



**NEW BRUNSWICK HEART CENTRE
CENTRE CARDIAQUE DU NOUVEAU BRUNSWICK**

**Cardiac Rehab New Brunswick (CRNB)
Réadaptation cardiaque du Nouveau-Brunswick (RCNB)**

**Alternate Cardiac Rehabilitation Models
Using Case Management and
Chronic Disease Management Frameworks**

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Introduction

The purpose of this document is to provide a resource for cardiac rehabilitation and chronic cardiovascular care professionals. Cardiac Rehab New Brunswick (CRNB), a professional body of the NB Heart Centre, has developed a collaborative model identifying alternate methods of program delivery in an effort to increase patient access to cardiac rehabilitation services. The model addresses approaches that combine home exercise with case management, telehealth and web based cardiac rehabilitation program delivery using a chronic disease management framework.

The document addresses basic cardiac rehabilitation program issues. More in depth program information and references can be obtained through evidence based guidelines available from the Canadian Association of Cardiac Rehabilitation (CACR), the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) and the American Association of Sports Medicine (ACSM).

Background

Cardiac Rehabilitation

Cardiac rehabilitation is a systematic model of chronic vascular disease care in which proactive disease surveillance is achieved using a multifaceted approach. This approach includes (1) comprehensive targeted cardiovascular risk factor therapies, (2) behaviour modification strategies related to sustainable lifestyle and pharmacological adherence, and (3) therapeutic exercise and physical activity programs. The breadth and depth of services required to achieve these goals successfully are usually beyond the current resources of family physician teams or practitioners and most cardiovascular specialists.^{1,2}

Cardiac rehabilitation decreases total and cardiac mortality by 20 to 25 percent and may also reduce re-hospitalizations for cardiac disease and the need for subsequent revascularization procedures, in patients with coronary artery disease. Cardiac rehabilitation is cost-effective and may in fact reduce the cost to the health care system. There is emerging evidence that the beneficial effects of cardiac rehabilitation (compared to usual care) remain significant regardless of whether cardiac rehabilitation services are delivered as traditional hospital-based programs, as home-based programs or integrated within family practice.^{1,2}

Alternative programs such as home based (individual) programs are a recent alternative to facility based group exercise programs (Appendix A).² Home based programs utilize limited hospital or clinic visits with regular mail or telephone follow up by a case manager, usually a cardiovascular nurse, nurse practitioner or American College of Sports Medicine (ACSM) Exercise Specialist. Within home based CR programs, the case manager usually provides ongoing communication to facilitate risk factor modification and interfaces directly with primary care physicians, specialist physicians and the multidisciplinary cardiac rehabilitation team.

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Recent research has shown that patients attending home based cardiac rehabilitation programs experience similar exercise capacity, quality of life, lower blood lipids and smoking cessation benefits when compared to a traditional model. Home based cardiac rehabilitation and may also be suited to low risk patients who may not want or require a group exercise experience.^{3,4,5,6,7,8,9}

In case management models, a case manager coordinates the activities of various health-care disciplines, on behalf of the patient. Case management of cardiac rehab patients works within a chronic disease management (CDM) framework following established protocols for care incorporating diagnosis, risk stratification, community resources and patient/caregiver and self-management components (Appendices B & C). The case management and CDM model for patients with cardiovascular disease (CVD) may well be ideal for many cardiac rehabilitation programs. The concept can be aligned very effectively with both traditional and home based models to enhance service delivery and improve patient outcomes.

Home Exercise Program Issues

Allowing patients with heart disease to exercise on their own in an unsupervised environment is not a new concept. In fact a "home based model" has been in place for more than a decade^{11,12}. Individuals unfamiliar with this type of program would still undoubtedly have reservations: Is it effective? Is it safe? Can it be monitored? A review of the literature helped answer these and other concerns related to Home Exercise Programs.

Creating an accessible cost-effective program is a formidable challenge to contemporary health care providers. Traditionally, access to medically supervised group programs has tended to be limited to larger communities. According to Haskell, the major factor influencing the cost of cardiac rehabilitation programs is the magnitude and type of medical supervision provided. Home exercise training for low to moderate risk cardiac patients is potentially less costly, more readily available, and may attract individuals who could not enroll in a group training facility or drop out due to inconvenience and/or cost.^{4,5,6}

The key to safety in any home based program begins at the entry point. Sufficient information and data is now available to triage patients into risk categories and low risk cardiac patients should be cleared for exercise programs⁵. The key to patient safety is consistent throughout the literature. The intensity of exercise has to be strictly controlled. Most cardiac events that occur during exercise programs happen when patients exceed the recommended heart rate range⁸.

Most programs determine a safe heart rate range for each patient by performing an exercise tolerance test. An exercise target heart rate is set at a percentage of the maximum heart rate that was reached safely during the test. In smaller communities it may not be feasible for patients to receive pre-admission exercise tests. This complicates exercise prescriptions for patients, but does not make them impossible. McConnell¹¹ has suggested an alternative method for

conservatively determining exercise intensity for cardiac patients without an exercise tolerance test. The initial target heart rate should be set at 20 beats per minute above the resting rate. Intensity of activity is then progressed according to the patient's symptoms when exercising.

Patients should be taught to use a Rating of Perceived Exertion Scale (RPE)¹⁴ and to learn to exercise at an RPE between 3 and 6 on a 10 point scale. If the patient has no cardiac symptoms at that level of intensity, the heart rate reached at that RPE becomes the new training threshold. According to Wenger⁷, the physiological benefits of training can be attained, even at lower to moderate exercise intensities, by gradually increasing the duration and/or frequency of exercise. Safety is further enhanced if the exercise program incorporates frequent contact by the patient with medical personnel including phone calls and/or reviewing of exercise logs. DeBusk⁴ proposed that a patient in a home training program may actually receive more intense medical surveillance than is standard in most communities due to the safety concerns.

