The *REFRESH* Study

*R*ecreation *E*nvironment and *F*ood *R*esearch:

*E*xperiences from *H*ockey

by

Marian Susan Caswell

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AUTHOR'S DECLARATION

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

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ABSTRACT

Introduction

Unhealthy dietary behaviours are prevalent among adolescents who participate in organized sports. This may be putting them at risk of obesity and chronic disease, since adolescent eating behaviours have been shown to track into adulthood. This might relate, in part, to obesogenic recreation facility food environments. Evidence clearly shows that in Canada recreation facilities represent unhealthy food environments. Participation in organized hockey places adolescents within the recreation food environment on a regular basis. The purpose of this phenomenological study was to explore the adolescent hockey player experience with the broad social and physical environment associated with playing hockey. Parent perspectives of players' food experiences were also explored.

Methods

Hockey players (n=24) aged 12-15 years were recruited from five Ontario leagues to describe their food experiences in relation to hockey using photovoice, a qualitative participatory action approach. Participants took photographs illustrating their experiences making food choices around participation in recreational hockey. Using semi-structured interviews, participants interpreted their perceptions, as illustrated in the photographs. Photographs best representing their experience were chosen and shared anonymously in two participant focus group discussions. Group discussions followed the SHOWeD method with the questions: what is *S*een, what is really *H*appening, how this relates to *O*ur (participant's) lives, *W*hy the situation *e*xists, and what can be *D*one about it. A selection of exemplar photographs were chosen for a photo exhibit to stakeholders and as the

foundation for interviews with parents. Parents of eligible hockey players were interviewed using semi-structured interviews to gain their insight into the experiences illustrated. Interviews and the group discussions were audio-recorded and transcribed verbatim. Thematic analysis of the transcripts was facilitated using NVivo 11 (QSR) software.

Results

Both players and parents perceived recreational facility food options as unhealthy and identified that travel and time constraints contributed to less healthy choices. Dominant influences among players included: the perceived importance of nutrients (i.e., protein) of foods (i.e., chocolate milk) for performance and recovery; branding and media (i.e., the pro-hockey aura of Tim Horton's®; social aspects of tournament and team meals; and moral values around 'right' and 'wrong' food choices. Players perceived recreation facility food offerings as mainly intended for spectators, not players.

Conclusions

Results indicate recreation facilities are only one of a range of environments that influence the eating behaviour of adolescent hockey players. Both the hockey players and their parents perceive Ontario recreation facilities to be unhealthy food environments. Indeed young hockey players, particularly those who had received nutrition education, were highly motivated by perceived benefits of healthy eating on performance and reported that they did not generally make food purchases at recreation facilities. Recreation food facility management and vendors may be missing a significant opportunity through not providing the healthy food options players' value.

The players embraced heathy eating choices when associated with performance demonstrating that adolescents will internalize information if associated with something of value. The players perceptions around brand and product marketing demonstrates the susceptibility of adolescents to advertising and that it can be used to support perceived healthy eating. Parents, coaches, and others involved in educating hockey players can use this to influence healthy behaviours.

Implications

This research contributes to our understanding of the comprehensive factors influencing adolescents' dietary intake related to exposure to the recreational hockey environment. This understanding can help to inform policy and intervention strategies that support adolescent healthy eating behaviours, particularly in recreation centres where nutrition policy does not currently exist in Ontario.

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INTRODUCTION

Relevance

Unhealthy[1] dietary behaviours are prevalent among Canadian adolescents, and have been identified as a risk factor for obesity and chronic disease such as Type II Diabetes (T2D) and cardiovascular disease (CVD) [1, 2, 3, 4, 5, 6]. Rapid increases in the prevalence of childhood and adolescent obesity have been attributed, in part, to obesity promoting environmental factors [3, 7]. For adolescents involved in organized sports in Canada, recreational facilities are an important environment. Indeed, adolescents participating in some sports, like recreational hockey, spend a significant amount of time in recreation facilities making it an environment with the potential to have a lasting influence on eating behaviour. Yet recreational facilities in Canada are often unhealthy [8, 9] and there is evidence that adolescents who participate in organized sports have a higher intake of fast food and sugar-sweetened beverages than non-participants [10].

While current recreation environments have been considered obesogenic, there is increased recognition by policy-makers and health professionals that recreational environments have the potential to positively influence healthy eating behaviours in adolescents [8, 11, 12, 13]. Several Canadian provinces are considering policy intended to increase healthy food offerings in recreation facilities and some provinces have already taken action instituting voluntary nutrition guidelines for recreation facilities. However,

[1] Typically defined as energy dense foods high in sugar, salt, and fat. [139]

assessment indicated adoption of the these voluntary guidelines was low [14]. Ontario, with some municipal-level exceptions, has yet to initiate policy or guidelines.

But, will providing healthy food be enough? Obesity prevention is complex and requires consideration of the factors that influence food related decisions and dietary consumption over time [13]. Research is needed to advance understanding of both how current environments associated with recreation influence unhealthy eating behaviours and how those environments can support the development and maintenance of healthy eating behaviours. To date, recreation facility food environment research in Canada has primarily focused on stakeholders such as facility management and government [8, 9, 12, 14, 15, 16]. The research must also include those regularly exposed to these environments. A comprehensive understanding of what influences adolescent food choices and food behaviours within the recreational environments is required. A review of environmental correlates of obesity-related dietary behaviours in youth identified gaps in evidence between environmental factors and adolescent dietary intake [7]. Those gaps included peer influences and environmental determinants of snack and soft drink intake [7]. A critical understanding of factors influencing adolescents' dietary intake in recreational environments is also essential to inform policy and intervention strategies that support healthy eating behaviours. Therefore, the aim of this research was to explore influences of the recreational hockey environment on food choices of adolescent hockey players regularly exposed to that environment.

Thesis Organization

This thesis is based on a photovoice study of adolescent perceptions of influences on food choices in relation to playing hockey and parental reflection on those perceptions. It will begin with a review of relevant literature with a focus on adolescent dietary behaviour, social and physical environmental influences on eating behaviour, and influences of the Canadian recreation facility environment in particular. An outline of the study rationale, objectives, interpretive framework, and methodological approach will follow the literature review. A description of methods and results will then be provided, separated into adolescent and adult participants. The discussion and implications sections will then synthesize and interpret key findings. Finally, the thesis will conclude by addressing future directions and knowledge translations opportunities.

BACKGROUND (LITERATURE REVIEW)

As the driving force behind this research is the dramatic increases in childhood and adolescent obesity in recent decades, this literature review will begin with adolescent obesity. This will be followed by an overview of relevant evidence supporting current understandings of adolescent eating behaviours, sports participation and eating behaviours, environmental influences, and the recreation food environment in Canada.

Adolescent Obesity and Overweight

Adolescent obesity prevalence has risen dramatically in Canada in recent years [17]. Based on data from the 2009-2011 Canadian Health Measures Survey (CHMS) of adolescents aged twelve to seventeen years, 19.9% (98%CI; 15.0:25.8) are overweight and 10.2% (95%CI; 7.3:14.1) are obese as defined by the World Health Organization (WHO) body mass index (BMI) category cut-offs [17]. These increases require that action be taken to prevent continued increases and a decline in existing numbers.

Obesity is currently defined based on BMI, which is calculated by dividing weight in kilograms by height in metres squared (kg/m^2). Increased BMI has been associated with increases in the development of chronic diseases such as T2D and CVD [1]. Not surprisingly, there has been an increase in the number of adolescents diagnosed with T2D associated with increased BMI [18]. Increases in these diseases can result in a reduced quality of life (QOL), increased disease related morbidity and mortality, increased age related cognitive impairments, increased cost to the Canadian health care system, and reduced productivity [1, 17, 19].

There is strong evidence of increased risk of childhood and adolescent obesity persisting into adulthood [19, 20, 21]. Given that much of this evidence is based upon longitudinal cohort data spanning twenty-plus years, the increasingly obesogenic[2] Canadian environment may result in an increased risk of overweight and obesity persisting into adulthood for this generation of adolescents [8, 9, 19, 20].

Adolescent Dietary Behaviours

The development of healthy eating habits early in life reduces the risk of becoming obese in adulthood and is associated with lower levels of chronic disease such as T2D and CVD [1, 2]. Evidence indicates that adolescent eating behaviours track into adulthood [1, 2, 22, 23, 24, 25] and that dietary habits are established by mid-to-late teens [26]. There is also evidence that fruit and vegetable (FV)[3] intake decreases from early to middle adolescence [27]. Together, this affirms the importance of the establishment of healthy dietary behaviours by early adolescence.

HEALTHY EATING HABITS

Evidence suggests that Canadian adolescents have suboptimal eating habits [5, 6]. An investigation of dietary intake of Ontario youth in grades six, seven and eight, found that, on average, the median intake of FV was below Canada's Food Guide to Healthy Eating (CFGHE)[4] and one quarter of their energy intake was from *other* foods [5]. In Alberta, an

[2] Includes food culture, access and availability of unhealthy food, food marketing, the built environment, and recreation opportunities. [140]
[3] Because of well-established associations between FV intake in childhood and adolescence and healthy eating behaviours and healthy body weights in adulthood, FV intake is commonly used as a measure of healthy eating [28, 29]
[4] 1992 version, updated to Eating Well with Canada's Food Guide in 2007

investigation of diet quality, nutrition, and physical activity in adolescents in grades seven to ten found that only 8% of participants met CFGHE recommendations [6].

Research outside of Canada also indicates the need for concern regarding healthy eating behaviour in adolescents. Rasmussen, Krolner and colleagues [28, 29] conducted two systematic literature reviews to gain insight into the determinants of FV intake in children and adolescents. In Part I, a review of quantitative studies (N=98), Rasmussen et al. [28] concluded that findings were contradictory for gender, age, socioeconomic position, and nutrition knowledge. This was despite extensive investigation of family related factors, school interventions, and the application of psychosocial behavioural theories [28]. The only variable that was positively correlated with consumption was food preference [28]. Results from Part II, a review of qualitative studies (N=31), indicated that the main concerns of adolescents when making food choices included taste, convenience, and sensory appeal rather than health benefits [29]. Both reviews highlighted gaps in current understanding of the influences on FV intake. In Part I, Rasmussen et al. [28] found that little research had been conducted investigating personal factors and the influence of neighbourhood level factors such as leisure time facilities on FV intake. Then, in Part II, Krolner et al. [29] identified potential factors impacting adolescent food choices with sparse or no investigation of time, satiating power, situational norms, availability, peer influence, and outcome expectancies.

In other research outside of Canada, Turconi and colleagues [30] evaluated the eating habits and behaviours of 532 adolescents, with a mean age of 15.4±0.7 years, as part of a nutritional surveillance study in Northern Italy. Areas of investigation included eating

habits, healthy and unhealthy dietary habits and food, nutritional knowledge, self-efficacy, barriers to change, and physical activity [30]. Results indicated that a general lack of concern about dietary guidelines was a barrier to healthy eating and that adolescents' lack of knowledge about foods made translating nutritional knowledge to food choices difficult [30]. The authors concluded that health promotion strategies related to dietary intake should focus on physical and psychological barriers to healthy eating rather than nutritional knowledge and that nutrition education should focus on food rather than dietary habits [30]. They also concluded that to facilitate the adoption of healthy eating, interventions should be framed in terms of what adolescents value [30].

Gaps in understanding identified around influences on adolescent eating behaviours have important implications for research. Results support the need for a better understanding of the influences on food decisions in order to tailor appropriate knowledge translation and intervention strategies.

NUTRITION KNOWLEDGE AND HEALTHY EATING

To date literature suggests that nutrition knowledge is not sufficient to sustain healthy eating behaviours. A ground-breaking 1999 study by Thakur and D'Aico [31] demonstrated that nutrition knowledge did not differ between two hundred and ninety-two obese and non-obese adolescents aged fourteen to eighteen years sampled from three socio-economically and ethnically diverse schools. Obese and non-obese participants demonstrated similar eating patterns and food preferences [31]. Research published since the Thakur and D'Aico paper consistently substantiates that nutrition knowledge is not a strong influential factor in healthy eating behaviours [4, 28, 29, 32, 33, 34, 35, 36, 37]. This

has also been corroborated in samples of adolescent athletes, including Canadian adolescent hockey players [38, 39]. Evidence indicates that adolescent athletes routinely exhibit unhealthy dietary behaviours and that there is a disparity between nutrition knowledge and nutrition practice [38, 39].

The more recent Healthy Lifestyle in Europe by Nutrition in Adolescence (HELENA) study group published findings that continue to support the findings of Thakur and D'Amico [31, 40]. The HELENA study, conducted in 2006-7 in ten cities across Europe, is a cross-sectional randomized, multi-centre study investigating the nutrition and lifestyle status of 3000 adolescents aged thirteen to seventeen [41]. HELENA researchers found no correlation between nutritional knowledge and BMI. Interestingly, this was despite an increase in nutrition knowledge of approximately 2% per year between the ages of twelve and seventeen years old [40]. As a result of these findings, study authors recommended that nutrition interventions be initiated at a younger age than the study cohort and that environmental components be incorporated [40].

The only conclusion that can be drawn is that nutrition knowledge-based interventions alone might be ineffective in encouraging healthy eating behaviour and in preventing obesity.

SOCI-ENVRIONMENTAL FACTORS AND HEALTHY EATING

Adolescents aged twelve to fifteen years have increasing autonomy over food choices and dietary behaviours often making food decisions independent of parents [7, 42]. Despite evidence indicating adolescents' food preferences are well developed, they are still developing eating behaviour patterns and are highly susceptible to environmental

influences [8]. The physical and social environments influence adolescent dietary behaviours; both peers and environmental triggers have been shown to have a powerful influence [43]. There is also evidence indicating that adolescent eating habits are closely associated with lifestyle [26].

Situational norms are also an important influence on adolescent food intake. There is evidence that adolescents generally have a positive attitude toward healthy eating but that healthy food is predominantly associated with the home and parents [4]. Adolescents perceive dinner to be the only appropriate time to eat vegetables and eating fruit is associated with the home environment [29, 35].

The social environment, friendship, and pleasure are associated with fast food [4], so not surprisingly, an increase in the consumption of food prepared away from home has been associated with a poorer quality diet and has paralleled increases in overweight and obesity trends in children and adolescents [44, 45]. Findings from Project EAT (Eating Among Teens) demonstrate that from middle adolescence (mean age=15.9±0.8) to young adulthood (mean age=20.4±0.8), a longitudinal decrease in FV intake was associated with the frequency of eating fast food measured at baseline [36]. Other findings from Project EAT research investigating dietary intake patterns over a five-year period, found that a new dietary pattern, called fast food, developed as adolescents transitioned from middle to late adolescence [46]. Other dietary patterns remained stable [46]. The fast food dietary pattern was characterized, as one would expect, by foods such as hamburgers, french fries, fried foods, and sugar-sweetened pop [46]. Project Eat researchers suggest the increased

consumption of fast food may be a reflection of increased autonomy and socio-environmental changes as adolescents mature from middle to late adolescence [46, 47].

