2008

Evaluation of a multisite cardiac rehabilitation program delivered via telehealth technology

Collinson, Cathy (Catherine Mary)

Evaluation of a Multisite Cardiac Rehabilitation Program Delivered via Telehealth Technology

by

Cathy Collinson

Student #: 0027180

MPH 9801: Research Project

Supervisor: Dr. Darlene Steven

January 3, 2008

EXECUTIVE SUMMARY

Background

Cardiovascular disease (CVD) remains one of the leading causes of hospitalization, mortality, and potential years of life lost in northern Ontario. In Northwestern Ontario (NWO), the rates as well as the risk factors for CVD are higher than those for the general population of the province (North West Local Health Integration Network [NWLHIN], 2006). Although the impact of CVD has been steadily decreasing in Ontario over the last 20 years, northern Ontario has not seen the same magnitude of positive change.

In 2003, the Northwestern Ontario District Health Council (NWODHC) identified inequities in the delivery of cardiac services in NWO and made specific reference to the benefits of cardiac rehabilitation (CR). Historically, CR services in NWO have been available consistently only to those patients able to attend CR programming at the Thunder Bay Regional Health Sciences Centre (TBRHSC). Recovering cardiac clients outside of Thunder Bay have been limited by issues of distance (see Appendix A) from a CR program and a lack of sufficient numbers to provide economically and functionally viable CR programming in the clients' home communities.

The Program: CR via Telehealth

In Feb 2006, an application for a pilot CR program via Telehealth from TBRHSC to residents in outlying communities was approved by the Change Foundation. This pilot project enabled residents of Nipigon, Atikokan, Marathon, and Manitouwadge to access CR services after a cardiac event. Utilizing TBRHSC in a coordinating role, cardiac clients from the district were risk stratified and then given initial exercise prescriptions

from TBRHSC. Education and exercise sessions were provided to the participants in their home communities via a Telehealth videoconferencing link to TBRHSC.

Rehabilitation and nursing staff from Nipigon District Memorial Hospital, Wilson Memorial Hospital, Manitouwadge General Hospital, and Atikokan General Hospital were trained by TBRHSC staff to monitor CR clients during the exercise portion of the program. The clients could exercise in their home communities while accessing support from caregivers and peers during the program. Program implementation facilitated access to CR for a segment of the 43% of individuals who comprise the NWO population currently living outside of Thunder Bay.

Evaluation of the Program

An evaluation provided an opportunity to assess the pilot program in terms of its effectiveness, examine the outcomes, and maintain accountability. Evaluation of the pilot program focused on the innovative mode of videoconferencing to deliver the program. Measures of utilization, access, and acceptability of the program were included, employing indicators related to access to service, quality of care, health and well-being, resource utilization, and capacity for transference/generalization of the model. Staff and client satisfaction, changes in health status, and quality management indicators formed part of the overall evaluation.

Specific attention was paid to the outcomes and satisfaction measures related to the CR program provided via videoconferencing technology compared with those achieved through in-person program participation in Thunder Bay. The evaluation model was developed in consultation with steering committee members and in association with Lakehead University's Master's of Public Health Program participants. The evaluation

framework was reviewed and approved by the Ethics Review Board of TBRHSC. Following are the five sources of information that were collected for this document:

1. **Quantitative data:** Comparison of measures of blood chemistry, blood pressure, weight, and so on, before and after participation in the program.
2. **Patient education satisfaction:** Measures of participation in and satisfaction with CR education.
3. **Patient exercise satisfaction:** Data related to accessibility of and satisfaction with the exercise component of the CR program.
4. **Counselling satisfaction:** Satisfaction with and access to counselling sessions via a Telehealth videoconference.
5. **District staff evaluations** of the 10 education sessions they took over 3 days before providing CR to clients in the district.

Quantitative Data

Four quantitative measures showed significant improvements from program intake to exit. These included a decrease in the number of medications, improvement in the length of time the participants could exercise during stress testing, an average decrease in waist circumference, and a decrease in fat intake. Access time comparisons among the two city groups and one district group showed no significant differences.

Client Education Satisfaction

Comparisons were made among three CR groups (city-based with videoconference links to the district [Group A], city-based without videoconferencing [Group B], and district-based group [Group C]) regarding their satisfaction with the education portion of the CR program. The ratings for the three groups were very positive,

with over 50% in each group giving positive ratings to every question. There were no significant differences among the three groups on 7 of 8 education satisfaction questions. The two education groups taking part in the videoconferencing sessions were presented with 6 additional questions related to satisfaction with the videoconference experience. The majority of participants in both groups reported positive experiences with the education sessions, although the city-based group recorded more neutral responses regarding participation with other sites that were involved. The district-based participants noted more difficulty than the city-based group regarding hearing the participants clearly from other sites. Two questions directed specifically to the participants outside the city garnered very positive responses, with 92% feeling that videoconferencing increased their access to CR education and 93% disagreeing that it would be more beneficial to attend in the city.

Client Exercise Satisfaction

Satisfaction with the exercise session of the CR program was also high, with overall satisfaction ratings of 98% in all groups. There were no significant differences among the groups on any of the questions related to exercise class satisfaction. Although 41% of the district-based group did not know if it would be more beneficial to attend sessions in the city, 75% felt that videoconferencing increased their access to CR exercise programming.

Comments from the participants in the program were positive and described feelings of increased well-being, enhanced exercise competence, and broader knowledge base in terms of taking care of their own health. The district participants commented very

positively regarding having access to a program that they would otherwise be unable to attend.

Client Counselling Satisfaction

Ratings of satisfaction with the videoconferenced counselling sessions were very positive, although 40% of the participants were unsure if they would have preferred face-to-face sessions.

District Staff Evaluations

Satisfaction of district staff with the educational sessions provided to prepare them to deliver the CR program was positive, with most of the 10 educational sessions garnering good to excellent ratings. Follow-up staff satisfaction data were not available for this report because of the limited response to the satisfaction survey.

Conclusions

Overall, CR programming delivered via videoconferencing appears to be as effective and satisfactory a method of providing secondary prevention treatment for clients as programming provided on site and in person. A number of suggestions were made regarding improvements to the program, such as better exercise equipment and slower and louder presentations of the educational material. There was no dissatisfaction with the videoconference programming; in fact, there was widespread praise for the quality and value of the CR program, and those participants outside of Thunder Bay appreciated being able to take the program in their home communities.

Recommendations

1. Continue providing CR via Telehealth to the communities of Nipigon, Atikokan, Marathon, and Manitouwadge, with TBRHSC continuing in the coordination role.
2. Identify opportunities to expand the program beyond the initial four district sites.
3. Ensure the regular evaluation and replacement of exercise equipment in facilities providing CR programming.
4. Have the steering committee and partner sites identify specific indicators and processes for annual follow-up evaluations.

TABLE OF CONTENTS

LIST OF TABLES

SECTION 1: PROGRAM OVERVIEW AND DESCRIPTION

In August 2005, a proposal was submitted to the Change Foundation requesting support for a pilot project that would provide cardiac rehabilitation (CR) services to residents of Nipigon, Atikokan, Manitouwadge, and Marathon in Northwestern Ontario (NWO). This program would be offered utilizing Telehealth videoconferencing technology to link the hospitals in the four rural communities to the Thunder Bay Regional Health Sciences Centre's (TBRHSC) CR Program. A steering committee comprised of clinical and management staff of TBRHSC and participating district hospitals, as well as a member of Lakehead University's graduate faculty and a graduate student, was established.

The pilot project would provide access to CR programming for residents living outside of Thunder Bay. To facilitate district access to evidence-based CR services, sites across the region would have CR education, counselling, and exercise sessions delivered at the hospitals within their home communities utilizing Telehealth videoconferencing technology. Local rural health professionals (i.e., physiotherapists, kinesiologists, and registered nurses) would be trained to monitor the exercise prescriptions developed by CR staff at TBRHSC.

Project approval was received from the Change Foundation in February 2006 (see Appendix B). The steering committee, which was established to oversee the planning, implementation, and evaluation of the pilot project, met to establish partnership agreements, plan site visits and communication plans, coordinate educational needs assessments with district professional staff, develop guidelines and standards for program

delivery, formulate the logic model (see Appendix C), and draft the program evaluation processes (see Appendix D).

Preparation and education for district clinical staff commenced in February 2006 utilizing a Telehealth format session and 3 days of on-site attendance at TBRHSC. An educational needs assessment was completed prior to delivery of the educational content. Education was provided on CR program content and standards, monitoring and client risk management strategies, and the principles of adult learning. The staff participants were provided with copies of the educational materials that would be given to clients enrolled in the CR program.

The CR program began with an initial referral and intake process for the clients that was completed at TBRHSC. Referrals to the program from family physicians and cardiologists were screened for appropriateness by CR program staff in Thunder Bay. At program entry, the clients underwent assessment and risk factor stratification. They then completed a cardiac stress test in order to set an exercise prescription. Education about the program also was provided. Referral of district clients to CR programming in their home communities was facilitated by the coordinating site, namely, TBRHSC. The program was meant to be completed in a 6-month period, with exercise sessions scheduled twice per week. Education sessions, as well as dietary and psychosocial counselling, were provided to district residents via a Telehealth videoconference from TBRHSC during the 6 months. At discharge, blood work, exercise stress testing, and satisfaction information were gathered from the participants.

These exercise sessions were linked via Telehealth from district sites to the coordinating site in Thunder Bay (TBRHSC). The participants from the region took part

in the warm-up and cool-down portion of the exercise class with those attending in Thunder Bay while being monitored by local professional staff. The remaining portion of the exercise session was facilitated locally utilizing the facilities and equipment of the regional site.

The first education session linking a district facility with the CR education program at TBRHSC took place in March 2006. This was followed by the first exercise session link in April 2006. The remaining sites launched the complete program in May 2006.

Sponsors of the program included the Change Foundation, TBRHSC, four hospitals in the district of Thunder Bay, and Lakehead University. Stakeholders served by the program included Thunder Bay District clients, all of whom have experienced a cardiac event, and their family members. The sponsoring agencies continue to be the primary users of the evaluation information because they are in a position to make decisions about the future of the program and conduct ongoing evaluations.

SECTION 2: LITERATURE REVIEW

Collection of literature for review included a search of electronic databases for the last 10 years up to December 31, 2006. MEDLINE, PUBMED, and OVID search engines were employed, and the following key terms were used: coronary artery disease, myocardial infarction, percutaneous coronary intervention, angina, angioplasty, rehabilitation, exercise, cardiac rehabilitation, exercise therapy, and sports medicine. Reference lists of retrieved articles were reviewed for additional resources.

Definition of CR

The Canadian Association of Cardiac Rehabilitation (2004) defined CR as the following:

> The enhancement and maintenance of cardiovascular health through individualized programs designed to optimize physical, psychological, social, vocational and emotional status. This process includes the facilitation and delivery of secondary prevention through risk factor identification and modification in an effort to prevent disease progression and recurrence of cardiac events. (p. 2)

The World Health Organization defined CR as "the sum of the activities needed to provide the optimal physical, mental and social pre-conditions for regaining a normal function in society" (as cited in Fridlund, 2002, p. 15). CR is a multidisciplinary approach to improve short-term recovery and promote long-term changes in lifestyle that help to correct adverse cardiovascular disease (CVD) risk factors (Hamm et al., 2004; Thompson, 1994).

The provision of CR as a secondary prevention treatment after a cardiac event (acute myocardial infarction [AMI], coronary artery bypass graft [CABG], angina, and percutaneous coronary intervention-angioplasty [PCI]) was found to be beneficial in all

studies reviewed, although program components and the size and scope of benefits varied.

Death from CVD in Canada was 74,626 in 2002 (Heart & Stroke Foundation of Canada, 2007). Approximately 32% of all male deaths and 34% of all female deaths are caused by CVD. The age-standardized mortality rates per 100,000 for CVD by gender for Canada in 2004 were 175.6 total, 223.7 male, and 137.9 female (Statistics Canada, 2007). According to Health Canada (2002), the economic burden of CVD is estimated to be more than $18 billion annually.

CVD is the primary cause of morbidity and mortality of men and women in NWO, and mortality rates continue to be higher than the provincial average (North West Local Health Integration Network [NWLHIN], 2006). The age-standardized mortality rate per 100,000 for Ontario in 2001 was 602.6; in the Northwest, the rate was 734.9, the highest in the province (NWLHIN). Rates of circulatory system diseases in the Northwest are in the upper quartile for the province. In fact, NWO has a 48% higher standardized mortality ratio for hospital separations for CVD than the rest of the province (Northwestern Ontario District Health Council [NWODHC], 2003). Residents of NWO have higher rates of many of the risk factors for CVD than people in the rest of the province, and individuals are presenting younger with multiple risk factors. NWO has one of the highest hospitalization rates for CVD in Ontario (NWODHC; Steven, Kirk-Gardner, & Cox, 2007).

CR Programs

Programs vary from exercise alone to those that incorporate exercise with a number of other interventions. Although a wide variety of program schedules and

components exist, the common elements consist of a medical evaluation, including baseline blood work and medication review; prescribed exercise regimen; behavioural change strategies; risk factor modification; education; counselling; and psychosocial support (Detry, Vierendeel, Vanbutsele, & Robert, 2001; Dolansky & Moore, 2004; Fox et al., 2004; Reid et al., 2005; Thompson, 1994; Tuniz et al., 2004; Turner, Bethell, Evans, Goddard, & Mulee, 2002). Services of some or all members of a multidisciplinary team, including physiotherapists, dieticians, psychologists, pharmacists, vocational counsellors, and social workers, were included in the majority of studies and literature reviewed.

Entrance into a CR program is initiated by physician referral after a client experiences a cardiac event. Inclusion criteria vary, but referrals generally are made after a diagnosis of angina, AMI, angioplasty, or CABG surgery. Recruitment and uptake into CR programs are impacted by communication, referral and discharge processes, health care provider practices, inter- and intrainstitutional relationships, and models of delivery (Grace et al., 2006). Arthur, Smith, Kodis, and McKelvie (2002) noted that only 25% to 30% of eligible clients are enrolled in institution-based CR programs after CABG surgery, and Norris et al. (2004) identified a lower uptake percentage in eligible clients (10%-20%). Norris et al. also noted that referral to a CR program is significantly more likely for young male clients who have undergone a prior revascularization procedure and who have not reported cerebrovascular, peripheral vascular, or renal disease. A review of the literature noted a significantly higher referral rate for males than females, which is out of proportion with CVD incidence rates.

Detry et al. (2001) noted that attendance at a CR program is dependent on the clients' location. Centres with a geographically large service area generally recruit CR program participants from within the immediate vicinity. Stewart-Williams, Lowe, and Candlish (2005) identified during a pilot study of a CR program that lack of transport was a major deterrent for many people to attend.

Client factors may include a lack of interest, reluctance to change lifestyle, depression, dislike of classes/hospital, work or domestic commitments, lack of family support, and rural residence. Program costs, electrocardiogram (ECG) monitoring requirements, location and accessibility, and parking are examples of service factors that influence CR program participation. Professional factors include knowledge and attitudes about CR; referral practices; and prejudice (i.e., age, race, gender; Beswick et al., 2004).

All the literature reviewed included admission evaluations with assessments of physical, physiological, emotional, and current exercise capability. Baseline blood profiles, including cholesterol, triglyceride levels, and blood glucose screening, were carried out along with a physical history and exam, smoking history, medication review, and an exercise tolerance test. Body mass index (BMI) was calculated in most of the studies that were reviewed. An exercise prescription based on initial risk stratification and developed by rehabilitative and/or specifically trained CR program staff was provided to each participant.

Assessment Tools

Measurement tools utilized to assess exercise tolerance varied from the Six-Minute Walk Test (a measure of distance walked in 6 minutes) to treadmill testing utilizing a graded increase in resistance such as the Bruce protocol. Few studies

specifically identified the protocol used to assess exercise capacity. Guidelines from the Canadian Association of Cardiac Rehabilitation (2004) noted that utilizing a reproducible graded exercise testing and a perceived exertion scale (such as the Borg Scale) are the standard for exercise assessment.

Demographic data, including height; weight; and quantitative measures of blood values (i.e., cholesterol [low-density lipoprotein, or LDL, and high-density lipoprotein, or HDL], blood glucose, and triglycerides), were completed at entry to CR programs. Blood pressure, smoking status, and history were identified in all of the literature reviewed. A majority of the studies examined also included a diet or nutrition history.

Measurements of quality of life were completed in most of the studies that were reviewed. Health-related quality of life was measured the most often utilizing the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). This measure assesses a person's perceived physical, social, and psychological functioning, as well as overall well-being or life satisfaction. In all of the literature that was reviewed, the various measurements taken at admission to a CR program were repeated at program completion.

A review of the literature also revealed a wide variety of exercise scheduling among programs. Frequency of the sessions varied from once to five times per week, with most of these sessions occurring in an institutional setting supervised by trained professional staff. Session length also varied from 30 minutes to 1 hour and included a warm-up and cool-down component of 5 to 15 minutes.

Program length also varied from 6 weeks (Wright, Williams, Riley, Marshall, & Tan, 2002) to 52 weeks (Hamm et al., 2004). Reid et al. (2004) noted in a randomized

trial that there were no clinically meaningful or statistically significant outcome differences between a group receiving CR over 3 months and one receiving the same program over 12 months. Both groups showed improvement in cardiorespiratory fitness and daily physical activity, as well as reduced levels of LDL cholesterol, generic and heart disease, and symptoms of depression

CR Results

Joliffe et al. (2001), in a Cochrane review, summarized a meta-analysis review with a total of 8,440 clients that exercise-based CR was effective in reducing cardiac deaths among the participants. Total cardiac mortality was reduced by 31% (95% confidence interval 0.51 to 0.94), although the review was not able to clarify if exercise only or a comprehensive CR model was more beneficial to the clients. Total cholesterol and LDL levels were significantly reduced in the comprehensive CR group.

