UNDERSTANDING THE RELATIONSHIP BETWEEN COMMUNITY FACTORS AND PHYSICAL ACTIVITY LEVELS IN INDIVIDUALS LIVING WITH HEART DISEASE NOT ATTENDING CARDIAC REHABILITATION PROGRAMS

by

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Submitted in partial fulfillment of the requirements
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The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "UNDERSTANDING THE RELATIONSHIP BETWEEN COMMUNITY FACTORS AND PHYSICAL ACTIVITY LEVELS IN INDIVIDUALS LIVING WITH HEART DISEASE NOT ATTENDING CARDIAC REHABILITATION PROGRAMS" by Jill Marie McSweeney in partial fulfillment of the requirements for the degree of Master of Arts.

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I dedicate this thesis to my family, friends, and peers who have helped me throughout this *mostly* pleasant journey which I *generally* do not regret!

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ABSTRACT

Background: Coronary heart disease (CHD) is a leading cause of death in Canada; however, physical activity (PA) has been shown to reduce mortality. Unfortunately, CHD patients are not engaging in enough PA. **Purpose**: To explore the association of the environmental variables (a) rurality, (b) access to PA opportunities, and (c) community socio-economic status (SES) with PA in CHD patients 3 months after discharge? And how does task self-efficacy may mediate these associations **Results**: Regressions showed that task self-efficacy predicted PA; however rurality, and SES did not predict PA at 3 months, nor did access to PA opportunities with the exclusion of pools. The lack of associations required no mediational analyses to be performed, except for pools, which demonstrated no mediational influence from self-efficacy. **Conclusion**: While task self-efficacy was a key PA correlate, there were no associations between the environment and PA (with the exclusion of access to pools).

LIST OFABBREVIATIONS USED

CHD	Coronary heart disease
DA	Dissemination area
GIS	Geographical information systems
MIZ	Metropolitan influence zones
PA	Physical activity
SAC	Statistical area classification
SCT	Social Cognitive Theory
SES	Socio-economic status

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CHAPTER 1 INTRODUCTION

Although largely preventable, coronary heart disease (CHD) remains the number one cause of death in Canada (Leung, Ceccato, Stewart, & Grace, 2007; Petter et al., 2008). Research indicates that maintaining regular physical activity (PA), that is, engaging in moderate intensity PA up to 30 minutes most days of the week (Leon et al., 2005), can reduce CHD recurrence and mortality (Bock et al., 1997; CACR, 2009; Leung et al., 2007; Myers et al., 2001; Petrella et al., 2005). In fact, exercise capacity has been shown to be the best predictor of mortality of all cardiovascular risk factors in people living with heart disease (Myers et al., 2002; 2004; Moholdt et al., 2008). Unfortunately, studies have shown that within two months after hospitalization, PA levels in cardiac patients already begin to decline (Reid et al., 2006). Moreover, with nearly 85% of CHD patients not attending cardiac rehabilitation (CR) programs, it is likely that these patients will not engage in the recommended PA needed to increase their exercise capacity, and improve their longevity (Heart & Stroke, 2009; Petter et al., 2009)

One way to better understand the poor PA rates of CHD patients is to identify important theoretical correlates of PA, such as those outlined by Petter et al., (2009). This review clearly identified task self-efficacy as a dominant predictor of PA in CHD patients. However, this research has been limited by a lack of understanding concerning the impact of environmental correlates directly on PA, and indirectly via task self-efficacy. Research in healthy populations has identified key community correlates such as rurality, access to recreational facilities and community socio-economic status (SES), as key community correlates influencing PA (Berke et al., 2007; Cerin & Leslie, 2008;

Giles-Corti & Donovan, 2002a; Lovasi et al., 2008); however, their impact on a CHD population, and the mediating role of task self-efficacy, has yet to be examined (Bandura 1997).

Over 200 participants between the ages of 25 and 85, hospitalized for a cardiac condition (i.e., heart attack, etc.) who have declined to participate in CR have been recruited for this study. Participants completed questionnaires that included a task self-efficacy and a PA measure during their hospitalization and 3-months after they were discharged. In addition, participant addresses were recorded and linked to community level variables, such as rurality and SES, using ArcGIS. Using geographical information systems (GIS), community buffers were developed for each participant and allowed for the examination of accessibility to facilities using a objective built environment database compiled of all recreational facilities (e.g., trails, parks, etc.) within Nova Scotia.

Research Objectives

Objective 1

What is the relationship between community factors (i.e., rurality, access to recreation facilities, community SES) and task self-efficacy on PA levels in individuals living with CHD 3 months after being hospitalized for a cardiac event?

Objective 2

How does task self-efficacy mediate the relationship between community-level correlates and PA in CHD patients over this 3 month period?

CHAPTER 2 LITERATURE REVIEW

2.1 CHD and physical activity

CHD is the leading cause of death in Canada (Leung et al., 2007; Petter et al., 2008) and Nova Scotia (Heart & Stroke Foundation, 2009). In fact, the Heart and Stroke Foundation (2003) estimates that 1 in 4 Nova Scotians will die of CHD or a corresponding complication annually. In 2001, CHD was the number one reason for hospitalization in Nova Scotia (Canadian Institution for Health Information, 2006), and it is estimated that Nova Scotia spends over 600 million dollars yearly servicing this population (Heart & Stroke Foundation, 2009). CHD is a largely preventable disease (Leung et al., 2007; Petrella et al., 2005), yet still remains the number one cause of mortality in Nova Scotia (Heart & Stroke Foundation, 2009).

Research indicates that these substantially high rates of diagnosis and mortality may be due to a lack of exercise capacity, and thus a decrease in an individual's ability to perform regular PA (CACR, 2009; Heart and Stroke Foundation, 2003; Leung et al., 2007; Petrella et al., 2005). In fact, the inverse relationship between exercise capacity and all-cause mortality is well documented (Myers et al., 2002 & 2004; Weiss et al., 2004), and has been proven to be the number one predictor of mortality in CHD patients (Myers et al., 2002 & 2004). Moreover, in a recent study, Moholdt et al. (2008) demonstrated that CHD patients engaging in moderate to vigorous PA, 1 to 3 times a week for at least 30 minutes at a time, had a 33% decrease in all-cause mortality compared to those who engaged in no PA.

Research also indicates that PA patterns in individuals living with CHD are problematic given the complexity of initiating and then maintaining PA (Leung et al., 2007; Reid et al., 2006). While individuals newly diagnosed with CHD often increase PA patterns after initial diagnosis, maintaining this increased PA beyond two months is largely unsuccessful (Leung et al., 2007; Reid et al. 2006). In fact, less than 45% of CHD patients engage in regular PA 1-year after being hospitalized (Reid et al., 2006). These low rates of PA indicate that a significant portion of CHD patients are not engaging in regular PA, and therefore are potentially increasing their chances of mortality from this disease.

CHD patients are continuing to engage in low amounts of PA, which leaves them at risk for reoccurrence and mortality. It is therefore crucial to understand what postively influences PA in CHD patients who have been recently discharged from the hospital if policies, practice and researchers wish to improve the longevity of this population.

2.2 Task self-efficacy: an important correlate of physical activity

Motivation is often identified as an explanation for engaging in long-term PA (Woodgate & Brawley, 2008). Motivation is a set of internal structures, and is demonstrated by behaviours such as effort, diligence, determination, and attention. A specific intrapersonal correlate known to be related to PA motivation is task self-efficacy (McAuley & Mihalko, 1998; Woodgate & Brawley, 2008). Someone who is highly motivated often has greater confidence in their abilities to engage in, and maintain a

certain behaviour and/or action. Task self-efficacy is one's perceptions and confidence in his/her ability to participate in a behaviour and/or action (Bandura, 1997). Moreover, an individual's internal confidence in his/her capability determines continual and persistence participation when faced with adversity (Bandura, 1997; Woodgate & Brawley, 2008).

Increased levels of task self-efficacy have been directly linked to high PA levels in healthy populations (Moulaert et al., 2007; D'Angelo, Reid, & Pelletier, 2007; Rhodes & Smith, 2006). Moreover, research consistently finds self-efficacy to be highly predictive of current and future PA behaviours in individuals living with CHD (Blanchard et al., 2006; D'Angelo et al., 2007; Moulaert et al., 2007; Petter et al., 2009; Sarkar, Ali & Whooley, 2007; Woodgate & Brawley, 2008). That is, CHD patients who have greater confidence in their ability to initiate PA participation and continue to engage in this behaviour are more likely to participate in greater PA (Blanchard et al., 2006; Moulaert et al., 2007; Sarkar, et al., 2007). Therefore, task self-efficacy is a key correlate in understanding how an individual living with CHD engages in long-term PA practices.

2.3 Our environment and our health

Our physical environment includes our immediate surroundings (i.e., home, work) as well as broader physical, social, and political elements that significantly influence our health (Schulz & Northridge, 2004). The World Health Organization (WHO) estimates that globally, almost a quarter of all premature deaths can be attributed to factors associated with our physical environment (Prüss-Üstün & Corvalán,

2006). Whether these factors are on a macro level (e.g., associated with topology, climate, air quality, etc.) or meso level (e.g., access to recreational facilities, green space, rurality, etc.), they can be considered key elements influencing our health (Mitchell & Popham, 2007; Prüss-Üstün & Corvalán, 2006; Schulz & Northridge, 2004).

Environmental health research consistently finds key environmental correlates associated with greater health outcomes. Such environmental factors as increased access to greenspace (Mitchell & Popham, 2007), lesser exposure to indoor and outdoor air pollution (Brook et al., 2004; Marchall, Brauer & Frank, 2009; Prüss-Üstün & Corvalán, 2006), limited exposure to lead (National Research Council, 1993), and greater access to healthy resources (Brook et al., 2004), have been positively correlated with healthy outcomes. Research on chronic disease incidence, mortality and morbidity shows clearly the strong influence of the environment on our health outcomes. An estimated 42% of COPD diagnoses can be linked to environmental risk factors associated with occupational exposures to chemicals, as well as indoor and outdoor pollution (Prüss-Üstün & Corvalán, 2006). Moreover there has been a direct link between air pollutants and an increase incident of heart disease (Pope et al., 2004), as well as cancer (Pope et al., 2002) and stroke (Tsai et al., 2000) mortality. These statistics clearly demonstrate the influence the environment has on our health outcomes.

Additional environmental factors have also been shown to significantly influence PA levels in healthy adults. However, literature consistently shows that the variables of rurality, accessibility to PA opportunities and community SES impact an individual's ability to engage in active living.

2.4 Our community and physical activity

An individual's environment can create barriers, limitations, and other obstacles that limit or even prohibit an individual's ability to participate in regular PA, regardless of their intentions (Berke et al., 2007; Brownson et al., 2000; Humpel et al., 2002; King, 2003; Riva et al., 2007). Unfortunately, there appears to be a gap in the literature looking at how communities influence individuals living with CHD, and his/her ability to engage in PA. Because of the high health care demands of individuals with CHD, it is crucial to understand how community characteristics impact PA in this population in order to increase their quality of life and potentially relieve unnecessary burden on our health care system.

Several key community factors have been proven to limit PA levels in healthy populations such as rurality, accessibility to PA opportunities and SES.

2.4.1 Rural/urban status and the built environment

Research in healthy populations has found several differences between PA levels in rural and urban dwellers. Such obstacles as distance to facilities (Frank et al., 2005; Riva et al., 2007), the presence of sidewalks (Duncan et al., 2005; Frank et al., 2005; McGinn et al., 2007; Rutt & Coleman, 2005), and traffic safety (Harrison et al., 2007) have been found to be barriers for rural individuals wanting to engage in PA. Obstacles such as these may account for the overwhelmingly low PA levels of rural dwellers). In fact, Parks, Housemann and Brownson (2003) found that individuals who live in rural

areas engage in significantly less PA than individuals living in urban or suburban communities.

Low PA rates in rural dwellers have been linked to a lack of sidewalks (Forsyth, Oakes, Lee, & Schmitz, 2009, Rutt & Coleman, 2004) or clear separation between walking paths and the side of the road (Humpel, Owen, & Leslie, 2002). Duncan, Spence, and Mummery (2005) found that communities with sidewalks were significantly more active than communities without sidewalks. When there is a lack of clear separation between sidewalks and traffic, individuals perceive an unsafe environment for PA. With high traffic volumes and speed, the risk of pedestrian accidents is greater for rural areas where sidewalks are absent, and the perception of safety is often low (Duncan et al., 2005; McGinn et al., 2007; Rutt & Coleman, 2004).

Literature in healthy populations has demonstrated the impact of features found within rural communities have on PA practices. However, the magnitude of this relationship remains unknown in a CHD population. As CHD diagnoses increase in Nova Scotia (Heart and Stroke Foundation, 2009), research must begin to understand if features of rurality are contributing to these outcomes. Moreover, due to the fact that 70% of Nova Scotia is classified as rural (Nova Scotia Community Counts, 2009), it is crucial to know the impact that rurality is having on CHD patients' ability to engage and maintain regular PA practices. Examining this relation is vital in understanding and predicting PA and mortality in this population.

2.4.2 Accessibility and physical activity

Accessibility to recreational facilities (i.e., gyms, trails) has been defined in multiple ways. For instance, accessibility may denote the number of physical activity opportunities (i.e., gyms, trails, parks) one has access to in a community (Duncan et al., 2005; Harrison et al., 2007; Hoehner et al., 2005; King, 2003; Kirkland et al., 2003; Riva et al., 2007). Accessibility could also refer to the distance (Duncan et al., 2005; Hoehner et al., 2005; McGinn et al., 2007) or time (Hoehner et al., 2005) one must travel to reach an opportunity. Therefore, when striving to understand how accessibility influences PA levels, it is important to include multiple constructs of accessibility to understand the impact of each on PA levels.

The majority of the literature around accessibility seeks to understand how the number of PA opportunities an individual has access to in the community influences their PA levels. Research consistently finds a positive correlation between the number of PA opportunities an individual has access to, and the amount of daily PA an individual engages in (Harrison et al., 2007; Huston et al., 2003; Riva et al., 2007). In fact, Humpel et al. (2004) have directly linked the perception of high numbers of walking trails, parks, gyms, and other indoor and outdoor recreational facilities to increased PA levels. Moreover, through the use of GIS, researchers are now linking objective data (i.e., the actual number of facilities) to participant PA levels (Giles-Corti et al., 2002 a & b; Frank et al., 2005; Lovasi et al., 2008; Riva et al., 2007) where concrete relationships are able to directly attribute increased access to increased daily PA levels.

Although research has shown that the number of PA opportunities is positively correlated with PA, researchers have also shown that the distance one must travel to access an opportunity also influences PA levels (Frank et al., 2007; Harrison et al., 2007; McGinn et al., 2007). Factors such as the proximity of trails and facilities to an individual's home (Duncan et al., 2005; Humpel et al., 2002; Kirkland et al., 2003; Rutt & Coleman, 2004) and short travel distance and time in a car to reach an opportunities (Frank, Saelens, Powell, & Chapman, 2007) have been found to have a positive association with PA.

While there appears to be less literature on travel time to PA opportunities, the concrete relationship found between increased distance and low PA (Frank et al., 2007; Harrison et al., 2007; McGinn et al., 2007) insinuates a logical connection between increased travel time and lower PA. While several researchers have indeed found that increased travel time in a car does lead to lower levels of PA (Frank et al., 2007), this appears to be a factor of accessibility that may require further investigation.

Overall, research in healthy populations indicates that accessibility to PA opportunities both in number, distance, and time, is significantly associated with increased PA. The existence of various PA opportunities in close proximity is a key factor in promoting, and maintaining PA. Unfortunately, to date, no research has examined how the proximity of PA opportunities influences the PA behaviours in CHD patients. If CHD patients are limited in their chances to engage in PA, that is, they do not have access to an environment that allows them to partake in PA, CHD patients will be limited in their ability to improve their exercise capacity and thus improve his/her health status.

It is therefore crucial to understand how accessibility influences the PA behaviours of CHD patients in order to better promote PA encouraging environments.

2.4.3 Community socio-economic status and physical activity levels

Inequalities and Our Health

Research has shown that when one has access to resources that improve health (i.e., PA opportunities), they will utilize them (Phelan et al., 2004). However, access to resources is positively correlated with income. Therefore, income inequalities may stem from the unequal access and utilization of health promoting resources. Phelan et al.'s (2004) findings are congruent with Wilkinson's (1996) and Wilkinson's et al. (1998) theoretical research which surmises that there are more than basic needs which must be satisfied, and that these needs often range in accessibility through status that is inherently linked to income levels. Phelan et al. (2004) suggest that access to these services is a key determinant in health outcomes on an individual level. Moreover, with this varying access to health-related resources, come health inequalities. Research continues to show that health inequalities in our country are significant and persistent. Canadians with lower incomes have a higher prevalence of diabetes (Anonymous, 2001) and other chronic diseases (Anonymous, 1999), as well as engage in greater amounts of behaviours harmful to their health (i.e., smoking, sedentary lifestyles)(Frohlick, Ross & Richmond, 2006).

Community SES has been linked to varying levels of health status (Phelan et al., 2004; Wilkenson, 1996; Wilkenson et al., 1998), with greater inequalities creating gaps in health outcomes between the wealthy and poor (Phelan et al., 2004). With lower SES

comes less access to healthcare services (e.g., primary care, community health programs) and community PA opportunities (Phelan et al., 2004; Wilkenson, 1996). Literature has linked lower SES and greater SES variations between and within communities, to poorer health outcomes (Phelan et al., 2004; Wilkenson, 1996; Wilkenson et al., 1998). Thus SES is a key factor in understanding both health outcomes and healthy lifestyle opportunities.

The impact of SES

The SES of a community imposes barriers and limitations for individuals wishing to engage in PA. In fact, varying levels of SES have been linked to differing PA levels, with lower community SES being directly related to lower PA levels (Brownson et al., 2000; Cerin & Leslie, 2008; Cohen, Vittinghoff, & Whooley, 2008; van Lenthe, Brug & Mackenbach, 2005; Riva et al., 2007; Wen et al., 2007; Yen & Kaplan, 1998). Additionally, communities with high SES have greater access to PA opportunities (van Lenthe et al., 2005; Powell, Slater, Chaloupka & Harper, 2006), increased community safety (Cerin & Leslie, 2008; Giles-Corti & Donovan, 2002b; van Lenthe et al., 2005), pleasing aesthetics (Ball, Bauman, Leslie & Owen, 2001), increased traffic management and safety (Cerin & Leslie, 2008; van Lenthe et al., 2005; Yen & Kaplan, 1998), and integrated land use (i.e., both residential and industrial land use) (Cerin & Leslie, 2008; Giles-Corti & Donovan, 2002b; Riva et al., 2007). These factors have been attributed to increased levels of PA, therefore creating encouraging PA environments in communities with higher SES. Communities with lower SES tend to have less PA opportunities, directly limiting PA access for individuals (Huston, Evenson, Bors, & Gizlice, 2003; van

Lenthe et al., 2005; Powell, Slater, Chaloupka & Harper, 2006; Wen et al., 2007). As well, van Lenthe, Brug and Mackenback (2005) found varying levels of walking and bicycling levels based on differing community SES. They concluded that neighbourhood SES inequalities contribute to decreased PA levels.

To date, literature in CHD populations have lacked the comparison of community SES to PA patterns. This recognized relationship in healthy populations indicates that varying SES produces varying levels of long-term PA participation. This same relationship may exist in CHD patients; however, to date it is undocumented. It is, therefore, crucial to understand how economic disparities in communities influence CHD patients' ability to partake in regular PA. Understanding this relationship and its effects on PA behaviours will allow for future policies and practices to target those individuals who may be at risk for low levels of PA.

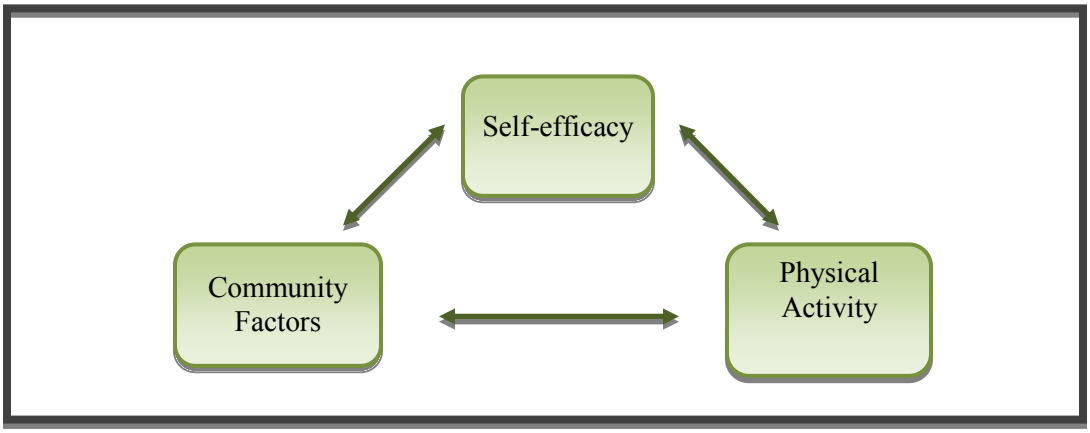
2. 5 Community, task self-efficacy, and physical activity: *a social cognitive theory perspective*

At this point, it is clear that task self-efficacy is a dominant predictor of PA in people living with CHD. On the other hand, the importance of community level factors in influencing PA in CHD individuals remains unknown. Importantly, social cognitive theory (SCT) would hypothesize that the latter relationship not be examined in isolation.

