change. Their leadership and interest in nutrition can help create environments that foster an open communication about policies and initiatives (MacLellan et al., 2009). Principals are important for relaying information to teachers. Stronger interpersonal factors such as closer communication between principals and teachers can raise awareness of the regional initiative.

Teachers' Beliefs of School Food Practices

Since awareness of the policy was not associated with teachers using food rewards in the classroom, other intrapersonal factors, such as their beliefs about students' eating practices and food choices at school, can influence teachers' classroom practices (Kubik et al., 2002; Kubik et al., 2005b). However, about half of the elementary school teachers from the Ottawa and Renfrew school boards rewarded students with foods despite recognizing the importance of healthy eating and the positive influence of the school environment on students' dietary habits. This is congruent with other studies, which reported that policies discouraging the use of food rewards were largely unsuccessful (Arcan et al., 2013; Downs et al., 2012; Kubik et al., 2002; Kubik et al., 2005a; Story, 2009; Turner et al., 2012b). Altogether, these findings show that teachers' beliefs regarding healthy eating and the importance of a healthy school environment did not alter their classroom behaviours regarding food rewards.

Primarily, it has been suggested that teachers use food rewards because they believed students preferred foods to encourage positive behaviour and academic performance (Hoffmann et al., 2009; Kubik et al., 2005b; Rossiter et al., 2007). In a study by Hoffman et al. (2009), elementary school teachers most frequently used prizes and tokens, such as candies and toys, for behaviour management whereas verbal praise and privileges were most often used for achievement purposes (Hoffmann et al., 2009). The action of rewarding students with chips, candies, or baked goods contradicts what students learn in schools about healthy eating, which may lead to an increase in the preference of such foods (Birch, 1998; Taylor, Evers, & McKenna, 2005). As a result, students may become confused with the mixed messages provided in the school nutrition environment, especially when nutrition education is taught but not

practiced in schools. Evidently, teachers can benefit from more training to help identify alternative options, other than food, for classroom management.

Teachers reported seeing positive changes to catered lunches as a result of the policy. The most frequently reported changes were offering whole-wheat pizza crust and the substitution of whole grain varieties for white breads and pastas. These findings are similar to the results from the Healthy Schools 2020 follow-up survey with the principals (CCPN, 2012). Switching from white breads to whole wheat or whole grain varieties is a step in the right direction as these products are associated with many health benefits (Rosenbloom, 2011; Slavin, Jacobs, Marquart, & Wiemer, 2001). However, many consumers are unable to accurately identify the differences between whole grain and whole wheat products. Whole grain has better nutritional quality because of the preservation of the germ and whole-wheat products where the germ has been removed (Burgess-Champoux, Marquart, Vickers, & Reicks, 2006; Slavin et al., 2001). Previous research results have suggested that adults' knowledge surrounding whole grain products is limited and they were more likely to associate whole grain varieties and whole-wheat products with healthfulness (Burgess-Champoux et al., 2006). Although we did not assess teachers' knowledge about whole grain and whole-wheat products, it would be interesting to examine if teachers considered both of these products equally healthy as it would an indication of their nutrition knowledge.

In regards to fundraising events, chocolate, candy, and bake sale items have continued to be sold at these events and many teachers reported having 10 or more special-event days at their schools after policy implementation. Similar to other studies, there was resistance to adhering to fundraising policies (Downs et al., 2012; Kubik et al., 2009; Story, 2009; Turner et al., 2012a). The resistance to change can be attributed to intrapersonal, interpersonal, and organizational

influences as parents or school councils are most often involved in organizing fundraising events. In previous studies, some teachers believed that it was acceptable for students to sell energy dense and low nutrient foods to generate revenue (Kubik et al., 2005b; Kubik et al., 2009). Principals from British Columbia schools identified two barriers to policy implementation: finding suitable fundraising alternatives and determining what rules fall under the scope of the policy (Mâsse & de Niet, 2013). School members were unsure whether the policy encompassed food rewards and fundraising activities (Mâsse & de Niet, 2013). Similarly in Alberta, even with the availability of guidelines in elementary schools, these guidelines were rarely consulted to determine the appropriateness of certain foods to be used in fundraising events (Downs et al., 2012). These findings support the need for clearly defined policies and guidelines, and more training programs for parents and teachers.