Utilizing a two-group randomized controlled trial experiment, Arthur et al. (2002) examined the benefits of 6 months of hospital-based exercise training versus 6 months of home-based exercise training with respect to physical, quality of life, and social support outcomes in 242 clients following CABG surgery. The findings included significant improvement in peak oxygen consumption (VO_2) and reductions in waist-to-hip ratio in both groups after 6 months of exercise training (36% in hospital group vs. 31% in home group). The hospital group had a statistically significant increase in peak heart rate (126.4 vs. 136.7; $p < .0001$) after 6 months, and both groups demonstrated significant improvements from baseline in the physical composite score of the SF-36 ($p < .0001$). Arthur et al. also found that the home-based exercise program resulted in greater total

social support (called functional support) and statistically significant higher scores in belonging support than the hospital-based exercise group.

Improvements in a number of measures were noted in all literature reviewed. Physical working capacity (functional capacity), as measured by VO_2, improved significantly in the studies that used this as a measure (Arthur et al., 2002; Detry et al., 2001; Hamm et al., 2004; Turner et al., 2002; Wright et al., 2002). A two-group longitudinal comparative study by Dolansky and Moore (2004) concluded that participation in CR improved the lower extremity function and perception of physical function in older adults.

Wright et al. (2002), who studied the effects of a low-level, short-term (6-week) exercise CR program following CABG surgery, noted a statistically significant increase in VO_2 capacity in both a post-CABG CR group and a post-CABG control group who supervised their own recovery. Improvements in resting heart rate and recovery of heart rate were noted by Tsai, Lin, and Wu (2005) in clients randomly assigned to a three times per week CR exercise group over control group participants who received no further advice about a specific exercise program.

Hamm et al. (2004) noted that significant increases in VO_2 capacity, gains in medical outcomes, and role physical scores, as measured by the SF-36, occurred at 38 weeks of program participation. Stewart-Williams et al. (2005) noted that unplanned readmissions to hospital at 28 days and 6 months, as well as mortality rates at 28 days, were higher for those who did not participate in a CR program pilot, although the sample size in the study was small.

There is speculation that hospital-based exercise classes promote perceived social support because of the group nature of the program. Arthur et al. (2002) did not find this to be the case in a 6-month trial of hospital-based versus home-based exercise programs following CABG surgery. Turner et al. (2002) noted a statistically significant decrease in anxiety and depressive symptoms in individuals who participated in CR programming, although Tuniz et al. (2004) identified CR as less effective in improving the psychological status of females.

Follow-up studies varied as to the endurance of initial gains from participation in CR programs. Detry et al. (2001) noted a statistically significant number of smoking recidivism within 1 year, as did Reid et al. (2005). Blood lipid levels were decreased in almost all studies, although the amounts varied in significance. Resting heart rate was lowered in all studies that identified it as a measure. Body weight maintenance or increase was found in almost half of the studies reviewed (Detry et al.; Fox et al., 2004; Reid et al.; Tuniz et al., 2004), although Detry et al. identified the greatest weight gain among the study participants who quit smoking and maintained abstinence from tobacco through 1 year.

Forty percent of the studies that were reviewed identified no significant change in blood pressure at discharge or at 1-year follow-up. Hamm et al. (2004) noted that all clinical and psychological variables improved significantly over the course of a 52-week CR exercise program, with the exception of resting systolic and peak diastolic blood pressures.

Rejeski et al. (2002) reported that participants in a CR program experienced significant improvements in all outcomes and that "older cardiac rehabilitation patients

with lower physical function who have the greatest risk for subsequent morbidity and mortality will achieve the greatest short-term benefit from organized physical activity when it is coupled with group-mediated cognitive behavioural counselling" (p. 1711). This finding was supported by Dolansky and Moore (2004), who found that the individuals who participated in a CR program had greater lower extremity strength, greater range of motion, better dynamic and static balance, better gait, and perceptions of better physical function.

Default rates varied in the literature reviewed. Completion rates ranged from 58% (Sanderson, Phillips, Gerald, DiLillo, & Bittner, 2003) to 91% (Rejeski et al., 2002). Rejeski et al. also noted that the females had lower rates of entry to and participation in CR programs, with higher rates of attrition. For those females who did complete CR programming, Rejeski et al. noted that their health status improvements were similar to those of the males. Fox et al. (2004) identified that partner and relative involvement increased compliance with and attendance at a CR program. Factors influencing completion fit into medical and nonmedical reasons. Sanderson et al. noted that personal reasons accounted for 63% of the individuals not completing, with the remaining 37% not completing for medical reasons. It is interesting to note that those who cited personal reasons were more likely to be employed and obese.

Telehealth/Telemedicine Technology

Telemedicine refers to the use of communications and information technologies to support the delivery of clinical care, professional education, and health-related administrative services. Telemedicine was developed in northern Ontario through a demonstration project in 1998-1999 to provide specialist consultation, continuing

professional development, and client education via two-way television and electronic medical devices. Ontario Telehealth Network, established with the amalgamation of North Network and two other provincial Telehealth networks, currently has more than 360 sites in rural and urban Ontario communities.

Telehealth, or telemedicine technology, has been utilized throughout the province to provide care closer to the health care consumer's location. Telehealth has been described as "the use of electronic information and communications technologies to provide and support healthcare [*sic*] when distance separates the participants" (Starren et al., 2005, p. 181). Telemedicine has been used primarily to enable rural citizens to consult with specialists without leaving their home communities. The technology also has been used to provide access to continuing education and professional development for health care professionals.

Barnason et al. (2003) noted that Teleheath technologies may be an efficient means to

> Provide patient education, reduce the distance burden between the patient and clinician, problem solve, collect process and outcome data, decrease patient anxiety, increase self-efficacy, improve early detection of post-hospitalization problems, decrease re-hospitalization, decrease hospital length of stay and improve patient satisfaction. (p. 150)

The growing use of non-face-to-face health care is a function of geographical remoteness and isolation, barriers in access to transportation, low-density populations with few economies of scale to be gained, and a lack of access to specialist services in sparsely populated areas.

Mair and Whitten (2000), in a systematic review of studies of client satisfaction with telemedicine, concluded that most studies represented demonstration and feasibility

studies rather than full-scale trials. They noted that sample sizes were often small, with only 7 of 32 studies having more than 100 participants. Client satisfaction measures were generally simple survey instruments. Information from Mair and Whitten identified that

> Patients found teleconsultations acceptable; noted definite advantages, particularly increased accessibility of specialist expertise, less travel required, and reduced waiting times; but also had some disquiet about this mode of healthcare delivery, particularly relating to communication between provider and client via this medium. (pp. 1518-1519)

Telepsychiatry has been utilized in Australia since 1996, and teleradiology began in 2001. Outcomes from a Telehealth project reviewed in 2004 by the Western Australia Department of Health noted that the project achieved its objectives of significant clinical utilization, education, and training support, and improved information access (as cited in Dillon, Loermans, Davis, & Xu, 2005). It is interesting to note that clinical use was second to educational use, at 30% and 40%, respectively. Although cost benefits were not significant, Dillon et al. noted that the relatively high start-up costs related to the purchase of Telehealth equipment skewed these costs. It was expected that costs per visit would decrease over time. A review of the delivery of child development services by videoconference in Australia noted the usefulness of the format in improving access to professional support services and developing networking opportunities among regional sites (Bailey, Smith, Fitzgerald, & Taylor, 2005).

Johnston, Wheeler, Deuser, and Sousa (2000), in a quasi-experimental study, measured quality indicators (i.e., medication compliance, knowledge of disease, ability for self-care); extent and use of services; level of client satisfaction; and direct and indirect costs to evaluate the use of remote video technology in the home health care setting. The results showed no differences in the quality indicators, client satisfaction, or

use between the intervention and control groups, and the study demonstrated a reduced total mean cost of care for the video technology group.

The participants in a descriptive study (Barnason, Zimmerman, Nieveen, & Hertzog, 2005) comparing the outcomes of elderly clients undergoing CABG surgery in two groups noted that those clients receiving home health care and home communication intervention via technology after surgery had improved 3-month physiologic and psychosocial functioning scores than those who received only home health care, although it was not statistically significant.

Hensel, Demiris, and Courtney (2006) observed that anxiety, worry, or frustrations associated with technology may impact referral and attendance rates. The threat of replacing in-person visits, confidentiality concerns, and additional demands on time and effort may make the use of technology more challenging for clients.

Summary of the Literature

The review of the literature found that CR programs are defined generally as an organized program of activities that promotes the enhancement of cardiovascular and physical health and the reduction of CVD risk factors. Exercise programs, paired with risk factor modification education, psychosocial support, and behaviour change strategies, are organized in a variety of designs to provide CR programming. Clients are usually referred for CR programming by family physicians or cardiologists following cardiac events, although referral rates are influenced by clients' gender and location, and physician referral patterns. Males are more likely than females to be referred.

At admission, clients undergo physical assessment; blood profiles reflective of cardiovascular status; smoking and medication history; and some form of graded,

reproducible exercise testing. Measures of quality of life are also taken. Exercise prescriptions based on baseline data are developed for each client. The frequency and length of exercise sessions varied in the literature, from one to five sessions per week, occurring for a period of 3 months to 12 months.

Benefits from participation in CR programming were noted in all of the studies that were reviewed, although the scope and size of benefits varied. Positive changes in peak oxygen consumption, resting and peak heart rates, and lower extremity strength were noted in most studies that used these measures. Improvements in quality of life measures also were reported, although it is interesting to note that home-based programming resulted in higher perceived social support measures than hospital-based programming. Maintenance of gains after CR program completion varied. Decreased blood lipid levels appeared to endure, but smoking recidivism within 1 year was high.

The literature identified that only 10% to 30% of eligible cardiac clients take part in CR programming. In addition, CR program uptake and compliance rates are influenced by a number of factors, including interest, willingness to change, partner support, and location. It was noted that the further away a client is from a service, the less likely or able he or she is to use that service.

The development of telemedicine technology to offer health services has facilitated access to specialists and programs located away from urban centres. The use of telemedicine technology is relatively new, with most of the current research addressing demonstration and feasibility studies. Small populations located in geographically remote locations can benefit from access to this technology in the provision of health care. Although the literature that was reviewed endorsed the use of telemedicine technology,

concerns regarding privacy, technological challenges, and anxiety may affect client satisfaction with this mode of service delivery.

SECTION 3: NEEDS ASSESSMENT AND ENVIRONMENTAL SCAN

NWO has the lowest population density in Ontario, but the area makes up 47% of the land mass of the province. Approximately 43% of a population of 242,450 in NWO lives outside of Thunder Bay. The region is comprised of numerous small towns and First Nations communities spread throughout rural and remote areas. The area has the highest percentage of Aboriginal population (13.9%) compared to the rest of the province (1.7%), although these numbers may be underrepresented because of underreporting and census data challenges. Aboriginal populations have a reduced life expectancy and poorer health status than the general Canadian population, and circulatory diseases account for 23% of all deaths among First Nations people (NWLHIN, 2006).

The geographic location and disbursement of the Northwest region population has resulted in numerous challenges in planning, delivering, and accessing health services. Many remote First Nations communities are not accessible year-round by road. Weather and road conditions can make transportation difficult or impossible for much of the winter season in all northern communities. Low-density populations mean that few economies of scale can be gained in the provision of health care.

A network of 12 small or community hospitals, one academic/teaching hospital in Thunder Bay (TBRHSC), community health centres, outpost nursing stations, and community-based health services exists in the region. This network provides acute, primary, and secondary health care to residents of the region. In rural and northern communities, the hospital is the hub of health care, providing a broad and comprehensive range of services to meet the needs of area clients. Access to tertiary care at TBRHSC is facilitated by transfer utilizing land and air ambulance.

Despite the fact that individuals have widespread knowledge of risk factors and prevention methods, CVD mortality in the north remains well above the provincial average. Heart disease is ranked #1 by the Ministry of Health and Long-Term Care (as cited in Steven et al., 2007), according to such criteria as prevalence, comorbidity, hospitalizations, and costs. Utilizing regional cardiac 2001 discharge rates adopted by the Cardiac Care Network of Ontario in the Ontario CR Pilot Project, the northern region has approximately 1,217 discharges after a cardiac event per 100,000 residents, the highest rate in the province.

The NWLHIN's environmental scan (2006) revealed that NWO has rates of hypertension that are in the highest quartile for the province. Determinants of health, namely, tobacco and alcohol use, daily fruit and vegetable consumption, obesity, and socioeconomic status, are all worse in NWO than in the rest of the province. Obesity rates are 7.1% higher in NWO, and the population identified as overweight is more than 10% higher than in the rest of the province. The presence of a higher rate of daily smokers in a region is significantly related to both CVD and ischemic heart disease (IHD) mortality. Poor health practices are known to be related to an increased risk of chronic disease, mortality, and disability. A detailed needs assessment can be found in Appendix F.

Based on 2005 data, the NWLHIN (2006) determined that male and female life expectancy in NWO is the lowest in the province, with the highest age-standardized mortality rate in Ontario. A rate of heart disease that is higher than the provincial average (8% vs. 7.2%) exists in the north. In four of the five major causes of hospitalization (i.e., circulatory system diseases, digestive system diseases, respiratory system diseases,

injury, and poisoning), NWO has the highest hospitalization rate in Ontario (NWLHIN). NWO residents report the lowest rates in the province for access to a physician (84.5%), while also reporting the highest utilization rate for in-hospital acute care. Emergency department use for nonurgent care is the highest in the province (NWLHIN). Readmission rates for AMI are above the provincial average. These statistics are likely a reflection of poorer general health status and a lack of ambulatory and community-based services available in the region.

In 2003, the NWODHC identified inequities in the delivery of cardiac services in NWO. The absence of CR programs in NWO may be attributed to an insufficient critical mass in sparsely populated communities. Historically, citizens of the rural region outside of Thunder Bay have had limited access to organized CR services. Health care providers in the region developed the proposal for CR programming via videoconferencing technology as a way to facilitate more equitable access to a program with demonstrated benefits for clients who have experienced cardiac events.

Evaluation Design and Methodology

Evaluation of the pilot program was focused on three dimensions: program needs and theory, program process and outcomes, and program efficiency. A variety of qualitative and quantitative measures utilizing a range of assessment tools were employed.

The project evaluation included measures of access to service, quality of care, health and well-being, effectiveness of the regional coordination model, resource utilization, and cost. The CR program participants were evaluated individually for elements reflective of changes in health status indicators. Demographic and clinical

profile data, including blood profiles, body measurements, psychological scores, and medications and risk stratification, utilizing the Canadian Association of Cardiac Rehabilitation (2004) guidelines were documented. Satisfaction measures also were obtained.

Measures were compared between those groups participating in CR programming in person in Thunder Bay and those at the regional sites. Of the two groups in Thunder Bay, one participated in a videoconference with the region during the exercise and education sessions (Group A), and the other, which served as the control group, did not (Group B). The third group included those clients outside of Thunder Bay who were attending CR programming at regional sites (Group C). All groups received the same CR programming based on the current delivery model and content. Additional measures of district staff satisfaction with the educational preparation to provide CR program monitoring were completed.

Client assignment to groups occurred based on location (i.e., city or region). The participants from Thunder Bay self-assigned to groups depending on the time of day of the exercise sessions they chose. When the Thunder Bay participants chose a session that included videoconference links with the district sites, they were informed of this and were offered the option of choosing a different session. Regional site participant selection was impacted by the size of the regional participant group. Because of the small number of regional participants, all of those who completed the CR program with pre- and postquantitative profiles available were included in the quantitative analysis. Regional results were reported only in nonidentifying form to reduce opportunities for individual client identification.

From March 2006 to December 1, 2007, there were 72 CR program intakes from district clients. Of those 72, 11 (15%) were excluded from the program because they did not meet the program eligibility criteria, 31 (43%) completed the program, 13 (18%) dropped out, and 17 (24%) remain active in the program During the same period, Thunder Bay had 454 intakes, of whom 35 (7%) were excluded, 197 (43%) completed the program, 72 (16%) dropped out, and 150 (33%) remain active in the program.

Data were retrieved from the CR program files at TBRHSC. Data analysis was completed offsite, with each of the three groups identified only by number. Individual client identification information was separated from the data prior to analysis to reduce bias and maintain confidentiality. The project evaluation included a summary of demographic data as well as quantitative and qualitative analyses.

Quantitative Data

Pre- and post-CR program data were gathered from 33 cases. These data included three measures of access: time from cardiac event to CR program referral, time from referral to CR program intake, and time from intake to program start. Attendance rates at the CR education sessions for the 33 cases were calculated. A summary list of the data that were gathered is included in Appendix F.

An extensive history (see Appendix G) was taken from each participant. The clients self-assessed their readiness for change utilizing information on the five stages of change (see Appendix H). Measures of clinical quantitative data included an analysis of blood chemistry at program entry and exit. The results of fasting blood sugar, total cholesterol, LDL, HDL, and tryglycerides were collected and analyzed using standard laboratory testing procedures. Client waist circumference, BMI, resting and average heart

rates, and blood pressure were measured by CR program staff. Exercise tolerance was measured utilizing the Duke Activity Status Index (see Appendix I) and the Bruce protocol stress testing procedures. Measures of ECG changes as well as reports of chest pain were documented.

Fat intake was evaluated at program start and completion using the Fat Intake Questionnaire, adapted from the Northwest Research Clinic Fat Intake Scale (see Appendix J). The results from the blood work, stress testing, and physiological measures were converted to risk stratification scores for the males (see Appendix K) and the females (see Appendix L). The Hospital Anxiety and Depression Scale (HADS; see Appendix M) was utilized as a screening and referral tool at admission and discharge.

Client Education

Education sessions were offered to all participants in the CR program. These sessions, which were taught by CR program staff, included an overview of the CR program, heart health education, medication tips, stress reduction instruction, information regarding heart healthy nutrition, and education about the benefits of exercise.

Client education data that measured participation in and satisfaction with CR education were gathered. Client satisfaction surveys (see Appendices N & O) utilizing Likert-scale questions developed specifically for the project were distributed to all education session participants at each session. Group B received a survey with the same questions, but this group's survey excluded questions regarding the videoconferencing technology. Two additional questions were posed to the Group C participants to ascertain their opinion regarding access and attendance preference. All surveys provided an opportunity to express comments and suggestions for program improvement.

