An Introduction to Cardiac Rehabilitation

Cardiovascular disease remains a leading cause of death and a significant health problem in Australia. (National Heart Foundation of Australia, 1999) However, many lives have been saved due to improved diagnostic, medical and surgical interventions. Due to this decrease in mortality, there are now more people living with cardiovascular disease providing a continuing challenge to the health care system.

Cardiac rehabilitation is for the survivors of cardiovascular disease. Cardiac rehabilitation services are designed to help patients restore and maintain optimal health. Although there are documented benefits for patients who participate in cardiac rehabilitation programs (Wenger, et. al. 1995), there are still a limited number of programs available in Australia.

This document is designed to provide information on cardiac rehabilitation to help promote further development and continued improvement in service provision and availability.

What is Cardiac Rehabilitation?

Cardiac Rehabilitation is that process through which cardiac patients return to an active and satisfying life. It is a process aimed at preventing the recurrence of further cardiac events.

Cardiac rehabilitation is for people with heart disease who have undergone associated medical and surgical treatment for their condition. The patient's family and partner should also be included in the rehabilitation process. Cardiac rehabilitation is also appropriate for those people at risk of developing heart disease.

Cardiac Rehabilitation is achieved by the combined and coordinated use of medical, psychological, educational, vocational and physical measures.

Justification for providing Cardiac Rehabilitation Services

Cardiac rehabilitation is widely accepted as an integral part of the cardiac patient care continuum.

Cardiac rehabilitation policy statements

(i) National Heart Foundation of Australia

Secondary prevention programs, including outpatient cardiac rehabilitation, should be available to all patients in Australia who have had acute myocardial infarction, coronary artery bypass grafts, coronary angioplasty or other cardiovascular disease. Unless contraindicated, these patients should be routinely referred to hospital or community-based outpatient programs.

National Heart Foundation of Australia, 1993

(ii) World Health Organisation

Cardiac Rehabilitation should be an integral component of the long-term, comprehensive care of cardiac patients. Cardiac rehabilitation programs or services should be available to all patients with cardiovascular disease. Rehabilitation services should be provided by any trained health professional caring for cardiac patients, since no sophisticated equipment or facilities are required. Both patients and their families should participate.
World Health Organisation, 1993

Benefits of Cardiac Rehabilitation

In 1995 the Agency for Health Care Policy and Research in the USA released the *17th Clinical Practice Guideline - Cardiac Rehabilitation*. The Guideline was created by a panel of experts representing the major health care disciplines involved in cardiac rehabilitation: physicians, nurses, exercise physiologists, behavioural specialists, dietitians, physiotherapists and occupational therapists.

In 1998 the New South Wales Health Department published a set of policy standards for cardiac rehabilitation based on the most recent and expert opinion. Its aim was to develop a unique outcomes focused text. To

In 1999 the Victorian Department of Human Services commissioned the Heart Research Centre, Victoria, to develop *Best Practiced Guidelines for Cardiac Rehabilitation and Secondary Prevention.* These guidelines provide a comprehensive review, analysis and discussion of research in the field of cardiac rehabilitation.

The recommendations made by these documents have been drawn from an extensive and critical review of scientific literature and from the expert opinion of the panel members. According to these documents, the benefits of well-designed cardiac rehabilitation include:

Increased exercise tolerance:

Cardiac rehabilitation exercise training improves objective measures of exercise tolerance in both men and women, including elderly patients, with coronary heart disease (CHD) and with heart failure. Maintenance of exercise training is required to sustain improvement in exercise tolerance.

Improved symptoms:

Cardiac rehabilitation decreases anginal pain and improves heart failure symptoms, such as shortness of breath and fatigue.

Improved blood fat levels:

Multifactorial cardiac rehabilitation, including exercise training and education, results in improved lipid and lipoprotein levels.

Smoking cessation:

Multifactorial cardiac rehabilitation, with well-designed educational and behavioural components, reduces cigarette smoking. Sixteen to 26 percent of patients, who previously smoked, can be expected to stop smoking.

Improved sense of well-being:

Education, counselling and psychosocial interventions, as well as exercise training improve a patient's sense of well being.

Reduction in mortality:

Comprehensive cardiac rehabilitate has been shown to reduce death rates in patients who have had a myocardial infarction, by 25 percent.

Candidates

Cardiac rehabilitation services are designed to assist patients with a variety of cardiac problems: These included but are not limited to:

- Coronary Heart Disease
- Angina Pectoris
- Myocardial Infarction
- Post Open Heart Surgery (especially coronary artery bypass graft surgery)
- Post percutaneous transluminal coronary angioplasty (PTCA) and stent insertion
- Heart Failure
- Heart Transplant
- High Risk Factor Profile
- Cardiac Implant Devices
- Arrhythmia's

Rehabilitation has many facets. Participants will benefit from some parts of rehabilitation but not necessarily from all. It is impossible to have a set list of patients who should or should not be included in rehabilitation. With appropriate assessment and communication between medical and health professionals it should become apparent who is a candidate for cardiac rehabilitation.

Program Structure

Traditionally there are three phases to cardiac rehabilitation.

- Inpatient Phase - These services are initiated as soon as possible following hospitalisation through to discharge.
- Outpatient Phase - These services commence as soon as possible after discharge from hospital and are provided to patients during the initial recovery period - approximately 4 - 12 weeks.
- Maintenance Phase - These services provide long term support and assistance to patients to ensure adherence to lifestyle improvements.

Although this structure provides some guidance as to how a patient may progress through a cardiac rehabilitation program, each cardiac patient must be assessed on an individual basis and programs tailored to their needs. For example:

1. An older patient may require additional outpatient rehabilitation due to a slower recovery.
2. As early discharge is encouraged by many medical facilities, time may be limited for providing inpatient cardiac rehabilitation and more innovative approaches may need to be addressed during the outpatient phase.

Regardless of the phase, cardiac rehabilitation programs should equally address psychosocial adjustment, education and activity.

Success in Cardiac Rehabilitation

Cardiac rehabilitation is a multifactorial intervention that can take many forms. However, there are a few key elements to a successful cardiac rehabilitation program:

1. Encouragement of Behaviour Change:
   A key role of cardiac rehabilitation practitioners is helping the patient to identify their risk factor status, and then assisting and supporting them in the adoption and long-term maintenance of behaviour(s) conducive to reducing the likelihood of further cardiac events
2. Provision of Individualised Care
   Each patient is unique and requires an individualised assessment and prescription for both physical and psychosocial status. The patient should be empowered to consciously develop his or her own goals and objectives for rehabilitation. This should enhance recovery time and long term outcomes
3. Provision of Group Interaction where possible
   Group work is an important part of rehabilitation and it is a cost-effective way to educate and exercise. It gives patients an opportunity to see they are not alone in their predicament and to receive support and guidance in their efforts to cope with and manage their illness.

Often planning a health care program begins within a health care facility and reaches out to the patient. The Australian Cardiac Rehabilitation Association (ACRA) encourages providers to begin planning the health care program with the patient.

Using A Practitioner's Guide to Cardiac Rehabilitation

Ideally, this book will address all the necessary elements of a successful cardiac rehabilitation program. These are:

Chapter 1 - Program Planning and Strategic Management
Chapter 2 - Program Administration
Chapter 3 - Program Implementation I -Psychosocial Issues
Chapter 4 - Program Implementation II - Activity and Exercise
Chapter 5 - Program Evaluation

It is designed as a practitioner's guide for continual program improvement. The ACRA recognises that access to personnel and resources may be limited when providing cardiac rehabilitation services. We encourage medical and health professionals to use this reference along with other resources to develop innovative programs and services to meet the needs of cardiac rehabilitation patients, service providers and the community.

OUR GOAL is that this book will encourage further development of existing programs and initiate new services throughout Australia.

References

1. National Heart Foundation of Australia (1999) *Heart Facts*. NHF. (http://www.heartfoundation.com.au)
2. National Heart Foundation of Australia. (1998). *Recommended Standards for Cardiac Rehabilitation*, NHF. (http://www.heartfoundation.com.au)
3. National Heart Foundation. (1993). National Medical, Scientific and Education Advisory Committee.
4. Wenger NK, et al. (1995). *Cardiac Rehabilitation as Secondary Prevention. Clinical Practice Guideline. Quick Reference Guide for Clinicians*, No. 17. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research and National Heart, Lung, and Blood Institute. AHCPR Pub. No. 96-0673. (http://www.ahcpr.gov)
5. World Health Organisation (1993). *Report of Expert Committee on Rehabilitation after Cardiovascular Disease.* WHO Technical Series No. 831, Geneva.

Chapter 1 - Program Planning and Strategic Management

With pressure on the health care dollar, there is an increasing demand for the ongoing assessment of resource utilisation and cost-effectiveness. Use of different interventions also has to be justified and all health care services, including cardiac rehabilitation, need evidence of their value. Proper planning and on-going strategic management will ensure program efficacy and are essential for the long-term success of a program.

Research has revealed that organisations that engage in strategic management generally outperform those that do not. (Miller et. al., 1994)

Strategic management is that set of decisions and actions which determine the success of a program. It emphasises continuous monitoring and evaluation of the external opportunities and threats to a program, in light of a program's internal strengths and weaknesses. It includes:

- analysis of the internal and external environment
- formulation of clear mission statement, objectives and strategies
- implementation of procedures and action plans
- evaluation of program performance.

Program planning and strategic management go hand in hand. The process of planning a new venture is the same as the strategic management of an existing service (see Figure 1.1). Whether starting a new cardiac rehabilitation program or looking to improve an existing service, program planning and strategic management provides many benefits to ensure the long-term success of the program. Table 1.1 sets out benefits of business planning and strategic management, which can be applied to a cardiac rehabilitation program.

Table 1.1 Eighteen Benefits of Planning and strategic management

Planning:

1. Identifies business problems and searches for alternative solutions.
2. Provides the company with a focus and a direction.
3. Forces business managers to stand aside from the day to day problems and to think on a systematic basis.
4. Forces the owner to define specific objectives and the nature of the business.
5. Identifies problems and possible new markets.
6. Coordinates resources.
7. Forces the study of competitors and helps pre-empt their moves.
8. Integrates and focuses business effort towards a single goal.
9. Establishes authority.
10. Defines responsibility.
11. Secures commitment of staff.
12. Focuses owners' attention on objectives rather than subjective "pet" projects.
13. Focuses study of the total available market before strategy design is attempted.
14. Delineates activities to be completed over time.

15. Provides for a contingency plan.
16. Encourages systematic forward thinking.
17. Effectively communicates to others what your business is about.
18. Can be regularly compared to actual results, to establish continued viability or progress of the business.

Queensland Small Business Development Corporation, 1989

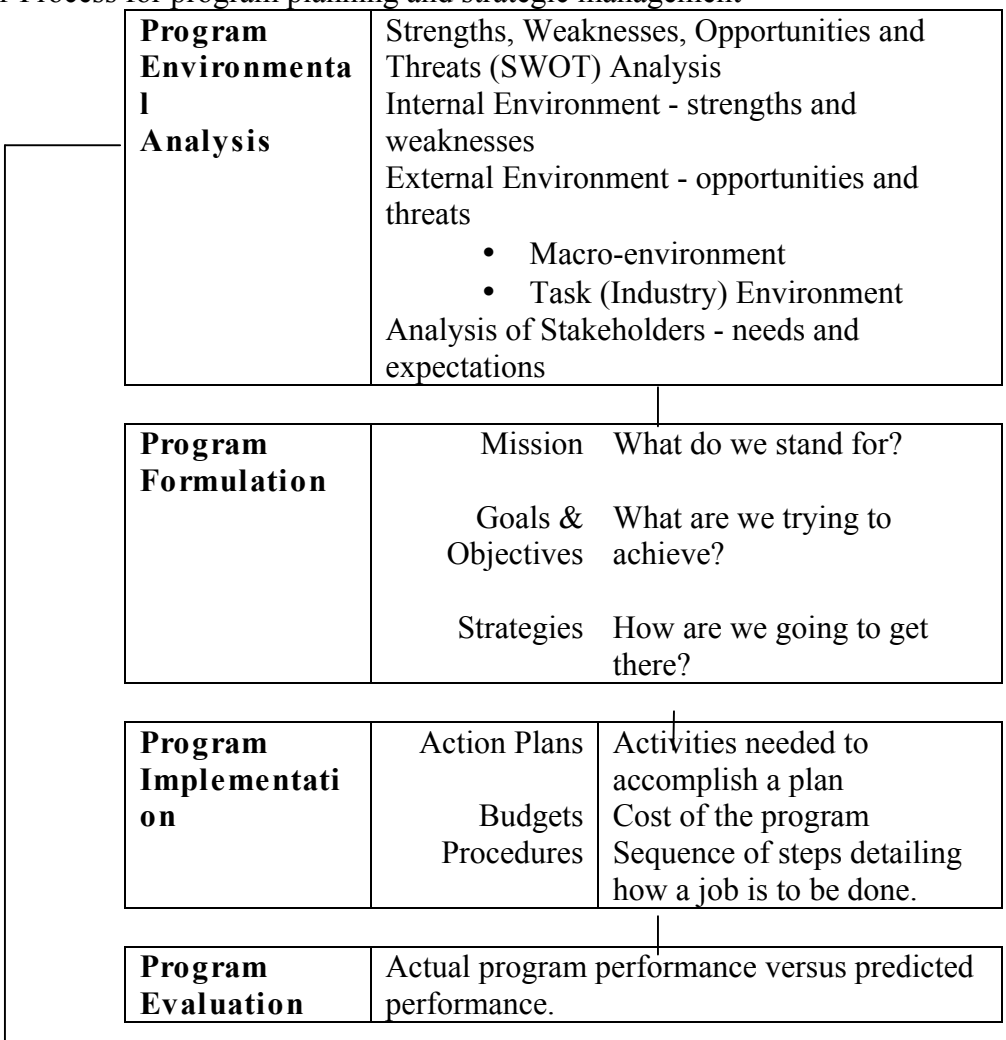
The Process of Program Planning and Strategic Management

The process of program planning and strategic management takes in four key processes (see Figure 1.1):

- Program Analysis (Environmental)
- Program Formulation
- Program Implementation
- Program Evaluation

All of these processes are interrelated and it is necessary to move between these activities in order to achieve the best result.

Figure 1.1 Process for program planning and strategic management



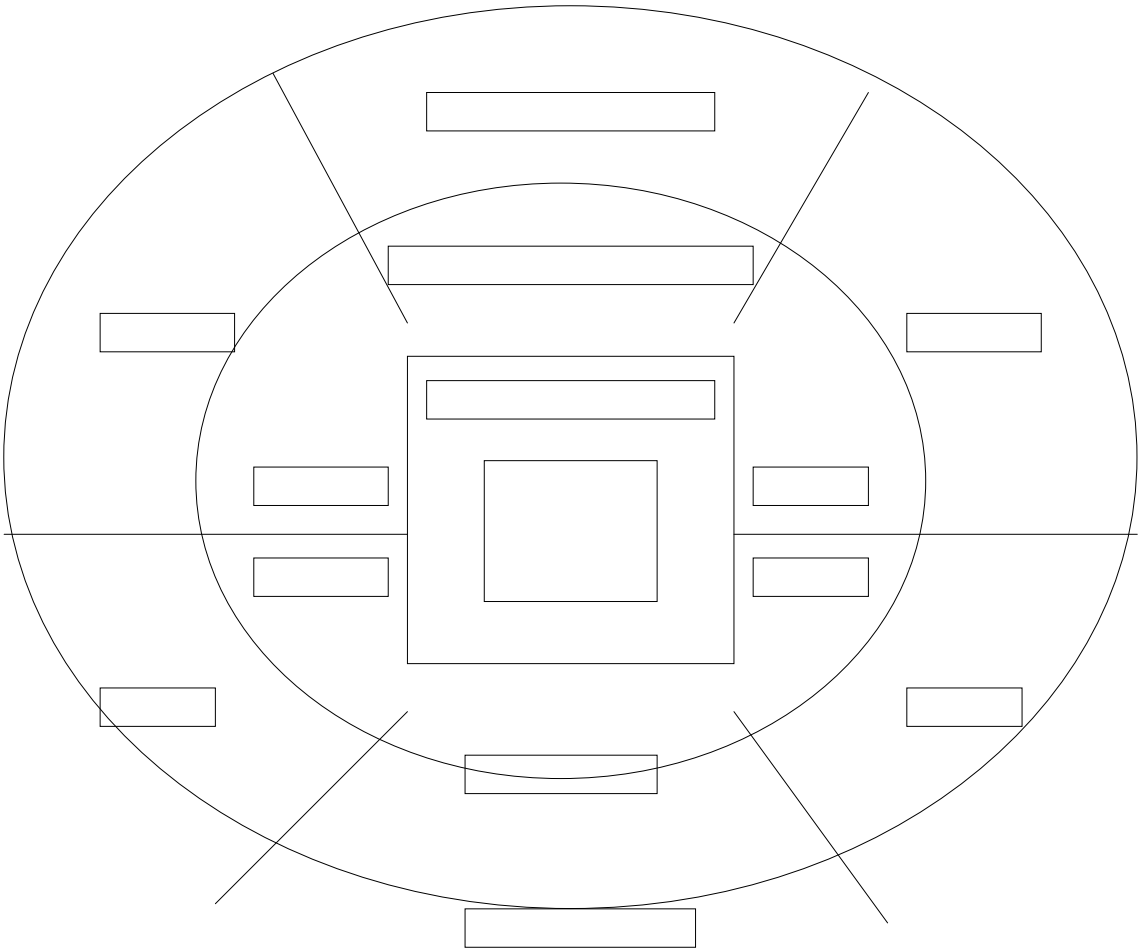
Strategic Management	The extent to which the performance is less than or much greater than expected. Reconsider the process again a possibly make changes to the program.

Program Analysis (Environmental)

Program analysis is a process to determine those factors that will have an impact on the success or failure of a program. This includes key personnel gathering information from both the internal and external environments. (See Figure 1.2).

The simplest form of environmental scanning is through the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The internal environment is assessed for strengths and weakness and the external environment for opportunities and threats.

Figure 2.2 - Environmental Variables Affecting the Program



** Adapted from Wheelen, T.L. et al. (1998*). Strategic Management and Business Policy: Entering the 21st Century Global Society*, 6th edition. Addison Wesley Longman, Inc. Fig 4.2.

Internal Environment

The internal factors are those strengths and weaknesses that are within the organisation itself. The evaluation of internal factors would include assessment of management expertise, vertical or horizontal integration, employee relations, patient satisfaction, doctor attitudes and experience, employee turnover, financial position, marketing expertise, organisational culture (beliefs. values and expectations) and employee commitment.

External Environment

External factors are outside the organisation and can be divided into two categories:

- Macro-environment
- Task (Industry) Environment.

Macro-environment refers to those general forces that affect the organisation and are usually not in the short-term control of top management. They are categorised as 'threats' and 'opportunities'. This area would include for example, the ageing population, insurance rebates, Medicare changes, new interventions, population concentration in the area and government regulations.

Task environment differs from the macro-environment in that it focuses on factors relating to the industry within which the organisation operates, for example, the health care industry. These factors can usually be controlled, at least to some extent, by the organisation.

The above model can be applied to a cardiac rehabilitation program (see Table 1.2).