Another interesting finding to highlight is the frequently reported sale item, pizza. Pizza can contain foods from all four food groups and can be classified as a healthy item. Since we did not evaluate whether pizza was believed to be healthy, results from other studies will be drawn upon to understand why pizza is a commonly sold food item in schools. According to Combet, Jarlot, Aidoo, and Lean (2013), pizza commonly appears on the menu as it is deemed the "safe" option and is generally liked and accepted by most. Previous studies have found that people had trouble distinguishing whether pizza was considered a healthy or unhealthy item (Combet, Jarlot, Aidoo, & Lean, 2013; Thomas, Nelson, Harwood, & Neumark-Sztainer, 2012). Due to the fact that most elementary schools are not equipped with appropriate kitchen facilities, lunch programs are commonly contracted out to large food companies (Mâsse & de Niet, 2013). Often parents or teachers are left in charge of coordinating fundraising events and catered lunch programs. However, we were unable to determine whether teachers were involved in the

decision-making process regarding catered lunches and whether they had a role to play in the shift of white crust to whole wheat crust pizza.

Since policies and guidelines surrounding fundraising, class parties, and food rewards receive less support from parents, teachers, and students compared to catered lunches, there is a need to educate these school members about healthy eating in all contexts (Downs et al., 2012; McDonnell et al., 2006; Story, 2009). Drawing on the SET, teachers' behaviours are dependent on multiple influences including intrapersonal factors (awareness and beliefs), interpersonal factors (communication of policies), organizational/institutional factors (rules around fundraising, classroom rewards, and catered lunches), and social structure, policy, and system factors (the policy and initiative). These interacting influences can impact the end goal of implementation and behaviour change, adding to the complexity of measuring indicators using the SET.

Role of School Nutrition Committees

A large body of evidence suggests that school nutrition committees or school champions are enablers of policy implementation (Budd et al., 2012; Cho & Nadow, 2004; Henry et al., 2010; Hoxie-Setterstrom & Hoglund, 2011; MacLellan et al., 2009; Mckenna, 2003; Veugelers & Schwartz, 2010); however, the findings from the current study indicate that the presence of a school nutrition committee was not effective in changing catered lunches or fundraising activities. In addition, only a small proportion of teachers reported having a school nutrition committee at their respective schools. School nutrition committees have been shown to bridge the gap between the "nutrition world" and the "school world" (MacLellan et al., 2009; Veugelers & Schwartz, 2010) and provide more organized structure to policy implementation (Kubik, Lytle, & Story, 2001; Longley & Sneed, 2009). School nutrition committees can

facilitate communication between school members. Since few teachers reported being at schools that have a school nutrition committee, this may have led to a lack of communication about policy development activities.

The absence of effective communication between school community members contributes to the lack of positive interpersonal influences on policy implementation. A large proportion of teachers were unaware if their schools communicated with parents, guardians, students, or parent councils about the development of these school policies. The literature suggests that inadequate consultation with students, staff, and parents about menu changes can hinder policy implementation (Lanier et al., 2012; MacLellan et al., 2010). Inadequate communication between school staff, parents, and students is problematic as support from parents and students is crucial for the success of a school policy (MacLellan et al., 2010). Consequently, increasing communication and incorporating school members in policy development activities can raise awareness and strengthen relationships to facilitate policy implementation.

The Need for More Student Learning Opportunities

Active engagement with community or partnership services can help shape students' lifestyle behaviours (Birch, 1998). In the current study, teachers relied heavily on media literacy to educate their students about healthy eating and less on hands-on learning opportunities such as cooking classes, community gardens, and field trips to grocery stores. Providing students with hands on learning activities can increase knowledge and change behaviour (Blair, 2009; Block et al., 2012; Evans et al., 2012; Heim, Stang, & Ireland, 2009; Liquori, Koch, Contento, & Castle, 1998; Robinson-O'Brien, Story, & Heim, 2009). Among grade 5 students in Alberta, students who were involved in meal preparation at home were associated with making healthier food choices (Chu et al., 2013). As such, incorporating food-related activities within the school

environment may be helpful in developing and maintaining healthy eating behaviours among children (Chu et al., 2013). Such programs can also strengthen the social connections within schools and between schools and the community (Block et al., 2012). For instance, partnerships with the community can expand the school's physical environment as demonstrated in one of the schools in New Brunswick's Healthy Schools Learning Program. The school had an organic garden, which was used to educate students about the importance of farming and healthy eating (Bertrand & Giles, 2012). Partnerships with community facilities can provide a number of healthy eating activities for students. Not only do they increase the use of these facilities, they provide an opportunity for health professionals to engage with the school community (Veugelers & Schwartz, 2010). Therefore, teachers from the Ottawa and Renfrew region can all benefit from increased learning opportunities through partnerships and services with the community.