Surveys from Groups A and B were randomly selected for inclusion in the study. The surveys that did not identify a location were excluded, as were the individuals who participated in the videoconference sessions, but did not complete the videoconference section of the survey. All completed satisfaction surveys from Group C were included. A total of 290 surveys were included in the analysis and were divided again into three groups; Group A (134 participants), Group B (82 participants), and Group C (74 participants).

Exercise Session

Clients enrolled in the CR program attended a twice-weekly exercise session for the program period of 6 months. The participants from the district were connected via videoconferencing technology with the exercise sessions at the coordinating site in Thunder Bay (TBRHSC). They participated in the warm-up and cool-down portions of the exercise session with the Thunder Bay group and were monitored for the remaining portion of the exercise session by professional staff at the district sites.

Information regarding client satisfaction with the exercise sessions was gathered in the same manner as the education component. Three groups (Group A [52 participants], Group B [49 participants], and Group C [12 participants]) were provided with questionnaires (see Appendices P & Q) that included Likert-scale questions seeking information about (a) their overall satisfaction, (b) their perceptions of the program's ability to meet their needs and expectations, and (c) their feelings that the program had been beneficial to them. The participants also were asked to rate the facility and to provide comments or suggestions for improvement.

Group C had 2 additional questions asking if they felt that it would be more beneficial to attend the program in the city and to comment on their experience of access to the program. Groups A and C were asked additional Likert-type rating questions about the videoconference experience.

Counselling

Counselling via videoconferencing was offered to Group C on an as-needed basis. This was evaluated utilizing a Likert-style satisfaction questionnaire developed specifically for the project (see Appendices R & S). The questionnaire asked specific questions related to access to and use of videoconference technology. Open-ended questions asking the clients to identify the benefits of the counselling session and requesting suggestions for improvement were included, along with an overall rating for the session. Nine surveys were returned.

Staff Education

Designated staff from the district sites attended the CR program delivery education sessions at TBRHSC. These sessions utilized expert staff from TBRHSC to train the district professionals to provide CR programming in their locales. A Staff Education Needs Assessment (see Appendix T) was completed prior to attendance at the education sessions.

A total of 10 sessions were provided over 3 days. These sessions included education about CR program components and structure, cardiac medications, motivational interviewing, diagnostic tests and interventions, CR program forms and Web site, congestive heart failure and cardiomyopathy, the registered dietician's (RD)

role in CR, IHD, and exercise prescriptions. District staff participants also observed the CR exercise sessions.

After each education session, the participants were provided with a satisfaction questionnaire (see Appendix U) that asked a series of Likert-type questions regarding their level of new knowledge and their opinion of the adequacy of presentation and discussion time during the session. The participants also were asked their opinion of the relevance of the session to their learning needs and if they felt that the instructor was able to convey the information clearly and was knowledgeable about cardiac issues. An overall rating of the training session was also included, along with space for comments and suggestions for improvement. A total of 13 staff completed the questionnaires for the 10 sessions.

Staff Satisfaction

Surveys were distributed to staff in Thunder Bay and the district to measure job satisfaction related to providing CR programming. A survey (see Appendix V) utilizing Likert-type and open-ended questions sought information regarding changes in workload, overall job satisfaction, and perceptions of senior management support and resource adequacy. Because only 4 of the 15 surveys were returned, this information is not included in this report. Informal discussion revealed that some staff were concerned that their responses would not remain anonymous

Findings

The analyses were conducted on the following five sets of data:

The quantitative data (33 cases) that assessed the measures of blood chemistry, blood pressure, weight, and so on, before and after the CR program.

The client education data that measured participation in and satisfaction with the CR education sessions (290 cases).

The data related to accessibility of and satisfaction with the exercise component of the CR program (113 cases).

The satisfaction and access items for the participants who attended the counselling sessions by videoconference (9 cases).

The district staff evaluations of the education sessions they took in order to start providing CR in the district. There were a total of 10 sessions provided over 3 days. These sessions had 13 cases each.

Part 1: Quantitative Data

Pre- (i.e., program entry) and postmeasures (i.e., program exit) were taken from 33 clients.

Description of these clients. There were 22 males (66.7%) and 11 (33%) females. Their mean age was 61.2 years (SD = 10.2). All but 1 (Filipino) was Caucasian. The majority (73%) were married, and 6% to 9% were divorced, single, common law, or separated

Program attendance. The number and percentage of clients attending each of the 8 sessions are given in Table 1. Most sessions were attended by about one third of the

clients, except for the Social Work Counselling and Smoking Cessation sessions, which were less well attended.

Table 1

Number and Percentage of Clients Attending Sessions

Session	Number attending	%
Introducing Your Heart Ed	11	33.3
Health Nutrition Ed	13	39.4
Benefits of Exercise Ed	12	36.4
Medications Ed	11	33.3
Destress Your Heart Ed	12	36.4
Dietary Counselling	10	30.3
Social Work Counselling	4	12.1
Smoking Cessation Counselling	1 of 3 smokers	33.3

Table 2 shows that one third of the clients did not attend any of the sessions. No one attended all 8 sessions, and only 1 person attended six of the sessions.

Table 2

Number of Sessions Attended

Number of programs attended	*N*	%
None	11	33.3
1	4	12.1
2	2	6.1
3	6	18.2
4	3	9.1
5	6	18.2
6	1	3.0
Total	33	100.0

Changes from intake to post. There was no significant change in employment (see Table 3). There also was no significant change in risk stratification. Two of 3 smokers quit smoking while enrolled in the CR program. ECG changes were noted during the Stress Test at Intake for 11 clients (33.3%), and for 8 clients at exit (24.2%). Chest pain

was reported by only 1 client at intake, and it was limiting. At exit, chest pain was also reported by 1 client. Neither of these changes was significant.

Table 3

Changes in Employment, Risk Stratification, Smoking Status, and ECG

Change in Employment Status	Number at intake	Intake %	Number at exit	Exit %
full time	13	39.3	14	42.4
retired	10	30.3	11	33.3
part time	3	9.1		3.0
not employed	2	6.1		3.0
LTD	3	9.1		6.1
STD short-term disability	2	6.1	3	9.1
Total	33	100.0	32	98.9
Change in Risk Stratification				
low	22	66.7	21	63.6
medium	9	27.2	8	24.2
high	2	6.1	2	6.1
Total	33	100.0	31	93.9
Change in Smoking Status				
yes	3	9.1	1	3.0
no	30	90.9	32	97.0
Total	33	100.0	33	100.0
Change in ECG				
stress test		33.3		
clients at exit				24.2
chest pain			1	
Total	11		9	

Comparison of mean changes from intake to exit. Means for intake and exit scores are presented in Table 4 for each quantitative measure. Four measures showed significant improvements from intake to exit. The largest improvement was in a decrease in the number of medications, from a mean of 6.76 to a mean of 2.45 ($p < .001$). There also was

a substantial improvement in the time for the stress test, from a mean of 426.9 seconds to 509.32 seconds (p = .004). Two other significant improvements were found, namely, an average decrease in waist circumference of 2.2 cm. (p = .034), and a decrease in fat intake of 1.5 grams (p = .037).

Table 4

Means for Intake and Exit Scores

Measures	Mean at intake	Mean at exit	p
Fasting Blood Sugar	6.23	6.59	.09
Total Cholesterol	4.22	4.07	.29
LDL	2.25	2.16	.43
HDL	1.13	1.18	.25
Triglycerides	1.82	1.63	.15
Body Mass Index	31.47	31.32	.66
Waist Circumference	107.09	104.83	.034*
Resting Heart Rate	72.87	70.73	.34
AHR	127.29	130.68	.20
Resting Systolic BP	128.10	128.16	.98
Resting Diastolic BP	77.10	74.84	.33
Average Systolic BP	161.48	166.32	.33
Average Diastolic BP	76.16	72.84	.18
Time in Stress Test - Seconds	426.90	509.32	.004**
ECG Changes noted during Stress Test	1.70	1.73	.71
Chest Pain during Stress Test	2.03	2.07	.33
Number of Medications at Intake	6.76	2.45	<.001***
HADS - Anxiety Symptom Score	4.32	3.71	.36
HADS - Depressive Symptoms Score	3.41	2.56	.065
Fat Intake Score	25.03	23.52	.037*

*p < .05; **p < .01; ***p < .001

Comparison of changes in the 5 locations. The means before and after for each of the measures for each location are presented in Table 5. Because of the small sample sizes and the number of variables examined, no statistical comparisons were made.

However, inspection of the means at intake and exit showed that the majority of measures changed in the direction of improvement for most locations. No location stood out as having better or poorer results.

Table 5

Means Before and After for Each Measure for Each Location

Measures	*A	B	C	D	E
	No. of Participants				
	9	5	8	5	6
Fasting Blood Sugar at Intake	6.70	6.16	5.99	6.04	6.02
Fasting Blood Sugar at Exit	6.87	6.15	7.00	5.92	6.63
Total Cholesterol at Intake	4.02	4.71	3.97	5.42	3.81
Total Cholesterol at Exit	3.85	4.00	3.75	5.25	3.90
LDL at Intake	1.97	2.52	2.21	3.27	2.03
LDL at Exit	1.87	2.27	1.92	3.07	2.23
HDL at Intake	1.16	1.15	1.11	1.29	1.04
HDL at Exit	1.11	1.06	1.22	1.40	1.15
Triglycerides at Intake	1.77	2.26	1.43	2.24	1.82
Triglycerides at Exit	1.93	1.46	1.33	1.68	1.65
Body Mass Index at Intake	33.19	31.32	30.33	26.65	34.56
Body Mass Index at Exit	33.76	31.04	29.78	26.20	33.91
Waist Circumference at Intake	110.11	106.80	103.12	93.40	118.00
Waist Circumference at Exit	108.22	108.00	102.37	90.80	112.58
Resting Heart Rate at Intake	72.44	66.40	70.38	70.00	80.83
Resting Heart Rate at Exit	69.38	67.25	71.00	70.50	74.67
AHR at Intake	119.67	119.20	124.13	125.80	137.83
AHR at Exit	120.00	129.25	132.00	140.00	136.33
Resting Systolic BP at intake	130.00	124.00	126.38	137.00	124.17
Resting Diastolic BP at Intake	76.11	66.20	76.13	83.00	76.67
Resting Systolic BP at Exit	121.25	132.50	133.50	128.00	127.50
Resting Diastolic BP at Exit	79.38	72.50	71.25	74.00	75.83
Average Systolic BP at Intake	155.56	168.00	153.25	172.00	158.33
Average Diastolic BP at Intake	71.11	70.00	75.13	82.00	78.33
Average Systolic BP at Exit	154.38	168.75	170.38	162.60	178.33

Measures	*A	B	C	D	E
	No. of Participants				
	9	5	8	5	6
Average Diastolic BP at Exit	73.75	66.25	73.75	71.60	75.83
Time in Stress Test at Intake - Seconds	374.56	331.00	523.50	385.00	400.67
Time in Stress Test at Exit - Seconds	475.25	501.25	575.13	531.20	454.17
ECG Changes during Stress Test at Intake	1.67	1.40	1.75	1.60	1.80
ECG Changes during Stress Test at Exit	1.88	1.50	1.75	1.60	1.80
Chest Pain during Stress Test at Intake	2.00	2.00	2.13	2.00	2.00
Chest Pain during Stress Test at Exit	2.00	2.00	2.25	2.00	2.00
Number of Medications at Intake	5.78	7.60	7.25	6.80	6.83
Medications Exit	1.56	2.80	2.63	3.80	2.17
HADS - Anxiety Symptom Score at Intake	3.11	4.60	6.50	3.00	3.17
HADS - Anxiety Symptom Score at Exit	3.67	3.50	4.13	3.00	3.83
HADS - Depressive Symptoms at Intake	2.67	2.40	3.88	5.60	2.33
HADS - Depressive Symptom Score at Exit	2.00	1.75	1.88	3.60	4.00
Fat Intake Score at Intake	26.67	19.40	25.13	26.80	24.50
Fat Intake Score at Exit	23.89	23.25	23.00	25.40	22.17

*To maintain the confidentiality of the participants, the names of the hospitals in this table will remain anonymous.

Comparisons of the five locations on their access times. The mean numbers of days for each group are presented in Table 6. No significant differences were found.

Table 6

Mean Numbers of Days for Each Group

	Location	No. of Participants	Mean Days	Minimum	Maximum
time from event to referral	A	9	20.00	2	75
	B	5	122.40	13	539
	C	8	260.00	29	873
	D	5	31.40	7	71
	E	5	204.20	14	934
	Total	32	126.56	2	934
time from referral to intake	A	9	85.90	30	121
	B	5	58.20	23	76
	C	8	51.00	20	83
	D	5	45.20	26	70
	E	6	80.00	13	148
	Total	33	66.00	13	148
time from intake to start	A	9	27.66	19	43
	B	5	39.40	14	120
	C	8	40.12	1	132
	D	5	29.40	12	51
	E	6	17.00	8	26
	Total	33	30.79	1	132

Part 2: Client Education Survey

A total of 290 ratings were obtained from clients about their education sessions. The number of clients per session ranged from 32 to 59 (see Table 7). Table 8 shows the number of participants per group.

Table 7

Number of Participants in Education Sessions

Name of session attended	No. of Participants	%
Destress Your Heart #1	43	15.0
Destress your heart #2	59	20.6
Introducing Your Heart	58	20.3
Nutrition	55	19.2
Benefits of Exercise	39	13.4
Cardiac Medication	32	11.0
Missing	4	1.4
Total	290	100.0

Table 8

Number of Participants per Group

Group	No. of Participants	%
Group A (Thunder Bay, VC)	134	46.2
Group B (Thunder Bay, No VC)	82	28.3
Group C (Outside Thunder Bay, VC	74	25.5
Total	290	100.0

Almost half (48.6%) of the participants did not answer how they became aware of the education sessions. Of those who answered, the main sources were the CR program instructor (71 clients) and the hospital (29 clients; see Table 9).

Table 9

Awareness of Education Sessions

How did you become aware of our education sessions?	No. of Participants	%
CR program instructor	71	24.5
printed info/pamphlet	10	3.4
Physician	19	6.6
Hospital	29	10.0
OTN/Telehealth coordinator	10	3.4
Spouse in CR	10	3.4
Missing	141	48.6
Total	290	100.0

Comparison of ratings among groups. Because of the small number of negative responses to most questions, the categories were collapsed into positive responses (*agree*, *strongly agree*) versus the others (*neutral*, *disagree*, *strongly disagree*). For those questions in which the wording was reversed, *disagree* and *strongly disagree* were scored as the positive responses. The percentage of positive responses to each question about the education session are given in Table 10.

Table 10

Percentage of Positive Responses to Each Question

Statements	Group A %	Group B %	Group C %	Total %
Presentation time was adequate	90.2%	87.8%	91.9%	90.0%
Discussion time was adequate	85.6%	87.7%	79.2%	84.5%
The speaker conveyed information clearly	96.9%	96.3%	94.5%	96.2%
I did not learn anything new in this session	79.2%	89.3%	69.4%	79.4%
The session was interesting and informative	94.0%	98.8%	93.1%	95.1%
The session was relevant to my needs	91.6%	100.0%	93.2%	94.4%
The handout materials were clear and understandable	97.8%	98.8%	98.6%	98.3%
The presenter was knowledgeable about cardiac issues	97.7%	98.8%	91.8%	96.5%

There was only a significant difference among the groups to one statement: "I did not learn anything new in this session," chi square (no. of participants = 277, $df = 2$) = 8.90, $p = .012$. The complete responses to that question are presented in Table 11. The main difference appears to be that more clients in Group B answered *neutral* (18.1%). This finding indicated that more clients outside of Thunder Bay were uncertain if they had learned anything new. However, it is possible that the reversed wording in the question also resulted in uncertainty how to respond.

Table 11

Percentage of Responses to Statement, "I Did Not Learn Anything New..."

Statements	Group A	Group B	Group C	Total
I did not learn anything new in this session	%	%	%	%
Strongly Agree	6.9%	2.8%	5.3%	5.4%
Agree	6.2%	9.7%	2.7%	6.1%
Neutral	7.7%	18.1%	2.7%	9.0%
Disagree	36.9%	47.2%	32.0%	38.3%
Strongly Disagree	42.3%	22.2%	57.3%	41.2%

Comparison of the two videoconferencing groups. The percentages of clients in Groups A and C who gave positive responses are presented in Table 12.

Table 12

Percentage in Groups A and C Who Gave Positive Responses

Statements	Group A	Group C	Total
	%	%	%
The involvement of multiple sites was valuable	70.5%	80.6%	74.0%
I could hear the presenter clearly	90.2%	94.5%	91.8%
I could see the presenter clearly	91.8%	94.5%	92.8%
Having other sites involved was a drawback	76.0%	78.9%	77.0%
I would prefer to attend sessions without other sites involved	72.0%	84.7%	76.6%
I could hear participants from other sites clearly	73.8%	59.7%	68.7%

Significant differences between Groups A and C were found for 2 questions. The complete responses for the questions are presented in Tables 13 and 14. There was a significant difference to the statement, "I would prefer to attend sessions without other sites involved," chi square (no. of participants = 197, $df = 1$) = 4.13, $p = .042$, This difference appeared to reflect a higher percentage of those in Group A (22.4%) being neutral than those in Group C (9.7%).

Table 13

Percentage in Groups A and C Who Responded to Statement, "I Would Prefer to Attend..."

Statement	Group A	Group C	Total
I would prefer to attend sessions without other sites involved	%	%	%
Strongly Agree	3.2%	1.4%	2.5%
Agree	2.4%	4.2%	3.0%
Neutral	22.4%	9.7%	17.8%
Disagree	29.6%	52.8%	38.1%
Strongly Disagree	42.4%	31.9%	38.6%

There was a significant difference to the statement "I could hear participants from other sites clearly," chi square (no. of participants = 198, $df = 1$) = 4.23, $p = .040$. This difference appears to reflect more negative responses from Group C than from Group A.

Table 14

Percentage in Groups A and C Who Responded to Statement, "I Could Hear Participants..."