The effectiveness of home exercise programs with respect to patient fitness levels is encouraging. In a study of post myocardial infarction patients, Miller⁶ determined no significant difference in functional capacity between patients training at home and those training in a group program. In another study involving patients without any cardiac history, Juneau⁹ found that improvements in maximal oxygen consumption in home based training were comparable to supervised group training. Wenger⁷ recognized that patients in supervised group programs sometimes show earlier improvements in functional capacity which is probably due to higher intensity levels when training. However, at the completion of the training programs, the improvements between supervised and unsupervised programs were comparable. The importance of improved functional capacity in cardiac patients has been well established, but can never be overstated. Regular exercise training lowers the relative aerobic cost of daily activities by decreasing the myocardial oxygen demand for any submaximal task and lessening the anginal symptoms that often limit activity.^{7,10}

Improvements in functional capacity will never occur or be maintained if patients fail to participate in a program.¹⁸ Without patient compliance and adherence, the most efficient and cost-effective training program is useless. Pashkow¹⁰ observed, in his review of cardiac programs, that survivors of myocardial infarctions are older and sicker and that poor compliance is often secondary to related medical problems and lack of motivation to exercise. However, participation for such patients may be even more important because they are less physically capable, more dependent, and have a smaller reserve than younger patients.^{2,19}

Studies examining compliance in home based programs have produced some interesting conclusions. The key to programs that demonstrated good patient adherence to exercise was the support and encouragement provided by telephone contact with a nurse, especially if it was the same nurse who provided the initial teaching.⁴ Rogers¹² listed several other factors that contribute to program adherence including the safety and comfort of moderate intensity exercise, effective instruction about exercise from staff, videos and/or handouts, regular staff reviewing of

patient exercise logs, and the flexibility of scheduling exercise at home. Home based exercise programs may even improve compliance due to the habit of exercise being developed. Cardiac surgery patients may be served as well or better with a monitored, home-based exercise program than with an institution-based program.

Home based exercise programs have not gone without criticism in the literature. Wenger⁷ listed several disadvantages, especially in the area of patient education. Individuals exercising on their own at home would not receive as much instruction on risk factor modification, they might not get adequate feedback regarding exercise safety, and they would not receive the level of peer support a group program might provide.

Disadvantages aside, the evidence supporting Home Programs is impressive. With proper case management, they may provide a safe, cost-effective method of delivering cardiac rehabilitation to individuals without access to group programs. The challenge to future programs may be to marry home exercise with effective case management and lifestyle coaching models.

Supporting Frameworks for Alternate Cardiac Rehab Models

Case management and chronic disease, or chronic care management are supporting and integral concepts for the delivery of home exercise and on-site cardiac rehabilitation programs. The following provides a brief overview of each of these concepts.

The Chronic Care Model

Cardiac Rehabilitation, whether administered through on-site or home based programs is a chronic disease management program. Chronic disease management using the Chronic Care Management Model (Appendix B) is a philosophy of care involving interactions between the health system and community that ultimately leads to a prepared proactive team having productive interaction with informed activated patients resulting in improved care outcomes.¹⁶

Case Management

In case management models, a case manager coordinates the activities of various health-care disciplines, on behalf of the patient. Case management of cardiac rehab patients works well within a chronic disease management framework following established protocols for cardiac rehabilitation that incorporates diagnosis, risk stratification, and referral to community resources as well as patient/caregiver and self-management components (Appendix C). This model is also important to achieving improvement of evidence based behavioral outcomes using goal setting, motivational interviewing and coaching techniques which facilitate the chronic disease management philosophy.

Alternate Program Models

The following four alternate cardiac rehab case management models combine lifestyle and behavior modification with home exercise. The patient is first assessed in a case management environment and then follows one of the following streams:

1. Attend on-site group education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. After completing a basic program, client evaluation is individualized by a cardiac rehabilitation case manager or other health care professional as appropriate for ongoing risk and behavior modification with frequency of follow-up determined by need for a minimum of 6 months.
2. Attend web based self management education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. The client emails a home exercise log to a case manager who interacts by email, phone or telehealth application. On-site visits would occur monthly (or as needed) with ongoing risk and behavior modification weekly or monthly for a minimum of 6 months.
3. Attend case managed only sessions (non-group) and be followed in clinic by the cardiac rehabilitation case manager for ongoing risk and behavior modification and prescribed home exercise weekly or monthly (or as needed) for a minimum of 6 months.
4. Telehealth group education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. After completing a basic program, client evaluation is individualized by a cardiac rehabilitation case manager or other health care professional as appropriate for ongoing risk and behavior modification with frequency of follow-up determined by need for a minimum of 6 months.

Program Content

Similarities exist between all cardiac rehabilitation programs including case managed home exercise programs. The following section will highlight some of those similarities. Individual programs may offer more variety or alternate levels of content particular to their patient population or community.

Education Content

Basic education elements should include, but not be limited to, the following components as well as be goal based using behaviour change processes.

- Your Heart and How it Works
- Recognizing signs and symptoms of angina, acute myocardial infarction, congestive heart failure, etc.
- Risk Factor Overview (i.e. hypertension, elevated cholesterol)

- Interventional Procedures
- Physical Activity Guidelines
- Self Assessment Techniques/ Goal Setting
- Smoking Cessation
- Medication Education
- Nutrition Education
- Maintaining a Healthy Weight
- Stress Management
- Dealing with Depression and the Emotional Aspects of Living with Cardiovascular Disease

Referral Guidelines

Each patient must be physician referred.

Entrance Standards

- Patients with documented cardiovascular disease or diagnosis of related cardiovascular disease and high risk for developing CVD by Framingham criteria.^{2, 17}
- Patients must be identified as low risk of event by risk stratification criteria (Appendix D), and be clinically stable. Patients identified as moderate risk (Appendix D) may be referred if clinically stable, and if approved by the referring physician.²
- Patients at high risk (Appendix D) may attend the education components of the program, but should attend medically supervised exercise sessions if at all possible.
- High Risk primary prevention patients can be risk stratified using Framingham criteria^{2, 17} and Duke Treadmill scoring.² (Appendix D)
- Clinical indications and contraindications for entry to inpatient and outpatient cardiac rehabilitation are well documented in ACSM's Guidelines for Exercise Testing and Prescription 7th ed. (2006, page 176).
- Patients must be willing to respect the guidelines given to them, participate in, and complete the program.
- Patients must be referred through the established referral system.
- Exercise treadmill testing is recommended before program entry, but in specific situations can be performed at a later date. Knowing a patient's functional capacity is useful for activity counselling, exercise prescription, return to work evaluation, disability assessment, and to help estimate prognosis.
- Informed consent must be obtained.

Exercise Guidelines

The case manager will provide, at minimum, the following exercise related information:

- Types of exercise
- Heart rate monitoring
- Exercising safely within prescribed training heart rate
- Climbing hills and stairs

- Tips for Saving Energy
- Sexual Activity
- Rating of Perceived Exertion
- Guidelines for how and when to take nitroglycerine
- Exercise safely to attain 1000 -2000 kcal/week energy expenditure
- Exercise regularly at least 3-5 times /week for 20-60 mins
- Tips on Temperature and Exercise

Exercise Prescriptions

The following guidelines are designed to assist with prescribing exercise for cardiac rehabilitation patients. The guidelines are based on results of the patient’s exercise tolerance test. These are “guidelines” and the final arbiter should always be clinical judgement and patient response to the exercise itself.