Facilitators and Barriers

The most frequently reported facilitator to having a healthy school nutrition environment was having affordable healthy food options. Confirmed by other studies, healthy foods were commonly perceived as more costly compared to foods of lower nutrition quality. As a result, parents and teachers were less likely to abide by the section of the policy that is concerned with allowable food items for fundraising and thus influence the adoption of the policy as a whole. (Downs et al., 2011; Mâsse & de Niet, 2013). Despite the immediate negative perceptions associated with cost of healthy foods and loss of revenue, studies have demonstrated selling healthy foods in vending machines and catered lunches did not result in revenue loss (Callaghan, Mandich, & He, 2010; French, 2005; French et al., 2001; Hannan et al., 2002; Leo, 2007; Messier, 2004). According to a study on the Annapolis Valley Health Promoting Schools, achieving a healthy school can be cost-effective (Ohinmaa, Langille, Jamieson, Whitby, &

Veugelers, 2011). In addition, healthy food fundraisers can generate as much profit or more than fundraisers selling low-nutrient foods (Leo, 2007). Staff, students, and parents are encouraged by the CPPN to seek out healthier alternatives to generate school revenue.

Another frequently reported barrier to policy implementation was parents' resistance to change. This barrier was consistently reported in previous studies with school staff (Cleland et al., 2004; Downs et al., 2012; Mâsse & de Niet, 2013; Odum et al., 2013). However, the perception of parents' resistance to change may be flawed. Pettigrew et al. (2012) explored the perceptions of school stakeholders and parents and found a discrepancy between the two perceptions. Parents were highly satisfied with the policy; meanwhile, stakeholders believed the opposite (Pettigrew et al., 2012). In contrast, teachers blamed parents for the poor implementation of school nutrition policies and for their students' poor dietary habits (Downs et al., 2012; Mâsse & de Niet, 2013; Story, 2009; Van Ansem et al., 2013). In contrast, parents involved in other studies believed that schools have an important role to play in developing children's eating habits, reinforcing nutrition education (Cleland et al., 2004), and that healthy eating should be a priority (Van Ansem et al., 2013). These findings imply that responsibilities for children's healthy eating habits are unclear and group members tend to blame others and rarely blame themselves (Power, Bindler, Goetz, & Daratha, 2010). A collaborative environment involving stronger interpersonal relationships between the school members and parents are needed to mitigate these misconceptions.

Social Ecological Model and Policy

SET was used to understand how the school nutrition environment influenced the implementation of the PPM150 in the Ottawa and Renfrew school boards, with the assumption that effective implementation of a policy is the result of behaviour which is influenced by

awareness. Not only do individual levels contribute to behaviours, behaviours are also influenced by the interaction of all of SET levels.

This study found that intrapersonal factors, which include teachers' awareness and beliefs of the school nutrition environment, did not have an influence on teachers' behaviours and implementation of healthy eating activities.

Factors in the interpersonal level (i.e., methods of communicating school policies) can influence awareness and the implementation of the policy (Brown et al., 2004; MacLellan et al., 2009). Our findings suggest that the way policies and initiatives are communicated influences teachers' awareness of policies. Another factor in the interpersonal level is the presence of a school nutrition committee. We did not find an association between the presence of a committee, and the implementation of policies in regards to changes to catered lunches and fundraising activities. Teachers' use of incentives to reward their students for positive behaviours in the classroom can be considered as another interpersonal factor. The type of incentives used (food versus non-food rewards) and the frequency of their use can influence the degree of success of the policy implementation as rewarding with unhealthy food can send a contradictory message to students who will attach more value to such foods (Birch, 1998).

Catered lunches and fundraising can be considered as belonging to the organizational and institutional factors mentioned in the SET. These factors, pertaining to the physical environment, could facilitate or impede the implementation of a school nutrition policy. In terms of partnerships and services in the school environment that impact the policy, school gardening opportunities, cooking classes, and public health organizations do not only provide learning opportunities for student but they can also contribute to raising awareness and behaviour changes for both teachers, staff and students. These can be considered as community-level factors;

therefore, the relationship between the community level and the other levels of the SET are important for the delivery of services and programs.

Finally, the overarching social structure, policy, and system level encompasses the actual policy and initiative, PPM150 and Healthy Schools 2020. It is evident that there is some disconnect between the levels of the SET as policy development activities around healthy eating and healthy food options were not always discussed with parents, teachers, and staff. Hence, this gap between the interpersonal and policy level can influence awareness and therefore hinder behaviour and implementation of school policies.

It is important to acknowledge that many barriers and facilitators influence the relationships between the different levels and the potential impact of the policy implementation. Some of these mediating factors identified in the current study include healthy affordable food options, support materials/training for students, parents, and staff, grant money/funding, timing of the implementation, parents' attitudes, availability of vendors who can meet nutritional guidelines, nutrition knowledge or training, etc. Unfortunately, the design of our study did not allow the assessment of the magnitude of these interactions. Other limitations were identified in the application of the social ecological model.

