ENHANCING YOUTH ACCESS TO COMMUNITY RECREATION FACILITIES: AN EFFECTIVENESS EVALUATION OF THE GRADE 10 COMMUNITY PHYSICAL ACTIVITY PASS

by

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A thesis submitted to the School of Kinesiology and Health Studies

In conformity with the requirements for

the degree of Masters of Science

Queen’s University

Kingston, Ontario, Canada

(September, 2010)

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Abstract

Given the high prevalence of physical inactivity, effective strategies are urgently needed to increase physical activity levels among youth, especially those most at risk for inactivity including adolescent girls, older adolescents, and youth from low socioeconomic status households. A clear understanding of the factors associated with physical activity among youth is needed to design effective interventions. Physical activity is a complex behaviour that is influenced by intrapersonal, interpersonal, and environmental factors. Most recently, emphasis has been placed on the environmental correlates of youth physical activity. One consistent finding is that access to recreation facilities and opportunities to be active are positively associated with youths’ physical activity participation.

Environmental interventions, which are often community-based, hold particular promise of instilling population-wide change. Yet, to date, little information is available about the effectiveness of environmental interventions to enhance youth physical activity in community settings.

The manuscript presented in Chapter 3 of this thesis addresses these gaps in knowledge by providing evidence about a community-based initiative designed to increase access to recreation facilities by eliminating facility user-fees for youth. More specifically, recreation facility use among adolescents (n=1261; \( M_{age} = 14.97 \pm 0.39; 46.3\% \) girls) was objectively measured and the factors associated with the use of recreation facilities were examined. A total of 200 students accessed at least one facility. Results revealed that the likelihood of the best multilevel model examining pass use was 13 times larger than a model that included only individual-level predictors \( (p<0.01) \). Pass users were more likely to: attend schools that were only a short distance away from facilities \( (OR=0.90, p<0.01) \), be active \( (OR=1.69, p<0.05) \), rate
their health as fair (OR=2.32, \( p<0.05 \)), report homework as a barrier (OR=1.84, \( p<0.01 \)) and to have used facilities previously (OR=2.01, \( p<0.05 \)). Overall, results suggest that providing free access may be insufficient to enable adolescents to use recreation facilities. Furthermore, an ecological model should be used when designing interventions that aim to increase adolescents’ use of facilities. The implications of this study for research and practice will be outlined.

Although further research is greatly needed to enhance our understanding of youths’ behaviours in order to develop effective interventions, the challenges associated with conducting research involving youth can deter researchers from investigating this population. In particular, several researchers have highlighted the methodological and ethical concerns of school-based research. These issues and their implications will be discussed in Chapter 4 of this thesis. Lastly, recommendations to help reduce the challenges of school-based research will be presented.
Co-Authorship

This thesis presents the original work of Carolyn M. Hureau in collaboration with her advisor, Dr. Lucie Lévesque.
Acknowledgements

First and foremost, I would like to acknowledge my supervisor, Dr. Lucie Levesque, for her mentorship, guidance, and support since I have been at Queen’s. Lucie, you have been a great advisor and friend. I admire the way you lead by example and show that physical activity should be a priority in our lives. I will always remember our running meetings together. Your ability to network and be resourceful is amazing! I am very grateful that you have taught me these skills. Thank you for providing such wonderful learning opportunities and for encouraging me to present my research at numerous conferences over the years. Of course, presenting at the ISBNPA Conference in Portugal was definitely a highlight.

I would also like to acknowledge the Canadian Institutes for Health Research for their generous financial contribution to this project.

My sincere thanks go to Steve who taught me how to perform multilevel statistical analyses. Thank you for your patience, support, and encouragement along the way. Your ability to explain such complex concepts in a way that is easy to understand is admirable.

I, of course, must acknowledge my fabulous research assistants Maddy, Jordanne, Jocelyne, and Arielle whose hours of hard work were a lifesaver for me. I am very thankful for your dedication to the project and your friendship.

I am also grateful to have been surrounded by such great friends and lab-mates. Thank you for always supporting me, making me laugh, and for all of the good times we shared. I will definitely miss the office jokes and shenanigans.

I would also like to thank my parents, Virginia and Paul, who have given me unwavering support in my academic journey. Thank you for your love and for always encouraging me to try
my best. You have taught me that life is a journey and that each experience in it will bring me wisdom.

I would like to extend my gratitude to my brother, Jonathan, who has given me an excellent academic example to follow. Your determination and perseverance in all situations has been inspirational to me. Thank you for being such a wonderful friend.

Finally, I would like to thank my Grandpa, Jack Carter who drove me to Queen’s for my initial interview with Lucie. He showed me in so many ways that he believed in me and always assured me that I could do anything I set my mind to. His positive attitude towards life has truly been an inspiration for me. His positive energy and good health were true examples of the benefits of physical activity as he remained active until he was in his 91st year.
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Chapter 1

General Introduction

The many benefits of engaging in regular physical activity during childhood and adolescence include healthy weight regulation (Kimm et al., 2005), proper growth of bones and tissues (Biddle, Gorely, & Stensel, 2004), and a reduced risk of several chronic diseases (Hurtig-Wennlöf, Ruiz, Harro, & Sjöström, 2007; Warburton, Nicol, & Bredin, 2006). Youth physical activity has also been positively correlated with good mental health (Biddle et al., 2004) and academic achievement (Taras, 2005; Trudeau & Shephard, 2008). Janssen and colleagues (2005) have suggested that beginning physical activity at a young age will yield the greatest overall health gains.

Physical inactivity among youth is a major public health concern (Motl, Dishman, Saunders, Dowda, & Pate, 2007) as the majority of youth are not active enough to obtain the health benefits associated with regular physical activity (Craig, Cameron, Russell, & Beaulieu, 2001). For instance, the CAN PLAY study (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2009) found astonishing levels of objectively measured physical inactivity, reporting that 93% of Canadian youth (aged 15-19) are not meeting Canadian physical activity guidelines in order to be healthy and to develop a lifelong active lifestyle. Some youth are at greater risk for inactivity including girls, older adolescents, and children from low income families (CFLRI, 2009; Craig et al., 2001; Sallis, Prochaska, & Taylor, 2000).

In order to develop effective physical activity interventions for youth, the factors that influence their physical activity behaviour must be understood. It is widely recognized that physical activity is a complex behaviour that is influenced by a multitude of intrapersonal, social,
and environmental factors (Ferreira et al., 2006; Pan et al., 2009; Sallis et al., 2000; Spence & Lee, 2003). Environmental influences have gained attention from researchers in the field as they hold particular promise of instilling population-wide change. Many researchers have emphasized the importance of creating physical activity supportive environments that increase physical activity opportunities and encourage people to be active (Sallis, Cervero, et al., 2006; Sallis & Glanz, 2006; Sallis, Bauman, & Pratt, 1998). Creating these supportive environments may be especially important during adolescence as youth gain autonomy in making their decisions and develop physical activity behaviour patterns that may track into adulthood (Telama, 2009).

In the quest to create these supportive environments, there has been a surge of research examining the relationship between physical activity and the availability and accessibility of recreation opportunities. Availability refers to the presence of resources in a neighbourhood (e.g., are there recreation facilities available in the area?), whereas accessibility refers to one’s capacity to make use of resources that are available to them (e.g., can a person afford the user-fees required to use the local pool?).

Many studies have found that youth physical activity levels are positively correlated with availability of recreation facilities and opportunities to be active (Dowda, Dishman, Porter, Saunders, & Pate, 2009; Gordon-Larsen, Nelson, Page, & Popkin, 2006; Sallis & Glanz, 2006; Sallis et al., 2000). Despite this, more than half of Canadian children and youth reported that they do not use recreation facilities (CFLRI, 2008). Cost and lack of access to recreation facilities have been consistently reported by researchers and youth as major barriers to their physical activity participation (Allison et al., 2005; CFLRI, 2005; Dwyer, Allison, Goldenberg, et al., 2006; Humbert et al., 2006; Rees et al., 2006). Moreover, these access barriers are more commonly reported by youth from low socioeconomic (SES) households, possibly contributing to the
existing differences in physical activity levels among youth from high versus low SES neighbourhoods (Humbert et al., 2006).

Environmental interventions hold particular promise for increasing physical activity among youth as they have the potential to reach all members of a given population, including those most at-risk for inactivity (Lavizzo-Mourey & McGinnis, 2003; Sallis, Cervero, et al., 2006). Often these interventions are most effective and sustainable when multiple sectors of the community are involved (Pate et al., 2000). Collaboration between communities and schools is considered especially important for promoting physical activity among youth (Pate et al., 2000).

To date, few studies have evaluated the effectiveness of environmental interventions to enhance youth physical activity in community settings (Salmon, Booth, Phongsavan, Murphy, & Timperio, 2007). In addition, very little information is available about the factors associated with adolescents’ use of recreation facilities. Lastly, the majority of studies investigating recreation facility use have relied on self-reported measures; very few studies have objectively measured adolescents’ use of these facilities. Thus, the purpose of the current study was to address these gaps in knowledge by providing objective evidence about the effectiveness of a community-based initiative to increase youth access to recreation facilities for physical activity.

The manuscript in Chapter 3 reports on an environmental intervention developed by Kingston Gets Active, a partnership between municipal, education, health, social, and recreation sectors. The overall aim of the “The Grade 10 Community Physical Activity Pass” program was to increase physical activity levels among grade 10 students by eliminating cost as a barrier to recreation facility use. Grade 10 students were chosen as the intended population because for the first time in their academic career, physical education is no longer a compulsory credit. As part of this initiative, all grade 10 students in Kingston, ON, received a free Community Physical Activity Pass granting them free access to all of the local pools, arenas, and the YMCA for 10
months. One unique aspect of the Grade 10 Community Physical Activity Pass program was that it was universal; all grade 10 students in the region received a pass. In addition, unlike subsidized recreation services or programs that require individuals to prove their need (e.g., provide income statements) the pass program avoided any stigmatization since it did not ask for any such information.

The current study also contributes evidence about the impact of mode of consent on research participation. Chapter 4 of this thesis will review current policies for conducting research involving children and youth. Additionally, the challenges associated with school-based research will be discussed in light of implications for potentially excluding youth from research initiatives that might benefit them.
Chapter 2

Literature Review

2.1 Importance of Physical Activity

2.1.1 Healthy Body Weight

Currently, Canadian youth are among the most obese in the developed world (Janssen et al., 2005). The prevalence of obesity in Canadian children and youth has tripled over the past 25 years, such that one in every four children (aged 2-17 years) is overweight or obese (Shields, 2005; Shields & Tjepkema, 2006). The prevalence of overweight and obesity among older adolescents is even greater. Shields (2005) reported that 29.2% of youth aged 12-17 years are overweight or obese. Furthermore, research has shown that obesity rates are continuing to rise (Janssen, 2008; Active Healthy Kids Canada, 2009).

Paediatric obesity is associated with several immediate and long-term health consequences, including numerous risk factors for cardiovascular disease. Immediate consequences include orthopedic abnormalities, gastroenterological and neurologic problems, asthma, and sleep apnea (Jolliffe & Janssen, 2006). There are also short-term psychological consequences associated with overweight and obesity in youth; overweight and obese children are often teased excessively and discriminated against by their peers (Janssen, Craig, Boyce, & Pickett, 2004; Storch et al., 2007; Wardle & Cooke, 2005). This can lead to more complex psychological problems such as depression and anxiety disorders (Janssen, Craig, et al., 2004; Motl et al., 2007; Storch et al., 2007; Wardle & Cooke, 2005). The long-term outcomes and risk factors of youth obesity are many, including: hypertension, high cholesterol, type 2 diabetes, early development of atherosclerotic lesions, and a substantial risk of obesity in adulthood.
Until recently, these chronic conditions were considered “adult diseases”, but they are now affecting children. Thus, it is evident that there are various physical, mental, and social consequences of youth obesity. These consequences will continue to increase if children and adolescents are not targeted through health promotion interventions (Jessup & Harrell, 2005).

Physical activity plays an important role in the prevention and management of overweight and obesity. In fact, several researchers have suggested that physical activity plays a more prominent role than nutrition in attaining and maintaining a healthy weight (Janssen et al., 2005; Janssen, Katzmarzyk, Boyce, King, & Pickett, 2004). Many researchers have identified an inverse relationship between physical activity and obesity (Janssen et al., 2005; Tremblay & Willms, 2003). For instance, the European Youth Heart Study (Ortega, Ruiz, & Sjöström, 2007) found that youth with low levels of vigorous physical activity were four times more likely to be overweight than their active counterparts. Given the astonishing rates of overweight and obesity among Canadian youth, effective physical activity promotion strategies are urgently needed to curb the incidence of them.

2.1.2 Physical Health

Physical activity not only aids in the prevention and treatment of obesity, but it enhances a person’s health profile regardless of body weight. A review article in the Canadian Medical Association Journal confirmed that there is now indisputable evidence that physical activity is a main factor in preventing and reducing chronic disease and premature deaths in all age groups (Warburton et al., 2006). For example, regular physical activity during adolescence reduces one’s risk of cardiovascular disease (CVD), metabolic disorders, cancer, osteoporosis, diabetes, and hypertension (Hurtig-Wennlöf et al., 2007; Rizzo, Ruiz, Hurtig-Wennlöf, Ortega, &
Sjöström, 2007). Physical activity is also important for the proper growth and development of bones and tissues during childhood and adolescence, a critical period for physical growth and maturation. For this reason, physical activity during youth may be a means of preventing osteoporosis later in life (Biddle et al., 2004).

Many of the risks associated with chronic conditions begin to develop as early as childhood and continue to increase with age (Warburton et al., 2006). For instance, although CVD manifests itself later in life, the development of CVD risk factors, including elevated cholesterol, insulin resistance, high blood pressure, and body fat, begins in childhood and tracks into adulthood (McGill et al., 2000; Ortega, Ruiz, Castillo, & Sjöström, 2008). However, physical activity during childhood and adolescence can help to diminish or delay the onset of CVD risk factors. Strong et al. (2005) confirmed this by reporting that children with higher levels of physical activity are less likely to display risk factors for CVD.

2.1.3 Psychosocial Health

Physical activity is positively correlated with psychological well-being and social health (Biddle et al., 2004). Research suggests that physical activity may serve as a protective factor against mental health problems (e.g., depression and anxiety) in youth. For example, lower rates of mental health problems are observed among active adolescents compared to their inactive peers. Furthermore, physical activity also improves self-esteem, mood, energy levels, concentration, memory, and classroom behaviour (Ortega et al., 2008; Trudeau & Shephard, 2008). Recently, researchers have also reported a positive association between physical activity and higher levels of cognitive functioning resulting in enhanced academic achievement (Field, Diego, & Saunders, 2001; Trudeau & Shephard, 2008).
2.2 Prevalence of Physical Activity among Youth

The immediate and lifelong health benefits to engaging in physical activity during adolescence are unequivocal (Shields, 2005). Despite this, the majority of Canadian youth are not active enough to obtain these health benefits (CFLRI, 2009; Craig et al., 2001). In the 2010 Active Healthy Kids Canada Report Card, children and adolescents received a failing “F grade” for physical activity levels (Active Healthy Kids Canada, 2010). The CAN PLAY study (CFLRI, 2009) of objectively measured physical activity reported that 93% of Canadian youth aged 15-19 years are not meeting the physical activity requirements in order to be healthy and to develop a lifelong active lifestyle. In addition, the Health Behaviour in School-Aged Children (HBSC) Survey (Janssen, 2008) found that almost half of the students in grades 6 to 10 are physically inactive.

It is important to note that some individuals are at a greater risk for physical inactivity than others. Specifically, girls, older adolescents, and children from low income and low education households are more at risk for inactivity and sedentary behaviour (CFLRI, 2009; Craig et al., 2001; Sallis et al., 2000). The dramatic physical activity decrease that occurs between childhood and adolescence has been described as a “robust epidemiological phenomenon” (Hills, King, & Armstrong, 2007). Sallis and colleagues (2000) found a negative association between age and physical activity in 70% of the studies reviewed in a meta-analysis of the physical activity correlates in adolescents. Furthermore, Campagna et al. (2007) found that there is a pronounced typical secular decline in physical activity levels among Canadian youth as they progress from grade 3 to grade 11.

If this trend of physical inactivity and sedentary lifestyles persists, the children of the current generation will not only live unhealthier lives but they will also live shorter lives
Evidently, there is a dire need for the development and implementation of physical activity interventions that target adolescents with the lowest physical activity levels.

2.3 Guidelines for Physical Activity in Youth

Until recently, Canada’s Physical Activity Guidelines for children and youth, developed in 2002, were the benchmark for physical activity recommendations. For youth aged 10-14 years, the guidelines recommended a gradual increase in their physical activity to 90 minutes per day while also decreasing sedentary activities (i.e. television, computer games) by 90 minutes per day (Health Canada, 2002). There were, however, no physical activity guidelines specified for older adolescents (aged 15-19 years).

In the spring of 2010, a new set of guidelines was released in Canada (Canadian Society for Exercise Physiology [CSEP] & ParticipACTION, 2010). Physical activity guidelines for older adolescents were included; these recommend an “accumulation of at least 60 minutes, and up to several hours, of moderate physical activity (such as brisk walking, skating or bike riding) each day” (CSEP & ParticipACTION, 2010, p. 1). These new physical activity guidelines for adolescents are synonymous with those provided by the Centers for Disease Control and Prevention (CDC) in the United States (2008) and the global physical activity recommendations of the World Health Organization (WHO, 2010).

2.4 Correlates of Physical Activity in Youth

In order to develop effective interventions that promote physical activity among youth, the factors that influence their physical activity behaviour must be understood. Youth physical activity correlates are often categorized into three groups: 1) Intrapersonal (e.g., demographic, psychological, and behavioural); 2) Interpersonal (e.g., social relationships); and 3)
Environmental (e.g., physical or built environment). The following section will discuss these correlates in turn.

2.4.1 Intrapersonal

Gender and sex are two demographic correlates that have strong and consistent associations with physical activity behaviour among youth. Research shows that males have higher levels of physical activity compared to their female counterparts (Butcher, Sallis, Mayer, & Woodruff, 2008; Sallis et al., 2000; Van der Horst, Paw, Twisk, & Van Mechelen, 2007). One study examining the gender differences in complying with recommended physical activity levels found that 57% of males and only 40% of females aged 14-17 years met the guidelines (Butcher et al., 2008).

