uOttawa

L'Université canadienne
Canada's university

FACULTÉ DES ÉTUDES SUPÉRIEURES ET POSTOCTORALES

uOttawa

L'Université canadienne
Canada's university

FACULTY OF GRADUATE AND POSDOCTORAL STUDIES

Jana Kocourek

AUTEUR DE LA THÈSE / AUTHOR OF THESIS

M.A. (Human Kinetics)

GRADE / DEGREE

School of Human Kinetics

FACULTÉ, ÉCOLE, DÉPARTEMENT / FACULTY, SCHOOL, DEPARTMENT

Effect of a Family Heart Health Program on Stage of Change Constructs of Exercise and Leisure Time Exercise in Family Members of Patients with Heart Disease

TITRE DE LA THÈSE / TITLE OF THESIS

Robert Reid

DIRECTEUR (DIRECTRICE) DE LA THÈSE / THESIS SUPERVISOR

CO-DIRECTEUR (CO-DIRECTRICE) DE LA THÈSE / THESIS CO-SUPERVISOR

Viola Polomeno

Michelle Foriter

Gary W. Slater

Le Doyen de la Faculté des études supérieures et postdoctorales / Dean of the Faculty of Graduate and Postdoctoral Studies

Effect of a Family Heart Health Program on Stage of Change Constructs of Exercise and Leisure Time Exercise in Family Members of Patients with Heart Disease

Jana Kocourek

Thesis submitted to the
Faculty of Graduate and Postdoctoral Studies
In partial fulfillment of the requirements for the
Masters degree in Human Kinetics

School of Human Kinetics
Faculty of Health Sciences
University of Ottawa

Your file Votre référence
ISBN: 978-0-494-65497-2
Our file Notre référence
ISBN: 978-0-494-65497-2

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LEGEND

ANOVA- Analysis of Variance

BMI- Body Mass Index

CHD- Coronary Heart Disease

GLTEQ- Godin Leisure Time Exercise Questionnaire

SD- Standard Deviation

UOHI- University of Ottawa Heart Institute

ABSTRACT

The purpose of this study was to assess the effect of a family heart health program on stage of change constructs for exercise behaviour and self-reported leisure time exercise in family members of patients with coronary heart disease (CHD).

One hundred and thirty eight participants were recruited by mailing an invitation to family members of patients with CHD enrolled in a cardiac rehabilitation program. Siblings, offspring and spouses of patients were eligible to participate if they did not have existing CHD or disease equivalent (diabetes, peripheral vascular disease and/or cerebro-vascular disease). Participants completed an individualized coronary risk factor assessment followed by an hour-long stage-matched counseling session with a health educator. Outcomes measures included stage of change constructs for exercise behaviour (readiness to change, decisional balance, processes of change and self-efficacy) as well as self-reported leisure time exercise. Outcomes were assessed at baseline, immediately after the counseling session, and three months later.

Complete follow up data was obtained for 73 participants. Data were found to be missing completely at random and complete case analysis was used. Compared to baseline, the proportion of participants in the combined action/maintenance stage increased from 50.7% to 78.1.% at three month follow-up ($p = 0.02$). Decisional balance was higher at three-month follow-up than at baseline (-1.43 vs. -2.52; $p < .0001$), and higher at three-month follow-up than at post-intervention (-1.43 vs. -2.43; $p < .0001$). There was a significant difference in the scores for total processes of change at three-month follow-up (M = 3.39, SD = 0.59)

compared to baseline (M = 3.21, SD = 0.62); t (72) = -2.73, p = .008. Participants were using more processes of change at follow-up, including both cognitive and behavioural processes. There were no significant changes in mean self-efficacy between the three time points. There was a significant increase in reported exercise minutes per week at three-month follow-up (M = 268.9 minutes, SD = 262.3) compared to baseline (M = 178.8 minutes, SD = 153.8); t (73) = -2.12, p = .040.

Participation in a family heart health program was associated with favourable changes in readiness to change exercise behaviour, decisional balance, use of processes of change, and self-reported leisure time exercise over a three-month follow-up period. The results of the study should be interpreted with caution given limitations with the study design and the self-reported nature of the interventions. Nonetheless, this study has set the stage for a larger, definitive trial of an enhanced family heart health intervention. This trial is now underway at the UOHI.

ACKNOWLEDGEMENTS

This research project would not have been possible without the support of many people. I would like to express my gratitude to my supervisor, Dr. Bob Reid who offered invaluable assistance, support and guidance over the past few years. Sincere gratitude is also due to the members of my committee, Dr. Michelle Fortier and Dr. Viola Polomeno without whose knowledge and assistance with this study would not have been successful. A special thanks also goes out to Nadine Elias and Isabelle Lalonde for help with data collection, and to my colleagues at the University of Ottawa Heart Institute for sharing their invaluable knowledge. Most importantly, I wish to express my love and gratitude to my wonderful mother for her continued support, understanding & endless love throughout the duration of my studies. And lastly to my daughter Alexa for keeping me motivated and inspired to be a better person.

CHAPTER 1: INTRODUCTION

1.1 Coronary Heart Disease and Coronary Risk Factors

Coronary heart disease (CHD) is the leading cause of death among men and women in Canada (Heart and Stroke Foundation of Canada, 2006). The disease occurs when the arteries that supply blood to the heart muscle (the coronary arteries) become hardened and narrowed. The arteries harden and narrow due to buildup of plaque along their inner walls, a process known as atherosclerosis (National Heart Lung and Blood Institute, 2006). Related illnesses include: heart attack, angina, congestive heart failure, and arrhythmias (2006).

Eight in 10 Canadians have at least one risk factor for CHD, and 11% have three or more risk factors (Heart and Stroke Foundation of Canada, 2006). Coronary risk factors are defined as behaviors or medical conditions that contribute to heart disease and are classified as either modifiable or non-modifiable (Heart and Stroke Foundation of Canada, 2006). Those that can be modified include: high blood cholesterol, high blood pressure, diabetes, and a variety of lifestyle factors (i.e. lack of exercise, obesity, unhealthy diet, smoking, excess alcohol and, stress). Risk factors that cannot be modified include: age, gender, ethnicity, and family history (i.e. having first degree relatives with a history of CHD).

1.2 Family History and its Relationship to CHD Risk

A positive family history is associated with a 1.5 to two-fold increase in cardiovascular risk among first-degree relatives (parents, siblings, and children) (Hunt, Gwinn, & Adams, 2003). While premature CHD is typically defined as onset before age 55 in males and 65 in females, epidemiological studies have shown that family history of CHD even at older ages is an

independent risk factor for the disease (Hunt et al., 2003; McPherson, Frohlich, Fodor, & Genest, 2006). Much of the disease accumulation can be explained by familial aggregation of established coronary risk factors (Brenn & Njolstad, 1998; De Sutter et al., 2003; Goble et al., 1997; Higgins, 2000; Wood et al., 1998). Although family history is non-modifiable, those with a positive history may be candidates for preventive manoeuvres such as lifestyle modification and medications to assist in controlling modifiable risk factors such that global risk of developing CHD is reduced.

Cross-sectional studies have also shown a high degree of concordance for CHD risk factors (i.e. blood pressure, cholesterol, phospholipids, glucose, obesity, and cigarette use) in married couples (Garrison et al., 1979; Sackett, Anderson, Milner, Feinleib, & Kannel, 1975; Wood, Roberts, & Campbell, 1997). A systematic review and meta-analysis regarding spousal concordance for major coronary risk factors showed a significant positive association between spouses for the majority of main coronary risk factors (Di Castelnuovo, Quacquaruccio, Donati, de Gaetano, & Lacoviello, 2009). Specifically, the overall odds ratio for concordance in hypertension, smoking, diabetes, and obesity were all significant, ranging from 1.2 to 3.3 (Di Castelnuovo et al., 2009).

Though studies suggest that the prevalence of cardiac risk factors is higher in spouses, siblings and offspring of those with heart disease, lifestyle advice is frequently not given and active medical interventions are rarely carried out (De Sutter et al., 2003). In the EUROASPIRE II family study, DeSutter found that only 11% of siblings and 6% of children of patients with *premature* CHD were screened because of CHD in the family (De Sutter et

al., 2003). Preventive interventions that specifically focus on family members may be useful for targeting strategies to reduce risk.

1.3 Interventions to Reduce CHD Risk

In the context of CHD, interventions to reduce risk are generally organized by assessing a person's global risk of CHD and then applying preventive treatments for the long-term management of modifiable risk factors that contribute substantially to the global risk (e.g., smoking, lipids, blood pressure, glycemia, lack of exercise, obesity, unhealthy diet, excess alcohol). Several clinical trials have demonstrated the efficacy of medical interventions and lifestyle changes for reducing the incidence of hard CHD end-points, both in patients with existing CHD and also in people with no prior history of CHD (Cheng, Braunstein, Dennison, Nass, & Blumenthal, 2002). The predicted reduction in first occurrences of hard CHD endpoints (death or myocardial infarction) following multiple preventive treatments at a threshold based on a 10-year global CHD risk of ≥15% estimated using the Framingham equation is 49% (Emberson, Whincup, Morris, Walker, & Ebrahim, 2004).

As part of an intervention, two or three sessions of behavioral counseling have been found to be effective to help adults at increased risk of CHD increase their readiness to change fat intake, physical activity, and cigarette smoking (Steptoe, Kerry, Rink, & Hilton, 2001). In a randomized controlled trial, odds ratios for moving to the action/ maintenance stage at four months in intervention compared to control patients were 2.15 (95% confidence interval [CI] = 1.30, 3.56) for fat reduction, 1.89 (95% CI = 1.07,3.36) for increased physical activity, and 1.77 (95% CI = 0.76,4.14) for smoking cessation. The likelihood of achieving action/maintenance was related to baseline stage for all three behaviors (Steptoe et al., 2001).

Another randomized controlled trial assessing the effectiveness of two multi-component lifestyle interventions compared to advice alone for CHD risk reduction revealed reductions of 12% to 14% in estimated CHD risk (Maruthur, Wang, & Appel, 2009).

A 1997 study measured the extent to which changes in cardiovascular risk factors were correlated among married couples following a one-year primary care, family-centered, cardiovascular lifestyle intervention program. Results showed that baseline values and one-year changes in overall coronary risk score (calculated from cigarette smoking, body mass index, systolic blood pressure, cholesterol levels, and glucose levels) were significantly and positively correlated (Pyke, Wood, Kinmonth, & Thompson, 1997). Lifestyle interventions targeted at men and women as couples rather than as individuals may result in a greater reduction in cardiovascular risk factors, possibly through mutual reinforcement of lifestyle changes (Pyke et al., 1997).

1.4 Interventions to Reduce CHD Risk in 'At Risk' Families

There is some information about the effectiveness of interventions focusing specifically on CHD-prone families. One of the most well-known studies is the Health Family Tree Study that included 122,155 Utah families (R. R. Williams et al., 2001). This study was designed to educate high school students, while also identifying high-risk families for preventive medicine programs. Family-based interventions were offered to families identified as being at high-risk for CHD (R. R. Williams et al., 2001). Families identified as having a positive or strong risk family history were referred to local public health agencies via the Family High Risk Program in the Utah Department of Health. Data showed that 14% of families accounted for 72% of early cardiovascular disease (onset at < 55 years of age for men and <

65 years of age for women) and 48% of all cardiovascular disease at any age (R. R. Williams et al., 2001). After six years of follow-up on 400 families, both the high-risk and average-risk groups showed increases in behaviors and habits associated with better health outcomes; the improvement was most dramatic in the high-risk families (e.g. the proportion of participants who lost weight in the high risk and average risk groups increased by 26% and 9%, respectively). Participants who routinely exercised increased by 17% in the high risk group and decreased by 4% in the average risk group. Annual medical checkups increased in both the high risk and average risk group by 52% and 13%, respectively (National Office of Public Health Genomics, 2007).

1.5 Development of a Family Heart Health Program at the University of Ottawa Heart Institute

Given evidence that history of CHD in one family member is an important predictor of future CHD risk in other family members, and that much of the risk is explained by the familial aggregation of coronary risk factors, and that lifestyle and medical treatments are effective for reducing the risk of first occurrence of CHD, the Minto Prevention and Rehabilitation Centre at the University of Ottawa Heart Institute (UOHI) has been developing a family heart health program over the past four years. The overall aim of the program is to assist family members of CHD patients to reduce their personal risk of disease. The program seeks to identify and engage family members of patients recently hospitalized with CHD, provide coronary risk factor assessments and counselling to these family members, and attach these individuals to follow-up and support as appropriate. An underlying principle of the family heart health program is that hospitalization of one family member creates emotional ripples leading to thoughts, feelings and actions on the part of other family members (Bowen, 2004).

Some of these relate to personal risk for CHD and may create motivational readiness for personal risk reduction. A pilot evaluation of the family heart health program has been conducted in a sample of 300 family members from 294 index patients. The present study is a sub-study from the pilot evaluation designed to examine the effect of the program on exercise behaviour.

1.6 Exercise and its Relationship to CHD Risk

Regular exercise plays an important role in the primary and secondary prevention of heart disease. Over the last few decades, many epidemiologic studies performed on several different and large populations have demonstrated a clear protective effect of physical activity on CHD (Sofi, Capalbo, Cesari, Abbate, & Gensini, 2008). Physiologically, exercise has been shown to improve body composition, enhance blood lipoprotein profiles, improve glucose homeostasis and insulin sensitivity, reduce blood pressure, improve autonomic tone, reduce systemic inflammation, decrease blood coagulation, improve coronary blood flow, increase cardiac function, and enhance endothelial function (Warburton, Nicol, & Bredin, 2006). Additionally, exercise has been shown to increase self-confidence, help in weight management, reduce stress, anxiety and depression, and in some cases, be a useful alternative to other high risk health behaviors such as smoking (Bouchard, Shephard, & Stephens, 1994).

Despite the known benefits of exercise, Canada remains a sedentary nation (Katzmarzyk, Gledhill, & Shephard, 2000). Canada's Physical Activity Guide to Healthy Active Living recommends 30-60 minutes of moderate (or vigorous) exercise most (four to seven) days of the week. However, the majority of Canadians are insufficiently active enough to meet this

recommendation. According to the 2000/2001 Canadian Community Health Survey, 59% of Canadian women and 58% of Canadian men in the 20 to 64 age group did not exercise enough to meet current Canadian guidelines (Statistics Canada, 2001). A more recent report from Statistics Canada revealed that only 53% of Canadians are even moderately active during their leisure time (Gilmour, 2007). In the context of population health, an increase in exercise would have the greatest impact on reducing the burden of CHD (Katzmarzyk et al., 2000).

Long-term observational studies consistently show that those who exercise regularly have significantly less CHD and a reduced risk of sudden cardiac death (Kavanagh, Shephard, Hamm, Mertens, & Thacker, 2000). The benefits of exercise on risk of myocardial infarction (MI) were demonstrated in the INTERHEART study (Yusuf et al., 2004). This study involved patients from 52 countries where, among many modifiable risk factors, lack of exercise accounted for 12% of the population attributable risk of MI (Yusuf et al., 2004). The British Regional Heart Study was a large prospective study of cardiovascular disease conducted in 1978 with 7735 participants (ages 40-50) and involved an eight year follow-up. Findings revealed that men without pre-existing CHD who participated in at least moderate exercise had a 50% reduction in heart disease risk compared to sedentary individuals (Press, Freestone, & George, 2003). The Honolulu Heart Programme demonstrated that elderly men who walked less than 0.25 miles per day had twice the risk of cardiovascular disease compared to those who walked more than 1.5 miles per day (5.1% vs. 2.5%) (Press et al., 2003). Additionally, the Nurses Health Study which began in 1986, collected information on women aged 40-65 that did not have cardiovascular disease. After eight years of follow up,

results indicated a strong, graded inverse association between exercise and CHD risk (Press et al., 2003).

1.7 Correlates of Exercise Behaviour

A variety of important demographic, environmental and personal correlates of exercise behaviour have been identified (Sherwood & Jeffery, 2000). Demographic correlates include: age (i.e. exercise declines with age and women experience a greater decline in older age groups than men; gender (i.e. men are more physically active than women); race (i.e. Caucasians are more physically active than African-Americans and Hispanic adults); socio-economic status (i.e. education and income are both positively associated with exercise levels); and marital status (i.e. unmarried adults are the most physically active whereas married women are the least active) (Sherwood & Jeffery, 2000). Environmental correlates associated with exercise include: social support, time, access, and urban or rural living, (where urban living is associated with increased exercise behaviour). Personal correlates associated with exercise include factors such as: co-morbidities, exercise knowledge, motivation, self-efficacy, exercise history, body weight, other health behaviours (e.g. smoking, alcohol intake, diet), and mental health (e.g. depression and stress) (Sherwood & Jeffery, 2000).

CHAPTER 2: THEORETICAL FRAMEWORKS

2.1 Stages of Change (Transtheoretical) Model

To date, researchers have used numerous theoretical frameworks and models to help explain exercise behavior change (King, Stokols, Talen, Brassington, & Killingsworth, 2002). The most commonly used frameworks are the theories of planned behavior and reasoned action (Ajzen, 1991; H. A. Hausenblas, Carron, & Mack, 1997); social cognitive theory (Dzewaltowski, 1994; King et al., 1998; McAuley & Blissmer, 2000); self-determination theory (Jolly et al., 2009; Silva et al., 2008; G. C. Williams, McGregor, Zeldman, Freedman, & Deci, 2004; Wilson, Blanchard, Nehl, & Baker, 2006); and the stages of change (transtheoretical) model (Marcus & Simkin, 1994; J. O. Prochaska & Velicer, 1997).

Although these frameworks include a variety of variables that are significantly associated with exercise behavior, readiness to change is unique to the stages of change model. Readiness to change is an important variable in committing to an exercise program and/or a physically active lifestyle. An individual who is not ready to change their exercise behaviour is unlikely to take steps required to change the status quo. The stages of change model is a model of intentional behavior change that focuses on the decision making of the individual (J. Adams & White, 2005), and it served as the primary theoretical framework for the present study. This model includes four core constructs: readiness to change; decisional balance; processes of change, and self-efficacy. Each of these constructs is described in more detail below.

2.1.1 Readiness to change

According to the stages of change model, individuals adopting new behaviours engage in a process of change that occurs over time (Plotnikoff, Hotz, Birkett, & Courneya, 2001). Within the exercise domain, this process involves progress through a series of six stages of readiness to change behaviour. *Precontemplation* is the stage in which the individual has no intention to begin regular exercise within the next six months. *Contemplation* is the stage in which the individual is weighing the pros and cons of a change in exercise behavior and is intending to begin regular exercise in the next six months. *Preparation* is the stage in which the individual is intending to begin regular exercise in the next month and is preparing to do so. *Action* is the stage in which the individual has started to exercise regularly (and is achieving criterion levels for regular exercise) and has been doing so for less than six months. *Maintenance* is the stage in which the individual has been exercising regularly (and has been achieving criterion levels for regular exercise) for six months or more (H. Hausenblas, Dannecker, & Symons-Downs, 2003). Individuals in all stages, with the exception of precontemplation, are subject to relapse. *Relapse* is a form of regression in which the individual returns to an earlier stage and is often associated with efforts made to increase exercise (J. O. Prochaska & Velicer, 1997).

2.1.2 Decisional balance

Decisional balance refers to the importance that an individual places on advantages (pros) versus disadvantages (cons) of changing their exercise behavior (J.O. Prochaska, Redding, & Evers, 2002). Perceptions of pros and cons to performing exercise have been shown to vary systematically across the stages of readiness to change (Wakui et al., 2002). Pros tend to

increase while cons decrease with progression to later stages (J. O. Prochaska & Velicer, 1997).

2.1.3 Processes of change

Processes of change are cognitive and behavioral strategies people use to progress through the various stages of readiness to change (J.O. Prochaska et al., 2002). Ten processes of change have been identified; five of these are considered cognitive (consciousness raising, dramatic relief, environmental re-evaluation, self-reevaluation, and social liberation) and five are considered behavioural (experiential) processes (self-liberation, helping relationships, counter-conditioning, reinforcement management, and stimulus control). Within the exercise domain, *consciousness raising* involves seeking new information about exercise. *Dramatic relief* involves experiencing and expressing intense feelings about being inactive. *Environmental reevaluation* involves assessing how being inactive affects the physical and social environment around the individual. *Self-reevaluation* involves assessments of one's image with respect to inactivity. *Social liberation* involves an assessment of social opportunities for exercise or alternatives to sedentary behaviour. *Self-liberation* involves believing that one can change and committing to act on that belief. *Helping relationships* involve using support from others to be more active. *Counter-conditioning* involves substituting alternative behaviors for sedentary activities instead of remaining inactive. *Reinforcement management* involves rewarding oneself or being rewarded by others for being active or exercising regularly. *Stimulus control* involves controlling situations and cues that support inactivity (J. O. Prochaska, DiClemente, & Norcross, 1992). People at different stages of readiness to change are hypothesized to use distinct processes of change (J.O. Prochaska et al., 2002). In the early stages of readiness, people apply more cognitive

processes to progress. In later stages of readiness, people rely more on behavioural processes (Lowther, Mutrie, & Scott, 2007; Plotnikoff, Hotz et al., 2001).

2.1.4 Self-efficacy

Self-efficacy describes the confidence of an individual in their ability to change their behaviors or overcome barriers, and has been identified as an important determinant of health behavior and behavior change (Holloway & Watson, 2002). Self-efficacy can help an individual cope with high risk or high stress situations without relapsing to an earlier stage of readiness and re-adopting unhealthy habits (Holloway & Watson, 2002). In previous studies, exercise self-efficacy was found to increase in a linear fashion when advancing through the stages of readiness to change for exercise, where precontemplators reported the lowest self-efficacy and those in maintenance reported the highest self-efficacy, in relation to exercise (Wakui et al., 2002).

2.2 Family Systems Theory

Bowen's family systems theory also informed the interpretation of the effects of the family heart health program. Family systems theory is "a theory of human behavior that views the family as an emotional unit and uses systems thinking to describe the complex interactions in the unit (Bowen, 2004)." According to the theory, family members are connected emotionally and affect each other's thoughts, feelings, and actions (Bowen, 2004). This premise is consistent with the underlying concept of the family heart health program, i.e., hospitalization of one family member creates emotional ripples leading to thoughts, feelings and actions on the part of other family members. Some of these relate to personal risk for CHD and may create motivational readiness for personal risk reduction. In considering

family systems theory in the interpretation of the program's effects, it is important to note that the family heart health program sought to provide care to individual family members of patients with heart disease within the context of their family (i.e., the individual was the client), rather than viewing the entire family as the unit of intervention (Bomar, 2003).