After determination of the patient’s current exercise practice, physical limitations, and clinical symptoms with exercise, emphasis should be placed on incremental increases in duration of exercise sessions to compensate for low intensity levels. Gradual increases of one to five minutes each day to attain 20 to 60 minutes of exercise within a prescribed training heart rate range and Rating of Perceived Exertion (RPE)¹⁴ scale of 3 to 6 is optimal. (Appendix F)

Setting the intensity level (Training or Target Heart Rate) for exercise is critical to the success and safety of any program. Cardiac events during exercise are rare, but usually occur if patients exercise above recommended heart rates prescribed for them. There are two types of calculations for Training Heart Rate (THR): Calculation of the training heart rate from a graded exercise treadmill test (ETT) and calculation without an ETT.

Cardiorespiratory Exercise Prescription

FITT Plan

Frequency of Exercise: 3-5 days per week

Additional benefits from 6 or more days per week are minimal, unless the patient is a competitive athlete or has a primary goal is to maximize caloric output.

Intensity of Exercise: RPE 3-6
40-85% Heart Rate Reserve
(See Training Heart Rate)

Time (Duration) of Exercise: 20-60 minutes

Activity can be continuous or intermittent (minimum 10 minutes) accumulated through the day.

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Type of Exercise:

Aerobic

Light Resistance

- 8-15 repetitions
- 8-10 exercises
- 2-3 X/week

Activities should emphasize large muscle groups (walking, swimming, cycling, dancing, skating, exercise machines etc.)

Training Heart Rate (THR)**With a Stress Test:**

The following table can assist in the selection of an initial exercise intensity and level of exertion. This intensity may need to be modified based on patient response.

MET Level on Stress Test	<3	3-5	5-8	>8
Target Heart Rate (%HRR)	40-50%	50-60%	60-70%	70-80%
RPE	3	3-4	4-5	5-6

The Heart Rate Reserve (HRR) is the maximal heart rate (HRmax) obtained on the stress test minus the resting heart rate (RHR).

$$\text{HRR} = \text{HRmax} - \text{RHR}$$

Calculation of the THR can be done using the Karvonen Formula:

$$[(\text{HRmax} - \text{RHR}) \times \text{Intensity \%}] + \text{RHR} = \text{THR.}$$

A THR may not be appropriate for individuals with arrhythmias or on Beta Blockers. They can use heart rate monitors, but should be guided primarily by their RPE.

HR max = maximum HR reached safely on ETT

RHR = resting heart rate (taken after patient has been sitting quietly for 5 minutes)

Intensity = set % based on MET level reached by ETT

Exercise Prescription Without a Preliminary Stress Test

Each program should adopt some form of preparticipation screening procedure for their clients.

The ACSM's Guidelines for Exercise Testing and Prescription 7th ed. (2006) offers a pre-

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participation screening algorithm (page 20) to help determine the depth of screening needed. There are many sedentary individuals who can safely begin a light to moderate intensity activity program without the need for extensive medical intervention.

Exercise Progression:

The ACSM's Guidelines for Exercise Testing and Prescription 7th ed. (2006) provides an example of a gently progressing exercise program for the sedentary and low risk individual (page 149). The RPE could also be assessed to monitor exercise intensity.

Energy Expenditure Goals

If the MET level of any activity can be measured or estimated, the caloric output of that activity can be assessed using the following formula:

$$(\text{METs} \times 3.5 \times \text{body wgt in kg}) / 200 = \text{kcal/min}$$

- a weekly expenditure > 1000 kcal from physical activity is associated with a significant reduction of all cause mortality
- individuals should be encouraged to progress to 300-400 Kcal output during each exercise session
- success with short and long term weight control requires weekly output levels in excess of 2000 Kcal (Estimating Caloric Expenditure Appendix G)

Outcome Measures

Outcome measures should be established to complement the Canadian Association of Cardiac Rehabilitation (CACR) minimum dataset registry and include, but not be limited to the following:

Minimum Datasets

Baseline Demographics:

- Patient diagnoses (i.e. MI, Angina, CHF, CABG, PTCA)
- Age and sex of patient
- Spoken and written language, ethnicity, education, travel time to program, occupation
- Service referrals

Pre and Post Outcome Measures:

- Cardiovascular status (Canadian Cardiovascular Society angina scale, NYHA class, LV function)
- Risk Factors
- Biochemistry (i.e. lipid profile, fasting blood sugar, serum creatinine, microalbuminuria)
- Anthropometric (i.e. height, weight, waist circumference, body mass index)
- Hemodynamic (i.e. blood pressure and heart rate)
- Exercise Treadmill Test results

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- Duration of Exercise (minutes per week exercised)
- Psychosocial (anxiety measure, depression measure, disease specific quality of life)
- Exercise Adherence Measures
- Medications and medication changes

Alternate Cardiac Rehabilitation Model Outlines

Alternate Model 1:

Patients will attend an outpatient education program, once a week for 6 weeks. Each session will address home exercise guidelines and follow-up, as well as a structured education component. A sample structure can be found in Appendix H. Patients will be given guidelines for home exercise, and be expected to participate in home exercise 3 to 5 times each week. Each patient will maintain an exercise diary or log to be reviewed by the case manager weekly. This home exercise model has proven beneficial to those who are at low risk and have returned to work.

The program is offered in a group education format, however each participant is assessed by a member of the cardiac rehab team, exercise prescriptions are individualized, behavior change goals are assessed and additional education or referral to another health care professional is provided as is deemed necessary. Polar heart rate monitors are provided to each participant for 6 weeks. Spouses and partners are encouraged to attend all phases of the program.

Follow-up is provided in clinic visits or by telephone or email for a minimum of 6 months.

Throughout the program, each participant receives a plan of care that outlines individual goals and timelines for attainment of objectives. Individualized appointments are provided with an appropriate health care professional based on case management, behavior change goals and specific need of the participant. Outcomes are measured for data entry prior to entry into the program and at 6 months. In the absence of standard cardiac rehab education sessions the Heart to Heart Program may be used with supplemental cardiac rehab educational material.

Alternate Model 2

This model incorporates web based (Podcast) or DVD education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. The client emails completed home exercise logs to a case manager who interacts by email, phone or telehealth application. On-site visits would occur monthly (or as needed) with ongoing risk and behavior modification weekly or monthly for a minimum of 6 months. Outcomes are measured for data entry prior to entry into the program and at 6 months.