The Growing Up Today (GUT) Study is a longitudinal study comprised of 16,882 children who are the offspring of the Nurses' Health Study II participants [44]. Baseline age ranged from nine to fourteen years [44]. Study results found that participants who ate fried foods away from home, which was being used as a proxy for fast food intake, reported higher intakes of sugar sweetened beverages, higher total energy intake, a higher glycemic load, and consumed less FV [44]. This is consistent with other studies indicating that food prepared away from home, and fast food in particular, has a detrimental effect on adolescents' diet quality [44, 48]. Perhaps most disturbing was the finding of an association between adolescents who increased their consumption of fried foods away from home over time and an increase in BMI [44].

In order to assess adolescents' perceptions regarding factors influencing their food choices, researchers with Project EAT enlisted participants for twenty-one focus groups [49]. The factors of primary importance identified by the adolescents included hunger and cravings, appeal, time available, and convenience [49]. Factors of secondary importance included availability, parental influences, perceived benefits, and situational factors such as time and place [49]. The research also highlighted barriers to healthier food choices including a lack of a sense of urgency about personal health and taste preferences for other foods [49]. Perhaps most interesting, was that the adolescents reported eating *'junk food'* because of taste and convenience in spite of an awareness of health consequences [49].

Other studies have also identified barriers to healthy eating behaviours for adolescents. These barriers include: the wide availability of unhealthy foods, personal preferences for fast foods, healthy foods being expensive, unhealthy foods being perceived as inexpensive, access to competitive unhealthy foods, unhealthy foods being perceived as more convenient, healthy foods being perceived as time consuming, and friends not being supportive of healthy eating [4, 29, 32, 33, 35]. A review of facilitators and barriers to healthy eating for adolescents concluded that more qualitative studies are needed to better understand the views of adolescents and this is crucial for the development of effective and appropriate health promotion strategies [4].

One final factor worth consideration is that as adolescents gain independence, they typically have increased disposable income, from either parents or part-time employment [50]. Although similar representative Canadian data were not available, there is marketing research indicating that food is the second largest discretionary spending category for American teens [51].

PEER INFLUENCES

Peer influence is generally not perceived as supportive of healthier food consumption mainly due to peer pressure towards eating unhealthy food [4, 29, 35, 37]. High fat, high sugar foods have been associated with social interaction and increased social capital [34, 43]. Healthy eating has been described as “uncool”, potentially making it an undesirable behaviour [33]. This highlights the importance of the broader meaning of food for adolescents.

A review of the influence of peers on adolescents' eating behaviours conducted by Salvy et al. [43] clearly demonstrated the complexity of peer influence on adolescent eating behaviour, which is dependent on a number of factors. Evidence supported the important role of social norms, modelling and impression management in adolescent dietary intake for both healthy and unhealthy eating behaviours [43]. From the evidence reviewed, Salvy et al. [43] concluded that energy intake increased in the presence of peers, except when impression management was high and when peers were displaying healthy eating behaviours. When adolescents are in the company of peers, food consumption increased, foods such as energy-dense snack foods were associated with social capital, and negative associations with healthy food choices influenced dietary intake [43].

Contento et al. [52] investigated the food choice decision making process in the context of family and friends and found that adolescents held multiple motivations for their food choices and that these motivations resulted in them using a process of cognitive decision-making strategies and rules. The research found identifiable patterns of interaction with family and that adolescents used different behaviours with their peers to reconcile conflicts in food choice values [52]. Peer influence on the decision making process was clearly demonstrated by the similarity in food choices between adolescents and their friends [52]. This similarity can be interpreted as adopting consensus amongst their peers, or as an indication that their friends have similar values around food choices [52].

This affirms the suggestion made by Salvy et al. [43] that a thorough understanding of the contexts of peer influence is necessary in order to address the mechanisms of adolescent eating behaviours.

Sports/Physical Activity Participation and Eating Behaviour

Several studies have investigated adolescent sport participation and dietary nutrient intake. A study by Croll and associates [53] using data from Project EAT, conducted with 4,746 adolescents in Minnesota, compared the dietary intake of adolescents participating in weight-related and power team[5] sports participants and non-participants. They found that the sport-involved adolescents had a better overall nutrient intake than the non-participants [53]. A two-part Swiss study conducted with 3540 participants aged nine to nineteen years and an ancillary study with a subgroup of 246 participants aged eleven to fifteen years suggests that sports-involved adolescents had healthier food intake patterns than non-participants [54]. Participants in an Alberta study investigating diet quality and physical activity found that those with poor and average diet quality (92%) had significantly lower levels of physical activity than participants with superior diet quality (8%) [6]. As well as providing evidence that adolescents who participate in sports have higher intakes of healthier food, this research also supports the concept of positive life-style clustering.

Further evidence of positive life-style clustering comes from a study in Southern Ontario investigating associations between nutrition and physical activity behaviours in grade six students [55]. Researchers found that overall diet quality was positively associated with being active one evening per week [55]. However, they also found that diet quality was not improved with higher rates of evening participation in physical activity [55]. Two suggested explanations for this were a healthy family environment that included

[5] Hockey is a power team sport

healthy eating could be indicated by at least one night of physical activity or that a higher rate of physical activity could mitigate diet quality due to time constraints associated with frequent evening participation in physical activity [55].

Unfortunately, this picture is far from complete. It was also found that adolescents participating in sports had a higher overall energy intake than non-participants [53, 54]. While the increased energy consumption may be required to meet sports participation needs, there is research, including another study using data drawn from Project EAT, suggesting that the increased energy consumption may be coming from sugar-sweetened beverages such as sports drinks, fruit juice and soft drinks, and from fast food [10, 56, 57]. A review comparing dietary intake and weight status of youth sports participants and non-participants found that youth involved in sports were more likely to eat fast food and drink sugar-sweetened beverages and that they have a similar weight status [10]. There is also recent evidence from a study examining dietary intakes in pre-adolescent and adolescent Canadian Athletes indicating that contributions of sugars, saturated fats, and servings of "other" foods to overall energy intake is high [58]. Further evidence indicates that time constraints associated with sports participation may lead to an increased consumption in fast food [48].

Consistent with other literature [48, 54, 56], U.S. parents reported that adolescents consume unhealthy food in association with sports activities, consume fewer meals at home, more meals and snacks are consumed in sports venues, and eating at fast food restaurants and facility concession stands is common [59]. They cite low availability of nutritious food in sports venues and time constraints associated with participation in

organized sports as barriers to healthier eating [59]. These parents also reported frequent eating out or in the car because of time constraints associated with their child's sports participation [59]. Importantly, a difference in eating habits between more competitive travelling teams and house leagues was reported; describing eating at fast-food restaurants and/or concessions as common among players traveling to games and participating in tournaments [59].

Together, this evidence suggests that there are factors associated with sports participation that influence eating behaviour.

HOCKEY PARTICIPATION AND NUTRITION

The physical demands of playing hockey can be high. While hockey has the second highest level of organized sports for children and adolescents in Canada [60, 61], specific nutrition research with adolescents is limited [39]. Competitive athletes have increased protein and carbohydrate requirements [62]. When analyzed by sport, Canadian adolescent power athlete's carbohydrate intake met minimum requirements [58] which, given the broad recommendation range, may not be adequate for power athletes [58, 63]. However, even with recent changes in protein recommendations, Canadian adolescent athlete's protein intake may exceed recommendations and requirements [58, 64]. It is also important to note that dehydration and overheating are of particular concern with adolescent athletes [62].

Environmental Influences on Eating Behaviour

The increase in overweight and obesity in the Canadian adolescent population is the result of a myriad of complex interacting factors, many of which have yet to be defined. Environmental factors are consistently cited in the literature as influencing healthy food choices. According to Birch and Anzman-Frasca [65], a key reason the current food environment is obesogenic is due to the pervading availability of sweet and salty foods that are palatable, energy dense, inexpensive, and tailored to our innate predispositions for these tastes. Such an environment can result in dietary intake that is limited in variety, nutrient poor, too low in FV, and too high in sugar, salt and energy [65]. This increasingly obesogenic environment in which adolescents spend their time plays an important role in increased body weight [1].

A review investigating environmental correlates of obesity related dietary behaviours found only a limited number of studies assessing environmental determinants of snack and soft drink intake [7]. As other research has demonstrated the importance of snack and soft drink intake as a correlate of obesity in adolescents, environmental influences may be of particular importance [7, 66].

An overview of environmental factors associated with obesity-related dietary behaviours was undertaken by van der Horst and colleagues [7] who conducted a systematic review of environmental factors that may influence obesity-related dietary behaviours in children aged four to twelve years and adolescents aged thirteen to eighteen years. The aim of the review was to investigate environmental factors consistently associated with fat, FV, snack food, fast food, and soft drink intake [7]. For adolescent

dietary behaviour, no associations were found for snack food, fast food, or soft drink intake [7]. The fifty-eight papers reviewed focussed primarily on household level sociocultural and economic-environmental factors, however, few studies investigated the influence of environmental factors in schools, neighbourhoods, municipality, or physical environmental factor [7]. As there were also few studies included on peer influence, the school environment, or examining associations within the school, neighbourhood, and municipal environments, no evidence was obtained to substantiate their importance to food behaviours [7].

More recent research has begun to address gaps in the literature highlighted by van der Horst. In Alberta, Storey et al. [6] confirmed that consumption of meals and snacks away from home was associated with lower diet quality scores. Research involving a large, diverse sample of Canadian youth in grades six, seven and eight found evidence to suggest that dietary quality is negatively associated with meals that were purchased or consumed away from home [67]. In Southern Ontario, a study investigating the physical and social contexts of eating lunch in 1236 grade six participants found that compared to home or school, there was increased consumption of energy, meats and alternatives, and *other*[6] foods at *between places* or at restaurant/fast food outlets [68]. While study authors noted that interpretation of *between places* is limited, higher amounts of FV, sandwiches, *other* foods, milk, and high-sugar dairy were consumed at *between places* compared with home, school, or a restaurant/fast food outlet [68]. This has important implications for

[6] Mainly high-sugar desserts [68]

adolescents participating in sports at a level requiring them to attend a sports venue several days a week, as eating *between places* may occur more frequently due to scheduling and time constraints.

Recreation Food Environments in Canada

According to the most recent report produced by the Canadian Fitness & Lifestyle Research Institute (2010-11), 74% Canadian children and adolescents between the ages of five and seventeen participate in organized sports [60]. This regularly exposes them to the recreational facility environment and does not account for ancillary exposure as a result of sibling participation or other activities within this environment (i.e., some recreational facilities have libraries attached).

Naylor et al. [8, 15] concluded that public recreation food environments in British Columbia were obesogenic and identified lack of selection and cost as barriers to healthier food choices. Results of research auditing the recreation food environment in British Columbia showed that the majority of recreation facilities had concessions operating at times of peak child and adolescent attendance with food offerings limited to mainly unhealthy choices such as hot dogs, deep fried sides, and soft drinks [8]. Healthier options tended to have a higher average price [8]. On average, beverage machines contained 57% sugar-sweetened beverages and snack machines contained 34% chocolate bars and 34% chips [8]. Children had unlimited access to beverage vending machines in 78% of the recreation facilities and snack vending machines in 81% [8].

Results echoing these findings were described in the recreational food environments in Quebec City and Alberta. An evaluation of the food environments in Quebec City recreational facilities found little availability of healthy food choices and most foods offered were of low nutritional value [9]. A survey of the adoption of the voluntary Alberta Nutrition Guidelines for Children and Youth (ANGCY) in recreational facilities one year after implementation found that adoption and implementation remained low with profitability cited as the principal barrier [12, 14, 16]. Results indicated that healthy eating was a medium priority for 50% of the recreation facilities, low priority for 32%, and only 19% of the facility managers reported even having nutrition policies. Barriers to the adoption of ANGCY included customer expectations and profit-making [69]. Healthier foods were perceived as less convenient, requiring more preparation, and having a shorter shelf-life [69]. Those facilities that had increased healthier food offerings indicated they were not selling, even with pricing incentives, and sales were being lost to nearby convenience stores [69].

Researchers in British Columbia also demonstrated perceived challenges of providing healthy food options in a pilot study targeting improving the food environment of recreational facilities [15]. Challenges included the perception that healthy foods do not sell and profits go down; children and adolescents do not buy healthy food options even if they were offered at competitive prices; competitive pricing of healthy food options reduces profit margins; and the goal to provide food options that customers demanded [15]. None of these perceived challenges was substantiated objectively, yet influence the food options being offered in recreational facilities.

In a study examining the factors that influenced adoption of the ACNGY guidelines in Alberta, Olstad et al. [12] concluded that voluntary improvements in the food environment might not be realized in an environment that relied on a funding model dependent upon the sale of unhealthy food and limited healthy foods to substitute [12]. For example, vending machines are a common source of revenue for many recreation facilities and typically contain a majority of unhealthy items [8, 9]. These challenges were reflected in stakeholder[7] interviews in an evaluation of the food environment in Quebec City recreational facilities [9], survey results from a needs assessment in recreational facilities in Southwestern Ontario [70], and research on industry perspectives on the implementation of Healthy Food and Beverage Sales in Recreation Facilities and Local Government Buildings (HFBS) in BC [11]. Although representatives indicated supporting a healthier food environment, along with profitability concerns, they described variable attendance, food sales competition, challenges stocking healthy products, and the nature of the cooking facilities in recreation centres as additional obstacles [9, 11, 70].

This evidence clearly shows that Canadian recreation facility environments are indeed obesogenic. It also confirms recreational facilities are promoting an obesogenic environment as a result of perceived challenges to providing healthier choices.

Attention is being given to intervention strategies that can improve the food landscape of these recreational environments. However, to date, research looking at changing food purchasing behaviour in Canadian recreation facilities has had mixed results.

[7] Municipal and government representatives, community organizations, food service providers

A study conducted in a recreation facility in Alberta demonstrated that availability was an important determinant of purchasing behaviours [71]. When increased healthy options were made available, they sold in proportion to their availability [71]. Authors concluded that increasing availability may influence selection within these settings [71]. However, while revenues remained constant, any change in profit was unknown and the majority (≈75%) of items sold were unhealthy [71]. Other research in Alberta investigating the impact of nudging, where healthier choices were presented in a way to encourage their purchase, found that pricing reductions and menu signage (only on healthy items) were ineffective [72]. However, in a sub-set of participants sales increased 30% when signage was combined with taste testing [72]. Research looking at the use of traffic light labels on menu boards resulted in an increase of 'choose most often' (green) and a decrease in 'choose least often' (red) with no loss of revenue [73]. Finally, demonstrating the necessity of engaging stakeholders, research in British Columbia evaluated the impact of an organizational capacity-building intervention [74]. Intervention facilities reported increased healthy vending machine offerings and increased capacity to provide healthy food (i.e., development of a food and beverage policy) compared to control facilities [74].

In summary, existing research highlights the need for further research investigating approaches to changing recreation centre food environments, the impact of food oriented environmental interventions on children and adolescents attending recreational centres, and potential implications for stakeholders.