Our study focused on awareness and behaviours of teachers to understand the implementation of the PPM150. These factors are often considered in the intrapersonal level of the SET. Therefore, understanding the whole environment of the policy implementation based on teachers' views without the organization and community level factors can be limiting. The application of the diffusion of innovation theory that provides a perspective on how a social system adopts a new idea, behaviour, or product would have improved our approach to the problem.

One of the challenges with the social ecological model is its complexity. This all-encompassing theory is very complex and requires the integration of multiple disciplines and coordination of various groups from the community, policy, and organizational levels (Glanz & Bishop, 2010; McLeroy et al., 1988; Stokols, 1996). To appropriately evaluate SET-based programs or interventions, it was suggested that researchers should have multi-level or multi-method assessments of program outcomes over an extended period of time (Glanz & Bishop, 2010; McLeroy et al., 1988; Stokols, 1996). However, this is not always feasible and is dependent on the availability of resources and expertise. As a result, researchers end up targeting one or two levels of the SET rather than multiple levels (Moore, de Silva-Sanigorski, & Moore, 2013; Stokols, 1996). In addition to the complexity of the SET, the levels within the model intertwine and cover a broad spectrum of settings and outcomes. Some of the limitations highlighted with the social ecological model such as its complexity, the broadness of the theory, the unclear extent to which of the factors is more influential than the other, reflect a few of the challenges encountered in the current study on teachers' awareness of the school nutrition environment in the Champlain region. Findings from the current study only touched the surface of each of the SET levels limiting the ability to interpret the findings.

Despite the limitations of the SET, the use of this model to interpret the findings from this study helped to identify areas of improvement within the environment such as the need for increased policy awareness, more training for teachers, communication between school members, the need for increased involvement between the school community and other organizations, and more learning opportunities for students.

Strengths and Limitations of the Study

This study identified areas for improvement for future health promotion programs in the four school boards. This study contributed to the Canadian literature on school nutrition policies and literature on the use of classroom rewards. The focus on teachers' awareness also added valuable insight, as teachers have an influential role in teaching children nutrition education in the school setting.

In light of these findings, there are some limitations to consider when interpreting the results. First, these findings are not representative of the general teacher population as this study employed convenience sampling and was based on a relatively small sample size. Data collection took place during the Ontario labour dispute, which affected many publicly funded schools in Ontario. Recruiting teachers to participate in the survey during the labour dispute period was a challenge. The final number of participants in the study was relatively low, thus limiting the generalizability of the findings.

In addition, the cross-sectional study design limited the ability to observe any trends that may have occurred in the school environment; therefore, we were unable to determine whether the labour dispute had any effect on the schools' priorities and nutrition-related activities. Another limitation to consider is the social desirability bias from self-reported surveys, as well as recall bias (Kristal & Satia, 2001; McGraw et al., 2000), as some questions required the teacher to recall past events. Lastly, the study was initially proposed as a mixed-method study involving surveys and interviews with elementary school teachers. The absence of a qualitative component made it very difficult to interpret the results from this study. The addition of semi-structured interviews would help us further understand the reasons why teachers were more aware of the PPM150 than the Healthy Schools 2020 initiative and why school nutrition committees were not effective in implementation activities.

Conclusion

Although awareness is the first step for policy implementation, there are many factors to consider beyond awareness (Downs et al., 2011). The results from the current study suggest that there is room for improvement among the school nutrition environment in the Ottawa and Renfrew school boards. Specifically, there is still resistance to change as indicated by the discrepancy between teachers' awareness and beliefs of the school nutrition environment; this should be addressed. In addition, there is a lack of communication between school members, teachers, and parents. Further, more hands on nutrition-related activities are needed to engage students to learn healthy dietary habits. Without appropriate communication and a common understanding of the policy between school members, school nutrition policies cannot be fully implemented.

Despite teachers' awareness of the provincial school nutrition policy, few teachers were aware of the Healthy Schools 2020 initiative and unhealthy food-related practices still occur in the school nutrition environment. Understanding the various levels of environmental influences is important to achieving a healthy school nutrition environment. This study identified the need to raise awareness about the regional initiative; the need to improve communication between school members; the need to adopt more creative and engaging learning activities for students by reaching out to community organizations; and the need for food-related practices to align with school nutrition policies (e.g., fundraising with healthy foods).

To raise awareness about the Healthy Schools 2020 initiative, the regional initiative should be promoted at school meetings, posted on school/district websites, or posted at schools. If the

members of the school community are unaware of school policies or initiatives, there is no doubt that implementation will fail. The lack of awareness of school nutrition activities, absence of a school nutrition committee, and the lack of awareness of various partnerships/organizations are several factors that can influence the success of achieving a healthy school nutrition environment. In general, school nutrition policies are a step towards a healthier school nutrition environment, but strict guidelines are required as voluntary standards or guidelines are not enough to sustain changes in behaviour.