Alternate Model 3

In this model patients attend case managed only sessions (non-group) and are followed in clinic by the cardiac rehabilitation case manager for ongoing risk and behavior modification and prescribed home exercise weekly or monthly (or as needed) for a minimum of 6 months. The patient emails completed home exercise logs to a case manager who interacts by email, phone or telehealth application. Outcomes are measured for data entry prior to entry into the program and

at 6 months. Coaching and education components will be addressed individually. Education sessions will be made available by DVD for patient use.

Alternate Model 4

This model incorporates Telehealth group education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. After completing a basic program, client evaluation is individualized by a cardiac rehabilitation case manager or other health care professional as appropriate for ongoing risk and behavior modification with frequency of follow-up determined by need for a minimum of 6 months. Outcomes are measured for data entry prior to entry into the program and at 6 months. The education session outline used in Model 1 could be used. Collaboration with nurse practitioners or other health care providers in rural areas, either in community health centres or community hospitals, may be beneficial to provide case management processes.

NOTE: all models support self-management concepts in an effort to improve chronic cardiovascular care.

Sample Templates

There are many variations and types of documentation tools used in cardiac rehabilitation programs. The following template samples are examples only and can be modified for individual programs.

1. Home Exercise Record (page 16)
2. Developing a Personal Exercise Plan (page 17)
3. Implementation Intention Exercise Barriers Worksheet (page 18)
4. Telephone Follow-up Guide (page 19)
5. Coaching Skills and Tips (page 20)
6. Goal setting Worksheets
 - Goal Setting Patient Worksheet (page 21)
 - Decisional Balance Patient Worksheet (page 22)
 - Case Manager's Sample Questions (page 23)
 - Exploring Change Concepts. Benefits vs Concerns (page 25)
7. General Case Management Processes (page 26)

Home Exercise Record

Name: _____

Your Exercise Plan:

Number of Times a Week:
How Hard:
How Long:
What Type:

Date	Type of Activity	Time Exercised & Distance (if applicable)	Heart rate before exercise	Heart rate during exercise	Rate of Perceived Exertion	Heart Rate after Exercise	Comments or additional information (blood pressure, pain, shortness of breath, feeling tired, blood sugars)

PERSONAL EXERCISE PLAN

Part 1: How many times per week do you plan on exercising?

Instruction: For the following statement, please insert a number between 0 and 7 in the blank space provided.

Statement: During the next 6 months, I plan to exercise _____ days per week

Part 2: What, Where, and When will you engage in exercise?

Instruction:

1. List up to 3 **KINDS OF EXERCISE ACTIVITIES** you plan on doing under **COLUMN #1** during the next 6 months
2. For **EACH ACTIVITY** you listed in column 1, state **WHERE** you plan on engaging in this activity under **COLUMN #2** and **WHEN** you plan on engaging in this activity under **COLUMN #3**.

Please use the example provided to help you.

COLUMN #1 Exercise Activity	COLUMN #2 Where I will engage in this activity	COLUMN #3 When I will engage in this activity
Example Activity: walking	Where?: treadmill in my home	When?: Monday, Wednesday, & Friday between 9:00 and 10:00
Your activity #1:	Where?:	When?
Your activity #2:	Where?:	When?
Your activity #3	Where?:	When?

Patient Signature: _____ Witness Signature: _____
 Date: _____ Date: _____

Developed by Dr. Chris Blanchard, Canada Research Chair, Dalhousie University.

IMPLEMENTATION INTENTION EXERCISE BARRIERS SHEET

General Instructions: Please think about EACH EXERCISE ACTIVITY you listed on your planning page. Which obstacles or barriers might interfere with the implementation of EACH of YOUR EXERCISE PLANS? How could you successfully cope with such barriers? Please write down your strategies to overcome EACH exercise barrier in the table below.

Part 3: Exercise Barriers and Strategies to overcome them

Instruction:

1. In the **COLUMN #1**, list the exercise activities you identified from part #2s
2. For **EACH ACTIVITY** you listed in column 1, identify an **EXERCISE BARRIER** that may prevent you from performing the exercise activity under **COLUMN #2** and a **STRATEGY TO OVERCOME** the exercise barrier under **COLUMN #3**.

Please use the example provided to help you.

COLUMN #1 Exercise Activity	COLUMN #2 Exercise Barrier	COLUMN #3 Strategy to Overcome Exercise Barrier
Example: walking	Barrier: memory / forget	Strategy: put a reminder note on the fridge door / ask spouse to remind me
Your activity #1:	Barrier:	Strategy:
Your activity #2:	Barrier:	Strategy:
Your activity #3:	Barrier:	Strategy:

Patient Signature: _____
Date: _____

Witness Signature: _____
Date: _____

Developed by Dr. Chris Blanchard, Canada Research Chair, Dalhousie University.

Telephone Follow - Up Guide

Name: _____

Date: _____ Time: _____

1st follow -up _____ 2nd follow - up _____ 3rd follow - up _____ 4th follow - up _____

Reason for call:

Select topic discussed and note suggestions or changes provided.

Weight

Dietary changes

Exercise habits

Lipid profile

Lipid lowering agent taken

Blood Pressure

Medication

Stress management

Patient goals

Follow-up

Signature: _____

Coaching Skills and Tips

Adapted from www.wellcoaches.com

- Be Client Centered
 - Tip: what is it that the client wants to work on today?
- Build Rapport
- Use Active Listening
 - Tip: don't think about what you are going to say next; be engaged with what they are saying- don't miss their last word; stay focused
- Use Open-ended questions
 - Tip: Reflect back what you heard if you don't know what to say
 - Tip: Ask a "powerful question" that brings them to a higher consciousness
- Use Reflection...Helps people think more objectively about what is going on.
 - Tip: You can kill rapport by asking too many questions. Alternate your questions with reflection- listen like you 'don't exist' and wait for the natural ebb of their understanding
- Summarize what the client has said
- Engage in Pro-change talk
 - Tip: The client makes the case for change – not you! When they say the words it is more powerful. Get them energized by asking what is it you want to do? Why would you want to do that?
- Emphasize their strengths to overcome obstacles
 - Tip: Help them identify what's currently working in other parts of their lives that they could use in the current difficult situation. Keep bringing their strengths out
- Ask them who they want to be?