Physical activity decreases with age, especially from childhood to adolescence (CFLRI, 2009; CFLRI, 2008; Sallis et al., 2000). Results from the CAN PLAY (CFLRI, 2009) study showed that only 7% of youth aged 15-19 years met Canada’s Physical Activity Guidelines compared to 15% and 12% of children aged 5-10 years and 11-14 years, respectively. Thus, less than half the number of 15-19 year olds met the physical activity guidelines compared to 5-10 year olds (CFLRI, 2009; CFLRI, 2008).

Another intrapersonal correlate of youth physical activity is SES. Two common indicators of SES are family income and parental education level. Due to the costs associated with participation in many sports and other physical activity endeavours, students from lower income families have fewer opportunities to participate (Gordon-Larsen, McMurray, & Popkin, 2000; Janssen, Boyce, Simpson, & Pickett, 2006). This lack of physical activity opportunities results in lower levels of physical activity in this sub-group. Indeed, there is consistent evidence that youth from low income families are less active than their more affluent peers (Butcher et al.,
A similar relationship exists between parental education level and youth physical activity, such that adolescents whose parents have higher levels of education (i.e., university) exhibit higher levels of physical activity (CFLRI, 2009; Van der Horst et al., 2007). Gordon-Larsen and colleagues (2000) reported the same positive relationship for maternal education.

The relationship between psychological factors and physical activity among youth has been studied extensively. Self-efficacy, one of the most highly investigated psychological correlates, refers to one’s confidence in his/her ability to be physically active. Two recent systematic reviews of youth physical activity correlates found a positive association between self-efficacy and physical activity levels, indicating that youth with higher levels of self-efficacy are more active (Van der Horst et al., 2007; Whitt-Glover et al., 2009). Other psychological factors that have shown a positive association with youth physical activity include: intention to be physically active (Sallis et al., 2000), attitude towards physical activity (Van der Horst et al., 2007), and physical activity enjoyment (Whitt-Glover et al., 2009). In several qualitative studies, adolescents stated that they were more likely to participate when they viewed activities as fun (Humbert et al., 2008; Ketteridge & Boshoff, 2008) and enjoyable (Ketteridge & Boshoff, 2008; Rees et al., 2006). This provides further support for the aforementioned psychological correlates.

Behavioural correlates that are positively associated with youth physical activity include previous physical activity (Sallis et al., 2000), as well as participation in organized physical activity and sport (CFLRI, 2009; CFLRI, 2008). More specifically, results from the CAN PLAY study (CFLRI, 2008) showed that youth who participated in organized physical activity or sport accumulated almost 1500 more steps per day than those who did not partake. Similarly, Van der Horst and colleagues (2007) reported that participation in physical education classes and team sports at school were associated with higher levels of physical activity. Lastly, students who
are sedentary after school and/or on the weekend have lower levels of physical activity (Sallis et al., 2000).

### 2.4.2 Interpersonal

Among several interpersonal factors that influence physical activity, this review will discuss social support as it is an important and well-established correlate of youth physical activity (Duncan, Duncan, & Strycker, 2005; Kurc & Leatherdale, 2009). According to Duncan and colleagues (2005), there are four main types of support including: informational (e.g., discussing the health benefits of physical activity), emotional (e.g., providing encouragement), provision of resources (e.g., registration fees, transportation, equipment, etc.), and/or modelling of the behaviour. Support can be provided by several different individuals. For example, youth may receive support from parents, significant others, friends, teachers, and coaches. Research has shown that youth physical activity levels are positively correlated with the amount of parental support perceived, such that adolescents with lower levels of support are less active than their peers who have higher levels of parental support (Kurc & Leatherdale, 2009; Sallis et al., 2000; Whitt-Glover et al., 2009). A positive association has also been found between support provided by friends and physical activity levels among youth (Duncan et al., 2005; Van der Horst et al., 2007). In fact, Duncan and colleagues (2005) reported that for youth “the source of support most highly related to physical activity was friends” (p. 8).

### 2.4.3 Environmental Correlates of Physical Activity

Recently, environmental correlates of physical activity have gained attention from researchers in the field. Many experts have suggested that the current level of physical inactivity among youth has been largely influenced by an environment that discourages physical activity and encourages sedentary behaviours (French, Story, & Jeffery, 2001). In order to create an
environment that is more supportive of physical activity, the environmental factors that influence youth physical activity behaviour must be understood. Examples of environmental influences that are negatively associated with youth physical activity include: 1) advances in technology (i.e., television, video games, and computers); 2) an increase in infrastructures designed for automobiles; and, 3) a decrease in recreation space including open spaces, parks, and trails (French et al., 2001).

Several environmental factors that have a positive correlation with youth physical activity have also been identified. In their review, Sallis and colleagues (2000) found that access to programs, facilities, and opportunities to be active were positively associated with higher levels of physical activity. This review by Sallis and colleagues (2000) was updated and expanded in a more recent paper by Davison and Lawson (2006) that systematically reviewed 33 studies that examined the influences of the physical or built environment on youth physical activity. Davison and Lawson (2006) defined the physical environment as “objective and perceived characteristics of the physical context in which children spend their time (e.g., home, neighbourhood, school) including aspects of urban design (e.g., presence and structure of sidewalks), traffic density and speed, distance to and design of venues for physical activity (e.g., playgrounds, parks and schools yards), crime, safety and weather conditions”. The main findings revealed that adolescent physical activity was positively associated with the availability of recreation facilities (e.g., parks, pools, gyms, etc.), perceived aesthetics of the environment, and the availability of sports equipment and exercise facilities at school. An inverse relationship between neighbourhood crime rates and adolescent physical activity was also identified in this study (Davison & Lawson, 2006). Thus, lower levels of physical activity were found in areas with a higher incidence of crime.
Physical activity levels among Canadian adolescents are also influenced by weather conditions and seasons (Bélanger, Gray-Donald, O’Loughlin, Paradis, & Hanley, 2009). More specifically, research shows that adolescents engage in smaller amounts of physical activity on days when it rains or snows. Not only are fluctuations in daily weather conditions associated with physical activity, but youths’ activity levels are also influenced by the season. Not surprisingly, adolescents in Canada have higher levels of physical activity participation during the warmer months and much lower levels during the winter months (Bélanger et al., 2009).

2.4.3.1 Availability and Accessibility of Recreation Facilities

Two environmental correlates that have received a great deal of attention recently are the availability and accessibility of physical activity resources. Before discussing accessibility and availability of recreation facilities as correlates of youth physical activity, it is important to differentiate between these two terms. As defined by Estabrooks, Lee, and Gyurcsik (2003), availability refers to the presence of resources in a neighbourhood (e.g., are there pools, arenas, and other recreation facilities available in the area), whereas accessibility refers to one’s capacity to make use of resources that are available to them (e.g., can an individual afford the user-fees required to use the local pool).

In the systematic review by Davison and Lawson (2006), four out of five studies examining the availability of recreation facilities found a positive correlation between the number of facilities in a neighbourhood and physical activity levels among youth. The majority of these studies assessed adolescents’ perceptions of the availability of facilities in their community using a self-report questionnaire. Only one study objectively measured the availability of recreation facilities using geographic information systems (GIS; Norman et al., 2006). Results from this study showed that the availability of facilities was related to higher levels of physical activity...
among adolescent girls only (Norman et al., 2006). As noted by Davison and Lawson (2006), the one study in the review that found no association had a significantly smaller sample size (n=79) compared to those that found a positive association (n=850 or more).

Several other studies have linked higher levels of physical activity with the availability of recreation facilities (Dowda et al., 2009; Gordon-Larsen et al., 2006; Pate et al., 2008; Sallis & Glanz, 2006; Scott, Evenson, Cohen, & Cox, 2007; Tucker et al., 2009; Whitt-Glover et al., 2009). More specifically, Tucker and colleagues (2009) found that the presence of two or more facilities within a 1.6km radius of schools was associated with an increase in physical activity levels among youth who resided within the school neighbourhood. Another study found similar results reporting that youth who lived in a neighbourhood with just one facility were more likely to obtain five or more bouts of moderate-to-vigorous physical activity (MVPA) per week (Gordon-Larsen et al., 2006). Furthermore, the odds of engaging in five or more bouts of MVPA increased as the number of neighbourhood recreation facilities increased (Gordon-Larsen et al., 2006).

The availability of recreation facilities in a neighbourhood also depends in part on the SES of its residents. Several studies have shown that a greater number of recreation facilities exists in higher SES neighbourhoods (Estabrooks et al., 2003; Gordon-Larsen et al., 2006; Powell, Chaloupka, Slater, Johnston, & O’Malley, 2007). Researchers have surmised that the lack of recreation facilities in low SES neighbourhoods may help explain the disparities evident in physical activity participation among adolescents from high SES versus low SES households (Gordon-Larsen et al., 2006; Powell et al., 2007).

Accessibility is another important determinant of recreation facility use. For example, one study reported that over 74% of Canadians indicated that recreation facilities were largely available in their community (CFLRI, 2007). Yet, less than half of Canadian children and youth
reported using or accessing these facilities (CFLRI, 2008). Researchers have suggested that accessibility barriers may contribute to these low levels of facility use (CFLRI, 2005). Indeed, cost is consistently cited by adolescents as a major barrier to their use of recreation facilities (Allison et al., 2005; Dwyer, Allison, Goldenberg, et al., 2006; Humbert et al., 2006; Rees et al., 2006). Moreover, Humbert and colleagues (2006) found that access barriers were more commonly reported by young people from low SES families. A study by Estabrooks and colleagues (2003) found that facilities located in lower SES neighbourhoods were less accessible. Specifically, there were fewer ‘free-for-use’ facilities and more ‘pay-for-use’ facilities in lower SES areas compared to higher SES areas (Estabrooks et al., 2003).

It is important to note that the majority of studies examining accessibility report on how accessible individuals’ perceive recreation facilities to be via self-reported measures; very few studies have measured the actual usage and accessibility of these facilities (Active Healthy Kids Canada, 2009; Davison & Lawson, 2006). Furthermore, all of the studies mentioned above followed a cross-sectional design; thus, causality could not be determined. All of these shortcomings have been identified as gaps in the research literature (Active Healthy Kids Canada, 2009; Davison & Lawson, 2006).

2.5 Reported Barriers to Physical Activity in Youth

Often in the research literature, correlates of physical activity are conceptualized as barriers. The relationship between perceived barriers and youth physical activity is well established; an increase in perceived barriers is associated with a decrease in physical activity (Allison, Dwyer, & Makin, 1999; Sallis & Owen, 1999).

Three Canadian studies identified the barriers to physical activity participation that were most pertinent to Canadian high school students (Allison et al., 2005; Dwyer, Allison,
Commonly reported barriers included: preference for technology-related activities, lack of time (e.g., due to school work, family responsibilities, and part-time jobs), no one to be active with, parental constraints and safety concerns, lack of transportation to recreation facilities, and the cost of recreation facilities and programs. Females also reported that body self-consciousness hindered their participation in physical activities while males were more likely to report lack of skill and competence to partake in activities as a barrier.

In addition to identifying barriers, several studies have examined facilitators of physical activity behaviour in youth. Two studies conducted focus groups to collect adolescents’ insight about how best to facilitate and promote physical activity in their peer group (Allison et al., 2005; Humbert et al., 2008). Adolescents provided the following suggestions: provide a variety of opportunities to be active (both structured and unstructured), emphasize the fun and social aspects of physical activity, improve and maintain existing recreation facilities, provide transportation to recreation facilities, and increase the accessibility of programs and facilities by reducing user-fees (Allison et al., 2005; Humbert et al., 2008).

2.6 Ecological Approach to Physical Activity Promotion

Although it is evident that physical activity is influenced by the interplay of intrapersonal, interpersonal, and environmental factors, very few studies have employed an approach that reaches beyond the individual level to promote physical activity. The majority of research driven intervention initiatives have used theories and models that account for intrapersonal factors, such as the Social Cognitive Theory, Theory of Planned Behaviour, and the Health Belief Model, to initiate individual physical activity behaviour change. Sallis, Cervero, et al. (2006) have acknowledged that “[although] these models have led to effective interventions, important
limitations of the models and resulting interventions are apparent” (p. 299). Specifically, there are three major limitations to individual-level interventions: 1) effect sizes are often small to moderate, 2) recruitment rates to programs are modest, and 3) individual-based interventions often lead to short-term behaviour change that is rarely maintained after the intervention period (Sallis, Cervero, et al., 2006).

Given the astonishing rates of physical inactivity among youth, ecological approaches that promote physical activity at the population-level are widely advocated. Ecological models propose that behaviours are influenced by individual, interpersonal, organizational, community, and political/societal factors (Figure 1). When multiple levels of influence are considered, ecological interventions may be more effective in influencing health behaviour change than single-level interventions (Sallis & Owen, 1999; 2002).

Given the complex nature of ecological interventions, researchers have suggested that a first priority should be to establish a clear understanding of individual, interpersonal, and environmental correlates of physical activity behaviour (Sallis, Cervero et al., 2006). Once the direct effect of each of these factors is understood, multilevel interventions should be employed to examine how these factors interact with each other (Sallis, Cervero et al., 2006).

2.7 Collaborative Partnerships and a Multilevel Approach

In order to be effective and efficient, comprehensive multilevel interventions require collaboration between all potential stakeholders. Collaborative partnerships can be defined as alliances among people and organizations from multiple sectors (i.e., municipal, education, social, recreation, etc.) who work together to achieve a common goal. As noted by Roussos and Fawcett (2000), one fundamental characteristic of partnerships in community health is “...broad community engagement in creating and sustaining conditions that promote and maintain behaviours associated with widespread health and well-being” (p. 369).

Collaborative partnerships are ideal for multilevel interventions for several reasons. First, collaboration between partners creates a synergistic effect such that the joint action of community partners produces an outcome that is greater than the sum of their individual contributions. Second, collaborative partnerships allow for the pooling and optimization community resources. Lastly, the changes that result from these partnerships are highly sustainable because stakeholders work together to leverage existing community resources by changing existing organizational policies and practices (e.g., waiving recreation facility user fees). As noted by Swerissen and Crisp (2004), “there is considerable evidence that once organizational policies and practices are adopted and put into place, they are maintained over time without the need for ongoing intervention programmes” (p. 125).
2.8 Settings for Physical Activity Promotion and Intervention

The three most popular settings studied for promoting physical activity in youth include primary care, schools, and the community (De Meester, Van Lenthe, Spittaels, Lien, & De Bourdeaudhuij, 2009; Salmon et al., 2007). The latter two provide the most relevant backdrop for the current study and thus, will be reviewed below.

2.8.1 Schools

The school environment is by far the most common setting for physical activity interventions among adolescents; a 2007 systematic review of 76 physical activity interventions for youth revealed that 75% were delivered via the school setting (Salmon et al., 2007). A more recent European review by De Meester and colleagues (2009) confirmed these findings; 15 of 20 youth physical activity interventions reviewed took place in schools.

Schools are often used as intervention sites because they can reach virtually all adolescents regardless of age, sex, ethnicity, and SES (Biddle et al., 2004; Lubans & Morgan, 2008; Simon et al., 2006). For this reason, schools play an important role in the promotion of physical activity (Biddle et al., 2004; Dwyer, Allison, LeMoine et al., 2006; Lubans & Morgan, 2008; Simon et al., 2006). Despite this, Salmon and colleagues (2007) concluded in their review that school-based curriculum strategies used in isolation were ineffective for promoting physical activity among adolescents. Moreover, curriculum strategies combined with physical education classes had a small effect during the lessons, but rarely influenced physical activity outside of school (Salmon et al., 2007).

These results are not surprising given that the majority of high school students do not enrol in physical education classes (Active Healthy Kids Canada, 2009; Dwyer, Allison, LeMoine et al., 2006). A province-wide study examining the opportunities for physical activity in Ontario
secondary schools (Dwyer, Allison, LeMoine et al., 2006) revealed that student enrolment in physical education classes decreases in upper years. The most substantial decrease occurring between grades 9 and 10; enrolment in physical education courses is 97.9% and 49.6%, respectively (Dwyer, Allison, LeMoine et al., 2006). Despite this evidence, a large number of interventions continue to promote physical activity through educational programs and modifications to the existing school curriculum (Pate et al, 2000; Salmon et al, 2007). Recently, researchers have begun to examine the effects of after-school programs for high school students (Lubans & Morgan, 2008). The LEAF (Learning to Enjoy Activity with Friends) intervention (Lubans & Morgan, 2008) was an eight-week intervention in New South Wales, Australia that evaluated the impact of an extra-curricular school sports program for students in grade 8 and grade 9 (equivalent to grade 9 and grade 10 in North America). The intervention was delivered at the University of Newcastle Health and Fitness Center by trained fitness instructors and consisted of information sessions and organized exercise activities after school. Physical activity levels were measured objectively (pre- and post-intervention) using pedometers. Results showed that students who were less active at baseline significantly increased their steps over the intervention period, while activity levels slightly decreased among students who were active at baseline. It is unknown, however, whether these changes in physical activity persisted after the intervention ended.

Although school-based interventions are not effective on their own (Salmon et al., 2007), schools play an important role in physical activity promotion (Biddle et al., 2004; Lubans & Morgan, 2008; Simon et al., 2006). Several interventions involving both schools and communities, such as the LEAF intervention mentioned above, hold particular promise in the promotion of lifelong physical activity habits among youth (CDC 1997; Pate et al., 2000; Van
Therefore, sustainable partnerships between schools and communities are strongly recommended (CDC, 1997; Pate et al., 2000).

### 2.8.2 Community-based

Given that adolescents obtain most of their activity outside of school hours, community-based interventions may be an effective means of increasing physical activity levels among youth (Biddle et al., 2004; Pate et al., 2000). In fact, Pate and colleagues (2000) asserted that “...intervention strategies involving the community at all levels have the greatest potential to improve physical activity and dietary behaviours in this age group” (p. S138).

Community-based interventions promote change at multiple levels; the adoption of healthy behaviours among individuals is often promoted through modifications to the physical and social environment surrounding the individual (Pate et al., 2000). For example, if the physical environment is changed so that safe places to be active (i.e., trails, parks, and recreation centres) are available, it is more likely that youth will engage in physical activity (Pate et al., 2000). One unique aspect of community-based interventions is the active involvement of community members in setting and achieving program goals. Encouraging community ownership of a program is critical as it increases the sustainability of the initiative over time (Merzel & D’Afflitti, 2003; Mittelmark, Hunt, Heath, & Schmid, 1993).