Table 1.2 External factors that may affect a Cardiac Rehabilitation Program

Macro-Environment	**Task (Industry) Environment**
Economic Considerations • Changes in health care funding: Medicare changes, hospital budgets, health fund rebates • Interest rates • Inflation • Taxes	Customer Profile • Customer needs • Market segments • Demographic profile • Changing buying patterns
Political Legislative changes Stability of government Special incentives Tax laws	Supplier Profile Prices charged Quality provided Special capabilities Reputation Flexibility
Social Lifestyle changes Career expectations Religious beliefs Level of education Cultural values Changing demographics	Labour Profile Availability Skills / quality Age / gender profile Union influence Politicisation

Ecology and environmental quality	
Technical Product technology Process technology Productivity improvements - length of stay Telemedicine New interventions	Competitor Profile Substitute Products (health clubs etc.) Potential new entrants Strength of rivalry Marketing proficiency Product/ service quality Managerial competence Facilities quality Market share New Product development
Geographic scope of activities	Creditor Profile Credit availability Terms of payment

This information concerning the internal and external environment will be used for the program planning and strategic management process. It is through this analysis that the program's mission, objectives, strategies and policies can be defined.

Program Formulation

The formulation of the program is the development of long-range plans for the effective management of environmental opportunities and threats, in light of corporate strengths and weaknesses. It includes defining the mission, specifying achievable goals and objectives, and developing strategies.

Mission Statement

A well-conceived mission statement defines the purpose or reason for the program's existence. There is no set way to develop a mission statement. It should state:

- who the organisation is
- what the program is
- what the program would like to become

The mission statement promotes a sense of shared expectations in employees and communicates a public image to important stakeholders in the program.

Program Goals and Objectives

Goals are open-ended statements of what one wants to accomplish with no quantification of what is to be achieved and no time criteria for completion.

Objectives are the end result of a planned activity. Objectives explain what is to be accomplished, by when, and are based on a quantifiable comparison.

Well-written program goals and objectives are essential in evaluating the program. See Chapter 5 - Program Evaluation for additional information on writing goals and objectives.

Program Strategies

A strategy is a comprehensive plan of how the program will achieve its mission, goals and objectives. The strength, weakness, opportunity and threat (SWOT) analysis that was use to assess the situation, can now be used to develop strategies.

As described by Wheelen et. al (1998), one way to formulate strategies is to use the TOWS Matrix, which is another method of applying a SWOT analysis.

"The TOWS Matrix illustrates how the external opportunities and threats facing the program can be matched with the program's internal strengths and weaknesses to result in four sets of possible strategic strategies (See Table 1.3).

- **SO Strategies** are generated by thinking of ways in which the program could use its strengths to take advantage of opportunities.
- **ST Strategies** consider a program strengths as a way to avoid threats.
- **WO strategies** attempt to take advantage of opportunities by overcoming weaknesses.
- **WT strategies** are basically defensive and primarily act to minimise weaknesses and avoid threats.
-

Table 1.3 TOWS Matrix

Internal Factors / **External Factors**	**Strengths (S)** List 5 - 10 internal strengths here	**Weaknesses (W)** List 5 - 10 internal weaknesses here.
Opportunities (O) List 5 - 10 external opportunities here	**SO Strategies** Generate strategies here that use strengths to take advantage of opportunities	**WO Strategies** Generate strategies here that take advantage of opportunities by overcoming weaknesses
Threats (T) List 5 - 10 external threats here	**ST Strategies** Generate strategies here that use strengths to avoid threats	**WT Strategies** Generate strategies here that minimise weaknesses and avoid threats.

Wheelen, T.L., et al. (1998

A TOWS Matrix example is illustrated below. This provides only a few examples and is by no means complete.

Table 1.4 - An Example TOWS Matrix:

Small private hospital in a country area wants to set up a cardiac rehabilitation program.

Internal Factors / External Factors	Strengths (S)	Weaknesses (W)
	• core group has a desire to proceed • rapport with a doctor with experience in cardiac rehab	• commitment form doctors yet to be obtained • lack of experience in core group.
Opportunities (O) • no existing program in our community • cardiac rehab promoted by the NHF	**SO Strategies** • set up a planning committee with direction from the doctor with CR experience • seek assistance from the NHF	**WO Strategies** • set up steering committee and involve key doctors • identify staff training opportunities
Threats (T) • establishment costs • another area hospital wanting to start a cardiac rehab program	**ST Strategies** • seek health fund approval • seek co-operation and referrals form other area health services	**WT Strategies** • obtain commitment to a budget and time-frame • co-opt outside health professionals to provide expertise

The TOWS Matrix is very useful for generating strategies that the program decision-makers might not otherwise have considered. However, this is only one example of how the Program Analysis (Environmental) can be used for Program Formulation.

Program Implementation

Program implementation involves development of action plans (those activities needed to accomplish the program) and procedures (the sequence of steps detailing how a job is to be done). This will involve the establishment of a policies and procedures manual, an administrative structure, treatment protocols and budgets. Further discussion on program administration and protocols can be found in Chapters 3, 4 & 5.

Budgeting

When developing a budget for a new or existing program, one must assess program costs compared to expected revenue. Program Costs can be divided into three categories:

- initial
- operating
- additional

Table 1.5 Categories to consider when formulating a budget.

Expenses	

Initial Expenditure	• renovations or construction
	• Equipment
	  • Exercise - e.g. cardiovascular/resistance training equipment, mats, bands, calisthenics tapes.
	  • Monitoring - e.g. BP sets, RPE Charts.
	  • Assessment - e.g. exercise testing, scales, calipers, blood analysis, blood glucose.
	  • Emergency - e.g. phone, defibrillator, crash cart.

	• Education - e.g. Overhead projector, VCR and television, cassette recorder, books, tapes. • Furnishings - e.g. desks, chairs, music, mirrors, posters, water dispenser • Office Equipment - e.g. computer, printer, photocopier, file cabinet • Staff Training
Operating Expenditure	• Personnel - e.g. Medical Director, Coordinator, staff, consultants, secretary, receptionist • Supplies - e.g. electrodes, blood analysis • Print material - e.g. brochures, forms • Office supplies - e.g. paper, pens, pads, notebooks, binders, folders, hanging files Overheads - e.g. capital charges, security, telephone, cleaners, electricity, water, insurance, air conditioning / heating, rental space, towel service, maintenance, administrative support
Additional Expenditure	• Liability insurance • Professional advancement training - e.g. conferences and travel, subscriptions
Revenue	• Medicare / Health Fund contributions • Patient out of pocket fees • Health promotion programs • Newsletter subscription • Exercise testing • Cardiopulmonary resuscitation training • Dietary consultations • Employee fitness • Weight reduction programs

Program Evaluation

Program evaluation is the process that allows cardiac rehabilitation practitioners to monitor actual performance against projected performance. Program evaluation is discussed in greater detail in Chapter 5 - Program Evaluation. Practitioners should use evaluation results to take corrective action and make adjustments to the program.

New Program Development Guidelines

In addition to the program planning process the following guidelines should be considered when developing a new program.

1. Research the historical and theoretical aspect of cardiac rehabilitation. Seek assistance from other programs. Look at what's been done, its effectiveness and limitations and try to improve on the existing structures and services.
2. Determine the needs of your patients, organisation and community. Programs should be offered at times which allow the patient and their family to attend, having a balance between achieving the best outcomes and return to normal life. For example, it may be appropriate for services to be offered early in the morning or in the evening to accommodate patients who have returned to work.

3. Utilise internal and external steering committees to determine program feasibility. The more people with an interest in the program who are approached for their input, the more complete the environmental analysis will be.
4. Determine doctor and patient support for the program. Find out who will attend the program and who will refer to the program. This is the important to maintain occupancy. Determine what types of programs are acceptable to the medical community and patient population.
5. Organise a strong advisory committee. This will have a dynamic Program Co-ordinator, Medical Adviser, and Staff. These individuals will be the keys to driving the program and ensuring its success.
6. Include existing staff and services in program development. Access all available resources within the organisation. Involvement in a program is the best way to ensure staff will support and co-operate with the program.
7. Develop a time schedule when planning a new program. Allow a realistic time period to accomplish the set goals.
8. Always remember that the program is developed to serve the patient's needs, rather that the needs of the staff or organisation.
9. Constantly re-evaluate and update the program. (see Chapter 5 - Program Evaluation)

Feasibility and Affordability

With the health care dollar being stretched further than ever before, there is enormous pressure to ensure cost effectiveness of services. In planning a new program it is important to address the financial requirements and expected outcomes. This will allow financial providers to assess the plan with knowledge and realistic expectations.

Feasibility determines the ability to implement the program. The main questions to ask are:

- Is the program compatible with the organisation's mission statement?
- Do people within the organisation already have the experience and expertise required to implement the program?
- How closely does your program parallel those services already provided by the organisation?

Affordability refers to the ability to do something without incurring financial difficulties. Some key decision-makers will look at the following criteria to assess affordability of a new program:

- What are the approximate start-up costs and/or investments in fixed assets of the program?
- How long will it take to cover the program's operating costs?
- How long will it take to yield enough surplus to repay its initial cost?

Cardiac rehabilitation is not necessarily a revenue generator. There are many non-financial benefits (for example, reduced re-admissions, goodwill among patients and doctors, etc.) that need to be considered in the global assessment of a cardiac rehabilitation program's feasibility and affordability.

Other ways to make your program affordable:

1. Fund Raising

Programs should make a conscious effort to solicit financial support in the form of donations and contributions. The key to fund-raising is to involve program participants. Past and present participants are important not only for their role in encouraging others to donate but for the acquisition of their direct donations.

2. Resources
   Many pharmaceutical companies provide free education materials, videos etc. In addition the National Heart Foundation of Australia is also a good source of low-cost materials.
3. Volunteers
   The largest operating expense is invariably personnel. Volunteers, particularly past patients, are able to add considerable value to a program by assisting with non -clinical duties.

References

1. Hall, L., et al. (1994). *Cardiac Rehabilitation: Exercise Testing and Prescription*. Life Enhancement Publications, Illinois.
2. Hall, L., (1993). *Developing and Managing Cardiac Rehabilitation Programs.* Human Kinetics Publishers, Illinois.
3. Miller, C. C., et.a l. (1994). Strategic planning and firm performance: A synthesis of more than two decades of research. *Academy of Management Journal*. 1649-1665.
4. National Heart Foundation. (1993). *How to Plan a Cardiac Rehabilitation Program*. National Heart Foundation.
5. Pekar, P. Jr., et al. (1995). Is strategic management living up to its promise? *Long Range Planning* , 32-44.
6. Queensland Small Business Development Corporation. (1989). *Handbook for Small Business (2nd Ed.).* Queensland Small Business Development Corporation.
7. Wheelen, T.L., et. al. (1998). *Strategic Management and Business Policy: Entering the 21st Century Global Society* (6th ed.). Addison Wesley Longman, Inc.

Chapter 2: Program Administration

Effective program management should not be overlooked as an essential part of a successful cardiac rehabilitation program. Operational problems such as equipment failures, poor documentation, miss-communication with internal and external patients, incompetent staff or lack of outlined policies and procedures can result in low attendance and a bad reputation for the program.

A policy and procedure manual which outlines the day to day operations of the program can be used for ongoing training, direction and evaluation to ensure consistency in program delivery.

Policy and Procedure

A Policy and Procedure Manual should document the who, what, why, where, when, and how of a cardiac rehabilitation program. It should include:

1. **Program Overview and Introduction:**

The introduction may include a brief history of the program to identify when and how it was started. The introduction should also demonstrate how your program supports its umbrella organisation and include a mission statement, organisational chart and the main aims and objectives of the program (See Chapter 1 - Program Planning and Strategic Management)

2. **Program Description:**

An overview of the program should include an outline of the basic components of the program, objectives of these components or phases, hours of operation, fees etc.

3. **Policies and Procedures** (See Table 2.1)
4. **Program Personnel**: Job descriptions, dress code, etc.
5. **Program Equipment and Facilities**
6. **Program Evaluation** (See Chapter 5 - Program Evaluation)
7. **Emergency Procedures**
8. **Documentation**: Copies of all forms, assessment tools & resources that will be used in the program.

The policy and procedure manual should be reviewed annually and whenever changes are made to the program. Its purpose is to define the rules of the program. It should be an active reference for the day to day running of a program.

Table 2.1 Common Policies and Procedures

Patient Management	**Program Management**
Patient Selection and Admission	Personnel Scheduling
Doctor Referral	Rostering for Sick or Annual Leave
Medical History and Assessment	Consultant Referrals
Patient Orientation	Staff Training
Informed Consent	Doctor Reports
Exercise Prescription	Lost and Found
Monitoring	Key Register (List of who has access to area)
Exercise Records	
Education Records	Injury / Emergency Procedures and Reporting
Behavioural Modifications	Patient Fees and Payment
Discharge Procedures	Patient Follow-up
	Customer Complaints
Facility Management	Program Evaluation
Cleaning and Maintenance	Utilisation of Space and Resources
Opening / Closing Procedures	Financial (purchasing, petty cash)
Inventory of Supplies	

Referral

There is much debate as to the need for a referral to a cardiac rehabilitation program. It is clear that significant benefit is gained from involvement in such a program. The World Health Organisation has stated that cardiac rehabilitation should be made available to all cardiac patients and their families. With this in mind, it could be argued that it is part of standard cardiac patient care and therefore does not require a separate referral. Currently, there is no legislation as to the need for referral to cardiac rehabilitation programs in Australia.

However, to work effectively cardiac rehabilitation requires a series of coordinated interventions including education, psychosocial support and guidance, physical activity, and at times medication. A variety of health professionals often provide these interventions. Coordinating these interventions requires effective communication and a team approach. It is therefore, recommended in the interest of best outcomes for the patient and wide acceptance for the program that a referral system be utilised.

The policy of referral between practitioners is the accepted norm in medicine today. Adopting this policy and adding regular communication with the referring practitioner should enhance patient care and limit conflict between care providers. Many programs find they can achieve this communication by providing written acknowledgment of referral and patient progress reports to the referring practitioner (See Figures 2.1, 2.2, 2.3).

Figure 2.1: Insert sample referral form

PHYSICIAN REFERRAL FORM

Patient Name _____ Date_____ date of birth _____

Address _____
_____

Phone: Home:_____ Work: _____

I Reason for Referral _____
_____
_____

II Diagnosis

A. _____ Stable Angina

B. _____ Bypass Surgery

C. _____ Post-Infarct

D. _____ Post Angioplasty

E. _____ Other (Explain) _____

Specific Cardiac Diagnosis _____

Additional Concerns _____

_____

Educational Requirements:_____

Approved by (signature): _____ Phone _____

Please print or type name _____

Address: _____

Please return to: Cardiac Rehabilitation Program
Name of Hospital
Hospital Address
Phone Number

Figure 2.2 - Sample Doctor Thank You Letter

Date_____

Dear Doctor_____:

Thank you for encouraging your patient, _____ to participate in the "X" Outpatient Cardiac Rehabilitation Program. We will be keeping you informed of your patient's progress through our program with progress reports sent approximately every four weeks.

In addition to supervised exercise, we will be providing educational sessions and individual counselling in order to encourage participant compliance with risk factor modification.

If there is any further information to your patient's care of which we should be aware, please notify us.

Thank you for your cooperation in helping us provide optimal care.

Sincerely,

Cardiac Rehabilitation Staff

Figure 2.3 - Sample Progress Report

MONTHLY PROGRESS REPORT

Dear Doctor _____:

Your patient _____ has been participating in the"X" Outpatient Cardiac Rehabilitation Programsince _____.

_____ has attended _____ out of the past _____ scheduled sessions. This report is to let you know how your patient is progressing through the program.

(List relevant goals)

Smoking: (Number of cigarettes per week)
Education: (Sessions attended)
Blood Pressure (BP): (Resting BP)
Cholesterol: (Fasting lipid profile)
Activity: (Amount of exercise per week).
Changes in clinical status -

Comments:

If you require and further information or if you would like to observe yourpatient during a cardiac rehabilitation session, please notify us at (phone number). Thank you.

Sincerely,

Cardiac Rehabilitation Staff

Admission Policy and Informed Consent

It is impossible to have a set list of patients that should or should not be included in rehabilitation.

Rehabilitation has many facets and participants will benefit from some parts of a rehabilitation program but not necessarily from all of it. With appropriate assessment, it should become apparent which areas will or will not benefit a patient. Programs should have an admission policy, which will protect and support the staff as well as the patients.

A written informed consent should be obtained from patients prior to commencement of the program (see Figure 2.4). This reinforces the patient's compliance and their recognition of the associated risks, particularly associated with exercise.

Figure 2.4 - A Sample Informed Consent

Outpatient Informed Consent

I desire to engage voluntarily in the "X" Outpatient Cardiac Rehabilitation Program in order to improve my cardiovascular knowledge, health and fitness. My participation in this program has been approved by my doctor, Dr……..

Before I enter this program, I will have had a written referral from my personal medical practitioner and consent to the release of my medical records to the cardiac rehabilitation staff.

The exercise session that I will become involved in will follow personalised exercise levels. The amount of exercise will be regulated on the basis of my exercise tolerance. The exercise activities are designed to place a gradually increasing workload on the cardiovascular and respiratory systems and thereby improve their function. The reaction of the cardiovascular system to such activities cannot always be predicted with complete accuracy. Therefore, there is a risk of certain changes occurring during or following the exercise. These changes include abnormalities of blood pressure or heart rate, ineffective "heart functions" and in rare instances, "heart attacks" or "cardiac arrest".

I realise that it is necessary for me to promptly report to the rehabilitation staff all signs or symptoms indicating any abnormality, discomfort, or distress. I understand that emergency equipment and trained personnel are available to deal with any untoward events should they occur, and consent to the administration of any immediate resuscitation measures deemed advisable by the supervising rehabilitation staff.

I have read and understand the above information. Any questions that have arisen or occurred to me have been answered to my satisfaction.

Signed: _____ Participant Signature

_____ Date

_____ Witness

_____ Date

Assessment and Screening

All patients should undergo an assessment and a screening before commencing a cardiac rehabilitation program. This provides an opportunity for the staff to identify those conditions that may place a patient at risk when participating in an activity, as well as outlining specific needs, interests, limitations and goals for developing an individualised comprehensive rehabilitation plan.

The type of assessment and screening that should be done will depend on the type of program being offered, the personnel and equipment available, the program's policy and procedures as well as the referring doctors recommendations. Table 2.2 lists components that may be included in a comprehensive screening tool.

Samples of an Inpatient Assessment Form and Outpatient Medical History Form are included in Figure 2.5 and 2.6. They are intended as a reference and are to be used only as a guide only to help develop documentation tools to suit individual programs.

Table 2.2 Suggested Components of a Comprehensive Screening Tool
(QFAC Education Screening Process Sub-Committee (1994) *Report on Screening in the Health and Fitness Industry*, unpublished)

a. Cardiovascular Screening Areas

Cardiovascular Disease/ Surgery: heart attack, arrhythmia, stroke, atherosclerosis, coronary angioplasty/stent, open heart surgery, valvular disease, vascular disease, heart failure, genetic defect, etc.

Cardiovascular Symptoms: chest/arm/leg/back discomfort, lightheadedness, fainting, shortness of breath, palpitations/irregular heart rate, numbness in legs, heart murmur/clicks, fluid retention, ankle swelling, claudication, unusual cardiac findings etc.