RATIONALE AND OBJECTIVES

Rationale

Unhealthy dietary behaviours are prevalent among Canadian adolescents and there is strong evidence that these behaviours will persist into adulthood [1, 2, 5, 6, 22, 23, 24, 25]. It is imperative that Canadian children and adolescents have positive influences on the development of healthy eating behaviour by early adolescence. The WHO considers supportive environments fundamental to shaping healthier food behaviour [2], yet Canadian adolescents live in an increasingly obesogenic environment. In order to circumvent components within the environment that currently support the development of unhealthy eating behaviours it is vital that we understand the influence of exposure to specific environmental influences on eating behaviour within the Canadian context.

Recreation centres, like schools, are an environment with potential to have a measureable, lasting influence on eating behaviours. These environments have the potential to shape norms of behaviour for physical activity and associated eating patterns. Given the amount of time that Canadian adolescents spend in recreational environments, the influence of exposure to this environment on eating behaviour warrants the attention of researchers, policy makers, educators, and health professionals.

To date, research investigating recreational environments has centred on adult stakeholders [8, 9, 12, 14, 15, 16]. Research has yet to investigate the perspectives of adolescents patronizing recreational facilities and experiencing the food environments within these facilities. There is, however, evidence indicating that adolescents participating

in sports eat out more, eat more fast food, and consume more sugar sweetened and energy drinks than similar-aged peers who do not participate in sports [10, 53, 54]. These last two are of special concern given Health Canada recommendations to reduce "other" foods [75]. This also underscores both the need and the opportunity for research aimed at developing an understanding of the food behaviours of adolescents within the recreational facility environment.

Published literature clearly supports the need for the adolescent perspective to be included in research on environmental influences on adolescent eating behaviours. In their study investigating factors influencing adolescent food choices, Nuemark-Sztainer et al. [49] concluded that interventions to improve adolescent nutrition require adolescent input and that they must address environmental factors. The results from Thakur and D'Aico [31], the HELENA study [40], and Turconi and colleagues [30], affirm the necessity of investigating the experience of adolescents when making food decisions so that the influences behind food behaviours can be understood. In addition, Sheperd et al. [4], in a review of barriers and facilitators to healthy eating among eleven to sixteen year olds, recommended utilization of qualitative approaches that include the views of adolescents in order to develop effective and appropriate health promotion strategies targeting healthy eating.

Hockey is second only to soccer for participation in organized sports for Canadian children and adolescents [60, 61]. Hockey is played within facilities that range from single pad arena to multi-plex sports facilities, and as discussed above, adolescents participating in levels above house league are typically exposed to more than one facility. This makes hockey players a suitable group from which to recruit key informants to provide an

adolescent perspective. A range of communities, urban and rural, were within reach of SC, allowing participation of hockey players from varied backgrounds to share their experience with the recreational hockey environment in Ontario.

Therefore, the aim of this study was to explore influences of the recreational environment on adolescent hockey players who are regularly exposed to that environment using photovoice. Photovoice is a qualitative method that values everyday life experiences and can provide nutrition researchers with the opportunity to gather rich data in diverse settings across the lifespan [76]. It also gives voice to populations that are influenced by policy, yet have no say in policy development or implementation. It is an innovative, evolving method that is readily adaptable to support the phenomenon under investigation, participant concerns, and the objectives of the researcher, making it well suited for food behaviour experiences in an adolescent population.

Adopting a qualitative approach to this research investigating environmental influences on adolescent eating behaviours could elucidate the perspective of these adolescents to identify what they consider healthy choices, what environmental triggers are present, how the food available shapes their decisions, what challenges they faced making food choices, and any number of other unknown factors that may influence their eating behaviours. It allowed for in-depth understanding while providing the opportunity to identify unanticipated and novel factors that may not have become known using predefined, structured quantitative measures [77].

It is hoped that results will provide stakeholders with insight as to how perceptions influence consumption decisions within the recreational hockey food environment. This understanding could provide evidence to determine where to effectively target knowledge mobilization efforts to maximize positive impact on the food behaviours and decisions of adolescents exposed to the recreational hockey food environment. This in turn could support directing resources and targeting policy and interventions where they can be most effective. It is anticipated that results will inform policy that supports healthy eating patterns by highlighting for policymakers factors within the recreational hockey environment that can act as negative and positive influences. For education and policy stakeholders, this research has the potential to provide insight into how strategies currently in place can be refined to better support healthy eating patterns. For parents, this research can provide an understanding of the influences their children experience around food decisions. Finally, it is also hoped that this research will inform the development of quantitative surveys targeting factors adolescents associate with adolescent eating behaviours.

Objectives

Using a modified photovoice method:

1. To explore, from the perspectives of adolescent hockey players aged 12-15 years playing at a level above house league, the influences of exposure to the recreational food environment on adolescent food choices and behaviours, encompassing the:
    a. recreational facility food environment
    b. broader physical and social environments;
2. To create a visual representation of adolescents' perception of their food experience and the factors influencing food intake as active participants in the recreational hockey environment; and,
3. To explore parent perceptions of the adolescent hockey player experience of the recreational hockey food environment represented in photographs.

INTERPRETIVE FRAMEWORK

This study was conducted within a Social Constructivist framework. Social Constructivism posits that reality is shaped by individual experiences. Knowing is active, with subjective meanings constructed through interaction with others, shared understandings, and the cultural norms that operate within participants' lives [78, 79]. The researcher looks for the complexity of meanings and inductively develops a pattern, or patterns, of meaning of phenomena as experienced by participants [78, 79]. Social Constructivist research focuses on specific contexts to understand cultural settings of participants by encompassing methodological approaches that support emergent content analysis, such as phenomenology and grounded theory [78]. The goal of research within this framework is to understand the lived experience, making it ideal to address the objectives as outlined on page 26 [78].

A Social Constructivist framework requires the researcher to position him/herself and acknowledge how interpretation is shaped and influenced by their personal experiences and background [78].

Interpretative Position of Researcher

As a nutrition professional, I place high value on healthy eating behaviours as one of the key components to maintaining health. Nutrition research evidence guides my perspective on what constitutes healthy eating. I understand that a variety of factors influence food intake, including physiological, psychological, social, and environmental, and

firmly believe that food decisions are rarely based on hunger alone. I place high value on the enjoyment of food and do not believe that food is, or should be, ingested solely based upon its' nutrient content. While taste preferences may develop at a much younger age, I believe we are strongly influenced in our adolescent years and develop behaviours and eating patterns during those formative developmental years that stay with us for a lifetime.

METHODOLOGICAL APPROACH

Phenomenological Inquiry

A Social Constructivism framework often manifests in a phenomenological methodological approach, as an examination of individual lived experiences contributes to a deeper understanding of how meaning is created [80]. The purpose of phenomenological research is to explore the phenomenon using data from those who have had direct personal experience with the phenomena of interest in order to understand its essential structure [81]. Phenomenological inquiry is a synthesis of data collected from individuals who have experienced a phenomenon, described as the essence of the shared experience making it well suited to research investigating experiences of phenomena, like exposure to the hockey recreation environment, shared by a group of individuals [78].

Plunkett et al. [82] suggest that data sources other than open-ended interviews, typically used in phenomenological research, could contribute to deepening understanding of the lived experience. Plunkett et al. [82] argue that photovoice is one method that can enrich understanding and elicit rich data about the lived experience that is central to phenomenological inquiry by allowing participants to convey experiences from their own perspective and through discussion of their interpretations of the photographs. Photovoice provides participants with the opportunity to share their experience of a phenomenon through photographs and interviews, providing a deeper understanding that would not be accessible through interviews alone [82]. Photovoice can be a powerful instrument for answering two fundamental questions integral to phenomenological inquiry: "*What have*

you experienced in terms of the phenomenon?" and "*What contexts or situations have typically influenced or affected your experiences of the phenomenon?*" [78, p. 81, 83].

The purpose of this research was to invite adolescent hockey players to act as key informants with regard to the influences that exposure to recreation hockey environments have on their food choices and food behaviours. Therefore, a phenomenological approach was adopted to explore the lived experience of adolescent hockey players' food decisions within the recreation environment. Use of this qualitative approach provided opportunity for the development of a comprehensive understanding of the phenomena under investigation: the experience of exposure to the recreational facility food environment and the physical and social environment of recreational hockey played above house league levels. A phenomenological approach allowed SC to capture diverse participant views, elucidate unknown factors that influence the phenomena in question, and explore meanings of adolescent hockey player experiences in a natural setting [84].

Community-based Participatory Research

Community-based participatory research (CBPR) recognizes participants as experts and partners in research rather than subjects [85]. CBPR allows the researcher to uncover contextual factors contributing to the phenomenon under investigation [85]. Using a CBPR approach allowed SC to capture the lived experience of adolescent hockey players within the recreational hockey environment.

The Photovoice Method

Photovoice, a CBPR method, represented the primary data collection method for this research. Recognizing that images can provide evidence, teach, and influence policy, Wang and Burris (1997) developed the photovoice method as a way to integrate community participation, visual images, and discussion of the images produced to give them meaning [86, 87, 88]. Community members take photographs to identify, record and reflect on their perceptions and experiences [87, 88]. To contextualize the images, a group discussion based on the acronym VOICE, *V*oicing *O*ur *I*ndividual and *C*ollective *E*xperience, allows participants to provide meaning and definition to the images [87, 88]. Then, the final component of photovoice is sharing the photographs with stakeholders and policymakers [88].

The group discussion and consensus components of photovoice (described on page 42) offer the researcher an opportunity to closely involve participants in the co-construction of their reality [82]. This co-construction places analysis in the hands of participants as well as the researcher [82]. According to Plunkett et al. [82], one common critique of interviews as a data collection method is possible influence of the researcher's agenda in framing questions, resulting in an inaccurate representation about what is meaningful to those experiencing the phenomenon under investigation. However, with photovoice, participants control the data by taking photographs that are meaningful to them and choosing those that best represent their experience for group discussion, reducing opportunity for such influence [82]. Therefore, intense involvement of participants through the use of photovoice can provide the researcher with opportunity to mitigate potential influence of

preconceptions with the phenomena under investigation and improve rigour, beyond what can be accomplished using bracketing, where the researcher sets aside their preconceptions and assumptions about the phenomena under investigation [78, 83, 89].

Wang and Burris [87] recognized that given the breadth of public health challenges, photovoice could be used in many ways:

> *"… (1) for specific participatory objectives in health promotion, (2) with different groups and communities, and (3) for diverse public health issues. … photovoice may be a creative approach that enables people to identify, define, and enhance their community according to their own specific concerns and priorities."* [87, p. 374]

Two reviews (*n*=191 studies and *n*=37 studies) of photovoice use in health and public health, and one review (*n*=31 studies) of photovoice use for community or health concerns, support the use of photovoice to explore public health issues [90, 91, 92]. The majority of papers reviewed used photovoice methodology to document community realities or individual and collective experiences and perspectives [90, 91, 92]. All three reviews described photovoice as a way to address descriptive research questions: research purposes related to understanding perspectives and experiences of an environment, activities, roles, health concerns, and meanings of health concepts [90, 91, 92].

Youth advocacy has the potential to be a promising strategy for environmental change. There are numerous photovoice studies demonstrating adolescent participation in health oriented community change [90, 91, 92, 93, 94, 95]. The three reviews described

above, also support photovoice as an appropriate methodological approach for adolescents. Participants were children or adolescents in 24% of the 191 [90], 19% of 37 [91], and 19% of 31 [92] papers reviewed. As Strack et al. [96] point out, adolescents fit the description of those ideally suited for the photovoice approach: having little money, status or power [93]. Photovoice can empower adolescents by providing opportunity to gain perspective on their behaviour and community norms while helping to communicate complex phenomena and experiences [96]. Photovoice provides a participatory learning environment that gives adolescent participants a voice in the community while supporting personal and social development [96].

Review findings also provide evidence that photovoice methodology has been widely adapted from how it was originally conceptualized [90, 91, 92]. Rationale provided for the adaptations include: the opportunity for participants to review all of their photographs, ensuring that participants felt safe, providing an environment conducive to self-expression and openness, and to facilitate deeper exploration of the research question [90, 91]. Modifications included individual rather than group interviews, not including a photo exhibit, and varying levels of community participation [90, 91]. Therefore, a modified photovoice method was used to elicit deep understanding of the essence of the experience of the recreation facility food environment for adolescents. Modifications included the addition of one-on-one interviews with hockey players and parents of eligible hockey players (stakeholders) to contextualize experiences illustrated in the photographs taken by hockey players.

Finally, this qualitative research method also provides the opportunity to identify barriers and facilitators to changing eating behaviours within the recreational environment [80].

METHODOLOGY

The purpose of this research was to use an adapted photovoice approach to document the experiences and perceptions of adolescent hockey players around their food choices and food behaviours as active participants in the recreational hockey environment. Over a two-week period, participants took photographs reflecting their lived experience with food choices as participants in a recreational environment associated with playing higher calibre minor hockey in Ontario. Following the photo-window, one-on-one semi-structured interviews with each participant were used to elucidate and contextualize the photographs taken. Then, the hockey players were invited to participate in a focus group to discuss the representative sample of photographs and determine which photographs would be used for exhibition to local stakeholders. These stakeholders included, but were not limited to, parents, coaches, and recreation facility representatives. Parents, as the primary stakeholders in adolescent eating behaviour, were invited to participate in one-on-one interviews regarding the displayed photographs. Parent interviews documented their perceptions of photos that the hockey players chose to represent their experience.

Participant Sample

A purposive sample of hockey players aged 11-15 years old were recruited from minor hockey teams within Ontario that play at levels above house league. Both male and female players were invited to participate. These players typically practice and play in multiple recreation facilities, participate in hockey activities a minimum of two to three

times per week, travel to out-of-town (away) games, and regularly participate in tournaments. This schedule provides them exposure to a variety of recreational hockey environment elements. Adolescents in this age range have also reached the development stage to make autonomous dietary intake decisions [42]. However, they are limited in food options other than recreational facilities and associated recreational hockey environment, as they must often rely on adult transportation. Therefore, this age range offers the benefit of making it easier to reveal any influences that are directly associated with a recreational hockey environment.

Sample Size Rationale

Draper and Swift [97] in their review of qualitative data collection issues, suggest that determining an adequate sample size is one of the biggest challenges of qualitative research and recommend that sample sizes in similar types of studies be used as an indicator. Lal, Jarus and Suto [90] conducted a scoping review on the use of the photovoice method in health research, documenting eleven studies ranging from two to forty participants. Six studies had between eleven and thirty-one participants. A review of photovoice literature by Catalini and Minkler [91] documented thirty-seven studies, ranging in size from four to seventy-six participants. Only six studies reviewed had over twenty-nine participants and nine had less than ten. Interestingly, three of the larger (N=62 for all 3) participant studies reviewed were conducted by Wang, who in a paper overviewing the photovoice technique, recommends seven to ten as an ideal sample size [88]. Therefore, a

projected participant target of ten to twenty-five participants was anticipated to be able to provide an adequate and appropriate sample for representation of this population.