The existing body of knowledge regarding community-based interventions was largely informed by three large-scale studies conducted in the United States: the Stanford Five-City Project, the Pawtucket Heart Health Program, and the Minnesota Heart Health Program (MHHP). Each of these multilevel interventions used an array of educational materials and programs to encourage people to adopt healthy lifestyles (i.e., physical activity, healthy eating, and smoking cessation), thereby decreasing their risk of CVD. Results from all three studies showed weak
and/or inconsistent changes in physical activity behaviour (Carleton et al., 1995; Farquhar et al., 1990; Luepker et al., 1994).

Of the aforementioned studies, MHHP was the only one that published results specific to youth (Kelder, Perry, & Klepp, 1993). This was an ancillary initiative to MHHP, titled the Class of ‘89 Study, that followed students (n=2376) as they progressed from grade 6 to grade 10 (Kelder et al., 1993). Students in the intervention group received educational and curriculum based interventions (e.g., Slice of Life), peer-led programs encouraging students to be active outside of school, and other promotional materials (e.g., booster greeting cards). Results showed a weak to moderate change in physical activity during the intervention period: girls from the intervention community reported significantly more exercise at each annual assessment except when they reached grade 11 (Kelder et al., 1993; Perry, Kelder, & Klepp, 1994). Among the boys, significant differences in exercise levels between the intervention and control group were found only in grade 7 and grade 11 (Kelder et al., 1993; Perry et al., 1994). This study was highly influential as it was one of the first to demonstrate the potential of community-wide interventions to bring about long-term physical activity behaviour change in youth.

In 1994, a community-based intervention titled the Kahnawake Schools Diabetes Prevention Project was implemented (Macaulay et al., 1997). This participatory research project encompassed several interventions to increase physical activity and other healthy behaviours among school-aged children in an Aboriginal Community near Montreal, Canada (Macaulay et al., 1997). A health education program for children in grades 1 through 6 was implemented in two elementary schools. The curriculum consisted of information on type 2 diabetes, nutrition, and physical activity. Several school-based and community-based initiatives were implemented to complement the health education curriculum by creating supportive environments. Examples of these additional initiatives include promotional events, construction of a recreation path for
walking and cycling, and the implementation of a nutrition policy banning junk food from schools (Macaulay et al., 1997). Results showed an increase in the mean number of physical activities among the intervention group between 1998 and 1999, however, these positive changes were not sustained over time and returned to baseline level in 2002 (Paradis et al., 2005).

The Intervention Centred on Adolescents’ Physical Activity and Sedentary Behaviour (also known as ICAPS) was a multilevel initiative that sought to prevent excess weight gain and cardiovascular risk in older children by promoting physical activity (Simon et al., 2006). In total, 954 first-level students (equivalent to grade 6 in North America) from 8 schools in eastern France participated in the project; schools were randomly assigned to either the control condition (n=4) or the intervention (n=4). The four-year intervention consisted of several strategies implemented at multiple levels: individual, interpersonal, and community. At the individual level, students in the intervention group received educational sessions delivered as part of the school curriculum. As well, students were provided with several new opportunities to participate in physical activities both at school (i.e. activity breaks) and after-school. Physical activity was promoted at the interpersonal level through regular meetings with parents and teachers to provide helpful information about how best support physical activity in youth. Lastly, community leaders were encouraged to provide access to local recreation facilities and programs either free of charge or at a low cost. Results from the first six months of the intervention showed that the proportion of adolescents that did not participate in physical activity outside of school was reduced from 36% to 17% (Simon et al., 2006). It should be noted that the community-based component had not been implemented when the first evaluation was conducted (six months following the commencement of the intervention). At this point in time, the program coordinators reported that discussions with community leaders concerning the provision of recreation facility use and
transportation to facilities at a subsidized cost were ongoing (Simon et al., 2006). Results from the remaining 3.5 years of the ICAPS intervention have yet to be published.

Overall, there are many challenges associated with community-based interventions, especially when a multilevel approach is employed. For example, community-based studies often receive short-term funding making it difficult to sustain programs and initiatives that lead to long-term behaviour change. Nonetheless, these studies were advantageous as they were some of the first to use an ecological approach to increasing physical activity among youth. As Mummery and Brown (2009) stated, “Despite these challenges, the whole community approach still offers tremendous potential for developing the social and cultural change which will be required for sustained improvements in population physical activity” (p. 1).

2.9 Environmental Interventions

2.9.1 Environmental Approaches to Promote Youth Physical Activity

Previous physical activity interventions and initiatives for adolescents have been mainly comprised of educational approaches to promote physical activity. Educational initiatives have only been effective in bringing about physical activity change in small groups of people. Given that the prevalence of physical inactivity and sedentary behaviour among youth has reached epidemic proportions (CFLRI, 2009; Janssen, 2008), researchers are increasingly advocating for environmental and policy interventions that have the potential to evoke change at the population level (Sallis et al., 1998). Likewise, large health organizations such as WHO and CDC, have placed environmental and policy strategies at the top of their agendas (Sallis, Cervero, et al., 2006).

The goal of environmental and policy approaches is to create or improve organizational and physical environments that encourage people to adopt healthy behaviours (Task Force on
Community Preventive Services, 2002). As Sallis and colleagues (1998) recognized, this goal is closely aligned with the primary principles of health promotion; many definitions and frameworks for health promotion support change at both the environmental and policy levels. For instance, Green and Kreuter (1990) define health promotion as “the combination of educational and environmental supports for actions and conditions of living conducive to health” (p. 321). In addition, four of the five areas of action identified in the Ottawa Charter for Health Promotion (WHO, 1986) call for environmental and policy interventions: (1) building healthy public policy; (2) creating supportive environments; (3) strengthening community action; and (4) reorienting health services. Lastly, the recently ratified Toronto Charter for Physical Activity: A Global Call for Action (Global Advocacy Council for Physical Activity & International Society for Physical Activity and Health, 2010) calls for concerted action across four areas that include introducing policies that support physical activity and reorienting services and funding to prioritize physical activity around the globe.

There are several ways to promote active living using an environmental approach including: creating safe and walkable neighbourhoods, providing convenient places for individuals to be active (i.e. parks, bike trails, and recreation facilities), and minimizing the barriers to physical activity participation (i.e. waiving or subsidizing recreation facility user-fees). The current review will examine environmental initiatives that promote physical activity by enhancing physical structures in the community (i.e., the built environment) and providing access to recreation facilities. It is important to note that research concerning environmental and policy interventions to increase physical activity among adolescents is still in its infancy (Sallis & Glanz, 2006).
2.9.2 Enhancing the Physical or Built Environment

As discussed earlier, aspects of the physical or built environment are positively correlated with physical activity participation in youth (Davison & Lawson, 2006). For instance, the absence of safe and direct routes to school discourages children from actively commuting to school (Boarnet, Anderson, Day, McMillan, & Alfonzo, 2005). The 2004 National Transportation Survey (Cragg, Cameron, & Craig, 2006) revealed that two thirds of Canadian students did not walk to school and 80% had not cycled to school in the previous year. Given that walking and biking are physical activities (Tudor-Locke, Ainsworth, Adair, & Popkin, 2003), the provision of safe routes for active transport to school may be a means of increasing daily physical activity levels in youth.

The Safe Routes to School Program in Marin County U.S., legislated by the state of California, is an example of an environmental intervention that sought to increase the number of children who actively commute to school (Stauton, Hubsmith, & Kallins, 2003). A total of 15 elementary and middle schools were involved in the intervention. In order to improve the safety of walking and biking routes to school, changes to the physical environment were made, including: traffic calming and the construction of sidewalks, bike pathways, crosswalks, and crosswalk signals. Promotional materials and educational programs were used to supplement the environmental changes. After two years, the number of children who walked to school increased by 64%, while the number of children who biked to school increased by 114%. Students’ total physical activity levels were not measured, thus, it is unknown whether the Safe Routes to School Program was successful in increasing daily physical activity levels among students. Despite this, programs that promote active commuting to school have become popular and have been implemented in several communities across Ontario via the Active & Safe Routes to School initiative.
2.9.3 Providing Access to Recreation Facilities as an Environmental Approach

Research has shown that use of recreation facilities is associated with higher levels of physical activity among adolescents (Gordon-Larsen et al., 2000). For instance, Gordon-Larsen and colleagues (2000) reported that “using a recreation centre was associated with a 75% increase in the likelihood of falling into the highest category of moderate to vigorous physical activity” (p. 4). In 2004, Moody and colleagues conducted a study that examined youths’ participation in physical activities at recreation centres. Participants in the study consisted of managers and coordinators from 44 recreation facilities in San Diego, California (Moody et al., 2004). Results showed that on an average day only 7% of the population under the age of 18 years utilized the centres (Moody et al., 2004). Thus, although use of recreation facilities is positively correlated with increased physical activity participation, only a very small proportion of youth are accessing these facilities.

Currently, there is a large demand from both researchers and governments to develop and implement interventions that increase physical activity by providing access to places where individuals can be active, including recreation facilities (Active Healthy Kids Canada, 2009; Gordon-Larsen et al., 2006; Sallis & Kerr, 2006; Ontario Ministry of Health Promotion, 2005; U.S. Department of Health and Human Services, 2002). To date, only a few interventions have been implemented to increase access to recreation facilities (Active Healthy Kids Canada, 2009). One such intervention was the Grade 5 Community Physical Activity Pass Program in Kingston, Ontario (Faloon, unpublished Master’s thesis, 2007; Faloon, Lévesque, & Fergus, under review). This program was launched in 2005 by Kingston Gets Active (KGA), a community partnership between multiple sectors. As part of the program, all grade 5 students in Kingston and surrounding townships were given a Community Physical Activity Pass providing them with free access to public swimming and skating at ten local recreation centres as well as the YMCA for
nine months. Results revealed that over 71% of grade five students used their pass (Faloon, unpublished Master’s thesis, 2007). Additionally, there was an increase in overall physical activity levels (Faloon, unpublished Master’s thesis, 2007; Faloon et al., under review).

The success of the KGA program prompted the Public Health Agency of Canada to fund a National Grade 5 Community Physical Activity Pass Program, titled “Canada Gets Active”, in fall 2009 (Active Healthy Kids Canada, 2010). The program was implemented in five pilot communities across the nation by the Canadian Parks and Recreation Association in collaboration with KGA (Active Healthy Kids Canada, 2010). The five pilot communities included: Whitehorse, Yukon; Burnaby, British Columbia; Okotoks, Alberta; Arnprior, Ontario; and Annapolis, Nova Scotia (Active Healthy Kids Canada, 2010). Results from the Canada Gets Active initiative have yet to be published (Active Healthy Kids Canada, 2010).

In the study by Moody and colleagues (2004), recreation facility managers reported that girls and youth from low SES households were less likely to use the centres. In addition, participants reported that there were no after school programs in place for high school students as there were for children in middle and elementary school (Moody et al., 2004). As stated previously, older adolescents, females, and youth from low SES families have the lowest activity levels (CFLRI, 2009; Craig et al., 2001; Sallis et al., 2000). Thus, providing equal access to recreation facilities by eliminating cost as a barrier may be an effective means of increasing physical activity among those most at-risk for inactivity.

2.10 Summary

It is critical to the health of young Canadians to develop effective physical activity interventions that will prevent consequences associated with physical inactivity. Given the alarming prevalence of inactivity among adolescents (CFLRI, 2009), interventions that affect
change at the population-level are needed. Environmental interventions that enhance or create environments that are supportive of youth physical activity are considered to hold the most promise for bringing about population-wide changes in physical activity levels (Sallis et al., 1998). In particular, community-based initiatives that aim to increase physical activity via enhanced access to recreation facilities (Sallis, Cervero, et al., 2006; Sallis & Glanz, 2006; Sallis et al., 1998; Whitt-Glover et al., 2009) and that involve collaboration between schools and community are widely advocated (CDC, 1997; Pate et al., 2000; Salmon et al., 2007).

Consistent with these recommendations, this thesis reports on a community-based environmental initiative that provided grade 10 students with free access to local recreation facilities for 10 months. The objectives of this study were to: 1) identify individual- and area-level factors that predicted whether or not students accessed facilities using their Community Physical Activity Pass; and 2) to determine individual- and area-level predictors of the rate of Community Physical Activity Pass use at each type of recreation facility: arenas, pools, and the YMCA.
Chapter 3

Manuscript

Individual- and Area-level Predictors of Objectively Measured Recreation Facility Use Among Grade 10 Students: A Kingston Gets Active Initiative

This paper has been prepared to submit to the Journal of Physical Activity and Health and was authored by Carolyn M. Hureau and Lucie Lévesque.

Appendices A-C at the end of this thesis contain the letters of information as well as the baseline survey that were used for this study.
Abstract

BACKGROUND: Availability and accessibility of recreation facilities are positively correlated with youth physical activity (PA). Few studies have objectively measured the use of facilities and examined factors associated with their use. This study reports on a community-based initiative that provided all grade 10 students (N ≈ 2500) in Kingston, ON, with a free access pass to 10 recreation facilities for 10 months. PURPOSE: To identify individual- and area-level predictors of pass use and rate of pass use at each type of facility: arenas, pools, and YMCA. METHODS: Students (n = 1261; M_age = 14.97 ± 0.39; 46.3% girls) self-reported demographics, PA, facility use, and barriers to facility use before receiving their pass. Census data and MapPoint were used to determine area-level SES and availability of facilities, respectively. An electronic monitoring system installed at each facility was used to measure pass use. Multilevel logistic and Poisson regressions were performed. RESULTS: The likelihood of the best multilevel model examining pass use was 13 times larger than a model that included only individual-level predictors (p<0.01). Pass users were more likely to attend schools that were only a short distance away from facilities (OR=0.90, p<0.01), be active (OR=1.69, p<0.05), rate their health as fair (OR=2.32, p<0.05), report homework as a barrier (OR=1.84, p<0.01) and to have used facilities previously (OR=2.01, p<0.05). CONCLUSIONS: Providing free access may be insufficient to enable students to use recreation facilities.
Introduction

The many benefits of engaging in regular physical activity during childhood and adolescence include healthy weight regulation (Kimm et al., 2005), proper growth of bones and tissues (Biddle, Gorely, & Stensel, 2004), and a reduced risk of several chronic diseases (Hurtig-Wennlof, Ruiz, Harro, & Sjostrom, 2007; Warburton, Nicol, & Bredin, 2006). Youth physical activity has also been positively correlated with good mental health (Biddle et al., 2004) and academic achievement (Taras, 2005; Trudeau & Shephard, 2008). Janssen and colleagues (2005) have suggested that beginning physical activity at a young age will yield the greatest overall health gains.

Physical inactivity among youth is a major public health concern (Motl, Dishman, Saunders, Dowda, & Pate, 2007) as the majority of youth are not active enough to obtain the health benefits associated with regular physical activity (Craig, Cameron, Russell, & Beaulieu, 2001). For instance, the CAN PLAY study (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2009) found astonishing levels of objectively measured physical inactivity, reporting that 93% of Canadian youth (aged 15-19) are not meeting Canadian physical activity guidelines in order to be healthy and to develop a lifelong active lifestyle. Some youth are at greater risk for inactivity including girls, older adolescents, and children from low income families (CFLRI, 2009; Craig et al., 2001; Sallis, Prochaska, & Taylor, 2000).

In order to develop effective physical activity interventions for youth, the factors that influence their physical activity behaviour must be understood. It is widely recognized that physical activity is a complex behaviour that is influenced by a multitude of intrapersonal, social, and environmental factors (Ferreira et al., 2006; Pan et al., 2009; Sallis et al., 2000; Spence & Lee, 2003). Environmental influences have gained attention from researchers in the field as they
hold particular promise of instilling population-wide change. Many researchers have emphasized the importance of creating physical activity supportive environments that increase physical activity opportunities and encourage people to be active (Sallis, Cervero, et al., 2006; Sallis & Glanz, 2006; Sallis, Bauman, & Pratt, 1998). Creating these supportive environments may be especially important during adolescence as youth gain autonomy in making their decisions and develop physical activity behaviour patterns that may track into adulthood (Telama, 2009).

In the quest to create these supportive environments, there has been a surge of research examining the relationship between physical activity and the availability and accessibility of recreation opportunities. Availability refers to the presence of resources in a neighbourhood (e.g., are there recreation facilities available in the area?), whereas accessibility refers to one’s capacity to make use of resources that are available to them (e.g., can a person afford the user-fees required to use the local pool?).

Many studies have found that youth physical activity levels are positively correlated with availability of recreation facilities and opportunities to be active (Dowda, Dishman, Porter, Saunders, & Pate, 2009; Gordon-Larsen, Nelson, Page, & Popkin, 2006; Sallis & Glanz, 2006; Sallis et al., 2000). For instance, Gordon-Larsen and colleagues (2006) found that adolescents who lived in a neighbourhood with just one recreation facility were significantly more likely to engage in five or more bouts of moderate-to-vigorous physical activity (MVPA) per week. Moreover, as the number of neighborhood recreation facilities increased, the odds of engaging in five or more bouts of MVPA per week also increased.

The presence or availability of recreation facilities alone is not sufficient to enable their use; facilities must also be accessible. For example, a report produced by CFLRI (2007) stated that 74% Canadians indicated that recreation facilities were largely available in their community. Yet less than half of Canadian children and youth used these facilities (CFLRI, 2008).
Researchers have suggested that accessibility barriers may contribute to these low levels of facility use (CFLRI, 2005). Indeed, adolescents have consistently reported cost and lack of access to recreation facilities as major barriers to their physical activity participation (Allison et al., 2005; Dwyer et al., 2006; Humbert et al., 2008; Rees et al., 2006). Furthermore, these access barriers were more commonly reported by young people from low socioeconomic status (SES) families (Humbert et al., 2008). It is hypothesized that these access barriers may be contributing to the disparities evident in physical activity participation between youth from high SES versus low SES families (Gordon-Larsen et al., 2006). Thus, interventions that create a supportive physical activity environment by enhancing access to community recreation facilities could be an effective means of increasing physical activity levels among adolescents, especially those at risk for inactivity.