CHAPTER 3: RESEARCH AIMS AND HYPOTHESES

3.1 Research Aims

1. The primary aim of this research study was to determine the effect of the family heart health program on participants' readiness to change exercise behavior.
2. Secondary aims were to determine the effects of the program on:
   a. Decisional balance for exercise behavior change;
   b. Use of processes of change for exercise behavior change;
   c. Self-efficacy for exercise behavior change; and
   d. Self-reported leisure time exercise.

3.2 Hypotheses

1. It was hypothesized that the program would produce an approximate 14% increase in the proportion of participants in the combined action/maintenance stage at three-month follow-up compared to baseline. This hypothesis was based on results of two previous studies (A. L. Marshall et al., 2003; Steptoe et al., 2001). Steptoe et al conducted a study to evaluate the impact of two or three sessions of behavioural counseling on stage of readiness to change exercise behaviour in adults at increased risk for CHD, recruited from primary care centres in the UK (Steptoe et al., 2001). They found a 22% increase (from 10% to 32%) in the proportion of patients in the action/maintenance stage at four-month follow-up. Marshall et al conducted a randomized controlled trial to determine the effects of a mailed stage-targeted print intervention designed to promote physical activity (A. L. Marshall et al., 2003). They found a 14% improvement in the proportion of participants achieving criterion levels of physical activity after six months. The

intervention used in the present study was less intensive than that used by Steptoe (Steptoe et al., 2001) but more intensive than that used by Marshall (A. L. Marshall et al., 2003). To be conservative, the hypothesized effect was based on the less intensive intervention.

2. Family systems theory suggests that program effects might vary depending on the relationship to the index patient, i.e., participants living with the index patient (e.g. their spouse) may make more changes than family members interacting less frequently (e.g., siblings). It was hypothesized that spouses would increase readiness to change exercise behaviour the most, followed by offspring, and then siblings.
3. Decisional balance reflects the individual's relative weighing of the pros and cons of regular exercise (J. O. Prochaska & Velicer, 1997). During counseling for exercise behaviour in the program, participants in the pre-action stages (precontemplation, contemplation, preparation) were given an opportunity to explore perceived positive (pros) and negative (cons) aspects of exercise. They also received additional information concerning the benefits of exercise and brainstormed ways to overcome perceived cons of exercise. Participants already in the action/maintenance stage of exercise were expected to report many more pros than cons for exercise. Overall, it is was hypothesized that participation in the program would be associated with an increase in the perceived pros of exercise and a decrease in the perceived cons of exercise, with overall decisional balance becoming more positive after intervention and at follow-up compared to baseline. This pattern would be consistent with previous research (Pinto, Lynn, Marcus, DePue, & Goldstein, 2001).

4. Meta-analytic results support the conclusion that individuals use all 10 processes of change when trying to modify their exercise behaviour (S. J. Marshall & Biddle, 2001). It was hypothesized that total use of processes of change would increase following participation in the program (i.e., process use would be greater at follow-up than at baseline). As participants moved toward the action/maintenance stage, a greater relative increase in behavioural compared to experiential processes was expected (Lowther et al., 2007).
5. Confidence to exercise generally increases as individuals move toward the action/maintenance stage (S. J. Marshall & Biddle, 2001). The counseling component of the program emphasized strategies to overcome common barriers to exercise in an effort to enhance confidence. It was hypothesized that participants' self-efficacy would be higher post-intervention and at three-month follow-up compared to baseline.
6. Leisure time exercise levels increase as individuals move to higher stages of readiness to change, and even transitions between inactive stages are associated with changes in physical activity (S. J. Marshall & Biddle, 2001). It was hypothesized, therefore, that participants in the program would report higher levels of leisure time exercise at three-month follow-up compared to baseline. Because the counseling intervention focused on exercise goals that were consistent with Canadian guidelines (Public Health Agency of Canada and Canadian Society for Exercise Physiology, 2003), it was expected that most of the incremental exercise would be performed at a moderate or vigorous intensity level as opposed to a mild intensity level.

CHAPTER 4: METHODS

4.1 Design

A sub-study was conducted as part of the pilot study of the family heart health program developed by UOHI. A single group pre-test post-test design was used to determine the effect of the risk factor assessment and counseling intervention on stage of change constructs for exercise behaviour in family members of patients with CHD.

4.2 Setting

UOHI is a tertiary care cardiac facility serving the Champlain region of Ontario. Each year, UOHI admits approximately 7000 patients for treatment of CHD. The study took place between May 2006 and May 2007.

4.3 Participants

The study population included family members of patients with CHD. A total of 138 participants were included in the sub-study of exercise behaviour. Study size calculations are provided in section 4.7

4.3.1 Inclusion criteria

Participants were eligible for the study if they were: a) $\geq$ 18 years of age; b) a first degree blood relative (sibling or offspring) or spouse of a patient hospitalized at UOHI within the past three months for acute coronary syndrome, percutaneous coronary intervention, or coronary artery bypass surgery; c) geographically available to attend UOHI for baseline CHD risk assessment and counseling; and d) recruited to the family heart health program

pilot study after stages of change construct measures were added to the pilot study procedures.

4.3.2 Exclusion criteria

Participants were excluded from the study for the following reasons: a) inability to understand or read/write English or French; b) life expectancy of less than three months; c) cognitive impairment; d) a previous diagnosis of CHD or CHD equivalent (i.e., diabetes, cerebrovascular disease, peripheral vascular disease); or e) another family member was already participating in the study.

4.4 Procedures

4.4.1 Recruitment

Patients with CHD attending an introductory session for cardiac rehabilitation were approached by a health educator and asked whether they were interested in assisting their family members to learn more about how they (the family members) could reduce their risk of CHD. If interested, patients completed a family tree and indicated which family members (siblings, offspring, and spouses) were potential candidates for the family heart health program. These family members were mailed a personal invitation to register in the program (Appendix A) and additional details concerning the program content. Interested family members contacted the health educator to make an appointment for a baseline assessment at UOHI.

4.4.2 Baseline assessment

Upon arrival for the baseline assessment, participants were asked to sign a consent form (Appendix B and C) prior to any data being collected. The study protocol was reviewed and approved by the Ottawa Hospital Research Ethics Board and the University of Ottawa Research Ethics Board. Participants first completed questionnaires concerning stages of change constructs for exercise behaviour (i.e., readiness to change, decisional balance, processes of change, and self-efficacy), leisure time exercise, and personal medical history. Next, a coronary risk factor assessment was conducted. Measures of height, weight, waist circumference and blood pressure were completed and recorded. A finger-prick blood sample was drawn for determination of total cholesterol and high-density lipoprotein cholesterol via a Cholestech analyzer (Cholestech, Hayward CA). The Cholestech analyzer was able to provide results from the blood lipid assessment within 5 minutes.

4.4.3 Counseling

At the completion of the risk factor assessment participants received a counseling session lasting approximately 30 minutes. During the counseling session, the health educator provided an overview of heart disease, its relationship to family history, and coronary risk factors. Participants were provided with a personalized summary of their coronary risk factors measured during the assessment along with information on recommended targets. The health educator provided guidance and information concerning the interpretation of personal risk. During the latter part of the counseling session exercise behavior was addressed. Counseling concerning exercise behavior was stage-based in that the counseling strategy was modified depending on the stage of change for exercise behaviour identified during baseline assessment. For participants in the precontemplation stage, counseling

focused initially on identifying pros and cons of increased exercise behaviour. Emphasis was placed on having the participant come up as many benefits to exercise as possible; these ideas were supplemented with other benefits identified by the health educator (Appendix D). Participants in the precontemplation stage were provided with ideas, tips and suggestions to support incorporating exercise in their daily routine (Appendix E). They were encouraged to express anxieties and worries about their sedentary behaviour, and the effect the current behaviours may be having on people around them. For participants in the contemplation stage, counseling again focused initially on identifying pros and cons of increased exercise behaviour. In this case however, greater emphasis was placed on brainstorming ways to overcome identified cons (barriers) to regular exercise (Appendix F). Participants were asked to consider how regular exercise might influence their identity as a person, and were provided with guidelines to clarify how much exercise was recommended. Participants in the contemplation stage were also provided with ideas, tips and suggestions to support incorporating exercise in their daily routine (Appendix E). For participants in the preparation stage, counseling focused on setting exercise goals and developing a plan of action to initiate a program of regular exercise (Appendix G). Participants were also provided with a list of community resources for active living in the Ottawa region (Appendix H); this helped identify opportunities in their immediate environment to engage in regular exercise. Finally, participants in this stage were also provided suggestions about how to buy home exercise equipment (Appendix I). For participants in the action and maintenance stages, the counseling focused on identifying tips for staying motivated (Appendix J), ways to overcome barriers to physical activity (Appendix F), seasonal considerations for exercise (Appendix K), learning about different types of exercise training to enhance variety

(Appendix L), and ways to add additional physical activity into the daily routine (Appendix E).

4.4.4 Post-intervention assessment

Immediately following the counseling session, participants completed a questionnaire re-evaluating decisional balance and self-efficacy concerning exercise behavior.

4.4.5 Mailed reminder postcards

Participants received three follow-up postcards via print or electronic mail, three, six, and 10 weeks following their risk factor assessment and counseling session. These "reminder postcards" were intended to cue participants to follow through on goals developed during the counseling session.

4.4.6 Follow-up assessment

A follow-up questionnaire was mailed to each participant three months after their risk factor assessment and counseling session to re-evaluate stage of change constructs and leisure time exercise levels using the same measures as the baseline assessment. Participants received a self-addressed, pre-paid envelope to return the questionnaire to UOHI. If the questionnaire was not returned within a one month period, reminder letter and replacement questionnaires were sent to the participant.

4.5 Measures

A timetable for study measures is provided in Table 1.

4.5.1 Readiness to change exercise behaviour

Readiness to change exercise behaviour was measured using a stage of change questionnaire designed specifically for exercise behaviour (Marcus, Rakowski, & Rossi, 1992); (Appendix M and Appendix N for the English and French versions, respectively). In the questionnaire, regular exercise was defined as "30 minutes or more of exercise at a moderate-intensity or greater (i.e. intensity of a brisk walk or faster) at least four days per week," which is in accordance with Canada's Physical Activity Guide to Healthy Active Living (Public Health Agency of Canada and Canadian Society for Exercise Physiology, 2003). Readiness to change exercise behaviour, the primary study outcome, was assessed at baseline and three month follow-up. Individuals were asked a single question regarding their current exercise habits: *"Which statement best describes your present exercise status?"* Response options were as follows: *a)" I currently do not exercise regularly, and I do not intend to start regular exercise in the next 6 month;" b) "I currently do not exercise regularly, but I intend to start exercising regularly in the next 6 months, but not in the next 30 days;" c) "I currently do not exercise, but intend to start exercising regularly in the next 30 days;" d)" I currently exercise regularly, but I have only begun doing so in the last 6 months;" or e) "I currently exercise regularly and have done so for longer than 6 months."* This question classified participants into one of the five stages of readiness to change exercise behaviour, i.e. precontemplaton, contemplation, preparation, action, or maintenance (Marcus, Rakowski et al., 1992). Test re-test reliability of the readiness to change exercise behaviour questionnaire has been reported as r = 0.79 (Schumann, Estabrooks, Nigg, & Hill, 2003) and its construct validity has been demonstrated (Cardinal, 1997; Dannecker, Hausenblas, Connaughton, & Lovins, 2003; H. Hausenblas et al., 2003).

4.5.2 Decisional balance

Decisional balance was measured at baseline, post-intervention, and three-month follow up using a 10-item questionnaire that assessed positive and negative aspects of exercise (Appendices O and P for English and French versions, respectively) (C. R. Nigg, Rossi, Norman, & Benisovich, 1998). Participants were asked to indicate how important various statements were with respect to their decision to exercise regularly in their leisure time. An example of a positive item was: *"I would have more energy for my family and friends if I exercise regularly."* An example of a negative item was: *"I would feel embarrassed if people saw me exercising."* Responses were scored using a 5-point Likert scale ranging from 1 (extremely important) to 5 (not important). Internal consistency of decisional balance items have been evaluated and found to be high (0.91 and 0.78 for positive and negative aspects of exercise, respectively) (Dannecker et al., 2003). An overall score for decisional balance is derived by subtracting the mean score for negative aspects of exercise (i.e. cons) from the mean score of the positive aspects for exercise (i.e. pros). If pros outweigh cons a positive value for decisional balance will result. If cons outweigh pros, a negative value for decisional balance will result. The test re-test reliability of the decisional balance scale has been established and found to be adequate (Plotnikoff, Blanchard, Hotz, & Rhodes, 2001)

4.5.3 Processes of change

Processes of change (Appendices Q and R for English and French versions, respectively) were measured at baseline and at three month follow-up using a 28-item questionnaire that rated how frequently various experiences concerning exercise had occurred during the past month. Examples of experiences include: *"I read articles about exercise in an attempt to learn more about it,"* and *"When I feel tired, I make myself exercise anyway because I know*

I will feel better afterwards." The questionnaire included experiences and subscales related to: consciousness raising; dramatic relief; environmental re-evaluation; self re-evaluation; social liberation; counter-conditioning; helping relationships; reinforcement management; self-liberation; and stimulus control. The frequency of each experience was measured using a five-point Likert scale ranging from 1 (never) to 5 (repeatedly). Higher scores reflected more use of processes of change. The individual process subscale scores reflected the mean score for experiences related to individual processes of change. Processes of change were not measured post-intervention as there was only one hour between the first and second measurement period which did not give sufficient time for the participant to use a number of the measured processes.

4.5.4 Self-efficacy

Self-efficacy (Appendices S and T for English and French versions, respectively) was measured using an 18-item questionnaire that rated how confident participants were to exercise when other things got in the way (Marcus, Selby, Niaura, & Rossi, 1992). Sample statements included when: *"I am under a lot of stress," I don't feel like it,"* and *"I have to exercise alone."* Confidence was measured on a five-point Likert scale ranging from 1 (not at all confident) to 5 (completely confident). The questionnaire included barriers and subscales related to: negative affect, excuse making, exercising alone, inconvenience, resistance from others, and bad weather. Higher scores indicated greater confidence to exercise when other things got in the way. Internal consistency of the overall self-efficacy scale has been reported as .89; internal consistencies for the various subscales range from .77 to .86 (Dannecker et al., 2003). Test-retest reliability of the overall self-efficacy scale has been reported as r =.82 (Dannecker et al., 2003).

4.5.5 Leisure time exercise

Leisure time exercise was measured at baseline and three-month follow-up using a modified version of the Godin Leisure Time Exercise Questionnaire (GLTEQ) (Appendices U and V for English and French versions, respectively). The GLTEQ contains open-ended questions that ask about the average frequency of mild, moderate, and strenuous exercise performed in a typical week in bouts of at least 15 minutes (Godin, Jobin, & Bouillon, 1986). The GLTEQ was modified in that participants were also asked to report the average time per exercise bout. Total weekly leisure activity was calculated in arbitrary GLTEQ units by multiplying the weekly frequencies of light, moderate and strenuous activity by three, five and nine, respectively, and summing the product of the separate components. Total leisure time exercise minutes were calculated by multiplying the weekly frequencies of light, moderate and strenuous activity by the average time per exercise bout at each intensity. The GLTEQ has compared very favorably with other common self-report measures of physical activity and has been found to have strong relationships with more objective measures of physical activity such as activity monitors (r = .45) and treadmill tests (r = .56) (Jacobs, Ainsworth, Hartman, & Leon, 1993).

4.6 Statistical Analysis

Participant flow through the study was summarized as per the *Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)* statement (von Elm et al., 2007). Data analyses were performed using Version 16.0 of the SPSS data analysis program. Preliminary analyses were conducted to check for outliers and the normality of the data distribution. Outliers were "winsorized" within three standard deviations of the mean (i.e. pulled back to the centre of the distribution). The type of data missingness was examined by dividing

participants into those with and without missing data at three months follow-up. T-tests were performed on baseline differences between the two groups for age, education, BMI, and GLTEQ units. Chi-square tests were performed on baseline differences between the two groups for gender and exercise stage of change. If data were found to be missing completely at random, complete case analysis was to be used (i.e. only subjects with complete data at all three time points were used in the analyses). If data were found to be missing at random, data imputation by maximum likelihood estimation was to be used. Baseline characteristics were summarized using descriptive statistics.

To test the hypothesis that the program would significantly increase readiness to change exercise behaviour in family members of patients with heart disease, a chi-square test was used to compare the proportion of participants in the combined action/maintenance stage of readiness to change exercise behaviour at three-month follow-up compared to baseline. For exploratory purposes, the relationship between readiness to change exercise behaviour over time was stratified by relationship to the index patient.

To test the hypothesis that the program would be associated with a positive shift in decisional balance over the three time points (baseline, post-intervention, and follow-up), repeated measures ANOVA was conducted. If results showed that there was a significant effect of time on decisional balance, post-hoc tests were conducted to determine the time points between which significant effects were occurring. A Bonferroni adjustment was used to account for multiple comparisons. Secondary analyses were performed using exactly the same procedures for the pros and cons subscales.

To test the hypothesis that the program would be associated with an increased use of processes of change, a paired-samples *t*-test was conducted to compare the use of total processes of change at baseline and at three-month follow-up. Secondary, exploratory analyses examined differences in the use of cognitive and behavioural processes of change as well as individual processes of change at the two time points.

To test the hypothesis that the program would be associated with an increase in self-efficacy, the effect of time (baseline, post-intervention, three-month follow-up) on self-efficacy was assessed using repeated measures ANOVA. If results showed that there was a significant effect of time on self-efficacy, post-hoc tests were conducted to determine the time points between which significant effects were occurring. A Bonferroni adjustment was used to account for multiple comparisons. Secondary analyses were performed using exactly the same procedures for subscales related to negative affect, excuse making, exercising alone, inconvenience, resistance from others, and bad weather.

To test the hypothesis that the program would be associated with an increase in self-reported leisure time exercise, a paired-samples *t*-test was conducted to compare self reported leisure time exercise at baseline and at three-month follow-up. The main analysis examined total leisure time exercise minutes per week. Secondary, exploratory analyses examined leisure time exercise minutes at mild, moderate, strenuous, and combined moderate/strenuous levels at the two time points. Total GLTEQ units were also compared at the two time points.

4.7 Study Size

Overall study size was constrained by the total number of people in the program pilot study after the introduction of measures for stage of change constructs. The program pilot study included 300 participants and stage of change measures were added after the first 140 participants were recruited. The application of eligibility criteria further reduced potential participants to be included in the present study. A required study size was calculated using the primary outcome of stage of readiness to change exercise behaviour. Previously, a meta-analysis of 71 studies employing stage of change measures across a variety of populations (S. J. Marshall & Biddle, 2001) showed that 11% of participants could be expected to be in the action stage and 36% of participants could be expected to be in the maintenance stage at baseline (total proportion in the combined action and maintenance stages at baseline = 11% + 36% = 47%). A previous study of a stage-targeted exercise intervention found a 14% improvement in the proportion of participants achieving criterion levels of physical activity after six months (A. L. Marshall et al., 2003). The study size required to detect an 14% increase in the proportion of family members in the combined action and maintenance stages of readiness to change with 80% power and 5% significance was 78 (Rosner, 2006).

CHAPTER 5: RESULTS

5.1 Participant Flow

Figure 1 summarizes the flow of participants through the study. Between May 2006 and May 2007, 300 family members were recruited to the pilot study of the family heart health program. Measures for stage of change constructs were added only after the first 140 participants were already recruited; therefore these pilot study participants were not included in the present study. Of the remaining 160 participants, 22 were ineligible for the current study (8 had already been diagnosed with CHD or a CHD equivalent; 12 had another family member participating in the study; and 2 were cousins of patients with CHD). The remaining 138 participants were included in the present study. Complete data were available for 138, 138, and 73 participants at baseline, post-intervention, and three-month follow-up, respectively. Reasons for loss to follow-up were as follows: 10 participants returned follow-up questionnaires without identifiers attached; and 55 participants failed to mail back questionnaires despite repeated mailed reminders.

The type of data missingness was examined by dividing participants into those with and without missing data at three months follow-up. T-tests were performed on baseline differences between the two groups, for age, education, BMI, and GLTEQ units. Chi-square tests were performed on baseline differences between the two groups for gender and exercise stage of change. Participants with complete data did not differ from participants lost to follow-up on age (53.2 vs. 49.9 years; $p = 0.123$); % female (73.9% vs. 63.8%; $p = 0.198$); education (14.9 vs. 15.3 years; $p = 0.452$); BMI (27.3 vs. 28.7 kg/m^2; $p = 0.107$); GLTEQ units (18.1 vs. 18.2 GLTEQ units; $p = 0.965$); and % in pre-action stages of change (49.3 %

vs. 53.6%; $p = 0.492$). Data were therefore considered to be missing completely at random; all further analyses were conducted using only the 73 people with complete data at all time points.

5.2 Characteristics of Participants

Baseline characteristics of the final study sample are shown in Table 2. Study participants were predominantly English speaking (97%), slightly overweight (mean BMI = 27.1) females (74%) with a mean age of 53 years. The sample included 23 offspring (31.5%), 34 spouses (46.6%), and 16 siblings (21.9%). Approximately half of all participants were in the combined action/maintenance stage at baseline. Most of the remaining participants were in the preparation stage of change. At baseline, participants reported an average of 179 minutes of leisure time exercise (mild, moderate, and strenuous minutes combined) per week over the past six months.

5.3 Readiness to change exercise behaviour

A chi-square test of independence was performed to examine the relationship between readiness to change exercise behaviour at three-month follow-up compared to baseline. Results are summarized in Table 3. The relation between these variables was significant, X^2 $(1, N = 73) = 5.41, p = 0.02$. Between baseline and three-month follow-up, the proportion of participants in the combined action/maintenance stage of change increased by 27.4% (from 50.7% to 78.1%).