SCT hypothesizes that the environment may not only have a direct effect on PA in people living with CHD, but an indirect effect (i.e., mediating effect) via task self-efficacy. Additionally SCT explains how behavioural patterns are acquired and

maintained through environmental factors and intrapersonal factors (Bandura, 2001; Humpel et al., 2002; Silver, Mitchell, & Gist, 1995).

Figure 1. Social cognitive framework.



Specifically, SCT hypothesizes that a triadic relationship exists between an individual's behaviours (e.g., PA), their physical environment (e.g., their community) and their internal beliefs (i.e., task self-efficacy) (Figure 1) (Bandura, 2001; Rutt & Coleman, 2004; Powell, 2005).

Behaviours regarding PA practices are directly influenced by external environmental factors such as those within a community (Bandura, 2001; Humpel, Owen & Leslie, 2002) and interact with existing personal correlates. This bidirectional reciprocal relationship can either encourage regular PA or create barriers and limitations (Molt et al., 2005; Morris, McAuley & Motl, 2008).

Current research indicates that environmental factors influence PA in healthy individuals (Cerin & Leslie, 2008; Duncan et al., 2005; Frank et al., 2005; Gile-Corti & Donovan, 2002a; Harrison et al., 2007; Hoehner et al., 2005; Lovasi et al., 2008; Riva et al., 2007; Rutt & Coleman, 2004). Unfortunately, while research has shown that these

community factors are independently important in influencing PA, they have ignored intrapersonal correlates, such as task self-efficacy, that have a proven effect on PA levels. It is therefore important to not only understand how community factors influence PA directly, but also how these factors simultaneously interact with task self-efficacy.

In the current context, it may be, for example, that PA practices are directly influenced by external environmental factors such as those within a community (Bandura, 2001; Humpel, Owen & Leslie, 2002) and are mediated by task self-efficacy. Therefore, based on recommendations made by Bandura (2001), SCT will be used as the framework for this project.

CHAPTER 3 METHODOLOGY

3.1 Data collection

A portion of the information used for this proposed thesis was collected from Dr. Blanchard's current project entitled: *Using a social ecological approach to explain exercise behaviour from a gender perspective in cardiac patients not attending cardiac rehabilitation in Nova Scotia.* The project recruited over 200 participants between the ages of 25 and 85, who had been hospitalized due to a cardiac condition (i.e., heart attack, bypass surgery, etc.), had declined to participate in CR at the time of recruitment, were not partaking in any additional research projects, and understood/spoke English. Participants were not eligible if they had any existing contradictions to PA (i.e., unstable angina, unstable a-fibrillation, etc.), and/or were currently or planning to enroll in a CR program.

Patients admitted to several units at the Halifax Infirmary were reviewed upon their admission to identify eligible participants. The information of eligible participants (e.g., civic address, diagnosis, co-morbidities) was recorded (Appendix B) and presented to the patient's healthcare team (i.e., cardiologist and nurse practitioner) by the research coordinator. The research coordinator and the patient's health care team then discussed the capacity (i.e., emotional and mental state) of the patient to participate in the research project. Individuals approved by the healthcare team were then approached by the project's research assistants, and asked if they would be willing to spend 10 – 15 minutes discussing their possible participation.

Patient's agreeing to talk to the research assistant were taken through the project's consent form and informed of (a) the standard research protocols at Capital Health; (b) what participating in the study would entail; (c) the rationale for the study; (d) privacy and confidentiality of: (i) their information and (ii) all project data; (e) their choice to volunteer to participate, and their right to refuse to answer any question and/or decline to participate at any time; and (f) the contact information of the research coordinator. Individuals who chose to participate in the project were then asked to sign a consent form indicating their agreement to volunteer. Consented individuals were given a baseline questionnaire (see Appendix C) to complete during their stay in the hospital. The research assistants returned the following day to receive a completed baseline questionnaire from participants, and answer any additional questions. Individuals who declined to either talk to the research assistant when approached, or who declined to participate in the project after reviewing the consent form, were asked to fill out a 2 page 'Non-participant Survey' (Appendix D) that recorded demographic and PA information.

Each participant was then contacted by mail a week prior to their 3 month anniversary, and notified that they would be receiving a questionnaire the following week (Appendix E), and to contact the research coordinator if they had any questions or concerns regarding their participation in the study. The following week individuals were sent a questionnaire (Appendix C), pre-paid envelope and instructions on returning the survey (Appendix F). The research coordinator followed-up a week later to ensure individuals received the package, and to answer any questions. Participants were called

every week for 2 weeks following the initial phone call if (a) their questionnaire was not returned, or (b) the research coordinator was unable to reach them during a previous phone call.

Participants were considered 'drop-outs' if they did not return questionnaires, if they indicated to the research coordinator that they were no longer interested in participating, were too ill to continue to participate, or died. Participants were deemed ineligible if they enrolled and participated in CR during the 3 months following their hospitalization.

3.2 Individual participant measurements

Individual level measures of PA and self-efficacy were taken from participant questionnaire data.

3.2.1 Physical activity

A PA measurement was computed through the Godin Leisure Time Exercise Questionnaire (Godin, 1985; Appendix G) completed within participants' questionnaires. This measure asked individuals the average number of minutes per day and days per week they engage in PA at mild (e.g., light walking), moderate (e.g., dancing), and vigorous (e.g., running) levels. Jacobs, Ainsworth, Hartman, and Leon (1993) found that the Godin (1985) rated as favorably in reliability and validity as other self-reported measures of exercise. Moreover, it has been frequently used in cardiac populations (Blanchard et al., 2002a; 2002b; 2006). Data from the Godin was used to calculate the total PA an individual regularly engaged in:

*PA TOTAL= sum(moderate frequency * moderate duration) + (vigorous frequency * vigorous duration)*

Where frequency was calculated by the number of minutes per day, multiplied by the number of days per week, an individual engages in that level of activity.

3.2.2. Task self-efficacy

The task self-efficacy scale utilized in the questionnaires was created based on the recommendations of Bandura (1997) and McAuley and Mihalko (1998) (Blanchard et al., 2007), and was used to calculate an overall task self-efficacy measure in relation to weekly PA goals over a 12-week period (Appendix H).

Participants were asked to rate their confidence in engaging in regular PA for 1, 2, 3 weeks out of 12 weeks, up to 12 out of 12 weeks. Responses were recorded on a scale from 0% (not at all confident) to 100% (completely confident). A composite task self-efficacy measure was based on a mean percentage. This task self-efficacy measure has been previously validated with cardiac populations (Blanchard et al., 2002b; 2003).

3. 3 Community level measurements

Additional data was collected to represent individuals' communities (i.e., rurality, accessibility, SES). Through the use of ArcGIS, participants' civic addresses were linked to (a) community variable composed of 2006 Canadian Census data and (b) an objective built environment database to create a portrait of their community.

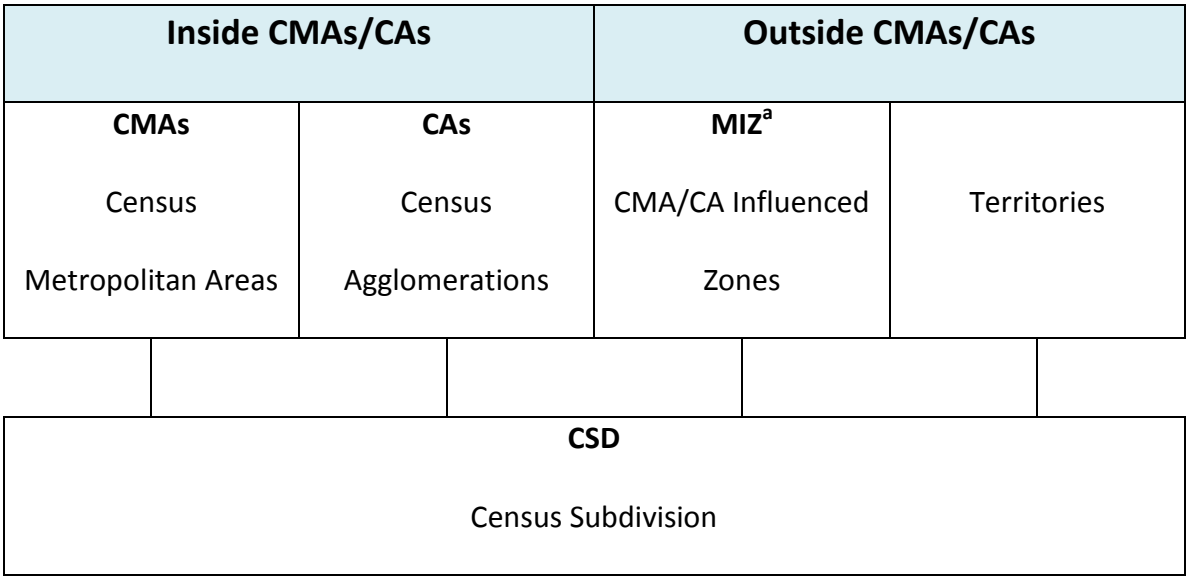
Figure 2. *Nova Scotia dissemination area categorizations.*

Communities were identified through dissemination area (DA) level geography units designated by Statistics Canada (Statistics Canada, 2001) (Figure 2). Statistics Canada (2001) has identified 1608 DAs across Nova Scotia, and defines DAs as the smallest standard geography unit, with a single DA containing 400 – 700 persons, and roughly measuring 1 or more blocks.

3.3.1 Rural/Urban status

A measure of rurality for each individual was calculated through the use of 2006 statistical area classification (SAC) data outlined by Statistics Canada (2006) (Figure 3). SACs group geographical areas, such as DAs, according to their association with census metropolitan areas (CMA), census agglomeration, and census agglomeration influenced zone (MIZ). Depending on their classification and association with these geographical components, a code of urban and rural status can be determined for each DA.

Figure 3. Statistical area classification (SAC) hierarchy.

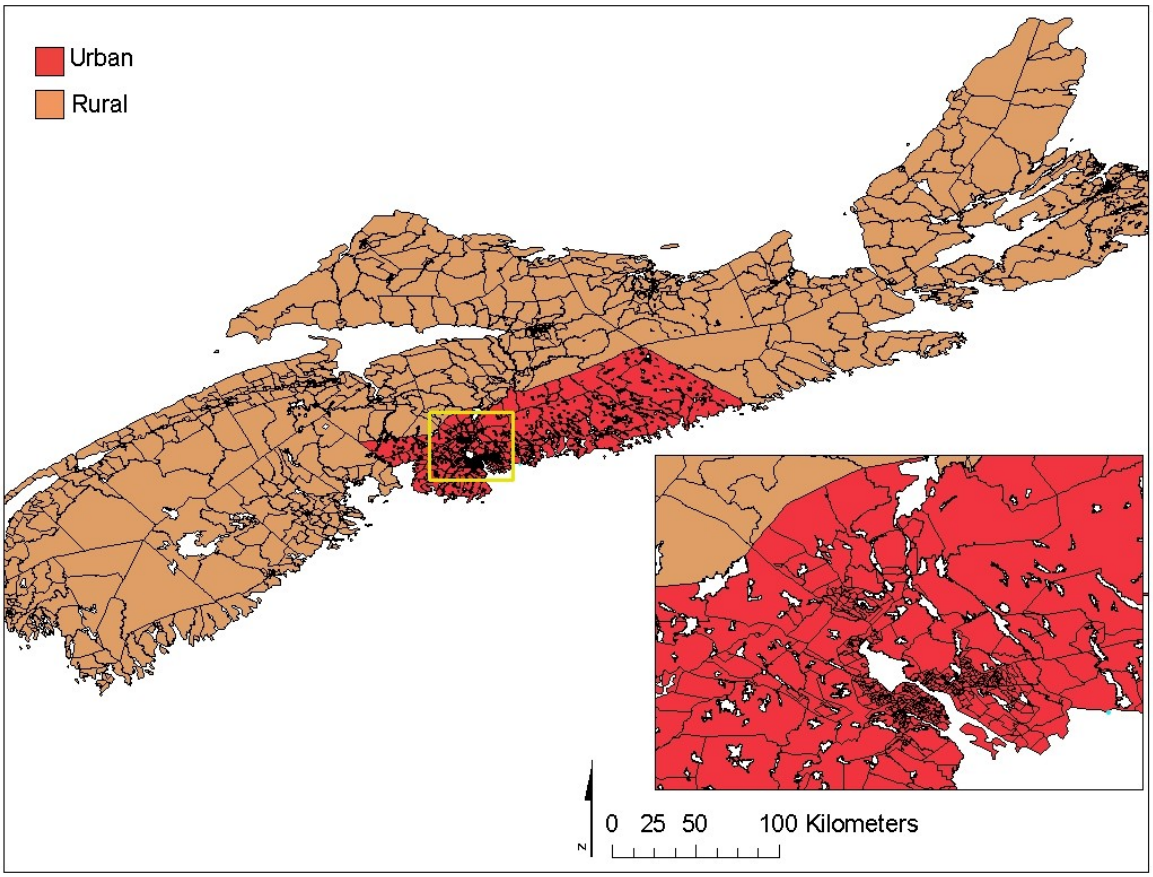


[a] MIZ categories are strong, moderate, weak or no influence

To generate a rurality measure for each DA, an intersect analysis was preformed where participants who coded as living either in a MIZ (i.e., an urban core with a population ≥ 100,000 persons) or census agglomeration (i.e., an urban core population between 10,000 to 99,999 persons) were given an urban classification score (Statistics

Canada, 2006), while all other participants were deemed as rural (Figure 4). This coding is consistent with Plessis et al. (2001) recommendations outlined in the November 2001 issue of Rural and Small Town (RST) Canada Analysis Bulletin. Here, Plessis and colleagues suggest the utilization of this classification when considering differing characteristics based on community level data (i.e., SES, accessibility).

Figure 4. Dissemination boundaries with SAC designation.

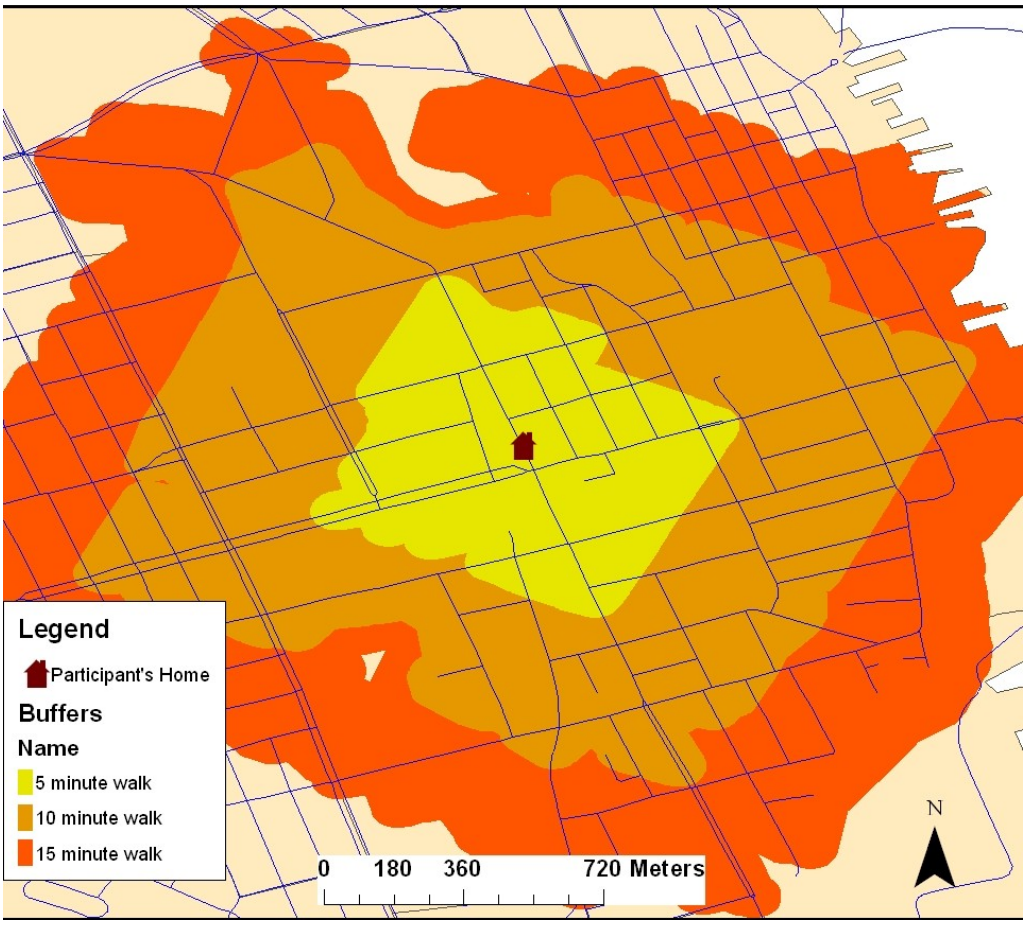


3.3.2 Buffers

Once participants' addresses were deemed urban or rural, buffers were created in ArcGIS 9 (ESRI, 2009) using a buffered lined-based network (Demers, 2005). As

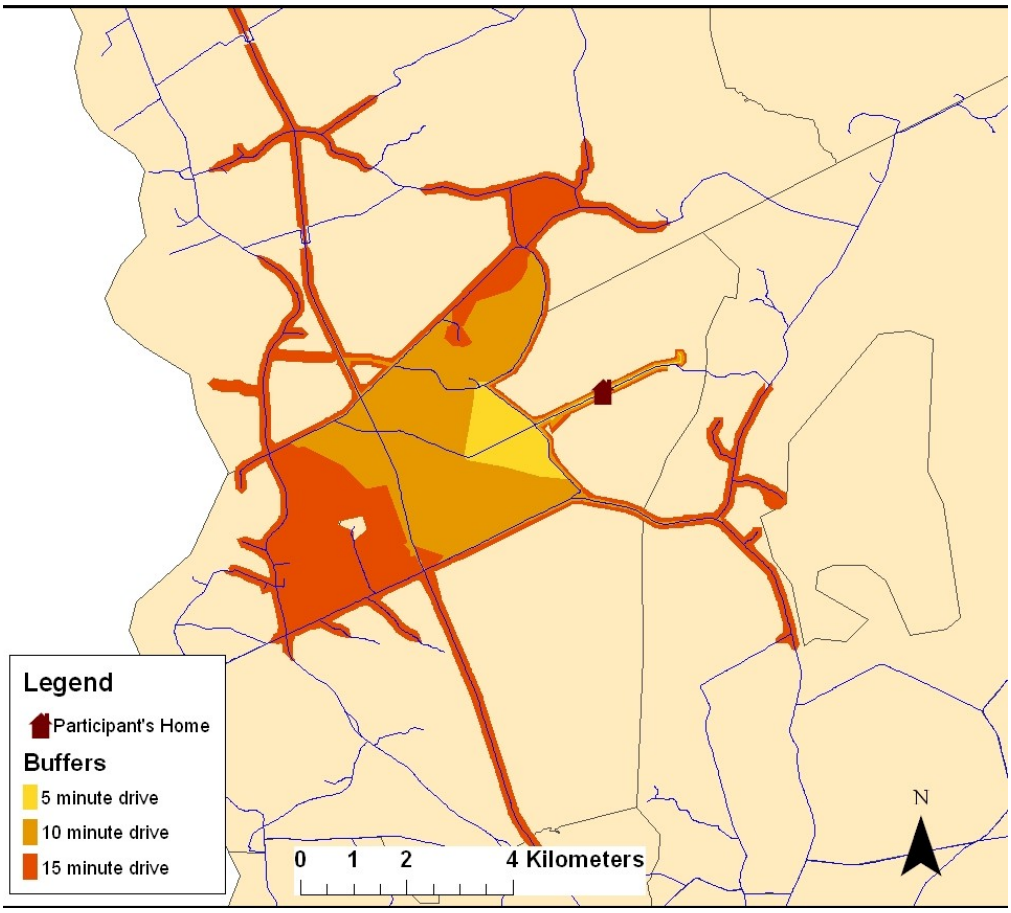
outlined by Demers (2005), buffers are simply a polygon created based on location/position, shape and orientation of an existing object; in this case these objects were the roads around and individual's home. Each participant received a series of line-based network buffers, as this establishes the area that an individual can access around their home (Frank et al., 2005; Longley, Goodchild, Maguire, & Rhind, 2005). Buffer sizes vary based upon the connectivity of the road network system, that is, more intersections allow for a larger area to be covered (Demers, 2005; Longley et al., 2005; Frank et al., 2005).