Associated Cardiovascular Conditions: Hypertension, high cholesterol, phlebitis, emboli, diabetes, varicose veins, rheumatic fever etc.

b. Pulmonary Screening Areas
Pulmonary Disease: asthma, emphysema, bronchitis, chronic obstructive pulmonary disease, etc.

Pulmonary Symptoms: shortness of breath, chest discomfort, lightheadedness, fainting, coughing on exertion, coughing up blood etc.

c. Other Systemic Illnesses or Conditions
Diabetes, anaemia, drug allergies, epilepsy, varicose veins, haemorrhoids, rheumatic fever, osteoporosis, arthritis, blindness, deafness, cancer etc.

d. Orthopaedic Screening Areas
Orthopaedic Conditions: arthritis, bone/joint/muscle/ injury, back injury, osteoporosis etc.

Orthopaedic Symptoms: numbness in extremities, limited range of movement, bone/joint/muscle/ connective tissue pain, swelling bruising etc.

e. Family History
Family history including parents, grandparents, brothers, sisters, aunts and uncles should be discussed with reference to screening areas a, b, and c.

f. Lifestyle Screening Areas
Caffeine, physical activity, alcohol, tobacco, eating disorders, drugs, obesity etc.

g. Medications - including vitamins

h. Mandatory Question
Are you aware through your own experience, or doctor's advice, of any other reason against your exercising without medical supervision and /or clearance?

I. Other Areas to Consider
Emotional disorders, recent trauma (physical or emotional), head injuries etc.

(Based on American College of Sports Medicine. "Guidelines for Exercise Testing and Prescription" (4th edition), Lea and Febiger, Philadelphia.)

The safety of patients in cardiac rehabilitation is a primary concern for all health care professionals. There are a group of high-risk patients for whom the physical activity component of cardiac rehabilitation is contraindicated. Contraindications for physical activity have been identified and should be considered when assessing a patient's readiness to start exercise rehabilitation. (See Chapter 4 - Exercise and Activity).

Figure 2.5 - Sample Inpatient Assessment Form

Date: _____

Name:	**ID #**	**Dr:**
Diagnosis		
Date of Admission:	**Date of Birth**	**Age:**

Complications:	
☐ Arrhythmia ☐ Heart Failure	Explain:

	Cardiac Arrest	
	Recurrent Angina.	At rest: on exertion
	Pacing	
	Wound	

Investigations / Procedures

Previous History:

Current Medications

Risk Factors

	Blood Pressure	Reading (mmHg):			
	Blood Lipids	Chol:	HDL:	LDL:	Trig:
	Smoking	No. per day:			
	Physical Activity	Regular exercise:		Yes:	No:
	Type: Frequency: Occupation: Hobbies		Sedentary?	Yes:	No:
	Weight	Wt (kg):	Ht (m)	Body Mass Index:(wt/ht2) <27 normal 25<30 overweight 30< obese	
	Diabetes	NIDDM / IDDM		Meds:	
	Family History			Yes:	No:

Other Concerns:

Cardiac Rehabilitation Plan:

Mobilisation: Stage 1 Date: Stage 2 Date: Stage 3 Date: Stage 4 Date:

Education Topics: Anatomy & Physiology Interventions (medical & surgical) Risk Factors Psychosocial Issues Return to Activities Medications Self Care (symptom management and wound care)

Discharge Planning: Doctor appointment/s Written guidelines Referral to outpatient rehabilitation Home assistance Appropriate professionals notified of patients discharge

Other:

Sign:

Figure 2.6 – A Sample Outpatient Medical History and Screening Form

Name: _____ Age _____Male / Female

Date of Birth _____

Postal Address

_____

Home Number _____ Work Number _____

Partner's Name _____ Day phone number

Referring Doctor:

_____Phone_____

Address: _____

Reason for Referral: _____

Cardiologist: _____

Address:_____

Surgeon: _____

Address:_____

GP: _____

Address:_____

How did you hear about the Program? _____

I. MEDICAL / SURGICAL HISTORY:

Place ( ) in those spaces which relate to your medical history

( ) **ANGINA:** Describe:_____
When did it last occur?_____
What Treatment did you have?_____

( ) **HEART ATTACK:** Date _____ Type _____

( ) **CARDIAC CATHETERISATION /ANGIOGRAM:** Date _____
Results _____

( ) **STRESS TEST:** Date _____
Results _____

( ) **CARDIAC ANGIOPLASTY /STENT:** Date _____
Result_____

( ) **HEART SURGERY:** Date _____ Type _____
Any Complications? _____

( ) **CARDIAC ARREST:** Date _____

( ) **IRREGULAR HEARTBEAT:** Type _____ How long? _____

( ) **PACEMAKER:** Date _____ Type _____
Setting _____

( ) **HIGH BLOOD PRESSURE:** How long? _____
HYPERTENSION Treatment ?_____

( ) **STROKE:** Date _____
Any limitations? _____

( ) **RHEUMATIC HEART DISEASE:** Age _____ Heart Murmur _____

( ) **DIABETES:** Type _____ How Long? _____
Control _____
Self Glucose Monitoring ( ) Yes ( ) No ( ) Blood ( ) Urine
How often? _____

( ) **EMPHYSEMA /BREATHING PROBLEMS:** Type _____
Last Episode?

( ) **SHORTNESS OF BREATH:** Describe _____
When does it occur? _____
Treatment?_____

( ) **DIFFICULTY SLEEPING:**
( ) **EPILEPSY /SEIZURES:** Date _____
( ) **ORTHOPAEDIC PROBLEMS:**
(eg. Back, Hip/Knee Replacement/Discomfort) _____
( ) **GOUT:** Location _____
Last Episode _____
( ) LEG CLAUDICATION/CRAMPING
/DISCOMFORT WITH WALKING: Where _____
How far? _____
( ) **ARTHRITIS:** Location _____
Limitations _____
( ) **THYROID PROBLEMS:** Type _____
Treatment _____
( ) **STOMACH PROBLEMS:** Date: _____
Treatment _____
( ) **HIATUS HERNIA:** Treatment _____
( ) **HERNIA:** Type _____
Treatment _____
( ) **DIZZINESS /FAINTING SPELLS:** Describe _____
( ) **NERVOUS OR EMOTIONAL PROBLEMS:** Describe _____
( ) **HEARING /SIGHT DIFFICULTIES:** Describe _____
( ) **OTHER: (Hospitalisations/ Reasons/ Dates)** _____
( ) **OTHER ISSUES:** (allergies, pregnancy etc.) _____

Error! Bookmark not defined.II. MEDICATIONS: INCLUDE PRESCRIBED MEDICATIONS AND OVER THE COUNTER DRUGS.

NAME	AMOUNT	HOW OFTEN	REASON FOR MEDICATION	SIDE EFFECTS

Error! Bookmark not defined.III. CARDIOVASCULAR RISK FACTOR ANALYSIS & ASSESSMENT

The following reflects a personal/ self risk factor analysis for heart disease. The more statements you have checked the greater the risk of heart disease. Place (X) in appropriate spaces.

1. UNCONTROLLABLE RISK FACTORS:

Sex/Age: ( ) Male ( ) Male 55 or over
( ) Female ( ) after menopause.
Oestrogen replacement therapy? ( ) Yes ( ) No

Hereditary / Family History:

Have any of your RELATIVES (mother, father, sisters, brothers) had:
(Please indicate family member with each diagnosis and include age of occurrence if known)

( ) Angina:
( ) Heart Attack:
( ) Heart Surgery:
( ) High Blood Fats /Cholesterol:
( ) Diabetes:
( ) High Blood Pressure /Stroke:

2. CONTROLLABLE RISK FACTORS:

Hypertension / High Blood Pressure:

( ) Known History

Diabetes:

( ) Before the age of 50 and now on insulin
( ) At or after age 50 and now on insulin or pill for control
( ) Controlled by diet and activity

Smoking:

( ) Present Smoker Brand/Strength _____
Cigarettes per day _____ How Long ? _____
( ) Past Smoker Brand/Strength _____ Date quit _____

Cholesterol: Indicate your most recent Cholesterol/Lipid Profile

Date: _____ HDL _____
Cholesterol _____ LDL _____
Triglycerides _____ ( ) Unaware of recent /present cholesterol level

Weight:

Body Mass Index: _____ ( ) <25 normal ( ) 25<30 overweight ( ) 30< obese

Exercise:

Is you day: ( ) Mostly inactive ( ) light house & yard duties ( ) Heavy Labour
( ) No regular exercise program.
( ) No cardiovascular exercise at least 20 minutes, 4 times per week.

Error! Bookmark not defined.IV. PSYCHOSOCIAL ASSESSMENT

Discuss with the patient the following issues:

- Emotional state
- Attitudes
- Marital/family factors
- Work issues
- Living circumstances
- Financial situation
- Leisure activities

Also see Chapter 3 – Psychosocial Issues

Error! Bookmark not defined.V. GOAL SETTING - to be completed with /by program staff

MAJOR GOALS	POSSIBLE INHIBITORS	STRATEGIES
1.		
2.		
3.		

Signed by Participant:_____ **Date:**_____

For the design of a specific activity questionnaire see Chapter 4 - Activity and Exercise.

Emergency Procedures

See Chapter 4 - Activity and Exercise

Patient Rights

Patients have a right to attend cardiac rehabilitation programs that provide a safe environment which are promoted by qualified and responsible staff. They also have the right to receive up-to-date information which is relevant and accurate

Personnel

Cardiac Rehabilitation requires the collective knowledge, skills, and clinical experience of a multidisciplinary team to facilitate a safe and effective program. The disciplines who are frequently involved include but are not limited to:

Medical Practitioners
Nurses
Physiotherapists
Exercise Physiologists
Nutritionists
Psychologists
Social Workers
Occupational Therapists
Pharmacists

Qualifications:

Maintenance of professional registration is imperative and a program for continued education and certification should be in place. It is best to approach each discipline's professional association for assistance in determining the qualifications and experience necessary for their members working in cardiac rehabilitation. (See Chapters 3 and 4 for more detail).

Staff Requirements

Ideally the program should have a Medical Adviser and a designated Coordinator. The expertise of these individuals will depend on the program and its resources but should include experience with cardiac patient care / rehabilitation. These individuals also require the skills to coordinate a multidisciplinary team.

During group activity two health professionals should be in attendance at all times in case of a medical emergency. The staff to patient ratio will vary according to the type of program, the risk stratification of patients, the type of monitoring and access to emergency assistance. (See Chapter 4 - Activity and Exercise for more detail). Successful cardiac rehabilitation involves constant interaction with patients.

Staff Meetings

Regular meetings (possibly weekly, depending on the frequency of the program) should be held to discuss program outcomes and patient progress. This meeting should include all relevant personnel. Proceedings at these meetings should be documented and reviewed regularly.

Job Descriptions

A job description should be documented for each employed rehabilitation staff member. A job description should outline the person's role and responsibilities in the work place and be used as a guide when evaluating the staff member's competency in fulfilling their role.

Annual Performance Evaluation

Staff performance can be directly related to the patient/program performance. If staff are fulfilling their role adequately, then the patient/program results should, within reason, reflect this. An annual performance evaluation allows staff to assess themselves along with a supervisor's assessment of their performance. This is valuable in identifying areas which may need attention or should receive merit.

Documentation

Documentation is essential in cardiac rehabilitation. Records must be kept on all participants including the interventions they undertake and the ensuing responses.

The maintenance of patient data allows evaluation of the patient's progress and the effectiveness of the program. Documentation should be reviewed at completion of the program. Where possible, the patient

should be encouraged to be reassessed again at six and 12 months. This review may assist in maintaining long term compliance to a positive lifestyle.

The exact specification for forms or charts will vary form program to program.

Two main considerations should influence the design of the forms to be used:
1. Efficiency:
   Quick & easy use is essential to keep records accurate & up to date.
2. Clarity:
   Information needs to be assessable & understandable to all members of the team.

When possible, the information should be kept in a format that will enhance outcome measurement both for the individual and the program (see Chapter 5 - Program Evaluation).

Records must be kept for each patient regarding progress and incidents.

Data items may include the following:

- Patient Identification:
  Name, Medicare Number, Hospital Admission Number, Health Fund, Date of birth, Address, Telephone
- Referral Details:
  Doctor's name, address and telephone, reason for referral etc.
- Medical History:
  (see Figure 2.5 and 2.6) Principle Diagnosis, Date of admission and discharge, Surgical &/ or Medical Intervention, Test results, Previous Cardiac Events, Past Medical History, Medications
- Baseline Data:
  BP, RHR, Weight, Height, Total Cholesterol, LDL, HDL, Triglycerides, Ejection Fraction, Exercise test result/ Exercise tolerance
- Social History:
  Marital Status, Lives alone, Family support/Inadequate family support, Preferred language, Country of Birth, Occupation
- Coronary Risk Profile:
  Smoking (number per day, smoking years), Hyperlipidemia, Overweight / Body Mass Index, Diabetes, Hypertension, Family history, Sedentary lifestyle
- Psychological Well Being:
  Anxiety, Depression,
- Risk Stratification:
  Low, Moderate, High
- Exercise Records:
  Exercise Time, Recovery Time, Blood Pressure, Heart Rate Response, Rate Pressure Product (heart rate x systolic blood pressure), Workload obtained, Perceived Effort, Symptoms and Signs of decompensation and emergencies, Assessment of Signs and Symptoms, Intervention and Results including times (See Chapter 4 - Activity and Exercise)
- Individual Requirements:
  Diet counselling eg. Lipids, Weight reduction, Stress management, Exercise program
- Additional Data:
  Program Commencement date, Program Completion Date, Attended sessions group or individual, Relative/Carer attended sessions, Exercise Session Record, Emergency / Incident Report, Reason for dropping out, Referral To other specialists (general practitioner, occupational therapist etc:)
- Outcomes
  (See Chapter 5 - Program Evaluation)

It is important that staff use discretion in recording very personal or private information (for example, sexual problems) in a document which may be read very widely within their own institution. It needs to be remembered that medical records may be used in a court in the event of legal action and, therefore, attention needs to be paid to accuracy in recording as well as using non-judgmental and objective language.

Confidentiality

Patient confidentially is paramount in Cardiac Rehabilitation. Special care has to be taken when running group sessions or providing information for example, outcomes to third parties such as Medicare or health funds to ensure patient confidentiality is not breached. Members of each program should review their program procedures regularly to ensure patients privacy and rights are maintained.

Discharge Policy

Patients have the right to join a program or leave a program when they wish. Each patient should be treated individually and have their needs assessed accordingly.

Non-attending patients should be identified and encouraged to resume participation in the program.

Patients should not be encouraged to develop a dependence on the rehabilitation program, but should be encouraged to develop the confidence to continue exercise and lifestyle changes independently once they leave the program.

References

1. American Association of Cardiovascular and Pulmonary Rehabilitation. Guidelines for Cardiac Rehabilitation Programs, 2nd edition, Human Kinetics Publishers, Illinois: 1995.
2. American Association of Cardiovascular and Pulmonary Rehabilitation. Guidelines for Pulmonary Rehabilitation Programs, Human Kinetics Publishers, Illinois: 1993.
3. American College of Sports Medicine 1991. Guidelines for Exercise testing and Prescription. 4th ed. Lea and Febiger, Philadephia.
4. Association for Fitness in Business. Guidelines for Employee Health Promotion Programs, Human Kinetics Publishers, Illinois: 1992.
5. Australian Resuscitation Council 1995 Policy Statements, Australian Resuscitation Council, Melbourne.
6. Hall. L. Developing and Managing Cardiac Rehabilitation Programs, Human Kinetics Publishers, Illinois: 1993.
7. Leon, A.S., Certo, C., Comoss, P., Franklin, B.A., Froelicher, V., Haskell, W.L., Hellerstein, H.K., Marley, W.P., Pollock, M.L., Ries, A., Froelicher Sivarajan, E. Smith, K.L. 1990. Position Paper of the American Association of Cardiovascular and Pulmonary Rehabilitation: Scientific Evidence of the Value of Cardiac Rehabilitation Services with Emphasis on Patients Following myocardial Infarction - Section 1: Exercise Conditioning Component. Journal of Cardiopulmonary Rehabilitation: 10:79-87.
8. Queensland Fitness Accreditation Confederation Inc. QFAC Education Screening Process Sub-Committee: Report on Screening in the Health and Fitness Industry, February 1994, unpublished)
9. Wenger NK, Froelicher ES, Smith LK, et al. *Cardiac Rehabilitation as Secondary Prevention*. Clinical Practice Guideline. Quick Reference Guide for Clinicians, No. 17. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research and National Heart, Lung, and Blood Institute. AHCPR Pub. No. 96-0673. October 1995. (http://www.ahcpr.gov)
10. Wilson, P.K., Fardy, PS. and Froelicher, V.F. 1981. Cardiac Rehabilitation, Adult Fitness and Exercise Testing. Lea and Febiger, Philadephia.

Chapter 3 Program Implementation 1 – Psychosocial Issues

Most patients seen in cardiac rehabilitation programs are psychologically healthy people who are facing adjustment to an event of a most traumatic nature (Rose and Robbins,1993). However, they may show a wide range of adaptive behaviour, varying from a moderately anxious response to temporarily debilitating depression (Miller, et al, 1990). These behaviours can also be confounded by pre-existing psychosocial disorders. In these instances patients will suffer more severe reactions and so will need special care and attention.

Maladaptive psychosocial reactions are frequently unrecognized and therefore inadequately managed in cardiac rehabilitation programs (Southard and Broyden, 1990). This is particularly so in those programs which concentrate exclusively on one aspect of rehabilitation, such as exercise or education. There has been comprehensive research to indicate the importance of psychosocial adjustment to successful cardiac rehabilitation and this should be a sufficient reminder to staff that psychosocial issues must receive focused intervention (Oldridge and Pashkow, 1993; Garrity, 1973; Medalie, et al., 1973; Cooper, et al., 1985; Berkman and Syme, 1979).

This chapter addresses the need to assess individual psychological status, the issues patients their families and partners will face and how to differentiate between typical coping behaviour and more serious maladaptive psychological reactions. Various intervention techniques are then addressed, including behaviour change, education and goal setting.

Assessment

It is unreasonable to expect adequate attention to be paid to psychosocial issues if there are no staff members in the cardiac rehabilitation team with appropriate training and expertise to attend to these. The complexity of assessment, treatment and appropriate specialist referral needs to be considered when decisions are made about the staffing formula used in establishing programs. Each program should have documented policies and procedures outlining when and how to refer to a specialist (see Referring to a Specialist).

Each patient who enters a Cardiac Rehabilitation program should be assessed for the presence of psychosocial problems. Appropriate intervention, including specialist referral can then be planned and realistic goals established with the patient's cooperation. Screening questions should be part of each program's protocol. However, evaluating the answers needs experience which comes with a thorough knowledge of the normal range of responses, not only to cardiac disease, but also to other crises.

There is no need, in most cases, to administer a formal questionnaire. Indeed, this may only serve to increase a patient's anxiety. It is better to talk in a relaxed way with the patient, asking questions as appropriate as well as using the skills of reflective listening.