Inclusion Criteria

HOCKEY PLAYERS

1. In order to ensure exposure to a variety of recreational hockey environments, regular scheduled practice had to take place in more than one recreational facility or arena;
2. Players had to be 12 years old by the end of the 2015-2016 hockey season;
3. Players had to be 'active' on their team during the designated photograph window (i.e. not benched due to injury or illness) to ensure food choice experiences are reflective of regular exposure to the recreational hockey environment;
4. Participants had to reside in Ontario within two hundred and fifty kilometres of SC; and
5. Informed parental consent and participant assent had to be obtained.

PARENTS/GUARDIANS

Adult participants were required to have a child who met eligibility requirements for the photographic data collection component in order to ensure a parental perspective that

reflects having a child actively exposed to the recreational hockey environment at a defined level of play. However, having a child actively participating in the research was not a requirement.

Exclusion Criteria

There were no defined exclusion criteria.

Data Collection

PARTICIPANT RECRUITMENT

Adolescent Participants

Adolescent hockey players from minor hockey teams playing at levels above house league within Ontario were recruited to participate in the photovoice portion of the study through verbal invitation, poster advertising, and word-of-mouth. Coaches of eligible players on teams within the three minor hockey leagues local to SC, were asked, with league approval, to allow SC to offer a verbal invitation to players immediately following a hockey practice. The invitation adhered to a defined script (*see Appendix A*). Players were provided with a copy of the study information letter (*see Appendix B*) for their parents, a copy of the poster (*see Appendix C*) detailing information sessions being offered, and a contact card to be filled out if they were interested in participating. Coaches were provided with copies of the information letter and poster for players not in attendance. Information

sessions were aligned with the play and practice schedule of eligible players and continued until participant recruitment was complete.

Posters detailing study information sessions were posted in arenas local to SC. These information sessions were scheduled based on the play and practice schedules of eligible players.

Posters were also made available through social media and electronically to those who have contacts within Ontario minor hockey and were within two hundred and fifty kilometres of SC.

Adult Participants

Five parents were recruited to participate in one-on-one interviews to discuss photographs exhibited. A verbal invitation to participate was offered to parents attending the exhibit who had a child participate in the photovoice component of the study or had a child who met eligibility requirements but did not participate. Contact cards and a copy of the study information letter were available for those expressing interest in participation. Parents of study participants unable to attend the exhibit were contacted directly with an invitation to participate.

INFORMED CONSENT

See ethical considerations (page 48)

FIELD NOTES

Field notes were maintained documenting all contact with participants and their parent(s)/guardian(s), submission of photographs, observations, and any other information deemed relevant *(see Appendix D)*. These notes will be kept confidential, in a secure location at the University of Waterloo.

PHOTOGRAPHS

Participants were instructed to take photographs documenting their food choice experiences when participating in hockey related activities. Guidance was provided to participants with regard to taking the photographs and how to ensure anonymity (*see Appendix E*). These guidelines were reviewed with each player individually to ensure understanding. Photographs were taken over a maximum two-week period chosen to include regular practice, a minimum of two scheduled league games, and one tournament in order to capture the breadth of the recreational hockey food environment and experience. The number of photographs taken was left to the discretion of participants. All participants opted to use their own smart-phones to take photographs (the option of cameras, memory cards and usb's was offered).

To ensure confidentiality, participants were instructed to submit their photographs electronically to a password protected dedicated email address (fuelyourgame@uwaterloo.ca) hosted on the University of Waterloo server.

Participants were sent digital reminders to their smartphones from SC, with parental approval, requesting photographs be submitted to the study email address. To encourage

participation and ensure photographs were not lost or deleted, reminders were sent according to the hockey schedule.

ONE-ON-ONE INTERVIEWS

Individual interviews are not a prescribed component of photovoice [87]. This added layer of data collection was included to allow participants to share the experience and context of individual photographs and indicate which photographs could/should be included in the focus group discussion. The interview also reduced inter-participant influence on contextualizing the photographs.

One-on-one semi-structured interviews with participants were scheduled as near to the end of the photographic data collection window as could be arranged. Interviews were conducted in a private, secure, comfortable room at an arena convenient to each participant. To ensure confidentiality and anonymity, only SC and a research assistant (RA) were present. The presence of an RA was required, as the hockey player participants were minors. In order to protect the confidentiality and anonymity of the interviewee, the RA was positioned so as to be unable to view the photographs being discussed and wearing headphones so they were unable to hear the interview. The interview was guided by a protocol comprised of open-ended questions and probes (*see Appendix F)* designed to stimulate participant response [78, 98, 77]. This allowed participants to freely express themselves, allowed unexpected responses to evolve, and provided the interviewer latitude to pursue and explore emerging issues that arose while still providing comparable data [77]. Pilot testing of the protocol was conducted with a convenience sample of representatives (n=2) from the target population (aged 12-15, playing select level hockey), using

photographs taken at a recent tournament. Verbal feedback was sought regarding content and age appropriateness of the question protocol, and adjustments were made accordingly.

Interviews were scheduled for a maximum forty-five minute time allotment, to allow sufficient time for a thorough exploration of photographic data while respecting participant's ages and attention span. Interviews were audio recorded and transcribed verbatim by SC.

Immediately following the interviews, interviewees were asked for consent to use their photographs for focus group and exhibit purposes (*see Appendix G*). To ensure that all participant experiences were represented in the focus group discussions, even if they were unable or unwilling to participate, between three and five photographs were chosen that best represented participant's personal experience. Participants were verbally reminded that they were free to withdraw this consent at any time prior to the photographs being shared.

PARTICIPANT FOCUS GROUP

The use of focus group interviews is considered an efficient strategy to collect rich data [77]. Group discussion of photographs, and the experiences they represent, are an integral component of photovoice [88, 93]. After all participants had completed taking photos and been interviewed, two focus groups were scheduled. Six to ten participants were required for the focus group to maximize collective input yet encourage participation and interaction [99]. The number of focus groups was dependent upon the number of players consenting to participate.

Focus group sessions were scheduled in a private room at arenas in two regions convenient to most participants. All players within travel distance of the scheduled sessions were invited to attend.

The focus group sessions followed methodological recommendations of Kreuger [99], Kitzinger [100] and Gibson [101]. Each focus group was held in a convenient, comfortable setting with minimal distractions. Refreshments (water, juice, and fruit) were available throughout the session. SC reviewed the ground rules, explained the role of the facilitators, reminded participants that there are no 'right' or 'wrong' answers, and reviewed the SHOWeD [88] method (described below) that framed discussion of the photographs. Verbal permission to record the session was obtained from parents and participants immediately prior to the scheduled focus group. To reduce anxiety and encourage engagement, an icebreaker[8] was used to provide each participant the opportunity to speak within the group setting. The discussion was scheduled to last approximately one hour.

The eighty-eight photographs chosen as representative of the hockey players' experiences were grouped according to content (i.e., pizza, chocolate milk, etc.). The acronym SHOWeD [93] framed the discussion of the photographs. SHOWeD uses the following questions to contextualize and appraise the photographs:

- What do you ***S***ee here?

[8] Participant were asked what they think their favourite hockey player eats

- What's really ***H***appening here?
- How does this relate to ***O***ur lives?
- ***W***hy does this situation, concern, or strength exist?
- What can we ***D***o about it?

SC facilitated the discussion. A second trained facilitator was present to observe participants, document facial expression, physical responses, etc. and track participant contributions to the discussion. The discussion was audio recorded and transcribed verbatim by SC.

Following their review of the photographs using SHOWeD, a selection of photographs were chosen believed to best represent their experience with food choices and decisions in the recreational hockey environment. The photographs chosen were the foundation of an exhibit for parents, coaches, and other interested stakeholders.

PHOTO EXHIBIT

An important component of photovoice is the representation of participants' experiences at an exhibit of the photographs. Exhibits of the representative photographs were scheduled at arenas convenient to most participants in two regions of Ontario. To provide opportunity for eligible parents to attend, exhibits were scheduled based on team training and try-out schedules. The exhibits were located in a private room in the arenas and were open to viewing from 11:00 am to 3:00 pm and 10:00 am to 2:00 pm, respectively (based upon facility availability). Photographs were exhibited as a continuously looping

PowerPoint presentation. The photographs were grouped into early emergent themes. Participant quotes were included to contextualize experiences. Anyone meeting study eligibility[9] qualifications was invited to participate in the parent focus groups. (Note: initial invitations were for participation in a focus group. This was later changed to one-on-one interviews).

PARENT/GUARDIAN ONE-ON-ONE INTERVIEWS

One-on-one interviews with parents proved to be easier to schedule than focus groups. Therefore, parents of adolescent hockey players who meet study eligibility were invited to participate in a one-on-one interview to discuss their perceptions of the photo exhibit. The interviews were scheduled in a private, secure, comfortable location with minimal distraction at an arena convenient to the participant. Refreshments were available for the duration of the session. SC conducted all interviews. Each interview was guided by a protocol comprised of open-ended questions and probes (*see Appendix H*) and the photographs chosen by the hockey players to represent their experiences. The protocol was designed to stimulate participant response, allowed participants to freely express themselves, allowed for unexpected responses to evolve, and provided the interviewer the latitude to pursue and explore emerging issues that arose, while still providing comparable data [78, 98, 77].

[9] They have a child participating in the study or between the age of 12 and 15 years old currently playing recreational hockey at a level above house league

Interviews were audio recorded and transcribed verbatim by SC. Verbal permission to record the interview was obtained from each participant prior to starting the session.

Anonymity and Confidentiality

To maintain participant confidentiality all participants were assigned a pseudonym. Only SC has access to the pseudonym key. Only SC and her faculty advisor have access to the photographs and recordings. Paper documents are being kept in a secure location and digital data, including photographs and recordings, is password protected and stored on a secure server. All documentation and data will be kept in a secure location at the University of Waterloo for a period of seven years and then destroyed, according to University of Waterloo policy.

Any identifying features in the photographs submitted were either removed or blurred using Adobe® Photoshop® Elements software [102], before being viewed by anyone aside from SC or her faculty supervisor. If identifying details were critical to the content and context of the photograph, the photograph was only used for analysis purposes and not for exhibit or as part of study results or discussion.

Participant Remuneration

Adolescent participants were given a $10 gift card from iTunes, EB Games, Sport Chek, or Chapters as a 'thank you' for their participation. As participation in the focus group

was not a requirement to participate in the study, focus group participants were given a $10 gift card, from the same selection, for participating. Adult participants were given a $10 gift card from iTunes or Chapters as a 'thank you' for their participation. Participants were also provided with a 'thank you' letter following their participation in the interview and focus groups (*see Appendix I*). Any participants who withdrew from the study received a $10 gift card, as described. When given the gift card participants were asked to sign a Receipt of Remuneration Acknowledgement form (*See Appendix J)*, as required by the University of Waterloo Office of Research Ethics.

ETHICAL CONSIDERATIONS

This study received ethics clearance from the University of Waterloo Office of Research Ethics (ORE File #20568).

Adolescent participants were required to provide written, informed assent prior to participation (*see Appendix K*). As participants were minors, written, informed consent from a parent or guardian was also required prior to participation (*see Appendix L*). Following the interview, a written release for the use of photographs for focus group and exhibit purposes was required from participants and a parent or guardian (*see Appendix G*). The consent for photograph use provided provisions for the use of all, a select number, or none of the photographs. Consent and release forms were reviewed with participants prior to participation in focus groups.

Adult participants were required to provide written, informed consent prior to participation in one-on-one interviews (*see Appendix M*).

The potential power dynamic between the researcher and participants is an important ethical consideration when conducting research with adolescent participants. There is potential for participants to see the researcher in a position of authority and tailor eating behaviour, photographs and/or interview responses to what they believe the researcher would like to see and hear. There is also the possibility that participants will want to decline further participation, but be afraid to voice this for fear of angering the researcher. To mitigate these possibilities, SC ensured that participants understood that they could discontinue participation at any time, that they would receive a thank you

honourarium regardless of whether they participated fully, and that they were welcome to review their interview transcript before it was included in analysis. SC also carefully explained the purpose of the research and that there were no 'right', 'wrong', or 'expected' answers. This was reviewed with participants prior to signing consent forms, at the time of the individual interviews, and at the beginning of the focus group sessions.

All participants were informed that any information revealed about activities that were illegal or dangerous would be brought to the attention of the participant's parents and/or appropriate authorities.

DATA ANALYSIS

1. SC transcribed one-on-one interviews and focus group discussions verbatim;
2. Analysis of transcripts from one-on-one participant interviews, participant photo focus groups, and parent interviews was undertaken guided by Colaizzi's process [81] and a codebook created to ensure standardized, consistent analysis [103];
3. NVivo 11 (QSR International, Doncaster, Victoria) [104] qualitative data analysis software was used to support the analysis; and,
4. As a measure of reliability, a second reader, a peer familiar with the phenomena under investigation and experienced with qualitative data analysis, reviewed a sub-set of transcripts using the codebook and any variations were discussed to achieve consensus [103].

Any reflections, ideas, assumptions and interpretive decisions were memoed throughout the data analysis process. According to Thorne [105], deconstructing the meanings of a phenomenon is required for interpretive understanding. Interview and focus group transcription as the first step in data analysis allowed SC to become immersed in the data and derive understandings that facilitated richer interpretations [106, 107]

Inductive analysis was used to interpret and structure meanings from the data [105]. Analysis conformed to Colaizzi' phenomenological method as described by Sanders [81] and Edward [108] as follows:

1. To gain a sense of the whole experience, beyond personally conducting the interviews and transcription, transcripts and audio tapes were reviewed;
2. Significant statements pertaining to experiences of the recreational environment were extracted;
3. Meanings were formulated from significant statements extracted and each underlying meaning was coded;
4. Formulated meanings (codes) were then aggregated into clusters of themes (categories) and collapsed into emergent themes;
5. Findings were integrated into an exhaustive description of the experience of the recreational environment (phenomenon);
6. The exhaustive description was reduced to an essential structure; and,
7. Finally, a sample of participants (n=2) were invited to review results and comment on how the findings compare with their experiences, in order to validate interpretation of the phenomenon.

STUDY RIGOUR

Data were collected from multiple sources: photographs, one-on-one interviews with both hockey players and parents, and focus groups with the hockey players. These data sources, which include both key informants and stakeholders, provide triangulation of the data. Triangulation supports the concept that any deficiencies in one method of data collection will be counter-balanced by the use of complementary and corroborating methods [109]. This will ensure reliability, credibility, and validity [78, 110].

Immersion in the data through the transcription process also supports increased trustworthiness and reliability of the data [111].

Member checks, as described in step 7 of data analysis, were used to ensure accuracy and credibility [78, 110]. Upon completion of preliminary analysis, a sample of participants (n=2) was invited to review preliminary analyses to confirm and comment on the accuracy of findings.

Peer review provided an external check of the data interpretation and analysis [78]. To verify findings, the codebook developed by SC and a sub-set of the transcripts were reviewed.

Finally, memoing, as a record of the research process, was used to facilitate data analysis, while also offering a reflexive perspective on subjective influences on data collection and interpretation [112]. The memoing documented researcher reflections, ideas, the analytic process, and the decision-making trail [112].