Cardiac Rehabilitation Goal Setting Worksheet
Sample Patient Worksheet

The changes I want to make (or continue making) are:
The reasons why I want to make these changes are:
The steps I plan to take in changing are:
The ways other people can help me are:
I will know that my plan is working if:
Some things that could interfere with my plan are:
What I will do if the plan isn't working:

**Decisional Balance
Sample Patient Worksheet**

When we think about making changes, most of us don't really consider all "sides" in a complete way. Instead, we often do what we think we "should" do, avoiding things we don't feel like doing, or just feel confused or overwhelmed and give up thinking about it at all. Thinking through the pros and cons of changing or not is one way to help us make sure we have fully considered a possible change in behaviour. This can help us to "hang on" to our plan in times of stress or temptation.

Below, write in the reasons that you can think of in each of the boxes. For most people, "making a change" will probably mean quitting smoking or becoming more physically active, but it is important that you consider what specific change you might want to make, which may be something else.

	Benefits/Pros	Costs/Cons
Making a Change		
Not Changing		

Cardiac Rehabilitation Goal Setting Case Manager's Sample Questions for Completion Patient Worksheet

The changes I want to make (or continue making) are:

Assessment:

1. *What are some of the things that you would like to change to improve your health?*
2. *Of those, which is most important to you?*
3. *You may be a little fed up with people lecturing you about your (i.e.) smoking. I'm not going to do that, but it would help me if you could tell me what you think about cutting smoking out of your life?*

The reasons why I want to make these changes are:

Assess Conviction:

1. *If you decided to quit smoking how would it benefit you?*

Assess Motivation

1. *On a scale of 1 to 10, how motivated are you to quit smoking?*
2. *Why are you at 4 and not at 1?*
3. *What would need to happen for you to get from 4 to 8?*
4. *How can I help you get from 4 to 8?*
5. *Can you give me an example of something you've done in the past that worked well for you?*

Assess Confidence

1. *If you really decide to quit smoking do you think you could do it?*
2. *If you were to decide to quit right now, how confident are you that you would succeed on a scale of 1 to 10?*
3. *Why are you at 4 and not at 1?*
4. *What would need to happen for you to get from 4 to 8?*
5. *How can I help you get from 4 to 8?*
6. *Can you give me an example of something you've done in the past that worked well for you?*

Identify Pros and Cons

1. *What do you like about smoking?*
2. *What do you dislike about it?*
3. *What types of information have you heard about the risks of smoking? (Ask permission to give expert information)*

Identifying Barriers: What would prevent you from...?

Identifying Strategies: How do you think you can...?

The steps I plan to take in changing are:

Brainstorm solutions

1. *Don't immediately offer a single simple solution*
2. *Encourage patient to say what could work (their past successes, experience of others,*
3. *wild speculation)*
4. *Supplement with your ideas*
5. *Patient chooses best option*

Use Smart Goal Framework: Specific, Measurable, Action-oriented, Realistic, Time-limited

1. Develop a simple, specific plan for starting to change
2. Decide when, where and how the intention (goal) is to be implemented
3. Identify actions that can be taken soon (48 – 72 hours)
4. Follow-up to see if plan implemented.

Other thoughts to explore during goal setting.

The ways other people can help me are:

1. *List specific ways that others can help support you in your change attempt*
2. *How will you go about eliciting others' support?*

I will know that my plan is working if:

1. *What do you hope will happen as a result of the change?*
2. *What benefits can you expect from the change?*

Some things that could interfere with my plan are:

1. *What could go wrong?*
2. *Anticipate situations or changes that could undermine the plan.*
3. *How might you stick with the plan despite the changes or setbacks*

**EXPLORING CHANGE CONCEPTS:
BENEFITS VS CONCERNS**

- What are the benefits of staying the same?
- What are your concerns about the same?
- What are your concerns about change?
- What are the benefits of change?

How important is it for you to change at this time?

1	2	3	4	5	6	7	8	9	10
Not important at all				About as important As everything else			Most important thing in my life		

How confident are you that you can change?

1	2	3	4	5	6	7	8	9	10
I do not think I Will achieve my goal				I have a 50% chance of achieving my goal			I will definitely achieve my goal		

How Ready Are You To Change?

1	2	3	4	5	6	7	8	9	10
I am not ready				I am almost ready			I am very ready		

General Case Management Processes

Assessment:

The health history is a collection of subjective data that includes information on both the client's past and present health status. It is used in conjunction with the physical examination and laboratory findings as a basis for drawing conclusions about an individual's state of health. It allows positive aspects, health problems, health habits as well as abnormal symptoms, health teaching needs, and health concerns to be identified.

Components of a comprehensive Health History

- Date history obtained.
- Source of history.
- Interpreter if used.
- Reason for seeking health care.
- Client Profile Data.
- Present Illness Data.
- Present Health Status.
- Past Personal data.
- Family Medical data.
- Life-style data.
- Health Management data.
- Psychological data.
- Review of Systems.

Guidelines for Obtaining a Health History

- Greet client by name.
- Introduce yourself and your designation, what you are intending to do.
- Provide a private, quiet environment free of interruptions.
- Ensure client is comfortable.
- Ask one question at a time.
- Ask direct questions.

- Avoid leading questions.
- Do not "put words in the client's mouth"; allow the client to use his or her own words.
- Give the client your undivided attention.
- Promote accurate, complete communication.
- Be alert to non-verbal communications.
- Take brief notes.

The physical assessment can be broken down into four components:

- Inspection, Palpation, Percussion, Auscultation.

Measurement Criteria

1. The priority of data collection is determined by the client's immediate condition or need.
2. Pertinent data is collected using appropriate assessment techniques.
3. Data collection involves the client, significant others, and health care providers when appropriate.
4. The data collection is ongoing.
5. Relevant data is recorded according to standards.

Diagnosis

The case management diagnosis is derived from data gathered during the assessment. Health problems or potential health problems are identified and formulated into a nursing diagnosis. Case management is the basis for planning interventions that help prevent, minimize or alleviate specific health issues.

A Medical Diagnosis is different from a nursing diagnosis, it is used to define etiology of the disease. It only focuses on the function and malfunction of a specific organ system. By using all of the components of case management, the problem is clearly communicated to everyone involved in the clients care.

Measurement Criteria:

1. Diagnosis is derived from the assessment data.
2. Diagnosis is validated with the client.
3. Diagnosis is documented to aid in the expected outcomes and plan of care.

Planning

The planning phase involves the development of a care plan for the client based on the diagnosis. The care plan is a communication tool that is kept up to date and provides vital information

related to continuity of care, preventing complications and providing health education and goal setting. Goals should be stated in terms of client outcomes.

Measurement Criteria:

1. The plan is individualized to the client's condition.
2. The plan is developed with the client and significant others if appropriate.
3. The plan reflects current cardiac rehab practice.
4. The plan is documented.
5. The plan provides for continuity of care.