Below is a list of issues that may be appropriate to discuss with cardiac patients in order to assess their psychological reaction to a cardiac event and consequently, their ability and willingness to make lifestyle and behavioural changes:

1. Emotional State
2. Attitudes
3. Marital/family factors

4. Work Issues
5. Living Circumstances
6. Financial Situation
7. Leisure activities

Some appropriate questions used to assess an individual's psychological state are as follows:

- Overall, is the patient's psychological status within the normal range of responses to cardiac events? (Blumentahl, 1985; Rejeski, et al., 1985). If not, why not?
- In particular, does the patient show signs of depression, excessive anxiety, denial or anger? (see Table 3.2).
- Does the patient have family or other support to help cope with the crisis? Does the patient live alone?
- How is the patient's family coping with the diagnosis? (Sotile, 1992). What concerns do they have?
- What employment and financial pressures does the patient have in regard to hospitalisation and recovery time?
- Does the patient understand what has happened to him/her? Has the patient received adequate information, in his or her own language, to aid in this understanding?
- Does the patient have a recent history of smoking, alcohol or other drug abuse, such that he/she requires immediate placement or other therapy? (Prochaska and Di Clemente, 1985; Taylor, et al., 1990; Sachs, 1991).
- In the surgical patient, is there any sign of cognitive impairment; for example, memory loss or difficulty in concentration, making education an unusually difficult process?
- Are there any other major concerns affecting the patient at this time that may impact on their illness or recovery?

Differentiating Typical Emotional Responses from Underlying Psychological Maladaptation

Factors Influencing Reaction After a Cardiac Event

Each patient copes differently with a cardiac event. Their ability to cope is influenced by a range of factors. A number of these are listed below.

Age

In general, older people cope better than younger people. This is thought to be due to the 'life experience' older people bring to a situation. (Folkman et al. 1987)

Personality and coping style.

The way an individual historically reacts during stressful or traumatic events in their life, will probably be similar to the coping style they use during and after their cardiac event.

Rotter (1972) explains that people have a tendency to attribute the control over how they react o either internal and external factors. This is called our 'locus of control'. Those with a predominantly internal locus of control tend to attribute life's events to something they 'made' happen or something they controlled. Conversely, those with a predominantly external locus of control are said to ascribe events in their life to forces out of their control, for example, other people's actions, or just plain luck. Those with an internal locus of control tend to cope with negative events better than 'externals'.

The implications here are that 'internals' are more likely than 'externals' to seek to adapt to or manipulate their environment.

Previous experience

Those who have coped effectively in a similar situation before, tend to cope better with their cardiac event than those who have not.

Severity of the incident.

The more severe or traumatic the cardiac event, the greater the affect on the individual.

Amount of threat to self, family and partner.

The more that the perception of threat to life is held by the individual and loved ones, the greater the affect on the individual.

Behaviour during the event

The less calm and controlled the behaviour of bystanders and/or patient during the cardiac event, the worse the psychological affect.

Presence of others during the event.

Those who were alone, tend to be more affected than those who were with others during the cardiac event.

Social support.

Single, isolated, people and those with little social support, tend to be more affected than others.

Reactions of others.

An unsupportive reaction from work mates, peers and friends causes the patient to be more affected by the cardiac event.

Preparedness.

Those people who have thought about cardiac problems and how they would manage the situation prior to an event are generally better prepared to deal with the situation.

Patients will often attempt to identify one trigger of their emotional reactions. Reassure patients that there are many factors that determine how they respond.

Typical Reactions Following a Cardiac Event

- Emotional numbness – "I'm not happy or sad - just 'dead' inside."
- Anger – "It's everybody else's fault"; "It should be someone else, not me"
- Denial – "No big deal. I'll cope just fine, thank you very much."
- Depression – "It's not worth it"; "It's hopeless."
- Anxiety – "I don't think I can do this activity again". "What if something happens?"
- Guilt – "If only…"; "I should have…"

A patient may experience one or all of these reactions as they learn to cope. Furthermore, the duration of these reactions will vary from individual to individual. However, it is generally accepted that rather than moving though these reactions in a linear manner, recovery is

usually cyclical. Although the vast majority of patients progress with time, most will also experience periods of regression. Sotile (1996) suggests that the psychological recovery of a 'typical' cardiac patient can be summarized in four stages. Table3.1 outlines these stages.

Table 3.1 Stages of Recovery

Stage of Recovery	Issues & Assessment	Considerations for staff
Stage I First 3-6 weeks after event	· Anxiety is often the most prominent emotion. This anxiety often peaks on the day of leaving hospital and the first day at home.	· Patients are very susceptible to external influences. · Don't overload the patient with too many concerns or information. · Keep negative influences to a minimum. For example, financial problems, family rifts, demands for behaviour change. · Patients benefit from informational discussion prior to Coronary Artery Bypass Graft (CABG) surgery, but the emotional support of family and friends after surgery is more helpful than information (King, 1985). · Generally how patients react initially has little bearing on long-term reaction.
Stage II First 3 months after discharge from hospital	· This period includes Phase II cardiac rehabilitation. · Psychosocial recovery mostly parallels physical recovery. • Most patients improve significantly over this time.	· Distress during this period is a normal reaction. Referral to a specialist is rarely justified during this time, unless the patient is displaying obvious psychological problems (see, Depression and Anxiety Disorders).
Stage III 6 months after discharge from hospital	If the patient fails to continue at a similar rate of improvement as the previous stage, this may lead to a period of depression and/or renewed anxiety.	A mechanism is needed to follow patients up after leaving their outpatient cardiac rehabilitation.
Phase IV More than six months after discharge from hospital	Often characteristic coping patterns surface.	If after this time the patient is still not coping they may need referral to a specialist.

Differentiating typical Depression from depressive disorder:

The everyday use of the word depression, meaning to feel 'down' or 'blue', confuses interpretation and needs to be distinguished from a clinical depressive disorder as identified by the Diagnostic and Statistical Manual of Mental Disorders – IV (DSM-IV) (American Psychiatric Association, 1994).

One study found that depression was an independent risk factor for mortality after a cardiac event (Frasure-Smith et al. 1993).

Research also indicates that there is a definite link between anxiety and depression and physical recovery from a major cardiac event. Several studies have shown that depression

and anxiety reduce the likelihood of surviving after a myocardial infarction (Dalack and Roose, 1990; Lowery, 1991; Milani et al., 1993; Carney et al., 1988).

Typical Depression

Many patients with cardiac disease, although appearing to have lowered mood, are not at risk of suffering from a major depressive episode. Instead, their responses more commonly resemble a finite grief reaction.

Given the impact of the fears and losses associated with a cardiac event, grieving is an appropriate emotional response. In most cases these reactions can be considered 'normal' and will pass with time and support. It therefore needs to be remembered in the cardiac rehabilitation setting that a forceful process, which tries to push patients into behaviour change, may not be appropriate in the early stages (see Table 3.3). Rather patients need information on the grieving process, with an explanation that these feeling are a typical reaction to the trauma associated with the cardiac event (see table 3.2).

Depressive disorder

Clinical depressive disorder, on the other hand, is not alleviated as time passes, nor by support (American Psychiatric Association 1994). In addition, clinical depression often encompasses suicidal thoughts and feelings of worthlessness (Schleifer et al., 1989)

Diagnosis of clinical depression in the medically ill is often difficult (Cohen-Cole et al. 1993) and should be made by a skilled specialist. It is often hard to recognize because it may exist behind a veneer of denial or anxiety. It can be confounded by medications than may cause depressive symptoms, such as beta-blockers and anti-hypertensive drugs. It can also be confounded by character traits which may be a part of the patient's personality. Some patients may have a long history of unhappiness, social maladjustment and pessimism. Consultation with the treating specialist, and liaison with the family members and monitoring is indicated for this type of patient.

Table 3.2 Symptoms of Grief Versus Depression

Grief	*Depression*
· Denial	· Decreased concentration
· Shock	· Loss of energy
· Despair	· Vegetative symptoms
· Confusion	· Loss of libido
· Bargaining	· Negative self-esteem
· Anger	· Social withdrawal
· Acceptance	· Changes in appetite and sleep patterns
· Feelings pass	· Feelings persist

Adapted with permission from Sotile (1996, p30).

The following questions should be kept in mind when assessing patients' depression (Clark, 1990):

1. Is the patient's depressed mood part of the normal despondency that follows a cardiac event?
2. Does the patient's depressed mood indicate the more serious constellation of symptoms, which indicate a major depression?
3. Are the patient's symptoms related to the current physiological status or treatment?

4. Is the patient currently a danger to him/herself because of either an inability to care for him/herself or increasing suicidal ideas?

The DSM-IV (American Psychiatric Association, 1994) can be consulted to establish the list of diagnostic criteria for a major depression. It may be useful to administer the Hare Davis Cardiac Depression Scale (Hare and Davis, 1996) which is a brief scale to go through with the patient, to further assist in the detection of cardiac-related depressive symptoms.

Differentiating typical Anxiety from Anxiety Disorder

It is normal for people to respond to a traumatic cardiac event with a degree of anxiety. However, a small percentage of patients may also suffer from anxiety disorder, which in these patients may also be called cardiac phobia. This disorder is characterized by a combination of fears including a fear of dying, having a heart attack, losing control or not being able to get to a safe place such as home (Sotile, 1996).

Stress Management

A cardiac event can represent a significant source of stress. Pychological stress can trigger ischemia in patients with heart disease (Howell & Krantz, 1994). Most cardiac rehabilitation practitioners would agree that a large percentage of their patients are interested in learning about stress management. It is important that these concerns be reflected in the interventions that are offered.

A basic program may cover the following points concerning stress.

A. What is stress?

- The role of the stress factor – the event that is the perceived source of stress
- The role of individual perception – the way the event is interpreted by the patient.
- The role of personal reaction – typical reactions to the event and individual differences.
- The positive aspects of stress – the relationship between demands and performance. The 'stress curve' provides a clear illustration of the relationship between demands and performance (Brown & Ritchie 1986).
- The negative aspects of stress – the relationship between perceived demands and the health problem.

B. The relationship between stress and heart disease

- Increased cardiovascular response
- The precipitant role of stress in the occurrence of angina and myocardial infarction.
- Stress as an indirect cause of heart disease

C. Stress reduction

This can be achieved by:

- Managing the source of stress by using problem-solving techniques and avoiding the use of stimulants and depressants
- Changing the way the problem is perceived, including the use of cognitive restructuring techniques to change attitude. These may include stress diaries, time organisation and realistic goal setting.
- Using relaxation techniques
- Talking through the individual's concerns.
- Deciding on appropriate exercise.
- Eating properly.

Stress management programs should focus on both the reactions to and the perceived sources of stress.

Interventions for Depression and Anxiety

- If the patient appears to suffer from depression or anxiety disorder they should be referred to a specialist.
- Patients with undiagnosed and untreated psychological disorders may need to postpone entry into an outpatient cardiac rehabilitation until their disorder is adequately managed. Patients with poorly managed psychological disorders are unlikely to gain full benefit from a cardiac rehabilitation program. However, some patients may gain benefit from continuing their rehabilitation program in conjunction with specialist psychological therapy.
- Milder cases of depression and anxiety will usually be greatly helped by the patient being regularly involved in the group discussion component of the cardiac rehabilitation program. Providing the patient with a chance to talk over common concerns and discuss ways of approaching these, helps normalize the patient's experiences. It is most important that the team allow the patients to ventilate their feelings, rather than tell them how they ought to be responding to their condition. Using words like "miserable" and "upset", often helps patients admit how they really feel. Reassure them that these feelings pass within a few weeks to months in nearly all cases.
- The whole cardiac rehabilitation team needs to discuss the approach to be taken with each patient so that a treatment plan can be discussed and the patient's condition monitored. For legal reasons, it is important to document all details of the proposed treatment plan.
- Counselling and behaviour therapy are usually important adjuncts to psychotropic medication. Remind the patient that it may take several weeks for medications to be effective.
- Relaxation training may be contraindicated in cases of depression, so it is important that the depression be properly assessed by a staff member trained in this field before a patient is referred to a stress management program.
- Cognitive behavioural techniques can be used by the team if appropriate, for example, challenging negative thoughts, problem solving, task focused activities such as a walking program, a journal to record thoughts and feeling, as well as regular appointment with a counsellor to monitor moods and provide a non-judgmental and empathetic environment.
- Follow up any patients with depressed and anxious moods who leave the program.

Much patience is required in caring for individuals with depression and anxiety, so good self-care and stress management is important to avoid burn-out of staff members.

Referring To a Specialist

A specialist in the field of psychosocial intervention is usually considered to be individuals with formal qualifications in psychology, social work, or psychiatry. A number of issues should be considered when referring a patient on to a specialist:

- Whether the patient would prefer to speak to a male or female specialist
- If the service will cost the patient anything. And, if so, how much is the patient willing to pay.

- Whether the specialist has experience working with cardiac patients. Whether they are registered with their professional body. And the professional philosophy they promote i.e., psychological, social, and/or medical.

Psychosocial Treatment Interventions

Given the wide range of psychological factors that influence a patient's reaction to a cardiac event it is helpful for the cardiac rehabilitation practitioner to have a model from which to work when designing intervention strategies.

Sotile (1996) outlines four intervention strategies that can be used when working with patients with cardiac disease:

Intervention 1: Crisis Intervention

- Inform patients that they may experience stress.
- Reassure, advise and follow-up.
- Normalise the patient's reaction and the program's interventions (see Typical Reactions Following a Cardiac Event, and Table 3.1).
- Make the intervention relevant (see, Goal Setting).

Intervention 2: Provide Support and Counselling

- Support patients and family through the stages of recovery (Table 3.1).
- Support throughout stages of change (see Behavioural Change).

Intervention 3: Increase Sense of Control

- Encourage the patient to be physically active and involved in their rehabilitation (see Self-efficacy).
- Help and encourage the patient and the family to use existing and effective coping strategies.
- Encourage rehearsal and practicing of positive skills. This can be achieved through education and discussion.

Intervention 4: Educate

- Education is not always enough. Education alone has shown to be ineffective in changing cardiac disease related risk factors (Lovibond, et al., 1985). Education should be paired with skills training and other behavioural strategies.
- Education may help to decrease anxiety by creating a motivational gap between the patient's behaviour and the 'ideal'.

Behaviour Change

Key responsibilities of the cardiac rehabilitation practitioner include providing reassurance and emotional support to distressed patients and their families. A patient's recovery is also facilitated if the patient is helped to identify their risk factor status, and then supported in the adoption and long-term maintenance behaviours designed to reduce the likelihood of further cardiac events.

These behaviours are often perceived by the patient to be restrictive and difficult to adopt and, even if taken up, relapse is a common long-term outcome.

Providing the patient accurate and up-to-date information on how they should change their lifestyle and how to cope with these changes often does not have a lasting effect on the habits of the patient. Health professionals are often frustrated by their inability to "make" the patient change.

Practitioners need to effect a patient centered approach that includes assessment of the individual's psychological status. It is the responsibility of the cardiac rehabilitation staff to find out the psychological, social and physical state of the patient and to respect these issues when matching interventions to the patient and not the other way around.

It is essential that all cardiac rehabilitation interventions, from changing behaviour to lending reassurance, be based on the wants and needs of the patient.

Prochaska and DiClemente (1992) suggest that individuals moves through various identifiable stages when trying to modify behaviour, whether stopping smoking or losing weight. It is important to note that the change process, and that practitioners should attempt to match their interventions to these stages. It is important to note the change process may not progress in a linear fashion. Table 3.3 describes these stages of change, the rational for change, and some approaches to change that staff can facilitate.

Table 3.3 Stages of Change

Stage of Change	**Issues & Assessment** (Sotile, 1996)	**General Approaches** (Amlick and Ockene, 1994)	**Specific Approaches** (NHF, 1995; Prochaska and DiClemente, 1983, 1991)
Precontemplation – No intention of changing.	· Rationalizes current behaviour. · May want to change but has no intention of doing so. · May affect change under coersion or pressure but only lasts for a short time. · Ask patient if they seriously intend to change the problem in the near future (e.g. < 6mth). If they do not intend to change they are in a precontemplative stage of change.	· Increase the patients' awareness of the health effects/benefits of behaviour. · Encourage patient to adapt a more socially acceptable, healthy lifestyle.	· Advise on risks of inactivity – heart disease, obesity, diabetes, osteoporosis, back problems, etc · Encourage patient to become more active and that even small amounts helps
Contemplation – Serious intention of changing.	· Responsive to information/education. · Realizes health risks associated with behaviour. They weigh up pros & cons of change.	· Give feedback to increase positives of change. · Encourage activities that increase awareness of behaviour and its impact on health. As well as how to change	· Give information/education on increasing physical activity (primed and/or video). · Give examples of how to fit activity into normal day - 10 min walks, taking stairs,

	· People can remain 'stuck' at this stage for years. · People at this stage say that they are seriously considering changing in the next 6 months.	behaviour and the benefits of this change. · Highlight social acceptance of healthy behaviour.	walking to shops, etc.
Preparation – Laying foundation for change.	· Has intention of taking action in the next month, but has not succeeded in doing so in the past year. · Report some small behavioural changes.	· Continue to reinforce benefits and impact of healthy behaviour. · Assist by providing resources that enable the individual to take action –make it easy.	· Praise patient's readiness to be more active. · Strengthen commitment and confidence for becoming active. · Reinforce examples listed in Stage 2 · Suggest local exercise groups or walking with family as an option.
Action – Change in progress.	· The person actively modifies behaviours and overcomes targeted problems. · The person has successfully altered a targeted behaviour for a period from 1 day to 6 months.	· Focus on past successes. · Provide rewards and encourage self-reward. · Help remove triggers to problem behaviour. · Encourage person to discuss behaviour change and help them see this in a positive light.	· Continue support & encouragement. · Encourage involvement of friends & family in activities. · Stress importance of gradual progression to avoid risk of injury and loss of interest. · Aim for 30 mins or more of moderate activity/day, but stress anything is better than nothing.
Maintenance – Seeking to avoid backsliding.	· Change has been implemented for 6 months.	· Prevent relapse. · Remind the person of their condition before the change. · Remind the person to avoid triggers to negative behaviour. · Remind the person about current success.	· Review level of activity. · Continue support & encouragement. · Talk about other ways of being active: playing with children, cleaning mowing the lawn etc.
Relapse – Return to original behaviour.	· The individual has reverted to 'old' behaviour.	· Help person to not get distressed. · Remind person of the reason why they originally wanted to change.	· Identify reason(s) for relapse and how these can be addressed. · Reassure that slips are part of the process. · Reset more suitable activity goals. · Go back to Stage 2.

Self-Efficacy

An important concern is the necessity for the patient to feel confident that they will be able to change the behaviour in question (Bandura, 1982; Condiotte and Lichtenstein, 1981; Oldridge and Rogowski, 1990). A persons level of confidence in relation to self-change is termed, self-efficacy.

Self-efficacy of the patient to change also relates to an individual's locus of control (see, Factors Influencing Coping After A Traumatic Event). These concepts are different from motivation to change.

For example, a smoker who has a strong physiological dependence on nicotine and has attempted to stop smoking previously will be unconvinced that they will succeed this time, even though they are highly motivated to do so. They need to be reassured that taking care of their dependence with nicotine replacement will enable them to tackle their difficult habit and associated psychosocial and emotional issues.