Environmental interventions present a promising approach to enhance physical activity involvement in youth. Yet, very little information is available about the effectiveness of environmental interventions to enhance youth physical activity in community settings (Giles-Corti & Salmon, 2007; Salmon, Booth, Phongsavan, Murphy, & Timperio, 2007). The majority of studies investigating availability and accessibility have been cross-sectional in nature (Active Healthy Kids Canada, 2009; Davison & Lawson 2006). Moreover, very few studies have measured the actual usage of recreation facilities and the factors associated with their use (Active Healthy Kids Canada, 2009). The current study addresses these gaps in knowledge by providing evidence about a community-based initiative designed to increase access to recreation facilities by eliminating facility user-fees for youth.
Study Context

In September 2007, Kingston Gets Active (KGA), a partnership between municipal, education, health, social, and recreation sectors in Kingston, Ontario, launched a new initiative titled “The Grade 10 Community Physical Activity Pass”. KGA launched their first Community Physical Activity Pass program for grade 5 students in November 2005. The success of this program prompted KGA to develop a similar program for grade 10 students allowing them free access to local pools, arenas, and the local YMCA for 10 months of the year (November 2007 to August 2008).

The primary research objective of this study was to identify individual- and area-level factors that predicted whether or not a student accessed participating recreation facilities using their Community Physical Activity Pass. A secondary objective was to determine individual- and area-level predictors of the rate of Community Physical Activity Pass use at each type of recreation facility: arenas, pools, and the YMCA.

Methods

Research Design

In September 2007, all grade 10 students (n=1812) from the public school board in Kingston, Ontario were invited to complete a baseline questionnaire before receiving a Community Physical Activity Pass providing free access to all of the recreation facilities (i.e. YMCA (n=1), arenas (n=7), and pools (n=3)) in the city of Kingston and surrounding areas. Throughout the duration of the intervention, pass use was monitored objectively through an electronic monitoring system (IRC-2000 from RBH Access Technologies, Inc.) that was installed at each of the participating recreation facilities.
School Recruitment

Ethical approval for this study was obtained from the Queen’s University General Research Ethics Board and the participating school board. All 11 secondary schools within the school board territory were invited to participate: six urban schools in the city of Kingston, one in the town of Napanee, and five schools in the surrounding rural communities. Out of the 11 secondary schools, 10 agreed to participate in the study (91% response rate). The principal from the school that declined participation cited distance (i.e., 1.5 hours outside of Kingston) as the main barrier to the school’s participation.

Participants

Grade 10 students were the intended population because they are at a vulnerable period, when for the first time in their academic career, physical education is no longer mandatory (Ontario Ministry of Education, 1999). Passive consent was sought from parents and students to participate in the study. The response rate for this study was 69.6% (n=1261). Participating students were 677 adolescent boys ($M_{age} = 14.98 \pm 0.41$) and 584 adolescent girls ($M_{age} = 14.95 \pm 0.36$).

Community Recreation Facilities

Eleven recreation facilities located in the city of Kingston and its surrounding Townships provided free access to grade 10 pass holders for a 10-month period. These recreation facilities were chosen because they fell within the catchment area of the participating school board.
Measures

Level 1 Measures

Community Physical Activity Pass Use. Pass use at each of the recreation facilities was measured objectively by an electronic monitoring system. The passes were printed on proximity cards that students presented to a card reader upon each visit. Each card had a unique identification number allowing it to be linked to the individual student’s survey data. Each card reader was connected to a panel that recorded the card identification number, date, time, and the location where the card was used. This information was downloaded and then exported into SPSS 17.0 for statistical analysis.

Demographics. Demographic information (e.g., gender, birth date, school) was collected for each student. Individual-level SES was assessed using the Family Affluence Scale (FAS) from the WHO Health Behaviour in School-Aged Children (HBSC) survey (Currie et al., 2004). A composite score of four-items was used to assess family affluence. Items included: 1) does your family own a car, van, or truck? (response categories were no; yes, one; yes, two or more), 2) do you have your own bedroom for yourself? (response categories were no and yes), 3) during the past 12 months, how many times did you travel away on holiday with your family? (response categories were not at all; once; twice; more than twice), 4) how many computers does your family own? (response categories were none; one; two; two or more). Following HBSC protocol, participants were categorized as being of high, moderate, or low affluence according to their composite score (Boyce, Torsheim, Currie, & Zambon, 2006). This measure has demonstrated acceptable construct (Spearman rank = 0.87) and criterion (Kappa = 0.57) validity (Boyce et al., 2006).
Baseline Physical Activity. The moderate to vigorous physical activity (MVPA) measure developed by Prochaska, Sallis, and Long (2001) was used to assess physical activity participation at baseline. Students were asked how many days they accumulated at least 60 minutes of physical activity over both the past week and a typical week. A composite average of these two items was used as an index of physical activity participation. As suggested by Prochaska and colleagues (2001), student responses were dichotomized into two categories: more active (i.e. active on 5 or more days per week) or less active (i.e., active less than 5 days a week). The MVPA measure has demonstrated acceptable validity ($r = .40$) and reliability (intraclass correlation $= .77$; Prochaska et al., 2001).

Baseline Recreation Facility Use. Students’ use of recreation facilities at baseline was assessed using a 4-point Likert-type scale (1=never, 4=every week). It asked students to report the number of times per month they used each type of recreation facility (e.g., pool, arena, and the YMCA) for unstructured activity (i.e., not part of an instructional program or team related activity). Based on this information, students were categorized as either a recreation facility-user or a non-user. The same procedure was used to assess students’ use of recreation facilities for organized activities (i.e., instructional programming or team related activity).

Barriers. At baseline, students were asked to identify barriers to facility use. Nine statements (0=no, 1=yes) represented potential barriers to facility use such as “it is too expensive” and “I am too busy with homework”. These barriers were chosen based on findings from the literature (Davison & Lawson, 2006) and findings from a similar study among grade 5 students in Kingston, Ontario (Faloon, Lévesque, & Fergus, under review).
**Additional Measures.** Perceived health status was measured using a single item from the WHO HBSC survey (Currie et al., 2004) that asked students to rate their health as excellent, good, fair, or poor. Enjoyment of physical activity was assessed using a 5-point Likert-type scale (1=strongly disagree, 5=strongly agree) that asked students to indicate the degree to which they agreed or disagreed with the statement “I usually enjoy being physically active”.

**Level 2 Measures**

**Proximity to Recreation Facilities.** MapPoint North America Software (Version 2010) was used to determine the distance (kilometres) between each secondary school and the recreation facility of interest. Street addresses were used to locate schools and recreation facilities.

**Socioeconomic Status.** As recommended by Janssen, Boyce, Simpson, and Pickett (2006), an area-level SES measure was included in addition to the individual-level SES measure. GeoSearch2006 (Statistics Canada, 2006) was used to determine which census tracts fell into the geographic boundaries of each school. For each participating school, a mean score for median family income was calculated by averaging the raw values for each census tract situated within the school catchment area. The same procedure was repeated for two other census variables: 1) unemployment rate; and 2) population over 20 years of age with no post-secondary education. Area-level SES for each school was determined by combining ranked scores for these three census variables. For analytical purposes, schools were categorized into low, medium, and high SES tertiles based on this overall score.
Statistical Analysis

In order to properly disentangle the contribution of individual- and area-level effects on pass use, multilevel analyses were performed. Students were nested within schools; therefore, other regression techniques were not appropriate since the assumption of independence would be violated (Raundenbush & Bryk, 2002). When this assumption is violated, the standard error estimates are too small resulting in significant results that are erroneous (Raundenbush & Bryk, 2002).

Four multilevel analyses were performed using STATA (Version 11.0). In the first analysis, multilevel logistic regression was performed to determine the contributions of individual- and area-level factors in predicting whether or not a student used their Community Physical Activity Pass. For this analysis, pass use was a binary outcome: 0 = did not use pass, 1 = used pass at least once. This two-level model was constructed in four steps. First, a null model with no predictors was created to determine the amount of variance in pass use attributable to either individual or area-level effects.

Next, individual-level (level 1) predictors were entered using 3 separate block entries (Step 2). The first block consisted of socio-demographic variables (i.e., gender and family affluence). The following physical activity related variables were entered in the second block: facility use at baseline for both organized and unstructured activities, physical activity level, physical activity enjoyment, and perceived health status. The third block contained all of the potential barriers to facility use.

The third step in the construction of the model was the inclusion of interactions between gender and individual-level variables entered in Step 2. Given the well-documented correlation
that exists between gender and physical activity, it was decided that including these interactions was important.

Lastly, all area-level (level-2) predictors were entered as a block (Step 4). The purpose of this step was to determine the factors that explained pass use at the school-level. It should be noted that likelihood ratio tests were performed at each step to determine the amount of variance explained by that step.

To address the second purpose of the study, three multilevel Poisson regression models were created; one for each type of facility: YMCA (Model #2), pools (Model #3), and arenas (Model #4). Given that the outcome variables for these three models consisted of counts (i.e. the number of times a student used their pass) for a fixed period of time, the Poisson distribution was the most appropriate analytical method. All three analyses followed the same model building steps as the first analysis, with two exceptions. First, an additional step was performed for Model #2 (YMCA) in which the interaction between gender and distance was added to the model. Second, interactions between gender and individual-level predictors (Step 3) were not included in Model #3 (pools) or Model #4 (arenas) because they were not estimable, due to the low pattern of pass use at these facilities.

For all four models outlined above, students were considered to be clustered within schools, schools were considered random effects, and all student-level predictors and school-level predictors were considered fixed effects in multilevel mixed-effect random-intercept models. For each of the four outcomes, each of the significant student-level predictors was further examined in a multilevel mixed-effect random-slope model that allowed for variability among schools in the slope of the predictor's influence and for covariance between the distribution of random-intercepts and the distribution of random-slopes. These random-slope models provided no evidence that the variance of slopes was greater than zero for any of these predictors for any of
the outcomes. Therefore, results from the multilevel mixed-effect random-intercept models are presented below.

Except for the fourth model (arenas), the minimal detectable difference at a power level of 0.95 was a moderate effect for individual-level variables and a large effect for area-level variables. The minimal detectable difference for the fourth model was a large effect for both individual- and area-level factors (Table 1).

**Table 1: Minimal detectable differences for a power level of 0.95**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Individual-level Variables</th>
<th>Area-level Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model #1 Pass Use</td>
<td>0.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Model #2 YMCA</td>
<td>0.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Model #3 Pools</td>
<td>0.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Model #4 Arenas</td>
<td>1.6</td>
<td>2.1</td>
</tr>
</tbody>
</table>

*Note:* These values represent the differences between the referent and estimate of an effect that are expected to be significant for each model.

**Results**

**Descriptive Information**

A total of 1261 grade 10 students from Kingston and surrounding areas completed the baseline questionnaire. Eight surveys were flagged due to inconsistent and unrealistic responses (e.g., reporting participation in 21 different physical activities seven or more times per week) and were therefore excluded from the analyses. Complete descriptive information for individual- and area-level variables are presented in Table 2.
Table 2: Individual- and area-level descriptive information

<table>
<thead>
<tr>
<th>Study Variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual-level Variables (N students=1261)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>677</td>
<td>53.7</td>
</tr>
<tr>
<td>Girls</td>
<td>584</td>
<td>46.3</td>
</tr>
<tr>
<td>Family Affluence Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>24</td>
<td>2.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>400</td>
<td>33.1</td>
</tr>
<tr>
<td>High</td>
<td>783</td>
<td>64.9</td>
</tr>
<tr>
<td>PA Facility Use for Unstructured Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least once</td>
<td>662</td>
<td>53.4</td>
</tr>
<tr>
<td>Did not use facilities (referent)</td>
<td>578</td>
<td>46.6</td>
</tr>
<tr>
<td>PA Facility Use for Organized Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least once</td>
<td>489</td>
<td>39.6</td>
</tr>
<tr>
<td>Did not use facilities (referent)</td>
<td>745</td>
<td>60.4</td>
</tr>
<tr>
<td>Physical Activity Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactive (&lt; 5 days per week; referent)</td>
<td>615</td>
<td>49.8</td>
</tr>
<tr>
<td>Active (≥ 5 days per week)</td>
<td>621</td>
<td>50.2</td>
</tr>
<tr>
<td>Enjoyment of Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoy PA</td>
<td>996</td>
<td>80.0</td>
</tr>
<tr>
<td>Do not enjoy PA (referent)</td>
<td>249</td>
<td>20.0</td>
</tr>
<tr>
<td>Perceived Health Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>10</td>
<td>0.8</td>
</tr>
<tr>
<td>Fair</td>
<td>157</td>
<td>12.5</td>
</tr>
<tr>
<td>Good</td>
<td>730</td>
<td>58.2</td>
</tr>
<tr>
<td>Excellent</td>
<td>357</td>
<td>28.5</td>
</tr>
<tr>
<td>Perceived Barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t have anyone to go with</td>
<td>524</td>
<td>43.4</td>
</tr>
<tr>
<td>I have someone to go with (referent)</td>
<td>684</td>
<td>56.6</td>
</tr>
<tr>
<td>I don’t have the equipment I need</td>
<td>208</td>
<td>17.1</td>
</tr>
<tr>
<td>I have the equipment I need (referent)</td>
<td>1008</td>
<td>82.9</td>
</tr>
<tr>
<td>It is too expensive</td>
<td>315</td>
<td>26.1</td>
</tr>
<tr>
<td>It is not too expensive (referent)</td>
<td>892</td>
<td>73.9</td>
</tr>
</tbody>
</table>
I’m too busy with homework                  518  43.0  
I’m not too busy with homework (referent)  688  57.0

I am too busy with other physical activities 542  45.1
I am not too busy with other physical activities (referent)  659  54.9

I am not allowed to go because my parents don’t think it is safe 44  3.6
I am allowed to go, my parents think it is safe (referent)  1164  96.4

The times that the facilities are open don’t fit into my schedule 590  49.5
The times fit into my schedule (referent) 602  50.5

The facilities are too far to walk to and I can’t get a drive 709  58.3
The facilities are not too far (referent) 508  41.7

There is no public transportation where I live 461  38.0
There is public transportation where I live (referent) 752  62.0

**Area-level Variables (N schools=10)**

<table>
<thead>
<tr>
<th>Distance to the YMCA</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 5km</td>
<td>5</td>
<td>50.0</td>
</tr>
<tr>
<td>&gt; 5km</td>
<td>5</td>
<td>50.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance to the Closest Pool</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 5km</td>
<td>5</td>
<td>50.0</td>
</tr>
<tr>
<td>&gt; 5km</td>
<td>5</td>
<td>50.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance to the Closest Arena</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 5km</td>
<td>7</td>
<td>70.0</td>
</tr>
<tr>
<td>&gt; 5km</td>
<td>3</td>
<td>30.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SES</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2</td>
<td>20.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
<td>50.0</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>30.0</td>
</tr>
</tbody>
</table>
Model #1: Pass use

Aggregate data from the electronic pass monitoring system showed that 200 (15.9%) study participants used their pass at least once during the study period. The null hypothesis that students were no more similar within schools than if chosen at random was rejected (Likelihood Ratio [LR] = 17.23, \( p<0.0001 \)), indicating the need to account for clustering of students by school. An additional LR test rejected the null hypothesis that area-level predictors did not have an effect (LR = 13.65, \( p<0.01 \)). These findings confirmed that multilevel modeling techniques were required to analyze the data. The fixed effects for each step of the model are presented in Table 3.

Table 3: Fixed effects for multilevel logistic regression examining pass use (n=1050)

<table>
<thead>
<tr>
<th>Fixed Effects Variables</th>
<th>OR (95% CI)</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Null Model</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block #1:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>1.20 (0.57, 2.55)</td>
<td>0.46</td>
</tr>
<tr>
<td>FAS Low</td>
<td>1.11 (0.27, 4.56)</td>
<td>0.80</td>
</tr>
<tr>
<td>FAS Moderate</td>
<td>0.91 (0.59, 1.39)</td>
<td>0.20</td>
</tr>
<tr>
<td>FAS High</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td>Block #2:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unstructured Facility Use</td>
<td>2.01 (1.10, 3.66)*</td>
<td>0.61</td>
</tr>
<tr>
<td>Organized Facility Use</td>
<td>1.41 (0.81, 2.46)</td>
<td>0.40</td>
</tr>
<tr>
<td>Active (≥ 5 days per week)</td>
<td>1.69 (1.10, 2.59)*</td>
<td>0.37</td>
</tr>
<tr>
<td>Enjoy PA</td>
<td>1.47 (0.84, 2.57)</td>
<td>0.42</td>
</tr>
<tr>
<td>Perceived Health Poor</td>
<td>2.44 (0.37, 16.04)</td>
<td>2.35</td>
</tr>
<tr>
<td>Perceived Health Fair</td>
<td>2.32 (1.13, 4.76)*</td>
<td>0.85</td>
</tr>
</tbody>
</table>
Gender and family affluence accounted for little of the variance in pass use. These variables were included in the model to account for their strong correlation with youth physical activity. Several other individual-level variables were significant predictors of pass use. For instance, pass-users were more likely to: 1) be active at least 5 days per week (Odds Ratio [OR] 1.69, 95% Confidence Interval [CI]: 1.10-2.59); and 2) to have used recreation facilities for unstructured activities at baseline (OR 2.01, 95% CI: 1.10-3.66). Students who reported poor or

<table>
<thead>
<tr>
<th>Block #3:</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>No one to go with</td>
<td>0.73</td>
<td>(0.48, 1.10)</td>
<td>0.15</td>
</tr>
<tr>
<td>No Equipment</td>
<td>0.95</td>
<td>(0.56, 1.60)</td>
<td>0.25</td>
</tr>
<tr>
<td>Too Expensive</td>
<td>1.06</td>
<td>(0.68, 1.66)</td>
<td>0.24</td>
</tr>
<tr>
<td>Homework</td>
<td>1.84</td>
<td>(1.22, 2.79)**</td>
<td>0.39</td>
</tr>
<tr>
<td>Other PA</td>
<td>1.04</td>
<td>(0.68, 1.59)</td>
<td>0.23</td>
</tr>
<tr>
<td>Not Safe</td>
<td>0.47</td>
<td>(0.14, 1.61)</td>
<td>0.29</td>
</tr>
<tr>
<td>Schedule Conflicts</td>
<td>0.66</td>
<td>(0.38, 1.14)</td>
<td>0.18</td>
</tr>
<tr>
<td>Too Far</td>
<td>0.97</td>
<td>(0.62, 1.51)</td>
<td>0.22</td>
</tr>
<tr>
<td>No Public Transportation</td>
<td>0.74</td>
<td>(0.42, 1.30)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender x Unstructured Facility Use</td>
<td>0.34</td>
<td>(0.14, 0.79)*</td>
<td>0.15</td>
</tr>
<tr>
<td>Gender x Organized Facility Use</td>
<td>1.39</td>
<td>(0.61, 3.17)</td>
<td>0.59</td>
</tr>
<tr>
<td>Gender x Schedule Conflicts</td>
<td>2.22</td>
<td>(1.02, 4.83)*</td>
<td>0.88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to YMCA</td>
<td>0.90</td>
<td>(0.86, 0.95)**</td>
<td>0.02</td>
</tr>
<tr>
<td>sSES Low</td>
<td>1.00</td>
<td>(referent)</td>
<td></td>
</tr>
<tr>
<td>sSES Moderate</td>
<td>2.38</td>
<td>(0.45, 12.64)</td>
<td>2.03</td>
</tr>
<tr>
<td>sSES High</td>
<td>1.22</td>
<td>(0.23, 6.64)</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Note: *** p < .001, ** p < .01, * p < .05  
  sSES = school-level socio-economic status
fair health were more than twice as likely to use their pass; this effect was significant for students who reported fair health (95% CI: 1.13-4.76). Interestingly, pass use was also more likely among students who reported homework as a barrier to facility use at baseline (OR 1.84, 95% CI: 1.22-2.79).