Statement	Group A	Group C	Total
I could hear participants from other sites clearly	%	%	%
Strongly Agree	36.5%	18.1%	29.8%
Agree	37.3%	41.7%	38.9%
Neutral	15.1%	19.4%	16.7%
Disagree	4.0%	12.5%	7.1%
Strongly Disagree	7.1%	8.3%	7.6%

Two questions were specific to the participants in Group C. A total of 93% disagreed that it would be more beneficial to attend in Thunder Bay, and 92% felt that the videoconferencing increased their access to CR programming (see Tables 15 & 16).

Table 15

Percentage and Number of Responses from Participants in Group C to Statement, "It Would be More Beneficial..."

It would be more beneficial to attend CR education sessions in Thunder Bay	No. of Participants	%
Agree	3	5.0
Disagree	56	93.3
Not Applicable	1	1.7

Table 16

Percentage and Number of Responses in Group C to Statement, "Attending this VC in Home Community..."

Attending this VC in home community made my access to CR	No. of Participants	%
Better	58	92.1
It made no difference	4	6.3
Not applicable	1	1.6

The final question asked, "Overall, I found the session...." The *good* and *excellent* responses were combined and are reported in Table 17. There were no

significant differences among the groups, and more than 98% of the participants in each group responded either *good* or *excellent*.

Table 17

Ratings of Session by All Participants

Statement	Group A	Group B	Group C	Total
Overall, I found the session…(good or excellent)	100.0%	100.0%	98.5%	99.6%

Two open-ended questions were asked. The representative answers are presented below, and the complete set of responses is included in Appendix W. The first question was, "What benefits, it any, did you get from this session?" All three groups responded positively about increases in knowledge in the following areas:

- Handling stress: "I learned I can reassess situations." "Learning I need to take more time to de-stress."
- Benefits of exercise: "Better understanding of the need for exercise."
- Importance of eating well: "Cleared up issues regarding fat, sodium, cholesterol." "Found out max grams of fat/day."
- Understanding medication: "Learned more about my meds."
- Relaxation: "Learned about deep breathing." "Pay more attention to my body."
- General benefits: "A lot of reinforcement – I'm on the right track." "I gained a very good understanding of my condition."

The second question asked, "How could this education session be improved?" Many responses were positive and offered no suggestions for change:

- "It was excellent as is."
- "Don't see how it could be improved; it covered all."

However, three areas for improvement were suggested:

- More time: "More discussion time"..."More time so more interactive with students and teacher."
- Speak louder: "Remember we are old and can't hear as well."
- Go slower: "As a senior the information was too fast"..."Don't go too fast."

In summary, the ratings for the three groups were very positive, with more than 50% of the participants in each group giving positive ratings to every question. For most questions, the rates were in the 80% to 90% range or higher. The open-ended comments also indicated widespread satisfaction with the sessions. Although the sessions were well received, some areas for improvement were indicated. The open-ended comments raised the need for taking more time, speaking louder, and presenting at a slower pace. As well, the quantitative ratings showed that Group C reported significantly more problems hearing the other participants.

Perhaps the most important finding was that Groups A and B were equally satisfied and that 93% of those in Group C disagreed that attending in Thunder Bay would have been more beneficial. The conclusion from this survey is that the videoconferencing delivery of CR education was successfully received by clients in Thunder Bay and those at the district sites.

Part 3: Client Exercise Satisfaction Data

Exercise evaluations were completed by 113 clients (see Table 18).

Table 18

Evaluations of Exercise Session

Group	No. of Participants	%
Group A	52	46.0
Group B	49	43.4
Group C	12	10.6
Total	113	100.0

Because of the small number of negative responses to most questions, categories were collapsed into positive responses (*agree*, *strongly agree*) versus the others (*neutral*, *disagree*, *strongly disagree*). For those questions in which the wording was reversed, *disagree* and *strongly disagree* were scored as the positive responses. The percentage of positive responses by each group to each question is presented in Table 19. There were no significant differences among the groups on any of the questions.

Table 19

Percentage of Positive Responses to Exercise Session Question

Statement	Group A %	Group B %	Group C %	Total %
Overall rating of the program	100.0%	100.0%	91.7%	99.1%
The exercise leader conveyed information clearly	100.0%	100.0%	100.0%	100.0%
Discussion time was adequate	94.2%	98.0%	91.7%	95.6%
Exercise staff were knowledgeable	100.0%	100.0%	100.0%	100.0%
The program has met my needs	96.2%	89.8%	81.8%	92.0%
The program has met my expectations	98.0%	95.9%	91.7%	96.4%
The program has benefitted me personally	96.1%	93.9%	83.3%	93.8%

Comparison of the two videoconferencing groups. The percentage of positive responses by Groups A and C to the questions about videoconferencing is presented in Table 20. There were no significant differences between the groups on any of the questions.

Table 20

Percentage of Responses of Groups A and C Regarding Videoconferencing

Statements	Group A	Group C	Total
The involvement of multiple sites was valuable	66.7%	70.0%	67.9%
I could hear the presenter clearly	94.4%	88.9%	92.6%
I could see the exercise leader clearly	93.8%	90.0%	92.3%
Having other sites involved was a drawback	88.2%	80.0%	85.2%
I would prefer to attend sessions without other sites involved	94.1%	70.0%	85.2%
I could hear participants from other sites clearly	62.5%	90.0%	73.1%
The technology used to deliver this session was satisfactory	93.8%	100.0%	96.2%
How would you rate the facility?	96.2%	90.0%	95.2%

Two questions were specific to those outside of Thunder Bay. Fifty percent of the participants in Group C disagreed that it would be more beneficial to attend in Thunder Bay; 75% felt that the videoconferencing increased their access to CR (see Tables 21 & 22).

Table 21

Percentage and Number of Positive Responses of Group C to Statement, "It Would be more Beneficial..."

It would be more beneficial to attend sessions in Thunder Bay	No. of Participants	%
Agree	1	8.3
Disagree	6	50.0
Don't know	5	41.7
Total	12	100.0

Table 22

Percentage and Number of Positive Responses of Group C to Statement, "Attending These Exercise Sessions..."

Attending these exercise sessions in my home community made my access to CR exercise .. .	No. of Participants	%
Better	9	75.1
Worse	1	8.3
It made no difference	1	8.3
Not applicable	1	8.3
Total	12	100.0

One last question asked for an overall rating. The responses from every group were very positive (see Table 23).

Table 23

Percentage of Responses from All Groups

	Group A	Group B	Group C	Total
My experience with the CR program was....	98.1%	100.0%	100.0%	99.1%

Three open-ended questions were asked. Following are representative samples of the answers. The complete set of responses is included in Appendix X.

The first question was, "Please tell us why you rated the facility as you did?" Most comments were positive: "excellent staff and program"..."knowledgeable staff"..."caring staff"..."good variety of equipment"..."everyone was very helpful and friendly." However, a few comments pointed to dissatisfaction with the equipment: "several machines were 'out of order,' making it difficult for everyone to use machines"..."equipment needs replacing"... "needs more "newer" equipment."

The next question was, "What benefits, if any, did you get from the exercise sessions?" A range of benefits were identified:

- Motivation: "helped me to start exercising"..."motivated me to continue at home"..."I gained the initiative to exercise."
- How to exercise correctly: "I know the safe limits of exercising"..."learned how to work out in the right way"..."I learned the importance of consistent exercise and variable movements to keep respiratory system working better."
- Physical benefits: "better heart rate and flexibility"..."increased strength, stamina and improved sense of well-being."
- Psychological benefits: "changed how I feel about myself"..."helped my self-esteem."
- General benefits: "found how exercise can have a very positive impact on my blood pressure"..."I learned the importance of consistent exercise and variable movements to keep respiratory system working better."

The last open-ended question asked, "How could this cardiac rehabilitation program be improved?" There were a number of positive responses: "It can't be better than it is!... "great job"..."I thought the program was excellent"..."staff were exceptionally caring and supportive of everyone."

Suggestions for improvement fell into three categories:

Equipment problems: "more equipment, treadmills"..."get rid of old exercise machines and replace with new ones" "make sure all equipment is functioning to match class size."

Timing of sessions: "to run 12 months, not 6"..."three sessions per week"..."to start sooner after my surgery."

Misc.: "would prefer frosted windows in the exercise room to maintain greater privacy"..."have a special parking area for CR clients" "more staff."

In summary, ratings of the various aspects of the exercise session ranged from 80% to 90% positive for all three groups. Ratings of the videoconference component were also very positive, although ratings to the questions about the value of having multiple sites were slightly lower at about 70% positive. The lowest rating, 62.5% positive, was from Group A on hearing the participants at the other sites. The open-ended questions identified a range of benefits:

- Increased motivation to exercise.
- Knowledge how to exercise correctly.
- Physical benefits and psychological benefits.

However, there was some dissatisfaction with the quality of the equipment. Nevertheless, the overall rating of the exercise session was 99.1% positive responses, and only 1 client from Group C felt that it would have been more beneficial to attend sessions in Thunder Bay. Thus, the conclusion from the exercise survey is that the exercise session was a success, regardless of mode of delivery.

Part 4: Satisfaction with Counselling Sessions

Nine participants completed evaluations of the counselling sessions. Because of the small sample size and the small number of negative responses to most of the statements, the categories were collapsed into positive responses (*agree*, *strongly agree*) versus the others (*neutral*, *disagree*, *strongly disagree*). For those statements in which the wording was reversed, *disagree* and *strongly disagree* were scored as the positive

responses. Only one statement had fewer than 50% positive responses, and 44% of the clients were neutral on whether they would have preferred face-to-face sessions. The percentage of positive responses to each statement is presented in Tables 24 and 25.

Table 24

Percentage of Responses Regarding Counselling Session

Statement	Positive
I could hear the counsellor clearly	100%
I could see the counsellor clearly	78%
I could ask the counsellor questions	89%
I felt I could talk about any kind of problem	78%
I was worried that others might be listening	78%
I would have preferred meeting face to face	44%
If it was suggested that I have another counselling session with VC, I would be....	67%
Having access to this service in my community made it _____ on my ability to receive counselling	100%
Overall, I found the session	89%
It would be better to attend session in Thunder Bay	100%
Attending VC session in my community made my access...	100%

Table 25

Client Preference for Face-to-Face Counselling Sessions

I would have preferred meeting face to face	No. of Participants	%
Strongly agree	1	11.1
Neutral	4	44.5
Disagree	1	11.1
Strongly disagree	3	33.3
Total	9	100.0

Part 5: Staff Education Surveys

Thirteen district staff members completed evaluations on each of the 10 programs. Information about each of these staff members follows in Table 26.

Table 26

Demographic Information for District Staff

Discipline	No. of Participants	%
RN	1	7.7
Physio	7	53.8
OT	1	7.7
Kinesiologist	2	15.4
Other	1	7.7
Missing	1	7.7
Total	13	100.0
Educational Background		
Diploma	1	7.7
Baccalaureate	9	69.2
Other	2	15.4
Missing	1	7.7
Total	13	100.0
Total Experience in Discipline		
< 5 yrs	5	38.5
11-15 yrs	3	23.1
16+ years	4	30.8
Total	12	92.3
Missing	1	7.7
Total	13	100.0
Experience in CR		
no experience	9	69.2
< 5 yrs	3	23.1
missing	1	7.7
Total	13	100.0

Nine questions were asked about each session. The questions were answered on a 5-point Likert scale. For the first 8 questions, the scale was 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree*. For the last question, the scale was 1 = *very poor*, 2 = *poor*, 3 = *satisfactory*, 4 = *good*, and 5 = *excellent*. The mean ratings for the 9 questions for the 10 sessions are given in Table 27.

Table 27

Mean Ratings for the 9 Statements for the 10 Sessions

	Session*									
Statement	1	2	3	4	5	6	7	8	9	10
1. I learned something new in this session	4.54	4.63	3.77	4.57	3.67	4.38	4.57	4.38	4.46	4.38
2. Presentation time adequate	4.46	4.63	3.23	3.57	3.08	4.31	4.17	4.00	4.15	4.46
3. Discussion time adequate	4.54	4.88	3.38	4.29	3.75	4.46	4.33	4.54	4.08	4.62
4. The speaker conveyed information clearly	4.69	5.00	3.46	4.43	4.25	4.77	5.00	4.77	4.58	4.77
5. The session was interesting and informative	4.62	4.75	2.92	4.43	3.75	4.46	4.57	4.62	4.50	4.58
6. Handout materials	4.69	4.83	3.85	4.60	4.08	4.54	4.67	4.69	4.33	4.69
7. Relevance to my needs	4.85	4.75	3.62	4.43	3.64	4.38	4.71	4.62	4.50	4.46
8. Instructor knowledgeable	4.85	5.00	4.46	4.57	4.10	4.85	5.00	4.85	4.83	4.92
9. Overall, the training session was	4.83	4.75	3.82	4.43	3.92	4.62	4.86	4.69	4.75	4.69

*Topics of the 10 sessions: 1. Exercise Prescription 2. Introduction to CR 3. Cardiac Medications 4. Exercise Class Observation 5. Motivational Interviewing 6. Diagnostic Tests and Interventions 7. Forms and Web Site 8. Congestive Heart Failure 9. Registered Dietician role in CR 10. IHD

Because of the small sample size and the fact that there were missing data to some of the questions, no statistical comparisons were made among the sessions. Seven of the sessions (i.e., 1, 2, 6, 7, 8, 9 and 10) received an average above 4 for every question (between *agree* and *strongly agree* and *good* and *excellent* for the last question). Session 4 (Exercise Class Observation) received only one mean below 4, which was for "presentation time" ($M = 3.57$). Session 5 (Motivational Interviewing) received 6 mean ratings below 4, whereas session 3 (Cardiac Medications) received a single mean rating above 4, which was for "instructor," and the only mean rating below 3 (*neutral*), which wa for "The session was interesting and informative."

Three open-ended questions were asked. The responses are summarized in Appendix Y. The questions asked, "What benefits, if any, did you get from this training session?" "How could this CR training session be improved?" and "Any other comments

or suggestions?" The responses included a range of general positive comments: "excellent," "very well presented," and "interesting and informative." However, most comments were specific to 1 of the 10 different sessions and ranged from satisfaction with the value of the session. Examples include the following: RD Role in CR - "real world, realistic" and "great discussion" to suggestions for improvement: Exercise Class - "observing one class would have been enough" "having the exercise prescription session before the observation would have been better."

In summary, most of the sessions received very positive ratings, although a few sessions, namely, Exercise Class Observation, Motivational Interviewing, and Cardiac Medications received somewhat lower ratings, indicating that there is room for improvement. The comments to the open-ended questions included specific suggestions for improvements.

Conclusions and Recommendations

Pilot studies can be a valid first step in program development, facilitating greater understanding of the potential benefits and barriers for target consumers of a new program. Program pilots can provide opportunities for in-course modifications to delivery modes and program content, and the results can be used to inform future proposals. Stewart-Williams et al. (2005) stated, "A pilot study can provide opportunities to bring together multidisciplinary teams from primary, secondary, tertiary and social care, and from within this team of professionals create a culture of ownership, responsibility and accountability for a new program" (p. 481).

The current pilot project was developed to address the problem of reduced access to CR programs related to rural location and distance from the CR centre. The provision

of on-site exercise and education sessions in communities in the district around Thunder Bay removed the larger geographic and critical mass barriers that existed prior to implementation of the project. The findings suggested that secondary prevention CR programming delivered via videoconferencing technology is as effective and satisfactory as programming delivered on site and in person. A number of suggestions were made to improve the program (e.g., better exercise equipment, and slower and louder presentations of education material), but none of the participants expressed dissatisfaction with the videoconferencing mode of delivery. On the contrary, there was widespread praise for the quality and value of the CR program, and the participants in Group C were particularly appreciative of being able to take the program in their home communities.

These findings strongly supported the continuation of this project. Offering CR programs through Telehealth provides a valuable and effective service to clients in NWO who live at some distance from Thunder Bay. Enabling them to complete this program in their own communities is precisely the sort of regional contribution that Telehealth was designed to provide.

Recommendations

1. Continue providing CR via Telehealth to the communities of Nipigon, Atikokan, Marathon, and Manitouwadge, with TBRHSC continuing in a coordinating role.
2. Identify opportunities to expand the program beyond the initial four district sites.
3. Ensure the regular evaluation and replacement of exercise equipment in facilities providing CR programming.
4. Have the steering committee and partner sites identify specific indicators and processes for annual follow-up evaluations.

REFERENCES

Arthur, H. M., Smith, K. M., Kodis, J., & McKelvie, R. (2002). A controlled trial of hospital versus home-based exercise in cardiac patients. *Medicine & Science in Sports & Exercise, 1*, 544-550.

Bailey, M. A., Smith, A. C., Fitzgerald, A., & Taylor, E. (2005). Delivery of child development services by videoconferencing: A review of four years' experience in Queensland. *Journal of Telemedicine and Telecare, 11*(Suppl. 2), 1-3.

Barnason, S., Zimmerman, L., Nieveen, J., & Hertzog, M. (2005). Impact of a telehealth intervention to augment home health care on functional and recovery outcomes of elderly patients undergoing coronary artery bypass grafting. *Heart and Lung, 35,* 225-233.

Barnason, S., Zimmerman, L., Nieveen, J., Schmaderer, M., Carranza, B., & Reilly, S. (2003). Impact of a home communication intervention for coronary artery bypass graft patients with ischemic heart failure of self-efficacy, coronary disease risk factor modification, and functioning. *Heart and Lung, 32*, 147-158.

Beswick, A. D., Rees, K., Griebsch, I., Taylor, F. C., Burke, M., & West, R. R., et al. (2004). Provision, uptake and cost of cardiac rehabilitation programmes: Improving service to under-represented groups. *Health Technology Assessment, 8*(41), 15-19.

Canadian Association of Cardiac Rehabilitation. (2004*). Canadian guidelines for cardiac rehabilitation and cardiovascular disease prevention: Enhancing the science, refining the art* (2nd ed.). Winnipeg, MB: Author.