Implementation

Implementation is the actual performance of the interventions identified in the care plan. The implementations are coordinated with other members of the health care team who have direct and ongoing case management of the client.

Measurement Criteria:

1. Interventions are consistent with the established plan of care.
2. Interventions are implemented in a safe and appropriate manner.
3. Interventions are documented.

Evaluation

Evaluation is an ongoing process that enables the case manager to determine what progress the patient has made in meeting the goals for care. The outcome criteria provide measures for determining outcomes of care.

In assessing outcomes of care, determine whether goals have been met, partially met, or not met at all. If the goals have not been met it will be necessary to re-evaluate the plan. The plan may need to be altered, to do this you will need to do a new assessment. Evaluation also provides data for Quality Assurance audits.

Measurement Criteria:

1. Evaluation is systematic and ongoing.
2. The client's response to interventions is documented.
3. The effectiveness of interventions is evaluated in relation to outcomes.
4. Ongoing assessment data are used to revise diagnosis, outcomes, and the plan of care are documented.
5. The client, significant others, and the health care providers are involved in the evaluation process, when appropriate.

Summary

The purpose of this document is to highlight alternate cardiac rehabilitation home exercise models using case management and chronic disease management frameworks. Four alternate models for delivery of cardiac rehabilitation care have been outlined. As these models are used, evaluated and adopted into practice environments in New Brunswick it is expected that new learning will lead to improved processes for delivery of care in cardiac rehabilitation programs.

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Alternate Cardiac Rehabilitation Programming Models

Web Based Education →

Self-Management Concepts →

Provides clinical decision support & case management →

Professional linkages and support →

1. Attend on-site group education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. After completing a basic program, client evaluation is individualized by a cardiac rehabilitation case manager or other health care professional as appropriate for ongoing risk and behaviour modification with frequency of follow-up determined by need for a minimum of 6 months.
2. Attend web based self management education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. The client emails home exercise log to a case manager who interacts by email, phone or telehealth application. On-site visits would occur monthly (or as needed) with ongoing risk and behaviour modification weekly or monthly for a minimum of 6 months.
3. Attend case managed only sessions (non-group) and be followed in clinic by the cardiac rehabilitation case manager for ongoing risk and behaviour modification and prescribed home exercise weekly or monthly (or as needed) for a minimum of 6 months.
4. Telehealth group education sessions using standard cardiac rehabilitation education modules for 6 weeks and prescribed home exercise. After completing a basic program, client evaluation is individualized by a cardiac rehabilitation case manager or other health care professional as appropriate for ongoing risk and behaviour modification with frequency of follow-up determined by need for a minimum of 6 months.

