

Food Environments in Recreational Settings - A Provincial Scan of Prince Edward
Island

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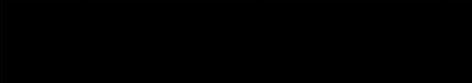
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Abstract

Childhood overweight and obesity, which is linked to the development of numerous chronic illnesses, affects approximately one third of Canadian youth. Recreation facilities, which serve as a hub for community-based sport and physical activity, have been criticized for fostering an obesogenic food environment. Although environmental scans have been conducted in some other provinces, none have been conducted in Prince Edward Island (PEI). This study assessed the current food and beverage offerings and healthy food practices in recreation facilities across PEI. A total of 20 facilities were selected for participation, representing facilities of various types from each county. It was found that 85% of facilities had canteens, most of which were characterized by a heavy reliance on commercially-prepared foods, including French fries, frozen breaded products and ready-mix gravy powders. The vast majority of products offered for purchase in canteens were generally energy-dense and high in fat, sodium, and added sugars, with deep frying being the most common cooking method. While water was offered for sale in every canteen, many of the other beverages sold were sugar sweetened including soda and sports drinks. Additionally, 70% of facilities had vending machines. When foods and beverages sold in vending machines were categorized according to Health HealthLink BC's Brand Name Foods List, it was found that 63% of beverages and 73% of foods were categorized as "do not sell", with many vending options were high in fat, sodium, added sugars, and overall energy. These findings are consistent with those of other provinces. These results suggest that initiatives to improve food and beverage offerings, including policy development and supports are needed. The results will also serve as a baseline to monitor changes in the food and beverage options.

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1. Introduction

Overweight and obesity rates in Canadian youth have been a public health challenge for decades (Roberts et al., 2012; Barton, 2012; Papoutsis et al., 2013; Rao et al., 2016). Although rates have remained stable over the past several years, the overall prevalence remains high (Rao et al., 2016). Approximately one third of children in Canada are overweight or obese; this accounts for more than 1.6 million children between the ages of 5 and 17 years (Roberts et al., 2012). This is concerning, since obesity can contribute to both the development and progression of many other chronic conditions, such as type 2 diabetes, dyslipidemia, breathing difficulties, and psychological issues (Barton, 2012). Furthermore, obesity and its comorbidities cost the Canadian healthcare system billions of dollars (Bach et al., 2013).

Although the causes of childhood overweight and obesity are numerous, overnutrition has been identified as among the most influential. The food environment across Canada has evolved so that foods and beverages that are energy-dense and nutrient-poor are widely available and often inexpensive (Drewnowski & Darmon, 2005; Papoutsis et al., 2013; Rao et al., 2013; Herforth & Ahmed, 2015). Given the influence of food environment on individual food choice, limiting unhealthy food options in settings where youth spend time has the potential to positively impact their overall health (Bruce et al., 2015; Sadeghirad et al., 2016; Bauer & Reisch, 2018). Recreation facilities, which serve as a hub for community-based sport and physical activity, have the potential to become health-promoting environments. However, food and beverages commonly sold in recreation facilities, such as sports drinks, chips, French fries, and soft drinks, are high in sugar, fat, and sodium, and are inconsistent

with health promoting physical activities offered through these facilities. As a result, these facilities can contribute to an obesogenic environment (Naylor et al., 2010).

As such, many provinces across the country have completed scans in recreation facilities to assess the current food environment and collect baseline data to be used in the development and implementation of health promotion programs and policies (Recreation NB; Naylor, 2014). It was found that a major proportion of foods and beverages offered were unhealthy and contradictory to the health-promoting messages of the facility (Recreation NB; Naylor, 2014).

In spite of the potential benefits for the population, there are no federal guidelines on the nutritional content of food and beverages in recreational settings. Some Canadian provinces have implemented various guidelines with the intent of improving the food environment in recreational settings, particularly for children (Government of Alberta, 2012; Government of British Columbia, 2014; McIsaac et al., 2018). The efficacy of these guidelines is questionable as adoption is voluntary (McIsaac et al., 2018). Further, several barriers to implementing the guidelines have also been reported, including lack of resources and lost revenue (Olstad et al., 2012).

Prince Edward Island does not currently have any such policies or guidelines regarding the nutritional quality of products sold in recreation facilities. Currently no studies have assessed the food environment in recreation facilities in PEI. These data are necessary to evaluate the effectiveness of future health promotion programs and policies in PEI aimed at improving the food environment in recreational facilities. As such, the aim of this study is to describe the current food environment in recreation facilities across the island. The proposed research has been completed in partnership with Heart and Stroke Foundation and Recreation PEI; the data will also be used by

PEI Heart and Stroke to lobby for policy change, as well as supports and resources to improve food and beverage offerings.

1.1 **Research Objectives**

- 1) To describe the nature of food operations, foods and beverages sold, and food preparation methods in Prince Edward Island sport and recreation facilities
- 2) To assess the nutritional quality of foods and beverages offered for purchase

2. Literature Review

2.1 **Childhood Overweight and Obesity**

Trends of overweight and obesity in childhood have been relatively stable over the past decade, though the consistently high rates are concerning (Olds et al., 2011; Rao et al., 2016). Most recent data shows that over 32% of Canadian children aged 5-11 and 30% aged 12-17 are overweight or obese (Roberts et al., 2012). Like other Atlantic provinces, Prince Edward Island children are more likely to be obese than children in other provinces (Rao et al., 2016; Saunders et al., 2018). As in adulthood, overweight and obesity in children is linked to the development of many chronic health complications, such as type 2 diabetes mellitus, hypertension, hyperlipidemia, and breathing issues (Paxton, 2005; Reeves et al., 2008; Franks et al., 2010; Barton, 2012). Additionally, overweight and obesity during childhood are likely to persist into adulthood and worsen with age (Singh et al., 2008; Barton, 2012; Rao et al., 2016).

In addition to the adverse health effects, overweight and obesity place a significant economic strain on the country: it is estimated that between 2 and 12% of

health expenditures in Canada are related to obesity, with a total estimated cost of between 1.2 and 11 billion dollars. An increased need for prevention programs further increases costs associated with obesity (Bach et al., 2013).

It has been known for some time that childhood obesity is a multi-factorial issue (Weihrauch-Blüher & Wiegand, 2018). A multitude of factors can impact a child's weight status, including genetics and socioeconomic status (Anderson & Butcher, 2006; Roberts et al., 2012; Papoutsi et al., 2013; Weihrauch-Blüher & Wiegand, 2018). However, at its core, obesity is influenced by energy balance, or the amount of calories consumed compared to energy expenditure (Papoutsi et al., 2013). As such, eating habits and physical activity are perhaps the primary modifiable risk factors for childhood obesity (Anderson & Butcher, 2006; Roberts et al., 2012; Papoutsi et al., 2013).

It has been well documented that excess consumption of sugar-sweetened beverages, including soft drinks, contributes to the problem of childhood obesity (Anderson & Butcher, 2006; Chang, 2010; Papoutsi et al., 2013). Likewise, the increased availability of inexpensive convenience foods in combination with growing time constraints has led to greater consumption of commercially prepared convenience foods, including fast food (Swinburn et al., 2011). Convenience foods, particularly those found on children's menus, are often energy dense and high in sodium, fat, and sugar (Anderson & Butcher, 2006; Chang, 2010). Further complicating the issue is growing portion sizes, which promote excessive intake (Zlatevska et al., 2014). Proximity to and overall number of fast food restaurants has also been positively correlated to increased BMI (Swinburn et al., 2011; Papoutsi et al., 2013).

In addition to changes in the food environment, recent declines in physical activity also contribute to childhood obesity (Anderson & Butcher, 2006; Barton, 2012; Roberts, 2012; Papoutsi et al., 2013; Saunders et al., 2018). Active transportation, such as walking or cycling, is less common, with the use of personal vehicles, school busses, and public transportation becoming the norm (Anderson & Butcher, 2006; Papoutsi et al., 2013; Barnes et al., 2018). Sedentary leisure activities are also more common, despite recommendations for at least 60-minutes of moderate to vigorous physical activity daily for children aged 5 to 17 years (Dale et al., 2016).

Many obesity-prevention efforts focus on individual behavioural interventions but have shown negligible long-term results (Weihrauch-Blüher & Wiegand, 2018). Given the role of the larger food environment on weight status, it is now widely accepted that environment-oriented prevention strategies are also necessary to manage the persistent high rates of childhood obesity (Weihrauch-Blüher & Wiegand, 2018).

2.2 Impact of the Food Environment on Food Consumption

It is well documented that food environment influences food choices, and by extension, weight status (Swinburn et al., 2011; Herforth & Ahmed, 2015; Bauer & Reisch, 2018). At the local, national, and global level, food systems have shifted towards highly-processed, energy-dense products. These foods and beverages are major contributing factors to “obesogenic” food environments (Swinburn et al., 2011). It has been shown that obesogenic environments create significant barriers to consuming a healthful diet, even when consumers prefer healthy options (Hawkes et al., 2015). Availability, affordability, and convenience of foods and beverages are all factors which contribute to the overall food environment (Herforth & Ahmed, 2015).

Additionally, product desirability impacts choices, and external factors such as food marketing should also be included when considering the larger food environment (Herforth & Ahmed, 2015).

Simply put, availability of food precedes food consumption; if a food is unavailable it cannot be consumed (Herforth & Ahmed, 2015). It has been shown that the amount of calories from highly-processed energy-dense foods in a typical North-American diet has increased in the past 50 years (Khoury et al., 2014). According to the Global Burden of Disease project, major contributing factors to dietary health risk include low intake of fruits and vegetables, nuts and seeds, whole grains, and omega-3 fatty acids, as well as excessive intake of sodium and highly-processed meats (IHME, year). These risk factors align with the current food offerings at many convenience stores and fast-food restaurants, which are typically energy-dense, low in fibre, and high in fat, sodium, and added sugars. Few, if any, whole foods are generally available in these settings (Moodie et al., 2013). In this context, availability also encompasses accessibility; a consumer's proximity to fast food restaurants and grocery stores can significantly impact food and beverage purchases.

Product affordability is another consideration. Over the past few decades, the availability of inexpensive calorie-dense foods has exploded (Swinburn et al., 2011). In fact, an inverse relationship between energy density and energy cost has been found in the United States (Drewnowski & Darmon, 2005). Refined grains and added fats and sugars are inexpensive sources of energy, while lean meats, fresh fruits and vegetables, and whole grains have a higher energy cost (Drewnowski & Darmon, 2005; Rao et al., 2013). For this reason, obesity and nutrition-related chronic disease, including type 2 diabetes and heart disease, disproportionately affect individuals with low socioeconomic status (Drewnowski & Darmon, 2005; Rao et al., 2013).