RESULTS

Hockey Players: Perceptions of Food Influences

SAMPLE

Participants ranged in age from eleven to fifteen years old with a median age of thirteen. Twenty-five players were recruited; twenty-three male and two female. Participants represented five minor hockey leagues and twelve teams in Southern and Central Ontario *(see Table 1)*. All participants played levels above house league: twenty-three played rep and two played select. One participant withdrew because no photographs were taken. An offer to reschedule the photo window was declined.

Table 1: Participant Distribution

TEAM	LEAGUE				
	1 *U*	2 *R*	3 *U*	4 *U*	5 *U*
1	3				
2	2				
3	5				
4	1				
5	1				
6	1				
7		6			
8		1			
9			1		
10			1		
11				1	
12					1

U:Urban; R:Rural

The twenty-four players who completed the study submitted over four hundred and fifty photographs, ranging from as few as four to as many as fifty-three per player

(median=15, mean=19). All twenty-four players participated in on-on-one interviews. These ranged in duration from thirteen to fifty-one minutes (mean=30 minutes).

After all one-on-one interviews were complete, two focus group discussions were conducted located such that all players had the opportunity to participate. Of the twenty-four players invited, sixteen players participated in the two focus groups; ten the first and six the second. Non-participation was due to scheduling conflicts, distance, and one player, who had agreed to attend, was unable to locate the meeting room within the arena. All focus group participants were male. Durations of the focus group sessions were fifty-nine and sixty-three minutes, respectively.

FINDINGS

Results indicate a complex interaction of factors influencing the food choices and behaviours of these adolescent hockey players. Five primary themes emerged from analysis of the transcripts of the one-on-one interviews and focus groups: perceptions of foods for performance and recovery, perceptions of branding and media, morality and values, influences of hockey as a team sport, and recreation facilities. The group discussions reinforced the themes and associated experiences from the one-on-one interviews. Results are presented according to the dominance of the primary emergent themes.

THEME: PERCEPTIONS OF FOODS FOR PERFORMANCE AND RECOVERY

All players reported the important influence of nutrition on performance and recovery. This was represented by their reported attention to intake, attitudes towards, and behaviours around, specific food groups and individual foods or beverages. Dominant

sub-themes included protein; fast food; water; carbohydrates; and beverages considered essential to recovery.

Sub-theme: Protein for Performance & Recovery

All players perceived that protein played an important role in their physical performance. Players reported that protein was important for muscle development and provided "lots of energy", making it a cornerstone of their diet related to hockey.

Most players included photographs of home-food experiences related to playing or practicing. When discussing these photographs, protein (i.e., chicken) was a central feature of much of the reported home-food intake around playing hockey. Protein was also reported as important outside of home. However, in circumstances outside of home, protein was typically depicted in the form of protein supplemented food and/or beverages. These included chocolate milk beverages with added protein, protein bars and protein-powder-based smoothies.

A difference in the perceived role of protein was apparent between players who reported being offered specific nutrition guidance around protein intake and those who had not received such guidance. A sub-set (n=6) reported having a nutrition specialist, brought in by their coach, speak to them in the early part of the season (approximately 4 months prior to interviews). The players receiving this guidance reported the information provided influenced their protein choices, the timing of their protein intake, and the amount of protein they ingested to support their performance. They indicated that protein was for replenishment *after* the game and recounted the guideline to ingest twenty grams of protein within twenty minutes of play or practice to maximize muscle recovery. The players

felt adhering to this guideline improved their performance. This sub-group provided numerous photographs of protein shakes, fortified beverages and bars which they described consuming in the locker room as an important component of their immediate post-game or practice off-ice routine.

In contrast, those without any nutrition guidance considered protein, typically in the form of protein shakes and/or bars, to be a snack most often consumed before play or practice and locations varied. The rationale for use was that when a full meal was not appropriate, the protein snack was filling without being too much so. Although they felt that "meat" was a "better" choice than "artificial" protein powder as a means to get energy, a meal would leave them "stuffed" and reduce performance. Described as a "good to keep going", the protein snack was quick and filling without being too much so.

> ". . . they're good options 'cuz you're just drinking it . . . you don't have to chew it or digest it 'cuz if you have like a big meal that gives you the same stuff that the shake will give you, you hafta like digest it and stuff and it like makes you feel really full and would like make you nauseous while you're playing"

Players also reported that protein smoothies were a good choice as a recovery food after a game instead of chocolate milk or a sports drink (discussed below). Protein bars were described as a popular choice to appease hunger and to restore energy on the way home because they were easily portable and it meant they did not have to stop for food on the way.

Finally, players perceived that protein powders and bars were designed for athletes and would not be used outside of sports participation. They described seeing examples of protein shakes and bars in relation to athletes and made the link to their use in hockey.

> ". . . seeing those people who are really into fitness, . . . they have a lot of protein shakes and stuff in their diet, so you like transition it over to hockey."

Sub-theme: Fast Food and Performance

There was consensus amongst all of the players that fast food had a negative impact on performance and this belief strongly influenced reported intake. Fast food was described as being "unhealthy" and "bad" and there was agreement amongst the players that it should not be eaten in large quantities. The players described their experience with recreational hockey as influencing how they perceived fast food and that they limited the amount of fast food they ate because they played hockey. Many players, in both the one-on-one interviews and as part of the focus group discussions, were emphatic that if eaten *before* a game fast food would make you feel sick and impede performance. As one player reported: "If you have it before a game, you're gonna feel sick".

The players described limiting the amount of fast-food they ate because they played hockey. Paradoxically, players reported that if they were not playing hockey they would eat less fast-food and restaurant meals as they would not be travelling. However, they also reported that they might eat more "junk food", as they would no longer be concerned with the influence their diet had on their hockey performance.

When discussing what, if anything could be done about eating fast food (the "D" in the SHOWeD method), the players recommended preparing food ahead at home to take with them, rather than having to purchase food. Interestingly, there was no suggestion in this context to make the food available outside of their homes healthier.

Sub-theme: Chocolate Milk for Recovery

Many of the players reported that chocolate milk was "good for you" after a game. They described it as restoring energy. All but two of the players reported frequently and consistently consuming chocolate milk as part of their hockey experience. Of the two who did not consume chocolate milk as part of their play, one was lactose intolerant and the other indicated that chocolate milk was a poor choice as it had "too much sugar".

Players expressed that "most people" know chocolate milk is a good beverage choice and one of the best choices they could make after a game. This occurred in the group discussion even when some players expressed doubt about truth in advertising. Players also reported that the added sugar in chocolate milk was "ok" after a game because "you're drained" and it would "help with your blood sugar level" and restore energy. They also claimed they had been "told their entire lives" that chocolate milk was "healthier" than Gatorade® or other beverages with "added sugar and stuff" and offered that as an important reason for choosing it. When prompted about where they had heard that, replies included coaches and parents.

In many instances, chocolate milk was paired with protein, either in the form of a protein bar or as chocolate milk with added protein. Players described this combination as "good for you" because it contained both protein and calcium.

Interestingly, many players reported that they would drink less chocolate milk if they were not playing hockey. As one player stated:

> "I would drink a lot less chocolate milk, 'cuz most of the time I have a chocolate milk . . . after hockey."

Players also perceived chocolate milk as convenient, as it was "easy to buy", is readily available in to-go packaging, and could be purchased "along the way". They reported it as the choice that would be made at a recreation facility concession if making a food purchase due to hunger or thirst. Not surprisingly, players also expressed that it tastes better than white milk.

Sub-theme: Sports Drinks for Recovery

Sports drinks (i.e., Gatorade®) were perceived to play a significant role in restoring energy and alleviating thirst. Players reported frequent consumption after play and practice. Sports drinks were either brought in or purchased before going on the ice for use immediately after getting off the ice. These beverages were described as always available at the arena and sometimes supplied for their teams. For example, one player reported that his grandfather supplied Gatorade® for the team after every game.

Sub-theme: Other Beverages for Recovery

Vitamin supplemented water (i.e., Vitamin Water®) beverages were perceived as a "healthier choice" and players reported their frequent use for recovery. Players reported they contained less sugar than sports drinks and other sugar-sweetened beverages and the sugars were "better". When prompted, players defined better sugar as "cane sugar" and "not aspartame".

Sub-theme: Water for Hydration

The players perceived hydration as important for energy. When discussing the numerous photos depicting water bottles, both refillable and purchased, players reported hydration as the main reason for water playing such an important role in their food experience. Players indicated that water was an integral part of playing hockey and that it directly impacted their ability to play well, making it a "basic" hockey drink.

Sub-theme: Carbohydrates for Performance

The players perceived carbohydrates to be an important source of energy and necessary to play well. They also perceived that combining a carbohydrate dense food, such as pasta, with a protein dense food, such as chicken, imparted "balance". Carbohydrates were reported as an important home-food around playing hockey. Players described, and the photographs showcased, high carbohydrate foods such as pasta as a central component of home-based hockey eating routines. However, carbohydrates were not discussed as part of the food routine outside of the home-food discussion.

THEME: PERCEPTIONS OF BRANDING AND MEDIA

Branding and media (i.e., advertising) were an important influence on the food choice behaviour of study participants. Perceptions around specific food outlets, Gatorade® and chocolate milk were predominant.

Sub-theme: Knowledge and Advertising

Some players suggested knowledge of nutrition protected them from being susceptible to advertising. Interestingly, they also reported that the products advertised could help performance, but that ultimately what mattered was the level of effort, not food

choices. The players suggested that professional hockey players got sponsorship offers because they were good players and expressed skepticism that media spokespersons even used some of the products they endorsed. Interestingly, players did not believe that professional sports figures would eat unhealthy foods, even if they were advertising them.

> *"Like there's some players that will do like a commercial for like McDonald's® or like a fast-food restaurant sometimes and you know that they don't eat there."*

Sub-theme: Commercial Food Outlets

Players reported definitive brand associations for several food outlets. The dominant brands referenced by players were Tim Horton's®, Subway®, and McDonald's®.

Sub-sub-theme: Tim Horton's®

Tim Horton's® was perceived as holding an important position in the recreational hockey food experience. Tim Horton's® restaurant and drive-through was reported by players to be part of the ritual of hockey participation. Players identified Tim Horton's® as a food destination they requested because the food tastes good, there is a lot of variety, locations are convenient (i.e., along the highway) and food is both better and different from McDonald's®. Tim Horton's® was described as being a better choice than a "fast food place" when short of time and travelling.

Tim Horton's® was defined as fast food, but only in the context of convenience, rather than as "junk food". Players repeatedly expressed that it was healthier than McDonald's®. This perception was partly based on Tim Horton's® status as a hockey player.

> "It's just representative of like a hockey-type meal, 'cuz Tim Horton was a hockey player."

The players also expressed an allegiance to Tim Horton's® due to the sponsorship of Timbits® hockey that many had experienced. The players discussed having played Timbits® hockey and owing Tim Horton's® loyalty as a result. Players indicted that because Tim Horton's® had supported their hockey career, they should support Tim Horton's®.

> ". . . played Timbits® when you were like real young, so prob'ly affects your hockey career, so like oh, Tim Horton's® supported me when I played hockey, so I'm gonna support them when I wanna get food"

Sub-sub-theme: Subway®

Subway® was also perceived as being a vital component of the hockey experience. It was consistently described as a "healthy" place to eat as offerings were healthier and supplied a better variety of choices. The players also reported it being heavily advertised as the "healthy" option.

> "They advertise it like as a fitness type store . . . so I think that prob'ly affects why people think it's a better option."

Interestingly, content of the photos of Subway® experiences appeared to contradict the experiences expressed by the players. When describing their experiences with Subway® in the focus groups, players reported that they would not choose the chips or cookies, yet several of the photographs of a "healthy" meal experience at Subway® included fountain pop, chips, and/or cookies.

Sub-sub-theme: McDonald's®

McDonald's® was referenced frequently when comparing "healthy" to "unhealthy". It was consistently used as the example of "bad" and "unhealthy", described as "empty

food", and as containing nothing healthy. However, it was also frequently reported as "tempting" and there was consensus amongst the players that the food offered "tastes good".

Sub-theme: Chocolate Milk Messaging

Players perceive chocolate milk as having a health halo based on messages from advertising, coaches, experts and parents. The players reported that *chocolate* milk is advertised as something you have with exercise. While they did question whether there was truth to that assertion, they reported that there are many commercials saying it and that it is likely true. Moreover, they noted the absence of similar advertisements for the benefits of white milk, so did not think to buy white milk.

> "And it's like, you don't really see like advertisements for like plain milk, how it's like good for you. It's all chocolate milk, how it's better for you, so you don't really think to have white milk, 'cuz it's not really said to you."

Sub-theme: Branded Beverages

Gatorade® was reported to be advertised as a beverage specifically intended for hockey players and as a product for athletes that was not appropriately used outside of sports participation.

> "It's advertised as like a hockey drink."

The players reported that commercials frequently employ well-known professional players and that advertisements suggest Gatorade® would improve performance.

THEME: MORALITY AND VALUES

Players' food descriptions frequently used morally weighted language, especially for fast food. It was described as "tempting", being something "you want that is not good for you", and causing feelings of "guilt". Foods being described as "treats" and "rewards" were perceived as "unhealthy" and "bad" choices. Subway® versus McDonald's® was frequently referenced by the players when making comparisons of healthy versus unhealthy. McDonald's® food was consistently labelled as "bad", "empty" and "unhealthy". However, it was also consistently described as "tasting good" while being "bad for you" and "tempting". For example, when discussing a photograph of a McDonald's® meal, focus group participants said:

P1: "It's like the meal of shame."

P2: "Double Big Mac's"

P3: "Yeah!

THEME: INFLUENCES OF HOCKEY AS A TEAM SPORT

Sub-theme: Tournaments

The hockey players reported that participating in hockey tournaments influenced their eating behaviours in several ways. This included time constraints, convenience, the need for snack foods, and frequent team restaurant meals.

Sub-sub-theme: Team Meals

Restaurant meals were reported as a common experience for the hockey players when attending tournaments. Team meals after a game were described as typical and often occurred as a "chain reaction". As one player described:

> ". . .if one person says it and another person says 'yeah we'll go' and your friends kind of . . . then like the whole team ends up going and you don't really want to be like that one guy who doesn't go."

The players reported eating similar types of food, although they also reported not being influenced by the choices made by teammates. The players indicated that while they often made similar choices it was because they like the same types of food.

Sub-sub-theme: Snack Food

The players reported snacks being highly associated with tournaments. They described a frequent lack of time to eat and the need to "grab" something to eat around games. Tournament snack foods typically consisted of small items from home purchased in larger quantities rather than purchased after arrival. For example, granola bars. Interestingly, players reported fruit, especially bananas, as a common snack for tournament play. Bananas were described as the predominant fruit because they provide energy and potassium. Players also reported fruit trays being very popular when staying at a hotel, and described them as the way parents encourage healthy options.

> ". . . to try to encourage you to kind of eat the healthy food and stuff instead of going out and like buying popcorn and chips and stuff and like eating a lot of that."