Implications for Future Research

Future researchers should consider quantifying the nutritional value of foods and beverages available in the school environment, specifically those offered during catered lunches and fundraising events. This would allow researchers to determine whether the foods sold in the school nutrition environment are in adherence with the PPM150 nutrition guidelines. Further, there is a need to evaluate the uptake of resources (i.e., presentations, training programs, pamphlets) for policy implementation and to determine which tools are most preferred by teachers, parents, and students. Lastly, the addition of a qualitative component would add great value to further understand why school nutrition committees were ineffective in policy implementation and why teachers' awareness and beliefs did not always lead to implementation, specific to the Champlain region.

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Appendix

Appendix A

University of Ottawa Ethics Approval

File Number: H08-12-04 **Date (mm/dd/yyyy):** 12/17/2012

Université d'Ottawa University of Ottawa
Bureau d'éthique et d'intégrité de la recherche Office of Research Ethics and Integrity

Ethics Approval Notice

Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

First Name	Last Name	Affiliation	Role
Malek	Batal	Health Sciences / Others	Supervisor
Dia	Sanou	Health Sciences / Others	Co-Supervisor
Shalane	Ha	Health Sciences / Human Kinetics	Student Researcher

File Number: H08-12-04

Type of Project: Master's Thesis

Title: Teacher Perceptions of the School Nutrition Environment in Ottawa: A Social Ecological Approach

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
09/21/2012	09/20/2013	Ia

(Ia: Approval, Ib: Approval for initial stage only)

Special Conditions / Comments:

Approval letter from OCDSB and OCSB received – the research will now only comprise of online teacher surveys.

Additional school boards will be added to the certificate as permission letters are received.

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http://www.research.uottawa.ca/ethics/index.html
http://www.recherche.uottawa.ca/deontologie/index.html

Appendix B

Approval for OCDSB and OCSB

OTTAWA-CARLETON DISTRICT SCHOOL BOARD

Ottawa Catholic School Board

Ottawa-Carleton Research Advisory Committee

March 21st, 2013

Ms. Shalane Ha

Re: Teacher Perceptions of the Nutrition Environment in Ottawa: A Social Ecological Approach

This letter is to inform you that we are pleased to give your study final approval for implementation in both the Ottawa Catholic School Board and the Ottawa-Carleton District School Board.

On behalf of the committee, thank you for approaching our school boards. We wish you the best in your research endeavors.

Sincerely,

On behalf of the Ottawa-Carleton Research Advisory Committee

Appendix C

Approval for RCCDSB

January 18, 2013

Renfrew County Catholic District School Board

499 Pembroke St. West
Pembroke, Ontario
K8A 5P1
1-800-267-0191
(613) 735-1031
FAX: (613) 735-2649
www.rccdsb.edu.on.ca

Dear Ms. Ha:

Re: Request for Master's of Science Research

I am in receipt of your request to conduct a Master's research project "Teacher Perceptions of the School Nutrition Environment in Ontario: A Social Ecological Approach" with the Renfrew County Catholic District School Board.

Please be advised that your request to conduct this research has been approved. Your thesis proposal has been forwarded to Jeannie Armstrong, Principal of Our Lady of Fatima School in Renfrew who has been instrumental in the development and implementation of our policies related to this subject.

If you need any additional information or other please do not hesitate to contact me.

Yours very truly,

...as an inclusive Catholic educational community, we are called to express our mission as church, to pass on the Good News of Jesus Christ, to make it relevant in the world today, and to be the hope for the future.

MA:nl

Appendix D

Online Survey

Project Title: Teacher Perceptions of the School Nutrition Environment in O...

Teacher Survey Consent Form

Dear Participant,

You are invited to complete an online survey on the on-going activities in the school nutrition environment. This Master's thesis has been approved by the University of Ottawa's Research Ethics Board, the Ottawa-Carleton Research Advisory Committee (OCRAC), and the Renfrew County Catholic District School Board. Please read the following information:

Purpose: The purpose of the research is to gain a better understanding of the ongoing activity in the school nutrition environment. This research is affiliated with the Champlain Cardiovascular Disease Prevention Network (CCPN) and will build on the work of the Healthy Schools 2020 initiative which is focused on improving the school nutrition environment with a particular focus on three priority areas: healthy catered lunches and food service contracts, healthy fundraising, and healthy classroom rewards.