← Telehealth Linkages

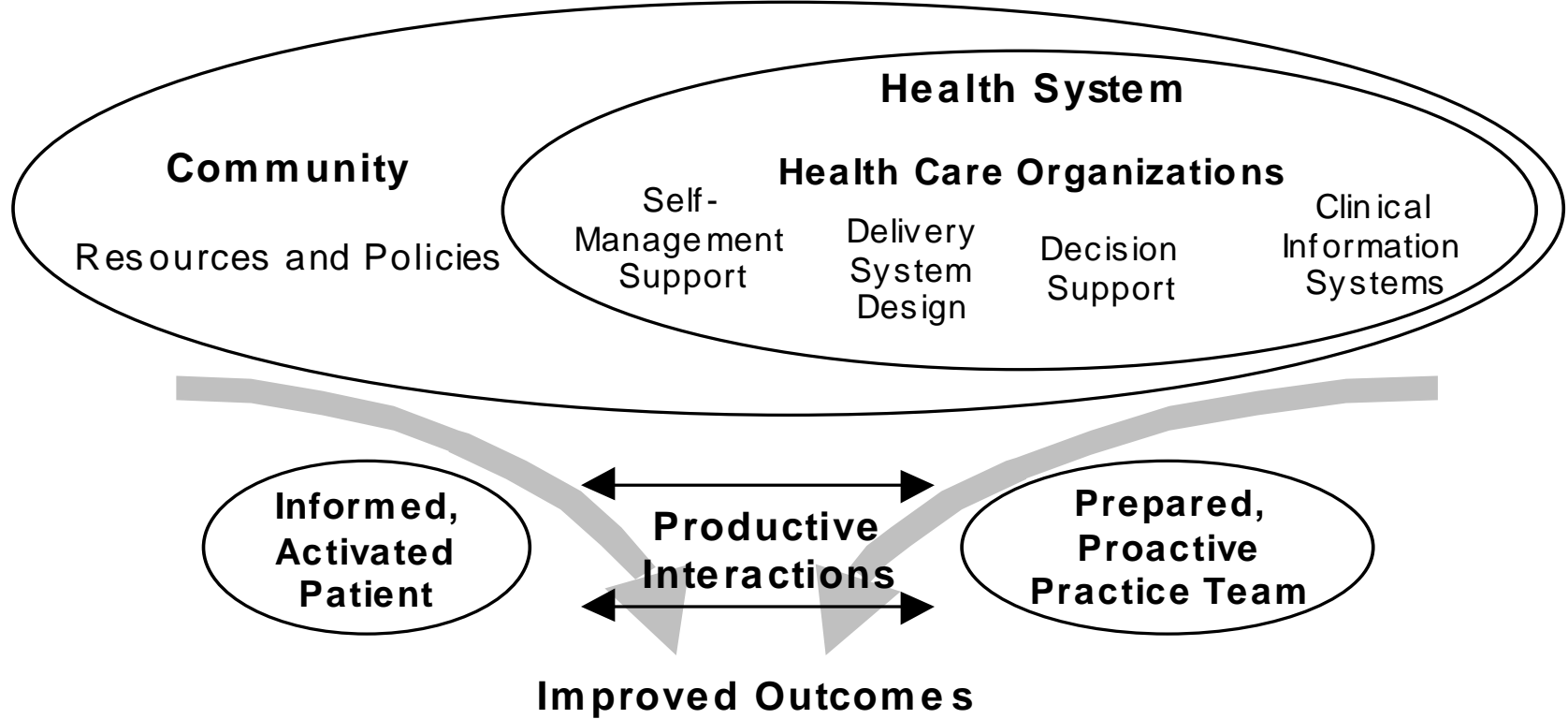
← Heart Function Clinic Linkages

← Community linkages

← Chronic Disease Management

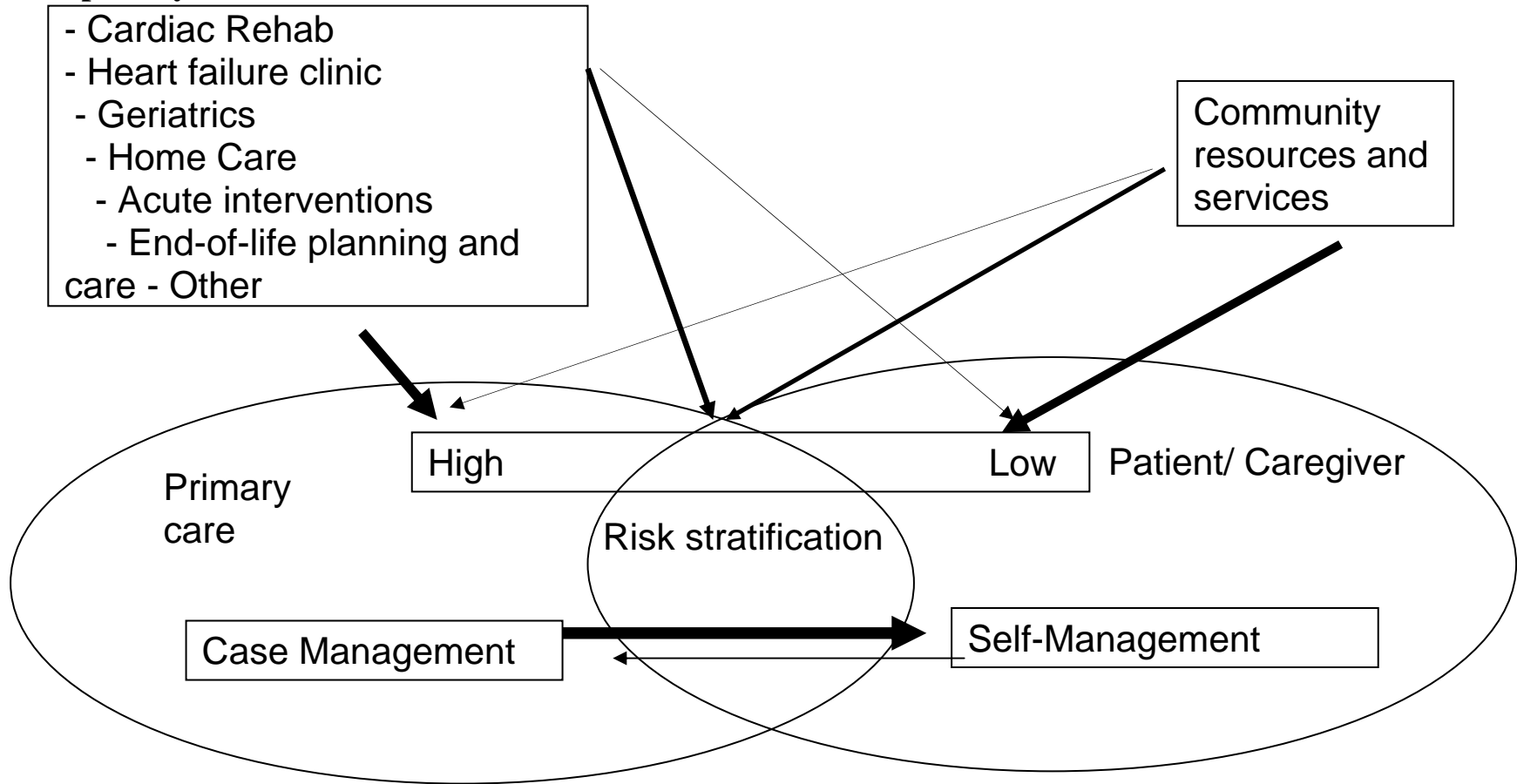
Appendix B

Chronic Care Model



Improving Outcomes in Chronic Illness
Wagner E, Austin B, Von Korff M. <http://www.improvingchroniccare.org/>

**Appendix C Model of Cardiovascular Care Management Integrating Chronic Disease Management Principles
Specialty Services**



CANADIAN HEART HEALTH STRATEGY and Action Plan, 2008

APPENDIX D CACR Risk Stratification Strategy for Persons with Documented Cardiovascular Disease

MEN

Total cholesterol level, 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, mm Hg	
<110	0
110-129	1
130-149	2
150-169	3
170-199	4
200-229	5
≥ 230	6
SBP Score	

Smoker	
No	0
Yes	1
Smoker Score	

Diabetes	
No	0
Yes	1
Diabetes Score	

MEN with Documented CVD	
Risk Factor	Risk Points
Age Group, yr	
20 - 34	0
35 - 39	0
40 - 44	1
45 - 49	1
50 - 54	2
55 - 59	2
60 - 64	3
65 - 69	3
70 - 74	4
> 75	4
Age Score	

Total Risk Points = Age Score + Lipid Score + SBP Score + Smoker Score + Diabetes Score

Mean 2-yr risk score in Men with CVD

Total risk points	2-yr CVD Event Probability (%) P.D.S.	Age (yrs)	Probability (%)
0	2	35	<1
2	2	40	8
4	3	45	10
6	5	50	11
8	7	55	12
10	10	60	12
12	14	65	14
14	20	70	14
16	28		
18	37		
20	49		
22	63		
24	77		

Modified from Califf et al, 1996

WOMEN

Total cholesterol level, 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

WOMEN with Documented CVD	
Risk Factor	Risk Points
Age Group, yr	
20 - 34	0
35 - 39	0
40 - 44	1
45 - 49	2
50 - 54	3
55 - 59	4
60 - 64	5
65 - 69	6
70 - 74	7
> 75	7
Age Score	

Total Risk Points = Age Score + Lipid Score + SBP Score + Smoker Score + Diabetes Score

Mean 2-yr risk score in Women with CVD			
Total risk points	2-yr CVD Event Probability (%) P.D.S.	Age (yrs)	Probability (%)
0	0	35	<1
2	1	40	<1
4	1	45	<1
6	1	50	4
8	2	55	6
10	4	60	8
12	6	65	12
14	10	70	12
16	15		
18	23		
20	35		
22	51		
24	68		
24	85		

Systolic blood pressure, mm Hg	
<119	0
120-139	1
140-169	2
170-209	3
≥ 210	4
SBP Score	

Smoker	
No	0
Yes	3
Smoker Score	

Diabetes	
No	0
Yes	3
Diabetes Score	

PDS	Low risk $\leq 2.5\%$ per year	Intermediate risk $\leq 5\%$ per year	High risk $> 5\%$ per year
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STEP 2 Calculation of Disease Prognosis Score (DPS) – Risk of Exercise Associated Adverse Events

1. Calculate the Duke Treadmill Score (DTS)

$$DTS = \text{exercise time} - (5 \times \text{maximal ST depression}) - (4 \times \text{angina index})$$

<p>Where:</p> <ul style="list-style-type: none"> • Exercise time = minutes on the Bruce protocol • ST depression = maximal recorded ST depression 	<p>Treadmill Angina Index:</p> <ul style="list-style-type: none"> • 0 = no angina. • 1 = non-limiting angina. • 2 = limiting angina.
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2. Determine the Disease Prognosis Score (DPS)

Event Risk	Duke treadmill score	Disease prognosis score
Low Risk	≥ 5	0.25 % per year
Intermediate Risk	$\leq +4$ to ≥ -10	1.0% per year
High Risk	≤ -11	5.0% per year

Modified from Mark et al, 1991

STEP 3 Integrate the DPS and the PDS to determine the recurrent cardiac event risk score.