Sub-theme: Time Constraints and Convenience

Time and convenience played an important role in influencing fast food intake by the players, especially when travelling to away games and attending tournaments. Time constraints between games provided little time to do much more than use a drive-through to have something to eat. Fast food was described as being something purchased between games when food that was quick to purchase and eat was needed. Participants also described fast food as a quick, easy and convenient part of the hockey experience. There was mixed response from the players around how often they ate fast food, but there was a general consensus that it was not healthy for you and that you should not eat too much of it.

THEME: RECREATION FACILITIES

Players reported that they considered the food offerings within the recreation facilities they were exposed to as part of their participation in minor hockey to be generally unhealthy. While they liked the taste of the food offerings, they "knew" these choices were not good for them. They reported that recreation facility food offerings were eaten as a "treat" or offered as a reward for playing well rather than as part of their hockey food routine. When the players were at an arena, they reported it was generally too close to play or practice to eat the type of food available. The players described the foods as making them feel nauseous and slowing them down while playing or practicing. The players also indicated that the choices offered were not good for recovery, so when they were finished playing or practicing they wanted to leave immediately or, at most, purchase a beverage.

One of the most interesting perceptions reported by the players was that the food offerings at recreation facilities was there for those attending to watch the games and practices rather than for the players.

> ". . . if you like look at the stands at like a younger hockey game where all the kids are, there prob'ly at least a quarter of them will have like popcorn or fries or something like that"

The players reported tradition to be an important element around the food choices in recreation centres. They described an expectation to be able to purchase something that tastes good, such as fries, rather than something healthy.

> ". . . but I always would rather have something that would taste better than is healthy at an arena, just 'cuz that's what's there and that's what you kind of think of when you think of arena food"

The players indicated that healthier choices should be available but some players suggested that if the facilities did not offer the unhealthy choices they would not get much business.

Photo Exhibit of Hockey Player Experiences

Eighty-eight photographs provided the foundation for focus group discussions for players. For the discussion, six to eight photographs were grouped together according to common content. From those photographs, forty two were chosen to exhibit. Quotations from the interviews and focus groups were added to the photographs groupings to contextualize the experience illustrated.

Parent Perceptions of Hockey Players' Experiences

SAMPLE

Interviews with parents continued until thematic saturation was achieved. Saturation was achieved after four interviews. However, as that was such a small number, an additional interview was conducted to ensure that saturation had indeed been achieved, resulting in five parents participating in one-on-one interviews to discuss photographs exhibited. Of these interviews, three of the parents were participant's parents and two were non-participant's parents. All parent participants were female. The male parents contacted were either unable or unwilling to participate.

FINDINGS

Three dominant themes emerged from the parent interviews: perceptions of recreational facility food offerings, perceptions around travel experiences, and perceptions around time and convenience. These themes were consistent across parents of both study participants and non-participants.

There was a mixed response to the content of player's photographs. Some parents expressed surprise at the amount of fast food and at the restaurant choices in that, there was more exposure to these choices than realized. However, some indicated it was "about what they expected".

"The pizza didn't surprise me."

"They're fairly accurate from what I've seen."

"The amount of fried food surprised me. 'Cuz I know that's what you get at an arena, it still surprised me that there was so much."

THEME: RECREATION FACILITIES

Parents agreed with the hockey players that recreation facility food offerings were generally unhealthy.

> ". . . just trying to think of all the different arenas we go to . . . there are not a lot of healthy options"

> ". . . if your only choice is chicken fingers and fries or a burger, you're going to choose chicken fingers or a burger, right?"

The parents expressed agreement with the perception there was an expectation to be offered what was described as traditional "arena type foods", such as french fries, poutine, and slushies. They also indicated that there was an expectation that the availability of those foods was part of the overall hockey experience. Parents also suggested that those attending a game would be resistant to any changes to this experience. As one parent described:

> "People go 'oh yeah, when you go to this arena they got really good poutine'. If that's what you remember an arena for, right, that's not good."

Two of the parents even suggested that there could be some resistance from those attending recreation facilities if these foods were not available. Interestingly, while expressing this sentiment, they also expressed that they rarely "indulged" in these types of foods.

Parents also indicated that siblings and other children attending as spectators had an expectation that they would be "allowed as a treat" food or beverage choice. That expectation was for a food or beverage traditionally available such as the french fries. Parents also echoed the players' experiences when discussing the use of food as a "treat" or "reward" for playing well.

THEME: TOURNAMENTS AND TRAVEL

Parents supported the player reports that team dinners were a regular part of tournament participation. The parents reported that at least one team dinner per tournament was typical. Also typical, was that the players and adults sat at separate tables at team restaurant dinners. The players were given a great deal of freedom around what they ordered. Parents indicated that price was generally more a concern than the nutritional value.

Tim Horton's® was described by the parents, as with the players, as part of the ritual of hockey participation. When discussing their perceptions of the photographs of food in the car, the parents expressed that the Tim Horton's® drive-thru was typically part of the travel routine for any game or practice that was "out-of-town". The parents also described requests by the players to stop both on the way to and from the arena.

THEME: TIME AND CONVENIENCE

Parents described time constraints as a constant challenge around the hockey players eating behaviour. Practice and play schedules limiting time for meal preparation and family dinners resulted in regular food purchases outside of the home.

DISCUSSION

Using a phenomenological approach, this thesis set out to explore the perceived influences on food choices and behaviours of adolescent hockey players associated with participating in recreational hockey at levels above house league. This included their perceptions of recreational facility food environment as well as the broader physical and social environment that the players were regularly exposed to. The research entailed participants capturing the experience in photographs, contextualizing them in one-on-one interviews, and then discussing photograph representativeness in a group discussion with other players who shared the experience of the recreational hockey environment. The use of photovoice as a primary data source provided a record of the players' reality and allowed them a "voice"; interviews and focus groups contributed to an enriched understanding of that reality. From the focus groups, photographs best representing the hockey player experience were shared in exhibits for interested stakeholders. Finally, as important stakeholders, parents' perceptions of the experiences illustrated in the representative photographs were also explored.

The use of photovoice combined with interviews promoted a high degree of authenticity as, true to the rationale for selecting the approach, the participants only provided content that reflected what was most meaningful to them [82]. The group discussion offered shared social meanings in addition to the perceptions of experiences that had come from the one-on-one interviews [82]. This was perhaps most apparent with the players' experience with recreation facilities and the moral associations ascribed to food by the players.

This study adds to the increasing body of research using photovoice with adolescents. The use of photovoice allowed identification of themes of particular importance to the players that may not have been uncovered with other approaches. It also appeared to have reduced the influence of researcher priorities.

A priori, the recreational facility food environment was expected to have a powerful influence on food behaviours of adolescent hockey players due to high levels of exposure. However, key findings indicated that overall, performance and recovery, branding and media, morality, and team activities (i.e., tournament participation) were stronger influences on food choices of participants.

As the objective of this research was to understand the adolescent hockey players' lived experience within the recreational hockey environment, positioning results within a socio-ecological framework was considered during early analysis stages. However, the experiences illustrated and described by the participants suggested the influences interacted across multiple domains to a degree such that clear delineation was not attainable.

Perceptions Translating to Behaviour

As results demonstrated, performance and recovery were considered key influences on the food behaviour of participants. The hockey players in the current study claimed to regularly act on information perceived as relevant to their performance and recovery when making food choices. In most cases, food perceptions were described as being informed by knowledge. These findings align with prior research investigating benefits and barriers to healthy eating in which adolescents recounted physical performance benefits as a motivator

for healthy eating [113]. Authors suggested that to promote healthful eating in adolescents their perceived benefits must be understood [113].

The differences in the perception of protein between those who had nutritional guidance and those who did not clearly demonstrated how such information can influence behaviour. The information was provided by a source perceived as expert and in a context that was relevant for the players. Interestingly, those players who described planning a future hockey career also described themselves as very strictly adhering to the guidelines provided, suggesting that perceived importance can also influence the degree of adoption of recommendations.

The players' perceptions around healthy and unhealthy choices did not consistently translate into behaviour. Players' perceptions around healthy and unhealthy choices demonstrated a disconnect between knowledge and behaviour, a disparity seen elsewhere [38, 49]. Knowledge alone was not a sufficient driver of lifestyle behaviours, as has also been established elsewhere [31, 38, 39]. Perceived healthy choices were made when they would directly influence performance, however, that knowledge did not prevent the players from eating what they perceived as unhealthy choices at other times. For example, the behaviour demonstrated in the photographs of Subway® experiences indicates that while the players described Subway® as being healthy, the choices did not always reflect those perceptions.

Interestingly, when initially planning the study with a team coach, he shared that the use of chocolate milk in recovery was encouraged by the nutritionist that spoke to the

team. However, there were no described differences in chocolate milk consumption by the players receiving the guidance or not, possibly because this was not new information and the perception of the benefits of chocolate milk consumption. Yet many sources were cited as encouraging chocolate milk was supported by many sources (including parents, coaches, and media). This indicates that, while perception of a distinct benefit is needed to influence behaviour change, a range of information sources can influence perceptions. This also suggests that utilizing a multi-pronged approach to encourage the adoption of healthy eating behaviours in adolescents may be effective [114]. Knowledge translation around healthy eating cannot be solely information focussed [39, 115]. Providing the information from sources with credibility to players will increase the probability that the information will be internalized. Nutrition information must also be associated with activities or consequences that are relevant and meaningful to the adolescents [30, 116]. Those adolescents who were less focussed on their performance did not heed the nutrition advice around protein to the same degree as those who valued this consequence of the behaviour change.

Morality and values

The judgemental language used by the players around certain foods and food behaviours indicate that moral values were an important influence. Prior research demonstrated that Canadian teens applied moral boundaries to fast food choices [117]. Fast food consumption was considered unhealthy, judged negatively, and consumption decisions were tinged by moral dictates [117]. For the adolescent hockey players in this study, their discourse clearly reflected that moral dictates were an integral part of their

decision making process. They demonstrated a moral hierarchy when choosing between fast food outlets at travel stops that clearly reflects this. The participants also made moralistic judgements of their own behaviour when they consumed foods that were "bad". Unhealthy choices were considered "bad" behaviour and associated with feelings of guilt. These negative judgements and the associated feelings of guilt have been demonstrated in other research [113, 117]. Foods perceived as unhealthy and bad choices were indulgences in bad behaviour that were approved only in that circumstance or context. The use of "unhealthy" choices as treats and rewards for performance attests to this perception. This rationalizing behaviour offers an example of how the adolescents reconciled conflicts in food choice values as described by Contento et al. [52].

Players also made judgements around specific types of food. For example, sugar was seen by many players, as good or bad, depending upon whether the type of sugar was perceived as natural or artificial. So, even beyond judgements around fast food, choices and perspectives shared by study participants reveals the pervasive social meanings of food.

Advertising

It was apparent from all participants that some foods were "halo" foods. These included chocolate milk and specific restaurant options. What is important about this perception is that all of these foods were directly influenced by advertising. The strong influence of media advertising on children's food preferences and eating behaviour is well documented [118, 119]. While limited, research with children has demonstrated that marketing exposure to healthy options can influence food choices [120, 121]. There is also research with children in grades four and five, indicating that products with a nutrition claim

identifying them as healthier were perceived as tasting better [122]. The results of the current research suggest advertising helped confer halo status and thereby impacted intake choices. Examination of the effects of advertising and marketing healthy food choices is warranted.

The participants offered some interesting insight into the impact of advertising. Some players questioned the legitimacy of advertising content and expressed awareness of the intent to influence their choices. However, again paradoxically, some of the behaviours they described as being influenced by advertising would not "legitimately" be labelled as healthy. There are gaps in the research around media literacy and the influence of marketing exposure [123]. It is also commonly argued that younger children cannot understand the persuasive nature of advertising making them more susceptible [119, 124]. However, research has demonstrated that age does not moderate susceptibility from exposure [119, 124]. This research supports a recommendation for future research to examine the relationship between emotional responses to advertising and preferences [119].

Social and Situational Norms

The social environment associated with being part of a hockey team and attending games were revealed as important perceived influences on food behaviours. Influences described by the players and parents highlighted social and situational norms. Perhaps the best illustration of this is tournament restaurant team meals and food choices made between games. Being part of the group appeared to be more important than the specific food choice. The similarity of food choices at team tournament dinners can be interpreted

as adopting a consensus, or as an indication that peers have similar values around food choices [52].

Attending a hockey game was perceived by players, and parents, as a social experience and it was apparent that certain foods and food behaviours (i.e., eating french fries) were associated with the recreation facility environment and were an important part of the experience of watching a game. The players' perception of the tradition and expectations highlighted norms influencing food choices within recreation facilities. As was also described by Salvy et al. [43], associated situational norms ("arena foods") and social norms ("part of the experience of watching a game") directly influenced food choices. Both the players and parents perceived that there would be resistance to changes due to the tradition associated with "arena food". The importance of performance to adolescent athletes presents an opportunity to shift norms associated with social and environmental aspects of recreation.

The influence of time constraints experienced by the players, and echoed by their parents may also have become both situational and social norms. The time pressures experienced have been cited in other research as reason for intake of fast food as "normal" behaviour [48, 59].

Higher Intake: Fast Food and Sugar-sweetened Beverages

Findings are consistent with earlier research indicating that adolescents involved in sports have a higher intake of fast food and sugar-sweetened beverages [10, 54]. Meals consumed away from home as part of team travel, and due to schedule constraints, are partly responsible for this higher intake described by the hockey players. Frequent eating

outside of the home is also consistent with prior research and with reported findings of US parents perceptions of the food environment of youth sports [59]. However, the increased sugar-sweetened beverages may be the result of purposeful intake of chocolate milk, sports drinks, and vitamin supplemented beverages than meals consumed away from home. Intake of these sugar-sweetened beverages are normative for this sample population and has even been described as "institutionalized" [10]. Given the level of activity, there is little doubt that their energy demands compensate for the increased energy intake associated with this type of beverage. However, the long- term implications of these behaviours are unknown and warrant further investigation. This may be of concern around protein intake as well.

Both fat free white and chocolate milk, have been shown to be an effective recovery beverage for rehydration and protein synthesis for endurance exercise compared to as commercial carbohydrate only based beverages in adults [125, 126, 127, 128]. Limited research with children and adolescents, has also demonstrated that fat free milk is more effective for rehydration and protein synthesis than commercial sports drinks [129, 130]. This suggests that the use of carbohydrate only commercial sports beverages may be unnecessary for this population as milk beverages can provide recovery support along with other nutritional benefits.

Recreation Facility Environment

Both players and participants indicated recreation facilities in Ontario "should" offer healthy options. Policies limiting the marketing and sale of unhealthy food and beverages may offer an effective approach to influence heathy eating behaviours within recreation

facilities. Limiting sponsorship promotions of unhealthy food and beverage products within recreation facilities has also been identified as a viable option [131]. Extreme change may not be sufficient to achieve necessary changes. Therefore, before policy interventions can be introduced appropriate outcome measures and targets must be identified [132].

Results from this study indicate modification of social norms is required. Results highlight the importance of perceptions these players have around the value of healthy food choices. The participant population have a high level of exposure and yet they limit consumption of recreation facility offerings. These views could be leveraged to influence change.