Participation: You will be asked questions about the school nutrition environment, the Healthy Schools 2020 initiatives, and the School Food and Beverage Policy (PPM150). The survey contains approximately 35 questions and will take approximately 10-20 minutes to complete.

Benefits and Risks: There are no known risks to your participation in this study. Benefits may include improving the school nutrition environment by understanding current activities and efficiency of policy implementation. Benefits to society include gaining a better understanding of strengths and weaknesses to policy implementation.

Confidentiality and anonymity: The information you share will remain strictly confidential and anonymous. Furthermore, all electronic data will be stored in encrypted files whose access keys will be known only to the researcher and her supervisor. The data will be kept for 5 years and will be stored in a locked cabinet in the researcher's office located at University of Ottawa. Electronic data will be stored in a password protected computer. This material will not be made available to anyone other than the researcher and her supervisor. Lastly, publications or dissemination of results will not include information that will make it possible to identify participants.

Voluntary Participation: Participation in this study is voluntary. You may choose to not participate. If you decide to participate, you may withdraw from the study at any time and/or refuse to answer any questions without any explanations. If you choose to withdraw, all data gathered until the time of withdrawal will be deleted.

Please note that the survey is only available in English.

Please print and keep a copy of the consent form for your records. If I have any questions regarding the ethical conduct of this study, I may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5

Tel.: (613) 562-5387
Email: ethics@uottawa.ca

Researcher:
Shalane Ha, MSc (c)

Supervisor:
Malek Batal, PhD

Page 1

Co-Supervisor:
Dia Sanou, PhD

1. Informed Consent

- I agree with the terms above and I will participate in the research study.
- I disagree to the terms above and do not wish to participate.

2. At which school board do you teach?

- Ottawa Catholic School Board (OCSB)
- Ottawa-Carleton District School Board (OCDSB)
- Renfrew County Catholic District School Board (RCCDSB)

3. Have you ever taken a nutrition SPECIFIC course in college/university?

- Yes
- No

4. Please rate the following statements:

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
a. Healthy eating is important to me.	○	○	○	○	○
b. Children's eating habits are developed and set during elementary school.	○	○	○	○	○
c. Eating behaviour portrayed by teachers influences the eating behaviour of students.	○	○	○	○	○
d. Parents have a greater influence on a child's eating behaviour than the school nutrition environment.	○	○	○	○	○
e. Students at my school are bringing healthier lunches and snacks (containing foods from the 4 food groups) than last year	○	○	○	○	○

5. How would you rate the following:

***NOTE: The school's nutrition environment refers to the messages, classroom teaching, school programs, supportive environments, and policies related to food, nutrition, and healthy eating.**

	Very healthy	Somewhat healthy	Neither healthy or unhealthy	Somewhat unhealthy	Very unhealthy	N/A
a. Catered lunches	○	○	○	○	○	○
b. Fundraising events	○	○	○	○	○	○
c. Classroom rewards	○	○	○	○	○	○
d. The School nutrition environment*	○	○	○	○	○	○

6. On average, how many days per week does your school offer catered lunches? (ie. Submarine days/pizza days)

- ○ 5
- ○ 4
- ○ 3
- ○ 2
- ○ 1
- ○ Less than once a week
- ○ Never

7. Have there been changes implemented in this school year with respect to the food and beverage offerings in your catered lunches?

- ○ Yes
- ○ No

8. What types of changes have been implemented in this school year with respect to the food and beverage offerings in your catered lunch programs? Please check all that apply.

- ☐ Replaced white breads and pastas with whole grain varieties
- ☐ Offered pizza on whole wheat crust
- ☐ Increased fruit and vegetable offerings
- ☐ Reduced the amount of processed and pre-packaged foods
- ☐ Switched to low-sodium soups and broths
- ☐ Switched to leaner protein offerings (ie. extra-lean ground meat, poultry)
- ☐ Switched to lower-fat cheeses and yogurts
- ☐ Prepared meals in a healthy manner (ie. baking, broiling, steaming, etc.)
- ☐ Ensured all meals included at least 3 or 4 food groups from Canada's Food Guide
- ☐ Other (please specify)

9. Does your school hold fundraisers?

- ○ Yes
- ○ No

10. Does your school use *food item(s)* as a fundraiser?

- ○ Yes
- ○ No

11. What food item(s) are used for fundraisers? Please check all that apply.

- ☐ Chocolate & Candy
- ☐ Bake sale items
- ☐ Chips
- ☐ BBQ Items
- ☐ Pizza
- ☐ Popcorn
- ☐ Cheese
- ☐ Pasta/Pasta Dinners
- ☐ Other (please specify)
- ☐ Soup
- ☐ Milk/Yogurt
- ☐ Fruit
- ☐ Frozen Desserts
- ☐ Vegetables
- ☐ Pop/Sweetened beverages
- ☐ 100% Fruit Juices