Detry, J. R., Vierendeel, I. A., Vanbutsele, R. J., & Robert, A. R. (2001). Early short-term intensive cardiac rehabilitation induces positive results as long as one year after the acute coronary event: A prospective one-year controlled study. *Journal of Cardiovascular Risk, 8*, 355-361.

Dillon, E., Loermans, J., Davis, D., & Xu, C. (2005). Evaluation of the Western Australian Department of Health telehealth project. *Journal of Telemedicine and Telecare, 11*(Suppl. 2), 19-21.

Dolansky, M. A., & Moore, S. M. (2004). Effects of cardiac rehabilitation on the recovery outcomes of older adults after coronary artery bypass surgery. *Journal of Cardiopulmonary Rehabilitation, 24*, 236-244.

Fox, K., Barber, K., Muir, L., Mead, A., Harris, A., Collier, T., et al. (2004). Development, implementation and audit of a cardiac prevention and rehabilitation programme for patients with coronary artery disease. *European Heart Journal,* (Suppl. 6), J53-J58.

Fridlund, B. (2002). The role of the nurse in cardiac rehabilitation programmes. *European Journal of Cardiovascular Nursing, 1,* 15-18.

Grace, S. L., Krepostman, S., Brooks, D, Jaglal, S., Abramson, B. L, Scholey, P., et al. (2006). Referral to and discharge from cardiac rehabilitation: key informant views on continuity of care. *Journal of Evaluation in Clinical Practice, 12,* 155-163.

Hamm, L. F., Kavanagh, T., Campbell, R. B., Mertens, D. J., Beyene, J., Kennedy, J., et al. (2004). Timeline for peak improvements during 52 weeks of outpatient cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation, 24*, 374-382.

Health Canada. (2002). *Economic burden of illness in Canada, 1998.* Retrieved from http://www.hc-sc.gc.ca/ahc-asc/media/nr-cp/2002/2002_ebic-femc_e.html

Heart and Stroke Foundation of Canada. (2007). *Incidence of cardiovascular disease.* Retrieved from http://www.heartandstroke.com/site/c.ikIQLcMWJtE/b.3484443 /k.5136/Incidence_of_Cardiovascular_Disease

Hensel, B. K., Demiris, G., & Courtney, K. L. (2006). Defining obtrusiveness in home telehealth technologies: A conceptual framework. *Journal of the American Medical Informatics Association, 13,* 428-431.

Johnston, B. Wheeler, L., Deuser, J., & Sousa, K. H. (2000). Outcomes of the Kaiser Permanente tele-home health research project. *Archives of Family Medicine, 9,* 40-45.

Jolliffe, J. A., Rees, K., Taylor, R. S., Thompson, D., Oldridge, N., & Ebrahim, S. (2001). Exercise-based rehabilitation for coronary heart disease. *Cochrane Database of Systematic* Reviews, *1*, CD001800.

Mair, F., & Whitten P. (2000). Systematic review of studies of patient satisfaction with telemedicine. *British Medical Journal, 320*, 1517-1520.

Norris, C. M., Jensen, L. A., Galbraith, P. D., Graham, M., Daub, W. D., Knudtson, M. L., et al. (2004). Referral rates and outcomes of cardiac rehabilitation after cardiac catheterization in a large Canadian city. *Journal of Cardiopulmonary Rehabilitation, 24,* 392-400.

North West Local Health Integration Network. (2006). *Environmental scan.* Thunder Bay, ON: Author.

Northwestern Ontario District Health Council. (2003). *Environmental scan of cardiac services in Northwestern Ontario, 2003.* Thunder Bay, ON: Author.

Reid, R. D., Dafoe, W. A., Morrin, L., Mayhew, A., Papadakis, S., Beaton, L., et al. (2005). Impact of program duration and contact frequency on efficacy and cost of cardiac rehabilitation: Results of a randomized trial. *American Heart Journal, 149*, 862-868.

Rejeski, W. J., Foy, C. G., Brawley, L. R., Brubaker, P. H., Focht, B. C., Norris, J. L., et al. (2002, July). Older adults in cardiac rehabilitation: a new strategy for enhancing physical function. *Medicine & Science in Sports and Exercise, xx,* 1705-1713.

Sanderson, B. K., Phillips, M. M., Gerald, L., DiLillo, V., & Bittner, V. (2003). Factors associated with the failure of patients to complete cardiac rehabilitation for medical and non-medical reasons. *Journal of Cardiopulmonary Rehabilitation, 23*, 281-289.

Starren, J., Tsai, C., Bakken, S., Aidala, A., Morin, P. C., Hilliman, C., et al. (2005). The role of nurses in installing Telehealth technology in the home. *CIN: Computers, Informatics, Nursing, 23*, 181-189.

Statistics Canada. (2007, April). *Mortality, summary list of causes.* Retrieved from http://www.statcan.ca/Daily/English/070427/d070427b.htm

Steven, D. (2007). *Environmental scan of heart disease in Northwestern Ontario.* Thunder Bay, ON: Lakehead University.

Steven, D., Kirk-Gardner, R., & Cox, S. (2007). *Follow-up survey for the Hearts for Life program.* Toronto, ON: Ministry of Health and Long-Term Care, Ontario.

Stewart-Williams, J. A., Lowe, J. M., & Candlish, P. M. (2005). Using pilot studies to inform health services. *Australian Health Review, 29*, 478-481.

Thompson, D. R. (1994, November). *Cardiac rehabilitation.* Retrieved from http://www.jr2.ox.ac.uk/bandolier/band9/b9-3.html

Tsai, S. W., Lin, Y. W., & Wu, S. K. (2005). The effect of cardiac rehabilitation on recovery of heart rate over one minute after exercise in patients with coronary artery bypass graft surgery. *Clinical Rehabilitation, 19*, 843-849.

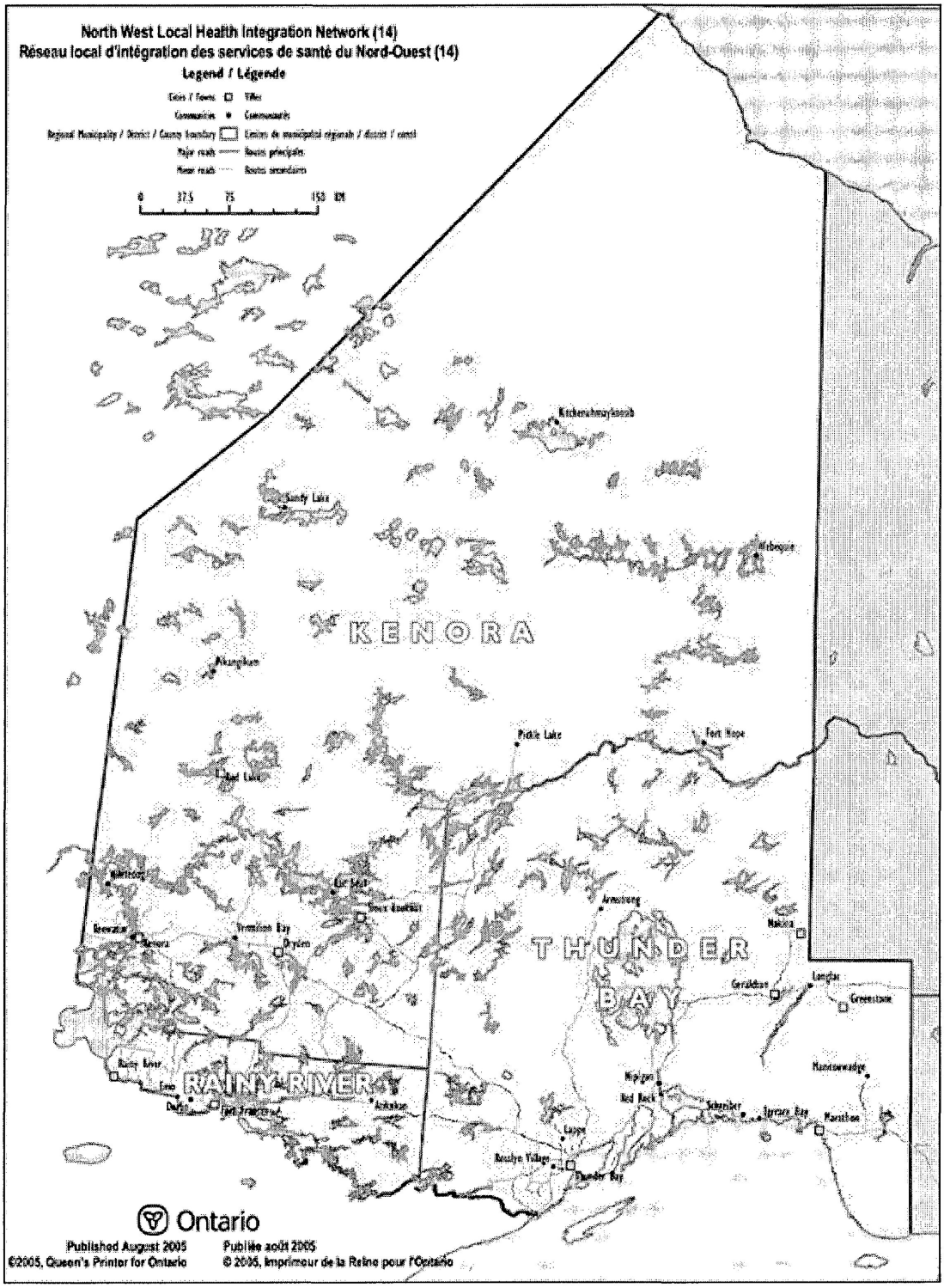
Tuniz, D., Bernardi, G., Molinis, G., Valente, M., D'Odorico, N., Morocutti, G., et al. (2004). Ambulatory cardiac rehabilitation with individualized care after elective coronary angioplasty: One year outcome. *European Heart Journal Supplements, 6,* J37-J46.

Turner, S. C., Bethell, H. J., Evans, J. A., Goddard, J. R., & Mullee, M. A. (2002). Patient characteristics and outcomes of cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation, 22,* 253-260.

Wright, D. J., Williams, S. G., Riley, R., Marshall, P., & Tan, L. B. (2002). Is early, low level, short-term exercise cardiac rehabilitation following coronary bypass surgery beneficial? A randomized controlled trial. *Heart*, *88*, 83-84.

APPENDICES

APPENDIX A: MAP OF NORTHWESTERN ONTARIO



APPENDIX B: PROPOSAL FOR THE CR PROGRAM

THUNDER BAY
Regional
Health
SCIENCES CENTRE

980 Oliver Road
Thunder Bay, Ontario
Canada P7B 6V4

Telephone
807-684-6000

www.tbrhsc.net

August 22, 2005

Victoria Wolno
The Change Foundation
200 Front Street West, Suite 2501
Toronto, ON
M5V 3L1

Dear Ms. Wolno,

Please find attached a submission for a Multi-site Telehealth Cardiac Rehabilitation Program for the residents of Northwestern Ontario.

The incidence and prevalence of cardiac disease in Northwestern Ontario exceeds the provincial average. Cardiac education and rehabilitation may be seen as one essential element in the delivery of care for these patients. Unfortunately, due to the geography of the region, currently the 50% of patients living outside the proximity of Thunder Bay have no access to this service.

The attached proposal presents an exciting alternative for these patients. Through the funding requested of the Change Foundation, Thunder Bay Regional Health Sciences Centre (TBRHSC) will be able to train staff in other facilities to provide the exercise component of the program. The proposed program will include the unique aspect of linking exercising patients via telehealth back to TBRHSC to provide essential peer support. This will be a key element of the evaluation.

The partner hospitals in this project are all committed to their in-kind contributions and to creating a truly sustainable service that may be transferable to other settings or other programs. TBRHSC is pleased to commit to the in-kind contributions as identified in the proposal and looks forward to leading this important initiative. TBRHSC will also act as the primary applicant and transfer payment agency.

Yours truly,

Ron Saddington,
President and CEO

Gwen Third,
Manager, Cardiology & General Medicine
Primary Contact

Foundation

Northern Cancer Research Foundation

APPENDIX C: LOGIC MODEL

Logic Model

- Problem or Issue
- Prevalence of Cardiac Disease in NWO
- Sparsely Populated Communities within the Region
- Lack of CR programs outside of Thunder Bay

Community Needs/Assets

- Regional Access to CR Programs including education, counselling, exercise
- Staff training to facilitate safe participation in regional sites
- Access to specialist assessments and diagnostic testing

Assets

- Established Cardiac Education and Rehabilitation program at TBRHSC
- Provincial Evaluation of CCN Pilot Model, including role of coordinating sites
- Established North Network for Telehealth access
- Commitment for Partnership to establish regional programming
- Commitment for program evaluation through Lakehead University

Desired Results, Outcomes, and Impact

Outputs

- Establish formal partnerships between 5 participating sites with coordination site
- Establish content for Professional Development /Preceptor Program
- Establish practice standards and guidelines for Regional Programs based on CACR and ACSM guidelines, as well as CCN Model Standards
- Detail implementation plan

Outcomes

- Establish multidisciplinary professional network in region
- Establish coordinating site role at TBRHSC
- Delivery of staff development program
- Review of implementation plan
- Establishment of full service program at all partner sites

Impact

Short Term

- Cardiac Rehab Network development in NWO

- Access to risk factor modification, stratification and modification for 50% of population of NWO
- Peer contact for regional participants through interactive Telehealth group sessions

Long Term

- Self Management of cardiac risk factors by participants leading to improved health outcomes and quality of life
- Potential to decrease utilization of health care resources with appropriate disease management
- Staff development will impact ability to improve quality of care for participants
- Potential impact to professional staff related to job satisfaction, recruitment and retention
- Evaluation of utilization of Telehealth in interactive format
- Evaluation of coordinating role model for CR utilizing Telehealth format including transfer potential to other sites

Influential Factors

- Increased awareness of cardiac risk factors including modification strategies will promote self management of disease process
- Expected change in quality of life of participants including family and community units
- Existing Cardiac Rehab Program at TBRHSC has demonstrated positive outcomes which are transferable to regional model
- Existing partnership programs in region such as Stroke Program with positive outcomes
- Expected regional focus on care delivery with LHIN will support program planning

Strategies

- Utilization of evidence based CCN coordinating site model for CR programming
- Utilization of Telehealth network for program delivery in remote sites
- Utilization of principles of adult education in both staff development and client education
- Implementation of nationally recognized program guidelines as per CACR and ACSM organizations
- Implementation of peer interaction and support networks for participants within the regional sites

Assumptions

- Response to improved access to programming would be equal to or greater than educational sessions tested with 8 regional sites via Telehealth.

- Professional staff in satellite sites would establish formal linkages with TBRHSC staff to provide expertise to communities.
- All sites will have capacity to provide program with no additional resources.
- Clients will be willing to attend intake sessions in Thunder Bay.
- Clients will assume responsibility for self management.
- Project would demonstrate effectiveness of Coordinating model via Telehealth method.
- Interactive methodology of delivery of Telehealth services would increase utilization of Cardiac Rehab services.
- Program delivery would be cost effective method to improve access to sparsely populated areas in region

APPENDIX D: DRAFT EVALUATION DIMENSIONS FOR CR PROGRAM DELIVERED VIA PILOT PROGRAM

What	How	When	Who
Program Needs and Program Theory Dimensions			
Program Needs	Literature review • CR - program components, effectiveness, outcomes Needs assessment • Demographics • Cardiac disease rates Rural/district-specific environmental scan • Population health • Determinants of health	All as part of paper	CC - all
Program Process and Outcomes Dimensions			
Access to Service	Referral practice and patterns *Time from event to referral *Time from referral to intake into program *Time from intake to program start *Patient satisfaction Site assessments	Once group of 6 or more discharges at reg. sites	CC with info provided by TBRHSC Completed
Quality of Care	Ability to implement all aspects of the program Education for district providers • standardization Consistent practice standards *Patient satisfaction *Professional staff satisfaction, recruitment & retention	 As above Q 6 mos-1 yr.	TBRHSC CC
Health and Well Being	*Demographics & history at admission • age, sex, ethnicity, marital and employment status • family, smoking, medication • referring event *Clinical profiles at admission and discharge • blood profiles, BMI, HADS, functional capacity • risk stratification *Patient satisfaction Readmission rates for cardiac CMGs Emergency department visits	Once 6 or more discharges at regional sites	CC with info provided from TBRHSC Long-term planning
Regional Coordination Model	Quality management • Standardization of materials between TBRHSC & sites • Regional referral processes • Common forms, policies, procedures and documentation	Anytime	CC & TBRHSC staff

What	How	When	Who
	Planning and program development • Regional steering committee implementation • Program established at partner sites Research and education Outreach Data stewardship	Anytime	
Program Efficiency Dimension			
Resource Utilization and Cost	Pilot start up costs Ongoing operating costs *Attendance rates	 Ongoing @ d/c	TBR TBR & sites CC
Generalizability	Focus group discussion & feedback Development of common database assessment guidelines	@ 1 yr	TBR TBR & CC

*denotes those items that will be measured of staff / clients at TBRHSC and district sites for statistical comparison

12/06 Rev. May 2007

APPENDIX E: NEEDS ASSESSMENT OF NORTHWESTERN ONTARIO

Summarized Fact Sheet (Environmental Scan)