For exploratory purposes, the relationship between readiness to change exercise behaviour over time was stratified by relationship to the index patient. For the 23 offspring, the

proportion of participants in the combined action/maintenance stage of change increased by 30.5% between baseline and three-month follow-up (from 39.1% to 69.6%; X^2 [1, N = 23] = 2.61, $p = 0.108$). For the 34 spouses, the proportion of participants in the combined action/maintenance stage of change increased by 26.5% between baseline and three-month follow-up (from 58.8% to 85.3%; X^2 [1, N = 34] = 3.65, $p = 0.056$). For the 16 siblings, the proportion of participants in the combined action/maintenance stage of change increased by 25.0% between baseline and three-month follow-up (from 50.0% to 75.0%; $p = 0.289$ for exact version of McNemar's test). Overall, it did not appear that the effect of the program on readiness to change exercise behaviour was related to the relationship of the participant to the index patient.

5.4 Decisional balance

The effect of time (baseline, post-intervention, three-month follow-up) on decisional balance (i.e., pros-cons) was assessed using repeated measures ANOVA. The results are summarized in Table 4. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 32.79, $p < .0001$, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = 0.63$). The results show that there was a significant effect of time on decisional balance, F (1.46, 105.12) = 51.98, $p < .0001$. Post-hoc tests conducted using Bonferroni adjustment for multiple comparisons indicated that decisional balance was higher at three-month follow-up than at baseline (-1.43 vs. -2.52; $p < .0001$), and higher at three-month follow-up than at post-intervention (-1.43 vs. -2.43; $p < .0001$). There was no difference in decisional balance between baseline and post-intervention (-2.52 vs. -2.43; $p = .697$).

Additional analyses were performed to determine if changes in decisional balance were the result of an increase in perceived pros of exercise or a reduction in the perceived cons of exercise.

The effect of time (baseline, post-intervention, three-month follow-up) on pros of exercise was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 15.25, p < .0001, therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\varepsilon = 0.81$). The results show that there was not a significant effect of time on pros of exercise, F (1.71, 123.21) = 2.27, $p = .116$.

The effect of time (baseline, post-intervention, three-month follow-up) on cons of exercise was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 38.07, $p < .0001$, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = 0.59$). The results show that there was a significant effect of time on cons of exercise, F (1.41, 101.76) = 102.59, $p < .0001$. Post-hoc tests conducted using Bonferroni adjustment for multiple comparisons indicated that cons for exercise were reduced at three-month follow-up compared to baseline (3.31 vs. 4.52; $p < .0001$), and reduced at three-month follow-up compared to post-intervention (3.31 vs. 4.48; $p < .0001$). There was no difference in cons of exercise between baseline and post-intervention (4.52 vs. 4.48; $p = 1.00$).

5.5 Processes of change

Paired-samples *t*-tests were conducted to compare the use of processes of change at baseline and at three-month follow-up. The results are summarized in Table 5. The main analysis examined total processes of change. Secondary, exploratory analyses examined the differences in the use of cognitive and behavioural processes of change as well as individual processes of change at the two time points.

There was a significant difference in the scores for total processes of change at three-month follow-up (M = 3.39, SD = 0.59) compared to baseline (M = 3.21, SD = 0.62); t (72) = -2.73, p = .008. Participants were using more processes of change at follow-up, including both cognitive and behavioural processes.

For individual processes of change, participants reported more frequently seeking information about exercise and exercise methods (consciousness raising); making firm commitments to exercising regularly (self-liberation); and substituting exercise for sedentary activities (counter-conditioning) at three-month follow-up compared to baseline.

5.6 Self-efficacy

The effect of time (baseline, post-intervention, three-month follow-up) on self-efficacy was assessed using repeated measures ANOVA. The results are summarized in Table 6. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 32.61, $p < .0001$, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = 0.63$). The results show that there was not a significant effect of time on self-efficacy, F (1.58, 45.56) = *2.50*, p = .103.

Additional exploratory analyses were performed using self-efficacy subscales for negative affect, excuse making, must exercise alone, inconvenient to exercise, resistance from others, and bad weather.

The effect of time on the negative affect subscale was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 18.40, $p < .0001$, therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ($\varepsilon = 0.77$). The results showed no significant effect of time on the negative affect subscale F (1.66, 119.57) = 0.15, $p = .819$.

Next, the effect of time on the excuse making subscale was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 21.36, $p < .0001$, therefore degrees of freedom were corrected using Huynh-Feldtestimates of sphericity ($\varepsilon = 0.81$). The results showed a significant effect on of time F (1.62, 116.46) = 4.32, $p = .022$. Post-hoc tests conducted using Bonferroni adjustment for multiple comparisons indicated that participants had more confidence to exercise regularly at post intervention compared to baseline even when they had an excuse not to exercise (3.24 vs. 2.92; $p = .001$). No significant differences were found when baseline was compared to three months (2.92 vs. 3.11; $p = .429$) or post intervention was compared to three months (3.24 vs. 3.11; $p = .764$).

The effect of time on the exercising alone subscale was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 29.18, $p < .0001$, therefore degrees of freedom were corrected using Greenhouse-Geiser estimates of sphericity ($\varepsilon = 0.66$). The results showed a significant effect on confidence to exercise regularly at three months compared to baseline, F (1.50, 107.70) = 25.72, $p < .0001$, when exercise had to be done alone. Post-hoc tests conducted using Bonferroni adjustment for multiple comparisons indicated that participants had greater self efficacy to exercise alone at baseline compared to three months (3.79 vs. 3.11; $p < .0001$) and post intervention compared to three months (3.94 vs. 3.11; $p < .0001$). No differences were found between baseline and post intervention (3.79 vs. 3.94; $p = .209$)

The effect of time on the inconvenient to exercise subscale was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 29.98, $p < .0001$, therefore degrees of freedom were corrected using Greenhouse Geiser estimates of sphericity ($\varepsilon = 0.66$). The results showed no significant effect of time on participants' self efficacy to exercise when it was inconvenient F (1.48, 107.11) = 2.55, $p = .098$.

The effect of time on the resistance from others subscale was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 23.39, $p < .0001$, therefore degrees of freedom were corrected using Greenhouse Geiser estimates of sphericity ($\varepsilon = 0.72$). The results showed no significant

effect on participants' self efficacy to exercise when they were experiencing resistance from others F (2.18, 80.27) = 1.95, p = .156.

Finally, the effect of time on the bad weather subscale was assessed using repeated measures ANOVA. Mauchly's test indicated that the assumption of sphericity had been violated, χ^2 (2) = 21.65, p < .0001, therefore degrees of freedom were corrected using Greenhouse Geiser estimates of sphericity (ε = 0.74). The results showed no significant effect of time on participants' self efficacy to exercise during bad weather F (2.53, 81.39) = 2.24, p = .122.

5.7 Leisure time exercise

Paired-samples t-tests were conducted to compare self reported leisure time exercise at baseline and at three-month follow-up. The results are summarized in Table 7. The main analysis examined total leisure time exercise minutes per week. Secondary, exploratory analyses examined leisure time exercise minutes at mild, moderate, strenuous, and combined moderate/strenuous levels at the two time points. Total GLTEQ units were also analyzed at the two time points.

There was a significant difference in the scores for total exercise minutes per week at three-month follow-up (M = 268.9 minutes, SD = 262.3) compared to baseline (M = 178.8 minutes, SD = 153.8); t (73) = -2.12, p = .040. Participants reported exercising more at three months than at baseline. Participants reported doing more moderate exercise minutes at three month follow-up (M = 120.4 minutes, SD = 114.7) compared to baseline (M = 72.1 minutes, SD = 117.3); t (73) = -2.40, p = .021, and more moderate/strenuous combined minutes at three month follow-up (M = 158.38 minutes, SD = 164.57) compared to baseline (M = 93.13

minutes, SD = 144.84); t (73) = -2.69, p = .010. No significant differences were found in mild exercise minutes at three-month follow-up (M = 110.5, SD = 205.4) compared to baseline (M = 85.6, SD = 91.1); t (73) = -.673, p = .505. Finally, no significant differences were found in strenuous exercise minutes at three-month follow-up (M = 38.0 SD = 94.5) compared to baseline (M = 21.0, SD = 74.0); t (73) = -1.17, p = .250.

A significant difference was also found in GLTEQ units at three-month follow-up (M = 30.9, SD = 21.1) compared to baseline (M = 18.2, SD = 19.4); t (73) = -3.57, p = .001.

CHAPTER 6: DISCUSSION

This research examined the effects of a family heart health program on stages of change constructs related to exercise behavior in family members of patients with CHD. Participation in the program was associated with favourable changes in readiness to change exercise behaviour, decisional balance, use of processes of change, and self-reported leisure time exercise over the follow-up period. Family members of patients with CHD were interested in participating in the study and the intervention used was brief and feasible to implement in this population.

Program participation was associated with a 27% increase (from 51% to 78%) in the proportion of participants in the combined action/maintenance stage of readiness between baseline assessment and three-month follow-up. The observed increase in readiness to change was greater than the 14% that was hypothesized based on a randomized controlled trial to determine the effects of a mailed stage-targeted print intervention designed to promote physical activity in a population-based sample (A. L. Marshall et al., 2003). The increase was similar to the 22% increase reported by Steptoe and colleagues in a randomized controlled trial comparing two or three sessions of behavioural counseling to usual care in adults at increased risk for CHD, recruited from primary care centres in the UK (Steptoe et al., 2001). It is also consistent with meta-analytic evidence (Pinto et al., 2001). Although program effects were expected to vary by relationship to the index patient, offspring, spouses and siblings responded similarly to the intervention. It had been hypothesized that spouses would increase readiness to change exercise behaviour the most, followed by offspring, and then siblings. Previously, it has been reported that offspring are less likely to change their

lifestyle, perhaps because their absolute risk is lowest and they may not see an immediate reason to change (Lloyd-Jones et al., 2004).

Participation in the program was associated with decisional balance becoming more positive over time, primarily because participants perceived fewer cons to exercise. While the pattern of decisional balance becoming more positive over time following intervention was consistent with previous research (Pinto et al., 2001), a greater impact on the perceived pros of exercise was expected. This likely reflects the stage distribution of the study sample at baseline since more than half of study participants were already in the action/maintenance stage. Perceived pros of exercise are a more important determinant of stage progression in people contemplating change, as opposed to those who already exercise regularly (S. J. Marshall & Biddle, 2001).

Program participation was associated with increased use of processes of change use; both cognitive and behavioural process use increased. The results for total use of processes of change are consistent with meta-analytic results that indicate individuals use all 10 processes of change when trying to modify their exercise behaviour (S. J. Marshall & Biddle, 2001). A recent study of processes of change and exercise behavior in the British population indicated that self-liberation, stimulus control, social liberation, and helping relationships were particularly important for stage progression (Lowther et al., 2007). In the present study, the pattern of process use was somewhat different. Family members of patients with CHD reported more frequently seeking information about exercise and exercise methods (consciousness raising); making firm commitments to exercising regularly (self-liberation);

and substituting exercise for sedentary activities (counter-conditioning) at three-month follow-up compared to baseline.

A priori, it was hypothesized that participants' self-efficacy would increase over time from baseline to post-intervention to follow-up. In the study, variable effects on self-efficacy were noted. Total self-efficacy for exercise did not change over time; however, there was movement on two of the subscales of self-efficacy. Confidence to exercise when participants had an excuse not to exercise increased over time, whereas confidence to exercise alone declined. One possible explanation for the lack of change in self-efficacy is that self-efficacy was already high in many participants and unlikely to improve further with the relatively brief intervention.

The hypothesis that participation in the program would be associated with higher levels of leisure time exercise at follow-up compared to baseline was supported; reported minutes of leisure time exercise increased by 61% (110 minutes) over this period. These results are consistent with meta-analytic results of individually-adapted health behavior change programs that measured change in the time spent in physical activity with a median net increase of 35.4% (interquartile range, 16.7% to 83.3%) (Kahn et al., 2002). Most of the additional minutes of exercise were performed at a moderate intensity level (as opposed to a mild or vigorous intensity level). This level of additional leisure time exercise would have measurable impacts on risk for CHD if it was sustained over the long-term (Sofi et al., 2008).

CHAPTER 7: LIMITATIONS

There were several important limitations to this study, related to: study design; attrition and loss-to-follow-up; the nature of the family heart health intervention; measures; and biases caused by study recruitment. Each will be discussed in more detail below.

The single group pre-test, post-test design does not allow definitive conclusions to be drawn about the impact of the program on the measured outcomes and mediators of change. In the absence of a control group, it is impossible to tell if the observed changes would have occurred even without any intervention. Family systems theory (Bowen, 2004) suggests that the hospitalization of a loved with CHD may be an event of sufficient magnitude that it, in an of itself, affects preventive actions taken by other family members. Uncontrolled studies generally demonstrate greater effects than will be observed in controlled studies (Rosner, 2006), therefore the design of the pilot evaluation likely biased results in a positive direction. Because the research design offered relatively poor control over potentially confounding variables, it is possible that other unmeasured factors 'caused' the observed changes over time. The follow-up period was relatively short (three months); therefore, long-term effects on stages of change constructs and exercise behavior are unknown. Nonetheless, the design was appropriate for the preliminary evaluation of the program and has provided useful information about how the intervention may work to help family members reduce their risk.

Attrition from the study was significant; three-month follow-up data was available for only 53% of the original sample. Attrition is an important threat to internal validity if the missing cases differ in important ways from cases where values are present (Allison, 2001). This

leads to a biased dataset and a distorted analysis of results. Fortunately, an examination of the pattern of data missingness revealed that data were missing completely at random with missing data randomly distributed across all participants. This allowed for the list-wise deletion of cases with missing follow-up data (Allison, 2001). For this reason, study attrition was unlikely to have affected the interpretation of the results.

The intervention had several components (e.g., coronary risk factor assessment, stage-matched counseling session, mailed reminder post-cards) and it is impossible to apportion the contribution of each component to the observed changes in readiness to change exercise behaviour and reported leisure time exercise. The main components of the intervention were delivered in a single face-to-face session. Multiple sessions of intervention or booster sessions may have produced larger effects.

All measures used in the study were self-reported and this may have influenced the results in a positive direction since exercise is considered a socially desirable behaviour. Previous research has established that questionnaire-based assessments of exercise behaviour can be prone to social desirability bias, i.e., the tendency of respondents to reply in a manner that will be viewed favorably by others (S. A. Adams et al., 2005; Okamoto et al., 2002). Given that people had received an intervention for exercise behaviour from a health educator, the may have over-reported their exercise level at follow-up to make the educator look good.

The sample may have been biased in a number of other ways, thereby limiting the generalizability of the results. This includes biases related to: the voluntary nature of study

participation; the high proportions of females and spouses of patients with CHD; and the small number of Francophone participants. Since participants had to initiate contact with the health educator and because participation in the study was voluntary, participants in the present study were probably a motivated subset of family members. The distribution of stage of readiness to change exercise behaviour observed at baseline suggests that this was the case. Percentages of participants in the precontemplation, contemplation, preparation, and combined action/maintenance stages of change were 0%, 3%, 47% and 51%, respectively. Comparatively, a systematic review assessing exercise stage distribution using multiple studies found the percentages of participants in the precontemplation, contemplation, preparation, and combined action/maintenance stages of change were 5%, 10%, 40% and 45%, respectively (C. Nigg et al., 2005). A second meta-analysis including 68,580 subjects surveyed from a variety of populations found the percentages of participants in the precontemplation, contemplation, preparation, and combined action/maintenance stages of change were 14%, 16%, 23% and 47%, respectively (S. J. Marshall & Biddle, 2001). It appears the present study was under-representative with respect to participants in the precontemplation and contemplation stages; this would tend to bias the program effects in a positive direction. Almost three-quarters of the sample were female and almost half were spouses of patients indicating that siblings and offspring were relatively under-represented in the pilot evaluation. Finally, the small number of Francophone participants in the sample did not allow for comparison of the stages of change constructs and leisure time exercise between Anglophone versus Francophone participants.

CHAPTER 8: IMPLICATIONS FOR THEORY, RESEARCH AND PRACTICE

The results of the present study have implications for theory, research, and practice.

From a theory standpoint, the stages of change model proved useful as a framework from which to develop the counseling intervention to increase readiness to change exercise behaviour and leisure time exercise in family members of patients with CHD. The algorithm that categorized participants according to the readiness to change exercise behaviour appeared to appropriately classify participants with respect to their leisure time exercise level (i.e., participants in the contemplation stage reported the least leisure time exercise and participants in the action/maintenance stage reported the most). Participation in the intervention was generally associated with changes in stages of change constructs like decisional balance and use of processes of change that were consistent with the model. In addition, an increase in readiness to change exercise in the sample was accompanied by a substantial increase in self-reported leisure time exercise. While consistent with other studies showing preliminary evidence of validity and reliability of applying the stages of change model to regular moderate exercise (Plotnikoff, Blanchard et al., 2001; Sarkin, Johnson, Prochaska, & Prochaska, 2001), the present study was unable to test the validity of the stages of change model by demonstrating its superiority over a non-stage-matched intervention. As such, it does not refute arguments that have been raised by critics of the model (J. Adams & White, 2005; Littell & Girvin, 2002).

Family systems theory may provide other useful constructs that could be used alongside the stages of change model to help better understand the dynamics of family relationships and

their impacts on exercise behaviour in this population. To date, it is unclear if the family heart health program should consider the family as context or whether the entire family unit should be considered as the unit of intervention.

From a research standpoint, the results of the present study have influenced the design of a larger trial of an enhanced family heart health program that recently commenced at UOHI. Specifically: methods of recruitment have been modified to include media-based advertising to attract more siblings and offspring; a design with random allocation of 562 participants to either usual care or a family heart health program intervention group has been used; the intervention has been strengthened to include a face-to-face visit followed by 12 weekly telephone-based coaching sessions with the health educator; a self-management manual for participants has been developed; direct communication between the health educator and the participant's family doctor has been added; face-to-face follow-up visits for re-assessment of outcomes at 12 and 52 weeks have been added; and measures of blood lipids, dietary behaviours, psychosocial mediators of lifestyle change (intentions, attitudes, self-efficacy), fasting blood glucose, and anxiety and depression have been added.

From a practice standpoint, this study has demonstrated that family members of patients with CHD are interested in the family heart health program and it is feasible to engage them soon after the index patient is hospitalized. There is a need to address a broad range of behaviours including, but not limited to, exercise behaviour. Such programs will have to work closely with primary care providers in the community for long-term effects.

CHAPTER 9: CONCLUSIONS

Family members of patients with the CHD may be at increased risk for developing CHD themselves unless preventive measures are taken to help them reduce their risk. This study found that participation in a family heart health program (consisting of an individualized coronary risk factor assessment and one-time counseling session) was associated with favourable changes in readiness to change exercise behaviour, decisional balance, use of processes of change, and self-reported leisure time exercise over a three-month follow-up period. The results of the study should be interpreted with caution given limitations with the study design and the self-reported nature of the interventions. Nonetheless, this study has set the stage for a larger, definitive trial of an enhanced family heart health intervention. This trial is now underway at the UOHI.

REFERENCE LIST

Adams, J., & White, M. (2005). Why don't stage-based activity promotion interventions work? *Health Educuation Research, 20*(2), 237-243.

Adams, S. A., Matthews, C. E., Ebbeling, C. B., Moore, C. G., Cunningham, J. E., Fulton, J., et al. (2005). The effect of social desirability and social approval on self-reports of physical activity. *Am J Epidemiol, 161*(4), 389-398.

Ajzen, I. (1991). The theory of planned behavior. *Org Behavior in Human Decision Processes, 50*, 179-211.

Allison, P. D. (2001). *Missing data*. Thousand Oaks, CA: Sage Publications.

Bomar, P. J. (2003). Promoting Health in Families. In *Applying Family Research and Theory to Nursing Practice* (3rd ed., pp. 5). Philadelphia: Saunders Title.

Bouchard, C., Shephard, R. J., & Stephens, T. (1994). *Physical activity, Fitness, and Health*. Champaign: Human Kinetics.

Bowen, M. (2004). Bowen Theory. Retrieved February 19 2009, from http://www.thebowencenter.org/pages/theory.html

Brenn, T., & Njolstad, I. (1998). Coronary heart disease risk factors in subjects whose brothers, sisters or husbands developed premature myocardial infarction during 12 years of follow-up. The Finnmark Study (1977-1989). *Journal of Cardiovascular Risk, 5*(5-6), 325-330.

Cardinal, B. J. (1997). Construct validity of stages of change for exercise behavior. *American Journal of Health Promotion, 12*(1), 68-74.

Cheng, A., Braunstein, J. B., Dennison, C., Nass, C., & Blumenthal, R. S. (2002). Reducing global risk for cardiovascular disease: using lifestyle changes and pharmacotherapy. *Clinical Cardiology, 25*(5), 205-212.

Dannecker, E., Hausenblas, H., Connaughton, D., & Lovins, T. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly in Exercise and Sport, 74*(3), 236-247.

De Sutter, J., De Bacquer, D., Kotseva, K., Sans, S., Pyorala, K., Wood, D., et al. (2003). Screening of family members of patients with premature coronary heart disease; results from the EUROASPIRE II family survey. *European Heart Journal, 24*(3), 249-257.

Di Castelnuovo, A., Quacquaruccio, G., Donati, M., de Gaetano, G., & Lacoviello, L. (2009). Spousal concordance for major coronary risk factors: a systematic review and meta-analysis. *American Journal of Epidemiology, 169*(1), 1-8.

Dzewaltowski, D. A. (1994). Physical activity determinants: a social cognitive approach. *Medicine and Science in Sports and Exercise, 26*(11), 1395-1399.

Emberson, J., Whincup, P., Morris, R., Walker, M., & Ebrahim, S. (2004). Evaluating the impact of population and high-risk strategies for the primary prevention of cardiovascular disease. *European Heart Journal, 25*(6), 484-491.

Garrison, R. J., Castelli, W. P., Feinleib, M., Kannel, W. B., Havlik, R. J., Padgett, S. J., et al. (1979). The association of total cholesterol, triglycerides and plasma lipoprotein cholesterol levels in first degree relatives and spouse pairs. *American Journal of Epidemiology, 110*(3), 313-321.

Gilmour, H. (2007). Physically active Canadians. *Health Reports, 18*(3), 45-63.

Goble, A., Jackson, B., Phillips, P., Race, E., Oliver, R. G., & Worcester, M. C. (1997). The Family Atherosclerosis Risk Intervention Study (FARIS): risk factor profiles of patients and their relatives following an acute cardiac event. *Australian and New Zealand Journal of Medicine, 27*(5), 568-577.

Godin, G., Jobin, J., & Bouillon, J. (1986). Assessment of leisure time exercise behavior by self-report: a concurrent validity study. *Canadian Journal of Public Health, 77*(5), 359-362.