In terms of gender differences, adolescent boys who used facilities for unstructured activities were more likely to use their pass as compared to girls who used the facilities for unstructured activities. Additionally, reporting scheduling conflicts as a barrier at baseline was associated with a higher probability of pass use among girls as compared to boys.

At the area-level, pass-users were more likely to attend a school in close proximity to the YMCA (OR 0.90, 95% CI: 0.86-0.95). Distance to the YMCA was used as the proximity measure for overall pass use because a large majority of students used their pass at this facility. Although pass use was more likely among students from moderate and high SES schools, this effect was non-significant.

**Model #2: Rate of Pass Use at the YMCA**

Analogous to the first model, the null hypothesis that students were no more similar within schools than if chosen at random was rejected (LR = 486.79, p<0.0001). Furthermore, a likelihood ratio test rejected the null hypothesis that the area-level predictors did not have an effect (LR = 17.76, p<0.001), indicating that multilevel techniques were relevant for data analysis. The fixed effects for each step of the model are presented in Table 4.
### Table 4: Fixed effects for multilevel Poisson regression examining YMCA visits (n=1050)

<table>
<thead>
<tr>
<th>Fixed Effects Variables</th>
<th>IRR  (95% CI)</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Null Model</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Block #1:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>1.81 (0.95, 3.46)</td>
<td>0.60</td>
</tr>
<tr>
<td>FAS Low</td>
<td>0.46 (0.06, 3.44)</td>
<td>0.47</td>
</tr>
<tr>
<td>FAS Moderate</td>
<td>0.49 (0.41, 0.59)**</td>
<td>0.05</td>
</tr>
<tr>
<td>FAS High</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td><em>Block #2:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unstructured Facility Use</td>
<td>2.26 (1.83, 2.79)**</td>
<td>0.24</td>
</tr>
<tr>
<td>Organized Facility Use</td>
<td>1.18 (1.01, 1.38)*</td>
<td>0.09</td>
</tr>
<tr>
<td>Active (≥ 5 days per week)</td>
<td>1.05 (0.92, 1.21)</td>
<td>0.07</td>
</tr>
<tr>
<td>Enjoy PA</td>
<td>10.90 (6.54, 18.17)**</td>
<td>2.84</td>
</tr>
<tr>
<td>Perceived Health Poor</td>
<td>4.03 (2.80, 5.79)**</td>
<td>0.74</td>
</tr>
<tr>
<td>Perceived Health Fair</td>
<td>1.30 (1.04, 1.64)*</td>
<td>0.15</td>
</tr>
<tr>
<td>Perceived Health Good</td>
<td>0.44 (0.39, 0.51)**</td>
<td>0.03</td>
</tr>
<tr>
<td>Perceived Health Excellent</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td><strong>Block #3:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No one to go with</td>
<td>0.67 (0.55, 0.81)**</td>
<td>0.06</td>
</tr>
<tr>
<td>No Equipment</td>
<td>1.54 (1.28, 1.83)**</td>
<td>0.14</td>
</tr>
<tr>
<td>Too Expensive</td>
<td>0.32 (0.25, 0.41)**</td>
<td>0.04</td>
</tr>
<tr>
<td>Homework</td>
<td>1.10 (0.97, 1.24)</td>
<td>0.07</td>
</tr>
<tr>
<td>Other PA</td>
<td>0.95 (0.84, 1.09)</td>
<td>0.06</td>
</tr>
<tr>
<td>Not Safe</td>
<td>1.31 (0.79, 2.18)</td>
<td>0.34</td>
</tr>
<tr>
<td>Schedule Conflicts</td>
<td>0.71 (0.61, 0.83)**</td>
<td>0.06</td>
</tr>
<tr>
<td>Too Far</td>
<td>0.64 (0.53, 0.79)**</td>
<td>0.07</td>
</tr>
<tr>
<td>No Public Transportation</td>
<td>2.16 (1.69, 2.76)**</td>
<td>0.27</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender x FAS low</td>
<td>0.35 (0.02, 5.81)</td>
<td>0.50</td>
</tr>
<tr>
<td>Gender x FAS moderate</td>
<td>3.41 (2.60, 4.46)**</td>
<td>0.47</td>
</tr>
<tr>
<td>Gender x Unstructured Facility Use</td>
<td>0.50 (0.38, 0.68)**</td>
<td>0.08</td>
</tr>
</tbody>
</table>
The YMCA was by far the most popular type of facility; among pass-users, 89% went to the YMCA (Table 5). Results showed that students from families with low or moderate affluence had a lower rate of pass use at the YMCA; however, this effect was only significant for students from moderately affluent families (Incidence Rate Ratio [IRR] 0.49, 95% CI: 0.41-0.59). Students with a high rate of pass use at the YMCA reported using recreation facilities for unstructured (IRR 2.26, 95% CI: 1.83-2.79) and organized activities (IRR 1.18, 95% CI: 1.01-1.38) at baseline more often. Compared to students who rated their health as excellent, those who rated their health as poor (IRR 4.03, 95% CI: 2.80-5.79) or fair (IRR 1.30, 95% CI: 1.04-1.64) had a higher rate of pass use at the YMCA. Enjoyment of physical activity was a strong predictor of a higher rate of pass use (IRR 10.90, 95% CI: 6.54-18.17).

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Gender x Organized Facility Use</th>
<th>1.10 (0.84, 1.44)</th>
<th>0.15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender x Enjoy PA</td>
<td>0.14 (0.08, 0.25)***</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Gender x No one to go with</td>
<td>1.51 (1.14, 1.99)**</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>Gender x No Equipment</td>
<td>0.43 (0.31, 0.59)***</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Gender x Too Expensive</td>
<td>6.87 (4.98, 9.47)***</td>
<td>1.13</td>
</tr>
<tr>
<td></td>
<td>Gender x Not Safe</td>
<td>0.12 (0.04, 0.33)***</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Gender x Schedule Conflicts</td>
<td>2.65 (2.04, 3.45)***</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>Gender x Too Far</td>
<td>1.76 (1.31, 2.36)***</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Gender x No Public Transportation</td>
<td>0.36 (0.23, 0.58)***</td>
<td>0.09</td>
</tr>
</tbody>
</table>

| Step 5 | Distance to YMCA              | 0.83 (0.75, 0.91)*** | 0.04 |
|        | sSES Low                      | 0.28 (0.01, 6.69)    | 0.46 |
|        | sSES Moderate/High            | 1.00 (referent)      |      |

|        | Gender x Distance              | 1.05 (1.01, 1.09)**  | 0.02 |

Note: ***p < .001, **p < .01, *p < .05  
sSES = school-level socio-economic status
Table 5: Distribution and frequency of pass use per facility type (N=1261)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Number of study participants who used their pass at least once</th>
<th>Frequency of pass use</th>
</tr>
</thead>
<tbody>
<tr>
<td>YMCA</td>
<td>178</td>
<td>1903</td>
</tr>
<tr>
<td>Pools</td>
<td>21</td>
<td>80</td>
</tr>
<tr>
<td>Arenas</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: Numbers in column 2 do not add up to n=200 (the number of students who used their pass) because some students used more than one type of facility.

Significant gender interactions were found for three of the individual-level variables mentioned above: family affluence, previous use of facilities for unstructured activities, and physical activity enjoyment. More specifically, adolescent girls who reported moderate family affluence had a higher rate of pass use than adolescent boys who reported the same affluence. Furthermore, among adolescent girls who reported moderate family affluence, a higher rate of pass use at the YMCA was found as compared to girls who reported high family affluence. Compared to adolescent girls, a higher rate of pass use was found among adolescent boys who reported the following: 1) using recreation facilities for unstructured activities at baseline; and 2) enjoying physical activity.

Many of the barriers interacted with gender. Specifically, adolescent boys who reported cost, having no one to go with, or scheduling conflicts as barriers to facility use at baseline had a lower rate of pass use at the YMCA as compared to: 1) boys who did not report these barriers; and 2) adolescent girls who did report the same barriers. In contrast, a lower rate of pass use was found among adolescent girls who reported no equipment, not being allowed to go to facilities due to parental safety concerns, or no public transportation as compared to: 1) girls who did not
report these barriers; and 2) adolescent boys who did report the same barriers. The comparisons within-gender were evaluated by stratifying the YMCA model by gender.

Among the area-level variables there was a strong inverse relationship between distance to the YMCA and the rate of pass use; a one kilometre increase in distance was associated with a 17% decrease in the rate of pass use at the YMCA (IRR 0.83, 95% CI: 0.75-0.91). Although this influence was the same for both genders such that the rate of pass use decreased as distance to the YMCA increased, the influence was greater for adolescent girls. Area-level SES was not a significant predictor of the rate of pass use at the YMCA.

**Model #3: Rate of Pass Use at Pools**

At the individual-level, pass use at the local pools was higher among adolescent boys (IRR 0.32, 95% CI: 0.16-0.63) as well as students who were inactive at baseline (IRR 0.51, 95% CI: 0.27-0.96). Enjoyment of physical activity was a strong predictor; the rate of pass use at pools was almost 6 times higher among students who enjoyed physical activity (95% CI: 1.98-16.30). Interestingly, students who reported having “no one to go with” (IRR 2.77, 95% CI: 1.58-4.84) and “no equipment” (IRR 4.90, 95% CI: 2.79-8.60) actually had a higher rate of pass use at pools. In contrast, the rate of pass use at pools was lower among students who reported cost (IRR 0.25, 95% CI: 0.08-0.74) and scheduling conflict (IRR 0.23, 95% CI: 0.10-0.51) barriers. All area-level predictors were non-significant. The likelihood ratio of a multilevel model (e.g., individual- and area-level predictors) and a model that included only individual-level predictors was non-significant (LR= 0.94, p=0.8152). Despite this, area-level variables were included to increase the consistency across all four models to allow for comparative analyses. These results for Model #3 are presented in Table 6.
Table 6: Fixed effects for multilevel Poisson regression examining pool visits (n=1060)

<table>
<thead>
<tr>
<th>Fixed Effects Variables</th>
<th>IRR (95% CI)</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Null Model</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Block #1:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys (referent)</td>
<td>1.00</td>
<td>0.11</td>
</tr>
<tr>
<td>Girls</td>
<td>0.32 (0.16, 0.63)**</td>
<td>0.11</td>
</tr>
<tr>
<td>FAS Low/ Moderate</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td>FAS High</td>
<td>1.07 (0.61, 1.87)</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>Block #2:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unstructured Facility Use</td>
<td>1.72 (0.97, 3.03)</td>
<td>0.50</td>
</tr>
<tr>
<td>Organized Facility Use</td>
<td>0.52 (0.27, 1.02)</td>
<td>0.18</td>
</tr>
<tr>
<td>Active (≥ 5 days per week)</td>
<td>0.51 (0.27, 0.96)*</td>
<td>0.16</td>
</tr>
<tr>
<td>Enjoy PA</td>
<td>5.68 (1.98, 16.30)**</td>
<td>3.05</td>
</tr>
<tr>
<td>Perceived Health Poor/Fair</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td>Perceived Health Good/Excellent</td>
<td>1.18 (0.51, 2.74)</td>
<td>0.51</td>
</tr>
<tr>
<td><strong>Block #3:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No one to go with</td>
<td>2.77 (1.58, 4.84)**</td>
<td>0.79</td>
</tr>
<tr>
<td>No Equipment</td>
<td>4.89 (2.79, 8.60)**</td>
<td>1.41</td>
</tr>
<tr>
<td>Too Expensive</td>
<td>0.25 (0.08, 0.74)*</td>
<td>0.14</td>
</tr>
<tr>
<td>Other PA</td>
<td>0.70 (0.36, 1.36)</td>
<td>0.24</td>
</tr>
<tr>
<td>Schedule Conflicts</td>
<td>0.23 (0.10, 0.51)**</td>
<td>0.09</td>
</tr>
<tr>
<td>Too Far</td>
<td>0.77 (0.43, 1.35)</td>
<td>0.22</td>
</tr>
<tr>
<td>No Public Transportation</td>
<td>0.68 (0.34, 1.36)</td>
<td>0.24</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to closest pool</td>
<td>0.98 (0.88, 1.09)</td>
<td>0.05</td>
</tr>
<tr>
<td>sSES Low (referent)</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>sSES Moderate</td>
<td>1.53 (0.04, 54.23)</td>
<td>2.79</td>
</tr>
<tr>
<td>sSES High</td>
<td>0.40 (0.01, 25.15)</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Note: ***p < .001, **p < .01, *p < .05
sSES = school-level socio-economic status
Model #4: Rate of Pass Use at Arenas

Results showed that the rate of pass use at arenas was 11 times greater among students from low affluent families (95% CI: 1.71-78.96). Students who reported “no one to go with” as a barrier were also more likely to have a higher pass usage rate at arenas (IRR 4.73, 95% CI: 1.02-22.05). All area-level predictors were non-significant. The likelihood ratio of a multilevel model that included both individual- and area-level predictors was 3 times larger than the likelihood of a model that included only individual-level predictors; however, these results were non-significant (LR= 0.61, p=0.7353). The area-level indicators were included in the model, despite their non-significance, for the same reasons outlined in the previous section (Model #3). These results for Model #4 are presented in Table 7.

As noted earlier, pass use at the community pools and arenas was low compared to the YMCA. Due to the low rate of pass use at these specific facilities, the variability in area-level SES was very low in Model #3 and Model #4. This lack of variability between schools explains why area-level SES was not a significant predictor of the rate of pass use at pools (Model #3) or arenas (Model #4).

Table 7: Fixed effects for multilevel Poisson regression examining arena visits (n=1057)

<table>
<thead>
<tr>
<th>Fixed Effects Variables</th>
<th>IRR (95% CI)</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Null Model</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Block #1:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>1.00 (referent)</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>0.64 (0.13, 3.04)</td>
<td>0.51</td>
</tr>
<tr>
<td>FAS Low</td>
<td>11.61 (1.71, 78.96)*</td>
<td>11.35</td>
</tr>
<tr>
<td>FAS Moderate</td>
<td>0.35 (0.06, 2.02)</td>
<td>0.31</td>
</tr>
</tbody>
</table>
Discussion

Overall, the uptake of the Community Physical Activity Pass was low. This provides evidence that there are several factors that inhibit adolescents from using recreation facilities; even when cost is eliminated as a barrier. A detailed discussion of the factors associated with recreation facility use among adolescents is provided below.

The primary purpose of this study was to identify factors that predicted whether or not a student accessed recreation facilities using their Community Physical Activity Pass. The principal
finding was that both individual- and area-level factors played an important role in distinguishing pass-users from non-pass users. At the individual-level, pass-users were more likely to be physically active and to have used recreation facilities for unstructured activities at baseline. These results are consistent with previous research that found recreation facility use was positively associated with higher levels of physical activity participation in adolescents (Gordon-Larsen, McMurray, & Popkin, 2000).

Results also revealed that “too much homework” was significantly associated with pass use. Previous research has shown that youth commonly perceive homework to be a major barrier to their physical activity involvement (Allison et al., 2005; Dwyer et al., 2006; Humbert et al., 2008). In part, this is a reflection of the emphasis that our society places on the importance of education. For many youth and their parents, education is such a top priority that the completion of homework supersedes students’ involvement in other activities (Allison et al., 2005, Dwyer et al., 2006). Results from the current study are particularly interesting; although students perceived homework to be a significant barrier to facility use, students who reported this barrier at baseline were actually more likely to use their pass. This finding may seem counterintuitive at first; however, the relationship between educational attainment and physical activity may be used to explain this outcome. Although educational attainment is mostly uniform among all adolescents of a similar age, it is widely recognized that parental educational level is positively correlated with physical activity levels among youth (Van der Horst, Paw, Twisk, & Mechelen, 2007). Thus, it logically follows that those students with highly educated parents, who are taught to value education and encouraged to do their homework, would engage in greater amounts of physical activity. Indeed, as mentioned earlier, active students were more likely to use their pass in the current study.
One encouraging finding from the current study was that students who rated their health as fair were more likely to use their pass. This suggests that students who perceived their health to be fair might have been interested in improving their health by taking advantage of physical activity opportunities that were available to them (i.e., Community Physical Activity Pass). This outcome, however, should be interpreted with caution given that only 12.5% of the sample rated their health as fair.

Interestingly, area-level distance to recreation facilities was the strongest predictor in the first model. This finding is consistent with previous research highlighting the positive correlation between the availability of recreation facilities and physical activity behaviour among youth (Dowda et al., 2009; Gordon-Larsen et al., 2006; Sallis & Glanz, 2006; Sallis et al., 2000). This finding along with the results from the likelihood ratio test confirm the importance of using an ecological approach when examining the factors associated with youths’ use of recreation facilities.