12. Does your school use *non-food item(s)* as a fundraiser?

- ○ Yes
- ○ No

13. What non-food items are used for fundraisers? Please check all that apply.

- ☐ Raffle Tickets
- ☐ Pencils
- ☐ Books
- ☐ Dance-a-thon
- ☐ Walk-a-thon
- ☐ Magazines/Catalogues
- ☐ Other (please specify)
- ☐ Sports tournaments/events
- ☐ Cards/Wrapping paper
- ☐ Hockey Tickets
- ☐ Gift Items
- ☐ Fun Fair

14. Do you use incentives to reward students for positive behaviour in the classroom?

- ○ Yes
- ○ No

15. What type of incentives do you use to reward students for good behaviour in the classroom? Please check all that apply.

- ☐ Candy/Chocolate Bars
- ☐ Baked Goods
- ☐ Chips
- ☐ Pop
- ☐ 100% Fruit Juice
- ☐ Stickers
- ☐ Toys
- ☐ Privileges
- ☐ Other rewards (please specify)

16. On average, how often do you use sweets (ie. candy, pop, cookies, doughnuts) as a reward, incentive, or as a special treat for students?

- Never
- Once or less a month
- Two or three times a month
- Once a week
- Once a day
- Two or more times a day

17. Does your school offer any of the following for students?

	Yes	No	Personally Not Aware
Cooking classes			
Gardening opportunities (e.g. growing produce)			
Field trips to farms/farmers' markets			
Media literacy on special topics related to healthy eating (e.g., body image, eating disorders)			
Field trips to the local grocery store			

If not listed, please specify (optional):

18. During the past 12 months, has your school sent home *educational material to provide opportunities for parents/families/guardians to learn about the following topics?

***Educational materials include brochures, newsletter articles, websites, introductions to curricula, and homework assignments that encourage family participation to adopt or practice healthy behaviour.**

	Yes	No	Personally Not Aware
a. Canada's Food Guide	○	○	○
b. Culturally diverse food	○	○	○
c. Healthy snacks and lunch suggestions	○	○	○
d. Material on the influence of screen time on child's health (e.g., TV, computer, and video games)	○	○	○
e. Promotion of positive self-body image	○	○	○

19. During the past 12 months, has your school...

	Yes	No	Personally Not Aware
a. met with any parents' organizations (e.g., school council) to discuss healthy eating activities at school?	○	○	○
b. formally collected suggestions from parents/families/guardians about planning for healthy food choices available at school?	○	○	○
c. formally collected suggestions from students about planning for healthy food choices available at school?	○	○	○
d. formally collected suggestions from school staff about planning for healthy food choices available at school?	○	○	○

20. During the past 12 months, did your school initiate/continue any of the following activities/programs at your school?

	Yes	No	Personally Not Aware	N/A in my school
a. Offered healthy food choices during breakfast program	○	○	○	○
b. Offered healthy food choices during lunch program	○	○	○	○
c. Offered healthy food choices during snack program	○	○	○	○
e. Offered healthy food choices in the snack bar/tuck shop(s)	○	○	○	○
g. Organized Nutrition Month activities	○	○	○	○
h. Formed a school committee that deals with nutrition and food (e.g., School Nutrition Action Committee)	○	○	○	○
i. Stopped the sale of junk food	○	○	○	○
j. Held junk food free days	○	○	○	○

21. During the past 12 months, has your school worked on healthy eating promotion and/or activities for students with any of the following?

	Yes	No	Personally Not Aware
Health organization (e.g., Heart and Stroke Foundation, Canadian Cancer Society, Canadian Diabetes Association)	○	○	○
Parks or Recreation department	○	○	○
Youth organization (e.g., YMCA/YWCA, Boys/Girls Clubs, Boy Scouts/Girl Guides)	○	○	○
Health or fitness club	○	○	○
Board/division/district itinerant teacher (e.g., consultant, specialist)	○	○	○
Public Health Units	○	○	○
Community Health Centers	○	○	○

If not listed, please specify (optional):

22. Are you aware of the Champlain Declaration and the Healthy Schools 2020 priority areas for action (healthy catered lunches, healthy fundraising, and healthy classroom rewards)?

- ○ Yes
- ○ No

23. Are you aware of the Ontario School Food and Beverage Policy (PPM150)?

- ○ Yes
- ○ No

24. How are your school's written policies on healthy eating communicated throughout the school community (i.e., staff, parents/families and students)? Are they...