Matching Interventions

It is most important that any intervention(s) be matched to the patient's stage of change. For example, it would be of no use giving the smoker who has no intention of quitting information on how to stop smoking. Rather, he/she needs information about why they should quit, the medical issues and the benefits to them of stopping smoking now. Once the idea of stopping smoking is "on their agenda" then the "how to" information becomes relevant. Interventions may be planned or opportunistic.

The stress caused by a cardiac event may impact on the patient's ability to process information and make decisions. When delivering suggestions and advice practitioners should (NHF, 1995):

- Use short words and sentences
- Give concrete advice, rather than general principles.
- Repeat important instructions wherever possible.
- Write instructions.
- Provide feedback and results in writing.

Key Points About Lifestyle Change (NHF, 1995):

- There is no fixed period to progress through the stages of change.
- Patient's needs vary. Some require close support and assistance, while others will be self-directed. This will be influenced by the individual's locus of control (see, Factors Influencing Reaction After A Cardiac Event).
- Interventions need to be tailored to the individual's needs and level of understanding.
- Appropriate printed and audiovisual materials are useful to support the change process.

Goal Setting

Studies have shown that, patients and health professionals sometimes have difficulty reaching mutually acceptable goals. Often this is as a result of a discrepancy between the patient and health professional in attributing the factors causing the illness (Fielding, 1987). It is important that the practitioner appreciates that, how patients perceive the health situation determines whether or not they will comply with the advice given. Further more, they also tend to understand their condition and the therapy in the way it will affect their health and everyday life. Thus, appreciating health situations from the patient's perspective is essential.

Goal setting should be done at the beginning and throughout the cardiac rehabilitation program. Staff should ensure that goals are:

1. Specific – Exactly what do you want to achieve?
2. Measurable – Exactly how much do you want to achieve? How will you be able to tell when you have achieved the goal?
3. Achievable – What can realistically be achieved in the time set?
4. Reviewable – Can the goal be changed if achieved or not?
5. Time line – Exactly when will the goal be achieved?

Regular, timely and relevant feedback about the patient's progress should be provided and discussed to allow adjustment of goals, behaviours and interventions.

Information Provision

Facilitated Group Sessions

Group discussions facilitated by cardiac rehabilitation practitioners, that include an educational component are an important part of cardiac rehabilitation programs. They give patients an opportunity to see they are not alone in their predicament and to receive support and guidance in their efforts to cope with and adjust to their illness. They help to instill hope in our patients because they see others getting on with life, recovering from what has happened to them and trying to be positive. Sensitive issues like fear of death and disability can be discussed in an open way, without the criticism that often occurs when these issues are discussed within families. A well conducted group discussion, which includes the open sharing of feelings, is the best antidote for many of the psychological reactions that occur in the presence of heart disease.

Whenever possible, the cardiac rehabilitation practitioner should use the discussion process to cover the theme of the session, thus minimizing the didactic or instructive aspects of the educational process. Current thinking in adult education indicates that adults prefer this method of learning to the method most often used with children in school. That is, the teacher assuming that he or she holds the knowledge which it is useful for the group to learn. Adults feel insulted, and therefore resistant to such a process. They need to feel that what they know is acknowledged, used and built upon. They want to be more in control of their own learning so that they are not in the situation of being passive recipients of information, some of which may not be relevant, to them. This requires staff in cardiac rehabilitation programs to learn the skills of being flexible group leaders rather than instructors. Whenever possible, staff should take the opportunity of doing further training in group leadership skills.

The following points are practical guidelines for conducting group discussions:

a) Beginning a Group Session

- Put the chairs in a circle wherever possible
- Sit down and relax. Introduce yourself. Put people at their ease. Starting a session standing up in front of a board gives the impression that you are going to give a lecture.
- Have everyone introduce themselves briefly, perhaps by asking them to give their name and what happened to them (in one sentence!).
- Remember how nervous people can get talking in a new group. Acknowledge each person.
- Talk to the group about:

-why the group is so important
-how the group works
-what will happen today
-that there will always be time for questions and discussion

b) Blending Educational Material and Group Discussion

- Bring up points for discussion rather than give a formal talk whenever you can.
- Give less, rather than more information. Most of us try to get too much across. A few points well discussed are better than a complicated message.
- Use and value the knowledge of the group and build on it.
- Listen carefully to what is behind the questions you are asked. Often they represent concerns of the whole group and sometimes there is more anxiety within them than is at first apparent. If you are not sure what is behind a particular question, a good response is always, "Why do you ask?". People are not able to take in information if they are very anxious, so sensitivity to group dynamics is a valuable skill.
- Use simple language and no jargon.
- Knowledge does not equal behaviour change.

c) Further Points to Remember

- The group needs one leader who is there all the time. This builds trust and cohesion. Someone needs to know the patients and remember what happened last week. This is the ideal situation, but the reality in some programs is that this is difficult to achieve. Nevertheless, it represents good group work practice and should remain the aim of each program.
- What they have to say is more important than what you have to say. If you are talking more than the group, you may be talking too much. Often, the group members can help each other more than you can help them. The group leader's task is to make sure the group is working well, keeping on track and being an interactive and positive force. It is important, however, to ensure that no one individual dominates. It is the leader's responsibility to ensure this does not happen.
- Whenever you can, encourage participation in a group, even if it is only made up of a few people. The therapeutic benefits are undeniable.

Self-Help Groups

One of the boom industries of the seventies and eighties was self-help groups. The major premise of these groups was that a bunch of people, with no formal training in the treatment of particular problems, but rather the personal experience of having suffered such problems would be able to provide a useful and supportive service to other sufferers.

Over time, the prevalence and effectiveness of these groups has tended to wax and wane. Some of the anti-establishment feeling which created the need for these groups in the first place has abated and people now seem less determined to form groups at the exclusion of trained professionals.

The effectiveness of these groups has tended to depend very largely on the organisers, and the degree of need of the members. Well-organised, well-structured groups, being facilitated by knowledgeable people have proved to provide a very effective source of information, support and encouragement to participants. However, poorly organised groups, such as those with no

clear goals and structure or which are dominated by the specific needs of one or two members, can be quite destructive to the remainder of the participants.

Self-help groups in the area of cardiac rehabilitation, can be an extremely valuable source of support to heart patients, and their families, over the difficult period following a heart attack, or surgery. These groups can also provide good ongoing support and motivation for heart patients to retain their impetus for change, particularly in the areas of diet and exercise improvements. However, there are some groups which, because of poor organisation or a lack of adequate knowledge, become focused on the negative aspects of heart disease.

Bradley Johnston, clinical psychologist, recommends that patients investigate the available self-help groups, but to do so with a keen eye for potential difficulties. Some tips for patients in finding the right self-help group are as follows:

1. Go along to one or two group meetings to check out the group without making any firm commitment for further attendance.
2. Ask for information about the structure, purpose and goals of the group.
3. If you begin to feel uncomfortable about any aspect of the way it is running – Stop going! Remember: You can always seek a professionally run group to help achieve the same ends, with less personal risk.

Education

Education of the cardiac rehabilitation patient is not merely providing facts but an ongoing, purposely planned, coordinated and adjusted service, offered to the patient and family to bring about long term positive health changes. Each patient has his/her unique holistic needs, which may encompass physical, psychosocial, cultural, and spiritual dimensions. Hence, the education content and process should be patient-centered and tailored to the individual's needs. When patients are adequately equipped with knowledge, skills and strategies, they are empowered to identify their own health problem/s, make choices and be on the path to bring about change.

Adult Learning

Learning is an ongoing process that involves thinking, discovery, inquiry, reflections and at times creative response. For the practitioner, the educational role is concerned with teaching, provision of support, and creation of an environment that facilitates learning, be it in a group or on an individual basis. The end product of education for the learners is a greater understanding of themselves and developing an awareness of their ability to change (Neilsen, 1989).

The four basic assumptions that underpin Adult Learning Principles are as follows:

Self concept

Adults view themselves as responsible, self-directing individuals. Hence, they have a need to be treated with respect, make their own decisions, and be seen as an important and unique individual. Prompt encouragement and positive feedback given by the practitioner would motivate further learning.

Life experience

Life experience tends to enhance new learning. Adults possess rich life experiences, thus they have abundant resources to which they can relate new learning ideas or concepts. For this

reason, the emphasis of education should be on the practical application of information. Experience should be the starting point for planning adult learning activities.

Readiness to learn

At times, the inability to deal with the illness effectively by the patients may impede their learning and thus compliance to therapy.

Orientation to learning

Adults are believed to possess a time perspective of immediacy of application in their orientation to learning. Consequently, they tend to desire problem-centered rather than subject-centered learning. Hence, when preparing health related information, the emphasis is on real life problems or issues rather than the subject or topics.

Application of Adult Learning Principles

Patients often have a minimum level of knowledge regarding their illness. Unlike the usual "adult learners" who have made a conscious decision to become better informed, our patients are often in a position of *need* rather than *want* information.
In this instance the practitioner takes a major role in formulating the content of the education program..

This approach, where the teacher controls the content, is the traditional teaching method. In contrast input from the learner can be stressed in determining what content to learn and how to learn it. This approach is particularly suited to the patients after they have had time to adjust to their illness and have reached a stage where they feel ready to deal with their health situation. Both sets of principles are seen as parallel and not in opposition and they both are appropriate, depending upon circumstances (Knowles, 1990). Not surprisingly, the practitioners would find a combination of the two sets of educational principles is needed and should be used.

Ultimately, it is the patients' *preferred learning styles* and health needs that dictate the choice of the education principles.

The following are the measures and key factors that have been shown to play an effective part in adult education among the literature:

- Identification of the current stage of change
- Mutual agreement of learning needs
- Perceived self efficacy
- Educational level and current knowledge base
- Readiness to learn
- Preferred method of learning (if known)
- Linking the learning to a real life experience
- Ability to apply new skills immediately
- The role of encouragement and feedback as motivation
- Family involvement and consideration of contextual socio-economical factors
- Relapse management
- Measurable & achievable short term goals and rewards

Aims & Objectives

Cardiac education like any other intervention, should be outcome driven if it is to be meaningful, practical and successful.

The cardiac education program should be designed to achieve the following broad objectives:

Intermediate objectives

For the patient to exhibit a knowledge and understanding of:

- the sense of loss and the need to grieve, triggered by onset of the symptoms of coronary artery disease (CAD)
- the CAD and its future life implications
- the need to cope positively with a changed health status
- the management options available
- own health risks factors and the underlying rational for such risky behaviours
- the strategies to be adopted to bring about change
- the details and risks associated with various investigations and interventions in order to feel confident to undergo these procedures

Middle to long term objectives

To assist the patient to acquire and maintain the skills for:

- compliance with positive health behaviours
- reviewing change strategies
- relapse prevention or management
- for coping with recurrence of symptoms

For the patient to develop appropriate personal attitudes and values in relation to:

- the importance of self-reliance regarding management of his/her health status
- the significance of lifelong compliance in maintaining quality of life
- the need to use the relevant health and community services

Educational Materials

A wide range of aids is available for patient education, some encompassing newer technology and a high level of user interaction.

Choice of educational materials may be dependent upon:

- The patient's diagnosis
- The patient's age and gender
- The budgetary restraints on the program
- The ethnic mix or cultural background of the patients
- The level of patient literacy
- The patient's preferred method of learning
- The resources already available to the learner
- The level of creativity of the Instructor

Written Material

An enormous range of products is available, many of which have been developed by various professional bodies and reviewed by the experts in their field, and these are the instructional materials of choice.

Audiovisual Material

A "home loan" library system consisting of various patient education videotapes should be established for easy access by the patient and their family. Videotapes are an invaluable format to portray the real life situations and experiences. Most patients, including those with low literacy level, will respond favourably to information conveyed this way.

Audio-tapes

These can be a useful adjunct to other educational resources. They are easy to use in almost any environment and are relatively inexpensive.

Slides

These can be incredibly useful in a group setting. They can provide see at a glance information, which can be adjusted, to the group members' pace of reading and information assimilation skill.

Overhead Transparency Sheets

Overhead Transparency Sheets are the most frequently used educational tool, and it works best in a group setting. This tool has the advantage of being relatively easy and quick to produce. It is vital not to overcrowd the overhead sheet with a mass of information.

Charts, Posters & Models

These are readily available from various health organisations and pharmaceutical companies. They are widely used for individual and small group formats.

Models such as the heart, coronary arteries, coronary arterial stent, heart valve and pacemaker are some samples that can be obtained from the pharmaceutical companies free of charge

Educational Strategies

To avoid wastage of limited resources, every effort must be made to individualise education program to better enhance each patient's outcomes. An education requirement assessment must be undertaken in collaboration with the patient and family. Also, an assessment of the stage of behavioural change the patient is exhibiting is vital, as this will impact upon the decision made regarding the most appropriate education content and strategy to be adopted (DiClemente & Prochaska, 1991) (See Behaviour Change).

Table 3.4 An outline of one strategy for education with program objectives included

Patient profile	Educational objectives	Educational materials and modes	Expected outcomes
Angina, AMI	• To understand disease process as it relates to diagnosis	• Explanation with the use of videos, pamphlets and heart model • Question and answer session	• Able to describe coronary occlusion, its causes and management options
Angiography, angioplasty with or without stenting, cardiac surgery	• To understand the procedure and participate in its preparation	• Pre-procedure videos on PTCA, stent. • Question and answer session	• Reduce stress levels associated with procedure. • Participate in aftercare effectively

Tobacco use	• To learn and understand the association between smoking and heart disease • To understand the importance of being physically active. • To learn ways of affectively carrying out activities	• Videos and pamphlets on smoking as a major risk factor. • Written guidelines on upgrading the activities of daily life • Hospital or home based exercise program arranged	• Reduction or cessation of tobacco use • Wellbeing • Compliance with safe exercise principles
Symptom management	• To understand the pathophysiology of CAD and those treatment options • To learn and discuss the symptoms which may be managed at home and those requiring hospitalisation	• Discussion on symptoms using overhead sheets or video • Correct use of medication and its therapeutic effects • Written handout on use of nitrates for angina recurrence • Contact numbers for medical assistance and ambulance	• Avoidance or minimization of symptoms with appropriate use of nitrates • Appropriate use of facilities for emergency assistance

Modes of Delivery

Individual Education

This mode of education is useful in the hospital setting, when the patients are in the early recovery phase and confined to bed, or if the issue to be addressed is of a sensitive nature.

Group Education

Group education is often less threatening for the individual patient to receive information.

Telephone Education

For rural patients or those who choose not to attend institution based education.

Mailout Information

If carefully produced and marketed, they can be a two-way system of information and feedback, between patient and practitioner.

Community Seminars or Information Evenings

Some cardiac patients may respond well to information that is partly packaged as a social occasion!

Education Modules

For effective utilisation of resources outside the hospital setting, it is possible to break cardiac education into modules or blocks, with each block dealing with a specific topic. For example, there could be modules dealing with Exercise and Activity, Healthy Eating, Stopping Smoking and so on.

Family and partner

The family and loved ones of a patient are often neglected in the cardiac rehabilitation process. Although these people are not the ones suffering the heart problem, they do experience similar, and sometimes more pronounced, psychological reactions than the patient. The emotional reaction and adjustment by people close to the patient is termed the 'survivor syndrome' and entails the following reactions:

- Anxiety and fearfulness
- Guilt
- Numbness
- Confusion
- Sense of Relief
- Anger

In addition, the major responsibility for providing care and support at home to someone who is ill or recovering from health problems is usually assumed by a family member (Edward, 1996; McDowall, 1995). Consequently, it is of no surprise that family members, and in particular, partners of cardiac patients often find this period as stressful for them as it is for the patient (Hilgenberg, et al., 1992). Such difficulties at this time can impact detrimentally on the patient's health outcomes (Antonucci and Johnson, 1994; Friis and Taff, 1986).

A family's attempts to help may have a negative effect for the patient. For example, over-protectiveness by a partner has been linked with patient irritability, frustration, anger, and difficulty in accepting changes in health status. However, over-protectiveness appears to be exacerbated by uncertainty about the future, which has been identified as a major stressor for partners. Uncertainty has been associated with a lack of knowledge about the patient's condition, required lifestyle changes, and how to deal with subsequent cardiac events (Hilgenberg, et al., 1992; Thompson, et al., 1995; Moser, et al., 1993).

On a more positive note, what appears to be an individual achievement by a patient in, for example, changing lifestyle habits following a cardiac event, may really be an outcome of the efforts of a partner, and the ability of the patient and partner to work together (Coyne and Smith, 1994). Recent evidence which suggests that post-acute myocardial infarction patients' self-efficacy is related to the coping strategies used by partners appears to support this theory (McDowell, unpublished). From this evidence it is clear that cardiac rehabilitation should include the family.

The family will often want to know how they should behave or speak to the patient. Hilbert (1985) suggests how family can assist the patient:

- Be positive, praise and encourage
- Make decision making a collaborative process
- Provide resources
- Use behaviour modification techniques
- Give physical assistance – share tasks

- Provide intimate interaction that allows the patient to express concerns and feelings. Issues of intimacy and sexual activity should also be addressed. Sotile (1996) offers some excellent guidelines for cardiac rehabilitation practitioners and family members regarding these issues (1992 and 1996).
- Encourage and promote social interaction
- Share norms.

Overall, the family should listen and be sympathetic, encouraging and respectful. They should avoid nagging, criticising, policing and competing (Cohen and Lichtenstein, 1990; Ell and Dunkel-Schetter, 1994).

Children

Young children who have a parent or loved one suffer a cardiac event may need some special care. The following guidelines are offered by Sotile (1996):

- Talk openly about the illness
- Allow them to ask questions. Admit when you don't know the answer.
- If they don't have questions give them information they can refer to later.
- Allow children to talk to people outside the family about the situation
- Reinforce that the child had nothing to with the cardiac event.
- Reassure children that the patient is receiving the best possible care and that everyone, including the patient will continue to do all they can to recover.

In summary, when planning rehabilitation programs for cardiac patients it is recommended that family members and in particular, partners, be targeted for inclusion as allies in the recuperative process.

Aboriginal and Torres Strait Islander patients

It appears that 'traditional' cardiac rehabilitation programs do not meet the needs of Aboriginal and Torres Strait Islander patients. Cardiac rehabilitation for these patients should be delivered by Aboriginal health workers in a separate and culturally relevant program. Patients should have an opportunity to be involved with the development of such health programs (Girle 1992; Gracey 1987).

Rural and remote patients

Many patients are unable to attend a traditional cardiac rehabilitation program due to geographical barriers. These patients should be provided with comprehensive discharge planning before leaving hospital and followed up on returning home and preferably for several weeks after that. These patients should be contacted by a health professional via phone, email, tele- or video-conferencing, mail or home visits. Alternatively, the patient may attend a follow-up clinic at a community health centre or with their local general practitioner. On these follow-up visits additional support and information may be offered along with written and audiovisual materials.