A secondary objective of this study was to determine the individual- and area-level predictors of the rate of Community Physical Activity Pass use at each type of recreation facility: the YMCA (Model #2), pools (Model #3), and arenas (Model #4). As mentioned previously, the majority of pass use occurred at the YMCA. This finding, in itself, is very interesting and warrants exploration. There are several plausible explanations for the YMCA’s popularity among study participants. First, the YMCA was unique as it was the only multi-purpose facility in this study. Thus, students were provided with the opportunity to participate in a wide range of activities on a daily basis, including, but not limited to: basketball, weight-lifting, squash, and fitness classes (e.g., yoga and dance). In previous research, adolescents have indicated that having a range of activity choices is an important facilitator for their physical activity participation (Ketteridge & Boshoff, 2008; Mulvihill, Rivers, & Aggleton, 2000; Rees et al, 2006).
Furthermore, basketball (Aaron, Storti, Robertson, Kriska, & LaPorte, 2002; Mulvihill et al., 2000) and dance/aerobics classes (Aaron et al., 2002; Grieser et al., 2006; Mulvihill et al., 2000; Saunders & Moody, 2006), both offered at the YMCA, have been consistently cited in the literature as being very popular activities among adolescent boys and girls, respectively.

Second, the accessibility of the YMCA in terms of the hours of operation undoubtedly contributed to its popularity. It was available for use anytime between 5:30am and 11:00pm on weekdays and for 13 hours each Saturday and Sunday. In contrast, the majority of community pools and arenas involved in this study were open to the public for one or two hour intervals throughout the day on most days of the week.

Lastly, it is plausible that the social atmosphere at the YMCA was very appealing to study participants. According to youth, the social aspect of engaging in physical activity is on par with the physical aspect in terms of motivating them to participate (Humbert et al., 2008; Mulvihill et al., 2000; Rees et al, 2006). At any time of day, there are people of all ages at the YMCA creating a social atmosphere that would be attractive to students and may have contributed to its popularity among pass-holders.

Given that the majority of pass use occurred at the YMCA, the discussion examining the predictors of the rate of pass use per facility-type will predominately focus on the YMCA (Model #2). Overall, there were several significant predictors for rate of pass use at the YMCA. The principal finding was that the predictors of the rate of pass use at the YMCA were very similar to the correlates of physical activity participation among adolescents outlined in the research literature. These commonalities will be discussed below. In addition, the predictors of the rate of pass use will be contrasted against those in Model #1 that distinguished pass-users from non-users, where appropriate.
Examination of area-level distance revealed that proximity to the YMCA was a strong predictor of a higher rate of pass use. This finding is congruent with results in Model #1 as well as previous research examining the availability of recreation facilities and youth physical activity levels (Dowda et al., 2009; Gordon-Larsen et al., 2006; Sallis & Glanz, 2006; Sallis et al., 2000). A recent study by Dowda and colleagues (2009) found that the proximity to multipurpose facilities (i.e., recreation centers) was associated with higher levels of physical activity among adolescent girls; whereas, proximity to individual activity (e.g., dance studios) and team activity facilities (e.g., soccer, baseball, basketball clubs, etc.) were not. The current study provides evidence that a similar relationship exists for actual recreation facility use among both genders. More specifically, proximity to multipurpose facilities (i.e. the YMCA) was a strong predictor of a higher rate of pass use; whereas proximity to individual and team activity facilities (i.e., pools and arenas) was not significant. Thus, perhaps the availability of a specialized recreation facility (e.g., arena) with limited activity options is not enough of a draw for adolescents, whereas availability of facilities that offer a variety of options (e.g., multipurpose facilities) has more pull for youth. Further research is needed to confirm these findings given the low rate of pass usage at both pools and arenas in this study.

The relationship between SES and physical activity levels in youth has been well established in the literature (Brodersen, Steptoe, Boniface, & Wardle, 2007; Butcher, Sallis, Mayer, & Woodruff, 2008; Gordon-Larsen et al., 2000; Stalsberg & Pedersen, 2010); however, less is known about SES and adolescents’ use of recreation facilities. Results from the current study revealed that individual-level SES predicted the rate of pass use at the YMCA; whereas, area-level SES was not a predictor of pass use in any of the models. This finding mirrors that of Janssen and colleagues (2006) who found that individual indicators of SES (e.g., FAS) predicted physical activity levels, but area-level SES indicators (e.g., median family income,
unemployment rate, and parent education level) did not. Thus, it appears that the relationship between SES and adolescent recreation facility use similar to that of SES and youth physical activity levels.

Although individual-level family affluence predicted the rate of pass use at the YMCA, these results should be interpreted with caution given the low variability in family affluence reported by participants in the study. As noted in Table 1, 64.9% of students reported being of high affluence. Of the 33.1% who reported being of middle affluence, over half reported being in the highest level within this middle category. Moreover, only 2% of students reported low family affluence. These findings are not consistent with 2006 census data that report 9.0% of families in Kingston, ON, Canada have low income status (Jackson, 2009). Thus, it appears that students may have overestimated their family affluence. This raises concern about the accuracy of family affluence measurement as well as youths’ ability to conceptualize and perceive their families’ financial status. The FAS has been shown to discriminate among youth from different status families; however, developers of the FAS have acknowledged that biases may occur in reporting affluence (Boyce et al., 2006; Currie et al., 2008). More specifically, the FAS may be a less sensitive measure in developed countries like Canada where even low affluent families own cars and computers. For these reasons, further investigation of the influence of both individual- and area-level SES on adolescents’ use of recreation facilities is warranted.

One positive finding was that students who perceived their health to be poor or fair had a higher rate of pass use at the YMCA; the rate of pass use among students who reported poor health was over four times higher than those who reported excellent health. This trend was also apparent in Model #1. As mentioned earlier, this finding should be interpreted with caution given that only 13.3% of the study sample perceived their health to be poor or fair. Research examining the construct of self-rated health among adolescents and its components is still in its infancy.
To date, studies have reported that physical inactivity is independently associated with lower ratings of health among youth (Breidablik et al., 2008; Koezuka et al., 2006; Tremblay et al., 2003). Thus, the finding from the current study is encouraging as it suggests that students with lower health ratings, who are likely to be inactive, are interested in improving their health by taking advantage of physical activity opportunities (i.e. Community Physical Activity Pass) that are available to them.

It is widely recognized that perceived barriers are an important correlate of overall physical activity participation in youth (Sallis & Owen, 1999). The current study suggests that the same is true for recreation facility use. In total, there were six barriers that significantly predicted the rate of pass use at the YMCA. The overall effect (when both genders were included) was that lower rates of pass use were found among students who reported the following barriers: having no one to go with, schedule conflicts (i.e. lack of time), distance from their home to facilities, or cost. These four barriers have been consistently reported to be associated with lower levels of physical activity in youth (Allison et al., 2005; Dwyer et al., 2006; Humbert et al., 2008). Interestingly, when these four barriers were analyzed for gender interactions results showed that the influence of these four barriers was much stronger for adolescent boys than girls. In fact, among adolescent girls, those who reported cost and schedule conflicts as barriers to facility use at baseline actually had higher rates of pass use at the YMCA as compared to those who did not report these barriers. Therefore, although cost may have prohibited adolescent girls from using recreation facilities previously, it is possible that the Community Physical Activity Pass alleviated this barrier for girls. It is unclear, however, why the cost barrier persisted for adolescent boys.

The two remaining barriers that significantly predicted pass use at the YMCA exerted a similar influence as homework in the first model. More specifically, the overall effect (when both
genders were included) showed that students who reported no equipment or no public transportation as barriers at baseline had a higher rate of pass use at the YMCA. Significant gender differences were also found for these two barriers. For instance, a lower rate of pass use at the YMCA was found among adolescent girls who reported no equipment or no public transportation as compared to adolescent boys who reported these same barriers. Furthermore, among adolescent boys, those who reported these two barriers actually had a higher rate of pass use than boys who did not report these barriers. In terms of equipment, the YMCA often provides some equipment (e.g., basketballs, volleyballs, etc.) free of charge. Therefore, although lack of equipment may have prohibited adolescent boys from using recreation facilities previously, it is possible that this barrier was alleviated by providing students with access to the YMCA and its equipment.

It is important to reiterate that the underlying reasons for these significant gender differences are unknown. It was unexpected and surprising to find such dramatic gender differences with respect to the influence of each barrier. These results show the importance of investigating gender differences when examining barriers to recreation facility use, as this information may be used to tailor future initiatives that aim to increase adolescents’ use of recreation facilities. For this reason, further research that examines the barriers to adolescents’ use of recreation facilities and the gender-specific influences among them is warranted.

Enjoyment of physical activity was a strong predictor of a higher rate of pass use at both the YMCA and community pools. This was not surprising given that previous research has found enjoyment to be “a key motivating factor” for adolescents’ physical activity participation (Mulvihill et al., 2000). Furthermore, an abundance of interviews and focus groups have been conducted with youth to identify barriers and facilitators of physical activity; a common theme throughout these studies has been students’ emphasis on the need for fun and enjoyable activities.
(Allison et al., 2005; Dwyer et al., 2006; Humbert et al. 2008; Ketteridge & Boshoff, 2008; Mulvihill et al., 2000). The more fun and appealing the activities, the more inclined students are to participate. In the present study, enjoyment of physical activity did not distinguish pass-users from non-users (Model #1); however enjoyment was a strong predictor of the rate of pass use at the YMCA (Model #2). These findings suggest that physical activity enjoyment may be more important in motivating students to continue to use facilities. For instance, it makes logical sense that students who enjoy being physically active as well as those who enjoyed their first visit to recreation facilities would be more likely to re-visit facilities in the future.

There were a few notable differences in the predictors of the rate of pass use at pools and arenas. First, all area-level factors were non-significant. The lack of variability among schools that resulted from a low rate of pass use at these specific facilities may have contributed to this outcome. Thus, it should not be assumed that area-level distance and SES do not predict the pass usage rate at pools or arenas; instead further research is needed to examine these relationships. Second, out of all four models, gender was only a significant predictor for the rate of pass use at pools (Model #3); such that adolescent boys had a higher rate of use. Body-centered issues including negative body images and bodily self-consciousness (Dwyer et al., 2006; Mulvihill et al., 2000; Rees et al., 2006) that are pervasive in adolescent girls could help explain this gender difference. In particular, teenage girls who are self-conscious or embarrassed about their physical appearance may be less likely to participate in an activity where the body is more exposed, like swimming. A third notable finding for community pools (Model #3) and arenas (Model #4) was that students who reported having “no one to go with” as a barrier at baseline, had a higher rate of pass use at these facilities. By providing all grade 10 students with a pass, it is conceivable that this barrier was overcome as students were able to go to the facilities with their friends, who also received a Community Physical Activity Pass. Another notable and very encouraging finding
was that less active students had a higher rate of pass use at community pools. The underlying reason students with lower activity levels were more likely to use pools at a higher rate is unknown. In order to better understand this finding and several others, it is recommended that future studies conduct focus groups with students to contextualize the findings and to ensure a participatory approach, whereby students are able to provide input to further improve program. Through this process, students may gain a sense of ownership over the program that might add to the popularity and success of the program.

**Limitations**

As with any study, this project is not void of limitations. First, the reliability of self-reported physical activity data is a study limitation. It would have been ideal to measure physical activity objectively using pedometers or accelerometers, however, given the large sample size this was an unrealistic option for the present study. Second, the current study focused on perceived barriers and did not measure actual barriers. Documenting actual barriers could be an interesting addition to future investigations. A third limitation to this study is the generalizability of results to other populations and age groups. Given the community context of the physical activity pass program, it is possible that the results would differ if the same study were conducted in another region. Lastly, we were unable to calculate a weighted average for area-level SES based on the number of students that lived in each census tract because we were unable to obtain individual student postal codes. Given that we did not use the raw average as the indicator, but instead used the average to categorize schools into low, moderate, and high SES tertiles, this is not of great concern.
Conclusion

The contributions from the current study are important and original given that, to the best of our knowledge, this is one of the first studies to objectively measure the use of recreation facilities and to examine predictors of recreation facility use among Canadian youth. Overall, results suggest that providing free access may be insufficient to get grade 10 students to use recreation facilities, especially those who are less active. This study was necessary as it provided a greater understanding of the factors associated with recreation facility use among adolescents. New knowledge yielded by this research may be used to: 1) inform future interventions aimed at increasing physical activity involvement through access to community recreation facilities; 2) develop interventions aimed at increasing physical activity levels among youth who are at-risk for inactivity; and to 3) inform policy decisions about future physical activity initiatives for adolescents.
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Chapter 4

GENERAL DISCUSSION

4.1 Summary of Findings

The Grade 10 Community Physical Activity Pass study aimed to investigate the effectiveness of an environmental intervention that provided students with free access to community recreation facilities for 10 months.

Overall, this thesis corroborates the complexity of physical activity behaviour among youth. Results highlighted in the manuscript show that the factors associated with adolescents’ use of recreation facilities are also complex. Both individual- and area-level (environmental) factors were found to be associated with recreation facility use among youth.

Many results from the current study were consistent with findings from research examining factors that influence youth physical activity behaviour. For instance, enjoyment of physical activity was a strong predictor of higher rates of pass use at pools and the YMCA. Results from the current study also revealed that pass-users were more likely to have accessed recreation facilities previously. Moreover, a higher rate of pass use at the YMCA was predicted by students’ use of facilities for both structured and unstructured activities at baseline. Among the area-level influences, distance was found to be positively associated with pass use. In addition, students who attended a school that was a short distance away from the YMCA had higher rates of pass use at this facility.

Other results from the Community Physical Activity Pass study were contrary to expectations, including the relationship between homework and pass use. More specifically, students who reported homework as a barrier to facility use at baseline were more likely to use
their pass. Another unexpected finding was the dramatic gender differences with respect to the influence of each of the significant barriers in the YMCA model. In terms of area-level predictors, it was surprising that distance to pools and arenas was not significantly associated with the rate of pass use at these facilities.

Although these represent only a sampling of the findings from the current study, they illustrate that, when taken together, the overall picture is somewhat puzzling. This is especially the case with findings that appear to be outright contradictory. For instance, results revealed that pass-users were more likely to be active and to have lower self-health ratings. These findings are not consistent with previous research that reported lower ratings of perceived health to be independently associated with physical inactivity among youth (Breidablik et al., 2008; Koezuka et al., 2006; Tremblay et al., 2003). This thesis identifies many of the pieces to the puzzle; however, the way in which these pieces fit together has yet to be determined.

There are several potential reasons for the aforementioned contradictions. It is important to acknowledge that the relationships outlined above compare predictors of recreation facility use among adolescents from the current study with previously identified correlates of youth physical activity behaviour. Given that the present study was one of the first to examine the factors that influence adolescents’ use of facilities, there is a lack of information in the literature pertaining to the correlates of facility use among youth with which to compare the results from the current study (Active Healthy Kids Canada, 2009). Thus, the contradictions discussed previously may be a reflection of the fact that physical activity and use of recreation facilities are two different behaviours that each have a unique set of correlates. In addition, previous research has been predominantly cross-sectional in nature and has not objectively measured recreation facility use. Previous research has relied on self-reported measures of facility use which often correlates with self-reported barriers to physical activity. When all of these data are obtained from one individual
(i.e. a single source), the information provided is often coherent and less contradictory even though in reality this may not be the case; this is one limitation of relying on subjective measures. The present study found that some self-reported barriers did not correlate with recreation facility use when an objective measure was utilized. Given that information obtained using subjective measures may not be an accurate, the use of objective measures where applicable is widely advocated.

The contributions from the current study are important and original given that, to the best of our knowledge, this is one of the first studies to objectively measure the use of recreation facilities and to examine predictors of recreation facility use among Canadian youth. Overall, results suggest that providing free access may be insufficient to get grade 10 students to use recreation facilities, especially those who are less active. These findings contribute to arguments in favour of using an ecological approach that endorses change on multiple levels. Multi-level interventions can be very complex and challenging to implement. For this reason, researchers have suggested a stepwise approach that builds towards a more comprehensive integration of ecological principles (Sallis et al., 1998). Logically, environmental initiatives should precede educational initiatives that promote physical activity behaviour. Beginning with educational initiatives instead of environmental ones may lead to the promotion of health behaviours that are ‘unrealistic or impossible’ (Sallis et al., 1998). This can deter individuals who want to engage in physical activity, but cannot in an environment that is unsupportive of such behaviour. Through the Grade 10 Community Physical Activity Pass initiative, KGA provided environmental support for youth physical activity as recommended. Results revealed that this initiative was not successful as less than one fifth of students accessed facilities using their Community Physical Activity Pass. Environmental support, however, is only one part of the equation; educational initiatives are also needed to raise awareness, build skills, and enhance knowledge and
motivation. Unfortunately, pass promotion efforts including educational initiatives, were restricted due to limited financial and human resources. Thus, although the environment was supportive, promotional and educational initiatives at the individual-level were not sufficient undoubtedly contributing to the low uptake of the intervention. For this reason, future pass programs should consider augmenting the program with educational initiatives in order to increase adolescents’ use of recreation facilities.

4.2 Future Directions

4.2.1 Future Directions for KGA

The following section of this chapter will discuss the next steps for KGA. The Community Physical Activity Pass program is currently in its sixth year. KGA prides itself on following a community-based participatory approach. As such, an annual ‘think tank’ is held with community stakeholders of the pass program. The time is used to gather feedback and suggestions to further improve the program. Results from the current research study provide additional insight to guide the changes that are required to enhance adolescents’ use of recreation facilities.

Given the strong negative association between distance to facilities and pass use, it is recommended that KGA consider providing transportation to recreation facilities. For example, providing students with free after-school transportation to facilities (e.g., a school bus that transports kids from school to a recreation facility) may further enhance the accessibility of facilities, thereby increasing adolescents’ use of them. As well, it is recognized that distance to recreation facilities is a large accessibility barrier for those who reside in rural communities. To reduce these barriers, it is suggested that school gyms could be used for recreation outside of
school hours. The gyms could be used for pick-up basketball, soccer, or fitness classes for adolescents to participate after school. In essence, this is a way of bringing a recreation facility to a rural community that is more cost-effective than building a new facility.

Results from the current study also showed that a greater number of students accessed the one facility that offered multiple activity choices (i.e., the YMCA) as compared to the others. These findings have important policy implications. Accordingly, it is recommended that KGA lobby the municipal council to enhance existing facilities by making them multi-activity facilities. Instead of building new multipurpose facilities that are very expensive, simply adding to existing facilities to increase the number of activities available might increase their use. For example, adding an outdoor basketball or tennis court to an arena. Alternatively, indoor arenas that are often closed for the spring and summer could be used for pick-up soccer or basketball during this time.

4.2.2 Future Directions for Research

Knowledge regarding the actual use of recreation facilities and the factors associated with adolescents’ use of these facilities is limited. For this reason, the current study has made a significant contribution to the research literature. Results from this study revealed that adolescents’ use of recreation facilities is a complex phenomenon that is influenced by multiple factors. Further research is needed to examine these influences and their interrelationships more closely. Future directions for research will be discussed herein.