Economic Forces	• Health care costs have been escalating at rates that exceed the growth of the population or the economy • Government funding for new health programs is limited • There is increasing pressure on health care organizations to seek outside capital to finance new construction, major technology acquisition, and research programs. Competition for these funds is intense. • Restrictions on university budgets will continue to reduce funding support for academic programs thus limiting physicians, specialists, nurses, and other health care workers. • Need to encourage more cost effective delivery of health care through primary health care model. • Need to develop efficient program evaluation and quality monitoring programs.
Health Professionals	• Specialization of professionals is increasing • Shortages of adequately trained cardiologists (presently 3) in Thunder Bay servicing NWO • Shortages of adequately trained manpower (nurse practitioners, nurses, technicians for stress testing, ultrasound, heart catheterization) • Professionals are demanding greater participation and involvement in policy development and decision making • Need for training of staff who will be working with those patients who will be having angioplasty performed at TBRHSC
Social, Political and Regulatory Forces	• The Premier's Council on Health Strategy developed a broad vision of health that forms the foundation for the strategic priorities of the Ministry of Health. These goals include: (1) a shift of emphasis to health promotion and disease prevention; (2) fostering strong and supportive families and communities; (3) ensuring a safe, high, quality physical environment; (4) increasing the number of years of good health for all citizens of Ontario by reducing illness, disability, and premature death; (5) providing accessible, affordable, appropriate health services for all. • The Ministry of Health has adopted a health care framework articulated by WHO. It includes prevention, detection, diagnostic and treatment services, community support, research and education, rationalizing resource allocation, and evaluating program effectiveness. • The Ministry's strategy for heart health is based upon: • Targeting funds to prevention and detection where shown to be effective (e.g., smoking cessation, Take Heart Coalition, restaurant program for healthy diet, programs designed for children and adolescents in risk factors for heart disease); • Equitable service distribution and access • Reallocating resources to activities that are proven effective; • Empowerment of the "heart" patient • Enhancing the quality of care provided to the patient; • Improved quality of care through practice standards; • Coordinated and integrated approach to heart patients;

Technological Forces	• Enhanced diagnostic capabilities through CT, MRI, and nuclear imaging (SPECT–Single photon emission computerized tomography gamma camera) • Therapeutic capabilities are also improving (gene therapy; chelation, angioplasty; CABG by laser technology) • Technological and therapeutic advances will increase the number of patients who are living longer and require chronic care • Centres will need to compete aggressively for private funding to support the acquisition of leading technologies
Patient Trends	• Consumers are becoming more highly educated and sophisticated as a result of the internet and availability of educational programs • Patients are placing higher demands on the system • Patients are identifying a need for coordinated services and a continuum of care • Increased demands for supportive care • Increased demand for alternative forms of "therapy" • Patients are taking a more active role in their care • Patients are sharing information on their health care needs via "chat" lines with others
Demographic and Population Trends in NWO	• Population • The population for NWO is cited as 121,885 males and 122,240 females. It is of note that the information for people living on reserves is not reflected in the population statistics as the First Nations people boycotted the census (please note that valid and reliable statistics from this population is not easily obtained and numbers differ from various sources) • The population for Thunder Bay District is a total of 74,520 males and 76,340 females. The Aboriginal population is cited as being 13,180, although this figure was from the 2001 statistics and may not reflect the total population. • Employment • The average income in Thunder Bay is $23,755, whereas the average income in Ontario is $24,816. It is important to note that the information presented excludes retirement pension investment earnings, Canada Pension Plan, Old Age Security, Unemployment Insurance, Child Tax Benefits, and individuals on reserves. • Education • Approximately 16.9% of those aged 20-34 have less than a high school diploma or graduate certificate compared to only 13.2% of the Ontario population. • Thunder Bay also has a lower proportion (17.4%) aged 20-34 that hold a university degree or diploma compared to the rest of Ontario whereby 25.7% hold a university degree. • Thunder Bay (Canadian 23%, English 12%, French 8%, North American Indian/Métis 8% and other 40%) • Rainy River (Canadian 28%, English 15%, French 8%, North American Indian/Métis 17%, and other 34%) • Kenora District (Canadian 21%, English 8%, French 5%, North American Indian/Métis 45%, and other 22%)
Demographic and Population Trends	• Lifestyle Issues • The percentage of those aged 65 and older who are currently taking medicine for heart or blood pressure in NWO (39%), Thunder Bay (40%) and Ontario (38%). Hypertension is a significant risk factor for CVD. It should be noted that the homeless, people living on

	reserves, and institutions are not included. • The numbers of people who reported engaging in physical activity is dismal (45-49% in the age group 30-44; 37% in the age group 45-64) considering NWO is located in an area where outdoor activities (skiing, hiking, swimming) are available. • The Body Mass Index (BMI) for both genders aged 20-65 years which was over 27 (obese) for NWO and Thunder Bay is 28%, compared with 24% for Ontario. High BMI has been found to be related to increased hypertension, hyperlipidemia, and coronary heart disease. • Although statistical data differ from each report, the approximate numbers of smokers is higher (21%-25%) than the Ontario population. The prevalence of smoking in the Native population is approximately 50%. • The fat intake levels for Thunder Bay and Kenora/Rainy River district is approximately 82% for males and 75% for females. This is much higher than the Ontario average of 76% (males) and 73% (females). • The current alcohol drinkers for both genders aged 20-24 is 89% (NWO), 90% (Thunder Bay), and 83% Ontario. In the aged 45-64 group, the average is 79% (NWO), 78% (Thunder Bay), and 75% (Ontario). • Self-perceived stress is approximately 50% in NOW, Thunder Bay, and Ontario. • Lifestyle issues in the Aboriginal population • Approximately 26% of males and 19% of females reported that they had been told they had high blood pressure. • Approximately 12% of males and 7% of females reported they had heart problems
	• Approximately 15% of males and 16% of the females reported that they had diabetes • Among the Ontario respondents, 79% of the males and 72% of the females indicated that they smoked • Approximately 59% of respondents indicated that they consumed alcohol once a week (Ontario First Nations Regional Health Survey 1998) • Approximately 47% of the population indicated that they did not partake in strenuous exercise. • Limited information was available in regard to sexually transmitted diseases. Chlamydia has been shown to have an effect on the development of heart disease. • Primary Health Care Services Currently Available • Ogden East End • Nishnawbe-Aski First Nations (Sioux Lookout Zone) - mental health services
	• Linkages • TBRHSC • Northern Ontario Medical Program • Take Heart Coalition • Heart & Stroke Foundation • Lakehead University • Nurse Practitioner Program, School of Nursing, Lakehead University • Mended Hearts • Northern Heart Retreat

	• Diabetes Network • Nishnawbi-Aski Nation • Dilico Ojibway Child and Family Services • Gaps in Services for Heart Patients • Shortage of specialists in cardiology • Coordination of services • Mortality and morbidity is higher than the rest of the province. In Thunder Bay, there were 1,500 individuals who had heart attacks and other cardiac problems (30% higher than data reported for the rest of Ontario). The mortality rate for Thunder Bay is 130% higher than Ontario (280/100,000). • More than 33% of MI patients never receive follow-up. • Services in Thunder Bay are limited. Congestive heart failure clinics, chest pain clinics, lipid clinics, coagulation clinics and outreach programs are not provided. Patients are required to leave their communities and loved ones to have invasive surgical interventions. Travel grants are limited and individuals often report spending $5,000 and upwards for travel and accommodations for their loved ones to spend time with them when they are in hospital
	• Limited "emergency" services available in the hospital • Limited "outreach" services to those living in rural communities in terms of prevention, treatment, and follow up. A new CR program offered via Telehealth to selected communities was introduced in 2006. • Limited services available to the Aboriginal population in remote, northern communities...individuals are often sent via air ambulance or other means to Thunder Bay and Winnipeg wasting precious time...of particular importance is that telemedicine is able to offer the individual timely assessment and treatment in the community.
Trends in Health Care	• Shift in emphasis to community based programs, ambulatory care, outreach programs, telemedicine and alternatives to institutional care • Emphasis on regionalization and rationalization of services • Emphasis on programs to improve quality and cost-effectiveness of care delivery • Development of health care networks, partnerships, and linkages among institutions and among community services • Devolution of authority for planning and management of health care programs • Increased emphasis on wellness programs and preventive medicine • Increased emphasis on ethical considerations in decision making • Enhanced technologies
Issues for Cardiac Care	• Coordinated services for heart patients in Thunder Bay and NWO • An immediate need to attract and retain cardiologists in this community • Need for enhanced "emergency" services in Thunder Bay • Need for enhanced services to rural areas especially in regards to early assessment and intervention

	• Need for telemedicine–diagnosis and treatment in the rural areas and northern outpost stations • Need for standardized treatment guidelines • Need for increased funding for clinical and interface research • Paucity of research in health promotion, cause and prevention of heart disease, diabetes and heart disease, behavioural health research, cost-effectiveness studies, health care delivery and heart disease, supportive services, technological integration (use of telemedicine for early intervention), and ethical decision making • Need for an organized health promotion program and wellness programs in NWO. Thunder Bay has a "Walk with Doc" program during the summer months. • A need to address our "waiting times" for surgical interventions • A need to address "waiting times" to be seen by specialists • Inadequate links between community physicians and hospitals • Need for programs to educate physicians and professionals regarding prevention, early detection, treatment, surgical intervention, and follow up • Need to enhance supportive programs in community (e.g., Mended Hearts) • Limited funding for supportive programs • Underservicing in small rural and outpost communities, as well as limited information of services available and how to access them • Limited amount of information available on the internet as to services available in NWO • Limited consultation with consumers in NWO to address their specific needs in the community
Opportunities	• Building partnerships/linkages with community based organizations with the main objective to develop a "seamless" delivery system • Improved collaboration with community hospitals and health professionals • Improved servicing of rural and aboriginal populations • Integrating research into practice • Integrating evidence based practice into clinical practice for all professionals • Exploring new "funding" sources for research and technological opportunities • Implementing new prevention and public educational opportunities especially through electronic means • Accommodating projected demographic changes • Opportunity to develop a community health centre specifically to address the preventive and treatment aspects of heart care • Development of a new structure which would ultimately result in "cost-savings" • Development of a "patient" focused care emphasis within the communities we serve • Development of a community-based "grass" roots support for a centre • Increased outreach to the community through telemedicine, Internet, and satellite heart programs
Challenges	• Shortage of adequately trained manpower • Need to enhance our understanding of the impact of prevention on heart health • Cost of treatment and appropriateness of resources outside with regard to the hardships experienced by individuals to travel to other centres in Ontario and Manitoba • Limited support for research

	• Unacceptable waiting lists for assessment and treatment • Unacceptable waiting times for diagnostic procedures and surgical interventions • Increasing fragmentation of services leading to patients being treated outside the formal system...leaving for assessment and treatment in the United States • Lack of coordination for the full continuum of services required by patients • Competition for fundraising because of the number of organizations competing for resources • Limited access to educational information on prevention, diagnosis and treatment of various conditions

Source: *Environmental scan of heart disease in Northwestern Ontario, by* D. Steven, 2007. Thunder Bay, ON: Lakehead University

APPENDIX F: QUANTITATIVE DATA LIST

Demographic and Quantitative Data Gathered at Program Entry and Exit

1. Location
2. Sex
3. Age
4. Ethnicity
5. Marital Status
6. Employment Status
7. Event Date
8. Referral Date
9. Intake Date
10. Program Start Date
11. Program End Date
12. Risk Stratification at Intake and Exit
13. # and Type of Education Sessions Attended
14. # and Type of Counselling Sessions Attended
15. Blood Work at Intake and Exit - FBS, TC, LDL, HDL, TG
16. Measurements at Intake and Exit - BMI, Waist Circumference
17. Stress Test Measurements at Intake and Exit - RHR, AHR, RBP, ABP, Exercise Time, ECG Changes, Chest Pain
18. Medications at Intake and Exit
19. HADS score at Intake and Exit
20. Fat Intake score at Intake and Exit

APPENDIX G: PATIENT ASSESSMENT AND HISTORY

CARDIAC EDUCATION AND REHABILITATION PROGRAM
Patient Assessment and History

DEMOGRAPHICS **INTAKE DATE:** _____

Name: _____ Name I prefer to be called: _____

Address: _____ Date of Birth: _____

_____

Postal Code: _____

Telephone: (H)_____ (W)_____

Do you speak English? Yes No Do you read English? Yes No

Primary Language: _____

Contact person:_____ Telephone:_____

Allergies:_____

Family Physician: _____ Cardiologist: _____

SOCIAL HISTORY

Marital Status: G Single G Married / common-law G Separated G Divorced G Widow / Widower

Living Arrangements: G Live alone G Live with Spouse / Partner G Live with others

Occupation: _____

Occupation Status: G Full-time G Short term disability G Semi-retired
G Part-time G Long term disability G Retired

Hobbies:_____

_____

MEASUREMENTS

To be completed by Cardiac Rehab staff

Height: _____cm Weight: _____kg BMI: _____

Waist: _____cm Hips: _____cm WHR: _____

RHR: _____bpm B/P Rt: _____ B/P Lt:_____

RISK FACTORS

Do you have blood relatives with a heart condition? G Yes G No

Are you past menopause? G Yes G No G N/A

Do you smoke? G Yes G No

I used to smoke but quit on _____.

Have you been told that you have high blood pressure? G Yes G No

Have you been told that you have high blood cholesterol? G Yes G No

Are you a Diabetic? G No G Type I G Type II

Do you suffer from depression? G Yes G No

Do you have trouble dealing with stressful situations or events? G Yes G No

Do you experience anxiety or panic attacks? G Yes G No

Do you exercise on a regular basis? G Yes G No

If you said yes to exercise please describe type of exercise and frequency and duration.

_____

HEART HISTORY

Do you have (place a check mark in box)

G Unstable Angina G Other _____

G Congestive Heart Failure

G Cardiomyopathy

G An irregular heart rhythm Type _____

Have you had:

G A Heart Attack Date: _____ Hospital: _____

G Angioplasty Date: _____ Hospital: _____

G By-pass Surgery Date: _____ Hospital: _____

G Valve Surgery Date: _____ Hospital: _____

G Heart Transplant Date: _____ Hospital: _____

G Pacemaker Date: _____ Type: _____

G Implanted Coronary Defibrillator (ICD) Date: _____ High _____ Low _____

Describe present chest pain/discomfort:_____

_____

_____

MEDICAL HISTORY

Do you have any problems with muscles, joints, bones? If yes please describe.

_____

_____

Past surgery not including heart. _____

_____

_____

_____

Other medical conditions. _____

_____

MEDICATONS

MEDICATION	DOSE	FREQUENCY
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

Guidelines for use:

1. Form to be filled out by patient.
2. Form to be reviewed by staff with patient.
3. Form to be placed on patient chart - exercise program.

APPENDIX H: STAGES OF CHANGE QUESTIONNAIRE

Cardiac Education and Rehabilitation

Telephone (807) 684-6060 **Fax (807) 684-5919**

Patient Name: _____ Date: _____

Stages of Change

The following are five stages of change. Please circle which stage most accurately describes your current readiness to change or maintain healthy eating habits. There is no right or wrong answer. This may be utilized to help the dietitian tailor a program to best suit your needs.

Stage 1: Precontemplation

I am not intending to change my eating habits. For example, "My father did not eat healthy and he lived to be 100, so I can too!"

Stage 2: Contemplation

I am intending to change my eating habits and eat healthier in the next six months. For example, "I know I really should eat healthy, but I never seem to follow through with my plan."

Stage 3: Preparation

I am making small changes, or I am ready to make small changes to eat a more healthy diet within the next 30 days. For example, "I am thinking about eating healthy, maybe I will try eating more fruits and vegetables next week."

Stage 4: Action

I have started eating healthy within the past 6 months. For example, "I have been eating a nutritious breakfast everyday for the past two months which may include corn bran, 1% milk, orange juice and a piece of whole wheat bread with peanut butter."

Stage 5: Maintenance

I have been eating healthy such as a low fat diet and lots of fruits and vegetables for six months or more. For example, "I have tried to eat healthy for most of my adulthood."

APPENDIX I: DUKE ACTIVITY STATUS

Cardiac Education and Rehabilitation Program
DUKE ACTIVITY STATUS INDEX (DASI)

Name: **Date:**

Can you:		Weight
1. Take care of yourself, that is, eat, dress, bathe or use the toilet independently?	G Yes G No	2.75
2. Walk indoors, such as around your house?	G Yes G No	1.75
3. Walk a block or two on level ground?	G Yes G No	2.75
4. Climb a flight of stairs or walk up a hill?	G Yes G No	5.50
5. Run a short distance?	G Yes G No	8.00
6. Do light work around the house like dusting or washing dishes?	G Yes G No	2.70
7. Do Moderate work around the house like vacuuming sweeping floors or carrying groceries?	G Yes G No	3.50
8. Do heavy work around the house like scrubbing floors or lifting or moving heavy furniture?	G Yes G No	8.00
9. Do yard work like raking leaves, weeding or pushing a a power mower?	G Yes G No	4.50
10. Have sexual relations?	G Yes G No	5.25
11. Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis or throwing a baseball or a football?	G Yes G No	6.00
12. Participate in strenuous sports like swimming, singles tennis, football, basketball or skiing?	G Yes G No	7.50
	Total:	

Adapted from ACSM Guidelines for Exercise Testing and Prescription, 6th ed. 2000

DASI = the sum of weights for yes replies
VO2peak (mL. Kg-1 . min-1) = 0.43 x DASI + 9.6

Guidelines for use:

1. Form to be completed on intake for those clients unable to undergo exercise stress testing.
2. Client to check off Yes or No for each question.
3. Staff to calculate VO2 peak and develop exercise prescription.

APPENDIX J: FAT INTAKE QUESTIONNAIRE

Name: _____ Date of Birth: _____

CHECK THE ANSWER WHICH BEST DESCRIBES THE WAY YOU HAVE BEEN EATING OVER THE PAST MONTH.

How many ounces of meat, fish, or poultry do you usually eat?

___1. I do not eat meat, fish, or poultry.
___2. I eat 3-6 ounces or less per day.
___3. I eat 7-8 ounces per day.
___4. I eat 9 or more ounces per day.

*3 ounces of meat, fish or chicken is any ONE of the following: 1 regular hamburger, 1 chicken breast, 1 chicken leg (thigh and drumstick), 1 pork chop or 3 slices of pre-sliced luncheon meat. A 3 ounce piece of meat resembles a deck of cards or a computer mouse.

How much cheese do you eat per week?

___1. I do not eat cheese
___2. I eat whole milk cheese (>(greater than) 35% Fat) less than once a week **or** use only lower fat cheeses such as fat-free, partly skimmed or skim milk cheese (0-18% Fat).
___3. I eat whole milk cheese once or twice per week.
___4. I eat whole milk cheese three or more times per week.

What type of milk do you use?

___1. I only use skim or 1% milk, or do not use milk.
___2. I usually use skim milk or 1% milk, but use others occasionally.
___3. I usually use 2% or whole milk (3%).
___4. I use whole milk (3%), half & half cream and/or full cream.