Convenience, or the time cost of food, further impacts consumer food choices. Particularly in urban areas, the availability of fast food and shelf-stable ultra-processed foods has increased in recent years (Herforth & Ahmed, 2015). It has been established that meals prepared in the home are generally more nutritious than meals purchased away from home (source). As the perception of time scarcity increases, consumers spend less time on food preparation and rely more on meals eaten away from home (Herforth & Ahmed, 2015). It has also been reported that many consumers, especially young adults, prioritize foods with time-value; when time is scarce, the time-value of food may trump its health-value (Howse et al., 2018). Although there are many examples of inexpensive nutritious foods, including beans and legumes, these ingredients often require a greater investment of preparation time (Drewnowski & Darmon, 2005). Accessibility of food can also factor into product convenience. For instance, low access to grocery stores increases the time needed to procure healthy ingredients, thus posing a major barrier to food preparation.

Finally, the desirability of a product is another factor of the food environment that influences consumer selections. Taste, texture, aroma, and visual appeal are factors that affect consumer purchases on the basis of desirability (Herforth & Ahmed, 2015). However, external factors, especially marketing, are major influences on food choices (Herforth & Ahmed, 2015). In fact, one of the key intentions of food and beverage marketing is to increase product desirability (Herforth & Ahmed, 2015). Children and youth are particularly susceptible to food marketing (Bruce et al., 2015; Sadeghirad et al., 2016). In addition to product advertising, product positioning can affect food choices. For example, items placed at eye-level in vending machines are more likely to be selected than products placed towards the bottom shelf of the vending machine (Bauer & Reisch, 2018). Cultural norms also impact the desirability

of foods (Herforth & Ahmed, 2015; Bauer & Reisch, 2018). Finally, product quality can impact desirability; low-quality or damaged produce may deter consumers from choosing healthier selections (Herforth & Ahmed, 2015).

2.3 Food Environments in Recreation Facilities

Recreation facilities are publicly funded community hubs for sport and physical activity that serve patrons of all ages (Naylor, 2010). As these centres already provide opportunities for positive health behaviours, they could also be an ideal place to promote healthy eating (Chang, 2010; Carter, 2011; Papoutsi et al., 2013; Smith, 2017). However, the current ubiquitous availability of unhealthy products contradicts health-promoting activities within these facilities.

Over three quarters of Canadian youth participate in organized sports, which often take place in these community-based recreation facilities, such as hockey rinks or soccer fields (Bulten et al., 2018; Barnes et al., 2018). Despite high participation rates, it has been argued that children's organized sports are obesogenic for many reasons; in addition to the availability of ultra-processed foods, sports sponsorship and celebrity endorsement are also important contributors to the obesogenic food environment (Naylor et al., 2010; Bruce et al., 2015; Smith et al., 2017).

A major source of program sponsorship for children's sports is food and beverage companies, comprising of an estimated 17% of sponsorship (Carter et al., 2011). Foods associated with sports sponsorship, such as Tim Hortons or Gatorade, are generally energy-dense and nutrient-poor; promotion of healthy foods through sports programs is uncommon (Smith et al., 2017). Sponsorship is an inexpensive

means to increase exposure to brand names and logos, thereby influencing a child's awareness and appeal for the product (Carter et al., 2011; Smith et al., 2017).

Similarly, endorsement of food and beverages by sports celebrities is common and it is well established that this promotion influences a child's food preferences, purchases, and consumption (Smith et al., 2017). Athlete endorsement is also reported to be a source of sport nutrition information for children (Smith et al., 2017). By extension, it has been argued that endorsement of food and beverage products by these figures can be detrimental to a child's ability to assess a product's nutritional quality (Smith et al., 2017).

To assess the overall quality of foods and beverages sold in recreation facilities, independent audits have been completed in several provinces across Canada (Naylor, 2014; Recreation NB). The first provincial recreational facility food environment scan was completed in British Columbia in 2014. Data was collected regarding quality of foods sold in vending machines, menu quality and pricing from snack bars, and overall health promotion environment, including internal policy development and educational opportunities. Based on data from 220 participating facilities, the authors suggest that these food environments were largely obesogenic, particularly in smaller communities where facilities had lower capacities to make changes (Naylor, 2014).

A similar scan in Alberta found that, despite provincial nutrition guidelines being in place, few recreation facilities offered healthy vending machine choices. Of those who did, low sales and subsequent lost revenue were commonly viewed as barriers. Another commonly cited barrier to offering healthy foods and beverages was a lack of tools and resources, such as funding and education (Olstad et al., 2012).

The most recent provincial scan was completed in New Brunswick, where similar results were reported. It was found that 66% of beverage vending and 87% of food vending options were categorized as “do not sell” according to HealthLink BC’s Brand Name Food List, a tool that categorizes foods and beverages based on their nutritional profile (HealthLink BC). Furthermore, 80% of food service facilities utilized deep fryers in food preparation, and 86% of facilities sold candy or sugary drinks, such as soda or sports drinks (Recreation NB).

In 2015, PEI’s Healthy Eating Alliance produced a report on the food environment in recreation facilities across the Island (PEI Healthy Eating Alliance, 2015). Despite the fact that the Brand Name Foods List was not used to classify available products, the report still offered valuable insight to the types of products offered in canteens and vending machines, as well as the available cooking and food storage equipment. It should be noted, however, that the data was self-reported by the participating facilities. The report remains unpublished.

Several other provinces have also set out to collect data on the current food environment in sport facilities. To date, scans are underway in Nova Scotia, Newfoundland, and Saskatchewan.

2.4 Nutrition Guidelines for Recreation Facilities

In spite of an obvious need, there are currently no federal policies regulating the nutritional content of food and beverages offered in recreation facilities. Some provinces have taken steps to improve the food environments in recreation facilities. In 2006, British Columbia introduced the Healthier Choices in Vending Machines in

Public Buildings policy, of which the main objectives were to improve healthy food and beverage offerings in publicly-accessible vending machines and provide support to food service operators in identifying healthy food and beverage options (Government of British Columbia, 2014). In spite of this being implemented, a 2010 scan of food environments in public recreation facilities throughout the province found that a significant proportion of food and beverage options were unhealthy, suggesting a low compliance with public policy (Olstad et al., 2012).

Likewise, Alberta has introduced the Alberta Nutrition Guidelines for Children and Youth, which aims to improve the food environment in schools, recreation facilities, and other environments frequented by children (Government of Alberta, 2012). Implementation of the guideline is voluntary with few supports provided to facilities. As such, policy adoption has been limited (Olstad et al., 2012).

There is mounting evidence that voluntary nutrition guidelines are ineffective at improving the food and beverage offerings in sport and recreation facilities across Canada (McIsaac et al., 2018). In fact, there is little evidence that current nutrition policies have any positive effects on food environments (Bauer & Reisch, 2018; McIsaac et al., 2018). Current efforts include voluntary guidelines with minimal supports or enforcement, taxation, public information initiatives, and restricting marketing and advertising (Bauer & Reisch, 2018). To ensure effectiveness, policy development must be evidence-based and should consider the interrelated determinants of dietary behaviour (Hawkes et al., 2015; Bauer & Reisch, 2018). More specifically, four mechanisms through which nutrition policies could be successful have been identified: 1) providing an environment that fosters the development of healthy food preferences, 2) overcoming barriers to making healthier selections, 3)

encouraging individuals to reassess unhealthy preferences, and 4) catalyzing a change in the greater food system (Hawkes et al., 2015).

In terms of sport and recreation settings, effective nutritional policies must provide appropriate resources to support a lasting change. This may include funding to implement physical changes, such as the installation of water bottle refill stations, or knowledge and information to assist policy adoption (Hawkes et al., 2015; Reilly et al., 2018). Enforcement is also key to a successful policy, an important consideration given that many recreation facilities are publicly funded (Reilly et al., 2018).

There are currently no nutritional guidelines or policies for recreation facilities in PEI. Although provincial school nutrition policies have been implemented, they do not address recreation facilities (Government of Prince Edward Island, 2011).

Consequently, such policies must be established to regulate the nutritional content of foods and beverages available in recreational facilities. As previously mentioned, appropriate support must be in place prior to policy implementation to ensure the policy's success. In order to do so, baseline data on the current food environment is needed, which is the intent of this study.

In addition to policy development, data collected in this study can be used to lobby for funding. Many changes that would improve the food environment, such as updating menu signs, have an upfront cost that may be prohibitive to facilities (Olstad et al., 2012). This data can also serve as the baseline data on food and beverage offerings in recreational facilities, from which recommendations can be formed and improvements can be made.

3. Methods

3.1 Design

A cross-sectional survey design was used to assess the nutritional quality of foods and beverages offered in recreational facilities. A researcher-administered survey was used to collect information from all PEI recreational facilities that offer food or beverages for sale.

3.2 Sample

All sport and recreation facilities with canteen or vending services were eligible to participate in the study, for a total of approximately 40 possible participants. Facility lists and contact information were provided by Recreation PEI. In July and August, 2018, all eligible sport and recreation facilities in PEI were sent an introductory letter by Recreation PEI informing them of the upcoming study. For feasibility, 20 facilities were selected for participation, representing facilities of various types, including rinks, swimming pools, and multisport complexes, from each county. Many summer facilities were unable to participate due to the timing of the study. Once selected, facility managers were contacted by researchers to schedule a visit.

3.3 Data collection

Data was collected by third- and fourth-year nutrition students. Volunteer nutrition research assistants Tionna Gordon and Andrea Furlotte aided in data collection, and were trained by the primary researcher on how to complete the questionnaires prior to the commencement of data collection. During site visits, facility managers assisted researchers in locating vending machines and answered

questions regarding times of operation and the nature of food services and food preparation. Researchers completed all forms by observation. Canteen food and beverage data were logged on Food Service Audit Forms (Appendix A). Foods and beverages offered in vending machines were recorded using Vending Audit Forms (Appendix B). Additionally, photos of vending machines and canteen menus were taken for data verification purposes.

3.3.1 Questionnaires

Both the Food Service and Vending Audit Forms were first developed for use in BC, and adapted by the researchers for use in PEI: instructions for self-administration and response scoring were removed and formatting was condensed. Although more time consuming, interviewer-administered surveys were used to ensure the validity of the data.

The Food Service Audit Forms includes questions regarding contracted food services operations, food storage and preparation tools, and promotion of healthy food choices. Availability of healthy foods, including fruits, vegetables, and reduced sodium sauces, as well as the use of lower-fat cooking methods were assessed. The Vending Audit Forms were used to record brand names, flavors, sizes, and prices of food and beverages available for purchase in vending machines. Products were then classified using the Brand Name Foods List, which was developed by British Columbia's Healthy Living Alliance as a tool to score foods and beverages based on Guidelines for Food and Beverage Sales in BC Schools and the Nutritional Guidelines for Vending Machines in B.C. Public Buildings (Healthlink BC). This form was also used to gather general information on vending machine advertising and profits, as well as to record the prevalence and contents of 25¢ candy machines.