Hausenblas, H., Dannecker, E., & Symons-Downs, D. (2003). Examination of the validity of a stages of exercise change algorithm. *Journal of Applied Social Psychology, 33*(6), 1179-1189.

Hausenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: a meta-analysis. *Journal of Sport Exercise Psychology, 19*, 36-51.

Heart and Stroke Foundation of Canada. (2006). Retrieved April 6 2006, from www.heartandstroke.ca/

Higgins, M. (2000). Epidemiology and prevention of coronary heart disease in families. *American Journal of Medicine, 108*(5), 387-395.

Holloway, A., & Watson, H. E. (2002). Role of self-efficacy and behaviour change. *International Journal of Nursing Practice, 8*(2), 106-115.

Hunt, S. C., Gwinn, M., & Adams, T. D. (2003). Family history assessment: strategies for prevention of cardiovascular disease. *American Journal of Preventive Medicine, 24*(2), 136-142.

Jacobs, D. R., Jr., Ainsworth, B. E., Hartman, T. J., & Leon, A. S. (1993). A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Med Sci Sports Exerc, 25*(1), 81-91.

Jolly, K., Duda, J. L., Daley, A., Eves, F. F., Mutrie, N., Ntoumanis, N., et al. (2009). Evaluation of a standard provision versus an autonomy promotive exercise referral programme: rationale and study design. *BioMed Central Public Health, 9*, 176.

Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., et al. (2002). The effectiveness of interventions to increase physical activity. A systematic review. *American Journal of Preventive Medicine, 22*(4 Suppl), 73-107.

Katzmarzyk, P. T., Gledhill, N., & Shephard, R. J. (2000). The economic burden of physical inactivity in Canada. *Canadian Medical Associaton Journal, 163*(11), 1435-1440.

Kavanagh, T., Shephard, R. J., Hamm, L. F., Mertens, D. J., & Thacker, L. (2000). Risk profile and health awareness in male offspring of parents with premature coronary heart disease. *Journal of Cardiopulmonary Rehabilitation, 20*(3), 172-179.

King, A. C., Sallis, J. F., Dunn, A. L., Simons-Morton, D. G., Albright, C. A., Cohen, S., et al. (1998). Overview of the Activity Counseling Trial (ACT) intervention for promoting physical activity in primary health care settings. Activity Counseling Trial Research Group. *Medicine and Science in Sports and Exercise, 30*(7), 1086-1096.

King, A. C., Stokols, D., Talen, E., Brassington, G. S., & Killingsworth, R. (2002). Theoretical approaches to the promotion of physical activity: forging a transdisciplinary paradigm. *American Journal of Preventive Medicine, 23*(2 Suppl), 15-25.

Littell, J. H., & Girvin, H. (2002). Stages of change. A critique. *Behavior Modification, 26*(2), 223-273.

Lloyd-Jones, D. M., Nam, B. H., D'Agostino, R. B., Sr., Levy, D., Murabito, J. M., Wang, T. J., et al. (2004). Parental cardiovascular disease as a risk factor for cardiovascular disease in middle-aged adults: a prospective study of parents and offspring. *Journal of the American Medical Association, 291*(18), 2204-2211.

Lowther, M., Mutrie, N., & Scott, E. M. (2007). Identifying key processes of exercise behaviour change associated with movement through the stages of exercise behaviour change. *Journal of Health Psychology, 12*(2), 261-272.

Marcus, B. H., Rakowski, W., & Rossi, J. S. (1992). Assessing motivational readiness and decision making for exercise. *Health Psychology, 11*(4), 257-261.

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly in Exercise and Sport, 63*(1), 60-66.

Marcus, B. H., & Simkin, L. R. (1994). The transtheoretical model: applications to exercise behavior. *Medicine and Science in Sports and Exercise, 26*(11), 1400-1404.

Marshall, A. L., Bauman, A. E., Owen, N., Booth, M. L., Crawford, D., & Marcus, B. H. (2003). Population-based randomized controlled trial of a stage-targeted physical activity intervention. *Annals of Behavioral Medicine, 25*(3), 194-202.

Marshall, S. J., & Biddle, S. J. (2001). The transtheoretical model of behavior change: a meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine, 23*(4), 229-246.

Maruthur, N. M., Wang, N. Y., & Appel, L. J. (2009). Lifestyle interventions reduce coronary heart disease risk: results from the PREMIER Trial. *Circulation, 119*(15), 2026-2031.

McAuley, E., & Blissmer, B. (2000). Self-efficacy determinants and consequences of physical activity. *Exercise Sport Science Review, 28*(2), 85-88.

McPherson, R., Frohlich, J., Fodor, G., & Genest, J. (2006). Canadian Cardiovascular Society position statement--recommendations for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease. *Canadian Journal of Cardiology, 22*(11), 913-927.

National Heart Lung and Blood Institute. (2006). Retrieved June 2006, from www.nhlbi.nih.gov/

National Office of Public Health Genomics. (2007). Retrieved December 2007, from http://www.cdc.gov/genomics/training/perspectives/files/famhistr_tree.htm

Nigg, C., Hellsten, L., Norman, G., Braun, L., Breger, R., Burbank, P., et al. (2005). Physical activity staging distribution: establishing a heuristic using multiple studies. *Annals of Behavioral Medicine, 29 Suppl*, 35-45.

Nigg, C. R., Rossi, J. S., Norman, G. J., & Benisovich, S. V. (1998). Structure of decisional balance for exercise adoption. *Annals of Behavioral Medicine, 20*(S211).

Okamoto, K., Ohsuka, K., Shiraishi, T., Hukazawa, E., Wakasugi, S., & Furuta, K. (2002). Comparability of epidemiological information between self- and interviewer-administered questionnaires. *J Clin Epidemiol, 55*(5), 505-511.

Pinto, B. M., Lynn, H., Marcus, B. H., DePue, J., & Goldstein, M. G. (2001). Physician-based activity counseling: intervention effects on mediators of motivational readiness for physical activity. *Annals of Behavioral Medicine, 23*(1), 2-10.

Plotnikoff, R., Blanchard, C., Hotz, S. B., & Rhodes, R. (2001). Validation of the decisional balance scales in the exercise domain from the transtheoretical model: a longitudinal test. *Measurement in Physical Educaton and Exercise Science, 5*(4), 191-206.

Plotnikoff, R., Hotz, S. B., Birkett, N. J., & Courneya, K. S. (2001). Exercise and the transtheoretical model: a longitudinal test of a population sample. *Preventive Medicine, 33*(5), 441-452.

Press, V., Freestone, I., & George, C. F. (2003). Physical activity: the evidence of benefit in the prevention of coronary heart disease. *QJM, 96*(4), 245-251.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change. Applications to addictive behaviors. *American Psychologist, 47*(9), 1102-1114.

Prochaska, J. O., Redding, C. A., & Evers, K. E. (2002). The Transtheoretical Model and Stages of Change. In K. Glanz, B. K. Rimer & F. M. Lewis (Eds.), *Health Behavior and Health Education: Theory, Research and Practice* (3rd ed., pp. 99-120). San Francisco: Jossey-Bass.

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion, 12*(1), 38-48.

Public Health Agency of Canada and Canadian Society for Exercise Physiology. (2003). *Canada's Physical Activity Guide to Healthy Active Living* Retrieved December 9, 2009. from http://www.phac-aspc.gc.ca/pau-uap/paguide/index.html.

Pyke, S. D., Wood, D. A., Kinmonth, A. L., & Thompson, S. G. (1997). Change in coronary risk and coronary risk factor levels in couples following lifestyle intervention. The British Family Heart Study. *Archives of Family Medicine, 6*(4), 354-360.

Rosner, B. (2006). *Fundamentals of Biostatistics* (6th ed.). Belmont, CA: Thomson Brooks/Cole.

Sackett, D. L., Anderson, G. D., Milner, R., Feinleib, M., & Kannel, W. B. (1975). Concordance for coronary risk factors among spouses. *Circulation, 52*(4), 589-595.

Sarkin, J. A., Johnson, S. S., Prochaska, J. O., & Prochaska, J. M. (2001). Applying the transtheoretical model to regular moderate exercise in an overweight population: validation of a stages of change measure. *Preventive Medicine, 33*(5), 462-469.

Schumann, A., Estabrooks, P. A., Nigg, C. R., & Hill, J. (2003). Validation of the stages of change with mild, moderate, and strenuous physical activity behavior, intentions, and self-efficacy. *Internation Journal of Sports Medicine, 24*(5), 363-365.

Sherwood, N. E., & Jeffery, R. W. (2000). The behavioral determinants of exercise: implications for physical activity interventions. *Annual Review of Nutrition, 20*, 21-44.

Silva, M. N., Markland, D., Minderico, C. S., Vieira, P. N., Castro, M. M., Coutinho, S. R., et al. (2008). A randomized controlled trial to evaluate self-determination theory for exercise adherence and weight control: rationale and intervention description. *BioMed Central Public Health, 8*, 234.

Sofi, F., Capalbo, A., Cesari, F., Abbate, R., & Gensini, G. F. (2008). Physical activity during leisure time and primary prevention of coronary heart disease: an updated meta-analysis of cohort studies. *European Journal of Cardiovascular Prevention and Rehabilitation, 15*(3), 247-257.

Statistics Canada. (2001). Canadian Community Health Survey. Retrieved July 2006, from http://www.statcan.ca/Daily/English/020508/d020508a.htm

Steptoe, A., Kerry, S., Rink, E., & Hilton, S. (2001). The impact of behavioral counseling on stage of change in fat intake, physical activity, and cigarette smoking in adults at increased risk of coronary heart disease. *American Journal of Public Health, 91*(2), 265-269.

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gotzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Annals of Internal Medicine, 147*(8), 573-577.

Wakui, S., Shimomitsu, T., Odagiri, Y., Inoue, S., Takamiya, T., & Ohya, Y. (2002). Relation of the stages of change for exercise behaviors, self-efficacy, decisional-

balance, and diet-related psycho-behavioral factors in young Japanese women. *Journal of Sports Medicine and Physical Fitness, 42*(2), 224-232.

Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: the evidence. *Canadian Medical Associaton Journal, 174*(6), 801-809.

Williams, G. C., McGregor, H. A., Zeldman, A., Freedman, Z. R., & Deci, E. L. (2004). Testing a self-determination theory process model for promoting glycemic control through diabetes self-management. *Health Psychology, 23*(1), 58-66.

Williams, R. R., Hunt, S. C., Heiss, G., Province, M. A., Bensen, J. T., Higgins, M., et al. (2001). Usefulness of cardiovascular family history data for population-based preventive medicine and medical research (the Health Family Tree Study and the NHLBI Family Heart Study). *American Journal of Cardiology, 87*(2), 129-135.

Wilson, P. M., Blanchard, C. M., Nehl, E., & Baker, F. (2006). Predicting physical activity and outcome expectations in cancer survivors: an application of Self-Determination Theory. *Psychooncology, 15*(7), 567-578.

Wood, D., De Backer, G., Faergeman, O., Graham, I., Mancia, G., & Pyorala, K. (1998). Prevention of coronary heart disease in clinical practice: recommendations of the Second Joint Task Force of European and other Societies on Coronary Prevention. *Atherosclerosis, 140*(2), 199-270.

Wood, D., Roberts, T., & Campbell, M. (1997). Women married to men with myocardial infarction are at increased risk of coronary heart disease. *Journal of Cardiovascular Risk, 4*(1), 7-11.

Yusuf, S., Hawken, S., Ounpuu, S., Dans, T., Avezum, A., Lanas, F., et al. (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet, 364*(9438), 937-952.

Table 1: Measurement of constructs at each time point

Construct/Time point	Pre-Intervention	Post-intervention	3- month follow up
Godin Leisure Time Exercise	√		√
Readiness to Change (Stage of change)	√		√
Decisional Balance	√	√	√
Barrier Self-efficacy	√	√	√
Processes of Change	√		√
Demographic Variables	√		

Table 2: Baseline characteristics of participants completing the study

Characteristic	Included Participants (N = 73)
Age, years, M (SD)	53.2 (11.9)
Gender, n (%)	
Males	19 (27.1)
Females	54 (73.9)
Education, years, M (SD)	14.9 (3.5)
Employment status, n (%)	
Employed	36 (49.3)
Retired	22 (30.1)
Other	15 (20.6)
Language, n (%)	
English	71 (97.3)
French	2 (2.7)
Relationship to patient, n (%)	
Offspring	23 (31.5)
Spouse	34 (46.6)
Sibling	16 (21.9)
Body Mass Index, kg/m^2, M (SD)	27.3 (4.9)
Stage of Change, n (%)	
Pre-contemplation	0 (0.0)
Contemplation	2 (2.7)
Preparation	34 (46.6)
Action/Maintenance	37 (50.7)
Total leisure time exercise, minutes/week, M (SD)	178.8 (153.8)

Table 3: Stages of change at baseline and three months

Stage of change	Baseline (N =73)	3-month (N =73)	P-value
Pre-contemplation, n (%)	0 (0.0)	6 (8.2)	<.001
Contemplation, n (%)	2 (2.7)	1 (1.4)	
Preparation, n (%)	34 (46.6)	9 (12.3)	
Action/Maintenance, n (%)	37 (50.7)	57 (78.1)	

Table 4: Decisional balance at baseline, post intervention, and three months

Outcome	Baseline (N =73)	Post-intervention (N =73)	3 month (N =73)	F value	P-Value	Post Hoc
Decisional Balance, M (SD)	-2.52 (.90)	-2.43 (1.04)	1.43 (0.88)	3.67	<.000	T1<T3
Pros, M (SD)	2.00 (0.80)	2.04 (0.91)	1.88 (0.80)	2.27	.107	-
Cons, M (SD)	4.52 (0.55)	4.47 (0.67)	3.31 (0.53)	0.91	.406	-

Table 5: Processes of change at baseline and three months

Outcome	Baseline (N =73)	3 month (N = 73)	*t*	Confidence Interval	P Value
Consciousness Raising, M (SD)	2.62 (0.85)	2.90 (0.87)	-3.15	(-0.45,-0.10)	.002
Dramatic Relief, M (SD)	3.25 (0.76)	3.32 (0.75)	-0.74	(-0.27, 0.12)	.464
Environmental Reevaluation, M (SD)	3.35 (0.96)	3.56 (0.88)	-1.87	(-0.43, 0.14)	.065
Self reevaluation, M (SD)	4.10 (0.92)	4.26 (0.64)	-1.55	(-0.37, 0.05)	.126
Social Liberation, M (SD)	3.63 (0.74)	3.69 (0.76)	-0.69	(-0.25, 0.12)	.495
Counter-conditioning, M (SD)	2.72 (0.92)	2.98 (0.91)	-2.54	(-0.46, -0.06)	.013
Helping Relationships, M (SD)	2.20 (1.21)	2.32 (1.24)	-0.91	(-0.37, 0.14)	.361
Reinforcement Management, M (SD)	3.67 (1.00)	3.74 (0.87)	-0.55	(-0.32, 0.18)	.583
Self Liberation, M (SD)	3.46 (0.93)	3.72 (0.92)	-2.30	(-0.49, -0.35)	.024
Stimulus Control, M (SD)	2.83 (1.20)	3.02 (1.07)	-1.55	(-0.43, 0.05)	.127
Total Cognitive, M (SD)	3.39 (0.59)	3.55 (0.58)	-2.39	(-0.29,-0.03)	.019
Total Behavioral, M (SD)	2.98 (0.78)	3.16 (0.76)	-2.25	(-0.34,-0.02)	.027
Total Processes of Change, M(SD)	3.21 (0.62)	3.39 (0.60)	-2.73	(-0.29, -0.46)	.008

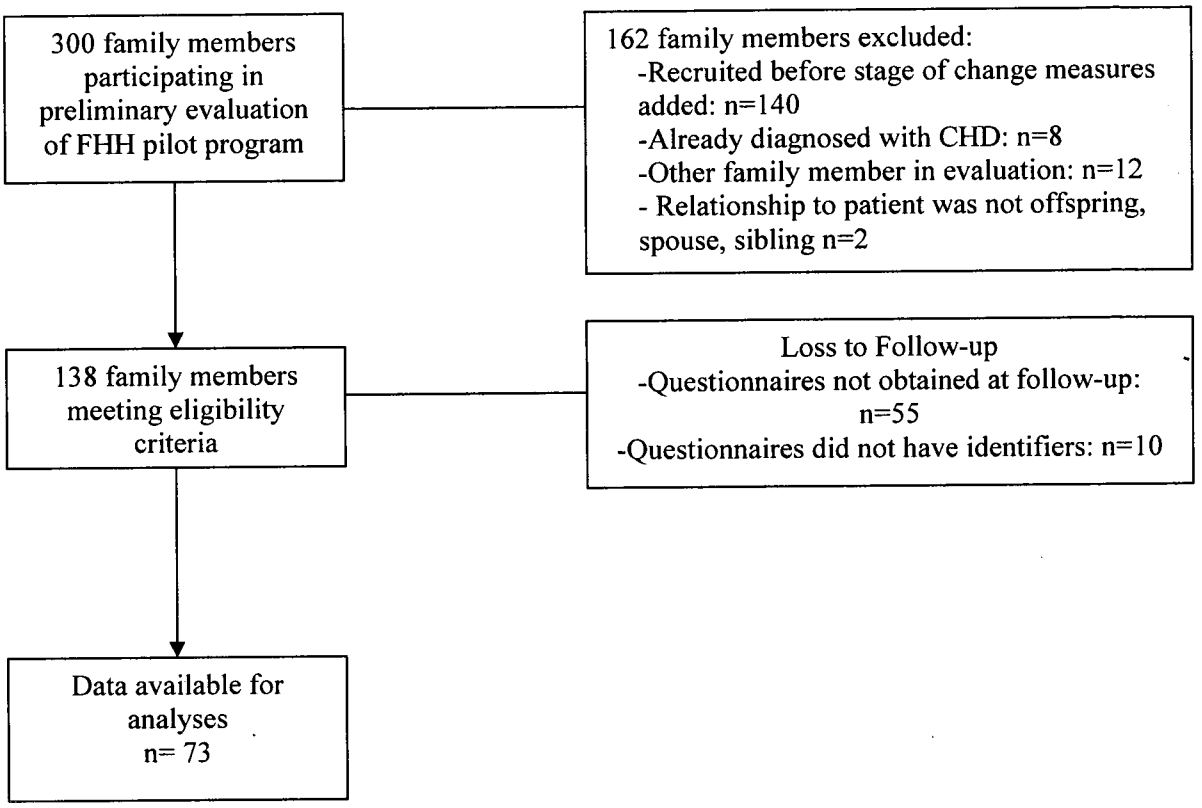
Table 6: Self-efficacy at baseline, post-intervention, and three months

Outcome	Baseline (N = 73)	Post-intervention (N = 73)	3 month (N = 73)	F value	P Value
Total self-efficacy, M (SD)	3.38 (.89)	3.58 (.83)	3.52 (.91)	2.50	.086
Negative Affect, M (SD)	3.33 (1.12)	3.40 (1.03)	3.37 (1.00)	0.15	.859
Excuse Making, M (SD)	2.92 (1.03)	3.24 (0.90)	3.11 (1.01)	4.32	.023
Must Exercise Alone, M (SD)	3.79(1.10)	3.94 (0.99)	3.11 (1.01)	25.7	<.0001
Inconvenient to Exercise, M (SD)	3.32 (1.04)	3.55 (0.95)	3.53 (1.11)	1.25	.081
Resistance from Others, M (SD)	3.59 (1.04)	3.79 (0.92)	3.81 (1.03)	1.95	.146
Bad weather, M (SD)	3.31 (1.16)	3.57 (1.02)	3.39(1.23)	2.24	.110

Table 7: Leisure time exercise at baseline and three month follow-up

Outcome	Baseline (N = 73)	3 month (N = 73)	t	Confidence Interval	P Value
Exercise, total minutes/week, M (SD)	178.8 (153.8)	268.9 (262.3)	-2.12	(-176.1, -4.2)	.040
Exercise, total mild minutes per week, M (SD)	85.6 (91.1)	110.5 (205.4)	-.673	(-99.6, 49.9)	.505
Exercise, total moderate minutes per week, M (SD)	72.1 (117.3)	120.4 (114.7)	-2.40	(-89.0, -7.5)	.021
Exercise, total strenuous minutes per week, M (SD)	21.0 (74.0)	38.0 (94.5)	-1.17	(-46.4, 12.4)	.250
Exercise, total moderate/strenuous minutes per week, M (SD)	12.2 (19.4)	22.3 (18.5)	-3.39	(-16.0, -4.0)	.002
Exercise METS, M (SD)	18.2 (19.4)	30.9 (21.1)	-3.57	(-18.8 -5.2)	.001

Figure 1: Participant and data flow



Appendix A: Participant Invitation to the Family Heart Health Program

Heart Health: It's A Family Affair

Dear: _____

While I was at the Ottawa Heart Institute, I heard about a new program especially for family members of patients with heart disease.

The Passport to Family Heart Health is a free program for family members of patients. The program includes a heart health assessment, a customized action plan, and a 3 month follow-up.

I thought I'd send you this postcard to let you know about the program and encourage you to check it out.

For more information about the program, or to schedule your appointment contact the Heart Health Education Centre 613-761-4753 or visit the web site at www.ottawaheart.ca/HHEC.

Personal Message:

_____

_____

_____

_____

_____

_____

_____

_____

UNIVERSITY OF OTTAWA
HEART INSTITUTE
INSTITUT DE CARDIOLOGIE
DE L'UNIVERSITÉ D'OTTAWA

Principal Investigator:	Robert Reid, MBA, Ph.D.	(Tel. 613-761-5058)
Co-Investigators:	Andrew Pipe, MD	(Tel. 613-761-4756)
	Sophia Papadakis, MHA	(Tel. 613-761-5489)
	Heather Sherrard, BSc.N, MHA, CHE	(Tel.613-761-4826)
	Pat O'Farrell, BSc.N	(Tel. 613-761-4542)
Educator/Coordinator:	Nadine Elias, B.Sc.	(Tel. 613-798-5555, x 17402)

Please read this Participant Information Sheet and Consent Form carefully and ask as many questions as you like before deciding whether to participate.

Introduction: You have been invited to participate in a research project entitled: *Family Heart Health Program: Pilot Evaluation.* A family history of heart disease is associated with an increased risk for developing heart disease. As such, early detection and management of risk factors in family members of heart patients is very more important.