However, exposure to unhealthy food environments beyond recreation facilities appears to have a greater influence on eating behaviour and must be addressed as well. Results reinforce the value and necessity of including an adolescent voice when researching environments that influence their eating behaviours to inform appropriate and effective policy measures.

STUDY STRENGTHS AND LIMITATIONS

Timeliness is a key strength of this study. Several Canadian provinces are considering policy/guidelines to increase healthy food offerings in recreation facilities. This study can inform those guidelines as well as the intervention approaches used to support those guidelines.

Another key strength of this study is its' unique approach. It used key informants from a population that typically has little or no influence on policy or regulations that directly affects them, combined with methodology that has not been used in this food environment. This informed, experiential viewpoint provides insights that could not be obtained using other methodological approaches. The addition of a stakeholder (parent) perspective also provides opportunity to contextualize the experience perspective of the adolescents to a greater degree than data from the adolescents alone.

There are potential study limitations that must be considered. Although, study participants represented twelve teams and qualitative approaches presented a range of perceptions, results may not be generalizable to the broader adolescent hockey playing population, within and outside of the region and playing level of the study.

Due to the open and interactive atmosphere of the recreation environment, and some participation of teammates, there could have been inter-participant influence on the data collected. To mitigate this possibility, a key objective of the individual interviews was to reduce any opportunity for inter-participant influence when contextualizing the photographs around participants' lived experience prior to group discussion [101].

One of the challenges recruiting participants was the potential for bias caused when parents refused to allow interested children to participate. In some cases, this centred on not wanting their child's food behaviour documented. One parent responded, "oh no, I wouldn't want you to know what I allowed (child's name) to eat last night after the game!". As the gatekeepers, these parents were concerned that they would be judged for the eating behaviours associated with their child participating in recreational hockey.

CONCLUSIONS

Recreation facilities are only one of a range of environments that influence the eating behaviours of adolescent hockey players. Yet, this does not exempt the recreation facility environment from supporting healthy eating behaviours. Both the hockey players and their parents perceive Ontario recreation facilities to be unhealthy food environments. Indeed young hockey players, particularly those who had received nutrition education, were highly motivated by perceived benefits of healthy eating on performance and reported that they did not generally make food purchases at recreation facilities. Recreation food facility management and vendors may be missing a significant opportunity through not providing the healthy food options that players value.

The perceptions and behaviours around brand and product messaging clearly demonstrates two things. First, they support the literature around how susceptible children and adolescents are to advertising and promotion. Second, the successful marketing of chocolate milk and Subway® as "healthy", choices shows that messaging can be used to support healthy eating.

Hockey players embraced healthy eating choices when those choices were associated with performance, clearly demonstrating how important it is for promotion of healthy behaviours to be associated with something target groups feel is important. Adolescents will internalize information and messages if they are associated with something they value. Parents, coaches and others involved in educating hockey players can use this to influence healthy behaviours.

IMPLICATIONS

Table 2: Implications for REFRESH Study Findings

APPLYING TO	IMPLICATIONS

Hockey Leagues/Administration	• Players are highly receptive to nutrition direction associated with team management, placing league administration in the position of supporting healthy nutrition behaviour by:
	  ○ Ensuring team management has the appropriate tools and/or training opportunities in place to support players' development of healthy eating behaviours
	  ○ Supporting healthy eating environments associated with league functions
	• Leagues are also in a position to support parents by offering guidance around how to support healthy eating behaviours within the minor hockey environment (i.e., tips for dining out, team travel, and after-play replenishment)
	• Players eating behaviours would benefit from consistent, informed nutrition information directed from league level (rather than relying on individual coaches, etc.) as part of overall player skills development

Coaches & Team Management	• Players are highly receptive to nutrition direction from coaches and team management providing an opportunity to leverage this influence with healthy eating guidance (informed and guided by appropriate information sources) as part of player skills development
Parents	• As nutrition gatekeepers, parents are a significant influence on eating behaviour and could benefit from tools to support healthy eating within the recreational hockey environment (i.e., tip sheets, Public Health info booth at recreation facilities during tournaments, etc.)

Recreation Facility Food Vendors	• Vendors have an opportunity to leverage the healthy eating motivation of more elite players by:
	  ○ Offering healthy options that fit the nutrition demands of these players
	  ○ Utilizing these players to support increasing sales of healthy options to others attending recreation facilities (i.e., house league players, grandparents, and/or siblings)

APPLYING TO	IMPLICATIONS

Recreation Facility Administration	• Recreation facility administration has the opportunity to support the development of healthy eating behaviours in youth by:
	  ○ Ensuring that the food environment within facilities supports healthy choices
	  ○ Supporting league and parent efforts to guide adolescent eating behaviours
	  ○ Supporting vendor efforts to
	  ▪ leverage player influence
	  ▪ provide healthier options

Public Health	• Partner with leagues to develop tools for:
	  ○ Player nutrition guidance
	  ○ Parents to navigate the recreational food environment, recognizing the demands it places on time and resources
	• Partner with recreation facilities to support offering healthy food options that those attending are receptive to
	• Support parents development of skills necessary for navigating the demands of the recreational environment (i.e., info booths at tournaments or registration)
	• Expand messaging (i.e., advertising) to support changing food norms within recreational environments
	• Advocate for government guidelines/policy in relation to healthy eating within recreation environments

Policy Makers	• Consider step-wise policy for recreation facilities
	  ○ Recognizing social norms require time to adjust
	  ○ Allow vendors to develop heathier menu offerings (suppliers, resources, etc.)
	• Include those within the environment when defining policies
	• When introducing policy utilize messaging tools (i.e., advertising) to ensure buy-in

FUTURE DIRECTION

This research supports the merit of further research with adolescents exposed to the recreation environment in Ontario. Findings could be used to develop a survey investigating such influences of physical and social recreational hockey food environments experienced by adolescent hockey players in Ontario. To determine if results are specific to the population of study, future research should look at influences of the level of play, gender, economics, and region.

KNOWLEDGE TRANSLATION

To disseminate knowledge to an interested academic and public health audience, early results were presented at the Dietitians of Canada conference June 2016. A manuscript has been submitted to the Public Health Agency of Canada's journal, Health Promotion and Chronic Disease Prevention in Canada targeting the special issue on the food environment in Canada. An abstract has also been submitted to the Canadian Obesity Network 2017 Summit.

SC is currently the Ontario research coordinator with the Eat, Play Live Study, a Heart and Stroke Foundation of Canada funded investigation of recreation facility nutrition guidelines in four Canadian provinces. Results from this thesis will be of interest to those partners as they can inform ongoing intervention approaches as well as future directions of research in the Canadian recreation environment.

Results will also be of interest to the Ontario Society of Nutrition Professionals in Public Health (OSNPPH), including the Healthy Eating in the Recreation Setting Workgroup (HERSWG). OSNPPH members who have an interest in recreation centres are part of an advisory group for the Ontario arm of the Eat, Play Live study. These individuals may be knowledge users and disseminators of this research.

Finally, a report outlining results will be offered to all leagues with participant players as well as the Ontario Minor Hockey Association and the Ontario Hockey Federation.

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APPENDICES

Appendix A: Hockey Player Verbal Recruitment Script

Hello, my name is Susan Caswell, and I am a student at the University of Waterloo in the School of Public Health and Health Systems.

I am studying what teenagers think about the foods available to them and what influences what you think go into the food choices you make in relation to when you are practicing or playing hockey.

If you volunteer as a participant in this study, you will be asked to take pictures of things you think are representative of food that you eat, foods you are choosing from, and the locations where you are eating in relation to practicing and playing hockey. I will ask you to send these pictures to me electronically – we will decide the format individually, based on what works best for you. I will ask you to take these pictures over a few days, based on your hockey schedule. Then, I would like to talk to you for about 15 to 45 minutes about the pictures you took at a time that works for you and your family.

I will ask you to share some of the pictures as part of an exhibit of photos from all players who participate that will be displayed for you, your parents, teammates, and anyone who is interested. No one will know who took the pictures. To decide what pictures to show, I will ask you to participate in a group discussion with other players who participate. No one will know who took which pictures. *(This statement is intentionally repeated)*

I would like to assure you, this study has been reviewed and received ethical clearance through a University of Waterloo Research Ethics Committee.

The decision about participation is yours.

If you are interested in participating, please fill out an individual confidential recruitment card and take a copy of the information letter for your parents. I will get in touch with your parents, as I will need their approval for you to participate.

Thank you

Appendix B: Study Information Letter

UNIVERSITY OF WATERLOO

FACULTY OF APPLIED HEALTH SCIENCES | School of Public Health and Health Systems
519-888-4567 | fax 519-746-6776
uwaterloo.ca/public-health-and-health-systems

My name is Susan Caswell and I am a student at the University of Waterloo. I am conducting this study with Dr. Rhona Hanning of the School of Public Health and Health Systems at the University of Waterloo as part of my thesis.

Project Title:

The *REFRESH* Study
*R*ecreation *E*nvironment and *F*ood *R*esearch: *E*xperiences from *H*ockey

The study to intended to explore adolescent food behaviours in recreational environments. The goal of the research is to understand, from the perspective of adolescent hockey players, how the food environment within recreational facilities affects the food choices they make while participating in hockey related activities (practice, regular games, play-offs, tournaments).

- Rep and/or select level hockey players aged 11-15 years old will be invited to participate
- Participants will be asked to take photos related to their food experience within the recreational environment around playing and practicing hockey using their cell phone or a camera provided
    - The time period for taking the photographs will be based upon the playing and practicing schedule (covering a maximum of two weeks)
    - Guidance will be provided with regard to the types of photos and how to ensure anonymity
    - Photos will be electronically submitted to a password protected, secure location at the University of Waterloo
- After submitting all of their photos, participants will be interviewed one-on-one regarding the content of the photos
    - Interviews will take approximately 15-45 minutes.
    - Interviews will be audio recorded with the permission of participants and their parents
        - Recordings and transcripts will be kept in a secure location at the University of Waterloo
    - A second researcher will be present at all interviews
        - All researchers involved have had appropriate police background checks
    - Participants can decline to answer any questions they do not wish to answer
    - Interviews will be scheduled at a time and location convenient to the participant

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- Participants will then be invited to participate in a group discussion to choose photos to exhibit for parents and other interested parties (themselves included)
    - **Photos will only be shared and exhibited with the permission of the individual participants**
    - **Any identifying details will be removed from photographs**
    - **Photographers will be anonymous**
    - ***Participation in the group discussion is not a requirement for study participation***
- Anonymity of all participants will be assured
    - Only myself and the assistant researcher present at the interview will know who took which photographs and what was said in the interview
    - Pseudonyms will be used for interview transcriptions to ensure participants cannot be identified
    - Participants in the group discussion will know that the others present took photos, *but not who took which photos*
- Following the exhibit parents will be invited to participate in a discussion group in order to gain an understanding of parental perceptions of the food experience the photographs document
    - **Participation is voluntary**
    - All information provided is considered confidential

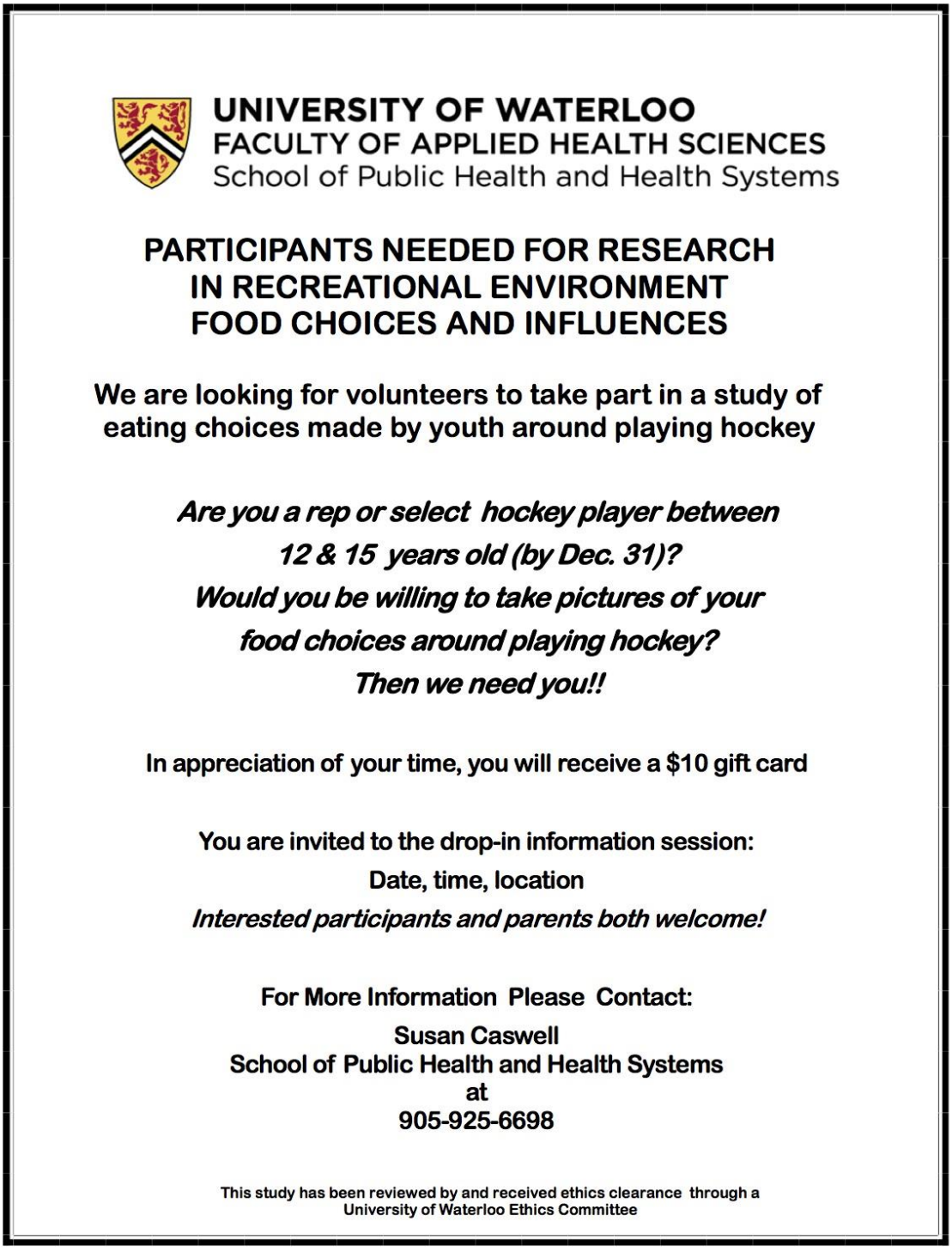
- The information collected from this study will be kept for a period of seven years in a secure location at the University of Waterloo.
- Participation in this study will not infringe on hockey participation or impact play
- There are no anticipated risks as a result of participation
- Participants can withdraw at any time without consequence
- In appreciation for their time all participants will be provided a $10 'thank you' gift card
    - If participants withdraw, they will still receive the gift card
- There is no cost to participants related to this study

If you have any questions or concerns regarding study procedures you may contact Dr. Rhona Hanning at 519-888-4567 ext. 35685 or rhanning@uwaterloo.ca or Susan Caswell at sue.caswell@uwaterloo.ca.