References

1. American Association of Cardiovascular & Pulmonary Rehabilitation. (1995). *Guidelines for Cardiac Rehabilitation Programs, 2nd Edition.*

2. American Psychiatric Association. (1994). Diagnostic *and Statistical Manual of Mental Disorders, 4th Ed. (DSM-IV)*. American Psychiatric Association, Washington, USA.
3. Antonucci, T. and Johnson, E. (1994). Conceptualization and methods in social support theory and research as related to cardiovascular disease. In S.A. Shumaker & S.M. Czajkowski (eds.), *Social support and cardiovascualr disease (*pp.21-40). New York: Plenum Press.
4. Bandura A. (1982). Self-efficacy in human agency. *American Psychology,* 2,122-147
5. Barbarawicz P, Nelson M, DeBusk R, Haskell W. (1980). A Comparison of in-hospital education approaches for coronary bypass patients. *Heart Lung, 9, 127-132.*
6. Berkman L and Syme SL. (1979). Social networks, host resistance and mortality: a 9-year follow-up study of Almeda County residents. *American Journal of Epidemiology*, 109,186-204.
7. Berra K., Franklin B., Hall L.K, et al. (eds). (1991). *Guidelines for Cardiac* Rehabilitation *Programs,* Champaign: Human Kinetics.
8. Blumenthal J.A. (1985). Psychological assessment in cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation,* 5, 208-215.
9. Budnick, N. (1997). *Hear To Heart*. Santa Fe: Health Press.
10. Carney, R.M., Rich, M.W. and Freedland K.E. (1988). Major depressive disorder predicts cardiac events in patients with coronary artery disease. *Psychosomatic Medicine*, 50, 627-633
11. Carte W.B., Mckenna M., Martin M.L. et al. (1987). Health education: Special issues for older adults. *Patient Education & Counselling,13, 117-131.*
12. Clark, S. (1990). Nursing interventions for the depressed cardiovascular patient. *Cardiovascular Nursing,* 5(1): 54-64.
13. Cohen-Cole, S.A., Brown, F.W. and McDaniel, J.S. Assessment of depression and grief reactions in the medical patient. In Stoudemire, A. and Fogel, S. (Eds), *Psychiatric Care of the Medical Patient.* Oxford University Press, Oxford, U.K.
14. Cohen, S. and Lichtenstein, E.(1990). Partner behaviours that support quitting smoking. *Journal of Clinical and Cconsulting Psychology,* 58, 304-309.
15. Condiotte M, Lichtenstein E. (1981). Self-efficacy and relapse in smoking cessation programs. *Journal of Clinical and Cconsulting Psychology*, 49 (5), 648-658.
16. Cooper CL et al. (1985).The significance of psychosocial factors in predicting coronary disease in-patients with valvular disease. *Social Science in Medicine,* 5, 315-318.
17. Coyne, J. and Smith, D. (1994). Couples coping with a myocardial infarction: Contextual perspective on patient self-efficacy. *Journal of Family Psychology*, 8(1), 43-54.
18. Dalack, G.W., and Roose, S.P. (1990). Perspectives on the relationship between cardiovascular disease and affective disorder. *Journal of Psychiatry*, 51 (7): 4-9.
19. Dracup K., Melies A., Baker K., et al. (1984). Family focused cardiac rehabilitation: A role supplementation program for cardiac patients & spouses. *Nursing Clinicians of North America,*113-123.
20. Edwards, H.E. (1996). Communication between older people and their family carers, In *School of Psychology*. The University of Queensland: Brisbane.
21. Ell, K. and Dunkel-Schetter, C. (1994). Social support and adjustment to myocardial infarction, angioplasty, and coronary artery bypass surgery. In S.A. Shumaker and S.M. Czajkowski (Eds.), *Social support and cardiovascular disease.* New York: Plenum Press.
22. Fielding R. (1987). Patients beliefs regarding the causes of myocardial infarction: Implications for information giving & design. *Patient Education & Counselling,* 9, 121-134
23. Frasure-Smith, N., Lespeance, F. and Talajic, M. (1993). Depression following myocardial infarction: impact on 6-month survival. Journal of American Medical Associaton, 270, 1819-1825.
24. Friis, R. and Taff, G. (1986). Social support and social networks and coronary heart disease and rehabilitation. *Journal of Cardiopulmonary Rehabilitation,* 6, 132-147.
25. Gagne RM. (1985). *The Conditions of Learning and Theory of Instruction (4thed).* New York, Holt, Rinehart & Winston.
26. Garrity, T. (1973) .Vocational adjustment after first myocadial infarction. *Social Science in Medicine*, 7, 705-71
27. Hare, D.L. and Davis, C.R. (1996). Cardiac depression Scale: validation of a new depression scale for cardiac patients. *Journal of Psychosomatic Research,* 40 (4): 379-386.
28. Hawe P., Degeling D., Hall J. (1990). *Evaluating Health Promotion – a Health Workers Guide. Sydney:* MacLennan & Petty.
29. Hilbert, G. (1985). Spouse support and myocardial infarction patient compliance. *Nursing Research,* 34 (4), 217-220.

30. Hilgenberg, C., et al. (1992). Changes in family patterns six months after a myocardial infarction. *Journal of Cardiovascular Nursing,* 6(2), 4656.
31. Kaplin G., Keil J. (1993). Social-economic factors and cardiovascular disease: A review of the literature. *Circulation,* 9, 1973-1998.
32. King A. (1985). Measurement of coping strategies, concerns, and emotional response in patients undergoing coronary artery bypass grafting. *Heart and Lung,* 14, 579-586.
33. Knowles M. (1984). *Androgogy; an Emerging Technology.* San Francisco: Jossey-Bass.
34. Knowles M. (1990). *The Adult Learner: A Neglected Species* (4th ed). London: Guif Publishing Co.
35. Lovibond, S., Birrell, P., and Langeluddecke, P. (1985). Changing coronary heart disease risk-factor status: The effect of three behavioural programs. *Journal of Behavioural Medicine,* 9 (5), 415-437.
36. Lowrey, B.J. (1991). Psychological stress, denial, and myocardial infarction outcomes. *England Journal of Medicine*, 294: 1165-1170.
37. McDowell, J. Recovery from acute myocardial infarction: Impact on the quality of life of patients and their partners, In *Centre for Public Health Research*. Unpublished, Queensland University of Technology: Brisbane.
38. McDowell, J. (1995). *Social Support, Burden, and Psychiatric Symptomatology In Caregivers: A Comparative Study. School of Nursing*, Queensland University of Technology: Brisbane.
39. McGuire W.J. (1985). Attitudes and Attitude Change In: Lindsay G, Aronson E (eds) *Handbook of Social Psychology.* (3rd ed). New York: Random House.
40. Medalie J., et al. (1973). Angina pectoris among 10,000 men: 5-year incidence and univariate analysis. *American Journal of Medicine,* 55, 583-594.
41. Merritt S. (1991). Learning style preferences of coronary artery disease patients. *Cardiovascular Nursing, American Heart Association, 27 (2), 7-11*
42. Milani, R., Littman, A. and Lavie, C. (1993). Depressive symptoms predict functional improvement following cardiac rehabilitation and exercise program. *Journal of Cardiopulmonary Rehabilitation,* 13, 406-411
43. Millar W, Stephens T. (1993). Social status and health risks in canadian adults. 1985 and 1991 Health Reports, 5(2), 143-156.
44. Miller, N.H., et al. (1990). The efficacy of risk factor intervention and psychosocial aspects of cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation,* 1O, 198-209.
45. Moser, D., Dracup, K., and Marsden, C. (1993). Needs of recovering cardiac patients and their spouses: compared views. *International Journal of Nursing Studies*, 30(2), 105-114.
46. National Heart Foundation. (1995). *Adapted from Lifestyle Change: Handicard for General Practitioners*. Australia, National Heart Foundation.
47. Nielsen B. (1989). Applying andragogy in nursing continuing education. *Journal of Continuing Education in Nursing,* 20(2), 86-90
48. Oldridge N. and Rogowski B. (1990). Self-efficacy and in patient cardiac rehabilitation. American Journal of Cardiology, 66, 362-365.
49. Oldridge N. and Pashkow F. (1993). Compliance and motivation in cardiac rehabilitation. In: Pashkow FJ and Dafoe WA (Eds) *Clinical Rehabilitation: A Cardiologist's Guide* Baltimore: Willlares & Wilkins; 335-348.
50. Oldridge N., Guyatt G., Fischer M., et al. (1988). Cardiac rehabilitation after myocardial infarction: Combined experience of randomised clinical trials. *Journal of American Medical Association*, 260, 945-950
51. Owen P., Porter K., Frost C., et al. (1993). The Determination of the Readability of Education Materials for Patients With Cardiac Disease. *The Journal of Cardiopulmonary Rehabilitation*, 13, 20-24.
52. Prochaska J. and DiClemente C. (1983). Stages and Processes of Self-Change of Smoking: Toward an Integrative Model of Change. *Journal of Clinical and Consulting Psychology,* 51 (3),390-395
53. Prochaska J. and Di Clemente C. (1985). Common processes of change in smoking, weight control and psychological distress. In: Shiftman S and Wills TA (Eds). *Coping and Substance Use*. San Diego: Academic Press, 345-363.
54. Prochaska J. and DiClemente C., et al. (1991).The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Clinical and Consulting Psychology,* 59 (2), 295-304.
55. Prochaska J. and DiClemente C., et al. (1992). In search of how people change: Applications to addictive behaviours. *American Psychologist,* 47(9), 1102-1114.
56. Prochaske A. (1993). Prescribing to the stages and levels of change. *Psychotherapy*, 28, 463-468.

57. Rejeski W.J., et al. (19985). Cardiac rehabilitation: a conceptual framework for psychologic assessment. *Journal of Cardiopulmonary Rehabilitation,* 4,172-180.
58. Rose MI and Robbins B. (1993). Psychosocial recovery issues and strategies in cardiac rehabilitation. In: Pashkow FJ and Dafoe WA (Eds) *Clinical Rehabilitation: A Cardiologist's Guide*. Baltimore: Willlares & Wilkins, 335-348.
59. Rotter, J.B. (1972). *Application of a Social Learning Theory of Personality*. New York: Holt Rinehart & Winston.
60. Sachs D.P.L.(1991). Advances in smoking cessation. *Curr Pulmonol,* 12, 139-198.
61. Schleifer, S., Macari-Hinson, M. and Coyle, D. (1989). The nature and course of depression following myocardial infarction. *Archives of Internal Medicine,* 149, 1785-1789
62. Sotile, W.M. (1992). *Heart illness and intimacy: How caring relationships aid recovery*. Baltimore: John Hopkins University Press.
63. Sotlile, W.M., Sotile, M.O., Ewen, G.S., et al. (1993). Marriage and family factors relevant to effective cardiac rehabilitation: a review of risk factor literature. *Sports Medicine and Training Rehabilitation,* 4, 115-128.
64. Sotile, W.M. (1996). *Psychosocial Interventions for Cardiopulmonary Patients.* Champaign: Human Kinetics.
65. Southard DR and Broyden R. Psychosocial services in cardiac rehabilitation: as status report. *J Cardiopulmonary Rehab*. 1990;10:255-263.
66. Taylor C.B., et al. (1990). Smoking cessation after acute myocardial infarction: effects of a nurse-managed intervention. *Annals of Internal Medicine,* 113,118-123.
67. *Thomas J*. (1993). Cardiac inpatient education; The impact of educational methodology on self-efficacy. *The Journal of Cardiopulmonary Rehabilitation,13, 398-405.*
68. Thompson, D., Ersser, S., and Webster, R. (1995). The experiences of patients and their partners 1 month after a heart attack. *Journal of Advanced Nursing*, 22(4), 707-14.
69. Wallace N. and Wallace D.C. (1977). Group education after myocardial infarction. Medical Journal of Australia, 2.
70. Walsh PL. (1982). Design considerations for adult patient education. *Patient Counselling and Health Education*, 4, 84-88.

Chapter 4 Program Implementation II - Activity and Exercise

Light to moderate physical activity improves cardiovascular capacity following myocardial infarction (MI), revascularisation procedures such as percutaneous transluminal coronary angioplasty (PTCA) and coronary artery bypass graft surgery (CABG) (Skinner 1993). Benefits from regular physical activity have also been reported for patients with chronic heart failure (Hambrecht et al. 1995; Keteyian et al. 1996; Koch et al. 1992; Sullivan et al. 1988, 1989) and those with other coronary artery disease (Skinner 1993).

The exercise component of cardiac rehabilitation offers a unique opportunity to accelerate recovery, improve functional capacity and encourage long term adherence to the cardio-protective practice of regular physical activity.

This chapter has been formulated to provide practical information to health professionals working in hospital and community based settings, who are interested in the promotion of physical activity to the patient with heart disease. This chapter represents commonly accepted exercise practices for patients in inpatient, outpatient and maintenance phases of cardiac rehabilitation. It is designed to guide health professionals in their work.

Diagnostic groups - special considerations

Traditionally, cardiac rehabilitation has catered for patients with coronary artery disease. However, the diagnostic groups now attending and benefiting from cardiac rehabilitation programs are far broader.

When prescribing exercise, each patient group has different needs and safety considerations. Some of these considerations are summarised below.

Coronary artery bypass graft (CABG) and valvular surgery

Where CABG or valvular surgery has been performed on patients for angina without MI, the major consideration is the surgical wounds as the myocardium is intact and the patient's primary physical difficulties are those of surgical discomfort and healing.

Exercise prescription following these surgical procedures is, therefore, fundamentally different from that following a myocardial infarction. Those adult patients who have undergone structural defect repair of the heart, such as atrial-septal defect repair and valvular surgery, may benefit from similar guidelines to those prescribed for the CABG patient, particularly if anxious about taking up physical activity.

Participation in an outpatient exercise rehabilitation program should commence as soon as possible after discharge. Higher risk patients should be referred, where possible, to a program that can offer more intensive supervision.

Care should be taken with the use of weights and upper body activities, such as rowing, swimming and bionic biking as the sternum is not fully healed for approximately 8-12 weeks after surgery. Lifting light weights (0.5-2kgs) may begin at approximately four weeks after discharge. While the healing of the sternum limits upper body activities, it does not preclude general physical conditioning with lower body activities, such as cycling and walking. However care should be taken not to aggravate the healing of limb wounds associated with the surgery. Patients should be taught to avoid stress on the healing sternum as well as leg and arm wounds, by delaying some activities for several weeks.

Table 4.1 outlines an example of activity progression for a patient following cardiac surgery. It is a sample only, as each patient requires an individual exercise prescription. Each week involves approximately 30-60 minutes of daily activity and the gym program is in addition to walking and/or cycling.

It should be noted that many cardiologists and health professionals recommend that swimming, particularly in public pools, be avoided until wounds are healed to reduce the likelihood of infection.

Table 4.1 Sample progression for a patient, post-cardiac surgery

Time post event	Swimming program (after wounds are healed)	Gym program (in addition to walking/cycling)
Week 6	• Walking with arm action • Kick-boarding with breast stroke leg action	• Light bionic bike riding (follow through with arms with no pushing/pulling) • Light weight exercising and stretching for upper body
Week 7	• Walking with over-arm action • Kick-boarding with regular kicking action	• Bionic bike riding with light push/pull action • Light weight exercising and stretching for upper body
Week 8	• Attempting breast-stroke and supplement with kick boarding activities	• Rowing machine – after being taught late pull technique with relaxed grip
Week 9	As per week 8	As per week 8
Week 10	• Attempting front crawl (freestyle)	• Arm cranking with circular apparatus • Supplement with isolation on bionic bike • Supplement with pedaling action if necessary
Week 11	As per week 10	As per week 10
Week 12	• Stroke medley (except butterfly)	• Arm cranking, rowing machine and moderate resistance training

Percutaneous transluminal coronary angioplasty (PTCA) and stent

As with valvular surgery, balloon angioplasty may be performed before or after myocardial damage has occurred, and subsequent exercise prescription will differ for each of these situations. If the procedure has been performed as part of the management of MI, the patient is treated as for MI. However, if the stenosis has been found as part of the investigation of angina pectoris and there is no MI, exercise may progress much more quickly with awareness of the risks of restenosis. PTCA patients generally progress faster than MI and CABG patients.

Therefore, exercise prescription is based on the total clinical status, rather than simply the performance of PTCA. As PTCA becomes more commonly performed, rehabilitation centres are being asked to handle complex cases, such as those involving patients with failed bypass grafts who have had one or more angioplasty. Hence, the total medical history of the patient

needs to be taken into account - not just the most recent event.

The uncomplicated PTCA patient, with or without stent, will usually begin a formal exercise rehabilitation program one to two weeks after discharge. However, vigorous lower body activity and heavy lifting should be avoided in the first few weeks to allow the groin wound to heal completely.

Pacemaker

Patients with pacemakers are capable of participating in regular physical activity.
The majority of pacemakers are used to manage bradyarrhythmias. However, newer pacemakers and implantable defibrillators are designed to manage tachyarrhythmias. Information about the pacemaker, such as type, rate and setting, should be known by program staff to determine an appropriate exercise prescription.

If a patient is pacemaker-dependent, care should be taken with the warm-up so that it is slow and progressive, to allow the cardiac output to increase gradually. Most pacemakers are now sensitive to movement and/or respiration. Therefore, exercise will induce a slow increase in cardiac output via stimulation of the pacemaker. In addition, these pacemakers allow staff to use exercise testing to prescribe exercise based on heart rate. It is helpful also to use ratings of perceived exertion (RPE)to monitor progress and intensity (see Monitoring, p.70).

It is not reliable to use heart rate (HR) to prescribe or monitor the exercise of patients with fixed-rate pacemakers. Ratings of perceived exertion are a more appropriate method of prescription. It is also wise to monitor the blood pressure (BP) of these patients intermittently during exercise.

Non-pacer-dependent patients, that is patients with demand pacemakers, should have normal chronotropic heart rate responses to exercise. However, minimum and maximum settings should be observed, along with perceived exertion, to determine level of dependency at various workloads. This may be determined with a rhythm strip if available. Patients who are dependent at the maximum paced setting may have a restricted exercise capacity.

Automatic implantable cardiac defibrillator (AICD)

Patients with an AICD may be able to exercise safely if the activity does not provoke or worsen the tachyarrhythmia. Care should be taken to avoid the setting for defibrillation. A safe margin for maximum exercise heart rate is 20 beats per minute (bpm) below the discharge rate. For example, if the AICD is set to discharge at a heart rate of 160 bpm, it would be advisable to stay below 140 bpm during exercise.

Patients should not perform activities such as swimming on their own. They should be more cautious about undertaking activities that would put them in a dangerous situation if their defibrillator were to discharge.

Cardiac transplant

Cardiac transplant results in a lack of autonomic cardiac innervation, causing the patient's heart rate response to exercise to be slower and to become dependent upon catecholamine release. Therefore, exercise sessions following cardiac transplantation should begin with a slow and progressive warm-up for at least 10minutes to allow for cardiovascular adaptation.

Initial increases in cardiac output will be stimulated by increases in venous return, then

followed by an increased heart rate due to catecholamine release. There is also a delay in the reduction of heart rate after exercise, due to the slow breakdown of the circulating catecholamines. Hence a longer cool-down period is also required to prevent a sudden drop in cardiac output.

The resting heart rate will approximate the inherent sino-atrial pacing rate of 100 bpm. The maximum heart rate of the denervated heart is significantly less than that predicted for its age. Exercise heart rates may only increase marginally to approximately 120bpm.The cardiac transplant patient may also be hypertensive, due to the use of the immunosuppressive medication cyclosporine. Blood pressure monitoring may be warranted for these patients.

Heart rate is not a reliable indicator of exercise intensity in these patients unless a symptom-limited exercise test has been performed with continuous monitoring of heart rate. Ratings of perceived exertion should be used to monitor exercise in the absence of such tests.