How many visible egg yolks do you use per week?

___1. I avoid all egg yolks and/or use one egg per week or less and/or use only egg substitutes or egg whites (Simply Egg Whites, Egg Beaters, Omega 3 Eggs).
___2. I eat 2-3 egg yolks per week.
___3. I eat 4 or more egg yolks per week.

How often do you eat these meats: regular hamburger, bologna, salami, hot dogs, corned beef, spare ribs, sausage, bacon or liver? Do not count lower fat versions.

___1. I do not eat any of these meats.
___2. I eat them once per week or less.
___3. I eat them 2-4 times per week.
___4. I eat them more than 4 times per week.

CS-262 **Assembly Number G-190** Info/Comm Approved Sept 18/01; Rev Oct 05; Rev Aug 06
MAC Approved Oct 23/01

6 **How often do you eat <u>regular</u> ice cream or commercial baked goods such as cake, cookies, sweetrolls, doughnuts and muffins? Do not count low fat versions.**

___1. I do not eat these commercial baked goods and ice cream.
___2. I eat these commercial baked goods and ice cream once per week or less.
___3. I eat these commercial baked goods and ice cream 2-4 times per week.
___4. I eat these commercial baked goods and ice cream more than 4 times per week.

What is the main type of fat you cook with?

___1. I use non-stick spray or I do not use fat in cooking.
___2. I use a liquid oil such as canola, corn, and olive oil, or a non-hydrogenated margarine (Becel, Lactantia).
___3. I use regular margarine. (Imperial, Parkay, Blue Bonnet, Monarch)
___4. I use butter, shortening, bacon drippings or lard.

How often do you eat <u>regular</u> snack foods such as chips, cheesies or crackers? Do not count low fat versions.

___1. I do not eat these snack foods.
___2. I eat these snack foods one time per week.
___3. I eat these snack foods 2 to 4 times per week.
___4. I eat these snack foods more than 4 times per week.

What spreads do you usually use on bread, vegetables etc?

___1. I do not use any spreads.
___2. I use non hydrogenated margarine (Becel, Lactantia).
___3. I use regular margarine (Imperial, Monarch).
___4. I use butter.

10. **How often do you eat candy bars, chocolate or nuts as a snack?**

___1. I eat these foods less than once per week.
___2. I eat these foods 1-3 times per week.
___3. I eat these foods more than 3 times per week.

When you use recipes or convenience foods, how often are they low fat?

___1. Almost always.
___2. Usually.
___3. Sometimes.
___4. Seldom or never.

When you eat away from home, how often do you choose low fat foods?

___1. Almost always.
___2. Usually.
___3. Sometimes.
___4. Seldom or never.

To Score: You will find a number beside each check mark you have made. Add these numbers together.
This total number is your score. If your score is 24 or less, your diet is moderate to low in fat and cholesterol. If your score is greater than 24, your diet is high in fat and cholesterol. A registered dietitian will contact you for voluntary diet counselling.

Total Score: _____ **Date:** _____

The completed form will be filed on the patient's chart in Cardiac Rehab.

Adapted from: Northwest Research Clinic Fat Intake Scale

APPENDIX K: RISK STRATIFICATION - MALE

Step 1

Progression of Disease Score (PDS) Men

Total Cholesterol (mmol/L)	**HDL Cholesterol**								
	<0.78	0.78-0.89	0.90-1.02	1.03-1.15	1.16-1.29	1.30-1.54	1.55-1.80	1.81-2.07	>2.07
<4.39	6	5	4	4	3	2	1	1	0
4.39-4.65	6	5	5	4	3	3	2	1	0
4.66-4.90	7	6	5	4	4	3	2	1	1
4.91-5.16	7	6	5	4	4	3	2	2	1
5.17-5.42	7	6	5	5	4	4	3	2	1
5.43-5.68	7	6	6	5	4	4	3	2	1
5.69-5.94	8	7	6	5	5	4	3	2	2
5.95-6.20	8	7	6	5	5	4	3	3	2
6.21-6.46	8	7	6	6	5	4	4	3	2
6.47-6.71	8	7	6	6	5	5	4	3	2
6.72-6.97	8	7	7	6	5	5	4	3	2
6.98-7.23	9	8	7	6	6	5	4	3	3
7.24-7.49	9	8	7	6	6	5	4	4	3
7.50-7.75	9	8	7	7	6	5	4	4	3
≥7.76	9	8	7	7	6	6	5	4	3
Lipid Score									

Systolic blood pressure (mmHg)		**Smoker**		**Diabetic**	
<110	0	No	0	No	0
110-129	1	Yes	1	Yes	1
130-149	2				
150-169	3				
170-199	4				
200-229	5				
≥230	6				
SBP Score		**Smoker Score**		**Diabetic Score**	

Men with CVD		Mean 2-yr risk score in Men with CVD			
Risk Factor	**Risk Points**	**Total risk points**	**2-yr event probability(%)**	**Age**	***Probability (%)***
Age group		0	2	35	<1
20-34	0	2	2	40	8
35-39	0	4	3	45	10
40-44	1	6	5	50	11
45-49	1	8	7	55	12
50-54	2	10	10	60	12
55-59	2	12	14	65	14
60-64	3	14	20	70	14
65-69	3	16	28		
70-74	4	18	37		
>75	4	20	49		
Age Score		22	63		
		24	77		

TOTAL RISK POINTS	
Lipid Score	Diabetic Score

SBP Score	Age Score
Smoker Score	Total Score

PDS	Low risk ≤ 2.5 % per year	Intermediate risk ≤ 5% per year	High risk > 5% per year

Step 2

Calculation of **Disease Prognosis Score** (DPS) – Risk of Exercise Associated Adverse Events

1. Calculate **Duke Treadmill Score** (DTS)

DTS = exercise time – (5x maximal ST depression) – (4x angina index)

♥*Exercise time* = minutes on Bruce protocol ♥*ST depression* = maximal recorded ST depression	Treadmill Angina Index: ♥0 = no angina ♥1 = non-limiting angina ♥2 = limiting angina

DTS Score:

2. Determine the **Disease Prognosis Score** (DPS)

Event Risk	DTS	DPS
Low Risk	≥5	0.25% per year
Intermediate Risk	≤+4 to ≥-10	1.0% per year
High Risk	≤-11	5.0% per year

DPS Score:

Step 3

3. Integrate the DPS and PDS to determine the **Recurrent Cardiac Event Risk Score**

	Progression of Disease Score		
Disease Prognosis Score	*Low Risk*	*Intermediate Risk*	*High Risk*
High	Intermediate Risk	High Risk	High Risk
Intermediate	Low Risk	Intermediate Risk	High Risk
Low	Low Risk	Low risk	Intermediate Risk

Staff Signature _____

Instructions to Hospital Personnel

1. Worksheet to be used for CR clients
2. Form and scoring to be completed by CR staff member
3. Form to be placed in Cardiac Rehab chart

APPENDIX L: RISK STRATIFICATION - FEMALE

Step 1

Progression of Disease Score (PDS) Women

Total Cholesterol (mmol/L)	**HDL Cholesterol**								
	<0.78	0.78-0.89	0.90-1.02	1.03-1.15	1.16-1.29	1.30-1.54	1.55-1.80	1.81-2.07	>2.07
<4.39	4	3	3	2	2	1	1	0	0
4.39-4.65	4	3	3	2	2	2	1	1	0
4.66-4.90	4	3	3	2	2	2	1	1	0
4.91-5.16	4	4	3	3	2	2	1	1	1
5.17-5.42	4	4	3	3	2	2	2	1	1
5.43-5.68	4	4	3	3	3	2	2	1	1
5.69-5.94	5	4	4	3	3	2	2	1	1
5.95-6.20	5	4	4	3	3	3	2	2	1
6.21-6.46	5	4	4	3	3	3	2	2	1
6.47-6.71	5	4	4	4	3	3	2	2	1
6.72-6.97	5	5	4	4	3	3	2	2	1
6.98-7.23	5	5	4	4	3	3	2	2	2
7.24-7.49	5	5	4	4	3	3	3	2	2
7.50-7.75	5	5	4	4	4	3	3	2	2
≥7.76	6	5	4	4	4	3	3	2	2
Lipid Score									

Systolic blood pressure (mmHg)		**Smoker**		**Diabetic**	
<119	0	No	0	No	0
120-139	1	Yes	3	Yes	3
140-169	2				
170-209	3				
≥210	4				
SBP Score		**Smoker Score**		**Diabetic Score**	

Women with CVD		Mean 2 year risk score in Women with CVD			
Risk Factor	**Risk Points**	**Total risk points**	**2-yr event probability** (%)	**Age**	**Probability** (%)
Age group		0	0	35	<1
20-34	0	2	1	40	<1
35-39	0	4	1	45	<1
40-44	1	6	1	50	4
45-49	2	8	2	55	6
50-54	3	10	4	60	8
55-59	4	12	6	65	12
60-64	5	14	10	70	12
65-69	6	16	15		
70-74	7	18	23		
>75	7	20	35		
Age Score		22	51		
		24	68		
		26	85		

TOTAL RISK POINTS	
Lipid Score	Diabetic Score
SBP Score	Age Score
Smoker Score	Total Score

PDS	Low risk ≤ 2.5 % per year	Intermediate risk ≤ 5% per year	High risk > 5% per year

Step 2

Calculation of **Disease Prognosis Score** (DPS) – Risk of Exercise Associated Adverse Events

1. Calculate **Duke Treadmill Score** (DTS)
DTS = exercise time – (5x maximal ST depression) – (4x angina index)

♥*Exercise time* = minutes on Bruce protocol ♥*ST depression* = maximal recorded ST depression	Treadmill Angina Index: ♥0 = no angina ♥1 = non-limiting angina ♥2 = limiting angina

DTS Score:

2. Determine the **Disease Prognosis Score** (DPS)

Event Risk	DTS	DPS
Low Risk	≥5	0.25% per year
Intermediate Risk	≤+4 to ≥-10	1.0% per year
High Risk	≤-11	5.0% per year

DPS Score:

Step 3

3. Integrate the DPS and PDS to determine the **Recurrent Cardiac Event Risk Score**

	Progression of Disease Score		
Disease Prognosis Score	*Low Risk*	*Intermediate Risk*	*High Risk*
High	Intermediate Risk	High Risk	High Risk
Intermediate	Low Risk	Intermediate Risk	High Risk
Low	Low Risk	Low risk	Intermediate Risk

Staff Signature _____

Instructions to Hospital Personnel

1. Worksheet to be used for CR clients
2. Form and scoring to be completed by CR staff member
3. Form to be placed in Cardiac Rehab chart

APPENDIX M: HOSPITAL ANXIETY AND DEPRESSION SCALE

APPENDIX M: HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)

Thunder Bay Regional Health Sciences Centre

HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)

Name: _____ Date: _____

For each of the following statements, please choose the response for each statement that comes the closest to how you have been feeling in the past week. Don't take too long over your replies. Your immediate reaction to each item will probably be more accurate than a long thought-out response. Clients scoring borderline or probable will be contacted by the department Social Worker for follow-up and possible voluntary counseling.
Please circle your answer:

1. I feel tense or "wound up":
   a) Most of the time
   b) A lost of the time
   c) Time to time, Occasionally
   d) Not at all

2. I still enjoy the things I used to enjoy:
   a) Definitely as much
   b) Not quite as much
   c) Only a little
   d) Hardly at all

3. I get a sort of frightened feeling as if Something awful is about to happen:
   a) Very definitely and quite badly
   b) Yes, but not too badly
   c) A little, but it doesn't worry me
   d) Not at all

4. I can laugh and see the funny side of things:
   a) As much as I always could
   b) Not quite so much now
   c) Definitely not so much now
   d) Not at all

5. Worrying thoughts go through my mind:
   a) A great deal of the time
   b) A lot of the time
   c) From time to time, but not too often
   d) Only occasionally

6. I feel cheerful
   a) Not at all
   b) Not often
   c) Sometimes
   d) Most of the time

7. I can sit at ease and feel relaxed:
   a) Definitely
   b) Usually
   c) Not often
   d) Not at all

8. I feel as if I am slowed down:
   a) Nearly all the time
   b) Very often
   c) Sometimes
   d) Not at all

9. I get a sort of frightened feeling like "butterflies" in my stomach:
   a) Not at all
   b) Occasionally
   c) Quite often
   d) Very often

10. I have lost interest in my appearance:
    a) Definitely
    b) I don't take as much care as I should
    c) I may not take quite as much care
    d) I take just as much care as ever

11. I feel restless as if I have to be on the move
    a) Very much indeed
    b) Quite a lot
    c) Not very much
    d) Not at all

12. I look forward with enjoyment to things:
    a) As much as I ever did
    b) Rather less than I used to
    c) Definitely less than I used to
    d) Hardly at all

13. I get sudden feelings of panic
    a) Very often indeed
    b) Quite often
    c) Not very often
    d) Not at all

14. I can enjoy a good book, radio or TV program:
    a) Often
    b) Sometimes
    c) Not often
    d) Very seldom

SCORE
A: _____
D: _____

Guidelines:

1. Form to be completed by client
2. Scoring to be completed by Cardiac Rehab staff member
3. Clients scoring 8 and greater to be referred to department Social Worker for follow-up and possible counselling.
4. Form is filed on patient cardiac rehab chart

Calculate **A** and **D** separately by adding scores and interpret as follows:

Anxiety (A)	**Depression (D)**
0 – 7 = non-case	0 – 7 = non-case
8 – 10 = borderline case	8 – 10 = borderline case
11 + = probable case	11 + = probable case

A

1. a) 3
   b) 2
   c) 1
   d) 0

2. a) 0
   b) 1
   c) 2
   d) 3

3. a) 3
   b) 2
   c) 1
   d) 0

4. a) 0
   b) 1
   c) 2
   d) 3

5. a) 3
   b) 2
   c) 1
   d) 0

6. a) 3
   b) 2
   c) 1
   d) 0

7. a) 0
   b) 1
   c) 2
   d) 3

8. a) 3
   b) 2
   c) 1
   d) 0

9. a) 0
   b) 1
   c) 2
   d) 3

10. a) 3
    b) 2
    c) 1
    d) 0

11. a) 3
    b) 2
    c) 1
    d) 0

12. a) 0
    b) 1
    c) 2
    d) 3

13. a) 3
    b) 2
    c) 1
    d) 0

14. a) 0
    b) 1
    c) 2
    d) 3

APPENDIX N: EDUCATION SATISFACTION QUESTIONNAIRE WITH VIDEOCONFERENCING

We ask that you evaluate the Cardiac Education session. The information gained will help us make improvements to the program. Thank you in advance for your time.

Name of session attended: _____

Date of session: _____

Session attended: (please check one) G In the city of Thunder Bay
G Outside of the city of Thunder Bay utilizing Video Conferencing

How did you become aware of the education session?

Please circle the number under the choice that best fits each statement about the education session.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) Presentation time was adequate.	1	2	3	4	5
b) Discussion time was adequate.	1	2	3	4	5
c) The speaker conveyed information clearly.	1	2	3	4	5
d) I did **not** learn anything new in this session.	1	2	3	4	5
e) The session was interesting and informative.	1	2	3	4	5
f) The session was relevant to my needs.	1	2	3	4	5
g) The handout materials were clear and understandable.	1	2	3	4	5
h) The presenter was knowledgeable about cardiac issues.	1	2	3	4	5

Videoconference Experience (for those attending both in and outside of Thunder Bay)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) The involvement of multiple sites was valuable.	1	2	3	4	5
b) I could hear the presenter clearly.	1	2	3	4	5
c) I could see the presenter clearly.	1	2	3	4	5
d) I could hear participants from other sites clearly.	1	2	3	4	5
e) Having other sites involved was a drawback.	1	2	3	4	5
f) I would prefer to attend sessions without other sites involved.	1	2	3	4	5

For those attending at sites outside the city of Thunder Bay (please check your response to the following):

1) It would be more beneficial to attend Cardiac Rehabilitation education sessions in person in Thunder Bay.	G Agree G Disagree
2) Attending this videoconference session in my community made my access to Cardiac Rehabilitation education:	G Better G Worse G It made no difference

Overall I found the session (please circle one)

Very Poor Poor Neutral Good Excellent

Comments and Suggestions

What benefits, if any, did you gain from this session?

_____

_____

_____

How could this education session be improved?

_____

_____

_____

Any other comments

_____

_____

_____

APPENDIX O: EDUCATION SATISFACTION QUESTIONNAIRE WITHOUT VIDEOCONFERENCING

We ask that you evaluate the Cardiac Education session. The information gained will help us make improvements to the program. Thank you in advance for your time.

Name of session attended: _____

Date of session: _____

How did you become aware of the education session?

Please circle the number under the choice that best fits each statement about the education session.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) Presentation time was adequate.	1	2	3	4	5
b) Discussion time was adequate.	1	2	3	4	5
c) The speaker conveyed information clearly.	1	2	3	4	5
d) I did **not** learn anything new in this session.	1	2	3	4	5
e) The session was interesting and informative.	1	2	3	4	5
f) The session was relevant to my needs.	1	2	3	4	5
g) The handout materials were clear and understandable.	1	2	3	4	5
h) The presenter was knowledgeable about cardiac issues.	1	2	3	4	5

Overall I found the session (please circle one)

Very Poor Poor Neutral Good Excellent

Comments and Suggestions

What benefits, if any, did you gain from this session?

_____

_____

How could this CR education session be improved?

_____

_____

Any other comments

_____

_____

APPENDIX P: EXERCISE SATISFACTION QUESTIONNAIRE WITH VIDEOCONFERENCING

We ask that you evaluate the Cardiac exercise sessions. The information gained will help us make improvements to the program. Thank you in advance for your time.