3.4 Data analysis

3.4.1 Coding and data cleaning

Foods and beverages sold in vending machines have been categorized as “sell most often”, “sell sometimes”, and “do not sell”, based on the Brand Name Food List. Prepared foods from food service operations have been coded based on the frequency of availability with “never”=0; “occasionally”=1; etc. Prepared foods have also been coded according to type.

Data was entered using SAS-FSP by the author. Proc univariate (SAS) was used to identify extreme or inappropriate values; any identified were checked and corrected if appropriate.

3.4.2 Statistical Analysis

Descriptive statistics, such as frequencies and means, were generated for prepared foods and beverages sold, foods in stock, storage and preparation tools, and promotion of healthy and unhealthy foods. Descriptive statistics were also generated based on food classification: “do not sell”, “sell sometimes”, and “sell most”.

4. Results

4.1 Food Service Audit Results: Canteens

The nature of sport facility canteens in PEI is described below. Canteens were most frequently patronized by users of the facility (76.5%), though almost a quarter of

facilities (23.5%) were open to the general public, similar to a take-out style restaurant (not shown). Over half of facilities (58.8%) had some seating available in or near the canteen. Most canteens (64.7%) operated during the evenings and weekends, though a small proportion (17.7%) operated daily. An additional 17.7% reported operating outside of these schedules. The majority of facilities (82.4%) operated canteens with facility staff, while a small proportion of facilities (17.7%) contracted canteen services from an outside provider. One facility had a privately-owned restaurant franchise in place of a traditional canteen and was excluded from the food service audit.

The availability of the most commonly sold entrées and side-orders are listed in Table 1. Of the most frequently available foods, eight of the twelve foods are deep fried, including French fries, mozzarella sticks, and onion rings. Other foods that were less commonly offered included pizza (23.5%), sandwiches (17.7%), grilled cheese sandwiches (17.7%), breakfast sandwiches (17.7%), sweet potato fries (11.8%), submarine sandwiches (5.9%), baked potatoes (5.9%), and battered vegetables (5.9%) (not shown).

Table 1: Availability of entrees and sides in canteens (n=17)

Food type	n (%)
French Fries	16 (94.1)
Fried Chicken	16 (94.1)
Onion Rings	15 (88.2)
Gravy	14 (82.4)
Poutine	12 (70.6)
Fried Clams	11 (64.7)
Hot Dog	9 (52.9)
Mozzarella Sticks	9 (52.9)
Burger	7 (41.2)
Soup	6 (35.3)
Fish & Chips	5 (29.4)
Fries with the Works	5 (29.4)

The availability of the most common beverages sold in canteens is shown in Figure 1. Sports drinks, regular soda, diet soda, and water were sold in every canteen. White milk was sold less frequently than chocolate milk. Conversely, 100% fruit juice was stocked more frequently than sugar-sweetened fruit drinks, such as fruit punch and lemonade. Likewise, hot brewed tea was more frequently available than commercially-prepared iced tea. Beverages that are not included in the figure include hot cider (35.3%), flavored coffee drinks (23.5%), slushies (23.5%), and fruit smoothies (11.8%). Energy drinks and flavored water were not found in any canteens.

Figure 2 shows the availability of snack- and dessert-type foods in canteens. The three most frequently stocked snack foods, bars, chips, and candy, are energy-dense foods that are high in sugar, fat, and sodium. Compared to chips and bars, fewer canteens offered baked goods, including cinnamon rolls, muffins, and biscuits, as well as other snack foods, like cheese and crackers or fruit.

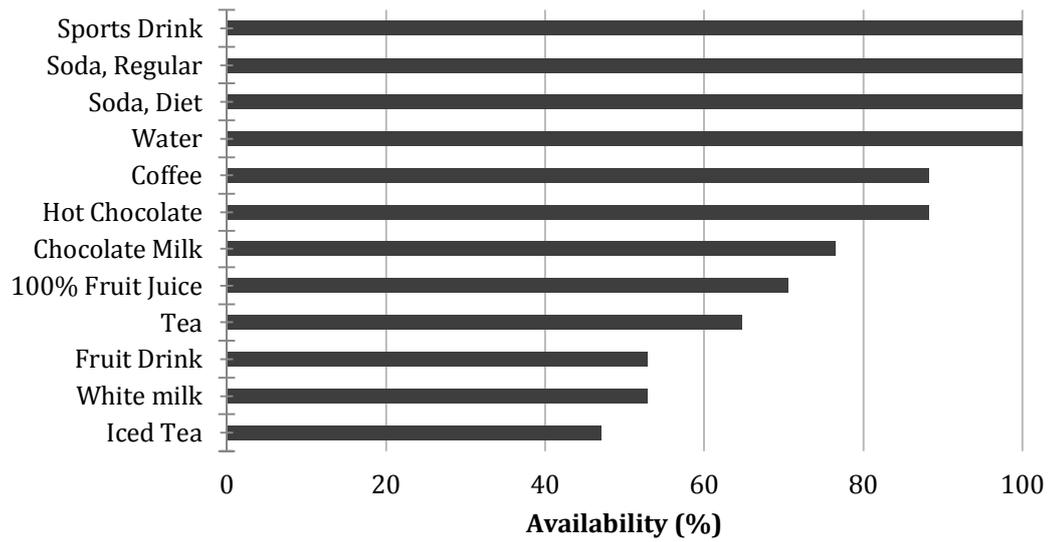


Figure 1: Availability of beverages in canteens (n=17)

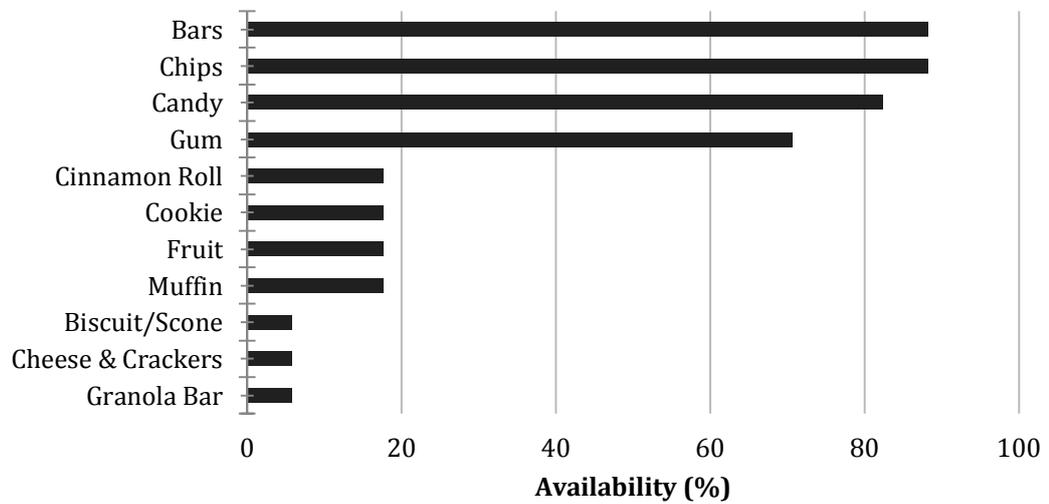


Figure 2: Availability of snack- and dessert-type foods in canteens (n=17)

Common cooking appliances and storage equipment was also assessed and is shown in Table 2. The most commonly found cooking appliance in canteens was deep fryers, which produce foods high in fat. Most facilities had a display refrigerator, which can be described as a glass-front refrigerator, through which customers can see food and beverage options. Likewise, most facilities had freezers for storing products for later use. Not included in Table 2 were numbers of sinks found in canteens: the majority (82.4%) had 3 or more sinks, two facilities (11.8%) had 2 sinks, and one facility (5.9%) had no sink.

The frequency with which facilities were implementing healthy food preparation practices are shown in Figures 3 to 7. A frequency of “never” was recorded if the facility did not stock the product or practice the behaviour at all; “occasionally” refers to stocking the product or practicing the behaviour once or twice monthly, while “frequently” refers to offering the product or practicing the behaviour at least once a week.

As illustrated in Figure 3, fresh fruit was rarely available in facility canteens. Few facilities reported that fruit was frequently stocked (17.7%), almost a quarter of facilities reported offering fruit occasionally (23.5%) and the majority reported never offering fresh fruit (58.8%). Vegetables were even less frequently available, with a majority of facilities never offering any (82.4%). Likewise, canned fruits or vegetables were almost never available (88.2%); none of the sample offered canned fruits or vegetables occasionally, and few stocked them frequently (11.8%).

Table 2: Commonly used cooking and storage equipment in canteens (n=17)

Equipment type	n (%)
Deep Fryer	16 (94.1)
Display Refrigerator	15 (88.2)
Microwave	15 (88.2)
Freezer	14 (82.4)
Burner Stove	10 (58.8)
Flat Top/ Griddle	10 (58.8)
Heat Lamp/ Warmer	10 (58.8)
Oven	9 (52.9)
Storage Refrigerator	9 (52.9)
Toaster	7 (41.2)
Slow-Cooker	6 (35.3)

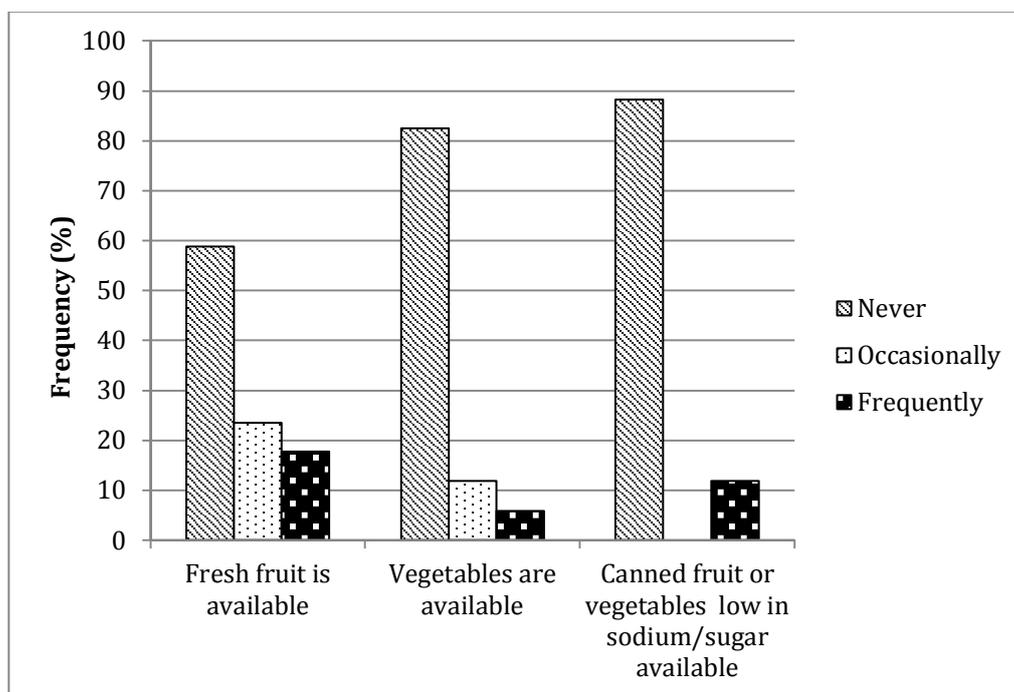
**Figure 3: Availability of fruits and vegetables in canteens (n=17)**

Figure 4 shows the availability of healthy grain products. Few facilities offered whole grain products; 23.5% of facilities reported using whole grain bread products or baked goods, including hamburger buns and muffins, while the majority of facilities (76.5%) never used whole grain products. Similarly, none of the sample facilities replaced white flour with whole wheat in recipes prepared on-site, and only one facility reported using low fat and sodium instant noodle products occasionally (5.9%). That being said, almost two thirds of facilities (64.7%) served moderately-sized baked goods and breads.