The purpose of this project is to evaluate a new risk assessment and counseling program for family members of heart disease patients. The goal of this program is to provide family members, such as you with a personalized risk factor assessment and the educational tools and knowledge to lower your risk for developing heart disease. This study will involve you completing a coronary risk assessment to determine your risk of developing heart disease and a follow-up telephone interview 14 weeks later.

This study will begin in *February 2006* and is expected to be complete by *April 2007.* Over those 14 months approximately 300 family members will take part in the study.

Procedures: If you agree to participate in the study, the Health Educator will take approximately 20 minutes to complete a risk assessment with you. The risk assessment will include completing a brief questionnaire to identify your medical history, and lifestyle behaviours, as well as having measures of height, weight, waist circumference, blood pressure, and cholesterol taken. Your cholesterol (total cholesterol and HDL cholesterol) will be measured using a finger prick technique. You will have the chance to complete a risk assessment on a drop-in basis, or by appointment at the Heart Health Education Centre at the Heart Institute.

After completion of the risk assessment, you will receive one-on-one counseling from the Health Educator. The goal of the counseling session is to: a) provide an overview of heart disease, family history, and risk factors; b) provide you with guidance and information in the interpretation of personal risk; c) help you develop an action plan; and d) link you to existing Heart Institute and community resources.

During the counseling session you will receive a "Passport to Heart Health" containing a record of your coronary risk factors and the recommended targets. It will also contain additional educational information for each of your risk factors which are identified as being "off target".

Immediately following the counseling session you will be asked to complete a brief survey which will allow us to evaluate how useful the counseling session has been in preparing you to make heart health changes. The survey will take approximately 5 minutes of your time to complete.

Fourteen weeks (3 months) following your risk assessment and counseling session the Health Educator will contact you by phone to conduct a follow-up. The telephone follow-up will take approximately 10-15 minutes of your time. You will also be sent a questionnaire by mail. The questionnaire will take approximately 5-10 minutes of your time to complete. A self-addressed stamped envelope will be provided to you for the return the survey.

Risks and Discomforts of Participation: Participation in this study requires a small portion of your time to complete the risk assessment, the one-on-one counseling and the telephone follow-up. There may be some slight discomfort experiences as a result of the finger prick blood sample taken during the risk assessment. However, there are no foreseeable harms that may arise from research participation.

Benefits of Participation: There is direct benefit from your participation in this research. Your participation in this research will enable you to complete a risk assessment and receive feedback on your risk for heart disease.

Compensation /Remuneration: In the event of research-related side-effects or injury, you will be provided with appropriate medical treatment. By participating in the study and signing this Consent, you are not waiving your legal rights that may be available to you.

Confidentiality: As part of this research protocol, the Principal Investigator and their clinical research staff will review your research records. The Ottawa Heart Institute is dedicated to ensuring the details about care remain confidential. No information bearing you name or initials will leave the University of Ottawa Heart Institute. In addition, you will be identified by study number only. The questionnaire responses will be kept in the locked office of our coordinator. The data collected may be examined by the study investigators, Facilitator, and study sponsors, as well as by representatives of the University of Ottawa Heart Human Research Ethics Board under the supervision of the Principal investigator or his/her staff. Results from this study may be published in the final research report, but under no circumstances would any names or identifying characteristics be used. .

Ethics: The Human Research Ethics Board (HREB) of the University of Ottawa Heart Institute has approved this protocol. The HREB considers the ethical aspects of all Heart

Institute research projects involving human subjects. If you wish, you may talk to the Chair, Human Research Ethics Board at 613-798-5555, ext. 19865.

Participation: Participation in research is completely voluntary. You are free to choose to participate or not to participate in this research study. If you agree to participate in this study, you may choose to withdraw your participation at any time. This will not affect your present or future care at the Heart Institute, or at any hospital. You may also refuse to answer any specific questions.

Consent to Participate in Research

I understand that I am being asked to participate in a research study to evaluate a new risk assessment and counseling program for family members of heart disease patients. This study has been explained to me by Nadine Elias.

I have read and understood these 3 pages, Participant Information Sheet and Consent Form. All my questions at this time have been answered to my satisfaction. If I or any of my family members have any further questions about this study, we may contact Nadine Elias at 613-798-5555, ext. 17402.

I will receive a signed copy of this Patient Information Sheet and Consent Form. I voluntarily agree to participate in this study.

Participant's Name _____

Participant's Signature _____

Date _____

Name of Person Obtaining Consent _____

Signature of Person Obtaining Consent _____

Date _____

(Co-)Investigator's Name _____

(Co-)Investigator's Signature _____

Date _____

Appendix C: Patient Information Sheet and Consent Form (French)

UNIVERSITY OF OTTAWA
HEART INSTITUTE
INSTITUT DE CARDIOLOGIE
DE L'UNIVERSITÉ D'OTTAWA

FEUILLE DE RENSEIGNEMENTS À L'INTENTION DES PATIENTS ET FORMULAIRE DE CONSENTEMENT

Programme pour la santé cardiaque de la famille : Évaluation pilote

Protocole n° 06-139 de l'ICUO

Chercheur principal : Robert Reid, M.B.A., Ph. D. 613 761-5058

Collaborateurs : Andrew Pipe, M.D. 613 761-4756
Sophia Papadakis, M.G.S.S. 613 761-5489
Heather Sherrard, B. Sc. inf., M.G.S.S., CHE 613 761-4826
Pat O'Farrell, B. Sc. inf. 613 761-4542

Éducatrice/ coordonnatrice : Nadine Elias, B. Sc. 613 798-5555, poste 17402

Veuillez lire attentivement la présente feuille de renseignements à l'intention des patients et le formulaire de consentement ci-joint, et poser autant de questions que vous le désirez avant de décider de participer ou non à l'étude.

INTRODUCTION :

Nous vous invitons à participer à un projet de recherche intitulé « Programme pour la santé cardiaque de la famille : Évaluation pilote ». Posséder des antécédents de maladies coronariennes dans sa famille est associé à un risque accru de développer une maladie du cœur. Pour cette raison, il est très important de faire une détection et une gestion précoces des facteurs de risque chez les proches (membres de la famille) de patients cardiaques.

Le but de ce projet est d'évaluer un nouveau programme de consultation et d'évaluation des risques pour les proches de patients cardiaques. Le programme vise à fournir aux proches, comme vous, des connaissances et des outils personnalisés d'éducation et d'évaluation des facteurs de risque afin de réduire votre risque de développer une maladie du cœur. Nous procéderons à une évaluation de vos facteurs de risque de maladie coronarienne pour déterminer votre risque d'avoir une maladie du cœur. Vous devrez aussi participer à un suivi par entretien téléphonique quatorze (14) semaines plus tard.

Cette étude débutera en février 2006 et l'on prévoit qu'elle prendra fin en avril 2007. Au cours des quatorze (14) prochains mois, environ trois cents (300) proches de patients cardiaques participeront à cette étude.

PROCÉDURE :

Si vous acceptez de participer à cette étude, l'éducatrice en santé remplira avec vous une évaluation des risques. Cela nécessitera environ vingt (20) minutes. L'évaluation des risques comprendra un bref questionnaire pour déterminer vos antécédents médicaux et vos habitudes de vie. On mesurera aussi votre taille, poids, tour de taille, tension artérielle et taux de cholestérol. Votre taux de cholestérol (cholestérol total et cholestérol HDL) sera mesuré par une piqûre au bout du doigt. Pour votre évaluation des risques, vous pouvez choisir de prendre un rendez-vous ou de passer sans rendez-vous au Centre d'éducation en santé cardiaque de l'Institut de cardiologie.

Après votre évaluation des risques, vous assisterez à une séance de consultation individuelle avec l'éducatrice en santé. Cette séance de consultation a pour objet de : a) vous offrir un aperçu des maladies du cœur, des antécédents familiaux et des facteurs de risque; b) vous fournir des conseils et de l'information pour l'interprétation de votre risque personnel; c) vous aider à élaborer un plan d'action; d) vous mettre en contact avec des ressources de la communauté et de l'Institut de cardiologie.

Pendant la séance de consultation, vous recevrez un « passeport pour la santé cardiaque » qui comprendra un dossier de vos facteurs de risque de maladie coronarienne et les objectifs recommandés. Le passeport comprendra aussi d'autres renseignements de base sur chacun de vos facteurs de risque où vous avez été identifié comme étant « à côté du but ».

À la suite de la séance de consultation, on vous demandera de remplir un bref questionnaire qui nous permettra d'évaluer si la séance vous prépare à apporter des changements relativement à votre santé cardiaque. Il vous faudra environ cinq (5) minutes pour répondre au questionnaire.

Quatorze (14) semaines – ou trois (3) mois – après votre évaluation des risques et votre séance de consultation, l'éducatrice en santé vous appellera pour faire un suivi. Le suivi par entretien téléphonique nécessitera de dix (10) à quinze (15) minutes de votre temps. Vous recevrez également un questionnaire par la poste. Il vous faudra de cinq (5) à dix (10) minutes pour y répondre. Nous vous fournirons une enveloppe-réponse affranchie afin que vous puissiez nous retourner le questionnaire.

RISQUES ET INCONVÉNIENTS LIÉS À LA PARTICIPATION :

La participation à cette étude nécessitera un peu de votre temps pour remplir l'évaluation des risques, assister à la séance de consultation et recevoir l'appel téléphonique de suivi. La petite piqûre au bout du doigt qui est effectuée lors de l'évaluation des risques pour obtenir l'échantillon de sang peut entraîner un léger inconfort. Par contre, nous ne prévoyons aucun préjudice découlant de la participation à cette étude.

AVANTAGES LIÉS À LA PARTICIPATION :
Vous bénéficierez directement de votre participation à cette étude. En participant à cette étude, vous aurez une évaluation des risques et recevrez une rétroaction sur vos risques personnels de maladies du cœur.

INDEMNISATION ET RÉMUNÉRATION :
En cas d'effets secondaires ou de blessure résultant de la présente étude, vous recevrez le traitement médical approprié. En participant à cette étude et en signant le formulaire de consentement ci-joint, vous ne renoncez à aucun de vos droits légaux.

CONFIDENTIALITÉ :
Dans le cadre de ce protocole de recherche, le chercheur principal et son personnel de recherche clinique examineront vos dossiers de recherche. L'Institut de cardiologie s'emploie à veiller à ce que les détails concernant les soins demeurent confidentiels. Aucun document portant votre nom ou vos initiales ne quittera l'Institut de cardiologie de l'Université d'Ottawa. De plus, vous serez identifié à l'aide d'un numéro d'étude seulement. Les réponses des questionnaires seront conservées dans le bureau fermé à clé de notre coordonnatrice de recherche. Les données recueillies pourraient être examinées par les chercheurs de l'étude, la facilitatrice et les commanditaires de l'étude ainsi que par des représentants du Comité d'éthique pour la recherche sur des sujets humains de l'Institut de cardiologie, sous la supervision du chercheur principal ou de son personnel. Les résultats de cette étude pourraient être publiés dans le rapport final de l'étude. Toutefois, ils ne contiendront en aucune circonstance les noms des participants ni des caractéristiques permettant de vous identifier.

ÉTHIQUE :
Le Comité d'éthique pour la recherche sur des sujets humains de l'Institut de cardiologie de l'Université d'Ottawa a approuvé ce protocole. Le Comité examine les aspects éthiques de tous les projets de recherche de l'Institut portant sur des sujets humains. Si vous le désirez, vous pouvez communiquer avec le président du Comité en composant le 613 798-5555, poste 19865.

PARTICIPATION :
La participation à ce projet de recherche est entièrement volontaire. Vous êtes libre d'y participer ou non. Si vous acceptez d'y participer, vous pourrez choisir d'interrompre votre participation en tout temps. Votre retrait ne nuira en rien aux soins qui vous sont ou qui vous seront donnés dans cet hôpital. Vous pourrez également refuser de répondre à certaines questions.

Consentement à participer à un projet de recherche

Je comprends que l'on me demande de participer à une étude portant sur l'évaluation d'un nouveau programme de consultation et d'évaluation des risques pour les proches de patients ayant une maladie du cœur. Nadine Elias m'a expliqué cette étude.

J'ai lu et je comprends la feuille de renseignements à l'intention des patients ci-jointe et le présent formulaire de consentement (4 pages). Pour le moment, on a répondu de manière satisfaisante à toutes mes questions. Si j'ai, ou si des membres de ma famille ont d'autres questions à poser au sujet de cette étude, nous pouvons communiquer avec Nadine Elias en composant le 613 798-5555, poste 17402.

Je recevrai un exemplaire signé du présent formulaire de consentement et la feuille de renseignements à l'intention des patients ci-jointe.

J'accepte volontairement de participer à cette étude.

Nom du participant ou de la participante _____

Signature du participant ou de la participante _____

Date _____

Nom de la personne qui obtient le consentement _____

Signature de la personne qui obtient le consentement _____

Date _____

Nom du collaborateur _____

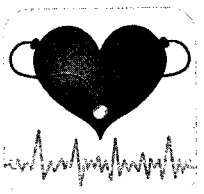
Signature du collaborateur _____

Date _____

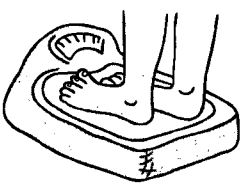
Benefits of physical activity & exercise

Everyone benefits from regular physical activity – men and women, young and old. It is best to adopt an active lifestyle in youth and stay with it over your lifetime. However, it is never too late to start being active and get fit. **Exercise can add years to your life and add life to your years.**

Here is a list of benefits of physical activity and exercise. Exercise can help you:



- ❑ Reduce your risk of dying prematurely
- ❑ Reduce your risk for heart attack, stroke, and some types of cancer
- ❑ Reduce cardiovascular risk factors:
  - ■ Prevent or control high blood pressure
  - ■ Raise your HDL "good" blood cholesterol and lower blood triglyceride levels
  - ■ Control body weight and waistline
  - ■ Control or prevent type 2 diabetes
  - ■ Manage stress and decrease levels of anxiety
  - ■ Reduce your cravings for cigarettes if you are trying to stop smoking

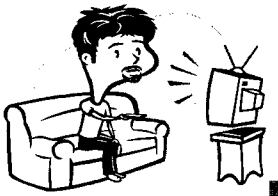


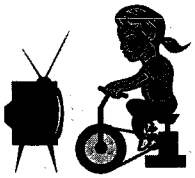
- ❑ Improve your sense of well-being and quality of life
- ❑ Increase your energy level
- ❑ Relax and sleep better at night
- ❑ Make your heart and lungs work more efficiently
- ❑ Improve muscular strength, endurance, and flexibility
- ❑ Lose weight and keep it off permanently
- ❑ Strengthen your bones and prevent osteoporosis
- ❑ Look more fit and trim
- ❑ Improve posture and balance
- ❑ Improve self-esteem and self-confidence
- ❑ Learn new skills and develop new hobbies
- ❑ Meet new people and have fun
- ❑ Challenge and stimulate your mind
- ❑ Helps maintain independence

Adapted from educational kits from Intervent Canada

The Activity Pyramid

You are encouraged to do as much lifestyle activity as possible every day in addition to your traditional exercise program. Be creative in finding ways to stay active. It is not difficult to do – opportunities are all around you.





Cut Down on
Watching TV, Computer games, Sitting for more than 30 minutes at a time

2-3 Times A Week

Leisure Activities	**Strength-building Exercises**
Golf, Bowling, Softball, Yard work	Calisthenics, Resistance machines, Hand-held weights

5-7 Times A week

Aerobic Exercise (30+ minutes)	**Recreation (30+ minutes)**
Brisk walking, Stair climbing, Cycling, Swimming, Aerobic dance	Hiking, Basketball, Tennis, Martial Arts, Dancing

Stretching Exercises following Cool-down

Everyday (As Much as Possible)
Walk the dog, take longer routes, take the stairs instead of the elevator, walk to the store or to the mailbox, work in the garden, park the car farther away, take extra steps in your day

Adapted from educational kits from Intervent Canada

Be more active, burn more calories

In addition to your traditional exercise program, look for ways to burn extra calories through lifestyle activities. Here are some examples of how you can make small but important changes to your everyday lifestyle. The key is to think about what activities you do and how you can improve them to benefit you.

Sedentary	Kcal.	Active	Kcal.
Waiting 30 min for home delivery of food	15	Cooking for 30 minutes	25
Using a lawn service	0	Gardening and mowing each for 30 min	360
Letting the dog out the door	2	Walking the dog for 30 min	125
Driving 40 min, walking 5 min (parking)	22	Walking 15 min to bus stop twice a day	120
Using the dry clean services	0	Ironing and vacuuming each for 30 min	152
Taking escalator or lift up 3 flights	0.2	Walking up 3 flight of stairs	15
Parking as close as possible, 10 sec walk	0.2	Parking further away & walking 2 min	8
Playing a computer game for 30 min	19	Playing a ball game for 30 min	131
Using remote control to change TV Channel	1	Getting up and changing the TV channel	3
Driving to the corner store to get the paper	2	Walk to the corner shop for 10 min	40
Getting off the bus right at your stop	20	Getting off the bus one stop earlier & walking 15 min to work	60
Shopping online for 1 hour	30	Shopping at mall, walking 1 hour	145-240
Driving to local coffee shop	2	Walking 20 min to local coffee shop	80

Amended table adapted from Mayo Clinic Proceedings Table 2002, based on Beil L. What is proper weight? Sake it up, or go figure

Overcoming Physical Activity Barriers

Barriers	Suggestions
Lack of time	• Identify available time slots. Monitor your daily activities for one week. Identify at least three 30-minute time slots you could use for physical activity. • Add physical activity to your daily routine. For example, walk or ride your bike to work or shopping, organize school activities around physical activity, walk the dog, exercise while you watch TV, park farther away from your destination, etc. • Make time for physical activity. For example, walk, jog, or swim during your lunch hour, or take fitness breaks instead of coffee breaks.
Social influence	• Explain your interest in physical activity to friends and family. Ask them to support your efforts. • Invite friends and family members to exercise with you. Plan social activities involving exercise. • Develop new friendships with physically active people. Join a group, such as the YMCA or a hiking club.
Lack of energy	• Schedule physical activity for times in the day or week when you feel energetic. • Convince yourself that if you give it a chance, physical activity will increase your energy level; then, try it.
Lack of motivation	• Invite a friend to exercise with you on a regular basis and write it on both your calendars. • Join an exercise group or class. • Choose an activity that you enjoy and look forward to.
Fear of injury	• Learn how to warm up and cool down to prevent injury. • Learn how to exercise appropriately considering your age, fitness level, skill level, and health status.
Lack of skills	• Select activities requiring no new skills, such as walking, climbing stairs, or jogging. • Exercise with friends who are at the same skill level as you are. • Find a friend who is willing to teach you some new skills. • Take a class to develop new skills.

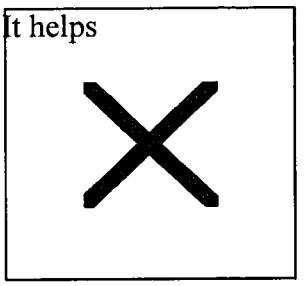
Lack of resources	• Select activities that require minimal facilities or equipment, such as walking, jogging, jumping rope, or calisthenics. • Identify inexpensive, convenient resources available in your community (community education programs, park and recreation programs, worksite programs, etc.).
Weather condition	• Develop a set of regular activities that are always available regardless of weather (indoor cycling, aerobic dance, indoor swimming, calisthenics, stair climbing, rope skipping, mall walking, dancing, gymnasium games, etc.) • Look on outdoor activities that depend on weather conditions (cross-country skiing, outdoor swimming, outdoor tennis, etc.) as "bonuses"-extra activities possible when weather and circumstances permit.
Travel	• Put a jump rope in your suitcase and jump rope. • Walk the halls and climb the stairs in hotels. • Stay in places with swimming pools or exercise facilities. • Join the YMCA or YWCA (ask about reciprocal membership agreement). • Visit the local shopping mall and walk for half an hour or more. • Bring a small tape recorder and your favourite aerobic exercise tape.
Family obligations	• Trade babysitting time with a friend, neighbour, or family member who also has small children. • Exercise with the kids-go for a walk together, play tag or other running games, get an aerobic dance or exercise tape for kids (there are several on the market) and exercise together. You can spend time together and still get your exercise. • Jump rope, do calisthenics, ride a stationary bicycle, or use other home gymnasium equipment while the kids are busy playing or sleeping. • Try to exercise when the kids are not around (e.g., during school hours or their nap time). • Encourage exercise facilities to provide child care services.

Content in the "Personal Barriers" section was taken from *Promoting Physical Activity: A Guide for Community Action* (USDHHS, 1999)

Goal Setting

S.M.A.R.T.

Setting goals is a very popular tool when trying to make any change in behavior. It helps map out a plan to get more active. We often hear of the term "SMART" when goal setting. Here is how we can break each of these letters down into segments to create a plan for activity.



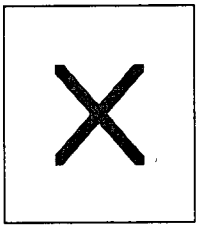
S = Specific
M = Measurable
A = Attainable
R = Realistic
T = Timely

Specific

Goals should be straightforward and emphasize what you want to happen. Specifics help us to **focus our efforts** and **clearly define what we are going to do**. Specific is the What, Why, and How of the SMART model.

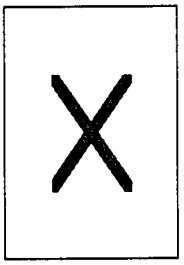
- **WHAT** are you going to do? Use action words such as direct, organize, coordinate, lead, develop, plan, build etc.
- **WHY** is this important to do at this time? What do you want to ultimately accomplish?
- **HOW** are you going to do it?

Ensure the goals you set are very **specific, clear and easy**.



Measurable

If you can't measure it, you can't manage it. The whole goal statement is a measure for the project; if the goal is accomplished, then it is a success. However, there are usually several short-term or small measurements that can be built into the goal. Choose a goal with measurable progress, **so you can see the change occur**. When you measure your progress, you stay on track, reach your target dates, and experience the joy of achievement that stimulates you on to continued effort required to reach your goals.