First, it is recommended that a pre-test post-test be used to evaluate changes in physical activity behaviour, reported barriers, and facility use that result from providing students with free access to recreation facilities. A detailed outline of this type of study will be discussed in the next section of this discussion (i.e. study limitations).
A second recommendation is that focus groups be conducted with grade 10 students to
gain a better understanding of the low uptake of the pass intervention. It was suggested by
program coordinators and research assistants that a lack of promotional strategies may have
contributed to the low uptake. For this reason, our third research recommendation is that a student
led marketing campaign be implemented and evaluated for its effectiveness. The purpose of this
marketing campaign would be to: 1) increase awareness of the pass program, 2) inform students
of the many health benefits associated with physical activity, and 3) remind students about
facility schedules and special events. Given the age of the intended population, implementing a
peer-led campaign may be most effective in increasing adolescents’ use of facilities as it will
allow students to feel a sense of ownership over the program.

Lastly, it is recommended that future research be conducted to assess the cost-
effectiveness of the pass program and other similar programs that provide free access to
recreation facilities. This research will be of interest to participating recreation facilities as well as
other physical activity-related facilities that might consider becoming part of the program. The
objective of this research would be to address the following questions: 1) Do students continue to
use recreation facilities when they no longer have a pass?; 2) Are pass-users accompanied by
paying customers?; and, 3) Does providing one family member with free access to facilities
encourage other members of the family to be active?

4.3 Study Limitations

While the contributions from the current study are important and original, this project is
not void of limitations. Study limitations include the reliance on a self-reported measure of
physical activity and the assessment of perceived barriers to facility use instead of actual barriers.
In addition, it is important to acknowledge that the scope of the current study was limited due to
challenges encountered at the school board level. Due to these unexpected complications, we were unable to proceed with the original study design. A brief summary of the original study design and its objectives are provided below. Following this, issues with conducting research in schools will be discussed. Examples from the Grade 10 Community Physical Activity Pass study will be provided.

The original plan was to evaluate the influence of the Community Physical Activity Pass on physical activity levels in grade 10 students by using a quasi-experimental, pre-test post-test study design. The same measures would be collected from a grade 9 comparison group. In the fall of 2007, all grade 9 (n=1402) and grade 10 students (n=1812) were invited to complete the baseline questionnaire. Following the completion of this questionnaire, grade 10 participants (intervention group) received a free Community Physical Activity Pass. The grade 9 participants (control group) did not receive a pass. In spring 2008, a follow-up questionnaire was to be administered to all grade 9 and grade 10 students. The objectives of this study were twofold:

1. To determine whether the Community Physical Activity Pass influenced the use of recreation facilities by grade 10 students as compared to grade 9 students who would not receive a pass; and,

2. To determine whether increased access to recreation facilities (via pass use) would increase overall physical activity levels in grade 10 students who used their pass as compared to grade 10 students who do not use their pass.

Approval was obtained from the Queen’s University General Research Ethics Board (GREB) to use passive consent for this study. After receiving approval from the university, the research coordinator met with the supervising principal at the local school board to discuss the project and request their participation. Given past successful research collaboration with this school board to
evaluate the grade 5 Community Physical Activity Pass initiative, the new supervising principal welcomed the project. Following this meeting, an email was sent from to supervising principal to all secondary school principals requesting their support and participation in the research study. A total of 10, out of 11 secondary schools, agreed to participate. Letters of information were sent to parents of grade 10 students via their child and students without parent refusal (i.e., with passive parental consent) were invited to participate. Baseline data were collected in October 2007 from a large representative sample of assenting grade 9 (n=977) and grade 10 (n= 1261) students. The overall response rate was thus 69.6%. In December 2007, we received notification from a superintendent of the same school board that active parental consent would be required in order for students to participate in the follow-up survey (May 2008). Consequently, the response rate for the follow-up survey decreased to 5.5%; in total, 114 grade 9 students and only 63 grade 10 students participated.

As we were unable to proceed with our original pre- and post-intervention evaluation plan, the modified study used the baseline data and the objective pass use data to determine the factors that predicted Community Physical Activity Pass use. Important information regarding actual facility use among youth and the factors associated with their use was gleaned from the final study. Gaining additional knowledge about recreation facility use in youth and how it impacts overall physical activity levels was unfortunately, impossible.

It is important to learn and gain knowledge from our research; not only from the data that are collected, but also from our experiences collecting the data. As such, the following section will discuss some of the challenges of conducting research in schools and the implications of these issues on the advancement of research and knowledge about children and youth. Examples will be provided within the context of physical activity promotion and the grade 10 Community Physical Activity Pass project.
4.4 Challenges of Conducting Research in Schools

As written in the Tri Council Policy Statement (1998), informed consent is a staple of all research initiatives involving human subjects. There are two methods used for obtaining informed consent from parents of school-aged children: active and passive consent. *Active consent* requires that all parents sign and return a consent form indicating whether or not they give permission for their child to participate in the research initiative. A non-response, or an unreturned form, under this procedure is equivalent to a refusal to participate (Ellickson & Hawes, 1989). Conversely, *passive consent* requires that parents return consent forms only if they do not want their child to participate in the research. For this procedure, a non-response from parents is equivalent to providing permission for their child to partake in the study (Ellickson & Hawes, 1989). There exists an ongoing and highly controversial debate about whether active or passive parental consent should be used when conducting research with children, especially in the school setting (Baker, Yardley, & McCaul, 2001).

In today’s society, children are often viewed as vulnerable and incompetent beings when it comes to research (Powell & Smith, 2009). For this reason, active parental consent is often sought for research involving children and youth. There are, however, concerns that arise when active parental consent procedures are employed that might compromise the integrity of the research. For this reason, many have questioned whether active parental consent is actually needed for minimal risk studies (Anderman et al., 1995; Baker et al., 2001; Esbensen, Miller, Taylor, He, & Freng, 1999), particularly with adolescents who have the cognitive capacity to make informed decisions about their participation (Santelli et al., 2003; Zinner, 1995). Specifically, there are two major methodological issues associated with active parental consent procedures: 1) low participation rates, and 2) biased sampling. Each of these issues will be reviewed below.
It is widely recognized that active parental consent procedures tend to result in lower research participation rates (Baker et al., 2001; Ellickson & Hawes, 1989; Esbensen et al., 1999). For instance, in a study involving students (12 years of age), Esbensen and colleagues (1999) found that research participation rates ranged from 40% to 60% when active parental consent was sought. In contrast, the participation rates increased to a range of 80% to 100% when passive consent was used (Ellickson & Hawes, 1989). The Grade 10 Community Physical Activity Pass project provides additional evidence of this effect. In this study, the response rates decreased dramatically from 69.6% when passive consent was used (baseline) to 5.5% when active consent was required (follow-up).

The active consent process can be quite onerous for individuals and it is probable that in general, the complexity of the process contributes to low response rates. For this reason, strategies might be put in place to decrease the number of non-responses when active consent procedures are used. The following strategies were used for the Grade 10 Community Physical Activity Pass project during the follow-up data collection: 1) consent forms were mailed home to parents (to ensure that forms reached their intended recipient), 2) promotional posters announcing the data collection time were displayed at participating schools (to enhance recall), and 3) daily announcements were used to remind students to return their forms (to enhance recall). Despite these efforts, the follow-up response rate for the Grade 10 Pass project was extremely low. These findings are consistent with previous research. For example, Esbensen and colleagues (1999) found that participation rates only improved marginally when similar strategies were put in place. Given the large number of non-responses associated with active parental consent, Ellickson and Hawes (1989) conducted a study that investigated the reasons for non-responses from parents. Results showed that an overwhelming majority of non-responding parents did not return the form due to lack of time and/or motivation. In other words, their non-response was not indicative of a
refusal to participate. This begs the question, is it fair to assume that a non-responding parent is in fact refusing their child’s participation? Additionally, Baker and colleagues (2001) found that the characteristics and attitudes of non-responding parents were more akin to those of parents who consented as compared to those who actively refused. Overall, these findings provide support for the use of passive parental consent procedures that equate non-response with permission to partake in research, when studies are of minimal risk.

A second methodological concern about active parental consent procedures is the difficulty in obtaining samples that are representative of the population. It is widely documented that active consent procedures tend to result in biased samples, thereby hindering the generalizability of the research results (Anderman et al., 1995; Baker et al., 2001; Betan, Roberts, & McCluskey-Fawcett, 1995; Dent et al., 1993, Ellickson & Hawes, 1989; Esbensen et al., 1999; Pirie et al., 1989). For example, data from the U.S. show that minority populations (e.g., Black and Hispanic adolescents), males, and older adolescents are often underrepresented when active parental consent is required (Esbensen et al., 1999). In contrast, there tends to be an overrepresentation of adolescents who are involved in extracurricular activities, perform well academically, live in two-parent households, and have parents with post-secondary educations (Anderman et al., 1995). In other words, youth who typically participate in research when active parental consent is sought represent a ‘socially advantaged group’ (Anderman et al., 1995). As acknowledged by Esbensen and colleagues (1999), this poses a large problem because “the very groups that are underrepresented under active consent procedures may be the ones most likely to be in the at-risk population…” (p. 319). In fact, research evidence has shown that adolescents who are systematically excluded through active parental consent requirements have a higher risk of both health and social problems (Baker et al., 2001; Henry, Smith, & Hopkins, 2002). In the context of physical activity research, it is probable that adolescents who are
excluded when active consent procedures are employed are also those most at-risk for inactivity
(i.e., youth with low SES, poor health, etc.).

The Grade 10 Community Physical Activity Pass project provides a good example of the
selection bias that can ensue from active parental consent procedures. Using the objective data, it
was observed that pass use among the representative sample of students who completed the
baseline survey (passive consent) was 15.9%. In contrast, the percentage of pass-users among
those who participated in the follow-up survey (active consent required) was 33%. Thus, there
was an overrepresentation of pass-users in the follow-up sample.

External validity and the integrity of the research findings are not the only concerns; there
is a much larger ethical issue at stake. In essence, through active parental consent procedures the
voices of already marginalized youth may be further oppressed. This breaches one of the most
fundamental principles of research ethics: the principle of justice. The principle of justice states
that both the risks and benefits of research should be shared evenly among individuals and groups
in the population. Thus, even if individuals are inadvertently excluded through stringent consent
procedures, the justice principle is violated as these individuals are denied the benefits that could
emerge from research (Santelli et al., 2003).

To ensure that all youth, including those who are socially disadvantaged or at-risk,
benefit equally from the knowledge gained through research endeavours, the policies for
conducting research with children and youth should be reviewed. When conducting research in
Ontario schools, researchers must abide by the Tri-Council Policy Statement as well as policies
determined by the Ontario Ministry of Education. These two organizations agree that informed
consent must be sought from parents for any research initiative involving youth; however, the

1 The parent letter of information informed parents that pass use would be objectively monitored at the
facilities.
type of informed consent (i.e., active or passive) that is required often differs. Under the current Tri-Council Policy Statement, active parental consent is generally recommended for minors to participate in research although there is currently no legal age of consent to research in Canada. There are exceptions, however, to active consent. As stated in Section 2 Article 2.1(c) of the Tri-Council Policy Statement, a university Research Ethics Board (REB) may, waive the requirement to obtain active consent when the study poses only minimal risk. Under the Tri-Council Policy Statement (1998), a study is considered to be of minimal risk when “...the probability and magnitude of possible harms implied by participation in the research are no greater than those encountered by the subject in those aspects of his or her everyday life...” (Article C1 p. 1.5). This statement is largely open to interpretation and for this reason has led to considerable debate. For instance, researchers have pointed out that if this statement were taken literally, then it would be acceptable to ask youth to engage in sexual activity without protection or to experiment with drugs, as these are risks that adolescents encounter in everyday life (Glantz, 1996). Due to the vagueness of this definition, the decision of whether or not a study is of minimal risk is largely at the discretion of university REB’s. In the case of the Grade 10 Community Physical Activity Pass project, and as per Queen’s University GREB policy that considers the final decision of consent type the purview of the school board, the research was cleared for using passive parental consent given that the study was deemed to pose minimal or no risk.

While the Ontario Ministry of Education mandates informed consent in order for children to participate in research initiatives, there are no provincial guidelines specifying the type of informed consent that is required (personal communication with Ontario Ministry of Education representative, May 13, 2009). Thus, most school boards have developed their own guidelines or policies. As a result, external research policies and guidelines can vary widely among school districts within a given province. For example, some school boards have established external
research review committees that consist of board personnel, school administrators, and teachers (Toronto District School Board, n.d.). Together these individuals review research proposals, determine what type of consent is required, and provide suggestions (e.g., who to contact at the schools, how to communicate effectively with teachers, etc.). At the other end of the spectrum, there are school boards which have not adopted an external research policy or written guidelines for conducting research within their board. Often in these situations, decisions are made on a case-by-case basis when proposals are received and decisions may lack consistency due to the absence of official guidelines or policies.

This section will conclude with two recommendations that will assist in reducing the challenges associated with conducting research in schools. First, it is recommended that a common document\(^2\) that outlines official policies and guidelines for conducting research in schools be developed between school boards and their local academic and community REBs. Collaboration between these two parties is highly encouraged and it is recommended that this document be written by members from both the school board and the REB. The purpose of this document would be twofold: 1) to increase dialogue and communication between these two entities; and 2) to provide clarity about the type of consent required and the protocol that should be followed for proposing and carrying out research in schools. Several contentious issues will need to be taken into consideration when forming this research policy. For example, the committee will need to determine whether it is necessary for parents or legal guardians to provide active consent for all studies. They will need to address the following questions: When is passive consent sufficient? In what situations is active consent necessary? Can high school students

\(^2\) A document titled “Research Involving Children/Youth in the School Systems” was drafted by GREB at Queen’s University in consultation with the local school boards, but was never formally adopted.
provide their own consent? Should adolescents’ competency to provide consent be based on chronological age or cognitive capacity?

Second, it is recommended that passive parental consent be sought for minimal risk studies among high-school aged youth. Consistent with current procedures, student assent should also be obtained and information gathered from students must be anonymous and kept confidential. Studies are not considered to be of minimal risk if the topic is sensitive (e.g., history of abuse, personal medical conditions, etc.) and/or if the student is asked to provide information that could get him/her in trouble with the law. Examples of minimal risk studies include those inquiring about physical activity levels, eating habits, and sleeping habits, to name a few.

4.5 Conclusion

The results from the Grade 10 Pass program are significant and relevant given the astonishing levels of physical inactivity among Canadian youth and the negative health consequences associated with inadequate activity involvement. This study should serve as an initial framework for interventions aimed at increasing youth physical activity involvement through access to community recreation facilities. It is hoped that future research initiatives that will build upon the knowledge yielded by this study to increase physical activity participation among youth.

It is not only important to learn from the results of research studies, but also to learn from our experiences conducting research, especially among children and youth. Sharing such information will assist in developing research policies and practices that are inclusive and reduce methodological and ethical issues thereby enhancing the validity of our research.
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Faloon, K. J., Lucie Lévesque, L., & Fergus, S. (under review). The grade 5 community physical activity pass: A Kingston Gets Active initiative to enhance access to community recreation facilities for fifth grade students. *Health Promotion Practice*.


Appendix A

Parent Letter of Information
Dear Parent/Guardian:

Your son/daughter is eligible to participate in a research project titled “The Grade 10 Community Physical Activity Pass use”. This project is being conducted by Dr. Lucie Lévesque from the School of Kinesiology and Health Studies at Queen’s University. This research has been approved by the General Research Ethics Board at Queen’s University and has the support of your school’s principal and the Limestone District School board.

Your son/daughter will receive a Grade 10 Community Physical Activity Pass in November 2007, which will allow your child access to participating arenas, pools, and gyms (YMCA) free of charge until August 31st 2008. The aim of this program is to encourage access to these facilities that provide physical activity opportunities for the community. Grade 10 students were chosen because they no longer need to take a physical activity credit at school.

The purpose of this research project is to examine the effects of the pass upon student physical activity. We are also interested in learning about what influences pass use. Please note that your child will receive the free pass whether or not they participate in this research project.

Information from this study will also be used as a baseline to follow consenting grade 10 students through their academic career in order to gauge the long-term impact of the Grade 10 Community Physical Activity Pass. This means that we will need to retain your child’s contact information for future follow-up. Consent to participate in the project, in following years, will be sought during each school year.

**Participant Requirements**

In Fall 2007, your child will complete a paper-and-pencil questionnaire at school in class with other students during a time decided by the principal or teacher. Questions asked will include the use of community facilities (arena/pool/gym), perceived barriers to the use of these facilities, physical activity levels, and demographic information. The questionnaire should take about 30 minutes to complete.

In Spring 2008, your child will complete a similar questionnaire and the same measurements will be taken. He/she will also be asked about their use of the Community Physical Activity Pass.

Throughout the school year pass use will also be monitored at the facility in order to assess attendance at each location. A magnetic strip on the pass will be read by a card swiping system installed at each of the recreation facilities. A unique identifier code on your child’s pass will provide information as to when and where the pass was used.

**Risks**

There are no known risks associated with participation in this study and participation is absolutely voluntary. You and/or your child are free to refuse to participate in or to withdraw from any part of the study at any time. Your child will also be asked to provide their consent at the time of the data collection and may refuse to answer any questions in the questionnaire that they find objectionable, questionable, or uncomfortable. He/she may choose to participate in none, some or all of the measures.
**Confidentiality/Anonymity**

It is important to us to protect the privacy of the students participating in this project. Here is how we intend to do so:

- Although student names will be collected in order to match Fall and Spring information for each child, names and school identifier will be kept separate from the data by assigning a number to each participant and each school.
- Questionnaires will be locked in a filing cabinet at Queen’s University and will be accessible only to the primary researcher and Dr. Lucie Lévesque. Electronic data will be password protected and stored behind a computer firewall.
- This research data will be part of a larger data set, used to assess long-term impact of the Community Activity Pass. Researchers continuing this project will be required to sign confidentiality agreements and to adhere to the confidentiality protocol of the original agreement.
- Dr. Lévesque will be responsible for access to the data by future researchers.
- Only group data will be reported and submitted to various health and exercise publication journals/conferences.
- Your child’s individual data will not be accessible to you, your child’s teacher or principal.
- The data will not be used to evaluate your child in any way.

**Remuneration**

Parents and participants in this project will be provided with the results of the study upon request.