Figure 5. Travel buffers drawn around an individual in an urban community.



Buffer size was determined by the rurality of the participant's address, those participants living in urban DAs were assigned line-based network buffers that were equivalent to a 5 minute, 10 minute and 15 minute walk at a speed of 6 km/hr (Lovasi, 2008; Kirtland, 2003). Urban participants were first given a 540m (5 minute), 750m (10 minute), and 1200m (15 minute) line-based buffer (Figure 5). Personal communications with the Nova Scotia Cardiovascular Rehabilitation (CR) Hearts in Motion program (2009), confirmed that through their program CHD patients' average walking speed is between 5– 6 km/hr. Therefore, based on the average walking speed of CHD patients attending CR, these buffers appear to be a reasonable estimation.

Figure 6. Travel buffers drawn around an individual in a rural community.



However, one buffer size is not recommended for a mixture of both urban and rural communities (Rutt et al., 2004). Rutt et al. (2004) suggest that buffers for urban communities are too small for rural communities, since population densities in rural communities vary, making the span of one's community greater in rural areas than that of urban. Unfortunately, the majority of research that has used ArcGIS to create boundaries, has only looked at the influence of urban communities on PA (Giles-Corti & Donovan, 2002b; Gordon-Larson et al., 2008; Hoehner et al., 2005; Kirklan et al., 2003; Lovasi et al., 2008; Rutt & Coleman, 2004); thus determining a size for a rural buffer remains an arbitrary task.

Little GIS literature has used buffer sizes for rural areas, however, work from Rutt et al. (2004) and Giles-Corti and Donovan (2002b) suggest the usage of large buffers for rural areas. In fact, research conducted by Kirkland (2003) used a 10 mile (17km) buffer that equated to a 20 minute drive. However, to make the rural and urban buffers comparable, an equitable time travel cost in minutes was denoted to the buffers.

Therefore, rural participants were given buffers equating to travel time within a vehicle, as to try and standardize the buffers and travel cost between urban and rural patients (Figure 6). A 5, 10, and 15 minute line-based network buffer was created for each rural participant based on the road network system of Nova Scotia, which took into account the impact of speed limits and road types.

Once buffers were created, an additional 100m buffer around the original line buffer was created to generate the final buffers. A 100m buffer was chosen based on

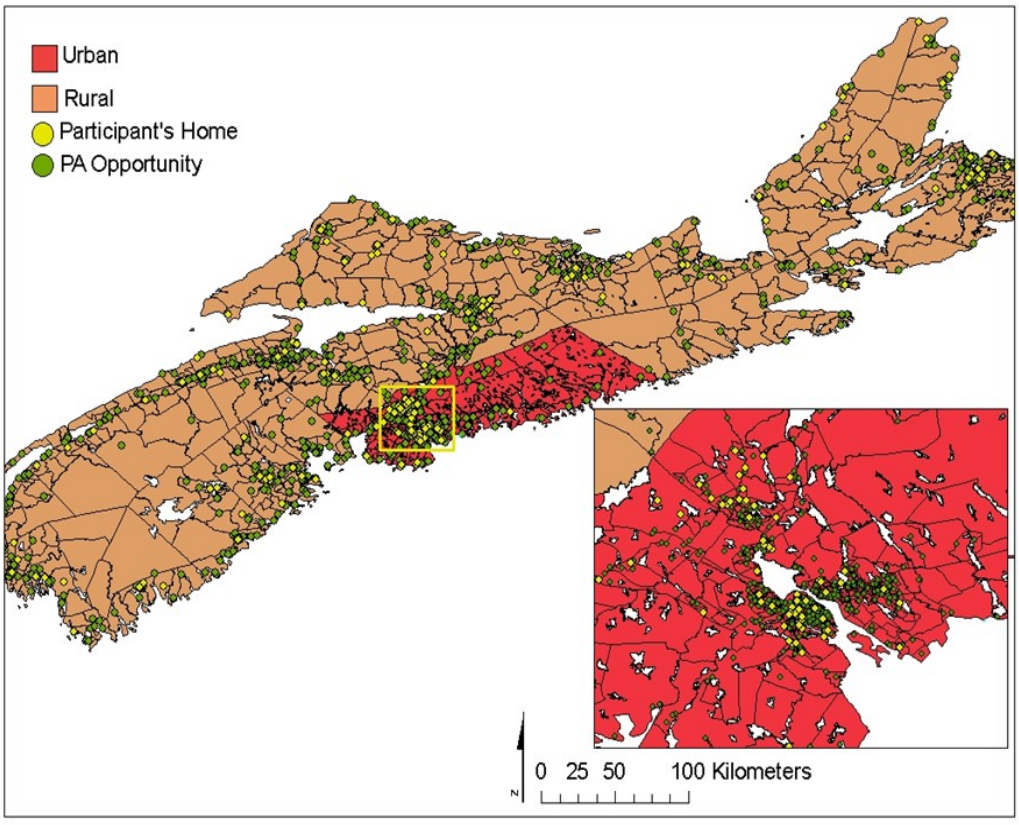
analyses of the average distance from participants' homes to the nearest street / highway.

3.3.3 Accessibility

Individual's civic addresses were layered onto communities (Figure 7) and geocoded (i.e., given geographical coordinates). Participant data points were then joined through a point in polygon overlay. That is, the spatial attributes (i.e., latitude and longitude) of each individual were joined to the spatial attributes of their DA.

To generate accessibility measures, an objective built environment database inclusive of all PA opportunities (e.g., gyms, parks, beaches) was layered onto the DA communities.

Figure 7. Objective built environment overlay.



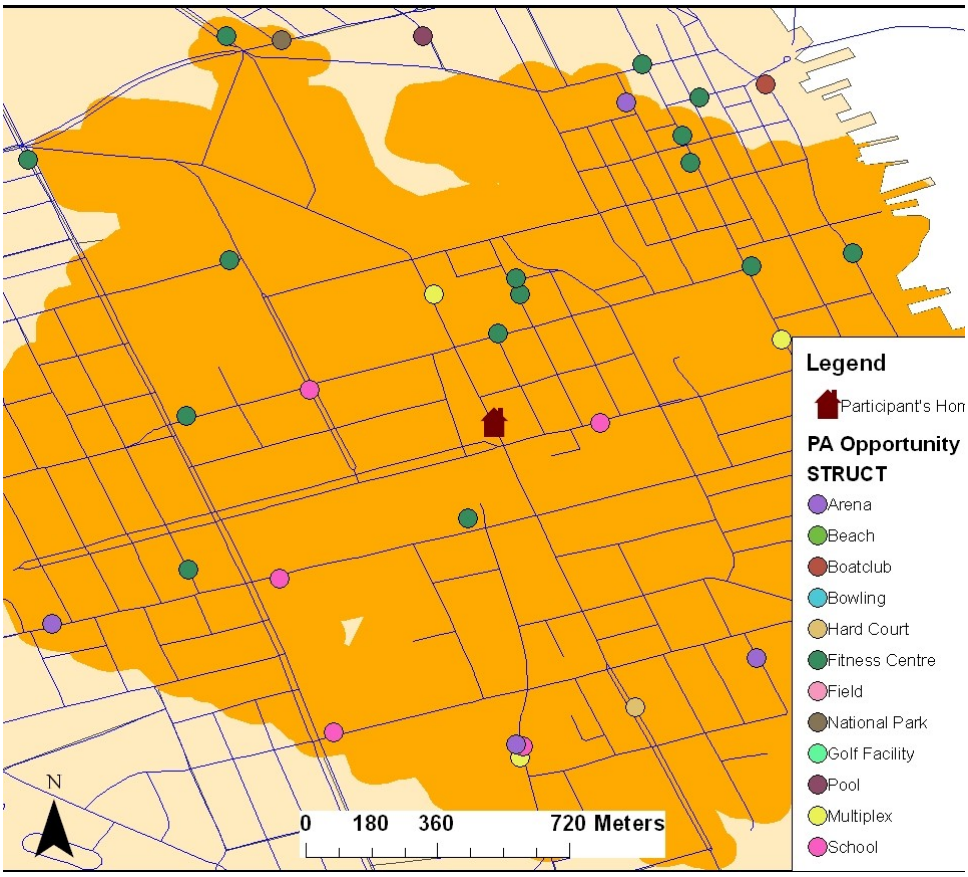
The objective built environment database was complied by conducting internet searches using keywords such as “fitness facility”, “Provincial Park”, and “beach”.Addresses, postal code, and contact information were among the information recorded about the PA opportunity site; any missing data was collected through telephone and email communications with the individual site. All facilities were segregated into an over-arching structure type (Table 1).

Table 1. Built database structure definition.

Structure Type	Structure Definition
Arenas	Arenas were categorized as having some form of ice available to the public (i.e., curling and/or hockey facilities).
Beaches	Any PA opportunity site that consisted solely of a beach (Provincial, and/or Municipal), was considered a beach structure.
Boating facilities	A PA opportunity that consisted of either a boat house, docking facility and/or offered boating equipment (i.e., canoe) was deemed a boating facility.
Bowling allies	Any PA opportunity that offered strictly lane and/or lawn bowling.
Hard courts	Any PA opportunity site that consisted solely of a basketball, tennis, squash, volleyball and/or badminton court was categorized as being a hard court structure.
Stables	PA opportunities that consisted of equestrian activity were categorized as a stable.
Fitness facilities	Fitness facilities were defined as any PA structure offering cardio facilities and/or classes, weightlifting equipment, dance classes, yoga instruction, etc.
Fields	PA opportunities consisting of simple greenspace, baseball, soccer, football and/or general sporting fields.
Parks	Any National, Provincial, or Municipal park. Parks may be a simple stand alone structure, but are not limited to

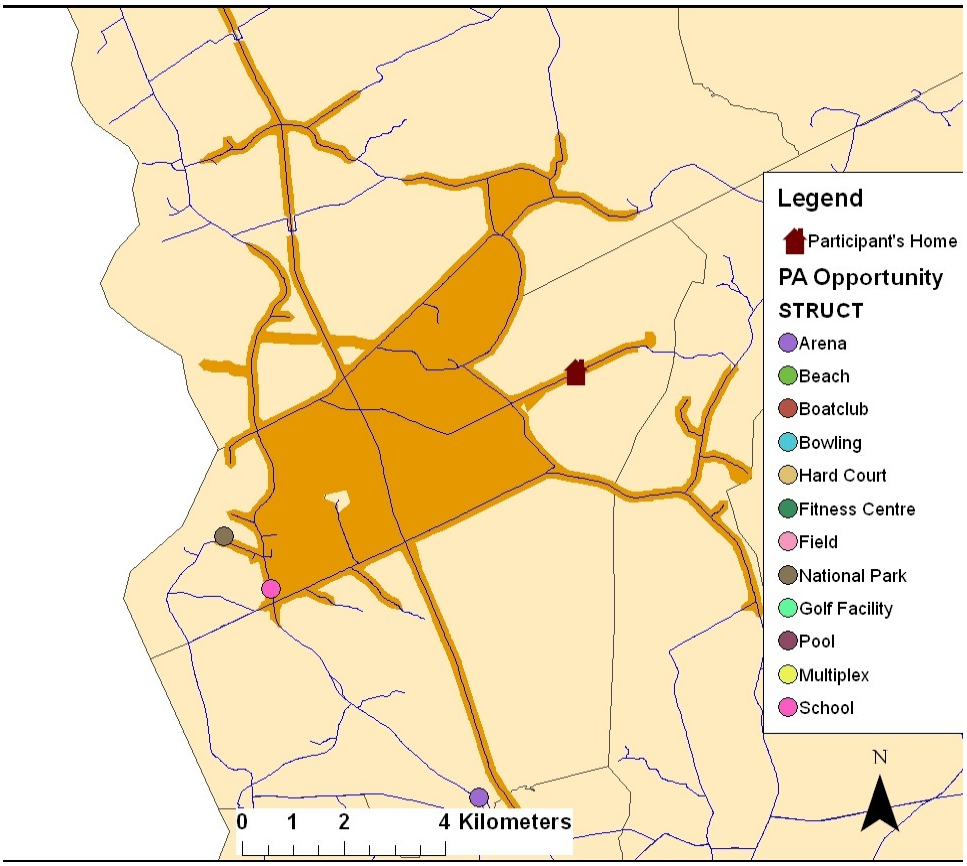
	including beaches, trails, fields, etc.
Golfing facilities	A PA opportunity site that consisted of a golf course and/or driving range.
Aquatic & pool centres	Any stand alone aquatic/pools facility located either indoors or outdoors.
Multiplex	A PA opportunity was deemed a multiplex if it consisted of several PA indoor and/or outdoor structures (i.e., pool, hard court, track), and was not associated with a school facility.
School	Any PA opportunities associated with structures that were located upon school grounds (e.g., fields, hard courts, fitness facilities), were deemed part of the overarching school facilities.

Figure 8. Pictorial demonstration of the number of PA opportunities within a 15 minute walk of an individual's home who resides in an urban community.



Three measures of accessibility were computed using the built environment data (Figures 8 and 9). Firstly, the number of PA opportunities within an individual's community was calculated (Gordon-Larson et al., 2008; Hoehner et al., 2005; Lovasi et al., 2008; Rutt & Coleman, 2004), by conducting a simple structured query language (SQL) count. Secondly, the average travel distance in meters to a PA opportunity in a participant's community was calculated. And lastly, the average time it takes to reach a PA opportunity in their community was computed (Giles-Corti & Donovan, 2002; Gordon-Larson et al., 2008; Kirklan et al., 2003; Rutt & Coleman, 2004).

Figure 9. Pictorial demonstration of the number of PA opportunities within a 15 minute drive of an individual's home who resides in an rural community.



3.3.4 Community SES

A measure of community SES was calculated for each participant based on Demissie et al. (2000) report on community SES calculations. The SES variable was created using employment, education, and income measures from the 2006 Canada Census, and then combined to create a composite community SES score. The following equation was used:

Community SES = (z-score of net education level) + (z-score of median income) + (z-score of proportion of unemployed)

Net education level for each community was calculated by subtracting the proportion of individuals 15 years of age and older without a high school diploma/certificate from the proportion of individuals 15 years of age and older with a university degree or post-secondary diploma. The median income of census families within the participant's community was used as a median income score. And a community value of the proportion of unemployed was calculated by dividing the number of individuals unemployed by the number of individuals in the labor force.

Occasionally buffers overlapped with several communities. Because of this, all communities within the buffer were considered to influence the individual's community SES impact. Therefore, a weighted SES measure was used to compute an overall SES score. The proportional influence of each community (DA) 9 was generated through ArcGIS 9, and then transferred into SPSS 13.0 and placed into the equation:

$$SES = aSES_a + bSES_b + kSES_k;$$

where *a,b,* and *k* are the proportion of the community within the individual's buffer, an

$SES_{a, b, k}$ are the individual SES measures of the community. The measures were then summed to achieve an overall SES score for the individual.

3.4 Data analysis

Preliminary analyses used frequencies and descriptives to calculate basic demographic data and describe the sample. Next, to understand the impact of potential confounding factors, Pearson's and Spearman's correlations were run between patient demographic variables (i.e., gender, age, etc.) and PA at time 2. All variables having a significant correlation ($p \leq .05$), were controlled for in subsequent analyses.

3.4.1 Objective 1 analytical plan

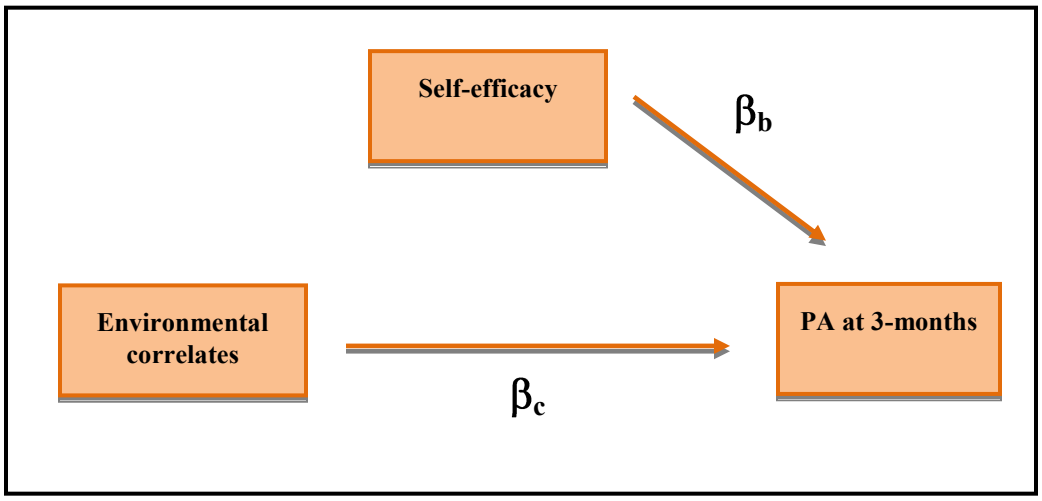
What is the association between community factors (i.e., rurality, access to PA opportunities, and community SES) and task self-efficacy on PA levels in individuals living with CHD 3 months after being hospitalized for a cardiac event?

To assess the association of an individual's community on their PA (β_c), a series of regressions were ran between PA at time 2 (3 months after being hospitalized), and the environmental correlates of: (1) if they lived in a rural or urban community; (2) their community's SES; and (3) accessibility associated with (a) having access to specific PA opportunity structures (i.e., yes or no), (b) the number of PA opportunities structures available overall and by structure type, (c) the average travel time to PA opportunities

within their community (i.e., travel buffer), and (d) the average travel distance to PA opportunities within their community.

Each series of regressions were run for all three travel buffer sizes (i.e., 5, 10, and 15). Betas having a *p-value* ≤ .05, were considered to be significant predictors of PA at time 2.

Figure 10. Analytical assessment of objective 1.



To assess the second component of objective 1, the relationship between task self-efficacy and PA at time 2, task self-efficacy at time 1 (i.e., the time of hospitalization), was regressed onto PA (β_b). A beta having a *p-value* ≤ .05, was considered to be a significant predictor of PA at time 2.

3.4.2 Objective 2 analytical plan

How does task self-efficacy mediate the relationship between community-level correlates and PA in CHD patients over this 3 month period?

The Barron and Kenny (1986) mediational analysis was conducted to assess the mediational influence of task self-efficacy on the significant environmental predictors of PA found in objective 1. This method uses four steps to establish the presence of mediation.

Step 1: The independent variable (IV), must be correlated with the outcome variable (βc).

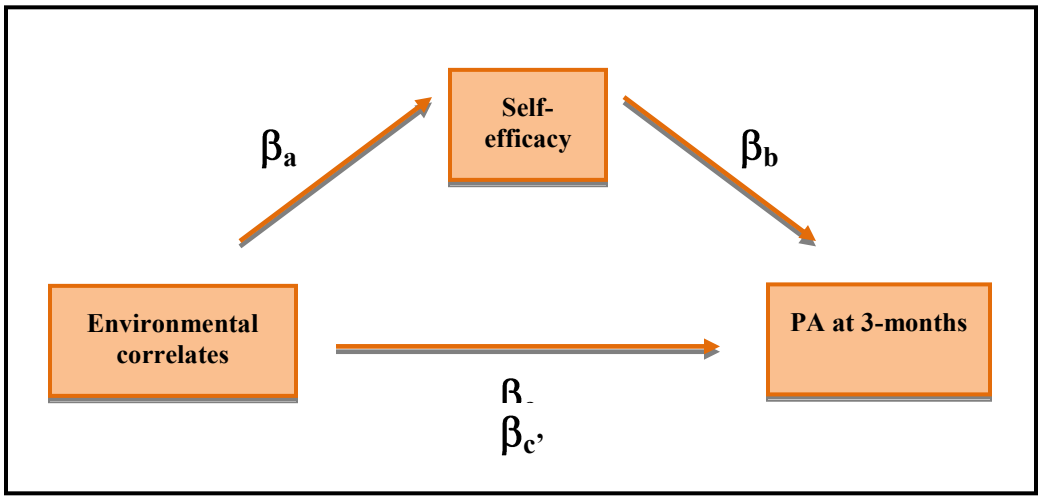
Step 2: The IV must be correlated with the potential mediating variable (βa).