This project has been reviewed by, and received ethics clearance through a University of Waterloo ethics committee. Should you have any comments or concerns please contact Dr. Maureen Nummelin, Director, Office of Research Ethics, at 519-888-4567, ext 36005 or maureen.nummelin@uwaterloo.ca.

Susan Caswell, MHSc
MSc(candidate)
sue.caswell@uwaterloo.ca

Appendix C: Recruiting and Information Session Poster



UNIVERSITY OF WATERLOO
FACULTY OF APPLIED HEALTH SCIENCES
School of Public Health and Health Systems

PARTICIPANTS NEEDED FOR RESEARCH
IN RECREATIONAL ENVIRONMENT
FOOD CHOICES AND INFLUENCES

We are looking for volunteers to take part in a study of eating choices made by youth around playing hockey

Are you a rep or select hockey player between
12 & 15 years old (by Dec. 31)?
Would you be willing to take pictures of your
food choices around playing hockey?
Then we need you!!

In appreciation of your time, you will receive a $10 gift card

You are invited to the drop-in information session:
Date, time, location
Interested participants and parents both welcome!

For More Information Please Contact:
Susan Caswell
School of Public Health and Health Systems
at
905-925-6698

This study has been reviewed by and received ethics clearance through a University of Waterloo Ethics Committee

Appendix D: Field Notes Template

REFRESH Participant Field Notes

Participant:			
Hockey Level:			
SC Cell Reminder Contact Info:			
Date	**Notes**	**Photo Format**	**Number of Photos Received**

Appendix E: Photograph Guidelines

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Photo Guidelines

Photos can include (but are not limited to!)

- Food you buy
- Food you have to choose from
- Food you bring with you
- Food parent(s) buy for you
- Food someone else gives you
- Anything that influences what you choose

Do take photos of:

- Food you eat because you are going to a game or practice
- Food you eat after a game or practice
- Foods you are choosing from
- Food you eat with team members around hockey activities
- Influences on your decision about what to eat

Please don't take photos:

- Of people
- With you in them
- Showing something that can identify you (i.e. your jersey or backpack)
- Location signs or anything that could identify your location at the time of the photo

Please don't share the photos with anyone other than the researcher to protect your anonymity

- i.e. on social media sites

***Send photos to*:** **fuelyourgame@uwaterloo.ca**

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Appendix F: Hockey Player Individual Interview Guide

Before commencing the interview, verbal consent from both the participant and a parent will be obtained to audio record the interview.

Players will be verbally reminded that participation is voluntary, that they can refuse to answer any question or questions, that they are free to stop the interview at any time, and that there are no right or wrong answers.

Key Questions

Questions are repeated for individual photographs

1) Tell me about this photo

2) (Probes) Please describe why you took this picture?
   a) What do you want this picture to 'say' about the food choice(s) you made or options you had to choose from?
   b) (If applicable) What influenced the choice(s) illustrated by this photograph?

General Questions about the experience

1) What do you think about the food choices you have while in the hockey environment?

2) What do you like about those choices?

3) What do you dislike about those choices?

4) What would you like to see change?

5) What would you like to see stay the same?

Additional probes around other people (peers, parents, coaches, etc.), location, time of day, tournaments, etc. will be used as appropriate in response to participant response to the primary questions and probes.

Appendix G: Photograph Release

UNIVERSITY OF WATERLOO

FACULTY OF APPLIED HEALTH SCIENCES | School of Public Health and Health Systems
519-888-4567 | fax 519-746-6776
uwaterloo.ca/public-health-and-health-systems

Photo Release Form

Permission for Susan Caswell of the University of Waterloo School of Public Health and Health Systems to use photographs taken as part of the Recreation Environment and Food Research: Experiences from Hockey study for study related reports, exhibits, presentations and publications on condition that the photographer remain anonymous and that any identifying objects in the photographs are blurred to protect the identity of the photographer.

Participant Photographer's name, printed: _____

_____ Yes You may use ANY of the photographs I took during the REFRESH Photovoice study.

_____ Yes You may use SOME of the photographs I took during the REFRESH Photovoice study.

(Please enter the code provided for each photo that you do NOT want to be used below.)

_____ No You may not use any of the photographs I took during the REFRESH Photovoice study.

Participant Signature: _____

Date (dd/mm/year): _____

Signature of the Parent or Guardian: _____

Name of Parent or Guardian (please print): _____

Date (dd/mm/year): _____

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Appendix H: Adult Focus Group Script

Before commencing the interview, verbal consent will be obtained to audio record the interview.

Participants will be verbally reminded that participation is voluntary, that they can refuse to answer any question or questions, that they are free to stop the interview at any time, and that there are no right or wrong answers.

Parent Focus Group: Key Question Guide

Thank you for your assistance with this project and willingness to participate in the group discussion of your perspectives, as parents, of the recreation food environment as represented in the photographs taken by young hockey players. The hockey players were asked to take photographs of images that they thought were representative of the food they ate, foods they were choosing from, and locations where they were eating when practicing and playing hockey.

1) Was the content of the photographs what you expected?
   a) If yes, why?
   b) If no, why not?

2) What is your opinion of the content of the photographs?

3) How do the photographs compare with your experience of the recreational hockey environment?

4) What do think influenced the choices illustrated by the photographs?

5) What is your opinion of the recreational hockey food environment as illustrated by the hockey players?

6) How would you describe the nutritional content of the choices illustrated in the photographs?

7) How well do you think the photographs represent the food choices available to hockey players in the recreational hockey environment? What changes would you like to see? What barriers do you face regarding food as the parent of a rep-level hockey player?

8) Does the players experience with the recreation hockey environment parallel your own? (probe: what do you think of the choices available? What factors influence choices? What choices would you like to see?)

Appendix I: Participant Thank You Letter

UNIVERSITY OF WATERLOO

FACULTY OF APPLIED HEALTH SCIENCES | School of Public Health and Health Systems
519-888-4567 | fax 519-746-6776
uwaterloo.ca/public-health-and-health-systems

Date

Dear *(Insert Name of Participant)*

I would like to thank you for your participation in this study entitled REFRESH *Recreation Environment & Food Research: Experiences from Hockey*

As a reminder the study was intended to better understand teenage hockey players food behaviours in the recreational hockey environment. The data collected from the photos, interviews and group discussions will help us better understand what influences adolescents to make the food choices they do in the recreational hockey environment.

Please remember that any data pertaining to you as an individual participant will be kept confidential. Once all of the data has been analyzed for this project, I plan on sharing this information with the research community through conferences and journal articles. If you are interested in receiving more information regarding the results please provide me with your email address and I will send you the information when the study is complete. In the meantime if you have any questions about the study, please do not hesitate to contact me by email. You are also welcome to contact Dr. Rhona Hanning the principal investigator of this project, 519-888-4567 ext. 35685 or rhanning@uwaterloo.ca.

As with all University of Waterloo projects involving human participants, this project was reviewed by, and received ethics clearance through a University of Waterloo research ethics committee. If you have any comments or concerns resulting from your participation, please contact the Dr. Maureen Nummelin, Director, Office of Research Ethics, at 519-888-4567, ext 36005 or maureen.nummelin@uwaterloo.ca.

Thank You,

Susan Caswell
University of Waterloo
School of Public Health and Health Systems
sue.caswell@uwaterloo.ca

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Appendix J: Receipt of Remuneration Acknowledgement

University of Waterloo
Research Participant's Acknowledgment of
Receipt of Remuneration
and
Self-Declared Income

Section A: To be completed by Principal Investigator or designate

Principal/Faculty Investigator's Name: Dr. Rhona Hanning

Student Investigator's Name: Susan Caswell

Department: School of Public Health and Health Systems

Study Title: REFRESH
Recreation Environment and Food Research: Experiences from Hockey

---

Section B: To be completed by research participant

In appreciation of my involvement as a research participant in the above study, I acknowledge that I have received $10 gift card from the University of Waterloo.

I further acknowledge that:

- this amount received from the University of Waterloo is taxable;
- that it is my responsibility to report the amount received for income tax purposes; and
- the University of Waterloo will not issue a tax receipt for the amount received.

Participant's Name: _____

Participant's Signature: _____

Date: _____

Witness' Name: _____

Witness' Signature: _____

Date: _____

Form issued: December 20, 2011

Appendix K: Hockey Player Consent

UNIVERSITY OF WATERLOO

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uwaterloo.ca/public-health-and-health-systems

Dear ***(Participant's Name)***:

Your parents have allowed me to talk to you about a project that I am working on through the University of Waterloo.

Who am I?
My name is Susan Caswell and I am a student at the University of Waterloo in the School of Public Health and Health Systems.

What am I doing?
I am conducting a study to understand how the foods that are available to young hockey players, for example, in recreation centres, affect the food choices players make while participating in hockey.

Why am I meeting with you?
I want to understand what you think about the foods available to you in relation to practicing and playing hockey and how you think they influence the foods you chose to eat. I'd also like to learn what you would like to change in the future. I am going to spend a few minutes telling you about my project, and then I am going to ask you if you are interested in taking part in the project.

What will happen to you if you take part in the study?
If you decide to take part in this study there are some different things I will ask you to do. First, I will ask you to take photographs with your cell phones of images that you think are representative of food that you eat, foods you are choosing from, and locations where you are eating when you are practicing and playing hockey. I can provide a research camera for the period of the study if you would prefer. I'll ask you to send the photos to me electronically to a secure location at the University of Waterloo. We will decide individually whether you text them or email them. Then, I would like to talk to you for about 15 to 45 minutes after one of your practices or home games about the pictures that you have taken. I will ask you if I can audio record our conversation so that I can listen and not take notes while we talk. There are no right or wrong answers to any questions I ask; it is what you think that matters. I will also ask which of the pictures it is OK to share, without naming you, in an exhibit you, parents, and others who may be interested.

I will be putting together an exhibit of some of the photographs for parents and others who may be interested. So, I will ask you to participate in a group discussion with some other players to decide which pictures will be included in the exhibition. All of the photographs will be anonymous and if there are any that you do not want shown to the rest of the group or in the exhibit they will not be included.

Could there be any problems for you if you take part?
I hope you will enjoy taking the photographs, talking to me, discussing the photographs, and seeing the exhibit. A few people get upset or uncomfortable when talking about their lives, and if you ever want to stop, I stop.

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Will you have to answer all questions and do everything you are asked to do?
If I ask you questions that you do not want to answer, then tell me you do not want to answer those questions. Also, if you change your mind about including any pictures or anything you've said, you can just tell me and I will take this out.

Who will know that you are in the study?
The things you say and any information I write about you will not have your name on it. I will change your name, so no one, including your parents and teammates, will know they are your answers or how you feel about some of the things that we will talk about.

The only time I might have to break this promise is if I think you or someone else might be at risk of being hurt. If so, I will talk to you first about the best thing to do.

Do you have to be in the study?
You do not have to be in the study. No one will get angry or upset with you if you don't want to do this. Just tell us if you don't want to be in the study. And remember, if you decide to be in the study but later you change your mind, then you can tell me you do not want to be in the study anymore.

Do you have any questions?
You can ask questions at any time. You can ask now or you can ask later. You can talk to me or you can talk to someone else at any time during the study. Here is the telephone number and email address that you can reach me at: ***(insert university phone number)*** or ***sue.caswell@uwaterloo.ca***

In appreciation of your time and assistance with this project you will receive a $10 *[insert retailer]* gift card.

Thanks for all your help,
Susan Caswell

Youth Assent Form

Youth's name, printed: _____

Do you want to participate in this study?

_____ Yes _____ No

Youth Signature: _____

Date (dd/mm/year): _____

Signature of the Researcher: _____

Date (dd/mm/year): _____

Appendix L: Parental Consent for Hockey Player Participation

UNIVERSITY OF WATERLOO

FACULTY OF APPLIED HEALTH SCIENCES | School of Public Health and Health Systems
519-888-4567 | fax 519-746-6776
uwaterloo.ca/public-health-and-health-systems

Project Title:

The *REFRESH* Study

*R*ecreation *E*nvironment and *F*ood *R*esearch: *E*xperiences from *H*ockey

I have read the attached information letter concerning the research project entitled *The Influences of Recreational Food Environment on the Food Choices and Food Requests of Adolescent Hockey Players: Perspectives Revealed Through the PhotoVoice Method* conducted by Susan Caswell and Dr. Rhona Hanning of the School of Public Health and Health Systems at the University of Waterloo.

I acknowledge that all information gathered on this project will be used for research purposes only and will be considered confidential. I am aware that my permission may be withdrawn at any time without any consequences to myself, my child or their hockey league by advising the researchers.

I understand that this project has been reviewed by, and received ethics clearance through a University of Waterloo ethics committee, and that I may contact the Director, Office of Research Ethics at 519-888-4567ext. 36005 if I have any comments or concerns about my son's or daughter's involvement in this study.

Child's Name: _____

Child's Birth Date (dd/mm/year): _____

Gender of Child: ___ Male ___ Female

Permission Decision: ____ Yes – I would like my child to participate in this study

____ No – I would not like my child to participate in this study

Signature of Parent or Guardian: _____

Date (dd/mm/year): _____

200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1

Appendix M: Adult Focus Group Participant Consent

UNIVERSITY OF WATERLOO

FACULTY OF APPLIED HEALTH SCIENCES | School of Public Health and Health Systems
519-888-4567 | fax 519-746-6776
uwaterloo.ca/public-health-and-health-systems

Date

Project Title: The *REFRESH* Study
*R*ecreation *E*nvironment and *F*ood *R*esearch: *E*xperiences from *H*ockey

You are invited to participate in a focus group to share your perspectives, as a parent or guardian of a rep-level hockey player, on the recreation food environment. You will have the opportunity to view and respond to an exhibit of anonymous photos taken by young hockey players on images they choose to represent their relationships with the food environment connected with hockey. The parent focus group will be facilitated by Susan Caswell, graduate student, School of Public Health and Health Systems, University of Waterloo.

Participation in this session is voluntary and involves approximately 1 hour of discussion. There are no known or anticipated risks to your participation in this session. You may decline answering any questions you feel you do not wish to answer. All information you provide will be considered confidential and grouped with responses from other participants. Your name will not be identified with the input you give during this session. The information collected from the focus group will be kept for a period of seven years in a secure location at the University of Waterloo.

Given the group format of this session we will ask you to keep in confidence information that identifies or could potentially identify a participant and/or his/her comments. If you have any questions about participation in this session, please feel free to discuss these with the facilitator.

I would like to assure you that this study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee. The final decision about participation is your own. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin, Director, Office of Research Ethics, at 519-888-4567, ext 36005 or maureen.nummelin@uwaterloo.ca.

Thank you for your assistance with this project. In appreciation of your time we will provide you with a $10 gift card.

Susan Caswell
MSc (candidate)
sue.caswell@uwaterloo.ca

200 UNIVERSITY AVENUE WEST, WATERLOO, ON, CANADA N2L 3G1