**Consent**

Your child will be invited to complete a questionnaire about their physical activity. If you wish to have your child excluded from the questionnaire and/or tracking of pass use components of the study, please notify the researchers, being sure to include your child’s full name, school and grade, either by phone: (613) 533-6000 x78164 or by email: lucie.levesque@queensu.ca.

Please keep this letter for your own information.

If you have any questions about this project or require additional information, please contact Dr. Lucie Lévesque (533-6000 ext. 78164). If you have any questions, concerns, or complaints about the research ethics of this study please contact the Director of the School of Kinesiology and Health Studies, Dr. Jean Côte (533-600 ext.78773) or the chair of the General Research Ethics Board, Steve Leighton (533-6081).

Thank you in advance,
Sincerely,
Lucie Lévesque, Ph.D.
Appendix B

Student Letter of Information
GRADE 10 STUDENT LETTER OF INFORMATION

Dear Student:

You are eligible to participate in a research project titled “The Grade 10 Community Physical Activity Pass”. This project is being conducted by Dr. Lucie Lévesque from the School of Kinesiology and Health Studies at Queen’s University. This research has been approved by the General Research Ethics Board at Queen’s University and has the support of your school’s principal and the Limestone District School board.

You will receive a Grade 10 Community Physical Activity Pass in November 2007, which will allow you access to participating arenas, pools, and gyms (YMCA) free of charge until August 31st 2008. The aim of this program is to encourage access to these facilities that provide physical activity opportunities for the community. As Grade 10 students, you were chosen because it is no longer mandatory for you to take a physical activity credit at school.

The purpose of this research project is to examine the effects of the pass upon student physical activity. We are also interested in learning about what influences pass use. Please note that you will receive the free pass whether or not you participate in this research project.

Information from this study will also be used as a baseline to follow you through your academic career in order to gauge the long-term impact of the Grade 10 Community Physical Activity Pass. This means that we will need to retain your contact information for future follow-up. Student and parent/guardian consent to participate in the project, in following years, will be sought.

**Participant Requirements**

In Fall 2007, you will complete a paper-and-pencil questionnaire at school in class with other students during a time decided by your principal or teacher. Questions asked will include the use of community facilities (arena/pool/gym), perceived barriers to the use of these facilities, physical activity levels, and demographic information. The questionnaire should take about 30 minutes to complete.

In Spring 2008, you will complete a similar questionnaire. This follow-up questionnaire will ask about your use of the Community Physical Activity Pass.

Throughout the school year pass use will be monitored at the facility in order to assess attendance at each location. A magnetic strip on the pass will be read by a card swiping system installed at each of the recreation facilities. A unique identifier code on your pass will provide information as to when and where the pass was used.

**Risks**

There are no known risks associated with participation in this study and participation is absolutely voluntary. You are free to refuse to participate in or to withdraw from any part of the study at
any time. You may refuse to answer any questions in the questionnaire that you find objectionable, questionable, or uncomfortable.

**Confidentiality/Anonymity**

It is important to us to protect your privacy as students participating in this project. Here is how we intend to do so:

- Although student names will be collected in order to match Fall and Spring information for each student, names and school identifier will be kept separate from the data by assigning a number to each participant and each school.
- Questionnaires will be locked in a filing cabinet at Queen’s University and will be accessible only to the primary researcher and Dr. Lucie Lévesque. Electronic data will be password protected and stored behind a computer firewall.
- This research data will be part of a larger data set, used to assess long-term impact of the Community Activity Pass. Researchers continuing this project will be required to sign confidentiality agreements and to adhere to the confidentiality protocol of the original agreement.
- Dr. Lévesque will be responsible for access to the data by future researchers.
- Only group data will be reported and submitted to various health and exercise publication journals/conferences.
- Your individual data will not be accessible to you, your parents, your teacher or principal.
- The data will not be used to evaluate you in any way.

**Remuneration**

Parents and participants in this project will be provided with the results of the study upon request.

Please keep this letter for your own information.

If you have any questions about this project or require additional information, please contact Dr. Lucie Lévesque (533-6000 ext. 78164). If you have any questions, concerns, or complaints about the research ethics of this study please contact the Director of the School of Kinesiology and Health Studies, Dr. Jean Côte (533-6000 ext.78773) or the chair of the General Research Ethics Board, Steve Leighton (533-6081).

Thank you in advance,

Sincerely,

Lucie Lévesque, Ph.D.
Appendix C

Baseline Questionnaire
Student Physical Activity Survey

PHASE 1: Baseline

Name: _______________________________

Grade: _______________________________

School: _______________________________

Researcher use only

Data ID #___________
Dear Student,

We are interested in learning about your physical activity at school and outside of school.

Physical activity can be done in sports, school activities, walking to school, or co-curricular activities (outside of school activities).

Participation in this questionnaire is voluntary. Please try to answer all of the questions. You do not have to answer any questions that make you uncomfortable.

Please do not talk to others while you complete the questionnaire. No one from school will see your answers.

For some questions you will write in the space provided. For other questions please put a check mark (✓) in the appropriate box.

Please raise your hand if you have any questions.

Researcher use only
Data ID #________
Please fill in today’s date: ______________________

Questions about YOU! Please remember that your name will not be shown on this survey.

1. Gender:
   - Male
   - Female

2. What month were you born?
   - Jan  Feb  Mar  Apr  May  June  July  Aug  Sept  Oct  Nov  Dec

3. What year were you born?

4. Would you say your health is……?
   - Excellent
   - Good
   - Fair
   - Poor
These questions are about YOUR ACTIVITIES!

5. About how many hours a day do you usually watch television (including videos and DVDs) in your free time? *(Please mark one box for weekdays AND one box for weekend)*

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<thead>
<tr>
<th>Weekdays</th>
<th>Weekend</th>
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<tbody>
<tr>
<td>□ None at all</td>
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<td>□ About half an hour a day</td>
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<td>□ About 7 or more hours a day</td>
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6. About how many hours a day do you usually play games on a computer or games console (Playstation, Xbox, GameCube etc.) in your free time? *(Please mark one box for weekdays AND one box for weekend)*

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<th>Weekdays</th>
<th>Weekend</th>
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<tbody>
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<tr>
<td>□ About 7 or more hours a day</td>
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</table>

122
7. About how many hours a day do you usually use a computer for chatting on-line, internet, emailing, homework etc. in your free time? (Please mark one box for weekdays AND one box for weekend)

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<th>Weekdays</th>
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<td>□ None at all</td>
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<tr>
<td>□ About 7 or more hours a day</td>
<td>□ About 7 or more hours a day</td>
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</tbody>
</table>

8. About how many hours a day do you usually spend doing school homework out of school hours? (Please mark one box for weekdays AND one box for weekend)

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<thead>
<tr>
<th>Weekdays</th>
<th>Weekend</th>
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</thead>
<tbody>
<tr>
<td>□ None at all</td>
<td>□ None at all</td>
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<tr>
<td>□ About half an hour a day</td>
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<tr>
<td>□ About 7 or more hours a day</td>
<td>□ About 7 or more hours a day</td>
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</tbody>
</table>
9. Are you involved in any of these kinds of club or organization?  
(Check "yes" or "no" for EACH line)

   a. I am not involved in any kind of club or organization  (Go to next question)

   b. Sport club or team
   c. Voluntary service
   d. Political organization
   e. Cultural association (music, science or other)
   f. Church or religious group
   g. Youth club
   h. Other club

   Yes  No

Now we are interested in your physical activity.

10. Please choose an answer that shows how much you 'agree' or 'disagree' with the statement. Place a check (✓) in the correct column.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I usually enjoy being physically active.</td>
<td></td>
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</tbody>
</table>

11. Over the past 7 days, on how many days were you physically active for a TOTAL of at least 60 minutes per day?

   1. 0 days  2. 1 day  3. 2 days  4. 3 days  5. 4 days  6. 5 days  7. 6 days  8. 7 days

12. Over a typical or usual week, on how many days are you physically active for a TOTAL of at least 60 minutes per day?

   1. 0 days  2. 1 day  3. 2 days  4. 3 days  5. 4 days  6. 5 days  7. 6 days  8. 7 days
13. About how many hours a week do you usually take part in physical activity that makes you out of breath or warmer than usual in your class time AT SCHOOL?

none at all
about 1/2 an hour
about 1 hour
about 2 hours
about 3 hours
about 4 hours
about 5 hours
about 6 hours
about 7 or more hours

14. About how many hours a week do you usually take part in physical activity that makes you out of breath or warmer than usual in your free time (example, lunch) AT SCHOOL?

none at all
about 1/2 an hour
about 1 hour
about 2 hours
about 3 hours
about 4 hours
about 5 hours
about 6 hours
about 7 or more hours

15. OUTSIDE SCHOOL HOURS: How often do you usually exercise in your free time so much that you get out of breath or sweat?

Every day
4 to 6 times a week
2 to 3 times a week
Once a week
Once a month
Less than once a month
Never

16. OUTSIDE SCHOOL HOURS: How many hours a week do you usually exercise in your free time so much that you get out of breath or sweat?

None
About half an hour
About 1 hour
About 2 to 3 hours
About 4 to 6 hours
7 hours or more
We are trying to find out about your level of physical activity from the last 7 days (in the last week). This includes sports or dance that make you sweat or make your legs feel tired, or games that make you breathe hard, like tag, skipping, running, climbing, and others.

Remember:
1. There are no right and wrong answers — this is not a test.
2. Please answer all the questions as honestly and accurately as you can — this is very important.

17. Physical activity in **YOUR ORGANIZED SPORTS**: Have you done any of the following activities in the past 7 days (last week)? If yes, how many times? 

*(Mark only one box per row.)*

<table>
<thead>
<tr>
<th>ORGANIZED SPORTS</th>
<th>No</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7 times or more</th>
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<tbody>
<tr>
<td>Rowing/canoeing</td>
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<td>Rollerblading</td>
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<td>Bicycling</td>
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<td>Jogging or running</td>
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<td>Aerobics</td>
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<td>Swimming</td>
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<td>Baseball, softball</td>
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<td>Dance</td>
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<td>Football</td>
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<td>Badminton</td>
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<td>Skateboarding</td>
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<td>Soccer</td>
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<td>Street hockey</td>
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<td>Volleyball</td>
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<td>Floor hockey</td>
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<td>Basketball</td>
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<td>Ice skating</td>
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<td>Cross-country skiing</td>
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<td>Ice hockey/ringette</td>
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<td>Other:</td>
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126
18. Physical activity in **YOUR SPARE TIME**: Have you done any of the following activities in the past 7 days (last week)? If yes, how many times? *(Mark only one box per row.)*

**SPARE TIME**

<table>
<thead>
<tr>
<th>Activity</th>
<th>No</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7 times or more</th>
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<tbody>
<tr>
<td>Skipping</td>
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<td>Rowing/canoeing</td>
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<td>In-line skating</td>
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<td>Tag</td>
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<td>Walking for exercise</td>
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<td>Bicycling</td>
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<td>Jogging or running</td>
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<td>Aerobics</td>
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<td>Baseball, softball</td>
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<td>Ice skating</td>
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127
19. In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)? (Check ONE only.)

- I don't do PE ..............................................
- Hardly ever ..............................................
- Sometimes ...............................................  
- Quite often ...............................................  
- Always .....................................................  

20. In the last 7 days, what did you normally do at lunch (besides eating lunch)? (Check ONE only.)

- Sat down (talking, reading, doing schoolwork)... ..............................................  
- Stood around or walked around ...............................  
- Ran or was active a little bit ..............................................  
- Ran around and was active quite a bit .................................  
- Ran and was very active most of the time .............................  

21. In the last 7 days, on how many days right after school, did you do sports, dance, or play games in which you were very active? (Check ONE only.)

- None ..................................................................  
- 1 time last week ..................................................  
- 2 or 3 times last week ...........................................  
- 4 times last week ...............................................  
- 5 times last week ..............................................  

22. In the last 7 days, on how many evenings did you do sports, dance, or play games in which you were very active? (Check ONE only.)

- None ..................................................................  
- 1 time last week ..................................................  
- 2 or 3 times last week ...........................................  
- 4 or 5 last week ...............................................  
- 6 or 7 times last week ...........................................  

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23. **On the last weekend**, how many times did you do sports, dance, or play games in which you were very active? *(Check ONE only.)*

None ..............................................................
1 time ............................................................
2 — 3 times ......................................................
4 — 5 times ......................................................
6 or more times ...............................................  

24. Which **one** of the following describes you best for the last 7 days?  
Read **all five statements** before deciding on the **one answer** that describes you.

A. All or most of my free time was spent doing things that involve little physical effort .................................................................

B. I sometimes (1 — 2 times last week) did physical things in my free time (e.g. played sports, went running, swimming, bike riding, did aerobics).................................

C. I often (3 — 4 times last week) did physical things in my free time ..................

D. I quite often (5 — 6 times last week) did physical things in my free time...........

E. I very often (7 or more times last week) did physical things in my free time........

25. Mark how often you did physical activity (like playing sports, games, doing dance, or any other physical activity) for each day last week.

<table>
<thead>
<tr>
<th>Day</th>
<th>None</th>
<th>Little</th>
<th>Medium</th>
<th>Often</th>
<th>Very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Wednesday</td>
<td></td>
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<tr>
<td>Thursday</td>
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<tr>
<td>Friday</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
26. Were you sick last week, or did anything prevent you from doing your normal physical activities? *(Check one.)*

- Yes ....................................................  □
- No ..................................................  □

If YES, what prevented you? ________________________________

27. How many times *A MONTH* do you go to the pool, the arena, or to the community gym to be active for *unstructured activities*?

*Please place a check (✓) in the time that applies to you.*
*If you went *every week* please *ALSO* circle the number of times you went per week.*

**UNSTRUCTURED PHYSICAL ACTIVITY**

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Once a month</th>
<th>Twice a month</th>
<th>3 times a month</th>
<th>Every week (and please circle # of times per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool (ex. free swim)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>Arena (ex. Public skate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>Community Gym (e.x. soccer in the gym with friends)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
28. How many times A MONTH do you go to the pool, arena or gym for organized activities like sports teams and practices?

*Please place a check (✓) in the time that applies to you.*

*If you went every week please ALSO circle the number of times you went per week.*

**ORGANIZED ACTIVITIES WITH A COACH**

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Once a month</th>
<th>Twice a month</th>
<th>3 times a month</th>
<th>Every week (and please circle # of times per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pool</strong> (ex. swimming lessons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td><strong>Arena</strong> (ex. Hockey or Figure Skating practice)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td><strong>Community Gym</strong> (e.x. basketball practice)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

29. When you go to the pool, arena or community gym, who do you go with?

- your parent/guardian?    YES    NO
- another adult?            YES    NO
- your sister/brother/cousins? YES    NO
- your friends?             YES    NO
- I go by myself            YES    NO
30. For each statement below please circle yes or no.

1. Is there a pool within walking distance or a 10 min drive of your house? YES NO

2. Do you know how to swim? YES NO

3. Is there an arena within walking distance or a 10 min drive of your house? YES NO

4. Do you own skates? YES NO

5. Do you know how to skate? YES NO

6. Do you think you could find or borrow a pair of skates to use if you wanted to go skating? YES NO

7. Is there a community gym (YMCA) within walking distance/10 min drive of your house? YES NO

31. Some reasons WHY you might NOT WANT TO GO to the arena/pool or gym would be:

1. I would rather be active at home YES NO

2. I would rather watch T.V or play on the computer YES NO

3. I would rather read a book or magazine YES NO

4. I don’t feel safe there YES NO

5. Other reasons: ____________________________________________________________________
____________________________________________________________________________________

COMMENTS: If there are any other comments you would like to make about the pool/arena or gym in your area please write them here.
____________________________________________________________________________________
____________________________________________________________________________________

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32. For this question you can pick more than one option. What would be a reason that you WOULDN'T BE ABLE TO GO to the pool, arena or gym even if you wanted to?

1. It is too far to walk and I can't get a drive YES NO
2. I don't have anyone to go with YES NO
3. I don't have the equipment I need (ex. Skates) YES NO
4. It is too expensive YES NO
5. I am too busy with homework YES NO
6. I am too busy doing other physical activities YES NO
7. I am not allowed to go because it is not safe YES NO
8. The times that the pool/arena/gym are open for free time don't fit with my schedule (I can't go because I have other things to do at those times) YES NO
9. There is no public transportation where I live YES NO

10. Other reasons that you wouldn't be able to go to the pool/arena/gym: ____________________________________________________________
    ___________________________________________________________________
    ___________________________________________________________________

These questions are about YOUR FAMILY! Please remember that your name will not be shown on this survey.

33. What language do you most often speak at home?
   1 □ English  2 □ French  3 □ Other  4 □ Don't know
34. All families are different (for example, not everyone lives with both their parents, sometimes people live with just one parent, or they have two homes or two families) and we would like to know about yours. Please answer this first question for the home where you live all or most of the time and place a check (✓) beside the people who live there.

<table>
<thead>
<tr>
<th>Adults</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mother</td>
<td>Please say how many brothers and sisters live here (including half, step or foster brothers and sisters). Please write in the number or write 0 (zero) if there are none. Please do not count yourself.</td>
</tr>
<tr>
<td>2 Father</td>
<td>How many brothers? _____</td>
</tr>
<tr>
<td>3 Stepmother (or father's girlfriend)</td>
<td>How many sisters? _____</td>
</tr>
<tr>
<td>4 Stepfather (or mother's boyfriend)</td>
<td></td>
</tr>
<tr>
<td>5 Grandmother</td>
<td></td>
</tr>
<tr>
<td>6 Grandfather</td>
<td></td>
</tr>
<tr>
<td>7 I live in a foster home or children's home</td>
<td></td>
</tr>
<tr>
<td>8 Someone or somewhere else: please write it down _____________________</td>
<td></td>
</tr>
</tbody>
</table>

35. Do you have your own bedroom for yourself?

| 1 No   |
| 2 Yes  |

36. Do you have a TV in your bedroom?

| 1 No   |
| 2 Yes  |

37. Does your family own a car, van or truck?

| 1 No   |
| 2 Yes, one |
| 3 Yes, two or more |
38. During the past 12 months, how many times did you travel away on holiday (vacation) with your family?

- Not at all
- Once
- Twice
- More than twice

39. How many computers does your family own?

- None
- One
- Two
- More than two

This is the end of the survey. 
THANK YOU VERY MUCH FOR YOUR HELP.

Thank You!