When supervising exercise with individuals who have received a heart transplant health Professionals should be aware that:

- Hip, knee and back pain may be related to the development of osteoporosis due to corticosteroids.
- Denervation prevents the transmission of pain from the myocardium, so patients will not complain of angina, which may result from diffuse coronary artery disease caused by chronic rejection. As a result, patients should be advised against exercising at higher intensities for a long period while unsupervised. Shortness of breath may also be an indicator of myocardial ischaemia.
- There may be occasions when the patient is unable to exercise, for example, following biopsy, infection or rejection. Patients should return to exercise at a lighter intensity after these episodes and progress in response to symptoms and physical condition.
- Steroid induced muscle atrophy may also present as a limitation.

Chronic heart failure (CHF)

The New York Heart Association's (NYHA) 1973 classification of heart failure is:

Class I: No undue symptoms associated with ordinary activity, without any limitation of physical activity.
Class II: Slight limitation of physical activity. Patient comfortable at rest.
Class III: Marked limitation of physical activity. Patient comfortable at rest.
Class IV: Inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or chest pain possible at rest.

Patients with chronic, stable heart failure (NYHA Class I-III) can benefit from and safely participate in exercise rehabilitation (Hambrecht, 1995; Keteyian, 1996).

Patients with NYHA Class I-III heart failure will commonly have ischaemic or dilated cardiomyopathy. They may have undergone various interventions and/or surgery and must be medically and pharmacologically stable before beginning exercise rehabilitation.

Muscle fatigue and breathlessness at low intensities of exercise are hallmarks of CHF. Muscle wasting, particularly in the lower limbs, is a problem for CHF patients and can adversely affect their quality of life. Heart rate responses to exercise are usually reduced by drug regimens, the extent of left ventricular dysfunction and the usually advanced age of the

patient. Due to muscle wasting, exercise programs should include both light resistance and aerobic exercise.

For patients at high risk of a cardiac event, electrocardiograph monitoring may be warranted (see Monitoring, p.70). All patients with heart failure should use RPE and have symptoms monitored carefully.

Vasovagal attacks may occur during or after exercise in the early weeks of exercise training due to a combination of low tolerance to exercise, problems of postural hypotension and/or bradycardias. A longer warm-up (10 minutes) may be useful to ensure maximum vasodilation. Leg fatigue often limits exercise, initially. Consequently, interval rather than continuous exercise may be helpful during the first few weeks of a program.

Criteria for stopping exercise sessions are similar to those mentioned later in this chapter (see Outpatient - Safety.p.78). In addition, rapid weight gain (>2kg in 2 days) should be reported to the individual's doctor before resuming exercise (Hanson 1994).

Inpatients

Mobilisation after a cardiac event aims to decrease the physical and psychological impact, minimise the effects of bed rest, lessen the period of disability and increase patient confidence. The purpose of a mobilisation program is to structure a gradual increase in activity so that, on discharge, patients are independent in basic self-care activities, such as showering, toileting, dressing, ambulating and transferring weight (National Heart Foundation of Australia 1998).

Eligibility

Patients with MI, unstable angina, heart failure, undergoing cardiac surgery or admitted for PTCA are eligible for inpatient mobilisation.

Patients must be clinically stable before they can begin a mobilisation program. To be considered stable or 'uncomplicated', a patient must not have clinical evidence of any of the following (Hayes et al. 1974; Pryor et al. I983;Topol et al. 1988):

- angina
- left ventricular failure (short of breath at rest, bibasal crackles)
- uncontrolled arrhythmias (resulting in haemodynamic compromise)
- cardiogenic shock
- persistent hypotension (systolic less than 90mmHg)
- high degree of atrio-ventrivular block
- persistent supraventricular tachycardia (SVT).

American College of Sports Medicine (ACSM) 1995 and the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR) 1998 provide more detailed information on contraindications to participation in inpatient mobilisation programs.

Staffing

In the research literature, physiotherapists and nurses have been the most involved in facilitating mobilisation (Hayes et al. I974; Jelinek et al. I980; Juneau et al. 1991; Jenkins et al. 1989; Stiller et al. 1994). Exercise physiologists and occupational therapists may also be involved in patient mobilisation.

Importantly, Staff must:

- be able to recognize symptoms, such as angina and signs of high-grade arrhythmia
- have current certification in cardiopulmonary resuscitation and knowledge of emergency procedures.

The mobilisation program must be initiated by the attending doctor or as per the institution protocol.

Monitoring

The cessation of electrocardiograph (ECG) monitoring often coincides with a move to selfcare. Further information regarding monitoring can be found under the Outpatient. Monitoring section (see p.82).

Activity Prescription

Method

Mobilisation is divided into stages of progress, rather than days of mobilisation, which increases the flexibility for individual patients (see Table 4.2). For example, a younger 'uncomplicated' patient, post-reperfusion or subendocardial MI, may progress rapidly by achieving a number of stages in a day or less. However, an older, less physically fit patient, with a larger MI, is likely to progress more slowly. The staged method also allows for some flexibility when considering the declining length of stay (3-4 days) for uncomplicated MIs (Topol et al. 1988; Sanz et al. 1993).

Mode

Programs can vary in their approach to activity. The inclusion of supervised exercises in a mobilisation program depends on resources. Some studies support the use of group activity:

- to enhance compliance and self-monitoring ability (Juneau et al. 1991)
- to decrease the length of hospital stay
- to improve range of movement following heart surgery (Ungerman 1986).

Table 4.2 and Table 4.3 provide a guide to a patient mobilisation program. The MI program presented inTable4.3 is slightly slower in the early stages than may be appropriate for a younger patient

Table 4.2 An example of a program and check sheet for an MI patient

Stage	Activity	Date Completed	Comments
Stage I	Shower and toilet on a commode chair with staff help		
	Sit out of bed for all meals.		
	Do limb exercises as shown.		
Stage 2	Shower on commode chair with help.		
	Toilet on commode. Sit out of bed for all meals		
	Continue limb exercises		
	Walk slowly for 1-2 minutes twice a day		
Stage 3	Shower self, seated on a chair		
	Walk to the toilet		
	Sit out of bed when wanted		
	Walk slowly for 2-3 minutes twice a day.		
Stage4	Shower.		

	Walk around the room as much as wanted.		
	Walk at an easy pace for 3-4 minutes twice a day		
Stage5	Shower		
	Freedom in walking around the ward. Walk up to 5 minutes twice a day. Climb one flight of stairs with staff.		
Stage 6	Shower. Walk for up to I0 minutes twice a day. Climb two flights of stairs with staff.		

Adapted from National Heart Foundation of Australia. 1998.

Table 4.3 An example of a slightly slower MI mobilisation program

Stage I	Day of arrival. Rest in bed. If able, sit out of bed. Use commode chair by the bed.
Stage 2	Rest in bed. Sit out of bed twice a day for up to an hour. Use commode chair by the bed.
Stage 3	Sit out of bed for up to 1.5hours morning and afternoon. Shower on commode chair.
Stage 4	Sit out of bed for up to 3 hours morning and afternoon. Walk to shower and toilet.
Stage 5	Sit out of bed for a total of 6 hours. Walk length of ward. Walk to the shower and toilet.
Stage 6	Out of bed as long as desired, with a rest after lunch. Walking as tolerated but only for 10-15 minutes at a time. Climb a flight of stairs with staff.

Adapted from National Heart Foundation of Australia, 1998.

Progression

Progression from one stage to the next depends on the patient remaining symptom free. Eligible patients are encouraged to begin mobilisation as soon as possible. In practice, this begins with the patient sitting out of bed as soon as they are pain free and haemodynamically stable. Walking usually commences within48 hours (George 1995).

To encourage faster recovery, some cardiac surgical patients are placed on a 'fast track' regime (see Table4.4). Under this regime, patients return to a high dependency type unit. They are usually extubated and sit out of bed on day one and are mobilised on day two. Slower; more traditional regimes involve patients being mechanically ventilated for longer and either sitting out of bed on day one (Juneau et al. 1991) or day two (Jenkins et al. 1989 and Stiller et al. 1994)(see Table 4.5).

Table 4.4 An example of a fast track mobilisation regime for a surgical patient

Stage 1	Sitting out of bed
Stage 2-3	Increasing mobilisation
Stage 4-5	Climbing stairs - home

Table 4.5 An example of a traditional mobilisation regime for a surgical patient

Stage I	Sit up in bed, limb exercises
Stage 2	Sit out of bed once or twice a day for around 1/2 to I hour
Stage 3	Sit out of bed for longer period of time and for all meals.
Stage 4	Walk freely around own room, to toilet and shower.
Stage 5	Sit out of bed for meals and as desired. Walk freely

Documentation

Apart from the normal case note writing, some centres include a copy of the mobilisation program, with start dates next to the stages, in the patient chart. Alternatively, it may be appropriate to record data on clinical pathway forms or checklists, such as the one above.

Outcomes

On discharge, the patient should be independent in self-care and ambulation.
If this does not occur; the physician should re-evaluate the patient. If the reasons for lack of self-care and ambulation are related to the patient's psychological state or physical ability, the appropriate allied health professional should be consulted.

Outpatients

Traditionally, there is a short delay between the time a cardiac patient is discharged from hospital and the beginning of their outpatient exercise rehabilitation.

Cardiac rehabilitation practitioners should encourage patients to attend outpatient exercise rehabilitation as soon as possible after discharge to reduce the effects of de-conditioning during recovery, to restore optimal physical function within cardiovascular limitations and to promote exercise behaviours that may have long term cardio-protective effects.

Models

Outpatient exercise rehabilitation normally consists of group exercise classes under the guidance of health professionals. Geographic, economic and cultural constraints often prevent eligible patients from attending these supervised exercise classes. Consequently, alternative models of care should be considered.

Supervised and non-supervised

Research has shown that supervised exercise rehabilitation results in earlier and larger improvements in cardiovascular exercise ability than unsupervised exercise with regular follow-up.

However, both forms of exercise rehabilitation (supervised and unsupervised with regular follow-up) have been shown to result in greater increases in functional capacity than spontaneous or patient self-managed exercise (De Busk et. al. 1985; Haskell et. al. 1994; Meyer et. al. 1991).

Several studies have shown that carefully selected 'low-risk' cardiac patients have gained similar physical benefits from either attending traditional supervised exercise rehabilitation or undertaking unsupervised exercise accompanied by regular communication with trained health professionals (De Busk et. al. 1994; Stevens et. al. 1984). Consequently, intervention strategies and alternative models of rehabilitation should be available to these individuals to assist with behaviour change and compliance.

Behaviour management

Helping patients initially to change a behaviour and then adhere to that change is one of the hardest challenges a cardiac rehabilitation practitioner faces (see Psychosocial Issues - Behaviour change, p.50). Whether a patient begins and adheres to an activity regime is dependent on numerous factors. Rejeski and Kenney (1989) outline 10 components that Influence an individual's ability to begin and maintain a regular exercise program.

These are:

1. The outcomes and behaviour must be valued by the patient. It is important to consider how exercise may compete with current interests and responsibilities.
2. The exercise should be prescribed in such a way that the outcomes are consistent with the patient's needs. Efforts should be made to set realistic and relevant goals and to ensure that they are reinforcing positive behavioural change (see Psychosocial Issues-Goal Setting.p.54). Practitioners should also consider how to combat frustration over delayed benefits of physical activity.
3. There should be a balance between extrinsic and intrinsic rewards. Inappropriate use of extrinsic rewards may have a negative influence on long term adherence.
4. Patients should be encouraged to believe that the prescribed activity will produce the desired benefits, particularly if they follow the practitioner's advice.
5. The role of the patient's expected outcomes and self-confidence in beginning or maintaining exercise should be considered. Patients will weigh up the costs and benefits of participating in exercise.
6. Consider what a patient's perceptions are of what they have to do to achieve their goals. Practitioners should shape these beliefs so they are consistent with constructive exercise prescription.
7. Social influences, such as family and friends, should be considered. Negative influences should be minimised.
8. Conflict between what the patient thinks and feels about exercise, before beginning and after adoption, should be resolved.
9. The more time that passes before initiating a program, the greater the risk of non-adherence to exercise.
10. The exercise prescription should complement the patient's stage of life.

Patients who are potentially less likely to adhere to an exercise regime can be identified through careful assessment by the cardiac rehabilitation staff. This process encourages the use of appropriate behavioural techniques and may indicate which exercise rehabilitation program model is most appropriate.

Patients who are less likely to comply with an exercise program include those who smoke, have sedentary jobs, have low levels of recreational activity, are overweight, are blue-collar workers and believe that they have poor health (Oldridge 1991).

Consequently, these individuals in particular should be encouraged to attend supervised exercise rehabilitation. Patients with prior exercise experience and social support are more likely to adhere to unsupervised exercise (US Department of Health and Human Services 1995).

Patients, particularly those who participate in unsupervised exercise, may require the assistance of motivational tools. Offering a variety of activities, rewards, reinforcements and reminders such as an exercise diary can be effective motivators (see Table4.6).

Table 4.6 An example of an exercise diary

Mon	Tue	Wed	Thur	Fri	Sat	Sun
Eg Walk 20 min Gentle	Eg Lawn bowls I hr Light	Eg Walk 35 min RPE=12				

Home activity and exercise

Method

On discharge, each patient should receive written guidelines for the resumption of usual activities, regardless of whether the individual is attending an outpatient program.
These guidelines should include:

- advice on activity at home, recreation and work
- information and encouragement for an exercise regime
- safety information (see Safety, p.76)
- contact phone number of staff who can assist with questions about the guidelines

The guidelines should be:

- succinct
- clear, using simple language
- broad enough to allow the patient to modify the activity to suit their circumstances
- verbally explained to the patient before discharge

Safety

Each patient will progress at a different rate. Activity should be conducted with minimal shortness of breath and the patient should be instructed to report to their doctor any undue increases in shortness of breath, return of anginal symptoms or excessive fatigue.

Activity progress guidelines

Figure 4.1 outlines examples of activity progress guidelines.

Figure 4.1 Outline of activity progress guidelines

Post surgical patients Activity is usually restricted to very light intensity, for example RPE 8-10 or 1-2 for at least the first four to six weeks after discharge. In particular; the resumption of activities using the upper body is slow. This restriction in exercise intensity is not because of the heart condition, but primarily due to the time required to heal the breastbone. This may take between 8 and 12 weeks to heal completely. Patients post sternotomy/thoracotomy should have free range of movement exercises until they regain full and pain-free range of movement in their arms, trunk and neck. Patients in this category, who have had no complications and are reasonably fit, are often able to return to driving a private vehicle after 4 to 6 weeks, sexual activity after the first few weeks and occupations requiring light physical work by 8 to 12 weeks after discharge from hospital.
Post MI patients The intensity of activities may be restricted to very light intensity. for example, RPE 8-10 or 1-2 for at least 4 weeks. Patients who have had complications, such as angina, need to progress more slowly. Patients in this category who have had no complications. mild heart damage (for example, small creatine kinase (CK) rise or subendocardial MI) and are reasonably fit, are often able to return to driving a private vehicle after 2 weeks. Return to sexual activity and occupations' requiring light physical activity usually occurs by the end of the first month after discharge from hospital. Individuals with significant heart damage (for example, large CK rise, left heart failure), angina or other complications may need to progress more slowly.
Post PTCA/stent patients PTCA/stent patients will usually be required to restrict their activity to very light intensity, for example RPE 8-10 or 1-2, for at least the first one to 2 weeks of recovery. Patients in this category, who have had no complications and are reasonably fit, are often able to return to driving, sexual activity and occupations requiring light physical activity by the end of the first or

second week after discharge from hospital.

Adapted from St Andrew's Heart Institute. (1998).

Sexual activity

The same principles and safety guidelines applied to resuming other activities should be applied to sexual activity. Sexual intercourse has been likened to walking up two flights of stairs. However; due to the intimate nature of sexual relation, it is also important to consider self-image (particularly if there is a wound scar), patient confidence and the patient's sexual partner. Consequently, sexual activity should be resumed when the patient and partner are both physically and psychologically ready. Until confidence and strength increases, the patient is advised to use positions requiring lower levels of exertion or adapt a more passive role.

Cardiac rehabilitation practitioners should address patients' and their partners' anxieties related to sexual activity, normalize these reactions and discuss the physical demands of sexual activity and likely responses. Sexual partners should be encouraged to communicate freely with one another about their concerns. Practitioners should never assume that their patients are or are not sexually active. Each patient should be given the opportunity to discuss the issue, or at least be informed about where they can get further information.

Driving

The Cardiac Society of Australia and New Zealand (CSANZ) has compiled comprehensive guidelines on cardiovascular disease and driving (Richards, 1998).These have been briefly outlined in the activity progress guidelines above.

Work

Return to work is dependent upon the individual ,the physical and mental stress level of their work and the employer. If possible ,the patient should undertake part-time work before resuming full-time working hours.

Other

All activities of daily living can be modified to reduce energy expenditure in the first days or weeks of recovery. For example, hills and stairs may be avoided or at the very least, attempted slowly and with rests.

Home exercise

A home exercise program should involve light cardiovascular conditioning such as walking, progressing to 30 to 60 minutes daily over a period of 2-6 weeks after discharge.
A deconditioned patient may prefer to begin with several sessions of 10-15 minutes a day and then progressively increase the duration by adding 5 minutes per week (seeTable4.7).
Distance is not important. However, for a younger patient with good left ventricular function, a pace of 4-5 km/hr on flat ground, may not be unreasonable. See the following section on Outpatient exercise rehabilitation, for more comprehensive details on exercise prescription.

Low to moderate intensity resistance training may be included in most programs (see Resistance training, p.89).

Table 4.7 An example of a home walking program

Weeks from discharge	Duration (min)	Frequency/day	Pace

I	5-10	1-4	Comfortable
2	10-15	1-4	Comfortable
3	15-20	1-3	Comfortable
4	20-25	1-2	Stride out
5	25-30	1-2	Stride out
6	30	1	Stride out

Outpatient exercise rehabilitation

Safety

All cardiac rehabilitation programs, regardless of the type and intensity of exercise and the category of patient, should have a documented emergency protocol (see Chapter 2, sections Personnel p.38 and Emergency Procedures, p.38).

The incidence of a non-fatal cardiac event during cardiac rehabilitation exercise sessions has been calculated to be 1 per 112,000 patient hours (VanCamp &Peterson, 1986). Although the risk of experiencing a cardiac event is slightly higher during physical activity compared with rest, long term studies have indicated that, overall, the habitually active are less likely to experience a cardiac event (ACSM 1995).

Where exercise testing is indicated, studies have shown that the mortality rate during or immediately following testing in hospitals and doctors' surgeries is 0.5 per 10,000 tests (Stuart & Ellestad, 1980).

Exercise safety considerations for patients with heart disease include:

- a warm-up and cool-down component, including stretching, for each exercise session
- avoiding exercising immediately after consuming a large meal
- exercising within the 'comfort zone'. For example, do not initiate or continue exercise when the patient is experiencing chest discomfort, excessive fatigue, pain, undue shortness of breath, nausea, light-headedness or any other relevant feelings of physical compromise
- exercising in comfortable temperatures. For example, avoid exercising in very humid, hot weather
- ensuring that water is available and used freely during exercise

Table 4.8 outlines guidelines from the American College of Sports Medicine (ACSM 1995) for ceasing an exercise session.