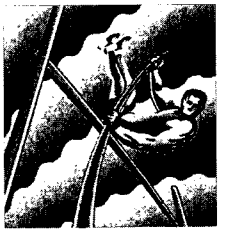


Attainable

When you identify goals that are most important to you, you begin to figure out ways you can make them come true. You develop the attitudes, abilities, skills, and financial capacity to reach them. You begin seeing previously overlooked **opportunities** to bring yourself closer to the achievement of your goals.

Goals you set which are too far out of your reach, you probably won't commit to doing. **A goal needs to stretch you slightly so you feel you can do it and it will need a real commitment from you.** For instance, if you aim to lose 20lbs in one week, we all know that isn't achievable. But setting a goal

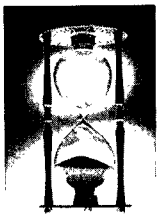
to loose 1lb/week and when you've achieved that, aiming to lose a further 1lb, will keep it achievable for you. **The feeling of success, which this brings, helps you to remain motivated.**



Realistic

This is not a synonym for "easy." Realistic, in this case, means **"do-able."** It means that the learning curve is not a vertical slope; the skills needed to accomplish the goal are available; and the goal fits with your personal plan for success. A realistic goal may push the skills and knowledge of the people working on it but it shouldn't break them.

The goal needs to be realistic for you and where you are at the moment. Be sure to set goals that you can attain with some effort! Not too difficult so you are not setting yourself up for failure, but not too low either, so you are not sending the message that you aren't very capable. **Set the bar high enough for a satisfying achievement!**



Timely

Set a timeframe for the goal: for next week, in three months, by fifth grade. Putting an end point on your goal gives you a **clear target** to work towards. If you don't set a time, the commitment is too vague. It tends not to happen because you feel you can start at any time. Without a time limit, there's no urgency to start taking action now. **Time must be measurable, attainable and realistic.**

My personal goal

To make goals effective they must be SMART. **S**pecific, **M**easurable, **A**ttainable, **R**ealistic and **T**ime measured. Post your goals where you can review them frequently. Have fun!

My short term goal for the first month will be: (e.g. I will walk 3x/week for 15 minutes at a time)

_____

My intermediate goal for the next 6 months will be: (e.g. I will walk 4 – 5x/ week for 15 minutes at a time)

_____

My long term goal for my first year will be: (e.g. I will participate in a 5K walk)

_____

I, _____, will try my best to obtain these goals. I will reward myself when I accomplish each goal by _____.

Date: _____ Signed: _____

Adapted from the Physical activity resource center handouts: www.ophea.net

Community resources for active living in the Ottawa region

Identify programs that are more suitable for individuals with known cardiac disease and felt to be 'Heart Wise Exercise' programs.

Central Ottawa

Walking Clubs

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Bayshore Walking Club Bayshore Shopping Mall 100 Bayshore Dr.	Indoor Walking	Every day: 7:00 am	Free	Keron Shankar & Naomi Legault (613) 829-7491 ext 223
Bytown Walkers University of Ottawa Sports Centre 801 King Edward www.bytownwalkers.ca	Fitness and Competitive Walking (Outdoors)	Beginner sessions Wed: 6:00 pm First Sat. of every month: 9:00 am	1 session: 5.00$ 5 sessions: 20.00$ Member: 150$ per year	Roger Burrows (613) 850-1451/(613) 745-5433
Dempsey Walking Club Dempsey Community Centre 1895 Russell Rd.	Indoor Walking	Mon-Wed-Fri 10:30- noon	12.50$/year	David Duffy (613) 247-4846
Dovercourt Centre/ Rehab Walking Club 411 Dovercourt	Indoor Walking	Tue – Thurs: 2:30 -3:30	45$ for 10 sessions	(613) 798-8950
Heron Seniors Walking Club 1480 Heron Road, Ottawa	Indoor Walking	Mon-Fri 10:30 - noon	10.00$ /year	Pamela Bakker (613) 247-4802
Hintonburg Walking Club 1064 Wellington Avenue, Ottawa	Indoor Walking	Mon-Wed-Fri 8-9 am	Free	M. Lachapelle (613) 798-8874
Hunt Club Riverside Walking Club Hunt Club Riverside Community Centre 3320 Paul Anka Drive, Ottawa K1V 0J9	Outdoor Walking		$39 per year	Bill Griffiths (613) 521-1392
Old Ottawa South Walking Club 260 Sunnyside Avenue, Ottawa	Outdoor Walking	Wed: 9:30 am	Free	Noreen Carisse (613) 247-4872

Owls Nest - Mall Walk Lincoln Heights Galleria 2525 Carling Avenue K2B 7Z2	Indoor Walking			(613) 724-4145
Jack Purcell Community Centre/ Rehab Walking Clinic 320 Jack Purcell Lane	Indoor Walking	Tue-Thur 2:30 – 3:30pm	61$ for 1x week 108.50$ for 2x week	(613) 564-1050
Pacesetters' Centre – Mall Walk Billingsbridge Mall 2323 Riverside Drive, Suite B001	Indoor Walking	Daily 7:00 – 10:00 am	10$/year (including pedometer)	Dora Cook (613) 523-2064
Rehab Walking Club Ron Kolbus Lakeside Gardens 2805 Carling Avenue, Ottawa K2B 8J8	Indoor Walking	Tuesday & Thursday 2:15-3:15pm	Once a week for 10 weeks = $45.00, twice a week for 10 weeks = $70.00	Nancy Bullis (613) 828-4313
Rideau Trails Ottawa Club PO Box 4616, Station E, Ottawa K1S 5H8	Outdoor Walking	All season	Free	Ken Buckingham (613) 860-2225
Rideauview Community Centre 4310 Shorline Drive, Ottawa K1V 1N4	Walking Club			(613) 822-7887
Running Room Walking Club 901 Bank St.	Outdoor Walking	Varying times	69.99$ /10 wks	Phil Marsh (613) 233-5617
Running Room Walking Club 160 Slater St.	Outdoor Walking	Varying times	69.99$/10 wks	Colin (613) 233-5165
Sandy Hill Community Health Centre (Rideau Centre Senior Walkers) 221 Nelson St.	Outdoor Walking	Mondays and Thursdays	Free	Natacha Ducharme (613) 244-2816
Senior Walkers Rideau Shopping Centre 50 Rideau Street, Ottawa K1N 9J7	Indoor Walking	Mondays & Thursdays	Free	Natacha Ducharme (613) 789-2377 / (613) 789-6309
Walk A Mall Carlingwood Shopping Mall 2121 Carling Avenue, Ottawa K2A 1H2	Indoor Walking (individual)	At your discretion	Free	Susan Christoff (613) 725-1551

Pool Facilities

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Brewer Pool 100 Brewer Way	Low intensity aquafit Lane swim		6$ drop in (6 months – 149.00$) 2.25$ drop in	(613) 247-4938
Canterbury Pool 2185 Arch	Aqua fitness Lane swim		Prices n/a	(613) 247-4865
Carleton University	Fifties Plus Fitness		$195	Fran Craig (613) 520-2600 ext. 8458
Champagne Pool 321 King Edward	Aquafit Lane swim		6.35$ drop in 2.25$ drop in (6 months – 157.00$)	(613) 244-4402
Deborah Anne Kirwan Pool 1300 Kitchener	Aqua fitness Lane swim		7$ drop in 2.25$ drop in (6 months – 157.00$)	(613) 247-4820
Dovercourt Recreation Centre 411 Dovercourt	Senior Aqua	Tues/Thurs 11:15-12:15	Varying prices	Pam Byers (613) 798-8950 ext. 244
Jack Purcell Community Centre 320 Jack Purcell Lane	Low impact Aquafit Lane Swim		6.50$ drop in 2.25$ drop in (6 months: 160.25$)	(613) 564-1027
Lowertown/ Basse-Ville Pool 40 Cobourg	50+ Vitality Aquafit Lane swim		3.30$ drop in 2.25$ drop in	(613) 244-4406
Ottawa Athletic Club 2525 Lancaster Rd.	Aquafit Various classes Lane swim		*Membership including use of all facilities* *Summer Special:* 199.00$ *Year round*: 545.00$	(613) 523-1540
Plant Recreation Centre 930 Somerset West	Aquafit (Low impact) Lane swim		6.30$ drop in 2.25$ drop in (6 months: 157.00$)	(613) 232-3000
Sawmill Creek Pool and Community Centre	Aquafit		6.35$ drop in	(613) 521-4092

3380 D'Aoust	Lane Swim		2.35$ drop in (6 months: 157.00$)	
National Capital Region YMCA-YWCA Carlingwood 200 Lockhart Ave.	Water Fit	Various times 7 days per week	$6.00 drop in Memberships available	(613) 788-5000 www.ymcaywca.ca
National Capital Region YMCA-YWCA Metro Central 180 Argyle Ave.	Water Fit	Various times 6 days per week	6.00 drop in Memberships available	(613) 729-7131 www.ymcaywca.ca

Low Intensity Exercise Programs

CENTRE	TYPE OF ACTIVITY	HOURS	COST	TELEPHONE
Alexander Community Centre 960 Silver	50+ Aerobics		55.50$ 1 class/ week 110.00$ 2 classes/ week	(613) 798-8978
Canterbury Community Centre 2185 Arch St.	Sit to be Fit! 50+ fitness		55$ for 10 weeks 65$ seasonal pass	(613) 247-4869
Carleton Heights Community Centre 1665 Apeldorn Ave.	50+ fitness		50$ 1x/week 85$ 2x/week 115$ 3x/week	(613) 226-2208
Carleton University	Fifties Plus Fitness		$195	Fran Craig (613) 520-2600 ext. 8458
	Stretch & Strength for Mature Adults		$120	
	Weight Lifting for Older Adults 5-week course /program		$130 for 5 week program	
	Personal Training Services		~$75	
Carlingwood Seniors' Activity Centre 2121 Carling	Adapted fitness		40$ twice per week (8 wks)	(613) 728-5341
Fisher Heights Community Centre	Fibromyalgia Yoga Low Intensity		$78, 1x/week, 10 wks	Online: Ottawa.ca Touch tone 580-2588 In person

Gold Club Dovercourt Community Centre 411 Dovercourt Ave.	Low impact fitness		50$ for 13 wks	Pam Beyers (613) 798-8950 ext. 244
Heron's Senior Centre 1480 Heron Rd.	Cardio & strength for seniors Chair exercises		25$ 1x/week 42$ 2x/week 54$ 3x/week 39$ 1x/week	(613) 247-4802
Hunt Club Riverside Community Centre 3320 Paul Anka	Tai Chi		$41, 1x/week, 8 weeks	Online, **Ottawa.ca; Touch tone 580-2588**; or in person
	Low impact		6$/class 35$/month (membership)	(613) 521-1392
Jack Purcell Community Centre 320 Jack Purcell Lane	Low impact		5$ drop in 40$/month	(613) 564-1050
Plant Recreation Centre 930 Somerset West	Tai Chi		$41, 1x/week, 8 weeks	(613) 232-3000
	Older Adult & Seniors Fitness		$49-$57, 1x/week	
	Rehab Walking (stretching, strengthening, balance)		$58, 1x/week	
Plant Recreation Centre cont...	Chronic Pain (for individuals with chronic fatigue syndrome, fibromyalgia, hip/knee replacement)		Drop – In $3.10/visit Membership: $28/mo	
	Low impact		6.35$ drop in (6 months: 149.00$)	
RA Centre 2541 Riverside Dr.	Tai Chi		$41, 1x/week, 8 weeks	Online, **Ottawa.ca; Touch tone 580-2588**; or in person

2-18D

	Therapeutic Recreation Post-Stroke Program		$180.00 for 12 weeks	Margot Quigley-Diotte Portfolio Coordinator City of Ottawa, Special Needs 580-2424 ext.29291 Margot.Quigley-Diotte@ottawa.ca
	Aerobics for seniors (Low impact)		*Membership*: 46$/year *(must be a member to participate)* 10$ drop in	Helen Bolt (613) 447-5840
Rockcliffe Park Recreation Centre 360 Springfield Rd.	Low impact		56$ - 64$	(613) 842-8578
Sandy Hill Community Health Centre 221 Nelson St.	Chair exercise Gentle yoga		Free	(613) 789-6309
Senior's Exercise Group 420 Cooper St.	Low impact aerobics (2x/week)		Free	(613) 233-4443
National Capital Region YMCA-YWCA **Carlingwood** 200 Lockhart St. (Just off Woodroffe) **Downtown** 99 Bank St.(Bank & Queen) **Metro Central** 180 Argyle Ave. (Corner of O'Conner)	- Individual Conditioning Consultation - Y50 - Learn Yoga - Individual Conditioning Consultation - Learn Yoga - Individual Conditioning Consultation - Y50 - Learn Yoga	See Y program guide for details See Y program guide for details See Y program guide for details	$6.00 drop in Memberships available $6.00 drop in Memberships available $6.00 drop in Memberships available	(613) 729-7131 www.ymcaywca.ca (613) 233-9331 www.ymcaywca.ca (613)237-1320 www.ymcaywca.ca

Ottawa South

Walking Clubs

CENTRE	TYPE OF ACTIVITY	HOURS	COST	TELEPHONE
Carelton Heights Walking Club 1665 Appledoorn Ave.	Possibly available in the fall	Spring/Fall	Not available	Mike Falor (613) 226-2208
Greely Walking Club Greely Community Centre 1512 Manotick Station Road	Indoor Walking	Wednesdays 9:30 – 11:00	Free	(613) 821-2298
Manotick Gotta Walk Manotick Community Arena 1512 Manotick Station Rd.	Outdoor Walking	Time N/A	N/A	582-2424 ext:30235
Merivale Mall – Nepean Heart Walkers 1642 Merivale Rd., Nepean	Indoor Walking	Mon to Sat 7:00 – 9:00 am	Free	(613) 226-1290
Nepean Nomads Walking Club 19 Beaumaris Drive K2H 1K1	Outdoor Walking	All season	Free	Marv Hinton (613) 828-3216
Nepean Sportsplex Walking Club Nepean Sportsplex 1701 Woodruffe Ave.	Indoor Walking (Individual walking of a mapped course)	At your discretion	Free	Valerie Blais (613) 728-8688
Running Room Walking Club 1518 Merivale Rd.	Outdoor Walking	Varying times	69.99$ / 10 wks	Hilda Beauregard (613) 228-3100
Walter Baker Walking Clubs 100 Malvern Dr.	250, 500, 1000 km Walk Program	At your discretion	Free	(613) 825-1816

Pool Facilities

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Nepean Sportsplex 1701 Woodroffe Ave.	Shallow – Lite Lane swim		6.35$ drop in 3.35$ drop in (6 months: 149.00$) *Membership including access to all facilities (pool and aerobics)* 6 months: 204.00$	(613) 580-2828
Walter Baker Sports Centre 100 Malvern Dr.	Aquafitness		6.35$ drop in (6 months:	(613) 580-2788

	Lane swim		149$) 3.30$ drop in (6 months: 56.75$)	

Low Intensity Exercise Programs

CENTRE	TYPE OF ACTIVITY	HOURS	COST	TELEPHONE
Greenboro Community Centre 363 Lorry Greenberg, Ottawa	Vitality Program For seniors or those that find other low intensity aerobics too strenuous	Classes: Monday – Friday 10:30 to 11:30a.m	$72 – 80 approx. 12 weeks (can attend all 5 classes for this cost)	(613) 247-4894
Manotick Arena	Older Adult & Seniors Fitness		$49-$57, 1x/week	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
Nepean Creative Arts Centre 11-35 Stafford Rd.	Low intensity		60.00$ per session (approx. 2 months)	(613) 596-5783
Nepean Sportsplex 1701 Woodroffe Ave.	Variety of classes		6.35$ drop in 6 months: 149.00$ *Membership including access to all facilities (pool and aerobics)* 6 months: 204.00$	(613) 580-2828
	Heart Health gram for Cardiac Participants Moderate Intensity		190$ for 12 weeks	Online, **Ottawa.ca; Touch tone 580-2588**; or in person
	Tai Chi		$41, 1x/week, 8 weeks	
	Arthritis Program		$31-56, 8 weeks	
	Chair Exercise for 2x per week		$39 for 1x/wk; 10 wks	
Walter Baker Centre 100 Malvern.Rd	Low impact	Varies	6.40$ drop in 149.00$ (6 months)	(613) 580-2788

	Freedom 55 Classes  Fit n' Tone	Mon 9:30-10:30 am Th 10:30 -11:30 am T/Th 7:30 - 8:45 pm		
National Capital Region YMCA-YWCA Nepean 1642 Merivale Rd. (Merivale Mall)	- Individual Conditioning Consultation - Y50 - Learn Yoga	See Y program guide for details	$6.00 drop in Memberships available	(613) 727-7070 www.ymcaywca.ca

Ottawa East

Walking Groups

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Ottawa Voyageurs Walking Club 2039 Gatineau View Cres., Gloucester	Outdoor Walking	Varying times	*Individual*: 5.00$/year *Family:* 10.00$/year	Benoit Pisonneault (613) 746-9071
Place D'Orléans Shopping Centre Orleans	Indoor Walking	Tue – Thurs 8:30 – 10:30am (Only during winter)	15$ for first year 10$ thereafter	(613) 521-2191
Place D'Orléans Shopping Centre	Informal Mall Walking		Free	Bill Holland (613) 824-9563
Wild About Walking / Friendly Corner 1200 St-Laurent Blvd.	 Indoor Walking	Mon, Wed, Fri 7:30-10:30am	15.00$/year	Jill Sooley-Perley (613) 745-6850 ext. 308 724-4206
Club de marche santé Centre Richelieu Vanier 300 avenue Pères Blancs K1L 1A2	Outdoor walking	All Season	Free	Helene Berthelet (613) 580-2424 ext 28464 Helene.Berthelet@ottawa.ca
Dempsey Walking Club Dempsey Community Centre 1895 Russell Road K1G 0N1	Indoor Walking	Monday, Wednesday, Friday: 10:30am-	$12.50 per year	David Duffy (613) 247-4846

		noon		
Dome at Louis Riel Blackburn Hamlet	Indoor Track Walking + Stationary Bikes		Monthly $35/ Seniors $20	Sophie (613) 830-1993
Gentle Fitness	Outdoors	All Season	Free	(613) 824-0819
Orleans Volkssport Association 1197 Grenoble Crescent K1C 2C5				John Virag (613) 830-1995 jvirag@magma.ca
Ottawa Hostel Outdoor Club 75 Nicholas St.	Hiking Club Outdoors			Brenda Briones kenz@playground.net
Jack Purcell Community Centre 320 Jack Purcell Lane K2P 2J5	Outdoors	Spring/Fall	Free	(613) 564-1050
	Indoor Rehab Walking	Tuesday & Thursday 2:15-3:15pm	1x week for 10 weeks = $45 , 2x a week for 10 weeks = $70	Chris Rodgers/ Nancy Bullis (613) 564-1050
St. Laurent Shopping Centre/ Rehab Walking Club 1200 St. Laurent Boulevard K1K 3B8	Indoor Rehab Walking	Monday-Friday mornings	$15 per year	(613) 724-4206
Rockliffe Park Recreation Centre 360 Springfield Road, Ottawa K1L 5A4	Outdoors - Progressions 6-8km			Claudia Morrison (613) 824-8578
Running Room Walking Club Running Room (Orleans) 260 Centrum Boulevard, Orleans K1E 3P4	Outdoors	Sun 8:30am, Wed 6pm	Free / $69.99 for 10 weeks	(613) 830-7539

Pool Facilities

CENTRe	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Orléans Recreation Complex 1490 Youville Dr.	Aquafit Soft Aqua Therapy Acute Aqua		6.35$ drop in (6 months: 149.00$) $42, 1x/week, 8 weeks	824-0819 Online, **Ottawa.ca; Touch tone (613) 580-2588**; or in person

Sawmill Creek Pool 3380 D'Aoust Avenue , Gloucester South	Aquafitness			(613) 521-4092
Splash Wave Pool 2040 Ogilvie Rd., Gloucester	Aquafit Soft/ Aquafit Cardio Lane Swim		6.35$ drop-in 2.25$ drop in (6 months: 157.00$)	(613) 748-4222
St-Laurent Complex 525 Coté St.	Aquafit Lane swim		6.35$ 2.25$ (6 months – 204.00$)	(613) 742-6767
Ray Friel Centre 1585 Tenth Line Rd., Orléans	Aquafit (Various classes) Lane Swim		7.50$ drop in (for both) (1 year: 245.00$)	(613) 830-2747

Low Intensity Exercise Programs

CENTRe	TYPE OF ACTIVITY	COST	CONTACT
Beacon Hill Community Centre	Older Adult & Seniors Fitness	$49-$57, 1x/week	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
Orleans Recreation Complex 1490 Youville Dr.	Low Impact Aerobics	6.35$ drop in (6 months: 149.00$)	(613) 824-0819
Overbrook Community Centre	Tai Chi	$41, 1x/week, 8 weeks	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
National Capital Region YMCA-YWCA Orleans 265 Centrum Blvd.	- Individual Conditioning Consultation - Y50 - Learn Yoga	$6.00 drop in Memberships available	(613) 830-4199 www.ymca-ywca.ca
Ray Friel Centre 1585 Tenth Line Rd.	Variety of classes	7.50$ drop in	(613) 830-2747

Rideauview Community Centre	Tai Chi	$41, 1x/week, 8 weeks	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
St-Laurent Complex 525 Coté. St.	 50+ Aerobics	7.00$ drop in 6 months: 149.00$	742-6767
	Osteoporosis Program	$88, 1x/week, 8 weeks	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
The Friendly Corner 1200 St-Laurent Blvd.	 Strength Training/ Chair Exercises		Betty Ann Hamilton (613) (613) 580-6744 ext 26189

Ottawa West

Walking Groups

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Goulborn Walking Clubs	Not Available	Not available	N/A	Janice Tughan (613) 724-4122 ext 26176 (613) 580-6744
The In Club Mall Walkers Hazledean Shopping Mall 300 Eagleson Rd.	Indoor Walking	Monday - Friday: 7:30-10:30am	Free	Nisha Mapara (613) 591-1294
Kanata "Y" Fitwalk Kanata YMCA 1000 Paladium Dr.	Power Walking (Outdoor)	Tuesday 9:30 am	Free for Members or 25.00$ for 8 wks	Kerri Milan (613) 599-0280
West Carleton Walking Club	Indoor Walking	Tue: 9:30 – 10:30 am	Free	(613)623-3562

Pool Facilities

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Goulbourn Recreation Complex 1500 Shea Rd.	 Aquafitness		6.30$ drop in 6	(613) 831-1169