The availability of nutritious dairy products was also assessed, as shown in Figure 5. Almost two thirds of facilities (64.7%) frequently offered white or chocolate milk that was 2% milk fat or less, and less than a quarter of facilities (23.5%) reported that they never stock milk. Conversely, over three quarters of facilities (76.5%) never offer yogurt, with less than one fifth of facilities (17.7%) offering yogurt frequently. The number of facilities that exclusively sold unprocessed cheeses were also few: just over a quarter of facilities (29.4%) used only unprocessed cheese products, while almost two thirds of facilities (64.7%) reported using processed cheese products, like Kraft Singles Slices.

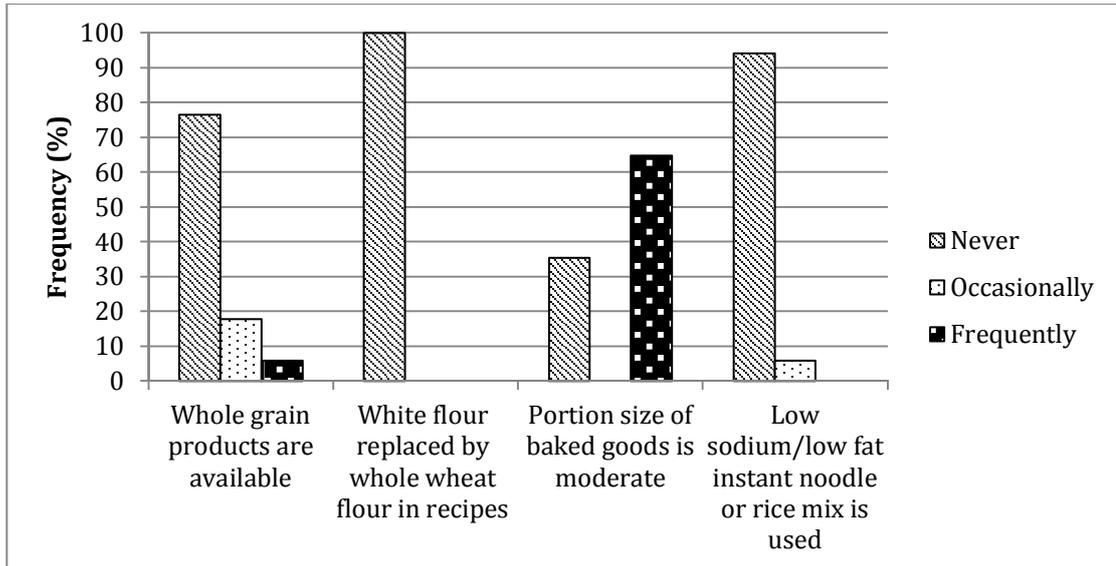


Figure 4: Frequency of healthy grain product availability in canteens (n=17)

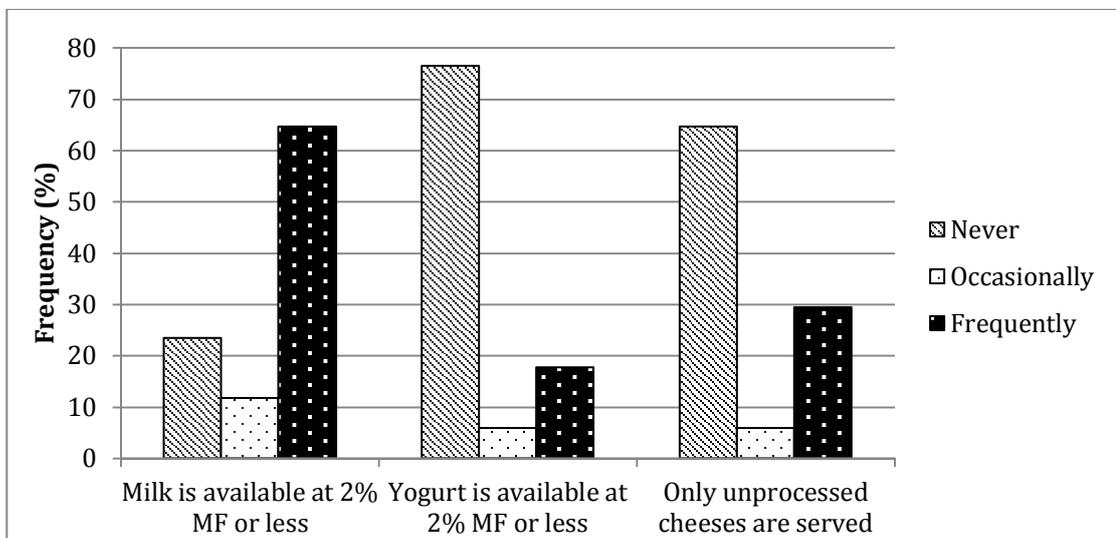


Figure 5: Availability of healthy dairy products in recreation facility canteens (n=17)

There are few options for meat alternatives in canteens; nearly every facility (88.2%) reported “never” offering plant-based proteins such as legumes or tofu. Only two facilities (11.8%) offered alternative proteins frequently. Likewise, most canteens “never” offer meats (88.2%) or fish (94.1%) that are cooked using low-fat cooking methods, including baking, roasting, or grilling. Over three quarters of facilities (76.5%) “never” offer deli meats that are low in fat or sodium, with the remainder only offering them “occasionally” (23.5%).

The frequency of practice of several healthy preparation methods is shown in Figure 7. Over two thirds of facilities (70.6%) reported “never” using recipes that avoid the unnecessary addition of salt, sugar, and fat; just under one third of facilities (29.5%) frequently practice the behaviour. Similarly, very few facilities replace deep frying for lower-fat food preparation methods. Nearly every facility (88.2%) reported that baking, grilling, or roasting “never” replace deep fat frying. Even more facilities (94.1%) reported that they “never” baked rather than deep fry breaded products, such as popcorn chicken or clam strips. A majority of facilities (94.1%) reported “never” using reduced sodium gravy mixes, and no facility used low sodium soup mixes or stocks.

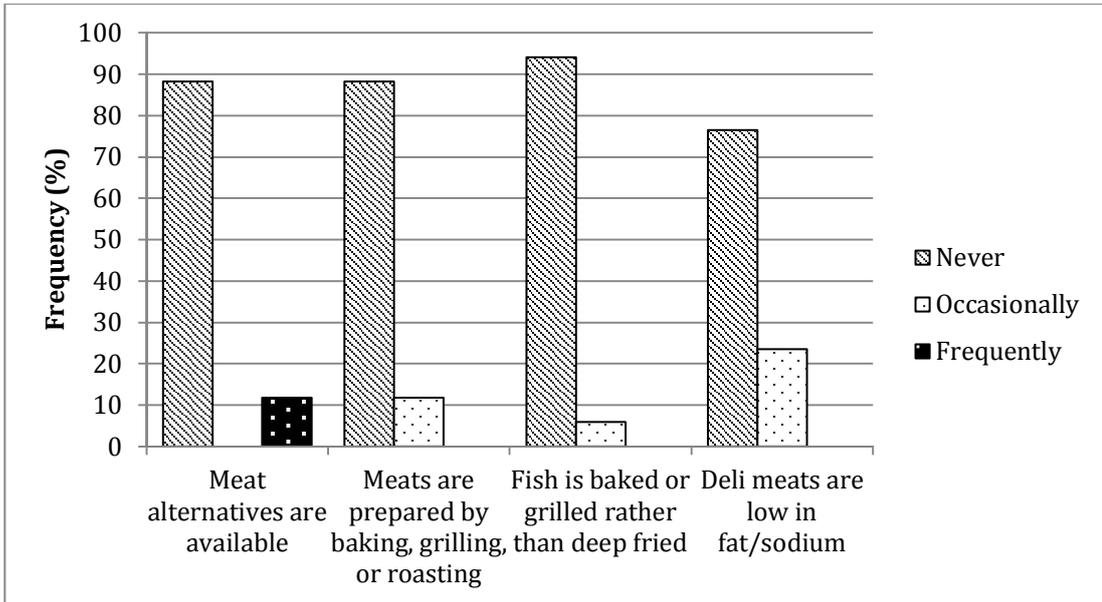


Figure 6: Availability of nutritious meats and meat alternatives in recreation facility canteens (n=17)

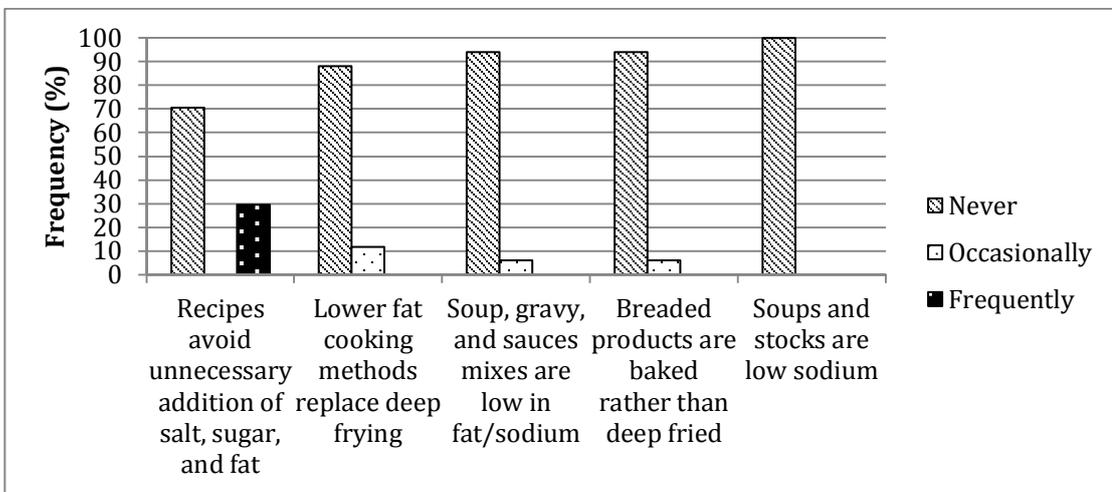


Figure 7: Frequency of healthy preparation methods used in canteens (n=17)