Disease Prognosis Score	Progression of Disease 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

The recurrent cardiac event score can be used to determine the exercise training setting. Low risk and intermediate risk persons are appropriate for program-associated, facility independent or program-based, facility dependent exercise. High risk persons should be assigned to program-based, facility dependent exercise.

Clinical Indications and Contraindications for Inpatient and Outpatient Cardiac Rehabilitation

Indications

- Medically stable postmyocardial infarction
- Stable angina
- Coronary Artery Bypass Graft surgery
- Percutaneous transluminal coronary angioplasty (PTCA)
- Compensated congestive heart failure
- Cardiomyopathy
- Heart or other organ transplantation
- Valve surgery or pacemaker/ICD insertion
- Peripheral arterial disease
- High-risk cardiovascular disease ineligible for surgical intervention
- Sudden cardiac death syndrome
- End-stage renal disease
- At risk for coronary artery disease with diabetes mellitus, dyslipidemia, hypertension etc.
- Other patients who may benefit from structured exercise and/or patient education (based on physician referral and consensus of the rehabilitation team)

Contraindications

- Unstable angina
- Resting systolic blood pressure of >200 mm Hg or resting diastolic blood pressure of >110 mm Hg should be evaluated on a case-by-case basis
- Orthostatic blood pressure drop of >20 mm Hg with symptoms
- Critical aortic stenosis
- Acute systemic illness or fever
- Uncontrolled atrial or ventricular dysrhythmias
- Uncontrolled sinus tachycardia (>120 bpm)
- Uncompensated congestive heart failure
- 3-degree AV block (without pacemaker)
- Active pericarditis or myocarditis
- Recent embolism
- Thrombophlebitis
- Resting ST segment displacement (>2 mm)
- Uncontrolled diabetes (resting blood glucose of >16 mmol/L) or >14 mmol/L with ketones present
- Severe orthopedic conditions that would prohibit exercise
- Other metabolic conditions such as acute thyroiditis, hypokalemia, hyperkalemia, hypovolemia, etc

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Appendix F

MODIFIED BORG

RATE OF PERCEIVED EXERTION (RPE) SCALE

Adapted from “You and Your Heart” Atlantic Health and Wellness Institute

- 0 **The feeling you have at rest**
 - 0.5 **Very, very light (just noticeable)**
 - 1 **Very light** – Working at a desk, watching TV, listening to music
 - 2 **Light** – Getting dressed. Little or no fatigue
 - 3 **Moderate** – Slowly walking across the yard
 - 4 **Somewhat hard** – Comfortable walking
 - 5 **Hard** – Brisk walk, beginning to breathe deeper
 - 6 **Harder** – Fast walk, breathing deep but able to maintain
-
- 7 **Very hard** - Vigorous exercise. Breathing hard and feeling fatigued
 - 8
 - 9 **Very, very hard** – Unable to maintain for very long
 - 10 **Maximal** – All out, complete exhaustion

PATIENT INSTRUCTIONS:

When using the RPE scale, select a number based on your **OVERALL EFFORT** needed to do the activity.

Adapted from: Borg, G.A. Psychophysical bases of perceived exertion. (1982). *Medicine and Science in Sports and Exercise*, 14(5), 377-381.

Appendix G

Estimating Caloric Expenditure

The ACSM recommends a daily energy expenditure of 150-400 kcal. A minimal caloric threshold of 1000kcal/week is associated with a significant 20% - 30% reduction in all-cause mortality.²¹ In combination with a low-fat, low cholesterol diet, 1500 kcal/week of physical activity may halt the progression of coronary disease and actual regression may be achieved with 2200 kcal/week.²²

Caloric expenditure can be measured with a simple calculation if the workload (MET level) of the activity can be assessed. Direct measurement of oxygen consumption is the most accurate method, but usually not practical. Most contemporary exercise modalities have the caloric output displayed and provides a reasonable estimation if the individual exercising remembers to enter their weight at the start of the session. For general activities the best tool for estimating workload would be “The Compendium of Physical Activities Tracking Guide”²³ which can be found at: http://prevention.sph.sc.edu/tools/docs/documents_compendium.pdf

Formula to estimate caloric output

$$\frac{\text{MET} \times 3.5 \times \text{Wgt. (KG)}}{200} = \text{_____ Calories/min expended}$$

APPENDIX H

SAMPLE: 6 WEEK HOME EXERCISE PROGRAM

DAY: TUESDAY TIME: 8:00 AM – 1:00 PM TOTAL PARTICIPANTS: 12-15 people

CLASS HOURS	WEEK 1 Date	WEEK # 2 Date	WEEK #3 Date	WEEK #4 Date	WEEK # 5 Date	WEEK #6 Date
8:00-9:00 AM	Nutrition (Basic Nutrition)	<u>Nutrition</u> (Fats)	<u>Nutrition</u> (Low Fat Diet)	<u>Nutrition</u> (Labels)	<u>Nutrition</u> (Salt & Fiber)	<u>Nutrition</u> (Restaurants)
9:00AM-9:15AM	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK
9:15AM-10:15AM	Introduction	Tests and Treatments	Risk Factors	Risk Profile/ Stress	Stress Video	Stages of Change Feelings
10:15 AM-10:30 AM	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK
10:30 AM-12:00Noon-	Anatomy of the Heart/Heart Failure	10:30-12:00 Exercise Guidelines	Hypertension / Cholesterol	Depression	Pharmacy	Wrap-up & <u>GRADUATION</u>
12:00 Noon-1:00 PM	Orientation in class and GYM	Exercise in GYM	Exercise in GYM	Relaxation in GYM	Exercise in GYM	

Exercise Sessions are approximately 1 hour each. Home Exercise Log Books are reviewed weekly.