Date of Program completion: _____

Session attended: (please check one) G In the city of Thunder Bay
G Outside of the city of Thunder Bay utilizing Video Conferencing

Overall, how would you rate the program? (please check one)

G Very good G Good G Fair G Poor G Very poor

Please circle the number under the choice that best describes your program experience.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) The exercise leader conveyed information clearly.	1	2	3	4	5
b) Discussion time was adequate.	1	2	3	4	5
c) Exercise staff were knowledgeable.	1	2	3	4	5
d) The program has **not** met my needs.	1	2	3	4	5
e) The program met my expectations.	1	2	3	4	5
f) The program has not been beneficial to me personally.	1	2	3	4	5

Videoconference Experience (for those attending both in and outside of Thunder Bay).

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) The involvement of multiple sites was valuable.	1	2	3	4	5
b) I could hear the exercise leader clearly.	1	2	3	4	5
c) I could see the exercise leader clearly.	1	2	3	4	5
d) I could hear participants from other sites clearly.	1	2	3	4	5
e) Having other sites involved in the sessions was a drawback.	1	2	3	4	5
f) I would prefer to attend sessions without other sites involved.	1	2	3	4	5
g) The technology used to deliver this session was satisfactory.	1	2	3	4	5

For those attending at sites outside the city of Thunder Bay (please check your response to the following):

3) It would be more beneficial to attend Cardiac Rehabilitation education sessions in person in Thunder Bay.	G Agree G Disagree
4) Attending this videoconference session in my community made my access to Cardiac Rehabilitation education:	G Better G Worse G It made no difference

How would you rate the facility you attended your exercise sessions in? (please circle one)

Very good Good Fair Poor Very poor

My experience with the CR program was: (please circle one)

Very good Good Fair Poor Very poor

Comments and Suggestions

What benefits, if any, did you gain from participating in the exercise sessions?

_____

_____

How could this CR be improved?

_____

_____

Any other comments

_____

_____

APPENDIX Q: EXERCISE SATISFACTION QUESTIONNAIRE WITHOUT VIDEOCONFERENCING

We ask that you evaluate the Cardiac exercise sessions. The information gained will help us make improvements to the program. Thank you in advance for your time.

Date of Program completion: _____

Overall, how would you rate the program? (please check one)

G Very good G Good G Fair G Poor G Very poor

Please circle the number under the choice that best describes your program experience.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) The exercise leader conveyed information clearly.	1	2	3	4	5
b) Discussion time was adequate.	1	2	3	4	5
c) Exercise staff were knowledgeable.	1	2	3	4	5
d) The program has **not** met my needs.	1	2	3	4	5
e) The program met my expectations.	1	2	3	4	5
f) The program has not been beneficial to me personally.	1	2	3	4	5

How would you rate the facility you attended your exercise sessions in? (please circle one)

Very good Good Fair Poor Very poor

My experience with the CR program was: (please circle one)

Very good Good Fair Poor Very poor

Comments and Suggestions

What benefits, if any, did you gain from participating in the exercise sessions?

_____

_____

How could this CR be improved?

_____

_____

Any other comments

_____

_____

APPENDIX R: COUNSELING SATISFACTION QUESTIONNAIRE WITH VIDEOCONFERENCING

We ask that you evaluate the counselling session. The information gained will help us make improvements to the program. Thank you in advance for your time.

Date of session: _____

1. How did you become aware of our counselling services?

_____

2. Please circle the number under the choice that best describes your program experience.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) I could hear the counsellor clearly.	1	2	3	4	5
b) I could see the counsellor clearly.	1	2	3	4	5
c) I could ask the counsellor questions.	1	2	3	4	5
d) I felt I could talk about any kind of problem.	1	2	3	4	5
e) I was worried that others might be listening.	1	2	3	4	5
f) I would have preferred meeting face to face.	1	2	3	4	5

Please check the answer below that best describes your choice.

3. If it was suggested that I have another counselling session with videoconferencing, I would be

□ Very pleased □ Pleased □ Neutral □ Displeased □ Very displeased

4. Having access to this service in my community made my access to counselling

G easier G harder G had no effect

5. **Comments and Suggestions**

What benefits, if any, did you gain from this session?

_____

_____

How could this counselling session be improved?

_____

_____

6. Overall I found the session (please circle one)

Very Poor Poor Neutral Good Excellent

APPENDIX S: COUNSELING SATISFACTION QUESTIONNAIRE WITHOUT VIDEOCONFERENCING

We ask that you evaluate the counselling session. The information gained will help us make improvements to the program. Thank you in advance for your time.

Date of session: _____

How did you become aware of our counselling services?

_____

Please circle the number under the choice that best fits each statement about your appointment.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) I could hear the counsellor clearly.	1	2	3	4	5
b) I could see the counsellor clearly.	1	2	3	4	5
c) I could ask the counsellor questions.	1	2	3	4	5
d) I felt I could talk about any kind of problem.	1	2	3	4	5

Comments and Suggestions

What benefits, if any, did you gain from this session?

_____

_____

How could this counselling session be improved?

_____

_____

Overall I found the session (please circle one)

Very Poor Poor Neutral Good Excellent

APPENDIX T: STAFF EDUCATION NEEDS ASSESSMENT

Name: _____ Date: _____

Site: _____

Please indicate your discipline:

Registered Nurse	Physiotherapist
Occupational Therapist	Kinesiologist
Other	

What is your educational background?

Diploma	Baccalaureate
Other_____	

How many years experience do you have in your discipline?

Under 5 years	6-10 years
11-15 years	16+ years

Please specify the type of work you have done.

_____

_____

_____

Do you have any specific experience in CR?

No experience	Under 5 years
6-10 years	11-15 years
16+ years	

Rate your level of expertise caring for clients with the following diagnosis using a Scale of 1 to 7. 1 = no experience 7 = expert:

__ STEMI __ NSTEMI __ CHF __ Arrhythmia __ DCM

Rate your level of expertise caring for clients with the following interventions using a scale 1 to 7. 1 = no experience 7 = expert:

__ PCI __ CABG __ Heart Transplant __ Pacemaker
__ ICD __ Valve repair or replacement __ Ablation

What are your specific learning needs:

Adult learning	Stages of change	Motivational Interviewing
Disease process	Diagnostic tests	Medications
Diet	Exercise prescription	

Comments:

_____

8. List any other topics you would be interested in learning about during the workshop.

Thank you for your participation

APPENDIX U: STAFF EDUCATION SATISFACTION QUESTIONNAIRE
(INDIVIDUAL)

Name of session: _____ Session Date: _____

Instructor: _____ Community Identifier: _____

Please circle the number under the choice that best fits each statement about the education session.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a) I learned something new in this session.	1	2	3	4	5
b) Presentation time was adequate.	1	2	3	4	5
c) Discussion time was adequate.	1	2	3	4	5
d) The speaker conveyed information clearly.	1	2	3	4	5
e) The session was interesting and informative.	1	2	3	4	5
f) The handout materials were clear and understandable.	1	2	3	4	5
g) The session was relevant to my needs.	1	2	3	4	5
h) The instructor was knowledgeable about cardiac issues.	1	2	3	4	5

2. Overall I found the training session (please circle one):

Very Poor Poor Satisfactory Good Excellent

Comments and suggestions

3. What benefits, if any, did you get from this training session?

_____
_____
_____

4. How could this CR training session be improved?

_____
_____
_____

5. Any other comments or suggestions?

_____
_____
_____

Name (optional): _____

Apr-07

APPENDIX V: STAFF SATISFACTION WITH PROVIDING CR PROGRAMMING

We ask that you evaluate your participation in providing CR services. The information gained will help us make improvements to the program. Thank you in advance for your time.

1. My location: G In the city of Thunder Bay
   G Outside the city of Thunder Bay Community (optional):_____

2. Which of the following best describes your current position?
   G Physiotherapist
   G Kinesiologist
   G Registered Nurse
   G Other (please describe) _____

3. How long have you worked in your present position?
   G less than 6 months G 6 months - 2 years G 3-5 years G 6-8 years G more than 8 years

4. How long have you been providing CR services in your present position?
   G less than 6 months G 6 months - 2 years G 3-5 years G 6-8 years G more than 8 years

5. Please indicate your level of agreement with the following statements regarding your participation is the CR (CR) program:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) My work in CR makes good use of my skills and abilities.	1	2	3	4	5
b) I feel Senior Management supports my involvement in the CR program.	1	2	3	4	5
c) My work in CR gives me a feeling of professional accomplishment	1	2	3	4	5
d) I have enough opportunities to interact with other city and district CR providers.	1	2	3	4	5
e) I have the tools and resources necessary to fulfill my CR program duties.	1	2	3	4	5
f) I would rather not be involved in providing the CR program.	1	2	3	4	5

6. Which of the following describes the variety of tasks required by your CR duties/position? (please circle one)
   Too many Enough Not enough

7. I believe that participating in the CR program will _____ my opportunities for career advancement in the future. (please circle one)

   Improve Have no effect Not improved

8. Overall, how satisfied are you with the quality of patient service provided by the CR program? (circle one)

Excellent Good Neutral Fair Poor

9. For CR service providers in the District of Thunder Bay, please circle the response that best describes your experience with TBRHSC CR program.
   TBRHSC staff respond promptly to requests for information or support.
   Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

10. What changes would you suggest to improve the program for clients?
    _____
    _____
    _____

11. What changes would you suggest to improve the program for staff?
    _____
    _____
    _____

12. Please provide any other comments about your participation in the provision of CR services.
    _____
    _____
    _____

Name (optional): _____

APPENDIX W: SUMMARY OF PATIENT EDUCATION EVALUATION COMMENTS

Question: What benefits, it any, did you get from this session?

Thunder Bay – No Videoconference	Thunder Bay – with Videoconference	District – with Videoconference
• Increased knowledge (9) • Learned more about my meds (4) • Very educational (3) • Very informative (3) • Clarification about types of fats and where they fit into my diet (2) • It was really excellent • Reaffirmed some things (2) • I've learned more about heart disease (2) • I gained a very good understanding of my condition (2) • Presentation was well done • Better understanding of the need for exercise • Learned what was expected at exercise sessions • Learned about motivation • Good to know what range of exercise I can reach before I have my stress test • Better knowledge of nutritional requirements • Cleared up issues regarding fat, sodium, cholesterol • Better understanding of what to look for when shopping • More balanced diet • Made me aware of how much stress I was under for the last few years • I learned I can reassess situations • Learned about deep breathing	• New knowledge (7) • Very helpful (5) • Understanding of what heart does and what my heart disease means (3) • Awareness of portion size and good food choices (3) • Learned to read labels (3) • Gave me motivation (2) • It was great – I learned about stress (2) • Understanding more (2) • Learning I need to take more time to de-stress • I liked that there were breathing exercises • I am happy to have attended these sessions • Gained self-awareness • Relaxation techniques • Thank you, very good session • Excellent reminder of the healthy things I already know • Learned what questions to ask my doctor • It was well explained • Pay more attention to my body • Learned what medical terms meant • Better knowledge of benefits of exercise and general health • To always start slow • Learned about medications • I learned my stress is more than I thought	• An understanding of stress and how to cope with it (5) • Learned more about the heart (2) • Very informative • Just getting more information on these subjects is great • I feel like I'm doing well with rehab • More info re stress • Learning new techniques • Learned about my medications • Speaker was involved, that was great • One can learn to help themselves • At my age I can still learn new things! • I need to take time to sit and look for small changes to make • Excellent, informative • A lot of reinforcement – I'm on the right track • Lots of good information I can use • Found out max grams of fat/day • Better knowledge of label reading • Learned more about my medications – benefits of each and about drug interactions • Learned about my husband's medications

Question: How could this education session be improved?

Thunder Bay – No Videoconference	Thunder Bay – with Videoconference	District – with Videoconference
• Very good as it is now (3) • More discussion time (2) • It was excellent as is • More time so more interactive with students and teacher	• More time for questions and interactions (7) • Don't change it (4) • Longer time for presentation (3) • Have everyone identify one	• Give more opportunities for discussion (4) • No suggestions (3) • Have the session archived and giving permission to videotape

• Could it be 15-20 minutes longer? • More audience participation • Demonstration and explanation of workouts • I would enjoy a repeat • More on triglycerides • Not so fast and needs to be louder • Bring in a rep from Superstore/Safeway to talk about the products available for heart healthy diets	thing that stresses them out • Remember we are old and can't hear as well • Don't see how it could be improved, it covered all • Do a test of the equipment to make sure • everything is in working order • Paul needs to speak louder – he's too soft spoken and pleasant! • Wish I'd learned this stuff before my heart attack • More sessions • As a senior the information was too fast • Eye contact was excellent • Answered all questions	because it is an excellent session • More notices to the public • It is terrific, keep up the great work • It was excellent • Good as is • Don't go too fast

APPENDIX X: SUMMARY OF PATIENT EXERCISE EVALUATION COMMENTS

Question: Please tell us why you rated the facility as you did?

Thunder Bay – No Videoconference	Thunder Bay – with Videoconference	District – with Videoconference
• Several machines were 'out of order' making it difficult for everyone to use machines (4) • Excellent staff and program (2) • Good equipment, nice room (2) • Not enough treadmills operating (2) • Change room setup was poor • The good care from the staff was really appreciated • Knowledgeable staff • Caring staff • Good variety of equipment • Facility is very clean	• Staff excellent (6) • Room and equipment were clean (4) • Equipment needs replacing (3) • Variety of equipment (3) • A-1 (2) • Crowded at times (2) • Space was limited otherwise good • Clean, bright, good temperature • Could use more variety of exercise equip. • We are monitored closely and feel safe	• On-site physiotherapist and great equipment • Everyone was very helpful and friendly • I enjoyed the 6 months • Needs more "newer" equipment • Good equipment • Nice clean facility • Staff very caring

Question: What benefits, if any, did you get from the exercise sessions?

Thunder Bay – No Videoconference	Thunder Bay – with Videoconference	District – with Videoconference
• Helped me to start exercising (2) • I know the safe limits of exercising (2) • Learned how to work out in the right way • I was exercising without any worry about what happened to me (2) • Better understanding of my heart rate (2) • Motivated me to continue at home • This has been the first time for me in any exercise program – it was all new-very good • Definitely improved my stamina and breathing • I found my comfort level for exercise • Proper techniques for warmup and stretching • Wonderful program, staff are exceptional	• Fellowship of other cardiac patients (5) • Increased strength, stamina and improved sense of well-being (3) • Knowing how to treat my body after surgery (2) • Motivation to exercise more (2) • It got me into a routine of exercise (2) • Better heart rate and flexibility • Helped me to get off my butt more! • Very positive instruction and communication • Lost weight, learned about my heart • Changed how I feel about myself • Learned how to warm-up and cool down so we wouldn't cause any harm • Helped my self-esteem	• Taught me not to be afraid of my pulse going high when exercising (4) • Exercising is important (3) • I enjoyed it very much and felt much better after each session • Learned how to monitor my body during exercise • Found how exercise can have a very positive impact on my blood pressure • Many – loved my exercise limits • I feel better with the exercise • I gained the initiative to exercise • I learned the importance of consistent exercise and variable movements to keep respiratory system working better • I'll miss the encouragement and positive support.

Question: How could this CR program be improved?

Thunder Bay – No Videoconference	Thunder Bay – with Videoconference	District – with Videoconference
• More equipment, treadmills (4) • Get rid of old exercise machines and replace with new ones (2) • Make sure all equipment is functioning to match class size • More staff • Repair equipment immediately, put more money in budget to purchase machines and get repairs done • Unfortunately I could only attend during the medical van hours as this was my only transport	• To run 12 months, not 6 (2) • Some of the equipment (treadmills) are looking a bit tired (2) • Longer sessions (2) • Have a special parking area for CR patients • Give a parking pass so it isn't so expensive to participate • It is very good • Three sessions per week • Less waiting time after procedure • It can't be better than it is! Great job • Need newer equipment	• To start sooner after my surgery • I thought the program was excellent • Staff were exceptionally caring and supportive of everyone • Would prefer frosted windows in the exercise room to maintain greater privacy • It is great the way it is

Any other comments?

Keep up the good work
The teachers are very caring and very professional

APPENDIX Y: SUMMARY OF DISTRICT STAFF EDUCATION SESSION COMMENTS

What benefits, if any, did you get from this training session?

Exercise Prescription
- doing a case example was helpful.
  excellent training session (4)
  clarified use of stress testing

Motivational Interviewing
- good use of case example to explain the principles being discussed.(2)
  learning about "states of change" (2)

Diagnostic Tests and Interventions
- knowing the effects of a pacemaker and how it relates to ex.
  understanding terminology and what tests mean
  better understanding of what can be done a why, put things in perspective (2)
  great review (2)

CHF
- Exercise rx in relation to the CHF client was useful as well as when not to exercise them.
  I knew very little about CHF and how to exercise safely

RD Role in CR
- new Canadian Food Guide changes (2)
  not an 'all or nothing' mentality
  real world, realistic
  that it was specifically for cardiac patients
  great discussion

Ischemic Heart Disease
- it was beneficial to learn the terminology/abbreviations (2).
  it was also helpful to learn how to exercise these clients
  lots of new info for me
  great review (3)

Cardiac Medications
- learning about med use and contraindications (2)

Forms and Web Site
- very helpful to review the forms (4)

Cardiac Meds
- learning the different reasons for the various meds was good (2)

Exercise Class
- great to see the program in action (2)

How could this CR training session be improved?

Cardiac Meds

- a bit slow, but it could just be the nature of the material.
  a one-page cheat sheet, I felt the session deserved more time
  don't offer this session at the end of the day (4)

Motivational Interviewing

- a little less detail, the session felt long (7).
  the room was too small (3) and the air circulation was poor

RD Role in Cr

- a bit more time (2)

Exercise Class

- observing one class would have been enough (3)
  having the exercise prescription session before the observation would have been better (2)
  would like to see an intake

Forms and Web Site

- I would like print copies to go over – tough to read off computer

Any other comments or suggestions?

I like how you use case examples to convey the information (3). It helps to clarify and keeps it interesting.
The exercise class staff were very helpful and friendly
Very enjoyable and realistic
Excellent (4)
Very well presented (2)
Interesting and informative
I had lots of questions and she provided informative, decisive answers
Thank you so much for sharing this program with all of us!
I've never done anything like this – all helpful
I will need more computer hands on training at home hospital
CR requires more space both for training and also holding classes