Step 3: The potential mediating variable must be correlated with the outcome variable (βb).

Step 4: The effect of controlling for the mediator will impact the correlation between the IV and DV (βc').

That is, the environmental variables significantly predicting both PA at 3 months and task self-efficacy were regressed onto PA at 3months controlling for task self-efficacy (βc'). To assess the mediational influence of task self-efficacy, the Sobel test was preformed to assess the significant difference between βc and βc'.

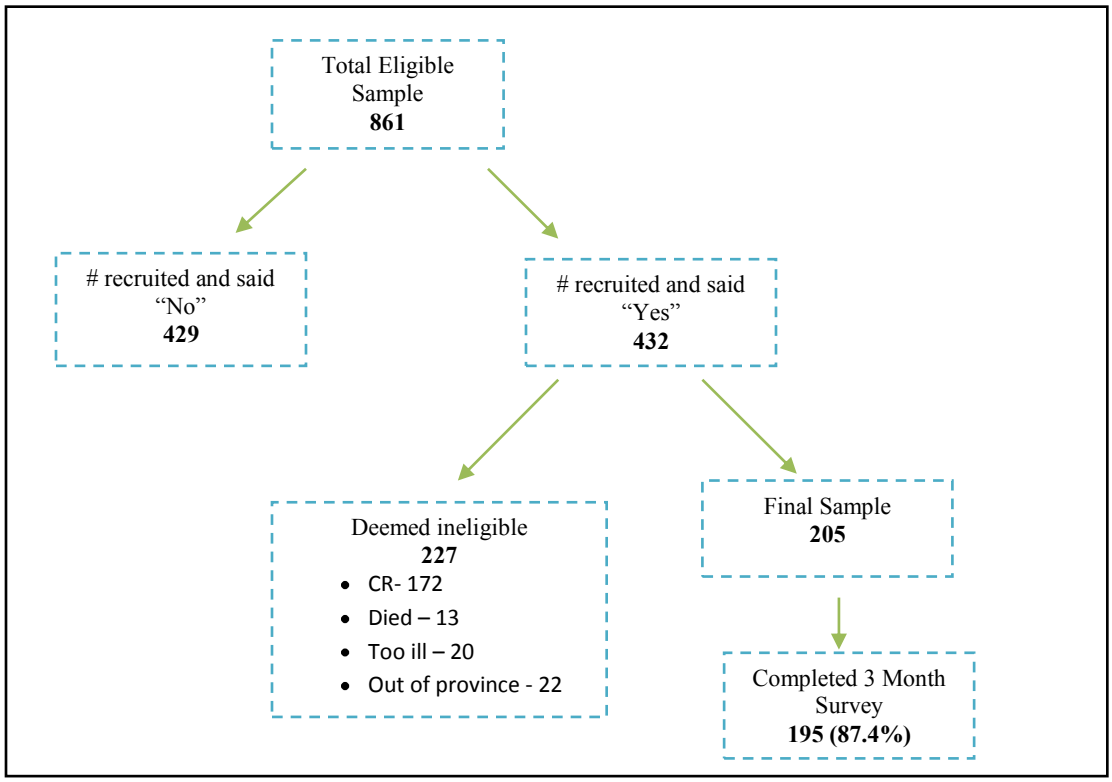
Figure 11. Analytical assessment of objective 2.



CHAPTER 4 RESULTS

4.1 Analyses of study progress

Over the course of recruitment, 3261 cardiac patients were screened for eligibility to the study. Of those, 1462 (46%) were eligible to participate. Of the 54% who were ineligible, the majority of these patients had contradictions to PA (16.4%), were currently too ill or unstable based on their medical records (14.4%), were in isolation restriction due to bacterial and/or viral health infections (10.3%), or did not meet the age inclusion criteria (7.2%). *Figure 12.* Recruitment flow diagram



A total of 1030 (70.5%) patients were approved for recruiting by the health care team, where the most common reason for denial of recruiting was that the health care

professional felt their patient was currently too ill to participate (37.5%). During recruitment, a total of 169 (16.4%) patients were not approached because of early discharging from the hospital unit, making a total of 861 patients approached to be recruited for this project.

Of the eligible sample, 49.8% declined to participate in the project (Figure 12). The reason most cited for not wishing to participate was that they were uncomfortable partaking in research and/or lacked confidence in research itself (32.7%), followed by not being interested in the specific research study (24.4%). A total of 432 patients agreed and consented to participating in the study; however, over the course of the follow-up year, 52.5% of the sample became ineligible largely due to patients participating in CR programs throughout the province. A final sample of 205 participants were followed over a 1-year period, and at 3 months, the study had an 87.4% retention rate.

4.2 Preliminary analyses

Consistent with other studies examining samples of CHD patients (Moholdt et al., 2008; Myers et al., 2008; Smith et al., 2004 & 2009), the final 205 sample (Table 2) consisted largely of males (75.1%), with an average age of 63.8 years (σ = 10.7), were of Caucasian decent (96.6%) and were currently married or living common-law (78.6%). Nearly half of the sample had an average household income below $40,000, and only 31.7% were currently employed at either part-time or full-time occupations. Interestingly, 60% of our sample reported that the cardiac event in which they were

hospitalized for (e.g., MI, CABG) was their first incident, and over half were diagnosed with coronary artery disease (CAD) (see Table 2 for patient demographics).

Table 2. Patient demographics.

	Mean (range)	N(%)
	(n=205)	
Age	63.8 (25 to 85)	
Gender		
Male		154 (75.1)
Race		
Caucasian		198 (96.6)
Employment		
Employed		65 (31.7)
Income		
<$40,000		99 (48.3)
Marital Status		
Married/Common-law		161 (78.6)
Education	12.8 (0 to 23)	
CAD		113 (55.1)
First cardiac event		123 (60.0)
BMI	27.6 (17 to 50)	
Number of comorbidities	2.32 (0 to 6)	
Hypertension		120 (60.9)
Family History of IHD		78 (39.6)
Currently smoking		50 (25.4)
Diabetes		51 (25.9)
Dyslipidemia		140 (71.1)
Obesity		30 (15.2)

The sample BMI ranged from 17 to 50, with an average of 27.6kg/m^2; indicating that the majority of our sample was overweight at the time of hospitalization (Table 2). Upon entering the hospital, participants had an average of 2 comorbidities (σ = 1.3), with 60% having a diagnosis of hypertension, 71% dyslipidemia, and almost 40% having a family history of heart disease. 25.9% of participants had a known diagnosis of diabetes, and 25% were considered smokers during the time of their hospital admission.

Table 3. Mean task self-efficacy scores.

	Range	Task self-efficacy& standard deviation
		(n=205)
Baseline	0 to 100	77.01 (26.3)
3-months	0 to 100	69.81 (26.1)

At the time of entering the hospital, participants had an average task self-efficacy score (Table 2) of 77, while 3 months after hospitalization participants were reporting 70 (Table 3). Internal consistency were acceptable at baseline (α = .981) and at 3 months (α = .988).

When asked about their PA levels (Table 4), participants reported engaging in 214.7 minutes of moderate-vigorous PA per week prior to being hospitalized. During the 3-months after being discharged from the hospital, participants reported in engaging in 207.9 minutes of moderate-vigorous PA per week.

Table 4. Mean PA scores.

	Total PA (minutes/wk) & standard deviation
	(n=205)
Baseline	214.7 (264.9)
3-months	207.9 (240.3)

Analysis of GIS data (Table 5) found that only 35% of our sample resided in an urban community at the time of their hospitalization. Within the first buffer (equivalent to a 5 minute travel time), participant's community SES had a range of z-scores from -3.1 to 6.9, with an average of .19, while subsequent buffer sizes (i.e., 10 and 15 minute travel times), had ranges of -3.0 to 5.1 and -2.7 to 4.0 and means of .208 and .213

respectively. Community SES scores for all buffers indicate that on average, participant SES scores were within 1 standard deviation of the average SES value of Nova Scotian communities.

As buffer sizes increased, so to did access to the number of PA opportunities. Within a 5 minute travel time, participants had an average of less than 5 (σ = 8.0, range: 0 to 38) PA opportunities available to them (Table 5). Within 10 minutes, participants had access to an average of 10 opportunities (σ = 14.2, range: 0 to 58), and within 15 minutes a little over 17 (σ = 21.9, range 0 -78).

Table 5. Patient community demographics.

	Mean (n=205)	N(%)
Rurality		
Urban		72 (35.1)
Average community SES		
Within 5 min	.189	
Within 10 min	.208	
Within 15 min	.213	
Average number of PA opp.		
Within 5 min	4.8	
Within 10 min	10.3	
Within 15 min	17.4	
Average travel time (min) to PA opp.		
Within 5 min	2.9	
Within 10 min	5.6	
Within 15 min	7.6	
Average travel distance (m) to PA opp.		
Within 5 min	1715.5	
Within 10 min	2980.1	
Within 15 min	4653.6	

In terms of travel time, participants spent an average of 2.9 minutes (σ =1.1, range: .36 to 5) traveling to PA opportunities that were on average 1715.5 m away (σ =1157.6, range: 36.2 to 4959.1) within a 5-minute travel buffer (Table 5). Within a 10 minute travel buffer, participants' average travel time was 5.6 minutes (σ =2.2, range: .36 to 9.8) and had an average distance of 2980.1m (σ = 2275.1, range: 36.2 to 8953.8) to PA opportunities. Lastly, participants traveled 7.6 minutes (σ =2.9, range: .36 to 7.6) and an average of 4653.6 m (σ =3595.5, range: 36.2 to 4653.6) to PA opportunities within a 15 minute travel buffer.

4.3 Bivariate Correlations

Bivariate correlations between patient demographics and self-report PA at 3-months indicated potential confounding variables (Table 6). Age, gender (0 = female, 1 = male), employment (0 = currently employed, 1 = not currently employed), having a known diagnosis of diabetes (0 = no, 1 = yes) and/or dyslipidemia (0 = no, 1 = yes), as well as the participant's reported PA levels at the time of hospitalization were all significantly correlated to 3-month PA levels. Therefore, these variables were controlled for in regression analyses.

Table 6. Bivariate correlations between participant demographics and PA at T2.

	R
Age[1]	-.209**
Gender[2]	.300***
Race[2]	.021
Employment[2]	-.194**
Income[2]	.136
Education[1]	.041

CAD[2]	.054
First cardiac event[2]	.118
T1 BMI[1]	-.027
Number of comorbidities[1]	-.061
Hypertension[2]	.008
Family History of IHD[2]	.059
Currently smoking[2]	.045
Diabetes[2]	-.145*
Dyslipidemia[2]	-.167*
Obesity[2]	-.061
PA at T1[1]	.488***

[1] Pearson's correlation statistic.
[2] Spearman's correlation statistic.
*** *p< .001; ** p < .01; * p <.05*

4.4 Objective 1 analyses

The primary objective of the thesis was to understand the associations between the environment, and task self-efficacy with PA during the 3-months after CHD patients' hospitalization of a cardiac event, simple regression analyses were performed (Table 7).

Analyses concluded that participant's task self-efficacy at the time of hospitalization was a significant predictor (R^2 = .348, β = .159, p < .05) of moderate-vigorous PA at 3 months (Table 7). However, regression analysis between rurality (0 = rural, 1 = urban) and PA concluded that living in a rural or urban community did not significantly predict PA at 3 months (R^2 = .337, β = .005, p = .938).

Table 7. Standardized beta coefficients for between PA, task self-efficacy and rurality.

	PA[1]
Task self-efficacy	.159*
Rurality	.005

[1] Controlling for age, gender, employment , diabetes, dyslipidemia and PA at baseline.
**p*< .05

A series of regressions (Table 8) between PA at 3 months and environmental correlates by travel time (i.e., 5, 10, and 15 minute buffers) found that the environment was not predictive of future PA. Community SES was a non-significant predictor of PA at 3 months for 5 (R^2 = .341, β = -.067, *p* = .267), 10 (R^2 = .340, β = -.057, *p* = .343), and 15 (R^2 = .339, β = -.050, *p* = .404) minute travel buffers, with all standardize betas indicating a small negative relationship, much like those associated with the number of facilities a participant had access too, and travel distance and time. Regressions between 3 month moderate-vigorous PA and access to and number of PA opportunities based on structure type (e.g., arenas, aquatic centers/pools, school) showed no predictive relationship for 5 and 10 minute travel buffers. The only significant predictors of PA at 3 months were within the 15 minute travel buffer, where having access to pools (R^2 = .352, β = -.123, *p* = .042), and the number of pools a participant had access to (R^2 = .350, β = -.119, *p* = .050), was negatively associated with PA at 3 months. That is, results indicated that individuals with greater access to pools and greater number of pools within their community (defined as a 15 minute travel time), decreased their moderate-vigorous PA at 3 months.

Table 8. Standardized beta coefficients for environmental correlates and PA by travel time.

	PA[1]		
	5 minute travel time	10 minute travel time	15 minute travel time
SES	-.067	-.057	-.050
# PA opp.	-.030	-.031	-.064
Ave travel time	-.041	-.052	-.024
Ave distance	-.113	-.092	-.083
PA opp. structure type[a]			

Access to ice arenas	.061	.061	.069
# of ice arenas	-013	-.013	-.018
Access to beaches	.027	.052	.005
# of beaches	.018	.034	-.009
Access to boating/sailing facilities	.018	.050	-.003
# of boating/sailing facilities	-.060	-.087	-.116
Access to bowling alleys	-.050	-.075	-.096
# of bowling alleys	-.056	-.061	.007
Access to hard courts	-.037	.046	.022
# of hard courts	-.032	.001	.000
Access to stables	-.108	-.014	-.016
# of stables	-.108	-.004	-.030
Access to fitness/gym facilities	-.022	.000	.-.052
# of fitness/gym facilities	-.002	.042	.055
Access to sporting fields	.051	.000	-.023
# of sporting fields	.062	.036	.009
Access to parks	-.073	-.093	-.094
# of parks	-.068	-.085	-.079
Access to golfing facilities	-.018	-.031	-.053
# of golfing facilities	-.018	-.011	-.015
Access to aquatic/pool centers	-.071	-.089	-.123*
# of aquatic/pool centers	-.069	-.083	-.119*
Access of multiplexes	-.021	-.028	-.048
# of multiplexes	-.002	-.057	-.008
Access to school facilities	-.025	-.038	-.073
# of school facilities	.037	-.031	-.002

[1] Controlling for age, gender, employment , diabetes, dyslipidemia and PA at baseline.
[a] Accessibility to PA opportunities was measured in both a simple count of the number of facilities, as well as if they had access to that type of structure (0 = no, 1= yes).
[b] School facilities consist of, but are not limited to, green space, hard courts and/or fitness facilities within the properties of a school.
* $p < .05$

4.5 Objective 2 analyses

As outlined in the analytical plan, to assess objective two, *what is the mediating influence of task self-efficacy on the relationship between the environmental correlates and PA during the 3 months after being discharged from the hospital for a cardiac event*,

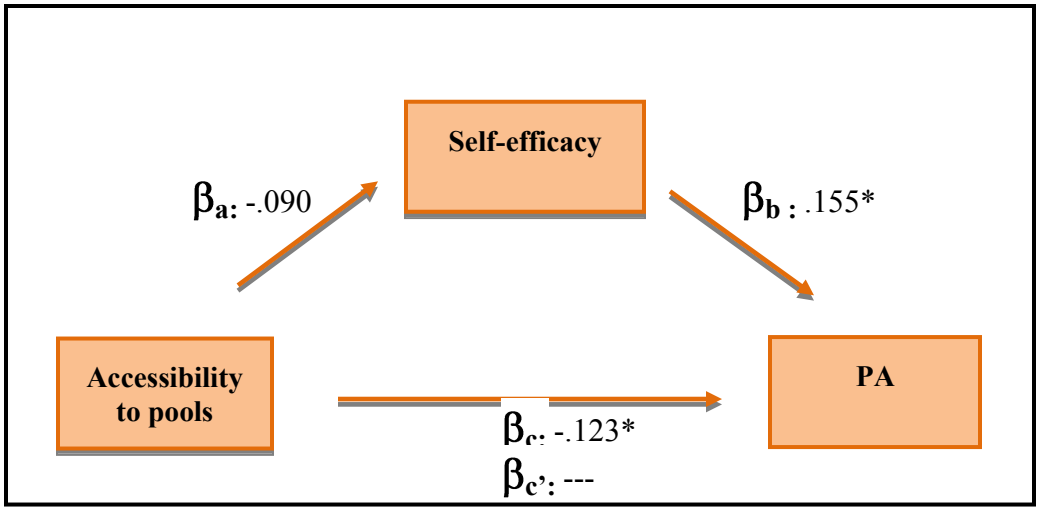
Barron and Kenny mediation analyses were preformed on the significant environmental correlates found in the previous analysis (Tables 7 & 8).

Table 9. Mediational analysis between pool facilities, task self-efficacy and PA.

	PA[1]	Self-efficacy (T1)	PA[2]
Task self-efficacy	.155*	---	---
15 minute buffer			
Access to aquatic/pool centers	-.123*	-.090	---
# of aquatic/pool centers	-.119*	-.088	---

[1] Controlling for age, gender, employment , diabetes, dyslipidemia and PA at baseline.
[2] Controlling for age, gender, employment , diabetes, dyslipidemia and PA at baseline, as well as task self-efficacy at baseline.
* $p < .05$

Figure 13. Mediational analyses on the environmental correlate of 'accessibility to aquatic/pool centers' within a 15 minute travel time.

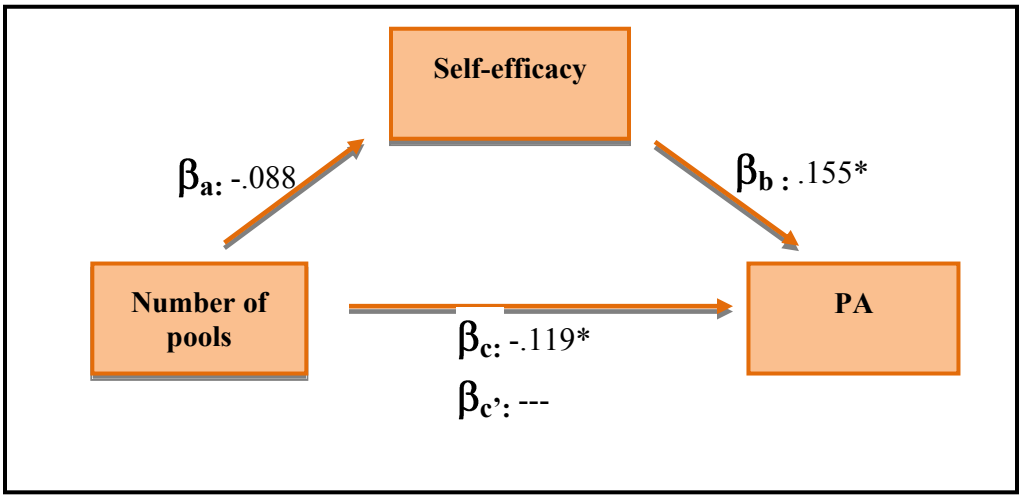


As outlined in Table 9, the only significant predictors of PA at 3 months were having access to aquatic/pool centers and the number of aquatic/pool centers within a 15

minute travel time. To first assess the mediational influence of task self-efficacy on this relationship, simple regressions were conducted between task self-efficacy at baseline and access to aquatic/pool centers (Figure 13) and the number of aquatic/pool centers accessible (Figure 14).

Outlined in Figure 13, the first two rules of the Barron and Kenny mediational analyses were met. That is, there was a significant relationship between task self-efficacy (the moderating variable) and accessibility to aquatic/pool centers (the IV) and PA at 3 months. However, since accessibility to aquatic/pool centers was not predictive of the potential mediating variable, task self-efficacy (R^2 = .145, β = -.090, *p* = .203), there was no need to assess the relationship between accessibility to pools and PA at 3-months controlling for task self-efficacy as a potential mediator.

Figure 14. Mediational analyses on the environmental correlate 'the number of aquatic/pool centers' within a 15 minute travel time.