	Lane swim		months: 149$) 3.30$ drop in	
Kanata Leisure Centre 70 Aird Place	Aquafit Lane Swim		6.35$ drop in 6 months: 149.00$) 3.30$ drop in	(613) 591-9283
Pinecrest Recreation Complex 2250 Torquay Ave	Vitality (50 +) Senior Swim		$4.40drop in (6 months: 77.25) 2.25$ drop in	(613) 828-3118
Soloway Jewish Community Center 21 Nadolny Sachs Private	Water Walking			Carla Gencher (613) 798-9818 ext. 278
	Aqua Waves			
	After Work Energizer			

Low Intensity Exercise Programs

CENTRE	TYPE OF ACTIVITY	HOURS	COST	CONTACT
Eva James Memorial Community Centre 65 Stonehaven	Older Adult & Seniors Fitness		$49-$57, 1x/week	Online, **Ottawa.ca; Touch tone (613) 580-2588**; or in person
Goulbourn Recreation Complex	Arthritis Program		$31-56, 8 weeks	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
Kanata Leisure Centre 70 Aird Place	Stretch and Strengthen Strength Training (for senior citizens)		10 weeks: 39.00$	(613) 591-9283 Online, **Ottawa.ca; Touch tone 580-2588**; or in person
	Arthritis Program		$31-56, 8 weeks	

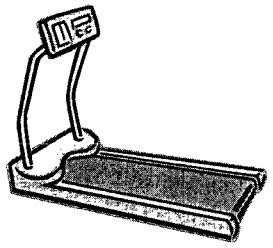
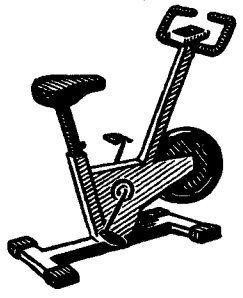
Kanata Seniors Centre	Chair Exercise 1x or 2x per week		$39 for 10 weeks (one class/ week)	
	Tai Chi		$41 for 8 weeks (one class/ week)	Janet Baigent (613) 599-4480 ext. 23
	Older Adult & Seniors Fitness		$49-57 for one class/week	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
Richmond Memorial Community Centre	Older Adult & Seniors Fitness		$49-$57, 1x/week	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
Stittsville Community Centre	Low impact		Not available	(613) 580-2424 ext: 33230
	Older Adult & Seniors Fitness		$49-$57, 1x/week	Online, **Ottawa.ca; Touch tone** (613) **580-2588**; or in person
Soloway Jewish Community Center 21 Nadolny Sachs Private	**Vitality Plus** - Low impact class		Membership: $600/year or $50/month for adults; $468/year or $39/month seniors (65+)	Carla Gencher (613) 798-9818 ext. 278
	Functional Fitness For those with arthritis and osteoporosis			
National Capital Region YMCA-YWCA Kanata 1000 Palladium (Scotiabank Place)	- Individual Conditioning Consultation - Y50 - Learn Yoga	See program guide for details	$6.00 drop in Memberships available	(613) 599-0280 www.ymca-ywca.ca

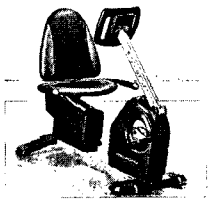
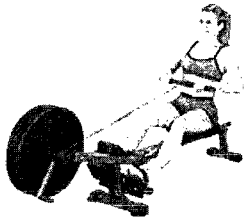
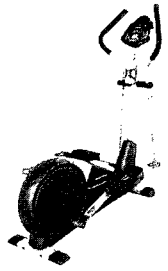
Source: www.ottawaheart.ca/HHEC

How to buy exercise equipment

Things to Consider:

- Your budget - How much can you spend?
- What type of equipment do you think you will enjoy using?
- How much space do you have for your new piece of equipment?
- Is the equipment under warranty and are you buying it from a centre that may offer you a service agreement for repairs and replacement parts?
- Can you try out the equipment you think you will like and return it if you are not completely satisfied?

Type of Equipment	Advantages	Disadvantages	Features to Consider
1. Treadmills 	Easy to learn to use Motorized treadmills absorb approximately 40% of the impact when compared to the road (this may vary greatly from one treadmill to another, depending on the suspension system –ask the salesperson for specifics)	Expensive May be noisy Require large amount of floor space	Motorized vs Manual (manual is not recommended) Size of the motor Variable speed Variable incline Safety features Size of the belt Cushioning on the deck (top surface). If you plan to run, you need a sturdy belt.
2.Stationary 	Good choice for people with knee or back problems or those who are overweight Less expensive Less amount of floor space used Some bicycles have features that allow you to use your arms and legs simultaneously	Seats may be uncomfortable or take some time to get used to, although there are gel seats on the market. Dual action cycles can be noisy	Adjustable intensity or resistance Easily-adjusted seat and handlebars Comfortable seat Dual action (arm & leg motions)

Types of Equipment	Advantages	Disadvantages	Features to consider
3.Recumbent Bicycle 	Good choice for people with knee or back problems or those who are overweight	May be more expensive than a regular bicycle	Easily adjustable seat Dual action (arm & leg motions)
4.Rowing Machine 	Excellent for overall fitness. Dual action (arm & leg motions)	Requires very long floor space With improper technique, may cause low back strain Piston-driven machines do not last and produce awkward rowing motion Requires a fair amount of flexibility	Look for variable resistance and intensity Smooth sliding/rolling seat
5.Elliptical Trainers 	Can pedal forward and backwards, thus using both major muscle groups in the legs More comfortable than a stair climber Burns more calories than level walking at the same speed	Requires more vertical space (ceiling height), especially for tall individuals	Non-slip pedals Variable speed and resistance Handlebars for dual action (arm & leg motions)
6.Stair Climbers	Burns more calories than level walking at the same speed	Avoid air-filled shocks because they heat up quickly and this may result in cylinder damage Not a good choice for individuals with bad knees	Adjustable step height & resistance Smooth and quiet operation Independent vs. linked pedal options

Appendix J: Exercise Counseling Resources (Tips to help stay motivated)

Tips to help you stay motivated

Factors affecting motivation level

While most people acknowledge how important exercise and physical activity are to the human body, few are regularly active enough to receive significant health benefits. The dropout rates for those who do begin an exercise program reach 50% or more by the end of the first six months.

There are three types of factors that affect our motivation to stay with an exercise program. **Personal factors** have to do with you and your perceptions toward exercise. **Program factors** focus on the exercise program, its convenience and the enjoyment you derive from it. **Environmental factors** deal with your external world that you can, and at times, can not control. The questions below may shed some light on how these factors affect your exercise program.

Personal Factors:

- How do you feel about the value of exercise?
- What is your past experience with exercise?
- What is your skill level in performing your chosen activities?
- What is your own personal motivation level?
- How do you perceive the exercise program's convenience and enjoyment?
- Do you feel that the activity is overly uncomfortable or difficult?
- Do you have the ability to resolve typical barriers to exercise? (i.e., travel, illness, time)

Program Factors:

- Is your program convenient? (Time of day, number of weekly sessions, schedule flexibility, accessibility to facilities)
- Does your chosen activity require special, costly or time-consuming preparation?
- Is the program of reasonable enough intensity so that you find it challenging but not punishing or aversive?
- Is the program varied enough to maintain interest and diminish boredom?

Environmental Factors:

- Are you comfortable with the location at which the activity takes place?
- Have you set up some regular cues to remind yourself to exercise? (Pack your gym bag and put it by the door, have equipment at home visible and easily accessible, schedule exercise on your calendar)
- Are you able to accommodate weather conditions? (Exercise indoors instead of outdoors, exercise at home instead of driving to the gym on icy roads)
- Do you have an ongoing support system? (Include your family in activities, get a "fitness partner" to workout with, meet other members in exercise classes

It's helpful to think of this motivational process as dynamic and ongoing; different strategies are needed for different stages of your exercise program. Here are some practical tips to keep you moving forward:

- ✧ **Build on success...** start with small goals that lead to larger goals.
- ✧ **Find a role model...** find someone who started where you were. Feel inspired by their success.
- ✧ **Be realistic...** set attainable goals. Being realistic will prevent you from becoming frustrated later.
- ✧ **Set well defined goals and reward yourself for reaching them...** this will encourage you to set new goals.
- ✧ **Keep a journal...** you'll be able to see how far you've progressed and evaluate what works and what doesn't.
- ✧ **Create variety...** as you learn the basics add new exercises and activities into your program. This will help keep you from becoming bored with your routine.
- ✧ **Try not to focus on what you are giving up...** focus on new options that you'll have after you become more fit.
- ✧ **Don't make exercise just another item on your to-do list...** connect to it on a deeper level.
- ✧ **Educate yourself...** the more you know the less likely you are to be injured or to get stuck in a rut.
- ✧ **Use your time wisely...** it doesn't have to take hours to achieve your fitness goals. Greater intensity can improve results and shorten total workout time.
- ✧ **Know your limits and stay within your means...** fatigue, insomnia, irritability, and elevated resting heart rate are all signs of overdoing it.

Adapted from "The motivation to move" by Vicki R. Pierson & Renee Cloe, ACE Certified Personal Trainers

Seasonal considerations

Winter

One of the pleasures of living in a climate such as ours is the ever changing seasons. At times, however, we may not feel quite so appreciative of mother nature, particularly when it is -40 °C outside. Just because it is cold outside doesn't make it open season for an excuse not to exercise. There are multiple exercise options one can choose to participate in regardless of what the outdoor thermometer reads. Depending on your location and likes, you can choose to workout inside or outside.

- **Winter exercise tips:**
  - Get warm first. A proper warm-up is critical. Cold temperatures can make your muscles tight and therefore they are more prone to injuries. So, it's important to get them warmed-up prior to engaging in intense physical activity.

  - Insulate your body. The best approach to dressing for outdoor exercise is with layers. Layering provides the most effective heating method, plus it allows you to remove the top layer if you get too hot. The layer closest to your skin should allow moisture to be wicked away. The top layer should be both wind and water resistant.
  - Drink up. It's just as important to stay hydrated when exercising in winter as it is in summer, even though you might not feel as thirsty.
  - No sweat. Don't assume that you have to sweat in order to get a good workout. You should avoid sweating that causes the clothing layer closest to your skin to get wet and cause you to be chilled. Instead monitor your intensity through a heart rate monitor or the Rating of Perceived Exertion.
  - Don't strip when you get inside. While you may be tempted to immediately remove your layers when returning inside, give your body time to adjust. Post exercise hypothermia is possible. This happens when your body rapidly loses its heating stores.
  - Lighten up. If possible, it's best to exercise outdoors during daylight areas. But, with shorten days that can be difficult to do. If you exercise outdoors when it is dark, wear reflective materials to ensure that you can be seen.

- **Indoor workout options:**
  - Walk at an indoor location, like a mall. If you need extra motivation to get yourself to the mall, join a walking group. This will help you stay accountable to someone other than yourself.
  - Join a health club. This will allow you a large variety of physical activities to choose from every week.
  - Create a home gym. This doesn't have to be expensive. You can easily set-up a great workout routine with just a set of dumbbells, an exercise ball and a jump rope. Get all of this for around $50.
  - If you have stairs where you live or close by, spend as little as 20 minutes at a time climbing up and down the stairs for a very intense and efficient workout.
  - Get wet. Find a local indoor pool you can use. Try swimming, water aerobics, or even just walking or running laps in the water.
  - Visit a library. Usually local libraries offer exercise videos you can check-out for free. Pick-up a new one to try out every time you return the previous video.

By staying fit during winter you'll be able to avoid gaining weight, have a head start on swimsuit season, and avoid losing strength and stamina caused from inactivity.

Source: http://www.workoutsforyou.com

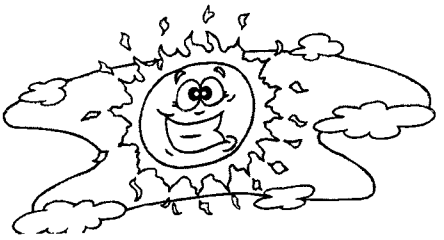
Summer

Exercising in the heat can put a lot of stress on your cardiovascular system to maintain a core body temperature and fluid balance. As you exercise, more heat is generated and your body temperature increases. In order to compensate, blood flow is directed to the skin and sweat at the skin surface evaporates and cools the body. In this way body temperature returns to normal. However, environmental factors such as bright sunlight, high humidity and lack of wind challenge your body's ability to dissipate heat and maintain a normal body temperature.

- **Heat Injury:**
  - **Heat rash** appears as areas of small red pimples or blisters. This condition is usually not uncomfortable, but severe enough to cause itching or burning.

  - **Heat cramps** are caused by sweating during exercise leading to dehydration and salt depletion. Symptoms include muscle cramping that can be painful depending on the severity of the cramp.
  - **Heat exhaustion** is caused by excessive sweating during exercise, such that your body's cooling mechanism becomes overwhelmed. Symptoms include chills, nausea, dizziness, weakness, loss of coordination and profuse sweating. The skin may also become pale and cool or clammy.

- **Heat stroke** is a more serious form of heat injury that requires immediate medical attention. Many of the symptoms are similar to heat exhaustion but also disorientation, loss of consciousness and seizures. Sweating is generally absent but the skin may also be moist from earlier sweat production.



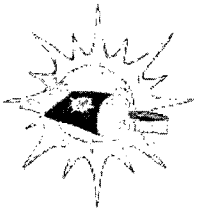
Should you experience any of the symptoms of heat illness, be sure to stop exercise immediately, find a cool shaded area and drink plenty of fluids.

- **Summer Exercise Tips:**

Stay hydrated
Simply drinking water when you are thirsty is not enough to offset the fluid lost during exercise. The general recommendation is 8-16 oz prior to exercise, 6-8 oz every 15 minutes during exercise and 16-24 oz after exercise.

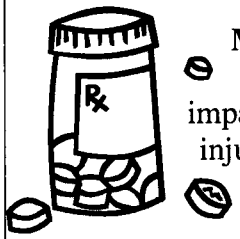
Choose your timing
Avoid exercising in the heat of the day. Instead choose to exercise early in the morning or in the evening during the coolest part of the day.

Clothing
Clothes should be light colored, loose and comfortable. There are unique fabrics that offer U.V. protection and are light weight and breathable. Some other fabrics are designed to keep you cool and dry; these include Dri-Fit™ and Omni-Dry™. Wear a hat to limit sun exposure.



Wear sunscreen
Apply sunscreen to prevent sunburn. Sunburn can decrease the body's ability to cool itself.

Reduce your pace
You may need to reduce your pace for the first few weeks when the weather is warm. It generally takes 7-14 days to acclimatize to the heat. There may be times when the heat and humidity are too high to exercise outdoors. Make sure you have an indoor option for exercise at these times. You can even stroll around an air -conditioned mall.

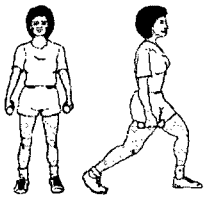
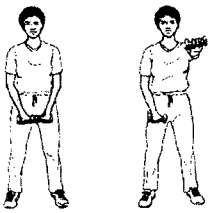
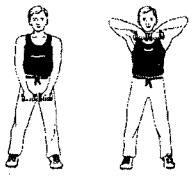
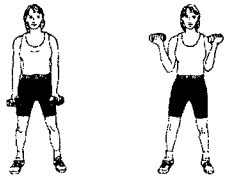
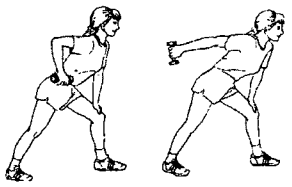


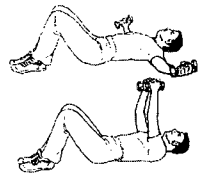
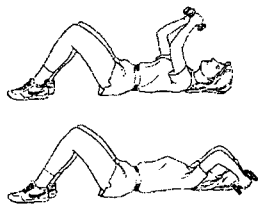
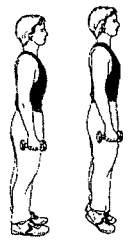
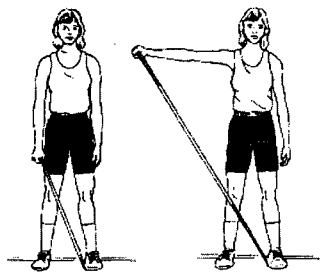
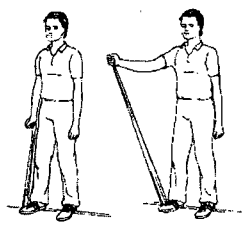
Medication
Certain chronic diseases such as high blood pressure, diabetes and heart disease can impair your body's ability to regulate temperature, thereby increasing your risk of heat injury. Some medications can also impair your body's ability to regulate body temperature. Some examples are Beta blockers, diuretics, vasodilators and anti-depressants. Be sure to ask your physician if any of your medications affect your ability to exercise in the heat. Exercise should not be avoided entirely if you are on these medications, but it will help you to better select an appropriate place and time for you to exercise.

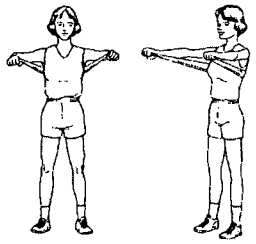
Adapted from educational kits from Intervent Canada

UNIVERSITY OF OTTAWA
HEART INSTITUTE
INSTITUT DE CARDIOLOGIE
DE L'UNIVERSITÉ D'OTTAWA

Heart Health
Education Centre

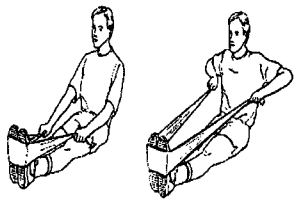
Hand-held weights	
	**1. Lunges (thigh muscles and buttocks)** Start with your arms hanging at your sides, dumbbells in hands, and feet apart. Take one step forward with one foot and bend your front knee slightly. Step back to the starting position and repeat with the opposite leg. Repeat, alternating your legs. This exercise can be performed without the dumbbells.
	**2. Front Shoulder Raise (front portion of the shoulder)** Start with your arms hanging in front of your thighs and your palms facing the thighs. Raise one dumbbell straight in front of you to shoulder height. Lower this dumbbell to your starting position and repeat using the other arm. Repeat, alternating your arms.
	**3. Upright Row (shoulder, neck, and upper back)** Stand with arms hanging in front of your thighs, palms facing your thighs, and the dumbbells close together. Keeping the hands together and close to the body, raise the dumbbells to the chin. Lower the dumbbells to starting position and repeat.
	**4. Bicep Curl (front of upper arm)** Start the exercise with your arms hanging at your sides and your palms away from you. Keeping the elbows close to the sides of the body, curl both dumbbells upward to the shoulders. Lower and repeat.
	**5. Tricep Extension (back of upper arm)** Place one foot about a step in front of the other and bend both knees slightly. Lean forward and rest one hand, palm down, on the knee of your front leg. Place the hand with the dumbbell in it against your hip (palm of your hand toward the hip). Keeping your elbow still, straighten your arm fully. Then bend your arm until your hand returns to your hip and repeat. After completing the desired number of repetitions, repeat with the other arm.

	**6. Supine Fly (chest muscles)** Lie face up on the floor with your knees bent and arms perpendicular to your body. Raise both dumbbells above your chest until they meet in the center. Lower dumbbells and repeat.
	**7. Pullover (chest and back)** Lie face up on the floor with your knees bent. Begin with dumbbells together directly above the center of your chest, elbows slightly bent. Lower the dumbbells to the floor behind your head, keeping your elbows bent. Raise the dumbbells back to the starting position and repeat.
	**8. Calf Raises (calf muscles)** Start with your arms hanging at your sides, dumbbells in hands, and feet slightly apart. Raise up onto the balls of both feet. Lower your heels to the ground and repeat. Do not bend your knees. This exercise can be performed without the dumbbells.
Resistance rubber band	
	**9. Side Shoulder Raise (outer portion of shoulders)** Place your foot on one end of the band and grip the other end with the hand on the opposite side of your body. Start with your arm extended at your side and the palm of your hand facing the side of your thigh. Keeping your elbow slightly bent, raise your arm out at your side to shoulder level. Slowly lower your arm to the starting position. Repeat this motion with the same arm until you do the desired number of repetitions. Switch to the other arm and leg and repeat.
	**10. Front Shoulder Raise (front portion of shoulders)** Place your foot on one end of the band. Grip the other end with the hand on the same side of your body. Begin with your arm extended at your side and the palm of your hand facing the side of your thigh. Raise your arm out in front of your body to shoulder level. Slowly lower your arm to the starting position. Repeat this motion with the same arm until you do the desired number of repetitions. Switch to the other arm and leg and repeat.



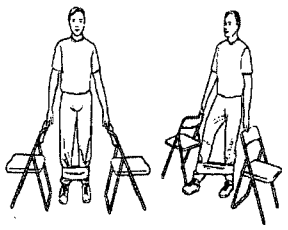
11. Chest Press (chest muscles and upper back)

Loop the band around your upper back and grip the ends in your hands. Bend both elbows to a 90 degree angle. Lift both elbows away from your sides until they are armpit level and your arms are almost parallel to the floor. This is your starting position. Press your arms forward until they are almost completely straight. Slowly bend your elbows until your hands return to the starting position. Repeat.



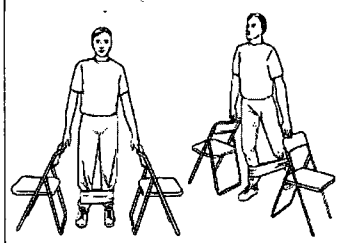
12. Seated Row (upper back, shoulders, and neck)

Sit on the floor with your back upright and your knees either slightly bent or straight, whichever is more comfortable. Grip each end of the band with your hands and loop the band around your feet. Start with your arms extended in front of you, your hands slightly lower than shoulder level, and your palms facing the floor. Pull both ends of the band toward your armpits, while keeping your back straight. Slowly return your hands to the starting position and repeat.



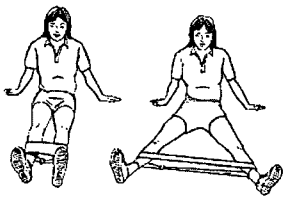
13. Standing Hip Flexion (hips and the front of the thighs)

Stand between the backrests of two chairs with your feet close together. Place a looped band around the outside of your ankles. Throughout this exercise, hold on to both backrests for balance and support. Keep both knees slightly bent. Bracing yourself with your arms and keeping one foot in place, press the other leg forward until you encounter significant resistance. Slowly return your leg to the starting position and repeat with the opposite leg. For less resistance, do this exercise with the looped band around the outside of your thighs just above the knees.