	Yes	No	Personally Not Aware
distributed through e-mail	○	○	○
written in a school/board/division/district handbook	○	○	○
posted on school/board/division/district website(s)	○	○	○
written in a student agenda provided by the school/board/division/district	○	○	○
written in a school/board/division/district newsletter	○	○	○
discussed at meetings (e.g., staff meetings, professional development days, assemblies, school council)	○	○	○
posted at school	○	○	○

25. Does your school have a committee that oversees programs or policies concerning healthy eating and the school nutrition environment?

○ Yes

○ No

26. How many "Special Food Days" (i.e. days on which the foods and beverages offered for sale in schools would be exempt from the nutrition standards in PPM 150) does your school offer per school year?

Number of Special Food Days: [▼]

27. What level of priority does your school place on the following:

	High Priority	Medium Priority	Low Priority	Personally Not Aware
a. Principal or teacher training in physical activity or healthy eating?	○	○	○	○
b. Healthy Fundraising Programs	○	○	○	○
c. Healthy Food Service Contracts for food service providers	○	○	○	○
d. Healthy Classroom Rewards	○	○	○	○
e. Overall Healthy Eating	○	○	○	○

28. In thinking about changing the food offerings in your school to healthier options, what supports would help your school to be successful in making these changes? Please check all that apply.

- ☐ No supports are needed (Please check off and proceed to next question)
- ☐ Policy
- ☐ Grant money/funding
- ☐ Support materials/training for students, parents, & teachers
- ☐ Affordable healthy food options
- ☐ Vendor education
- ☐ Other (please specify)

29. What are some of the barriers that you feel may impede your school's ability to change the offerings of foods in your school to healthier options? Please check all that apply.

- ☐ No barriers (Please check off and proceed to next question)
- ☐ Push-back from parents
- ☐ Analyzing the foods we are serving to see if they are compliant with nutritional guidelines
- ☐ Competition for school priorities
- ☐ Lack of nutrition knowledge/training
- ☐ Lack of time to understand and implement nutritional guidelines
- ☐ Availability of vendors who can meet nutritional guidelines
- ☐ Other (please specify)

30. What is your sex?

- Male
- Female
- Other (please specify)

31. How many school years have you been teaching?

- Less than 1
- 1 - 3
- 4 - 7
- 8 - 10
- 11 - 15
- 16 - 20
- 20 +

32. Do you teach between the grades of Junior Kindergarten and Grade 6?

- Yes
- No

33. What grade level(s) do you currently teach?

- Junior Kindergarten
- Senior Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6

34. What is your teaching status?

- Full-Time
- 0.5 FTE - 0.8FTE
- Substitute
- Retired

35. Which category below includes your age?

- 18-20
- 21-29
- 30-39
- 40-49
- 50-59
- 60 or older

36. If you have any general comments, please enter your comments in the text box below. (Optional)

Thank you for taking the time to complete the survey.

Appendix E

Recruitment E-mail to School Boards and Teacher Unions

Dear *(insert name),*

My name is Shalane Ha and I am in the second year of my Master's at the University of Ottawa. For my research, I am planning on exploring the current practices in the school nutrition environment - specifically the Healthy Schools 2020 initiative. My research findings will serve to augment the evaluation activities of the Champlain Cardiovascular Disease Prevention Network's (CCPN) Healthy Schools 2020 initiative and enrich the understanding of practices in the school nutrition environment.

I am writing to request your help in the dissemination of a short 10 - 15 minute online survey to the elementary school teachers (by e-mail). I have already received ethics approval from the Research Ethics Board at the University of Ottawa. If you have any questions or require any documents, please contact me by e-mail or my supervisors (copied to this e-mail).

Thank you for your time and consideration. I look forward to hearing from you soon.

Sincerely,

Shalane Ha, MSc (c)

Appendix F

Online Recruitment E-mail

Université d'Ottawa • University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

Are you interested in improving the nutrition environment in your school?

What do YOU think about the Ontario School and Food Beverage Policy (PPM150)?

Dear Teachers,

My name is Shalane Ha and I am currently a Master's student at the University of Ottawa. My thesis is on the current activities in the school nutrition environment and I am seeking input from elementary school teachers (JK – Grade 6) for my research.

I would like to invite you to participate in a short online survey about the school nutrition environment. Your participation will take approximately 10 - 15 minutes. Please click the link below to start the survey:

https://www.surveymonkey.com/s/schoolnutrition3

Please be assured that all data collected will remain confidential. If you have any questions, please contact myself or my supervisor(s) (contact information provided below).

NOTE: This study is NOT part of the CCPN's school facilitation pilot project. If your school is part of the CCPN's pilot study, please disregard this message.

Thank you for your interest and your responses are very valuable to us.

Sincerely,

Shalane Ha, MSc Candidate