4.2 Vending Audit Results

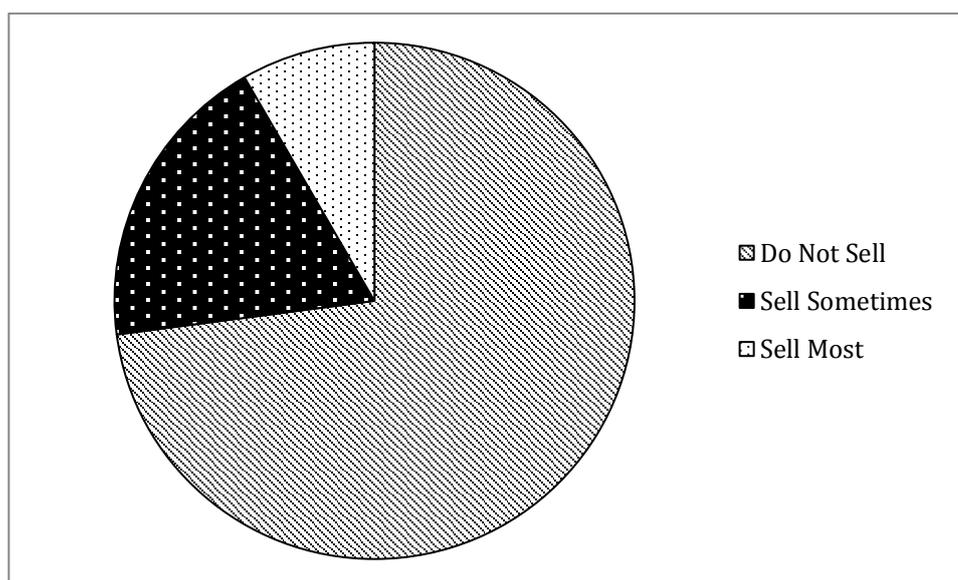
The availability of foods and beverages commonly sold in vending machines is documented in Table 3. Almost half of facilities offered chips, bars, and candy. However, the same number of facilities offered baked chips, which are lower in fat, sodium, and overall energy. Just over a quarter of facilities offered cheese and crackers, which generally consisted of crackers with a spreadable processed cheese product. Snack foods that have not been included in Table 3 include nuts and rice crisps, which were offered by 14.3% of facilities, whereas fruit snacks, fruit puree, and dried fruit were offered by 7.1% of facilities. Yogurt was not found in any vending machines.

Water was available at every facility. However, sugar-sweetened sports drinks were also available at every facility with vending machines. Almost two thirds of facilities also offered sugar-sweetened soda pop, however just as many facilities offered diet soda, which is sugar-free. Sugar-free flavored water, such as Vitamin Water Zero, was available in half of facilities with vending machines. Sugar-sweetened fruit drinks were more frequently offered than 100% fruit juice. Other beverages sold in vending machines that are not reflected in Table 3 include white milk (14.3%), chocolate milk (14.3%), flavored coffee drinks (14.3%), caffeinated energy drinks (14.3%), and sugar-sweetened flavored water (14.3%).

Vending machine contents were also analyzed based on HealthLink BC's Brand Name Foods List; the results are shown in Figures 8 (foods) and 9 (beverages) (Healthlink BC). Almost three quarters of foods (72.9%) sold in vending machines were classified as "do not sell". Less than a quarter of available products (18.8%) were classified as "sell sometimes", and even fewer products (8.3%) were considered "sell most" snack foods. Slightly less than two thirds of beverages

Table 3: Availability of common food and beverages in vending machines (n=14)

Snack Food	n (%)	Beverage	n (%)
Chips	6 (42.9)	Sports Drinks, Sugar Sweetened	14 (100)
Bars	6 (42.9)	Water	14 (100)
Candy	6 (42.9)	Soda, Regular	9 (64.3)
Baked Chips	6 (42.9)	Soda, Diet	9 (64.3)
Cheese & Crackers	4 (28.6)	Flavored Water, Sugar Free	7 (50)
Cookie	4 (28.6)	Fruit Drink	7 (50)
Gum	3 (21.4)	Iced Tea	5 (35.7)
Granola Bar	2 (14.3)	100% Fruit Juice	5 (35.7)

**Figure 8: Classification of foods in vending machines according to HealthLink BC's Brand Name Foods List (n=14)**

available (63.3%) were classified as “do not sell” products, while roughly equal numbers of beverages offered in vending machines were considered “sell sometimes” (19.4%) and “sell most” (17.3%).

Vending Audit forms were also used to record the prevalence of 25¢ candy machines. Of the 20 facilities sampled, 35.0% had the machines. The typical contents included candy, gumballs, chocolate-covered nuts, and flavored nuts. One facility had a novelty cotton-candy machine.

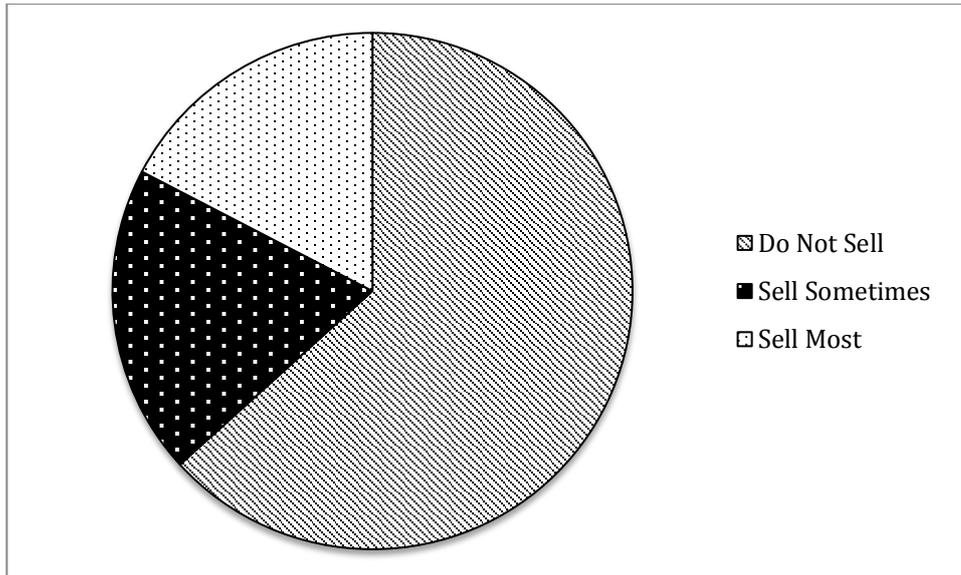


Figure 9: Classification of beverages in vending machines according to HealthLink BC's Brand Name Foods List (n=14)

5. Discussion

One of the major objectives of this study was to describe the food environment in recreation facilities across the province. More specifically, the study aimed to describe the foods and beverages sold in the facilities, as well as describing food preparation methods in the facilities.

5.1 Description of Facilities

5.2 Canteen Audit

Most canteens surveyed operated either daily or during evenings and weekends. Of the proportion that operated outside of that schedule, most opened the canteen based on facility use; canteens were only staffed during scheduled events or sport tournaments. Seasonality of the recreation facility was not assessed in the present study. However, the majority of ice rinks across the province operate on a seasonal basis through the winter and spring months. Multisport complexes were generally open year-round.

The majority of canteens were operated by staff of the facility, while only a small proportion of canteens were contracted to outside providers. Outside contractors, as well as non-negotiable contracts, may prevent short-term improvements in nutritious food and beverage offerings. While most canteens were patronized by users of the recreational facility, some operated as a take-out restaurant for the community at large. This happened most frequently in rural areas.

Not surprisingly, deep fryers were the most common cooking appliance in recreation facility canteens. This is consistent with, though slightly higher than, findings from other provinces; 80% of facilities in New Brunswick had deep fryers

(Recreation NB). Admittedly, this study found a higher proportion of facilities using deep fryers than the unpublished 2015 PEI Healthy Eating Alliance report, which found that 77% of PEI facilities use fryers (PEI Healthy Eating Alliance, 2015). The use of freezers was also consistent across provinces: 86.7% of recreation facilities in New Brunswick and 82.4% of PEI facilities reported having freezers. There was a large discrepancy in the proportion of facilities with grills. 60% of New Brunswick facilities reported having grills, while only 5.9% of PEI facilities reported having one (Recreation NB). Interestingly, the PEI Healthy Eating Alliance reported that 62% of island recreational facility canteens had a grill (PEI Healthy Eating Alliance, 2015). The discrepancy may be explained by a difference in how appliances are defined. In this study, grills were described as an appliance with metal grates that cooks food by a flame from below. It is possible that other studies included flat-tops, or griddles, in the category. In this case, the results of this study would be consistent with the reports from New Brunswick and the PEI Healthy Eating Alliance.

As governmental sanitation regulations dictate that a minimum of three sinks are required for commercial food production, the total number of sinks in a facility was reported. Almost all (94.2%) of canteens in PEI recreation facilities have at least one sink, which is higher than the 73.3% of facilities in New Brunswick (Recreation NB). That being said, 17.6% of canteens in PEI have fewer than three sinks, which would pose a barrier to on-site food production (Government of Prince Edward Island, 2016). Though it was not measured in this study, the PEI Healthy Eating Alliance report found that no facilities indicated that equipment for food preparation or storage was a barrier to offering healthier foods (PEI Healthy Eating Alliance, 2015).

Foods offered in canteens were generally of low nutritional quality. Eight of the twelve most commonly offered foods were deep fried, and are therefore likely to

have a high fat content. Since the 2015 report by the PEI Healthy Eating Alliance, the availability of French fries has increased considerably from 69% (PEI Healthy Eating Alliance, 2015). Likewise, the proportion of facilities offering fried chicken has increased from 62% in 2015 to almost 95% (PEI Healthy Eating Alliance, 2015). The availability of pizza, which tends to be high in fat, sodium, and overall calories, increased from 8% of facilities in 2015 to 23.5% (PEI Healthy Eating Alliance, 2015). Overall, healthier entrees are much less frequently offered than high-fat, high-calorie, low-nutrient options. Breakfast sandwiches (egg and cheese served on bread or an English muffin), were offered in only a small proportion (17.7%) of facilities. This is slightly higher than the 8% of facilities offering the product in 2015 (PEI Healthy Eating Alliance, 2015). Further, baked potatoes saw a small decrease in availability; 8% of facilities sold baked potatoes in 2015, while only 5.9% of facilities sell the product now (PEI Healthy Eating Alliance, 2015).