Much like accessibility to aquatic/pool centers, the number of aquatic/pool centers is not significantly correlated to the potential mediating variable, task self-efficacy (R^2 = .145, β = -.088, *p* = .214) (Figure 14). Therefore, there was no need to

assess the mediational influence of task self-efficacy on the relationship between accessibility to aquatic/pool centers and moderate-vigorous PA at 3 months.

CHAPTER 5 DISCUSSION

This study set forth to understand the association between the environment and PA levels in CHD patients 3 months after being discharged for a cardiac event, and whether or not task self-efficacy mediated this relationship.

5.1 Self-efficacy

5.1.1 Objective 1: What is the association between self-efficacy and the environment?

The primary objective of this study was twofold. First, it set out to assess the association between self-efficacy and PA levels in CHD patients 3 months after being hospitalized for a cardiac event. Results showed that a CHD patient's task self-efficacy at the time of hospitalization was a significant predictor of their PA levels 3 months after being discharged, confirming that individuals who are confident that they have the skills to engage in PA will in fact engage in more PA, thus making task self-efficacy a key PA correlate in a NS CHD population. These results are in line with those from Petter et al. (2009), Vidmar & Rubinson (1994), Woodgate & Brawley (2008) and Yats et al. (2003), who have established a clear relationship between ones task self-efficacy and future PA patterns. Moreover, it appears that task self-efficacy is a key PA correlate in this population, regardless of the context. That it, while this relationship has been established in a non-CR population, it is also well documented in a CR context (Blanchard et al., 2006b; D'Angelo et al., 2007; Petter et al., 2009). Therefore, our results add to the body of literature supporting the positive relationship between task self-efficacy and PA in cardiac patients.

This study defined self-efficacy in terms of one's confidence in their ability to engage, and continue to engage in certain behaviours, such as PA. However, self-efficacy can be distinguished in other ways. While this project utilized the conceptual definition of task self-efficacy, several studies have looked at the relationship between barrier self-efficacy and regulatory self-efficacy with PA in cardiac populations. Barrier self-efficacy, or one's confidence in their ability to overcome difficult aspects or barriers, can affect an individual's ability to engage in PA (Blanchard et al., 2007; Pender, 1996; Woodgate & Brawley, 2008). In a larger context, such barriers could refer to internal personal perceptions and/or environmental barriers. These barriers may cause fear or disinterest in the individual, which dissuades them from engaging in PA. Moreover, high regulatory self-efficacy (i.e., confidence in planning and/or scheduling PA) has been linked to greater levels of PA in both CR populations (Blanchard et al., 2002a & 2007; Petter et al., 2009; Sniehotta, Scholz, Schwarzer, 2005) and CHD patients not attending CR (Petter et al., 2009; Schroders & Schwarzer, 2005; Vidmar & Rubinson, 1994). Therefore, these different conceptual definitions of self-efficacy may be impacting the PA levels in CHD patients differently than task self-efficacy. Unfortunately, this study only looked at the relationship of task self-efficacy, thus this study may not capture the true impact of self-efficacy without understanding the associations of other self-efficacy constructs on PA levels in CHD patients.

Yates, Price-Fowlkes, & Agrawal (2003) suggest that the impact of self-efficacy on PA should not just be looked at in a singular context, but include multiple definitions that address both barriers and facilitators. Maddison and Prapavessis (2004) confirm

this suggestion, as they point out that while task self-efficacy can realistically predict the physical components of PA (i.e., duration and intensity), self-regulatory efficacy can predict behavioural aspects of PA (i.e., attendance/adherence). Therefore, because self-efficacy can be defined through different conceptual ways, and each way may be measuring specific aspects of PA, future research should consider the relationship of each with PA levels in this population. This is particularly important from an intervention standpoint, as understanding different aspects of self-efficacy, specifically potential barriers a CHD patient may face when engaging in PA, is crucial in developing an intervention that is successful at achieveing longterm PA behaviours.

The timing of the measurements may be a significant contributor to the relationship between task self-efficacy and PA. Several studies have noted decreased levels of PA 2- 3 months after hospitalization; however, by 6 months, patients' PA levels generally increase as they have resumed most daily activities (Barnason et al., 2000; King, Porter & Rowe, 1994; Tooth, McKenna & Maas, 1999). During the first few months following hospitalization, our sample may have been limited in the type of PA they were recommended to engage in (i.e., mild (walking) vs vigorous), especially those recovering from invasive surgeries such as a CABG. Therefore, the amount of PA our sample was engaging in at 3 months, may be less than that at 6 or 12 months when they have fully recovered from their procedure. Thus, this difference may be due to functional capacity rather than an individual's confidence in their ability to engage in PA. This logic seems to be strengthened by work from Moore et al. (2003). Moore and colleagues examined CR patients and found that at 3 months, CR patients' task self-efficacy was correlated with

the total number of exercise minutes, but not the intensity. Therefore, the results of this study may be less applicable to the prediction of self-efficacy over longer periods, as the self-efficacy/PA relationship examined here only looks at a 3 month time span after hospitalization, while a longer longitudinal follow-up may provide better insight on this relationship after full recovery.

Additionally, enhanced task self-efficacy is linked to increased exposure/participation to PA (Woodgate & Brawley, 2008). Ewart et al. (1986), in particular, highlight the reciprocal relationship between exercise and self-efficacy by showing that exercise related efficacy in CHD patients predicts self-reported PA behaviours. That is, individual's who engage in more PA will increase their self-efficacy towards PA. Therefore, due to the limited time frame (i.e., 3 months after hospitalization), and the recovery time needed to fully engage in moderate-vigorous PA, participants may not have enough time to accurately judge their task self-efficacy towards PA, since they may have only begun to engage in PA for a short period prior to measurement. In contrast, this shorter period of time may not accurately reflect those individuals who have lower task self-efficacy. That is, individual's who are recently discharged from the hospital often have greater levels of task self-efficacy; however, several weeks after being discharged their task self-efficacy levels decrease (Reid et al., 2006). Therefore, it might be that participants are highly motivated upon being discharged and perceive themselves as having high levels of task self-efficacy, however, upon actually engaging in PA, their perceived task self-efficacy level changes. In fact, Maddison and Prapavessis (2004) looked at the temporal patterns of self-efficacy across

several phases of CR and found that self-efficacy increased during CR, however self-efficacy leveled off during the completion of the program. These results are similar to Blanchard et al. (2002b), who found that during CR, individual's task and barrier efficacy increased, however following CR, both showed a significant decline. Therefore, to assess the relationship of task self-efficacy over time, future research should look at conducting longer longitudinal trials, as this will ensure to include a more accurate understanding of how their self-efficacy changes over the course of their recovery period and into the period of their life where they are engaging in their regular PA routine.

Research has clearly defined a temporal reciprocal relationship between PA and task self-efficacy. Moreover, while non-significant, the results of our study do show that there is a drop in task self-efficacy from baseline to 3-months, perhaps indicating that participants' confidence in their ability to engage in PA may decrease during recovery, or perhaps their perception of their confidence in their ability to engage in PA changes at 3 months since they have had time to experience activity. Regardless of why task self-efficacy seems to decrease at 3 months, these results indicated that the timing of the self-efficacy measurement may be key in understanding the relationship between this correlate and PA. While our study examined changes in PA over 3 months after hospitalization, future research should address task self-efficacy over greater spans of time, as an individual's task self-efficacy is inherently influenced by past task self-efficacy and PA practices. Depending on the level of PA an individual engages in, their task self-efficacy may increase or decrease, thus influencing their future PA behaviours.

This reciprocal relationship may be particularly important in this population, as PA recommendations are bound to change during the course of recovery. If CHD patients are limited in their PA behaviours immediately after discharged because of physician recommendations, then perhaps assessments should be made not only at 3 months, but up to a year after discharge. Additionally, as research has indicated, an individual's self-efficacy is also impacted by their experience in engaging in PA, thus a longer period would allow for an individual's PA behaviours to be influenced by their task self-efficacy, and thus a stronger relationship could be assessed.

5.1.2 Objective 2: The mediating influence of task self-efficacy

The second objective of this study sought to understand the mediating role of task self-efficacy on the associations between the environment and PA. To date, few studies have examined the relationship of the environment using an SCT framework, and to our knowledge, none have looked at this relationship within the context of a cardiac populations.

Previous literature utilizing SCT found that self-efficacy was a mediator in the relationship between environmental factors and PA. For example, in their work with adolescent girls, Motl et al. (2005) found that barrier self-efficacy mediated the relationship between perceived accessibility of PA equipment (i.e., playgrounds) and moderate-vigorous PA; that is, young girls with greater confidence in their ability to overcome barriers associated with PA not only had increased PA, but perceived that they have greater access to PA opportunities. Additionally, research on mild PA in low-income adults from Bennett et al. (2007) found that task self-efficacy was positively

correlated to perceived safety in participant's communities, and mediated the relationship between perceived community safety and mild PA. Morris, McAuey and Motl (2008) found that older females with greater neighbourhood satisfaction engaged in more PA than those females who had lesser satisfaction, and that this relationship was mediated by exercise self-efficacy. Regardless, there appears to be a gap in understanding self-efficacy, specifically task self-efficacy, and how it mediates the relationship between objective factors of the environment (i.e., rurality, SES) and PA. To date, no study has looked at how this relationship exists in a CHD population.

To assess the additional objectives of this study, we first broke down the environment into three categories (i) rurality, (ii) accessibility to PA opportunities, and (iii) community SES; and investigated their association with CHD patients' PA 3 months after being discharged. We then assessed the mediational influence of task self-efficacy on each of these associations.

5.2 Rurality

5.2.1 Objective 1: The association between rurality and PA

The first component of the environment to be assessed was the relationship between living in a rural or urban community. Research from Parks et al. (2003) and Parks, Houseman and Brownson (2003) have demonstrated that individuals living in rural communities engage in significantly less PA than those individuals living in urban communities. This research has indicated that these varying levels may be due to factors specifically present in rural areas, such as high and fast traffic volumes, a lack of

sidewalks, and a feeling of decreased safety. However, the results from this study have concluded that within Nova Scotia, CHD patients living in either a rural or an urban community do not have significantly different PA levels.

While previous research has indicated a relationship between rurality and PA (Parks et al., 2003; Parks, Houseman, & Brownson, 2003), the results of this study are in line with the work of Martin et al. (2005) and Plotnikoff et al. (2004), which found no difference in PA practices and living in a rural community. In fact, a recent review on the impact of the built environment on PA in rural adults (Frost et al., 2010) outlined several studies that found no relationship among traffic (Eyler, 2003; Sanderson et al., 2003; Wilcox et al., 2000), sidewalks (Boehmer et al., 2006; Eyler, 2003; Sanderson et al., 2003; Wilcox et al., 2000), and perceived safety (Eyler, 2003; Hooker et al., 2005; Sanderson et al., 2003; Wilcox et al., 2000) and regular PA practices. Moreover, Wilcox et al. (2003) found an inverse relationship between sidewalks and increased PA practice, thus contradicting the idea that the absence of sidewalks in rural communities may lead to decreased PA. It appears that there is a contradiction between the connection of living in a rural community, factors associated with rurality (i.e., presence of sidewalks), and their relation to PA behaviours.

Frost et al. (2010) suggest that perhaps variations in findings may be caused by the lack of a clearly defined unit of rurality. Frosts and peers propose that the absence of a common and consistent definition of rurality limits the utility of current research, and decreases generalizability of findings to other rural locations. However, one could

pose that the problem lies within the current standardized set of parameters in which rurality is to be defined.

Plessis et al. (2001) include several measurements of rurality based on SAC classification to population density in the RST Canada Analysis Bulletin. Each measure of rurality contains its own utility and has been used in conjunction with urban-rural research. However, Smith, Humphrey, and Wilson (2008) suggest that researchers should consider that there may be difficulties associated with defining a rural versus a remote environment, and this distinction could be lost with a single definition or rurality based on standardized parameters. Research by Dejardin et al (2005), Nayfield, Dawson, McClish & Desch (1990), Taylor, Hughes, & Garrison (2002), and Wainer & Chesters (2000) suggests that access to health care and healthy lifestyle services is more difficult for rural residents in geographically large territories (e.g., a large Canadian territory) where services are vastly dispersed in smaller concentrations due to greater travel distances. However, in countries with smaller geographical areas (i.e., the UK), the difficulty of accessibility to health services and those promoting healthy lifestyles are less problematic (Cambell et al., 2001; Guildea, Fone, Dustan, & Cartlidge, 2005; Phillimore & Reading, 1992; Pitchforth, Russel & Van derPol, 2002; Robertson, Campbell, Smith et al., 2004; Veitch, 1995), which suggests that there is a key component of distance beyond what is accessible in terms of standard rurality (i.e., living within a strong vs weak MIZ), but perhaps in terms of specific geography (i.e., living in a geographically large vs small country). In comparison to other Canadian provinces, Nova Scotia is relatively small, thus there remains very few significantly remote regions where

very little is inaccessible. Therefore, perhaps the standard units of rurality, such as the SAC classifications used in the study, do not accurately capture rurality within Nova Scotia. Moreover, because Nova Scotia is relatively small in size, CHD patients in the province may have relatively equal access to PA opportunities regardless of their rural designation.

Perhaps to understand rurality and its connection to PA, researchers need to consider seeking specific rural designation within the geographic area of study. As stated above, literature has found that there are stark differences between a rural community in a large geographic region with highly dispersed low population densities, compared to that of a smaller geographic area. Therefore, future studies assessing the association of rurality and PA, may wish to look at the usefulness of an area specific measure of rurality in conjunction with standardized parameters, this may be especially useful within Nova Scotia, since this province is relatively small in size and issues of remote accessibility, especially to services and opportunities associated with PA, may not be the same as other geographically large areas.

5.2.2 Objective 2: The mediational influence of task self-efficacy on the relationship between rurality and PA

The SCT proposes that there may be a mediational influence of task self-efficacy on the association between rurality (i.e., the environment) and PA (i.e., an individual's behaviour). Therefore, *objective 2*, set forth to understand how task self-efficacy may mediate the relationship between living in a rural/urban community and PA levels in CHD patients. However, because our results found no relationship between rurality and

PA, task self-efficacy was not assessed as a potential mediator. Moreover, the study found no correlation between task self-efficacy and rurality (r = .014, p = n.s.), which may indicate that a participant's task self-efficacy is associated with their choice to participate in PA regardless of if they lived in a rural or urban location. In fact, both rural and urban participants experienced relatively similar levels of task self-efficacy at the time of their hospitalization (77.1% for rural participants and 76.3% for urban), which suggests that rurality is not associated with task self-efficacy in regards to PA.

These findings may be caused by the fact that (a) Nova Scotia is a relatively small province; therefore, perhaps there are not significant differences between opportunities to engage in PA, and/or (b) due to the fact that all patients were recruited from the same hospital, where practitioner guidelines would be consistent throughout patient care. That is, because patients were all recruited from the same units, within the same hospital, they are bound to receive the same PA recommendations, guidelines and information, all of which could be impacting their task self-efficacy in the same way regardless of where they live.

Future studies should examine the associations between rurality and task self-efficacy in association with PA, especially utilizing other measures of rurality (i.e., MIZ classification, or unique area specific classifications). Additionally, other self-efficacy constructs such as barrier self-efficacy should be examined, as CHD patients living in rural/urban communities may experience different barriers within their communities and different associations with PA.

Overall, our study found that rurality was not associated with differing PA levels in CHD patients 3 months after hospitalization, much like previous research in healthy populations has demonstrated. These results may be partially due to the use of a generalized rurality measurement, rather than an area specific measure. Task self-efficacy levels between rural and urban participants were relatively similar, which makes sense since task self-efficacy was not correlated with rurality.

5.3 Accessibility to PA opportunities

5.3.1 Objective 1: The association between accessibility and PA

Literature has defined accessibility in multiple ways. For this study, we looked at accessibility as (a) the overall number of PA opportunities an individual has access to within their community, (b) if they had access to specific types of PA opportunities within their community and the overall number of each, (c) the average travel time to the PA opportunities within their community, and (d) the average travel distance to the PA opportunities within their community. The results of this study have demonstrated that the number and type of facilities, as well as travel distance and travel time to facilities does not appear to be associated with PA in CHD patients regardless of the area of their community (i.e., 5 vs 15 minute travel time buffer). While these are contradictory to the findings from previous research (Duncan et al., 2005; Frank et al., 2007; Giles-Corti & Donovan, 2002a; Harrison et al., 2007; Huston et al., 2003; Humpel et al., 2002; Kirkland et al., 2003; McGinn et al., 2007; Riva et al., 2007; Rutt & Coleman, 2004), several studies have found a similar disconnect between accessibility and PA.

In fact, research has found no relationship between healthy adults achieving recommended PA levels and recreational opportunities within respondents' communities (Boehmer et al., 2006; Brownson et al., 2000; Eyler et al., 2003; Foster et al., 2004; Hoehner et al., 2005 Sanderson et al., 2003). Therefore, our results are consistent with a growing body of literature that counters the association between accessibility and PA levels. While this relationship has yet to be understood in a CHD population, our results indicate that CHD patients' PA levels are not associated with greater or lesser access to PA opportunities.

One potential mechanism to explain our findings may be due to the fact that ruraility was not associated with PA levels in our sample. Recent research has linked the lack of accessibility to PA opportunities to living in rural communities (Frank et al., 2005; Riva et al., 2007). Since there is no difference in PA between rural and urban participants, it may be that our sample overall has equal access to PA opportunities.

Another potential reason for our findings may be that there are variables impacting an individual's choice to utilize a PA opportunity. Gile-Corti et al. (2005) developed an index of attractiveness by summing specific features within PA opportunities, and found that this, along with size, were useful methods in understanding the impact of proximity. Additionally, Cohen et al. (2006), Cutt et al. (2008), and McCormack et al. (2010) highlighted several amenities (e.g., washrooms, seating, shade) that were significantly important when determining the usage of PA opportunities such as parks, regardless of their location. The presence of amenities may allow for individuals to use these opportunities for longer periods (McCormack et al.,

2010; Ries et al., 2008), thus encouraging greater amounts of PA. These findings suggest that amenities and/or characteristics of PA opportunities impact the choice of utilization, thus these additional factors may be useful to examine when assessing the association between PA and accessibility. Amenities may be an important aspect of utilization for CHD patients, especially in understanding the association of accessibility in the early stages of recovery. That is, an amenity such as seating may be particularly important to someone who is starting a PA regime recovering from a heart event, as they may feel more confident in their ability to engage in longer PA if they have the opportunity to rest.

Additionally, other factors may be overriding this relationship. Qualitative findings from Wilbur et al., (2002) found that the usage of PA opportunities may not be solely impacted by accessibility, but other factors within an individual's community. For example, a female participant from a low-income community commented: "I have a park right across from my house, and I would not go over there if you paid me" (Wilbur et al., 2002, p. 22). Thus, while accessibility is high, her perceived safety overrode her desire to utilize the PA opportunity. Further qualitative work from Aronson and Oman (2004) found that rural older adults reported actively engaging in outdoor activities (i.e., walking), but indicated that they were limited by factors such as weather, temperature, crime, and dogs. These qualitative findings suggest that accessibility may not be the only contributor to usage, and that when making assumptions about accessibility, it may be useful to assess other factors that may be directly or indirectly influencing PA behaviours. While our research indicates that accessibility is not a key predictor of PA in

a CHD population, further research on amenities and other qualities of PA opportunities may find that with a CHD population these things may be prominent indicators of utilization.

In fact, looking at our sample, we can see that the average age of our participants is 64 years. Because our sample largely consists of older adults, it may be that these additional factors are stronger predictors of utilization than accessibility. Research has shown that such factors as safety, crime, lighting, and upkeep are significant factors in PA levels of older adults (Li et al., 2008). Therefore, our sample may be more inclined to be influenced by factors such as these, rather than the presence of specific types of PA opportunities (i.e., fitness facility). Moreover, research from Strath, Issacs, & Greenwald (2007) suggest that aspects of the environment such as walkability, impact PA patterns in older adults. Aspects of walkability such as well maintained sidewalks and lighting were factors that significantly impacted PA levels in seniors. Thus, because our sample is of the baby boomer population, it may be that factors associated with walkability of neighbourhoods are unrelated to PA levels rather than specific facilities associated with differing modes of PA (i.e., weight lifting).

The research above suggests that a better understanding of accessibility and the impact of utilization maybe developed if details of the PA opportunities are taken into account. Therefore, future studies should consider expanding the detail in which they examine PA opportunities, and which characteristics of these opportunities may be useful in predicting PA (Kaczynski et al., 2009), as amenities, weather, and crime/safety may be significantly related to usage and PA behaviours regardless of accessibility. This

is especially important when you take into account the age of our sample. Since our results are of an older demographic, it may be useful to assess aspects of walkability, which has been demonstrated to impact PA.