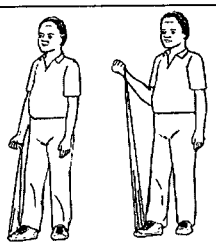
14. Standing Hip Extension (hips, back of the thighs, buttocks, and lower back muscles)

Stand between the backrests of two chairs with your feet close together. Place a looped band around the outside of your ankles. Throughout this exercise hold on to both backrests for balance and support. Keep both knees slightly bent. Bracing yourself with your arms and keeping one foot in place, press the other leg backward until you encounter significant resistance. Slowly return your leg to the starting position and repeat with the opposite leg. For less resistance, do this exercise with the looped band around the outside of your thighs just above the knees.



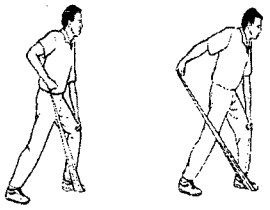
15. Seated Hip Abduction (hips and outer thighs)

Sit on the floor with your back upright and your legs out straight in front of you. Place a knotted band around the outside of your ankles. Keep your legs straight as you brace yourself with the palms on the floor just behind you. Slide one leg apart until you note significant resistance. Repeat on other leg. To decrease the resistance, do this exercise with the band looped around the outside of your thighs just above the knees.



16. **Bicep Curl (front of upper arm)**

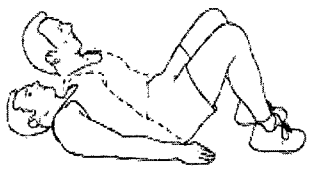
Place your foot on one end of the band and grip the other end with the hand on the same side of your body. Start with your arm extended at your side and the palm of your hand facing forward. Keeping your elbow close to your side, bend it so that your fist curls upward to your shoulder. Slowly lower your arm to the starting position. Repeat this motion with the same arm until you do the desired number of repetitions. Switch to the other arm and leg and repeat.



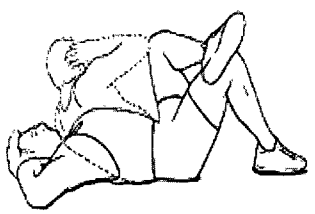
17. Triceps Extension (back of upper arm)

Take one step forward and place your front foot on one end of the band. Grip the other end with the hand on the opposite side of your body. Bend your front knee slightly, lean forward, and rest the hand on the same side of the body, palm down, on your knee. Place the other hand – the one holding the band – against your hip, palm facing inward. Gradually straighten that arm out fully behind you. Then slowly bend your arm until your hand returns to the starting position at your hip. Repeat this motion with the same arm until you do the desired number of repetitions. Switch to the opposite arm and leg and repeat.

Calisthenics

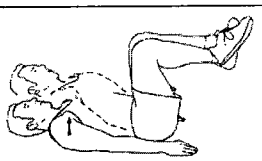
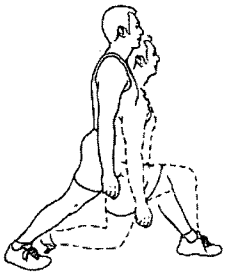
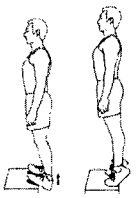
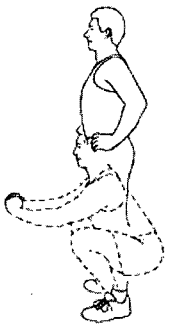
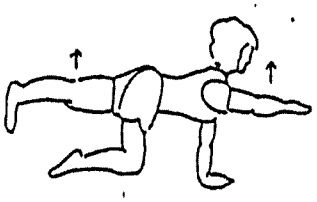
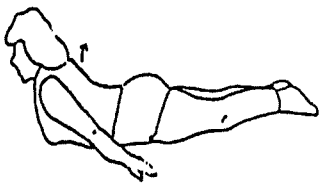


18. Crunches (Abdominal Muscles)
Lie on the floor face up with the knees at a 90-degree angle and palms resting on your thighs. Lift your shoulders off the floor and slide your fingers up toward your knees. Keep your head and neck in the neutral position by looking at the ceiling. Return to the starting position and repeat, to fatigue.



19. Twisting Crunch

Lie on the floor and place left ankle across to right knee, place left hand behind your head and tighten abdominal muscles and lift and rotate upper body so that left elbow comes up and touches (if possible) right knee. Perform your maximum number of repetitions. Reverse and do the same thing on the opposite side.

	**20. Reverse Crunch** With knees bent at 90 degrees (forming an L shape), curl hips up and raise feet toward ceiling.
	**21. Lunges (Thigh Muscles and Buttocks)** Start with your arms hanging at your sides and feet apart. Take one step forward and bend your front knee slightly. The forward knee should not go past the foot and ankle. Most of the movement is occurring at your hips. Step back to the starting position and repeat with the opposite leg. Repeat the exercise while alternating your legs. This exercise can be performed with dumbbells in each hand when you find that 15 on each side is easy.
	**22. Calf Raises (Calf Muscles)** Start with your arms hanging at your sides and feet slightly apart. Rise up onto the balls of both feet. Lower your heels to the ground and repeat. Do not bend your knees. This exercise can also be performed with dumbbells.
	**23. Squats** Start with the soles of your feet flat on the ground. Extend your arms out, palms down. Make sure to widen your stance to at least shoulder distance apart, this distance helps to emphasize the gluteal (buttock) and hamstring (back of the leg) muscles. Slowly lower your upper body towards the floor in a sitting position until your knee-joint angle is about 90 degrees. Then slowly return to your upright starting position and repeat. This exercise can be performed with dumbbells held at the sides of your body.
	**24. Leg and arm raises** Begin on your hands and knees. Simultaneously raise and straighten your right arm and left leg until they are parallel to the ground. Hold for 2 seconds and come back slowly to a starting position. Repeat with left arm and right leg.
	**25. Back Extension** Lie on your stomach on a mat. Place your arms at your sides so that your hands are by your hips. Raise your head and shoulders off the mat as high as comfortably possible. Lower the head and shoulders. Do not tense your shoulder muscles.

Adapted from educational kits from Intervent Cana

Appendix M: Readiness to Change Exercise Behavior Questionnaire (English)

Which statement best describes your present exercise status (please check only one): Regular Exercise = 30 minutes or more of physical activity at a moderate-intensity or greater (e.g. intensity of a brisk walk or faster) at least 4 days per week.

a. I currently do not exercise regularly, and I do not intend to start regular exercise in the next 6 months.	O
b. I currently do not exercise regularly, but I intend to start exercising regularly in the next 6 months, but not in the next 30 days."	O
c. I currently do not exercise, but I intend to start exercising regularly in the next 30 days."	O
d. I currently exercise regularly, but I have only begun doing so in the last 6 months.	O
e. I currently exercise regularly and have done so for longer than 6 months.	O

Appendix N: Readiness to Change Exercise Behavior Questionnaire (French)

Lequel des énoncés suivants décrit le mieux votre situation actuelle en matière d'exercice (veuillez en cocher un seul). Exercice régulier = 30 minutes ou plus d'activité physique à un rythme modéré ou plus (p. ex. intensité d'une marche d'allure vive ou plus rapide encore), au moins 4 jours par semaine.

a. Je ne fais actuellement pas régulièrement d'exercice et je n'ai pas l'intention de commencer à en faire régulièrement au cours des 6 prochains mois.	O
b. Je ne fais actuellement pas régulièrement d'exercice, mais j'ai l'intention de commencer à en faire régulièrement au cours des 6 prochains mois, mais pas au cours des 30 prochains jours.	O
c. Je ne fais actuellement pas régulièrement d'exercice, mais j'ai l'intention de commencer à en faire régulièrement au cours des 30 prochains jours.	O
d. Je fais actuellement régulièrement de l'exercice, mais je n'ai commencé à en faire qu'au cours des 6 derniers mois.	O
e. Je fais actuellement régulièrement de l'exercice et j'en fais depuis plus de 6 mois.	O

Appendix O: Decisional Balance Questionnaire (English)

Indicate how important each statement is with respect to your decision to exercise regularly (i.e. 30 minutes or more of physical activity at a moderate-intensity or greater at least 4 days per week) or not to exercise in your leisure time…

	Extremely Important	Quite Important	Somewhat Important	A Little Bit Important	Not Important
a. I would have more energy for my family and friends if I exercised regularly	①	②	③	④	⑤
b. I would feel embarrassed if people saw me exercising	①	②	③	④	⑤
c. I would feel less stressed if I exercised regularly	①	②	③	④	⑤
d. Exercise prevents me from spending time with my friends	①	②	③	④	⑤
e. Exercise puts me in a better mood for the rest of the day	①	②	③	④	⑤
f. I feel uncomfortable or embarrassed in exercise clothes	①	②	③	④	⑤
g. I would feel more comfortable with my body if I exercised regularly	①	②	③	④	⑤
h. There is too much I would have to learn to exercise	①	②	③	④	⑤
i. Regular exercise would help me have a more positive outlook on life	①	②	③	④	⑤
j. Exercise puts an extra burden on my significant other	①	②	③	④	⑤

Appendix P: Decisional Balance Questionnaire (French)

Indiquez à quel point chacun des énoncés suivants est important quant à votre décision de faire régulièrement de l'exercice (c.-à-d. 30 minutes ou plus d'activité physique à un rythme modéré ou plus, au moins 4 jours par semaine) ou de ne pas faire d'exercice durant vos temps de loisirs.

	Extrêmement important	Passablement important	Quelque peu important	Un petit peu important	Pas important
a. J'aurais plus d'énergie à consacrer à ma famille et à mes amis si je faisais régulièrement de l'exercice.	①	②	③	④	⑤
b. Je serais gêné(e) si les gens me voyaient faire de l'exercice.	①	②	③	④	⑤
c. Je me sentirais moins stressé(e) si je faisais régulièrement de l'exercice.	①	②	③	④	⑤
d. L'exercice m'empêche de passer du temps avec mes amis.	①	②	③	④	⑤
e. L'exercice me rend de meilleure humeur pour le reste de la journée.	①	②	③	④	⑤
f. Je me sens mal à l'aise ou gêné(e) en tenue d'exercice	①	②	③	④	⑤
g. Je me sentirais plus à l'aise relativement à mon corps si je faisais régulièrement de l'exercice.	①	②	③	④	⑤
h. Il me faudrait apprendre trop de choses pour faire de l'exercice.	①	②	③	④	⑤
i. L'exercice régulier m'aiderait à prendre la vie du bon côté.	①	②	③	④	⑤
j. L'exercice impose un fardeau supplémentaire à mon conjoint ou à ma conjointe.	①	②	③	④	⑤

Appendix Q: Processes of Change Questionnaire (English)

The following experiences can affect the exercise habits of some people. Think of similar experiences you may be currently having or have had in the past month, and rate how frequently the event occurs by circling the appropriate number…

	Never	Seldom	Occasionally	Often	Repeatedly
a. I read articles about exercise in an attempt to learn more about it	①	②	③	④	⑤
b. I look for information related to exercise	①	②	③	④	⑤
c. I find out about new methods of exercising	①	②	③	④	⑤
d. I get upset when I see people who would benefit from exercise but chose not to exercise	①	②	③	④	⑤
e. I am afraid of the consequences to my health if I do not exercise	①	②	③	④	⑤
f. I get upset when I realize that people I love would have better health if they exercised	①	②	③	④	⑤
g. I realize that if I don't exercise regularly, I may get ill and be a burden to others.	①	②	③	④	⑤
h. I think that my exercising regularly will prevent me from being a burden to the healthcare system	①	②	③	④	⑤
i. I think that regular exercise plays a role in reducing health care costs	①	②	③	④	⑤
j. I feel more confident when I exercise regularly	①	②	③	④	⑤
k. I believe that regular exercise will make me a healthier, happier person	①	②	③	④	⑤
l. I feel better about myself when I exercise	①	②	③	④	⑤
m. I have noticed that many people know that exercise is good for them	①	②	③	④	⑤

n. I am aware of more and more people who are making exercise a part of their lives	①	②	③	④	⑤
o. I have noticed that famous people often advertise the fact that they exercise regularly	①	②	③	④	⑤
p. When I feel tired, I make myself exercise anyway because I know I will feel better afterwards	①	②	③	④	⑤
q. Instead of taking a nap after work, I exercise	①	②	③	④	⑤
r. Instead of relaxing by watching TV or eating, I take a walk or exercise	①	②	③	④	⑤
s. I have a friend who encourages me to exercise when I don't feel up to it.	①	②	③	④	⑤
t. My friends encourage me to exercise	①	②	③	④	⑤
u. One of the rewards of regular exercise is that it improves my mood	①	②	③	④	⑤
v. I try to think of exercise as a time to clear my mind as well as a workout for my body	①	②	③	④	⑤
w. If I engage in regular exercise, I find that I get benefit of having more energy	①	②	③	④	⑤
x. I tell myself that I can keep exercising if I try hard enough	①	②	③	④	⑤
y. I make commitments to exercise	①	②	③	④	⑤
z. I believe that I can exercise regularly	①	②	③	④	⑤
zz. I keep a set of exercise clothes conveniently located so I can exercise whenever I get the time	①	②	③	④	⑤
zzz. I use my calendar to schedule my exercise time	①	②	③	④	⑤
zzzz. I make sure I always have a clean set of exercise clothes	①	②	③	④	⑤

Appendix R: Processes of Change Questionnaire (French)

Les expériences suivantes peuvent influer sur les habitudes d'exercice de certaines personnes. Songez à des expériences semblables que vous pourriez vivre actuellement ou que vous avez vécues au cours du dernier mois et indiquez la fréquence de l'incident en encerclant le nombre approprié.

	Jamais	Parfois	Occasionnellement	Souvent	Sans cesse
a. Je lis des articles sur l'exercice en espérant en savoir plus à ce sujet.	①	②	③	④	⑤
b. Je cherche des renseignements relatifs à l'exercice.	①	②	③	④	⑤
c. Je me renseigne sur de nouvelles méthodes d'exercice.	①	②	③	④	⑤
d. Cela me dérange de voir des gens à qui l'exercice serait bénéfique, mais qui choisissent de ne pas en faire.	①	②	③	④	⑤
e. Je crains les conséquences pour ma santé si je ne fais pas d'exercice.	①	②	③	④	⑤
f. Cela me dérange de voir que des gens que j'aime seraient en meilleure santé s'ils faisaient de l'exercice.	①	②	③	④	⑤
g. Je comprends que si je ne fais pas régulièrement de l'exercice, je pourrais devenir malade et imposer un fardeau à d'autres.	①	②	③	④	⑤
h. Je pense qu'en faisant régulièrement de l'exercice, j'éviterai d'imposer un fardeau au système de soins de santé.	①	②	③	④	⑤
i. Je pense que l'exercice régulier a quelque chose à voir avec la réduction des coûts des soins de santé.	①	②	③	④	⑤
j. Je suis plus sûr(e) de moi quand je fais régulièrement de l'exercice	①	②	③	④	⑤
k. Je crois que l'exercice régulier va faire de moi une personne plus en santé et plus heureuse.	①	②	③	④	⑤

l. Je me sens mieux dans ma peau quand je fais de l'exercice.	①	②	③	④	⑤
m. Je remarque que beaucoup de gens savent qu'il est bon de faire de l'exercice.	①	②	③	④	⑤
n. Je sais que de plus en plus de gens intègrent l'exercice à leur vie.	①	②	③	④	⑤
o. Je remarque que les gens célèbres crient souvent sur les toits le fait qu'ils font régulièrement de l'exercice.	①	②	③	④	⑤
p. Si je suis fatigué(e), je me force quand même à faire de l'exercice en sachant que je me sentirai mieux après.	①	②	③	④	⑤
q. Je fais de l'exercice au lieu de faire une sieste après le travail.	①	②	③	④	⑤
r. Je fais une promenade ou de l'exercice au lieu de me détendre en regardant la télévision ou en mangeant.	①	②	③	④	⑤
s. J'ai un ami ou une amie qui m'encourage à faire de l'exercice quand je ne me sens pas d'attaque.	①	②	③	④	⑤
t. Mes amis m'encouragent à faire de l'exercice.	①	②	③	④	⑤
u. Une des récompenses de l'exercice régulier est que cela me rend de meilleure humeur.	①	②	③	④	⑤
v. J'essaie de voir l'exercice comme le temps de me libérer l'esprit ainsi que de faire de l'entraînement pour mon corps.	①	②	③	④	⑤
w. Je trouve qu'un des avantages retirés de l'exercice régulier, c'est d'être plus énergique.	①	②	③	④	⑤
x. Je me dis que je peux continuer à faire de l'exercice si j'en fais l'effort.	①	②	③	④	⑤
y. Je prends des engagements en matière d'exercice.	①	②	③	④	⑤
z. Je crois pouvoir faire régulièrement de l'exercice.	①	②	③	④	⑤

zz. Je garde un ensemble de vêtements d'exercice dans un endroit commode, pour pouvoir faire de l'exercice chaque fois que j'en ai le temps.	①	②	③	④	⑤
zzz. J'inscris mes séances d'exercice dans mon agenda.	①	②	③	④	⑤
zzzz. Je m'assure de toujours avoir un ensemble de vêtements d'exercice propres.	①	②	③	④	⑤

Appendix S: Self-efficacy Questionnaire (English)

Regular Exercise is defined as "30 minutes or more of physical activity at a moderate intensity or greater (e.g. intensity of a brisk walk or faster) at least 4 days per week." According to this definition please indicate how confident you are that you will be able to engage in regular exercise even when…

	Not at all confident	Somewhat confident	Moderately confident	Very Confident	Completely Confident
a. I am under a lot of stress	①	①	①	①	①
b. I am depressed	①	①	①	①	①
c. I am anxious	①	①	①	①	①
d. I feel I don't have time	①	①	①	①	①
e. I don't feel like it	①	②	③	④	⑤
f. I am busy	①	②	③	④	⑤
g. I am alone	①	②	③	④	⑤
h. I have to exercise alone	①	②	③	④	⑤
i. My exercise partner decides not to exercise that day	①	②	③	④	⑤
j. I don't have access to exercise equipment	①	②	③	④	⑤
k. I am traveling	①	②	③	④	⑤
l. My gym is closed	①	②	③	④	⑤
m. My friends don't want me to exercise	①	②	③	④	⑤
n. My significant other does not want me to exercise	①	②	③	④	⑤
o. I am spending time with friends or family who do not exercise	①	②	③	④	⑤
p. It's raining or snowing	①	②	③	④	⑤
q. It's cold outside	①	②	③	④	⑤
r. The roads or sidewalks are snowy	①	②	③	④	⑤

Appendix T: Self-efficacy Questionnaire (French)

L'exercice régulier se définit comme « 30 minutes ou plus d'activité physique à un rythme modéré ou plus (p. ex. intensité d'une marche d'allure vive ou plus rapide encore), au moins 4 jours par semaine ». Selon cette définition, veuillez indiquer à quel point vous êtes certain de pouvoir faire régulièrement de l'exercice malgré les circonstances suivantes.

	Pas du tout certain	Quelque peu certain	Moyennement certain	Très certain	Absolument certain
a. Je suis très stressé(e).	①	①	①	①	①
b. Je suis déprimé(e).	①	①	①	①	①
c. Je suis anxieux(se).	①	①	①	①	①
d. J'ai l'impression de ne pas avoir le temps.	①	①	①	①	①
e. Je n'en ai pas envie.	①	②	③	④	⑤
f. Je suis occupé(e).	①	②	③	④	⑤
g. Je suis seul(e).	①	②	③	④	⑤
h. Je dois faire de l'exercice seul(e).	①	②	③	④	⑤
i. Mon ou ma partenaire d'exercice décide de ne pas faire d'exercice ce jour-là.	①	②	③	④	⑤
j. Je n'ai pas accès à des appareils d'exercice.	①	②	③	④	⑤
k. Je suis en voyage	①	②	③	④	⑤
l. Le centre de conditionnement physique est fermé.	①	②	③	④	⑤
m. Mes amis ne veulent pas que je fasse d'exercice	①	②	③	④	⑤
n. Mon conjoint ou ma conjointe ne veut pas que je fasse d'exercice.	①	②	③	④	⑤
o. Je passe du temps avec des amis ou des membres de la famille qui ne font pas d'exercice.	①	②	③	④	⑤
p. Il pleut ou il neige.	①	②	③	④	⑤
q. Il fait froid dehors.	①	②	③	④	⑤
r. Les routes ou les trottoirs sont enneigés.	①	②	③	④	⑤

Appendix U: Godin Leisure Time Exercise Questionnaire (English)

Considering a typical week in the last 6-months, how many times on average did you do the following kinds of leisure time exercise for 15 minutes or more during your free time?

Intensity of Exercise	*Times per Week*	*Time (minutes) per Session*
Mild Exercise ➔ (Minimal effort, no perspiration) Examples: yoga, easy walking, golf (no cart), bowling, etc.		
Moderate Exercise ➔ (not exhausting, light perspiration) Examples: brisk walking, easy bicycling, easy swimming, downhill skiing, dancing, tennis, recreational sports, etc.		
Strenuous Exercise➔ (heart beats rapidly, sweating) Examples: running, jogging, cross country skiing, vigorous swimming, vigorous long distance bicycling, competitive sports (soccer, basketball, etc.)		

Appendix V: Godin Leisure Time Exercise Questionnaire (French)

En tenant compte d'une semaine typique au cours des 6 derniers mois, combien de fois en moyenne avez-vous pratiqué les genres d'activités physiques ci-dessous pour temps de loisirs pendant 15 minutes ou plus, durant vos temps libres?

Intensité de l'activité physique	*Nombre de fois par semaine*	*Durée (minutes) par séance*
Exercice de faible intensité ➔ (effort minime, sans transpiration) Exemples : yoga, marche facile, golf (sans voiturette), quilles, etc.		
Exercice d'intensité modérée ➔ (pas exténuant, légère transpiration) Exemples : marche rapide, bicyclette à un rythme facile, natation à un rythme facile, ski alpin, danse, tennis, sports récréatifs, etc.		
Exercice d'intensité élevée➔ (pouls rapide, transpiration) Exemples : course, jogging, ski de fond, natation énergique, bicyclette de longue distance à un rythme énergique, sports compétitifs (soccer, basketball, etc.)		