All of the foods most frequently available in canteens require minimal preparation and are shelf-stable, such as ready-mix gravy powder, or can be stored in freezers, such as commercially-prepared French fries or mozzarella sticks. By extension, these heavily processed foods are likely to contain excessive amounts of sodium and fat. Similar results were found when snack- and dessert-type foods sold in canteens were assessed; products high in sugar, sodium, and fat content, such as candy and chips, were most commonly available. As with the common entrées, these popular snack foods are shelf-stable and require essentially no preparation. In fact, there is a notable reduction in availability of products that have the potential to be more nutritious, including fruit, muffins, and cheese and crackers. These items tend to require more preparation and have a shorter shelf-life.

Given the limited operational hours of most canteens in recreational facilities, using primarily frozen convenience-style foods for entrees and side-orders, such as hamburger patties, is protective against food waste. If kept frozen, these products can last for months with little impact on quality. Similarly, stocking snack foods that can be kept for relatively long periods with no change in product quality is more convenient for canteens than highly perishable foods, like fruits. Food waste is a major concern for these facilities as products that can no longer be sold due to quality issues translates to lost revenue.

Some foods sold in canteens, like muffins, have the potential to be nutritious options, but generally require more preparation, which may be a barrier to offering them. Many of the facilities have limited staff or volunteers to run canteens, so finding personnel to prepare more labour-intensive foods may be challenging. Similarly, lacking the appropriate equipment, like ovens or sinks, may be prohibitive to making more food on-site.

Most beverages commonly sold in canteens were also generally of low nutritional quality. Sports drinks and regular soda were available in every canteen and both have a very high sugar content. Though the 2015 PEI Healthy Eating Alliance report combined the contents of canteens and vending machines, these results show that the availability of soda in the present study is higher than the 77% of facilities (PEI Healthy Eating Alliance, 2015). Diet soda, which is sweetened with sugar-alternatives, was offered in all canteens. Water, which is arguably the healthiest beverage option, was also available in each canteen. This is consistent with the findings of the PEI Healthy Eating Alliance report (PEI Healthy Eating Alliance, 2015).

When the availability of chocolate and white milks was assessed, it was found that chocolate milk was offered much more frequently in canteens than white milk. It should also be noted that although chocolate milk is still a good source of calcium, magnesium, and vitamin D, it is higher in sugar than white milk. On the other hand, canteens offered 100% fruit juice more frequently than fruit-flavored drinks, the latter of which much higher in added sugars. Even still, there was a lower availability (14.4%) of fruit juice compared to the PEI Healthy Eating Alliance report (PEI Healthy Eating Alliance, 2015). However, the results of this study are consistent with the HERS New Brunswick report, which found that 73% of canteens offer fruit juices (Recreation NB).

Energy drinks, which are high in both sugar and caffeine, were not found in any of the sampled canteens. This is a positive finding as energy drinks can be detrimental to the health of young people (Health Canada, 2011). This is also an improvement from the findings of the PEI Healthy Eating Alliance report; 8% of canteens offered caffeinated energy drinks at that time (PEI Healthy Eating Alliance, 2015). On the other hand, some healthier beverage options were found less frequently than ideal. Smoothies, which can be made with fruit, vegetables, and yogurt, were offered in only two facilities. Likewise, flavoured water was not found in any canteen, but sugar-free flavored water can be a healthy alternative to popular sugar-sweetened beverages.

Fresh fruit availability in canteens across PEI was lower than other provinces; almost half (46%) of facilities in both British Columbia (Naylor et al., 2010) and New Brunswick (Recreation NB) sold fruit on a regular basis, compared to only 17.7% of PEI sport facilities. However, this shows a small improvement from the PEI Healthy Eating Alliance's 2015 report, where fresh fruit was only offered in 8% of Island

facilities (PEI Healthy Eating Alliance, 2015). Facility seasonality may contribute to the low fruit availability: fresh fruit is highly perishable, and if unsold, could contribute to lost revenue. Vegetables were even less frequently offered in canteens. Many facilities that reported using vegetables regularly used them in a popular PEI French fry dish: “fries with the works”. It is thus important to understand the context of the availability of vegetables, as serving canned peas on top of high-fat French fries with gravy is not be considered a healthy practice.

Whole grain baked goods are higher in fibre than products made from white flour and are therefore a more nutritious option. That said, whole wheat products are rarely offered in PEI canteens. It was found that 23.5% of facilities offered whole wheat products, which is moderately higher than in New Brunswick, where whole grain baked goods were available at only 13% of facilities. However, whole grain bread was offered in almost all sport facility canteens (96%) in British Columbia. No Island sport facilities reported replacing white flour for whole wheat in recipes made on-site, which mirrors the findings of the New Brunswick audit (Recreation NB). It is important to note that most canteens surveyed did not prepare any recipes from scratch, so this figure is artificially high. The same could be said for canteens using recipes that avoid the unnecessary addition of sugar, salt, and fat; 70.6% of PEI facilities reported that they never use healthier recipes, when in fact, most facilities did not use recipes at all. From this, it could be said that when facilities use recipes, they tend to avoid extra sugar, salt and fat. Therefore, foods prepared in canteens tend to be healthier than commercially prepared products.

The portion size of baked goods was moderate in most PEI canteens (64.7%). However, “moderately-sized” was subjectively assessed by the researcher; a clear

definition would make the findings more valid and allow for interprovincial comparisons.

The frequency with which healthy milk options were offered in PEI sport facility canteens was comparable to findings in other provinces: 65% of facilities in PEI and British Columbia offered low-fat milk (Naylor et al., 2014). Yogurt, a food rich in calcium, vitamin D, and protein, was rarely available, being offered regularly in fewer than one fifth of PEI canteens. This could be a viable option for facilities, since, when refrigerated, individual yogurt cups can last for much longer than other healthy snack options such as fresh fruit. Cheese availability in canteens was also assessed. Slightly more than a quarter of PEI facilities exclusively used unprocessed cheeses, while the majority (64.7%) used processed cheese products. These results are similar to those in New Brunswick, where almost three quarters of facilities used processed cheeses (Recreation NB). However, processed cheese can be high in fat and sodium and low in nutrients commonly found in dairy products, including calcium and protein. As such, using real cheese is a healthier alternative to more processed products. However, cost could be an important consideration: processed cheeses are generally less expensive and often have a longer shelf-life than real cheeses.

Meat alternatives, like lentils, beans, or tofu, are rarely available in recreation facility canteens in PEI. A large proportion (88%) of facilities in PEI, and 93% of facilities New Brunswick, never have meat alternatives available for purchase (Recreation NB). With the recent release of the updated Canada's Food Guide (Health Canada, 2019), which emphasizes plant-based proteins, this is an area that could be improved. Fortunately, many meat alternatives, like canned beans, are shelf stable; meals like chili can be made in large batches, primarily from canned foods, and frozen for later use.

Deep frying was found to be the most common cooking method for meat and fish sold in canteens. Only 11.8% of PEI facilities reported that deep frying has been replaced with low-fat cooking methods. This is lower than the 26.7% of facilities in New Brunswick that use baking, roasting, or grilling in place of deep frying (Recreation NB). By using low-fat cooking methods, even frozen convenience products, like breaded chicken, can be made somewhat healthier. Currently, few recreation facilities use low-fat cooking methods for breaded products, like clam strips. Only 5.9% of PEI facilities and 13.3% of New Brunswick facilities reported using methods other than deep frying to prepare breaded products (Recreation NB). Though it was not assessed, there may be several reasons why deep-fat frying remains so popular, despite the negative health implications. First, cooking time may influence the practice: deep frying is a relatively quick cooking method, especially for small items like popcorn chicken. Further, product quality may be impacted by using cooking methods other than deep frying, especially when using commercially-prepared products intended for deep fryers. Finally, customer demand may be driving the continued use of deep fryers since fryers generally give breaded products the desired taste and texture.

Gravy was very commonly sold in sport facility canteens on Prince Edward Island, with 82.4% of canteens offering gravy. Only 5.9% of facilities reported using a low-sodium gravy mix. This is much lower than the findings in New Brunswick, where one third of facilities used reduced-sodium gravy mixes (Recreation NB). Many PEI facilities reported using their food service supplier's "standard" gravy mix, which was generally Knorr Brown Gravy Mix. Additionally, many facility operators were unsure if their gravy mix was low in sodium. Given that facilities are more likely to use recipes that avoid the unnecessary addition of fat, salt, and sugar than to use

reduced-sodium gravy mixes, it may be easier for facilities to improve internal factors, like staffing, that contribute to health-promoting behaviours than it is to improve external factors, such as products offered by local suppliers. This is a potential reason why some healthy practices are more commonplace in recreation facility canteens than others.

5.3 Vending Audit

It was found that products in vending machines in PEI recreation facilities were generally high in fat, sugar, sodium, and overall energy. The nutritional quality of beverages available was similar to that of other provinces. A slightly lower proportion of vending machine beverages in PEI were considered “do not sell”, which is slightly lower than the 66% of beverages in New Brunswick, but on par with results from a similar study in British Columbia (Recreation NB; Naylor et al., 2014). In both Prince Edward Island and New Brunswick, water, sports drinks, and soda were the most commonly sold beverages in vending machines (Recreation NB). The availability of water is a positive finding, as it is arguably the healthiest beverage option; however, the near-ubiquitous availability of sports drinks is concerning due to the high added sugar content. Likewise, the proportion of facilities offering sugar-sweetened soda is high on PEI; however, sugar-free diet soda was just as widely available. Fruit juice was reported in almost half of vending machines in NB, but only 35.7% of facilities in PEI (Recreation NB). It was also found that sugar-sweetened fruit drinks were sold more frequently in PEI than 100% fruit juice. This is a concern, since, compared to real fruit juice, fruit-flavored drinks contain more added sugars and fewer vitamins.

Milk was rarely sold in recreation facility vending machines. Only 14.3% of facilities offered white milk, which, according to the Brand Name Foods List, is considered a “sell most” beverage (HealthLink BC). Chocolate milk, which was found to be more popular in canteens, was also sold in only 14.3% of facilities with vending machines. Interestingly, instead of milk being offered alongside of other beverages, like soda or sports drinks, it was often in a vending machine by itself. This may indicate that few vending machine companies stock milk products, or that PEI dairy companies, like ADL, only sell directly to consumers. Adding milk to existing beverage vending machines may increase availability; however, current beverage vending companies, especially Pepsi and Coca Cola, do not offer dairy products. That being said, flavoured milk drinks, like Muscle Milk, are already sold in existing vending machines. However, due to the high added sugar content, these beverages are generally classified as “do not sell” (HealthLink BC).