While nearly all variables associated with accessibility were not significantly associated with PA at 3 months, having access to and the number of aquatic/pool centers within 15 minutes of a participant's place of residence was a significant predictor of PA. While statistically significant, the negative relationship assumes a counter intuitive relationship. That is, results imply that the more opportunity that a CHD patient has to utilize an aquatic/pool centre, the less active he/she is. One potential reason for this result may be that swimming is not a mode of PA for this population, or specifically for Nova Scotian CHD patients. Perhaps future research should concentrate to the mode of activity CHD patients are choosing to engage it. Another reason for this finding may be the result of our sampling, in that the CHD patients we recruit largely lived in communities where there were a lot of aquatic/pool centers. Regardless of the potential causes, future research should look at understanding why it is that CHD patients PA levels are negatively associated with aquatic/pool centers, and if these results are related to the particular mode of activity CHD patients are choosing to engage in.

Overall, our results are in agreement with a body of literature that has found that accessibility is not associated with varying PA levels. However, our study adds new information on how this relationship exists in a cardiac population. Interestingly, our results found a negative association between PA and having access to swimming

facilities. However, in general, there appears to be no association between accessibility and PA in a CHD population.

5.3.2 Objective 2: The mediational influence of task self-efficacy on the relationship between accessibility and PA

Objective 2 set out to use the SCT to understand how task self-efficacy mediated the relationship between PA and accessibility. Unfortunately, much like rurality, accessibility overall was found not to be a significant predictor of PA (excluding access to aquatic/pool centres), thus there was no need to assess if there were any factors, in particular task self-efficacy, mediating this association.

The only significant correlate to predict PA at 3 months was having access to, and the number of aquatic/pool centers within a 15 minute drive. Unfortunately, this environmental variable did not predict task self-efficacy; therefore task self-efficacy was not a mediational variable in the relationship between access to aquatic/pool centers and PA. As mentioned above, these results may be influenced by the patient's functional status related to their recovery and/or the fact that our sample may be unique in that they have greater access to pools within their neighbourhoods. Moreover, the type of self-efficacy examined may impact this mediating relationship. That is, while the environment and task self-efficacy were not correlated, barrier or regulatory self-efficacy may have a different association. Thus, further examination of this relationship with additional contexts of self-efficacy should be examined.

Future research should also consider the impact of the environment on self-efficacy. Davidson et al. (2010) identified the presence of sidewalks as well as parks as a

determinant of exercise self-efficacy in pre-adolescent children. Children who had greater access to sidewalks and parks had higher self-efficacy towards PA. Although our results concluded that the environment does not play an integral role in PA behaviours, other research has identified its importance, therefore its function as determinants of self-efficacy should be considered. Research may find that the environment that CHD patients are living in may be influencing their self-efficacy, or conversely that an individual's self-efficacy may infact predict the environment in which they choose to live in, and subsequently engage in PA through.

While our results, along with findings from such studies as Boehmer et al. (2006), Brownson et al. (2000), Duncan et al. (2008), Hoehner et al. (2005), Sanderson et al. (2003) and Wilcox et al. (2000 & 2003), imply that there is not a significant relationship between PA and accessibility, perhaps there are additional individual factors that are potentially constraining PA behaviours and indirectly influencing the utilization of accessible PA opportunities. While this study looked at this relationship through the use of the theoretical framework of the SCT, we only examined the association of task self-efficacy on this relationship. However, research from Fotheringham, Brunsdon & Charlton (2000) and Kaczynski et al. (2009) suggest that an individual's choice of opportunity is confined by their knowledge of what is available and familiar to them, and their preference. Studies that utilize GIS to objectively and precisely measure accessibility to PA opportunities may not find their expected significant effects on PA because they assume that perception and preference are not part of the presumed impact of accessibility. Moreover, the type of self-efficacy could be influencing this

relationship. To better understand the importance of the environment on PA, perhaps additional individual behaviours (i.e., preference and/or perception) and measures of self-efficacy (i.e., barrier and regulatory) should be considered and clarified, as they are consistently linked to PA behaviours (Hooker et al., 2005).

One potential mechanism to explain these results through an SCT framework, is that task self-efficacy may simply not be related to accessibility. In fact, our sample had relatively high task self-efficacy at the time of hospitalization. Perhaps our sample had such high task self-efficacy that they were willing to seek our PA opportunities regardless of the travel distance and time from their residence. Thus, one's task self-efficacy could supersede the effects of accessibility on PA. Or perhaps as time progresses, an individual's perceptions and judgments about their ability to engage in PA become more accurate, and perhaps it is at that time that the environment / efficacy association emerges. Therefore, future research should look at conducting longer longitudinal studies to assess if over time, as one's judgment about their task self-efficacy changes, if it is then that the environment/self-efficacy association is seen.

Overall, accessibility to PA opportunities was not a significant correlate to PA with the exception of access to aquatic/pool centers. Moreover, there was no mediational influence of task self-efficacy on this relationship. Our results are in line with previous research that also found no association between PA and accessibility.

5.4 Community SES

5.4.1 Objective 1: The association between community SES and PA

Previous research has found that neighborhood SES is a positive predictor of PA in healthy populations (Brownson et al., 2000; Cerin & Leslie, 2008; Cohen, Vittinghoff, & Whooley, 2008; Giles-Corti & Donovan, 2002; van Lenthe, Brug & Mackenback, 2005; Riva et al., 2007; Wen et al., 2007). Unfortunately, this relationship in a cardiac population has been rarely documented. Interestingly, while we assumed that the positive relationship between PA and SES documented in previous literature would also be present in a CHD population, the results of this study indicated that this is not the case. In fact, regardless of the buffer sizes, SES was not found to be a significant predictor of PA at 3 months.

While our results are in contradiction to the majority of research on SES and PA, our results may be explained by the absence of an influence of accessibility on PA. That is, SES research largely contributes the varying levels of PA between SES echelons (i.e., low vs. high SES) to differing access to PA opportunities (Cohen et al., 2007; Estabrooks, Lee, & Gyurcsik, 2003; Michaels et al., 2010; Moore et al., 2008; Powell et al., 2006; Wilson et al., 2004). Since the results of this study show that accessibility is not a significant predictor of PA, perhaps between high and low SES communities, there is equal access to services. Moreover, perhaps Nova Scotia's overall SES and SES variability between communities is different than the geographic areas studied in previous research. In fact, Nova Scotia Community Counts (2010) shows that Nova Scotia has the lowest average and median household incomes in Canada, with almost 18% of our

population reporting that they are in the lower income bracket range. Moreover, almost 30% of Nova Scotians have not graduated high school. These statistics suggest that the majority of Nova Scotian neighbourhoods may be considered low SES, thus our study may be limited by a lack of variability in SES between neighbourhoods. Therefore, further research should be done to assess the ranges in SES between neighbourhoods in Nova Scotia.

While our results are not consistent with current literature on SES and PA, the study does offer a novel approach in calculating an individual's community SES. To date, there have been no studies that have assessed the proportional influence of neighbourhood SES on an individual's overall community SES. The majority of studies have simply used GIS to link an individual's home address to their corresponding geographical unit (i.e., postal code or DA). For instance, Powell et al. (2006) geocoded participant's addresses and used their corresponding postal code data as their composite SES score, while van Lenth et al. (2005) used the same method of geocoding, but linked participants up to the neighbourhood code (a unique classification given to each neighbourhood by Statistics Netherlands) to derive a SES measure for each participant. While these methods are used throughout the literature, it does not take into account the impact of neighbouring communities on an individual's SES.

By using geomatics to develop buffers, the study was able to calculate the proportion of a DA within an individual's community and its corresponding influence on their SES (D., Rainham, personal communications, Janurary, 2010). Future research should look to utilize a similar method, as it takes into account the influence of the

entire socioeconomic environment of an individual's neighbourhood, which may overlap several geographic units.

While our method of calculating the proportional influence of each neighbourhood on a community's SES is novel, the calculation of the composite SES score may have impacted our results. van Lenthe et al. (2005) point out that the internal validity of such SES measures needs to be addressed. While many studies examine community SES, there is no theory-based description of its measurement. Although the use of composite measures is believed to be more reliable and accurate than single indicators, according to van Lenthe et al. (2005), there needs to be more theoretical considerations when choosing what aspects of the socioeconomic environment should be included in the composite. Interestingly, Wilson et al. (2004) used cluster analysis to generate an SES measure that was reflective of their sample's neighbourhoods. This method allowed for the selection of indicators relevant to a specific area of study, rather than relying on previous literature to generate a score. Moreover, several studies examining SES and PA have found significant correlations between ethnicity of a community and/or a large presence of minorities and the utilization of PA opportunities, especially in low income areas (Cerin & Leslie, 2008; Moore et al., 2008; Powell et al., 2006). However, this study did not include ethnicity within its SES calculation, or other potential variables related to socioeconomic disparities (e.g., type and ownership of dwellings within a community). Thus, variables outside of those that were used to construct the SES variable for this study, income, education and employment, may have impacted the results. Therefore, future examination of SES and PA in a CHD population

may wish to conduct a cluster or factor analysis on a variety of indicators, as to ensure that influence of each is considered.

5.4.2 Objective 2: Mediational influence of task self-efficacy on the relationship between community SES and PA

Like the previous environmental variables, *Objective 2* looked to understand how task self-efficacy mediated the association between community SES and PA levels at 3 months. However, community SES was not a significant predictor of PA in CHD patients, thus we did not assess the mediational influence of task self-efficacy on this relationship. This finding is contradictory to the previous research on the association between community SES and PA. However, little literature has looked at the association between community SES and task self-efficacy. To date, literature on individual SES and exercise self-efficacy has found a positive relationship (Clark, 1995; Grembowski et al., 1993; Lindström, Hanson & Östergren, 2000), therefore one would assume that this relationship would exist with community SES. Future research should examine the relationship between community SES and task self-efficacy associated with PA, as this relationship may provide important information on how this environmental variable is related to PA behaviours.

Much like the previous variables, our results may have been impacted by the fact that community SES may not be associated to task self-efficacy. Perhaps the use of a different self-efficacy construct, such as barrier and/or regulatory self-efficacy could influence the association. Individuals who live in lower income communities may experience more barriers (i.e., those associated with lack of access, and/or crime, safety,

etc.). If those individuals are experiencing increased barriers, their confidence to overcome them may be lower compared to those individuals in higher income communities experiencing fewer barriers. Future research should look to understand how an individual's community SES is related to their PA self-efficacy. These studies should look at including several types of self-efficacy and look at their association with SES and PA over longer longitudinal trials.

This study examined the relationship between community SES and PA in CHD patients. Our results showed that there is no association between this environmental variable and PA, thus there was no need to assess the mediational influence of task self-efficacy on this relationship. Our results are contradictory to the bulk of literature examining this relationship. However, factors such as the construction of the SES variable and the lack of association to task self-efficacy could be impacting our findings.

The purpose of *Objective 1* was to assess the relationship between task self-efficacy and the environment with PA levels in CHD patients 3 months after being discharged from the hospital. While the results of this study found that task self-efficacy was a significant predictor of PA, our results indicated that other than having access to aquatic/pool centers within a 15 minute travel distance, the environment is not significantly associated with PA. In fact, the results of our study indicate that the environment plays a rather insignificant role in explaining PA behaviour differences. It appears that, at least within Nova Scotia, differences in task self-efficacy might be mainly responsible for engaging and maintaining PA behaviours in a population (i.e., CHD patients). This is in contrast to a large portion of literature that attribute area-level

factors to differences in PA, linking disparities in recreational resources, lower SES levels and rurality to lower PA (Cerin & Leslie, 2008). The discrepancy between studies and findings underlines the contextual nature of these relationships, and highlights the need to repeat this research in various settings (Davidson et al, 2010).

In *Objective 2,* this study set forth to contribute new understanding on how task self-efficacy mediates the association of objective measures of rurality, accessibility and neighbourhood SES, on PA. Recent research in other populations (i.e., older females) has indicated that task self-efficacy mediates the association between perceived environmental factors (i.e., safety and/or satisfaction) and PA. Therefore, because our results demonstrate that task self-efficacy is a correlate to PA in CHD patients, it is important to understand how this correlate is related to the environment and its association with PA.

The majority of results from this study are consistent with a portion of literature that has found no relationship between the environment and PA. However, consideration of changes to methodology, units of analyses, and the inclusion of additional factors may help future studies clarify the current divide within the literature.

Lastly, because SCT identifies that the relationship between the environment, PA and task self-efficacy is bidirectional, future studies should assess the relationship between both PA and task self-efficacy with environmental correlates. Research may find that an individual's PA behaviours and their task self-efficacy levels are related to the environments that they choose to live in. While this study only examines the

relationship one way (i.e., the environment onto PA), future studies should consider that this relationship according to SCT is bidirectional.

5.5 Study Limitations

Like any study, our project held several limitations that should be considered.

The impact of seasonality.

While our analysis controlled for individual variables, we did not consider the impact that potential variables within the environment may have on results. One such variable that future research on this topic should consider is season. Plotnikoff et al. (2004) stress the importance of taking into account seasonal variability such as climate, temperature and weather, as these have all been associated with varying levels of PA. Specifically, the season in which individuals are reporting their PA may influence the association between this behaviour and the environment. That is, generally individuals engage in different levels and different types of PA during different seasons. The influence of the season has been shown to be great enough to impact PA levels in healthy populations (Plotnikoff et al., 2004), thus this same relationship may exist in CHD patients.

The impact of restricted use with PA opportunities.

While we looked at the number of PA opportunities someone has within their neighbourhood, we did not assess if these opportunities held access restrictions. That is, some PA opportunities are gender specific, have membership fees, or are located within environments that are accessible only to specific populations (e.g., aboriginal

reservations). Therefore, because we did not assess accessibility in terms of restriction of usage, we may have calculated individuals having access of unavailable PA opportunities.

The composition of the built environment database and it's utility to this population?

The built environment database that was used to assess accessibility and PA may not have been the most accurate assessment of PA opportunities for this population. While the database was inclusive of a wide range of opportunities (e.g., martial arts centers), these may not be what our sample is actually using. The sample's average age was 64 years, indicating that the majority of our sample was seniors. For example, having access to a fitness facility may not directly impact a senior's PA behaviours, whereas the walkability of their neighbourhood may be very influential. Therefore, the utility of the database in assessing specific PA opportunity types with our particular sample may have limited results, as this population may not be using the PA opportunities identified.

Defining PA and the use of self-reported measures

An additional limitation to this study is the use of a self-reported PA measure, which has been noted in recent reviews of studies examining similar objectives (Giles-Corti & Donovan, 2002a & b; Hooker et al., 2005; Humple, Owen, & Leslie, 2002; Salens, Sallis & Frank, 2003; Owen et al., 2004; Trost et al., 2002). Since PA is a multifaceted and complex behaviour, Eyler et al. (2003) suggest that this can contribute to variations between peoples' responses; that is, moderate PA to one individual may not be the same to another. Moreover, self-reported measures can also lead to both the under and

over inflation of quantity, specifically if individuals are not differentiating between leisure time PA, transportation PA, and/or work PA.

The PA measurement for this thesis was a standard validated measure, where the calculation of moderate to vigorous activity provided a composite PA score. However, future studies should use the stratification of PA levels to compare the relationship between environmental factors and PA in CHD populations. Research by Floyd et al. (2008) found varying differences in correlates (i.e., community income, temperature) and engaging in walking verses vigorous activity. Sanderson et al. (2003) suggest that researchers should consider refining and defining associations between environmental correlates and specific PA behaviours, as often walking is not perceived as exercise or PA among certain populations. Research has shown variation in the use of PA opportunities based on the type of PA an individual is engaging in (i.e., mild vs. vigorous). Unfortunately, this study only looked at the relationship between accessibility and moderate-vigorous PA, rather than differentiating between mild, moderate, and vigorous activity. As the average of the current sample was above 60 years, with poor health status, and recently recovering from a cardiac event, we may be inaccurately representing the amount of PA an individual is engaging in. That is, this population may be limited to engaging in mild PA, such as walking, but this would be missed due to the segregation of moderate and vigorous PA into the composite activity measure.

To combat these limitations, future research should consider the use of objective measurements rather than self-reported, or a combination of both. Frank et al. (2005) employed the usages of accelerometers on over 357 adults over a two day period to

capture objective levels of PA. Accelerometers not only capture the amount of PA an individual is participating in, but the device can also measure the intensity, and thus can compare varying degrees of PA levels. The use of an objective measure would eliminate any self-reported confusion from participants, and decrease the error in PA measurement.

Self-efficacy measurement

Our study solely looked at task self-efficacy. Since previous literature has linked barrier and regulatory self-efficacy to varying levels of PA in healthy populations, it is important to understand how these constructs impact this relationship. Additionally, like the study's measure of PA, participants reported/recorded their task self-efficacy measure. Therefore, this measure is open to participant bias and error and could potentially impact our results.

The limited timing of measurementsand clinical implications

This study used measurements from participant's time in hospital (baseline) and 3 months after hospitalization (Time 2). It is important to recognize that from a clinical perspective, participants may still be under strict recommendations from their cardiologists/nurses to limit their engagement in PA, specifically moderate-vigorous PA, as this could impact their recovery process. In fact, Heart and Stroke (2009) recommends that during the early stages of recovery (i.e., the first few weeks), CHD patients should be mindful of strenuous activities and returning to work, and to only complete these activities based on consultation with their physican. Therefore, this short period of time may not capture our participants at their full funtioncal capacity,

and their PA habits may be limited by physican recommendations based on their recovery process. Future research on the association of the environment and PA in CHD patients should be mindful of the recovery process, and the period of time following hospitalization that may be impacting this association. Future research should use long longitudinal data, where the assessment of PA is made over several time periods, to ensure that the recovery process is over and participant are engaging in their regular PA practices without clinical and/or functional limitations.

Time varying relationships

Due to the scope of this project, the assessment of PA through the use of hierarchical linear modeling (HLM) was unable to be completed. Since PA is varying over time (Michael et al., 2010), the relationship between PA and the environment might differ if temporal changes were accounted for. Moreover, research from Blanchard et al. (2006a) examining the correlates of PA in cardiac patients not attending CR, recommend that researchers are aware of the stable and temporal relationships between theoretical variables, such as task self-efficacy, and PA. Future analysis of this data will use HLM to assess these objectives.

The impact of moderation

Mediation, in its simplest terms, is the mechanism in which one variable affects another (MacKinnon, Fairchild, & Fritz, 2007). While mediation has become an important tool (James & Brett, 1984; Mackinnon, Fairchild, & Fritz, 2007), our associations may have been impacted by the *moderating* influence of task self-efficacy, rather than the *mediating* influence. Moderation assesses the direction and/or strength

of the causal association between an independent and dependent variable (Baron & Kenny, 1986). While a mediator may explain why such an association occurs, a moderator simply influences the strength of the relationship between two variables (Baron & Kenny, 1986; James & Brett, 1984). For example, it may be that task self-efficacy interacts with community SES in such a way that the task self-efficacy / PA association is stronger for CHD patients living in a higher SES community verses a lower SES community. In this instance, task self-efficacy may be targeted in a physical activity intervention for patients living in a high SES community, but not a lower SES community. As such, moderation can provide important information to tailor physical activity interventions for heart disease patients. Therefore, future analysis should consider investigating the moderating influence that task self-efficacy may have on these associations as this information could be crucial in the development of specific PA interventions.

Defining a community

Research surrounding PA and community variables is relatively new, and because of this, there is a lack of consistency in the definition of a community (Humpel et al., 2002; Lovasi et al., 2008). As environmental research grows, the question of how to define a community must be answered. Currently, a community may be defined according to area, density of dwellings, MIZs, or number of individuals per square foot. Differences in defining what a community is, may lead to inconsistencies in results, and a lack of generalizability and comparison of research. Moreover, community definitions are often subjective in nature, with community size differing between individuals.

Therefore, it is important to recognize that an objective measure of a community may not be completely accurate or exclusive, since we are discounting the highly subjective nature of defining a community.

Non-participant bias

Studies are now considering that individuals who decline to participate in PA studies are a population that is not represented (Hill, Roberts, Ewings, & Gunnell, 1997). Researchers are now finding that the 'non-participant population' is engaging in PA differently than those who choose to participate in research. Additionally, community level factors may be influencing this 'non-participant population' differently, and therefore may be experiencing different barriers and limitations. It is therefore crucial to recognize that the results of this study may not be generalizable to the entire population of individuals living with CHD.