Snack food vending results were also comparable to that of other provinces. It was found that 72.9% of snacks in PEI vending machines were classified as “do not sell”. This is moderately lower than 87% of snacks in New Brunswick, but slightly higher than the 68% of snacks in British Columbia (Recreation NB; Naylor et al., 2014). The top vending machine snacks in PEI, candy, chips and bars, are foods that are high in sugar, sodium, fat, and overall energy. Baked chips were just as frequently sold as regular potato chips; this is a positive finding as baked chips are generally lower in fat and calories. Cheese and crackers made with processed cheese spread were moderately common in vending machines. These products are generally high in sodium and low in other important nutrients that are found in unprocessed cheeses, particularly calcium and protein. It should be noted that cheese and crackers with unprocessed cheese was not offered in any vending machine. However, it is also

important to recognize that using unprocessed cheese would significantly reduce the shelf-life of the product. Many individually-sized cheese products are available, meaning using unprocessed cheeses could still be feasible.

Some of the healthiest snack foods were the least commonly available. Rice crisps, a low-fat alternative to chips, were found in less than a quarter of facilities (14.3%). Likewise, dried fruit and fruit puree, which provide some vitamins, minerals, and fibre and are both classified as “sell most” in HealthLink BC’s Brand Name Food List (HealthLink BC), were seldom available. Yogurt was not offered in any vending machine sampled. As previously mentioned, yogurt is a healthy snack option and has a longer shelf-life than many other healthy snacks when properly refrigerated. Yogurt is also classified as a “sell most” food, though care should be taken to select products low in added sugars (HealthLink BC).

5.4 Food and Beverage Availability

Slightly more than one third of PEI sport facilities (35%) had candy machines. In comparison, almost half of facilities in New Brunswick (47.5%) had the machines (Recreation NB). Though these machines dispense a small portion of candy for under \$1, the contents are typically high in sugar, fat, and sodium. Further, some machines, notably a novelty cotton-candy machine, had flashing lights which may be enticing to children.

As many recreation facility canteens have limited operational hours, vending machine options are generally more accessible to patrons. This is important as the nutritional quality of products sold in canteens and vending machines differed. For instance, 100% fruit juice was available in almost three quarters of canteens but only

one third of vending. Likewise, chocolate milk was offered in 76.5% of canteens but only 14.3% of vending. Interestingly, one facility offered no milk in the canteen but had a vending machine that exclusively sold milk. Patrons of sport facilities who visit outside of the canteen's operating hours will rely on food and beverage vending, despite an overall lower nutritional quality. As such, these patrons would have fewer healthy food and beverage options than patrons who could access facility canteens. This highlights the need for healthier options in vending machines.

5.5 Effectiveness of Health Promotion Strategies

Though it was not assessed in this study, the perspective of sport facility operators on perceived barriers to healthy food and beverage options is critical to making meaningful changes. While the 2015 PEI Healthy Eating Alliance found that over half of facilities expressed interest in offering healthier options, commonly cited barriers included cost and potential impact on profits, a lack of customer demand, product waste, and staffing concerns (PEI Healthy Eating Alliance, 2015).

While healthy food pricing in vending machines and canteens was comparable to unhealthy items, healthy foods tend to have lower profit margins (Olstad et al., 2014). Naturally, decreased revenue related to healthy offerings is concerning to recreation facilities (Olstad et al., 2014; PEI Healthy Eating Alliance, 2015). However, several intervention strategies have been proposed to encourage consumers to choose healthier options. Incentivized pricing strategies, where unhealthy items or large portions are priced higher than healthy alternatives, have been shown to positively impact consumer purchases (Olstad et al., 2014; Grech & Allman-Farinelli, 2015). More specifically, discounts of greater than 10% have been shown to increase sales volume of healthy foods and beverages across all age groups (Grech & Allman-

Farinelli, 2015). Inflating prices of unhealthy selections have also shown promising results (Grech & Allman-Farinelli, 2015). High prices of healthier options have been a common complaint of sport facility patrons; price manipulation favoring healthy foods and beverages may therefore improve consumer perceptions and purchases (Thomas & Irwin, 2010). Further, this strategy could be employed in both vending machines and canteens.

Additionally, identifiers for healthy canteen and vending options can be used to increase product visibility. It was reported that 19% of canteens in British Columbia and 13% of canteens as well as a small number of vending machines in New Brunswick use stickers and signs to highlight healthier selections (Recreation NB; Naylor et al., 2014). When properly labelled, this has the potential to impact the purchases made by sport facility patrons (Olstad et al., 2014). No canteens in PEI used similar signage, though it was not assessed for vending machines. This method of healthy food promotion may be helpful for identifying nutritious foods and beverages; however, both British Columbia and New Brunswick noted issues around incorrect labelling, whereby unhealthy products were mislabelled as being a healthy choice (Recreation NB; Naylor et al., 2014). Mislabelled products have the potential to confuse customers and may lead to the misinformed purchase of unhealthy foods and beverages. It should be noted that modifying existing or introducing new signage to highlight healthy selections has an upfront cost that may not be feasible for some facilities without external funding (Olstad et al., 2014).

Food service suppliers are also an essential component to improving the food environment in recreation facilities. Though it was not assessed in this study, it is important to identify healthy options offered to facilities by suppliers. Mandatory nutrition policies would likely improve the quality of products carried by food service

suppliers (Hawkes et al., 2015; McIsaac et al., 2018), although enforcement and support are needed if this is to be case (Hawkes et al., 2015). Until such policies are implemented, suppliers will not increase healthy food and beverage options unless facilities request these. Likewise, when negotiating contracts for vending and food services, facilities have the power to choose contractors who commit to providing more healthy selections. It is important to note, however, that rural facilities may have a more limited selection of food service suppliers, based on their location making it more challenging for them to access healthier options.

5.6 **Recommendations**

There are a number of changes that could be easily implemented by facility operators to improve the nutritional quality of foods available in recreational settings. For example, as the majority of canteens used powdered gravy mixes that were high in sodium, it would take little effort to switch to a low-sodium mix, which are just as commonly sold as standard gravy mixes. Likewise, using whole wheat instead of white hamburger and hotdog buns is another possibility. Whole wheat buns are just as widely available as white, and pricing for the two products are generally comparable. However, whole wheat buns may not be as readily accepted by consumers.

Identifying “champion” facilities, or facilities that could be considered early adopters of change, could be key in creating a shift in the food environment. These champions could be role models for other Island facilities in promoting healthier options (McIsaac et al., 2018).

5.7 Limitations

There were a number of limitations to this study. First of all, the timing of the study impacted the types of facilities that were included in the study. As research was completed from September to March, many facilities that operate exclusively through the summer, such as Soccer fields, baseball fields, and other seasonal sports facilities, were excluded from the study. This could impact the generalizability of the results: most of the data was collected from ice rinks and multisport complexes and thus may not reflect the reality of canteen and vending in other facilities. Many summer facilities that were contacted for this study indicated that few products were offered for purchase in their canteens; as such, it is unclear if the excluded facilities would have had a significant effect on the findings.

Using pre-designed audit forms allowed comparisons with similar studies, but may also be a limitation of this study. Some questions in the Food Service Audit Form (Appendix A) were repetitive and overlapping. For example, “recipes or mixes for soups, gravies, and sauces are low-fat and low-sodium” may be interpreted as very similar to a later question, “use reduced- or low-sodium sauces to enhance flavors”. More specific questions may have been more useful in assessing healthy practices. Likewise, when healthy practices were being assessed, a “not applicable” option would have been useful to ensure results were valid. As previously mentioned, this would have improved results for variables such as “recipes are followed to avoid unnecessary addition of salt, sugar, and fat” in canteens relied heavily on commercially-prepared foods. With that clarification, results would clearly show which facilities practiced the health-promoting behaviour.

Further, while the Brand Name Food List was very useful in classifying the nutritional content of vending machines, it was not designed to classify commercially-

prepared canteen foods, such as brand-specific frozen French fries (HealthLink BC). As such, the inability to score canteens in a similar fashion to vending machines is another important limitation to the research. Assessing the foods and beverages offered in canteens would have made the results more comprehensive and would allow for better comparisons across provinces.

Many of these issues could have been identified and possibly addressed had a pilot test been completed. However, with such a limited number of facilities on the Island, this would have further reduced the sample size.

6. Conclusion

The results of this study provide insight into the food environment in recreational facilities in Prince Edward Island. The data was collected in partnership with the PEI Heart and Stroke Foundation and will be used as a basis for health promotion efforts designed to improve food and beverage offerings. Results will also be used as a baseline when assessing the impacts of such efforts.

Objective 1: To describe the nature of food operations, foods and beverages sold, and food preparation methods in Prince Edward Island sport and recreation facilities.

The majority (85%) of PEI sport facilities had canteens. It was found that there was a heavy reliance on commercially prepared products which are high in fat and sodium, including ready-mix gravy powders and frozen breaded products. It was also found that few facilities prepared food on-site. Although the reasons for this were not assessed as part of this study, the preponderance of these items may reflect inadequate

cooking or food preparation equipment in the facilities. Similarly, deep frying was found to be the most commonly used cooking method: over half of the most commonly sold foods in canteens were deep fried. Despite the negative nutritional implications of deep frying, the popularity of this cooking method is historical and likely reflects the fact that it cooks food quickly and lends a pleasing taste and texture to foods. This may be a reason that recreational facilities are so hesitant to transition to lower-fat cooking methods, such as baking or grilling. Water was offered for sale in every canteen, which is a positive practice. However, many of the other beverages sold were sugar-sweetened, including soda and sports drinks.

Almost three quarters of facilities offered foods and beverages for purchase in vending machines. Foods sold in vending machines were generally highly-processed. Chips, bars, and candy were among the most commonly sold snacks. As in canteens, water was available in every beverage vending machine; however, many other frequently sold beverages were high in added sugars.

Slightly more than one third of facilities had coin-operated candy machines, which typically contained candy, chocolate-covered nuts, or seasoned nuts.

Objective 2: To assess the nutritional quality of foods and beverages offered for purchase.

All food and beverage products sold in vending machines were categorized based on their nutritional profile, according to HealthLink BC's Brand Name Foods List. It was found that 63% of beverages and 73% of foods were categorized as "do not sell", as many vending options were high in fat, sodium, added sugars, and overall energy. It is possible that few healthy options are offered by local vending machine suppliers.

The nutritional quality of food and beverages sold in canteens was also generally poor. Fruits, vegetables, and whole wheat products were rarely available. Most food products are heavily-processed and commercially-prepared, as well as general high in sodium, fat, and overall energy. Though few facilities prepare recipes on-site, recipes that were used generally avoided the unnecessary addition of sugar, salt, and fat. As such, recipes prepared on-site were typically healthier than frozen, pre-prepared products. Though it was not assessed, inadequate preparation equipment, staffing, and low-volume sales may contribute to the reliance on processed foods in canteens. As noted above, it was also found that deep frying, a high-fat cooking method, was used in nearly every facility canteen. The near-ubiquitous use of fryers may be due to a lack of quick-cooking alternative appliances or customer taste preferences.

In summary, there is much room for improvement for the nutritional quality of foods and beverages offered in recreational settings. Mandatory nutrition policies with appropriate supports and accountability are needed to improve the current food environment. Funding to reduce barriers to change is also necessary to ensure sustainable improvements.

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Appendices

Appendix A: Food Service Audit Form

FOOD SERVICES AUDIT

Date _____

Facility Location _____

Facility Code Number: _____

This assessment was completed by: _____

Recreation Staff volunteer assisting with the assessment:

(Name, email, phone)

**Note: Once interview is complete, ensure that code number is recorded on every page.
Remove this sheet for separate storage at UPEI.**

Description of Food Outlet

Please briefly describe your food service outlet.

1. What best describes this food service outlet?

- Concession
- Snack bar/Café
- Cafeteria
- Restaurant

2. How long has it been in operation? Since date: _____

3. Where in the facility is it located? _____

4. Who typically eats here? (staff, program participants, parents, etc.) _____

5. Is there seating? If yes, please describe (how much, situation etc.): _____



Please take photos of the food outlet, showing current menus and food placement.

Operations

6. What are the regular hours of operation of this food outlet? _____

7. What are the regular hours of operation of your recreation facility? _____

8. a) Who operates this food outlet? Staff Volunteers Contractor

b) If the outlet is operated by a contractor, please provide a status of your facility's contract:

Name of Contractor: _____

Time remaining in contract: _____

Is this contract negotiable? Yes No Not sure

9. Profits from this concession go to:

- Contractor
- Fundraising
- Operational Budget
- Other: _____

Promotion of Unhealthy Foods *-1 for Yes and +1 for No*

16. Unhealthy impulse items (ie. chocolate bars, candy, sugar sweetened beverages) are positioned to promote visibility (e.g. displayed at check-out) Yes No Score:_____
17. Candy is sold Yes No Score:_____
18. Sugary drinks are sold (includes: sports drinks, pop, iced tea) Yes No Score:_____
19. High fat/high sodium snacks (includes: chips, cheesies) Yes No Score:_____
20. Marketing of unhealthy products are displayed (i.e. posters of ice cream) Yes No Score:_____
21. Supersized portions are offered Yes No Score:_____

Prepared Foods Monitoring Form

Adapted from the Planning Healthy Cafeteria Menus Fact Sheet in the Guidelines for Food & Beverage Sales in BC Schools (2013)

Please tick the appropriate boxes for what is true of this food outlet.

For any pre-packaged food & beverages, please use the Vending Audit tool to assess the Sell Most/Sell Sometimes criteria.

Indicator	Availability, e.g. "Served" or "Offered"				Comments/Notes
	Never	Occasionally 1-2 times/month	Often 1-2 times/week	Always (Most days)	
Vegetables and Fruit					
Fresh fruit is available					
Raw or cooked vegetables are served, with a minimum of added salt, fat, or sauces					
Canned vegetables and fruit are low in added salt and sugar					
Juice is 100% fruit or vegetable juice and is 360 mL or smaller					

Grain Products					
Whole grain products are served at least 50% of the time					
Replace flour with whole grain flour in recipes					
The portion size of baked goods is moderate					
Homemade, or commercial low sodium, low fat products have replaced regular instant noodle products and rice mixes					

Food Stock Monitoring Form

Indicator	Availability, e.g. "Served" or "Offered"				
	Never	Occasionally 1-2 times/month	Often 1-2 times/week	Always (Most days)	Comments/Notes
Milk and Alternatives					
Low fat dairy products are served regularly e.g. <ul style="list-style-type: none"> • milk is 2% MF or less • yogurt is 2% MF or less • cheese is 20% MF or less 					
Milk or soy beverages sold meet the Sell Sometimes or Sell Most nutrient criteria					
Only unprocessed cheeses are served					
Meat and Alternatives					
Alternatives such as beans, lentils, and tofu are served regularly					
Meat, fish and poultry are lean, prepared with a minimum of added fat, and cooked in a manner that reduces total fat (e.g. baked, grilled, roasted)					
Fish is baked or grilled, rather than deep- or pan-fried					
Deli meats, used for sandwiches, pizzas and other mixed entrees meet the Sell Sometimes or Sell Most criteria					

Food Stock Monitoring Form

Indicator	Availability, e.g. "Served" or "Offered"				Comments/Notes
	Never	Occasionally 1-2 times/month	Often 1-2 times/week	Always (Most days)	
Recipes are followed to avoid the unnecessary addition of salt, sugar and fat					
Lower fat cooking methods (baking, grilling, roasting, stir-fry) have replaced deep- and pan-frying					
All soft spreadable margarines and oils meet the restriction of 2% or less trans fat of total fat content					
Recipes or mixes for soups, gravies and sauces are low fat and low sodium					
Breaded products are baked not fried and meet the Sell Sometimes or Sell Most nutrient criteria					
Use reduced sodium options when choosing canned vegetables, tomato sauces, soups or stocks					
Ready-to-serve or heat-and-serve items are low in fat, sugar and sodium and meet the Sell Sometimes or Sell Most nutrient criteria					
Use reduced or low sodium sauces to enhance flavours					

Food Stock Monitoring Form

Indicator	Availability, e.g. "Served" or "Offered"				Comments/Notes
	Never	Occasionally 1-2 times/month	Often 1-2 times/week	Always (Most days)	
Beverages					
Water is available to drink					
Other beverages should meet the Sell Sometimes or Sell Most nutrient criteria					
Hot chocolate is made with lower fat milk in a moderate serving size					
Regular coffee/tea are not available for sale to students					

Condiments					
Condiments are offered in small portions and students are encouraged to limit their choices to one to two portions					

Monitoring Do Not Sell Foods

Please conduct a "walk through" of the cafeteria/snack bar at lunchtime and complete the following table. List the food and beverage items served by the categories in the table. The itemization need not be too detailed. Please make and complete additional copies of this table, if necessary.

Category	Food and Beverage Items in the Cafeteria/Snack Bar
Lunch Entrees (e.g. sandwiches, subs, burgers, hotdogs, pasta, pizza, vegetarian stew)	
Side Orders (e.g. baked or fried french fries, green salad, veggie tray, soup)	

Beverages (e.g. milk, chocolate milk, 100% fruit juice, fruit flavoured drinks, pop)	
Desserts/Bakery Items (e.g. date squares, whole grain muffins, jello, cookies, fresh fruit)	

Appendix B: Vending Audit Form

VENDING AUDIT

Date _____

Facility Location _____

Facility Code Number: _____

This assessment was completed by: _____

Recreation Staff volunteer assisting with the assessment:
(Name, email, phone)

**Note: Once interview is complete, ensure that code number is recorded on every page.
Remove this sheet for separate storage at UPEI.**

VENDING AUDIT STEP 1: VENDING STOCK LIST

Vending Machine # _____

(specify machine location so you can re-audit after changes have been made to evaluate) _____

Machine Type: Snack Beverage

Vending Machine Purpose: Cafeteria Fundraising Other

Vendor Company Name: _____

Advertising on Machine (describe):

Record the code slot location by its code in the machine. Then identify the product that is in each slot according to the company that produces the product, the product's name, flavour, size and current selling price. This information will help you to find the product on the Brand Name Food List in Step 2.



Along with each stock list please **include a photo or two** of the machine that shows its current products and promotional images.

Slot Location (e.g. A1 or "top left" etc.)	Company Name (e.g. Pepsi, Lays, Doritos etc)	Product Name & Flavour (e.g. Gatorade-Berry Blast, Doritos Chips-Salsa, Mars Bar)	Size (ml or g)
A1			

Appendix C: Consent Form

Healthy Eating in Recreation Settings: HERS PEI Consent Form

I understand that the purpose of this research study is to collect information on the types of foods and beverages offered at all 85 recreation facilities across Prince Edward Island that offer foods and/or beverages. This survey has been conducted in Nova Scotia, New Brunswick, Alberta and British Columbia. Results will help us to see where facilities are doing well, and identify ways that we can increase the availability of healthy choices at facilities across the province.

I also understand that:

This study is being led by UPEI researcher Dr. Jennifer Taylor and the Heart & Stroke Foundation of PEI in partnership with Recreation PEI. Research assistants are Emily Barney is the UPEI Foods & Nutrition honours student who is conducting the survey. Tionna Gordon and Andrea Furlotte, nutrition students, will assist Emily.

- I have been asked to allow the research assistants to come to my facility and show them where the foods and beverages are sold in my facility. I have been asked to answer a few questions about the food service and provide clarification if they have questions. This will take about 15 minutes.
- The research assistants will write down all the foods and beverages available at my facility using two forms: one for vending machines and one for the food service (e.g. canteen).
- The research assistants will take photos of foods sold in the canteen/food service and vending machines in order to make sure the information is accurate and complete. The entire process will take about 45-60 minutes to complete, depending on the size of the facility and the number of foods and beverages sold.
- There is no known risk to participating in this study and possible benefits may include supporting healthy eating in recreation facilities in PEI. For example, the findings may be used to advocate for more funding so that PEI recreation facilities can more easily prepare and store healthy choices.
- Results of the study will be presented to recreation facilities through municipalities, sports councils, and Recreation PEI.
- A paper copy of the attached form will be stored in a locked filing cabinet at UPEI, for five years and will then be shredded. The researchers and research assistants will be the only people who have access to this information. Information that I provide will be kept confidential. After the study is complete, results will be summarized and the

findings will be presented to Recreation PEI, sports councils, Heart & Stroke Board of Directors and the provincial government.

- Neither my facility's name, my name nor names of staff will be used in this study. Instead, a code will be used to protect the identity of the facility. Places, names and other identifiers will not be used in all reports and publications. If photos of food are used in reports or presentations, the researchers will ensure that the facility cannot be identified from the photo, and no names or locations will be identified.
- My participation in this study is entirely **voluntary**. I may refuse to have the survey completed or withdraw at any point in time without repercussions.
- If I have any questions I can contact **Dr. Jennifer Taylor at (902) 566-0475 or at jtaylor@upei.ca**. I can also contact the **UPEI Research Ethics Board at (902) 566-0637**, or by email at mknight@upei.ca if I have any concerns about the ethical conduct of this study. I can keep a copy of this consent form for my records.

I hereby consent to participate in this research study.

Signature

Date