Point of access

Our analysis of accessibility only included a radius representing a community distance around participant's homes. This inherently assumes that their PA only occurs within and is influenced by opportunities and factors within that area (Kaczynski, 2009; Nicholls & Shafer, 2001). While we were primarily interested in understanding the influence of accessibility to PA opportunities closest to participant's prime location, CHD patients may likely use PA opportunities outside of this perimeter (Kaczynski, 2009), especially when one considers that travel distance and time may not be impacting utilization.

An additional limitation is the assumption that every individual will be accessing PA opportunities from their home. Many individuals who commute daily to an urban center for employment access recreation facilities during their commute, or directly from their place of employment. Therefore, assuming that all individuals access facilities from their home may be creating an inaccurate relationship by discounting the various locations an individual may travel from to engage in PA.

5.6 Clinical implications

The aim of the project was to assess the relationship between the environment and PA in CHD patients, and use these results to inform policy, practice, and programs. Trost et al. (2002) concluded that physician influence had a positive association on patients initiating PA behaviours. Because of this, physicians must realize that they are significant facilitators of PA promotion and healthy behaviours, and could possibility impact long-term PA practices.

The results of this study confirm that task self-efficacy is a key correlate of PA. Therefore, PA interventions, prescriptions, and programs should include key task self-efficacy components. For example, education on how to appropriately engage in PA, the physicological effects of PA (i.e., sweating, heavy breathing), and the appropriate PA that patients should be engaging in during their recovery period. Moreover , physicians should target CHD patients who are not attending CR, and focus on increasing their task self-efficacy in initiating and engaging in PA, as research from Blanchard et al. (2007) and Dutton et al. (2009) found that an individual's willingness to adopt a PA program

was strongly influenced by their task self-efficacy. Encouraging education and knowledge surrounding PA is crucial for CHD patients. A higher sense of task self-efficacy associated with PA behaviours supplies individuals with the necessary aptitude, confidence, and competence to begin behaviour change (i.e., increased PA), and gives them the drive to maintain the behaviours (D'Angelo, Reid, & Pelletier, 2007). Additionally, while targeting task self-efficacy, physicians should concentrate on creating an individualized plan/prescription for the CHD patients, as there is evidence that this will increase their adherence to PA (Weldinger et al., 2008), which may increase their task self-efficacy in the long-term.

Clinicians and practitioners should continue to target task self-efficacy while CHD patients are hospitalized, as it may be the only period of time to offer information, gudiance, and encouragement to engage in PA. It is important to identify those CHD patients that may be experiencing low task self-efficacy in regards to PA, and to provide extra attention to these individuals, as to ensure that upon discharge, they have experienced a raise in task self-efficacy, which may potentially impact the PA experiences postively post discharge. Policies, programs and practices do not need to be limited to certain geographical areas or SES locations, as these factors, along with PA accessibility do not appear to significantly impact the PA levels of CHD patients living in Nova Scotia.

5.7 Conclusion

CHD is a leading cause of death in Nova Scotia; however, promoting regular PA can significantly reduce the impact of this disease. This study set out to understand the relationship between task self-efficacy and the environment with PA levels in CHD patients 3 months after being discharged from the hospital.

Overall, our results indicate that task self-efficacy is a key correlate of PA, which has been demonstrated in previous research on CHD patients. However, our study concluded that the environment was not a significant predictor of Nova Scotian CHD patient's exercise.

Results from our study indicated that:

- Task self-efficacy was a significant predictor of PA.
- Within Nova Scotia, the "rurality" of a CHD patient's community did not impact his/her PA levels at 3 months.
- Accessibility to PA opportunities largely did not predict PA; however, a negative relationship was found between having access to aquatic/pool centers and PA levels.
- Neighbourhood SES did not impact PA at 3 months.
- Task self-efficacy was not a mediating variable in the relationship between environmental correlates and PA.

Our findings, which are somewhat inconsistent with previous research, may be due to:

- Our use of task self-efficacy, and the exclusion of other self-efficacy constructs (i.e., barrier and regulatory).
- The impact of only measuring 3 months after hospitalization. This short period of time may impact results as participants may have limited functionality due to recovery.

- Our operational definition of rurality, and a lack of separation between “remote” and “rural; and a lack of understanding if rural participants had differing levels of self-efficacy than urban participants.
- Only looking as accessibility and not including measures of restriction (i.e., gender specific PA opportunities), measures of amenities within PA opportunities, and other environmental factors such as temperature, climate and safety which may be directly impacting an individual’s choice to utilize a PA opportunity.
- The use of a standardized SES construct, rather than using factor analysis to compose an SES measure from variables found to be uniquely contributing to Nova Scotians SES.

This study contributes to the existing literature on the association between the environment and PA. Moreover, this study adds new insight on how task self-efficacy mediates this relationship, and how this relationship exists in the context of a CHD population.

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APPENDIX A SCREENING SHEET

Date & Time: _____ *SERVICE:* _____

HUN ☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Admission Date : _____

Patient NAME: _____ Gender: _____ Discharge Date: _____

Birthdate & MSI : _____ Age: _____ Next of Kin: _____

Home Address : _____ _____

_____

Family Physician: _____ Attending Physician: _____

DIAGNOSIS *(and any complications/contraindications to exercise?)*

_____

_____

_____

_____

UNIT / Rm. #

COMORBIDITIES / CARDIAC RISK FACTORS:

- ☐ *hypertension*
- ☐ *family history of IHD*
- ☐ *smoking*
- ☐ *other:* _____
- ☐ *diabetes*
- ☐ *dyslipidemia*
- ☐ *obesity*

COURSE in HOSPITAL:

_____

_____

_____

_____

_____

LAB RESULTS on DISCHARGE (date: _____):

Total cholesterol: _____ *Hgb A1C* _____ *Peak troponin:* _____

LDL cholesterol: _____ *Creet :* _____ *Ejection Fraction (%):* _____

HDL cholesterol: _____ *Hgb:* _____ *INR:* _____

Ratio: _____ *K+:* _____

Other: _____

_____

Cardiology Tests Booked for post-discharge:

- ☐ *stress test*
- ☐ *MIBI*
- ☐ *echo*
- ☐ *WMS*
- ☐ *Holler/loop*
- ☐ *other:* _____

Recommendations to FP:

_____

_____

Medications: _____

_____

_____

_____

Discharge Outcome Measures:

Function

- ☐ *increased*
- ☐ *decreased*
- ☐ *no change expected*

Comfort

- ☐ *increased*
- ☐ *decreased*
- ☐ *no change expected*

This Patient meets the criteria for the Physical Activity Study

If Yes:

CHART tagged: _____ ***YES*** ☐ ***NO*** ☐

Approval given : _____

Approached on: _____

Consent given: _____

Baseline Questionnaire completed on : _____

Smoking Cessation Education given?

YES NO N/A

Referred to Cardiac Rehabilitation Program?

YES ☐

N/A ☐

APPENDIX B QUESTIONNAIRE

Participant Questionnaire

BASELINE

Using a social ecological approach to explain exercise behavior from a gender perspective in cardiac patients not attending cardiac rehabilitation in Nova Scotia

CRU

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Capital Health

NOVA SCOTIA Health Research FOUNDATION

DALHOUSIE UNIVERSITY
CARDIOVASCULAR RESEARCH UNIT

General Instructions

Thank you for consenting to participate in this study. With your help, we hope to:

- ✓ Understand why men living with heart disease do more exercise than women;
- ✓ Develop an exercise intervention to get men and women living with heart disease more physically active.

The following questionnaire asks you about several aspects of your health, your well-being and about the kinds of exercise you will participate in over the next 3 months. There are no right or wrong answers; we ask only that you consider each question and answer it as honestly and accurately as you can.

You may notice that you are only identified by a study & participant identification number. The information you are providing in this questionnaire is **personal** and **we assure you that it will remain confidential.**

If, at any time, you have questions as you complete this questionnaire, or regarding your participation in this study, please call :

Jill McSweeney
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QEII Health Sciences Centre
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5790 University Avenue
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(last updated March 22nd, 2007)

Section 1: About You

Instructions: This part of the questionnaire is needed to help understand the characteristics of the people participating in this study. For this reason, it is very important information. Be assured that all information is held in strict confidence.

---

1. Your Age:_____ 2.Gender *(tick the box)*: ☐Female ☐Male

3. Marital status *(tick the box that best describes you)*:

☐ Never Married ☐ Divorced ☐ Living Common Law
☐ Married ☐ Separated ☐ Widowed

4. Race *(tick the box that best describes you)*:

☐ White ☐ Korean ☐ Latin American
☐ Black ☐ Filipino ☐ Aboriginal People of North America
☐ Chinese ☐ Arab ☐ Other:_____
☐ South Asian ☐ Japanese

5. How many years of formal schooling have you completed? *(tick the circle that best describes you):*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
			(grade school)					*(high school)*							*(college / university)*							

6. What is your employment status? *(tick the box that best describes you):*

☐ Full-time ☐ Unemployed ☐ Retired
☐ Part-time ☐ Homemaker ☐ Presently on disability leave

*occupation (when employed):*_____

7. Annual household income *(tick the box that best describes you)*:

☐under $5,000 p/a	☐$17,499-$19,499	☐$32,500-$34,999	☐$75,000-$99,999
☐$5,000 - $7,499	☐$20,000-$22,499	☐$35,000-$39,999	☐$100,000 - $124,999
☐$7,500 - $9,999	☐$22,500-$24,999	☐$40,000-$44,999	☐Over $125,000 p/a
☐$10,000 -$12,499	☐$25,000-$27,499	☐$45,000-$49,999	
☐$12,500-$14,999	☐$27,500-$29,999	☐$50,000-$59,999	
☐$15,000-$17,499	☐$30,000-$32,499	☐$60,000-$74,999	

8. Height & weight information: weight in pounds_____ ***OR*** kilograms_____
height in feet/inches_____ ***OR*** meters/cent._____

Section 2: Your Medical History

1. Is this your first cardiac event or procedure?
   - ○ Yes, skip to question 2
   - ○ No

If No, please indicate which of the following diseases/procedures you have previously had *(tick the box that best describes you):*

- ☐ Heart Attack
- ☐ Bypass Surgery (CABG)
- ☐ Angioplasty (balloon procedure)
- ☐ Stent(s) Implant
- ☐ Atherectomy
- ☐ Other : _____

2. Please indicate which of the following medical conditions you have and if they are currently limiting your physical activity:

Condition			If you answered YES, to what extent does this condition limit your physical activity?			
Do you have any of the following conditions?	**No**	**Yes**	**Not at all**	**Mildly**	**Moderately**	**Severely**
Lung Disease	○	○	○	○	○	○
Arthritis	○	○	○	○	○	○
Diabetes	○	○	○	○	○	○
Stroke	○	○	○	○	○	○
Cancer	○	○	○	○	○	○
Angina	○	○	○	○	○	○
Depression	○	○	○	○	○	○
Poor Circulation to legs	○	○	○	○	○	○
Chronic pain or injury to any of the following:						
Back	○	○	○	○	○	○
Hip	○	○	○	○	○	○
Knee	○	○	○	○	○	○
Foot	○	○	○	○	○	○

3. How would you describe your smoking status? *(tick the box that best describes you):*
   - ○ Never smoked *(e.g., Life-long non-smoker)*
   - ○ Smoker *(e.g., even a puff over the last 14-days)*
   - ○ Recently quit *(e.g., in the last 6-months)*
   - ○ Quit *(e.g., more than 6-months ago)*

Section 3: Your Views

Did you receive EXERCISE GUIDELINES when you were discharged from the hospital? ☐ ***YES*** ☐ ***NO***

If ***YES*** - **If you received exercise guidelines from your health-care provider, please describe them here:**

For the remainder of this questionnaire use this as your definition of "regular" exercise

If ***NO*** - **If you did not receive exercise guidelines from your health-care provider, it has been suggested that you engage in:**

30-45 minutes of mild to moderately intense exercise on most days of the week.

For the remainder of this questionnaire use this as your definition of "regular" exercise

Instructions: The items listed below are designed to **assess your views on your heart condition and how you view regular exercise in relation to this.** Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 4) using the scale provided.

During the next 3 months…	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) I believe my heart condition will be extremely serious.	1	2	3	4	5	6	7
(2) I believe my heart condition will definitely give me problems.	1	2	3	4	5	6	7
(3) I am completely confident that I will exercise regularly.	1	2	3	4	5	6	7
(4) I believe participating in regular exercise will definitely improve my heart health.	1	2	3	4	5	6	7

Section 4: Confidence

Instructions: The items listed below are designed to **assess your confidence in your ability** to continue participating in regular exercise during the next three months (or 12 weeks). Please circle the percentage (%) that best represents your response for EACH question (i.e.,1 to 9) using the scale provided.

How confident are you that you will definitely participate in regular exercise during the next 3 months (12 weeks) for…	*Not at all confident (%)*				*Moderately confident (%)*						*Completely confident (%)*
(1) 1 week out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(2) 2 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(3) 3 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(4) 4 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(5) 5 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(6) 6 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(7) 8 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(8) 10 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(9) 12 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%

Instructions: The following questions ask you to rate **how confident you are** that you will continue to participate in regular exercise during the next three months (or 12 weeks) under the following circumstances. Please circle the percentage (%) that best represents your response for EACH question (i.e., 1 to 8) using the scale provided.

How confident are you that you will continue to participate in regular exercise during the next 3 months even if...	*Not at all confident (%)*				*Moderately confident (%)*						*Completely confident (%)*
(1) you fear you will have another cardiac event.	0%	10	20	30	40	50	60	70	80	90	100%
(2) you were experiencing back pain.	0%	10	20	30	40	50	60	70	80	90	100%
(3) you were experiencing medication side effects.	0%	10	20	30	40	50	60	70	80	90	100%
(4) the weather was bad.	0%	10	20	30	40	50	60	70	80	90	100%
(5) you felt you had too much work to do.	0%	10	20	30	40	50	60	70	80	90	100%
(6) you felt you did not have time.	0%	10	20	30	40	50	60	70	80	90	100%
(7) you had angina/ chest pain earlier in the day.	0%	10	20	30	40	50	60	70	80	90	100%
(8) you had other health problems.	0%	10	20	30	40	50	60	70	80	90	100%

Section 5: Your Attitudes toward Exercise

Instructions: These questions ask you to rate **how you personally feel** about participating in regular exercise during the next three months (or 12 weeks). Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 4) using the scale provided.

During the next 3 months, for me to participate in regular exercise…	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) will be extremely fun for me.	1	2	3	4	5	6	7
(2) will be extremely good for me.	1	2	3	4	5	6	7
(3) will be extremely enjoyable for me.	1	2	3	4	5	6	7
(4) will be extremely beneficial for me.	1	2	3	4	5	6	7

Instructions: These questions ask you about **your confidence and/or control** over participating in regular exercise during the next three months (or 12 weeks). Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 3) using the scale provided.

If I wanted to, during the next 3 months…	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) I am completely confident that I could participate in regular exercise.	1	2	3	4	5	6	7
(2) I am in complete control as to whether or not I participate in regular exercise.	1	2	3	4	5	6	7
(3) it would be extremely easy for me to participate in regular exercise.	1	2	3	4	5	6	7

Section 5: (cont'd)

Instructions: These questions ask you to rate **how you personally feel** about participating in regular exercise during the next three months (or 12 weeks). Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 8) using the scale provided.

During the next 3 months, if I participate in regular exercise, it will definitely…	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) get me in shape.	1	2	3	4	5	6	7
(2) strengthen my heart muscle.	1	2	3	4	5	6	7
(3) make me feel more energetic.	1	2	3	4	5	6	7
(4) make me feel more confident in doing everyday activities.	1	2	3	4	5	6	7
(5) make me feel as good as I did before my cardiac event.	1	2	3	4	5	6	7
(6) decrease my risk of having further heart problems.	1	2	3	4	5	6	7
(7) help me incorporate exercise into my lifestyle.	1	2	3	4	5	6	7
(8) help me achieve and/ or maintain my optimal weight.	1	2	3	4	5	6	7

Section 6: Your Intentions to Exercise

Instructions: These six questions ask you about **your intentions** to participate in regular exercise during the next three months (or 12 weeks). Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 6) using the scale provided.

During the next 3 months,	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) I definitely intend to participate in regular exercise.	1	2	3	4	5	6	7
(2) I definitely plan to participate in regular exercise.	1	2	3	4	5	6	7
(3) I have made plans concerning "when" I am going to participate in regular exercise.	1	2	3	4	5	6	7
(4) I have made plans concerning "where" I am going to participate in regular exercise.	1	2	3	4	5	6	7
(5) I have made plans concerning "what" kinds of regular exercise activities I am going to participate in.	1	2	3	4	5	6	7
(6) I have made plans concerning "how" I am going to get to a place to participate in regular exercise.	1	2	3	4	5	6	7

(7) Complete the following statement by inserting the number from 0-7 in the space provided that best reflects your intentions to participate in regular exercise:

During the next three months, I intend to engage in regular exercise _____ days per week.

Section 7: Your Past Exercise History

Instructions: Please recall your average/typical weekly exercise during the past 3 months. In the space provided, indicate how many days per week you participated in the kinds of exercise listed, for at least 10 minutes at a time, and how many minutes per day you participated in the kinds of exercise listed. If you did not participate in any activity(ies), please put a zero (0) in the "days" AND in the "minutes per day" spaces.

1. MILD EXERCISE

This includes all activities requiring minimal effort and no perspiration

Some examples of mild exercise are: easy walking, yoga, slow dancing, fishing, bowling, golf, light house keeping (e.g., dusting, washing dishes, vacuuming), light home repair (e.g., wiring or plumbing), light gardening (e.g., riding a ride-on mower or snowblower); sitting and playing with a child, playing a musical instrument, driving or shopping.

Considering a typical week during the past 3 months, I engaged in MILD EXERCISE (for at least 10 minutes at a time)...

_____ ***days per week for***
_____ ***minutes per day.***

2. MODERATE EXERCISE

This includes all activities that are not exhausting but lead to light perspiration

Some examples of moderate exercise are: fast walking, tennis, easy bicycling, easy swimming, dancing, small game hunting, heavier house cleaning (e.g., washing windows or car, scrubbing floors), heavier home repair (e.g., carpentry, cleaning gutters, painting, using power tools); heavier gardening (e.g., raking, digging, mowing, snowblowing manually), carrying objects downstairs (25-74lbs), actively playing with a child.

Considering a typical week during the past 3 months, I engaged in MODERATE EXERCISE (for at least 10 minutes at a time)...

_____ ***days per week for***
_____ ***minutes per day.***

3. VIGOROUS EXERCISE

This includes all activities that cause your heart to beat rapidly and lead to heavy sweating

Some examples of vigorous exercise are: running, jogging, squash, cross country skiing, vigorous swimming, vigorous bicycling, vigorous aerobic or martial arts classes; carrying boxes, groceries or heavy objects (25+ lbs) upstairs, moving furniture, baling hay, shovelling heavy snow.

Considering a typical week during the past 3 months, I engaged in VIGOROUS EXERCISE (for at least 10 minutes at a time)...

_____ ***days per week for***
_____ ***minutes per day.***

Section 8: Opinions of Others

Instructions: These questions ask you about **what you think** important people in your life would think about you participating in regular exercise during the next three months (or 12 weeks). Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 2) using the scale provided.

During the next 3 months…	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) most people important to me will definitely think I should be participating in regular exercise.	1	2	3	4	5	6	7
(2) most people important to me will definitely want me to participate in regular exercise.	1	2	3	4	5	6	7

Instructions: Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 3) using the scale provided.

During the next 3 months…	*Strongly Disagree*	*Moderately Disagree*	*Mildly Disagree*	*Neutral*	*Mildly Agree*	*Moderately Agree*	*Strongly Agree*
(1) Seeing my family participating in regular exercise will make me want to to participate in regular exercise.	1	2	3	4	5	6	7
(2) Seeing my friends participating in regular exercise will make me want to to participate in regular exercise.	1	2	3	4	5	6	7
(3) Seeing other people with heart problems participating in regular exercise will make me want to to participate in regular exercise.	1	2	3	4	5	6	7

Instructions: Below are three statements asking you about those individuals who **you see doing exercise.** Please answer these questions (i.e., 1-3) by placing the number beside each statement.

1. The number of people on average within my home that participated in regular exercise during the past 3 months (12 weeks) was……	_____ *(insert # of people here)*
2. The number of close friends of mine who participated in regular exercise during the past 3 months (12 weeks) was…..	_____ *(insert # of people here)*
3. The number of people I know who are living with heart disease that participated in exercise during the past 3 months (12 weeks) was…..	_____ *(insert # of people here)*

Instructions: Below is a list of people that cardiac patients have suggested will expect you to participate in regular exercise over the next three months (12 weeks). Please indicate how much you **agree or disagree** with each statement by circling a number for each question (i.e., 1 to 6) using the scale provided.

During the next 3 months, the following people will definitely think I should participate in regular exercise….	***Strongly Disagree***	***Moderately Disagree***	***Mildly Disagree***	***Neutral***	***Mildly Agree***	***Moderately Agree***	***Strongly Agree***
(1) spouse/partner	1	2	3	4	5	6	7
(2) other family members	1	2	3	4	5	6	7
(3) friends	1	2	3	4	5	6	7
(4) family physician	1	2	3	4	5	6	7
(5) cardiologist	1	2	3	4	5	6	7
(6) other individuals living with heart disease	1	2	3	4	5	6	7

Section 9: Your Feelings

Instructions: Please read each item below and indicate which reply comes closest to **how you have been feeling <u>in the past week</u>.** Do not take too long to look over your responses; your immediate reaction to each item will probably be more accurate than a long, thought-out response.

During the past week…	*Tick the box that comes closest to how you've been feeling in the past week.*			
(1) I felt tense or wound up	○ Most of the time	○ A lot of the time	○ From time to time	○ Not at all
(2) I still enjoyed the things I used to enjoy	○ Definitely as much	○ Not quite so much	○ Only a little	○ Hardly at all
(3) I got sort of frightened as if something awful is about to happen	○ Very definitely and quite badly	○ Yes, but not too badly	○ A little, but it doesn't worry me	○ Not at all
(4) I could laugh and see the funny side of things	○ As much as I always could	○ Not quite as much now	○ Definitely not so much now	○ Not at all
(5) Worrying thoughts went through my mind	○ A great deal of the time	○ A lot of the time	○ Not too often	○ Very little
(6) I felt cheerful	○ Never	○ Not often	○ Sometimes	○ Most of the time
(7) I could sit at ease and felt relaxed	○ Definitely	○ Usually	○ Not often	○ Not at all
(8) I felt as if I have slowed down	○ Nearly all of the time	○ Very often	○ Sometimes	○ Not at all
(9) I got a sort of frightened feeling like 'butterflies' in my stomache	○ Not at all	○ Occasionally	○ Quite often	○ Very often
(10) I lost interest in my appearance	○ Definitely	○ I don't take as much care as I should	○ I may not take quite as much care	○ I take as much care as ever
(11) I felt restless as if I have to be on the move	○ Very much indeed	○ Quite a lot	○ Not very much	○ Not at all
(12) I looked forward with enjoyment to things	○ As much as I ever did	○ Rather less than I used to	○ Definitely less than I used to	○ Hardly at all
(13) I got sudden feelings of panic	○ Very often indeed	○ Quite often	○ Not very often	○ Not at all
(14) I could enjoy a good book or radio or television program.	○ Often	○ Sometimes	○ Not often	○ Very seldom

Section 10: Your Family and Friends

Instructions: Below is a list of things people might do or say to someone who is trying to engage in regular physical activity. Please rate each question three times. Under **FAMILY**, rate how often anyone living in your household has said or done what is described during the last three months. Under **FRIENDS**, rate how often your friends, acquaintances, or coworkers have said or done what is described during the last three months. Under **OTHER PEOPLE LIVING WITH HEART DISEASE**, rate how often patients living with cardiovascular disease have said or done what is described during the last three months.

PLEASE WRITE ONE NUMBER FROM THE FOLLOWING RATING SCALE IN EACH SPACE

Never	Rarely	A few times	Often	Very Often
1	2	3	4	5

During the past 3 months, HOW OFTEN have the following people…	*YOUR FAMILY*	*YOUR FRIENDS*	*Other People Living with Heart Disease*
(1) Engaged in physical activity with me.			
(2) Offered to engage in physical activity with me.			
(3) Gave me helpful reminders to engage in physical activity (e.g., "Are you going to engage in physical activity tonight?")			
(4) Gave me encouragement to stick to my physical activity program.			
(5) Changed their schedule so we could engage in physical activity together.			
(6) Discussed physical activity with me.			
(7) Planned for physical activity on recreational outings.			
(8) Helped plan activities around my physical activity.			
(9) Asked me for ideas on how they can get more physical activity.			
(10) Talked about how much they like to engage in physical activity.			

Section 11: Your Health Care Experience

Instructions: Staying healthy can be difficult when you have a chronic illness. We would like to learn about the type of help with your condition you get from your health care team. This might include your regular doctor, his or her nurse, or physician's assistant who treats your cardiovascular disease. Your answers will be kept confidential and will not be shared with anyone else.

Think about the health care you've received for your cardiovascular disease over the past 3 months. (If it's been more than 3 months since you've seen your doctor or nurse, think about your most recent visit.)

During the past 3 months, when receiving medical care for my cardiovascular disease, I was:	Almost Never	Generally Not	Sometimes	Most of the time	Almost Always
(1) Asked for my ideas when we made a treatment plan.	○	○	○	○	○
(2) Given choices about treatment to think about.	○	○	○	○	○
(3) Asked to talk about any problems with my medicines or their effects.	○	○	○	○	○
(4) Given a written list of things I should do to improve my health.	○	○	○	○	○
(5) Satisfied that my care was well organized.	○	○	○	○	○
(6) Shown how what I did to take care of my illness influenced my condition.	○	○	○	○	○
(7) Asked to talk about my goals in caring for my illness.	○	○	○	○	○
(8) Helped to set specific goals to improve my eating or exercise.	○	○	○	○	○
(9) Given a copy of my treatment plan.	○	○	○	○	○
(10) Encouraged to go to a specific group or class to help me cope with my chronic illness.	○	○	○	○	○
(11) Asked questions, either directly or on a survey, about my health habits.	○	○	○	○	○
(12) Sure that my doctor or nurse thought about my values and my traditions when they recommended treatments to me.	○	○	○	○	○

During the past 3 months, when receiving medical care for my cardiovascular disease, I was:	Almost Never	Generally Not	Sometimes	Most of the time	Almost Always
(13) Helped to make a treatment plan that I could do in my daily life.	○	○	○	○	○
(14) Helped to plan ahead so I could take care of my illness even in hard times.	○	○	○	○	○
(15) Asked how my chronic illness affects my life.	○	○	○	○	○
(16) Contacted after a visit to see how things were going.	○	○	○	○	○
(17) Encouraged to attend programs in the community that could help me.	○	○	○	○	○
(18) Referred to a dietitian, health educator, or counselor.	○	○	○	○	○
(19) Told how my visits with other types of doctors, like the eye doctor or surgeon, helped my treatment.	○	○	○	○	○
(20) Asked how my visits with other doctors were going.	○	○	○	○	○
(21) Asked what I would like to discuss about my illness at that visit.	○	○	○	○	○
(22) Asked about my work, family, or social situation related to taking care of my illness.	○	○	○	○	○
(23) Helped to make plans for how to get support from my friends, family or community.	○	○	○	○	○
(24) Told how important the things I do to take care of my illness (e.g., exercise) were for my health.	○	○	○	○	○
(25) Set a goal together with my team for what I could do to manage my condition.	○	○	○	○	○
(26) Given a book or monitoring log in which to record the progress I am making.	○	○	○	○	○

Section 12: Your Health & Wellbeing

Instructions: The following questions ask you about your health, how you feel and how well you are able to do your usual activities. If you are unsure how to answer a question, please give the best answer you can.

1. In general, would you say your health is: (Please circle one number)

Excellent ..... O
Very good ..... O
Good ..... O
Fair ..... O
Poor ..... O

2. The following questions are about activities that you might do during a typical day.
(Please circle one number on each line)

Does your health limit you in these activities? If so, by how much?	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
c. Climbing several flights of stairs	1	2	3
d. Bathing or dressing yourself	1	2	3

3. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?
(Please circle one number on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Accomplished less than you would like	1	2	3	4	5
b. Were limited in the kind of work or other activities	1	2	3	4	5

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)? *(Please circle one number on each line)*

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a. Accomplished less than you would like	1	2	3	4	5
b. Did work or other activities less carefully than usual	1	2	3	4	5

5. How much bodily pain have you had during the past 4 weeks? *(Please circle one number)*

None 1
Very mild 2
Mild 3
Moderate 4
Severe 5
Very severe 6

6. During the past 4 weeks, how much did pain interfere with your normal work (including work both outside the home and housework). *(Please circle one number)*

Not at all 1
A little bit 2
Moderately 3
Quite a bit 4
Extremely 5

7. **These questions are about how you feel and how things have been with you during the past month. (For each question, please indicate the one answer that comes closest to the way you have been feeling.) *(Please circle one number on each line)***

How much of the time during the past 4 weeks:	All of the time	Most of the time	A good bit of the time	A little of the time	None of the time
a. Have you been a very nervous person?	1	2	3	4	5
b. Have you felt calm and peaceful?	1	2	3	4	5
c. Did you have a lot of energy?	1	2	3	4	5
d. Have you felt down-hearted and low?	1	2	3	4	5

8. **Has your health limited your social activities (like visiting friends or close relatives)? *(Please circle one number)***

Not at all 1
Slightly 2
Moderately 3
Quite a bit 4
Extremely 5

Section 13: Your Access to Equipment &

1. What **exercise equipment**, if any, do you own or have available to you **in your home** during the next three months (or 12 weeks)?

   (Please consider only equipment that is in working condition and safe for you to use and answer the "will you use it?" column even if you have answered that you do NOT have access to the equipment.)

Equipment	Available to use at home? YES	NO	Will you use it? YES	NO
Treadmill	○	○	○	○
Stationary Bicycle	○	○	○	○
Outdoor Bicycle	○	○	○	○
Skis (downhill, cross country, water)	○	○	○	○
Skates (ice, roller)	○	○	○	○
Weight training equipment	○	○	○	○
Running / Walking Shoes	○	○	○	○
Other: _____	○	○	○	○
_____	○	○	○	○
_____	○	○	○	○

Section 13:(cont'd)

2. Which of the following exercise facilities will be **present in your community (within a 15 km radius or a 20-minute drive from your home)** over the next three months (or 12 weeks)?*(Mark all those that apply even if you don't use them.)*

Facilities	Available? YES	NO	If YES, how many?	Do you have access? YES	NO	If NO, Why?
Fitness Clubs	○	○	_____	○	○	_____
Schools offering recreation programs	○	○	_____	○	○	_____
Community Recreation Centers	○	○	_____	○	○	_____
Arenas	○	○	_____	○	○	_____
Jogging / Walking path	○	○	_____	○	○	_____
Bicycle path / Bicycle lane	○	○	_____	○	○	_____
Swimming pool	○	○	_____	○	○	_____
Racquet Club/courts (e.g., tennis)	○	○	_____	○	○	_____
In-door Shopping Mall	○	○	_____	○	○	_____
Ski trails	○	○	_____	○	○	_____
Golf Courses	○	○	_____	○	○	_____
Other: _____	○	○	_____	○	○	_____
_____	○	○	_____	○	○	_____
_____	○	○	_____	○	○	_____

Notes

For Administrative purposes only:

Assigned CODE NUMBER: _____
Date Completed: _____
Date Received : _____
Date Processed: _____

If at any time you have questions regarding your participation in this study, please call:

Jill McSweeney
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QEII Health Sciences Centre
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APPENDIX C NON-PARTICIPANT SURVEY

Non – Participant Survey

The purpose of this survey is to gather information about the demographics, heart condition, general health, and physical activity habits of patients who have chosen not to participate in a research study titled:

Using a social ecological approach to explain exercise behavior from a gender perspective in cardiac patients not attending cardiac rehabilitation in Nova Scotia.

The information within this survey will assist investigators in designing and implementing new programs to support patients with heart disease in becoming more physically active. All of the information you provide will be kept confidential and will only be included as group findings so your anonymity will be maintained throughout.

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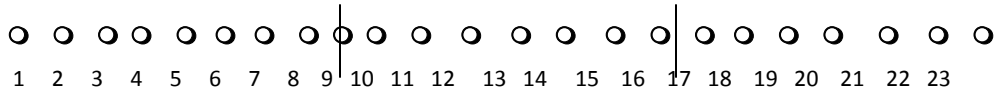
1. Gender: ❍Male ❍Female **2. Age:** _____ years

3. How many years of formal schooling have you completed?



4. What is your employment status?

❍Working full-time ❍ Working part-time ❍ Retired ❍ Unemployed

❍ Homemaker ❍ Presently on disabilities leave

5. What is your city of residence? _____

6. What is the reason(s) for your hospitalization? *(Tick all that apply)*

❍ Angioplasty ❍ Stent(s) Implant ❍ Heart Attack ❍Angina

❍Other:_____

7. Is this your first hospital admission for a heart problem?

❍ Yes

❍ No:_____

8. Did you receive EXERCISE GUIDELINES when you were discharged from the hospital?

❍ Yes (please describe):_____

❍ No **If you did not receive exercise guidelines from your health-care provider, it has been suggested that you engage in: 30-45 minutes of mild to moderate physical activity on most days of the week.**

9. Considering a typical week in the last 3-months, how many times on average did you do the following kinds of leisure time physical activity during your free time and what was the average amount of time you spent doing these activities?

1. How many days in a typical week out of the past 3 months did you do MILD exercise for at least 10 minutes at a time? *Activities such as: easy walking, yoga, slow dancing, fishing, bowling, golf, light house keeping (dusting, washing dishes), light home repair (wiring or plumbing), light gardening (riding a ride-on mower or snowblower); caring for a child, or shopping.*	**____ days per week**
2. On the days when you did MILD exercise(s) (for at least 10 minutes at a time), how much total time on average did you spend per day doing these mild exercise(s)?	**_____ minutes per day**
3. How many days in a typical week out of the past 3 months did you do MODERATE exercises for at least 10 minutes at a time? *Activities such as: fast walking, tennis, easy bicycling, easy swimming, dancing, small game hunting, heavier house cleaning (washing windows or car, scrubbing floors), heavier home repair (carpentry, cleaning gutters, painting); heavier gardening (raking, digging, mowing, snowblowing manually,) actively playing with a child.*	**____ days per week**
4. On the days when you did MODERATE exercise(s) (for at least 10 minutes at a time), how much total time on average did you spend per day doing these moderate exercise(s)?	**_____minutes per day**
5. How many days in a typical week out of the past 3 months did you do VIGOROUS exercise(s) for	

at least 10 minutes at a time? ***Activities such as: running, jogging, squash, cross country skiing, vigorous swimming, vigorous bicycling, vigorous aerobic or martial arts classes; carrying boxes or furniture upstairs, baling hay, shoveling heavy snow.***	**____ days per week**
6. On the days when you did VIGOROUS exercise(s) (for at least 10 minutes at a time), <u>how much total time on average did you spend per day</u> doing these vigorous exercise(s)?	**_____ minutes per day**

10. Would you be willing to allow the Research Coordinator to review your patient chart for information regarding your general health at the time of discharge?

❍ Yes (please sign here):_____Date: _____

❍ No

APPENDIX D MONTHLY NOTIFICATION

Cardiovascular Research Unit
QEII Health Sciences Centre
Centre for Clinical Research, Room 205
5790 University Avenue
Halifax, NS, B3H 1V7
(*local calls*) 473-2035
(*toll-free outside Halifax*) 1-866-996-5699
Email: **jill.mcsweeney@cdha.nshealth.ca**

Dear _____

Spring is finally here! And with it we are marking the ___-month point of our Physical Activity study.

As a participant, your experiences before and immediately after, and now 3 months after your cardiac event continue to give us valuable information and insights into our health care system and especially into what we can be doing BETTER to help people living with heart disease achieve their exercise, and physical activity goals.

NEXT WEEK, I will be sending you the __-month follow-up questionnaire by mail along with instructions and a stamped, self-addressed envelope you can use to return it to me when you have completed it.

In the meantime, if you have any questions about the study or your participation in the study, you can call me at 1-866-996-5699 (toll-free outside Halifax)***,*** 473-2035 (local calls) ***or email me at*** *jill.mcsweeney@cdha.nshealth.ca* ***anytime.***

Sincerely,

Jill McSweeney

Research Coodinator

APPENDIX E INSTRUCTIONS

Cardiovascular Research Unit
QEII Health Sciences Centre
Centre for Clinical Research, Room 205
5790 University Avenue
Halifax, NS, B3H 1V7
(*local calls*) 473-2035
(*toll-free outside Halifax*) 1-866-996-5699
Email: **jill.mcsweeney@cdha.nshealth.ca**

Dear ____,

As you approach your __ month participation milestone, I want to thank you for your continued interest in this research project. With the ongoing support of people like you, we are well on our way to achieving our target of 400+ participants for this study.

In fact, in the first 2 years of recruiting (January, 2007 to December, 2008) we already have 400 people involved in this rapidly growing research project. Over the next month, we hope to add more than 30 new participants.

Attached here is the ___ month follow-up questionnaire for you to review and complete. It is very similar to the one(s) you have already seen, either at home or while you were in the hospital. Also included, is a quick questionnaire regarding dog ownership and physical activity.

At this point in the project, we are most interested in seeing how your views, opinions and exercise behaviours have changed since your cardiac event and what exercise and physical activity plans you have made for the next 3 months.

As always, we are interested in collecting only as much information as you are willing to provide. If there are any questions you don't feel comfortable answering, please leave them blank. ***Be assured that all of the information you are providing will remain confidential.***

I have also included a postage paid/business reply envelope in which you can send me your completed questionnaire. ***If you could complete the questionnaire and return it to me in the next 7 days, it would be greatly appreciated!***

If you have questions as you complete this questionnaire, or any time regarding your participation in this study, please call me at ***1-866-996-5699 (toll-free outside Halifax)***, ***473-2035 (local calls)***,or email me at the following address: jill.mcsweeney@cdha.nshealth.ca

Sincerely,

Jill McSweeney
Research Coordinator

Section 7: Your Past Exercise History

Instructions: Please recall your average/typical weekly exercise during the past 3 months. In the space provided, indicate how many days per week you participated in the kinds of exercise listed, for at least 10 minutes at a time, and how many minutes per day you participated in the kinds of exercise listed. If you did not participate in any activity(ies), please put a zero (0) in the "days" AND in the "minutes per day" spaces.

1. MILD EXERCISE

This includes all activities requiring minimal effort and no perspiration

Some examples of mild exercise are: easy walking, yoga, slow dancing, fishing, bowling, golf, light house keeping (e.g., dusting, washing dishes, vacuuming), light home repair (e.g., wiring or plumbing), light gardening (e.g., riding a ride-on mower or snowblower); sitting and playing with a child, playing a musical instrument, driving or shopping.

Considering a typical week during the past 3 months, I engaged in MILD EXERCISE (for at least 10 minutes at a time)...

_____ ***days per week for***
_____ ***minutes per day.***

2. MODERATE EXERCISE

This includes all activities that are not exhausting but lead to light perspiration

Some examples of moderate exercise are: fast walking, tennis, easy bicycling, easy swimming, dancing, small game hunting, heavier house cleaning (e.g., washing windows or car, scrubbing floors), heavier home repair (e.g., carpentry, cleaning gutters, painting, using power tools); heavier gardening (e.g., raking, digging, mowing, snowblowing manually), carrying objects downstairs (25-74lbs), actively playing with a child.

Considering a typical week during the past 3 months, I engaged in MODERATE EXERCISE (for at least 10 minutes at a time)...

_____ ***days per week for***
_____ ***minutes per day.***

3. VIGOROUS EXERCISE

This includes all activities that cause your heart to beat rapidly and lead to heavy sweating

Some examples of vigorous exercise are: running, jogging, squash, cross country skiing, vigorous swimming, vigorous bicycling, vigorous aerobic or martial arts classes; carrying boxes, groceries or heavy objects (25+ lbs) upstairs, moving furniture, baling hay, shovelling heavy snow.

Considering a typical week during the past 3 months, I engaged in VIGOROUS EXERCISE (for at least 10 minutes at a time)...

_____ ***days per week for***
_____ ***minutes per day.***

APPENDIX G TASK SELF-EFFICACY MEASURE

Section 4: Confidence

Instructions: The items listed below are designed to **assess your confidence in your ability** to continue participating in regular exercise during the next three months (or 12 weeks). Please circle the percentage (%) that best represents your response for EACH question (i.e.,1 to 9) using the scale provided.

How confident are you that you will definitely participate in regular exercise during the next 3 months (12 weeks) for…	*Not at all confident (%)*				*Moderately confident (%)*						*Completely confident (%)*
(1) 1 week out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(2) 2 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(3) 3 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(4) 4 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(5) 5 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(6) 6 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(7) 8 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(8) 10 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%
(9) 12 weeks out of the next 12 weeks.	0%	10	20	30	40	50	60	70	80	90	100%