Table 4.8 American College of Sports Medicine guidelines for cessation of an exercise session

1.	Acute myocardial infarction or suspicion of a myocardial infarction.
2.	Onset of moderate to severe angina.
3.	Drop in systolic blood pressure with increasing workload accompanied by signs or symptoms of pain or drop below standing resting blood pressure.
4.	Serious arrhythmias (eg second or third degree atrio-ventricular block, sustained ventricular tachycardia or increasing premature ventricular contraction).
5.	Signs of poor perfusion, including pallor, cyanosis, or cold and clammy skin.
6.	Unusual or severe shortness of breath.
7.	Central nervous system symptoms, including ataxia, vertigo, visual or gait
8.	Technical inability to monitor the patient's response when using equipment, such as electrocardiography.

9. At patient's request.
10. Excessive rise in blood pressure.
11. Fatigue.

Adapted from ACSM, (1995).

Status and eligibility

Comprehensive patient assessment, skilled supervision and observation of safe exercise guidelines significantly lower the risks associated with exercise. In all cases, exercise prescription should be individualised, initially supervised (inpatient) and dependent upon both cardiac and non-cardiac factors.

Exercise history prior to the cardiac event should also be considered. This may include:

- querying what activities were done prior to the cardiac event
- assessing current physical activity level
- assessing activities that the patient enjoys and would like to resume
- noting the patient's preference for increasing physical activity levels

Cardiovascular considerations

A cardiac history should include information about the patient's:

- current cardiac diagnosis
- past cardiac events and medical status
- results of relevant tests - echocardiography, Holter monitoring, exercise testing, angiography, etc.
- medications likely to affect cardiovascular function, particularly beta blockers and some calcium antagonist medications, which influence heart-rate measurements
- history of high, low or erratic blood pressure
- evidence of exertional hypotension - a drop in systolic blood pressure $\geq$ 15 mmHg may indicate exertional hypotension
- state of left ventricular function (indicated by medical diagnosis, test results etc.). Poor left ventricular function may be represented by an ejection fraction <30%
- presence and nature of symptoms, such as angina, and the patient's knowledge of its threshold
- past and current functional capacity
- history of arrhythmia, particularly any arrhythmia that may induce haemodynamic compromise, such as sustained ventricular tachycardia or complex ventricular contractions that increase in frequency with activity
- presence of any other cardiovascular conditions, for example signs or symptoms of aortic stenosis
- known triple vessel disease
- recommendations from a cardiologist

Non-cardiovascular considerations (co-morbid conditions)

A detailed non-cardiac history will commonly reveal problems, such as musculo-skeletal disorders, diabetes, asthma, cancer, previous stroke, peripheral vascular disease, as well as visual and hearing disabilities. Anxiety and depression are especially common post MI and CABG and the patient may not be aware of these problems. Often families will notify staff of those conditions that may be improved by group exercise sessions (see Chapter 3 - Psychosocial Issues, p42).

In some instances the non-cardiac risks may outweigh the cardiac risks and may have a

greater influence on exercise prescription. For example, a patient's severe arthritis may influence the exercise prescription more than their cardiac condition.

Risk stratification

An important aspect of exercise prescription and participation in cardiac rehabilitation is the identification of a patient's risk of a secondary cardiac event, according to their clinical diagnosis and cardiac-related history and prognosis.

This information assists the practitioner to prescribe safe and appropriate exercise when moderate to high intensity exercise is to be prescribed.

In general, the higher a patients risk of another cardiac event, the lower the intensity of the exercise prescription and the slower the progression should be. Therefore a patient at high risk of another cardiac event should be discouraged from participating in high intensity exercise. All patients should be encouraged to attend and participate at an appropriate level.
The American College of Physicians Health and Public Policy Committee (1988) has outlined factors that assist practitioners to identify whether a patient is at high, medium or low risk of another cardiac event during exercise (see Table 4.9).

Table 4.9 Identifying factors of level of risk for cardiac event during exercise

Low risk patients
• following uncomplicated myocardial infarction or bypass surgery • functional capacity> 8 metabolic workload (METs) on 3 week maximal exercise tolerance test • asymptomatic at rest with exercise capacity adequate for most vocational and recreational activities • no ischaemia, left ventricular dysfunction or complex arrhythmias.
Intermediate risk patients
• functional capacity < 8 METs on 3 week exercise test • shock or chronic heart failure during recent myocardial infarction < 6 months) • inability to self-monitor • failure to comply with safe exercise prescription • exercise induced ischaemia of < 2 mm ST • regular violation of exercise intensity instructions
High risk patients
• severely depressed left ventricular function (EF<30%) • resting complex ventricular arrhythmias (Low grade IV or V) • PVCs increasing with exercise • exertional hypotension (> 15 mmHg) • recent myocardial infarction « 6 months) complicated by serious ventricular arrhythmia • exercise induced ischaemia of > 2 mm ST • survivors of cardiac arrest

Adapted from American College of Physicians Health and Public Policy Committee, (1988).

Exclusion criteria

Patients should be excluded from exercise programs until stabilised if they have:

- resting unstable angina
- uncontrolled hypertension or resting blood pressure> 200 mmHg systolic, > 105 mmHg diastolic
- uncontrolled arrhythmia that results in significant haemodynamic compromise, at rest or during exercise
- severe aortic stenosis

More detailed relative and absolute contraindications for entry into exercise programs are presented by the ACSM (1995), MCVPR (1998) and Fletcher (1990).

Patients who are unable to exercise safely may be able to take advantage of the other components of the cardiac rehabilitation program.

Staffing

Staffing is dependent on the nature of the program and its participants.
Staff involved in exercise prescription and supervision should be:

- qualified health professionals with training and experience in the management of patients with cardiovascular disease, for example nurses (with additional exercise qualifications), doctors and allied health professionals
- trained and experienced in exercise management for special populations. For example, exercise physiologists, physiotherapists, occupational therapists or nurses with qualifications (eg fitness leader; exercise for special populations)
- currently qualified in basic life support

Where high intensity activity is prescribed or high risk patients are exercising, it is preferred that at least one staff member has knowledge of advanced cardiac life support (ACLS) techniques (for example, defibrillation and assisting an emergency team with other related procedures). While it is preferable that the ACLS trained staff member be present during the activity session, they may be located outside this area but close enough to respond rapidly.

It is recognised that appropriately trained staff are not always readily available, particularly in remote regions. We advocate that staff training and resources should be upgraded to meet these needs. However; in the interim, these programs should offer services that match their available resources. These programs may wish to promote low-intensity physical activity, recruit low risk clients and/or liaise with qualified professionals to assist with program development, improvement and staff training.

Staff-to-patient ratio

The number of staff per patient will vary depending on the program structure and the status of the patients. A ratio of 1:4 may be desirable for new patients or those who are deemed to be at higher risk of another cardiac event Alternatively, a staff-to-patient ratio of at least 1: 10 may be appropriate for lower intensity exercise with low risk patients.

Monitoring

There are a number of subjective and objective monitoring methods that can be employed to evaluate the intensity and comfort level of the cardiac patient during exercise. There are strengths and weaknesses associated with each method. Some cardiac rehabilitation programs choose to use a combination of a number of different techniques, while others use only a small selection. All patients should be taught to self-monitor.

Subjective methods

Ratings of perceived exertion (RPE)

Application: An example of this method is the Borg scale (Borg 1998).
Patients should be carefully instructed in its use. It is recommended that outpatient participants exercise at a RPE of 11-14 using the original scale and 3-5 using the modified

scale. These levels allow for a range of exercise intensities and generally ensure the patient is comfortable.
Advantages: Simple and reliable for most people. Patients learn to monitor themselves and to 'listen to their body'.
Disadvantages: A small percentage of patients consistently under or over estimate their rating of exertion. An alternative form of monitoring would be appropriate for these patients.

Talk test

Application: The talk test is based on the reasonable assumption that a patient is exercising too hard if they are short of breath and struggle to talk freely.
Advantage: Simple and reliable for most people and it is not necessary to know how to read. Patients learn to monitor themselves and to 'listen to their body'.
Disadvantage: It is difficult to set and monitor a lower limit of exercise intensity using this method.

Objective Methods

Heart rate (HR) and blood pressure (BP)

Application: Heart rate (HR) and blood pressure (BP) directly measure the physiological responses of the patient. It is particularly useful and desirable to measure HR and BP in patients who are at higher risk of cardiovascular compromise, for example, those with abnormal heart rate or blood pressure, those who have had relevant medication changes, or those whose BP and HR responses to exercise are unknown.

HR and BP monitoring can help to determine any deleterious effects of exercise on the cardiovascular system. For example, a dramatic drop in heart rate during increasing exercise intensity is indicative of a compromised cardiovascular system.

BP and HR can assist with decision-making in exercise prescription, particularly for progressing exercise loads and monitoring training effects of exercise over time (see Exercise prescription - Intensity, p.92).

If these measures are taken it is also possible to provide information relating to the level of exertion in the event of an incident. It can be useful in providing feedback to physicians about general patient progress and also specific elements of progress, such as effects of medications.

Advantages: Accurate method. Direct measure of physiological responses.
Disadvantages: Requires skilled staff and equipment to conduct BP testing.
It is relatively difficult for patients to learn how to accurately measure HR.Some medications can have an effect on HR and BP readings. Therefore, these methods may prove unreliable if a patient changes their medication dosage or type. In such cases, the patient's physiological response to exercise should be reassessed (see Assessing functional capacity,p.85). Careful monitoring using a method such as the Borg Scale (Borg 1998),may also be helpful.

Intensity

Application: The exercise at which a patient can safely and effectively do a task (for example, walking) can be calculated and then applied to a number of different tasks (for example, cycling and stepping).This ensures a consistent workload across different tasks. Some methods for using workload to monitor exercise intensity are outlined in the Following section Exercise prescription – Cardiovascular exercise, p.84

Advantages: Useful if medication changes are imposed during the rehabilitation period. Accurate
Disadvantages: Complicated mathematical calculations required. Does not give information about patient comfort or physiological response.

Electrocardiogram (ECG)

Application: It is neither essential nor recommended that the majority of patients have ECG monitoring during outpatient exercise. Based on available research (Leon et al. 1990), continuous ECG monitoring should only be considered for individuals considered at high risk of a secondary cardiac event, such as those who exhibit significantly depressed ventricular function, complex ventricular arrhythmias, decreased systolic blood pressure during exercise, or survivors of sudden death. When these patients are exercising at low intensity, ECG monitoring may not be necessary.

However, high risk patients undertaking moderate-to-high intensity exercise may warrant an initial period of at least intermittent ECG monitoring. According to Leon et al. (1990) this criterion would be expected to eliminate the requirements of an extended period of monitoring for about 75-80% of patients in outpatient rehabilitation.

ECG equipment should be readily available in the event of an emergency.

Advantages: Direct and immediate measure of heart activity, enabling quick assessment in the case of a cardiac compromise.
Disadvantages: Costly and requires skilled staff to interpret the results. Patients may become psychologically dependent on being monitored.

Exercise prescription - cardiovascular exercise

Mode

Cardiovascular activity can have a positive impact on other heart disease risk factors, such as weight, cholesterol and blood pressure (Skinner 1993). Cardiovascular activities, such as walking, swimming, cycling and aerobic dance are preferred modes of exercise for patients with heart disease.

These activities are favoured because they make use of large muscle groups, for example legs, and can be undertaken by most patients (AACVPR 1998). Exercises using the arms, particularly above the head, tend to cause a higher heart rate and blood pressure compared to leg exercises of the same difficulty. However, short bouts of arm exercises during an exercise regime are generally not problematic.

Often, orthopaedic problems or intermittent claudication prevent patients from walking and doing other weight-bearing exercise regularly. Weight-supported activity, such as cycling on a stationary bike with low resistance or exercising in water, can be beneficial for these individuals. I

Care should be taken when prescribing swimming as a form of exercise because of the variation in individuals' stroke efficiency. It may be safer to avoid swimming for exercise until a moderate level of fitness is achieved. Alternatively, patients may use swimming aids, such as foam boards and support jackets, to assist them with their water exercise. The average

heart rate achieved during swimming is said to be 20 beats per minute lower than walking at the same intensity. Maximal heart rates during swimming may also be lower. Therefore, RPE is a more appropriate method for monitoring intensity than heart rate.

Resistance training is also a mode of activity that can benefit most cardiac patients (see Resistancetraining,p.89).

To best meet the needs of the patient, a varied and well-rounded exercise regime needs to be offered.

Assessing functional capacity

It is essential to assess a patient's functional capacity before prescribing exercise, particularly if the patient is at high risk of another cardiac event, or is going to exercise at a moderate or high intensity. Such an assessment is also useful for tracking progress and alleviating patient and family anxieties.

Methods for assessing functional capacity include exercise testing (symptom-limited), physical activity history and self-reported physical activity participation.

Exercise testing

An exercise test can be performed to a level at which the patient is limited by their symptoms(symptom-limited) or to a level before symptoms are induced(submaximal). Exercise tests are more accurate than either physical activity history or activity questionnaires, but invariably take more time, expertise and/or resources.

During all exercise tests the responses of a patient (ie heart rate, blood pressure, perceived exertion and symptoms) to various physical workloads may be measured. These data can then be used to create an exercise program and make recommendations regarding safe participation in work and recreational activities.

Results from an exercise test are reliable to use for exercise prescription even when a patient is taking medications that may affect BP and HR. This is provided that the patient continues to take the same dosage and type of medication during exercise rehabilitation as they did during the exercise test.

Symptom-limited exercise tolerance test (ETT)

Symptom-limited exercise tolerance testing is not a necessary component of exercise rehabilitation. However ,it may be warranted in a cardiac rehabilitation program if the patient is at moderate to high risk of further cardiac problems or will be exercising at a high intensity.

A symptom-limited ETT is one of the most accurate methods for testing an individual's functional capacity. As such testing is expensive and involves greater risk to the patient than other methods (Stuart et al. 1980), it should be done using 12 lead ECG monitoring and at the discretion of the patient's doctor.

Performing symptom-limited ETTs for the purpose of cardiac rehabilitation is optional.
If, however, a recent ETT has been performed for diagnostic purposes, these results should be obtained as they can provide useful information about a patient's functional capacity, anginal threshold and other symptoms.

Due to the inherent risks involved with this type of testing, tests should be supervised by a medical practitioner or appropriately trained health professional (Shepard, 1991; Zecchin et al.1999). The Cardiac Society of Australia and New Zealand has a comprehensive policy addressing exercise testing (CSANZ 1996).

During a symptom-limited m the patient exercises at incremental levels of intensity usually on a treadmill, until they are unable to comfortably tolerate the activity any longer; or display compromising signs or symptoms (see Outpatient - Safety. p.78). This final workload indicates the patient's maximal exercise tolerance or functional capacity. At this final stage of the test, as with the preceding workloads, the patient's heart rate, blood pressure, ECG, RPE and symptoms are recorded. The data from the final workload of the test can then be used to prescribe a safe and comfortable starting exercise workload (see Outpatient - Intensity. p.88).

A symptom-limited ETT can be carried out using a variety of methods and protocols (for more detail, see ACSM, 1995).

Submaximal exercise tolerance test (ETT)

A submaximal ETT is an accurate and direct method for assessing patients' submaximal exercise tolerance. This testing method is generally less expensive and involves less risk to the patient than a symptom-limited ETT. However; the information obtained from the test is less conclusive.

A submaximal exercise test follows the same principles as a symptom-limited ETT. However; the patient stops the exercise at a pre-determined workload, ideally before the onset of symptoms. This pre-determined level is based on a predicted heart rate and/or age and/or any accompanying physical limitations. A Borg rating of perceived exertion between 13 and 15 (Borg 1998) may be an appropriate end point for such tests.

Unlike a symptom-limited ETT, the submaximal exercise test does not directly indicate a patient's maximal functional capacity; although a conservative prediction can usually be made from the results. It will not usually reveal the workload that induces physiological compromise. It does, however; provide information about workloads the patient can undertake comfortably and safely.

Patients who are not considered to be at high risk of another cardiac event undergoing a submaximal ETT may be supervised by non-medical staff who are trained and experienced in exercise testing and basic life support (ACSM 1995). Medical assistance and emergency equipment should always be readily available.

As with the symptom-limited ETT, there are a number of protocols and methods which can be employed (ACSM 1995). Expensive equipment is not always necessary for submaximal exercise tests, which can be conducted on a treadmill, cycle ergometer or on an outdoor walking track, for example the 10 metre shuttle walk or the six minute walk protocol (Steele 1996).

Activity history and participation questionnaires

Physical activity questionnaires provide a quick and efficient method for determining an individual's exercise habits and are a moderately accurate estimate of functional capacity. These methods are an alternative method when resources or appropriate expertise is unavailable.

The Specific activity questionnaire (SAQ) (Rankin et al. 1996) is an example of such a test. The SAQ is a simple, self-administered questionnaire.

This questionnaire asks patients to confirm whether or not they feel capable of completing a range of daily and recreational activities without symptoms. All the activities on the questionnaire have a known metabolic workload or MET value obtained from a compendium of physical activities (Ainsworth et al. 1993). A SAQ score is determined from the corresponding MET value of the most demanding activity the patient believes they can perform. This value, along with the patient's age and weight, is inserted into a regression equation to provide a measure of functional capacity.

No assessment

In the absence of any accurate measure of functional capacity, staff should 'promote' comfortable, safe activity rather than 'prescribe' exercise intensity in detail. Rather than advising a patient to, 'walk at 4km/hr for 30 minutes', it may be more appropriate to offer general activity guidelines, such as 'walk at a level that feels comfortable, building up to 30 minutes each session. If symptoms occur; slow down or rest: A comprehensive medical and activity history will provide much useful information in such cases.
This approach will help to avoid inaccurate and possibly unsafe exercise advice being given to patients and exposing personnel to accusations of negligence.

Warm-up and Cool-down

All exercise sessions should include warm-up and cool-down periods of approximately 10 minutes duration.

Light cardiovascular activity, such as walking and stretching, is ideal for the warm-up. The cool-down may involve light resistance exercises, for example floor exercises and stretching or may be similar to the warm-up.

Suitable warm-up will reduce the incidence of exercise induced myocardial ischaemia, arrhythmia and muscle and joint injury (National Heart Foundation of Australia - NSW Div., 1994). It is suggested by Barnard et al. (1973) that inadequate warm-up and cool-down may be the primary reason for exercise-related cardiac problems.
Stretches should be static (no bouncing), held for at least 20 seconds and done two to three times each. Care should be taken to stretch all the major muscle groups along with other muscles that may be used during the exercise session.

Duration and frequency

The total amount of energy that people use, whether or not they have heart disease, is important in reducing the risk of developing health problems.

Traditionally, it has been advised to aim to complete 30 to 60 minutes of sustained cardiovascular activity. However; recent evidence shows health benefits accrue with the accumulation of 30 minutes of activity, for instance, 3 x 10 minute sessions throughout the day (U.S. Surgeon General 1996). This method may be particularly beneficial for patients suffering from peripheral vascular disease and those unable to put aside 30 to 60 minutes for exercise each day. More research is needed in this area.

Accumulated activity provides more health benefits than remaining sedentary. If patients

cannot find the time to complete a continuous bout of 30 minutes exercise four to seven days per week, they should be encouraged to accumulate the activity (Whaley 1996).

It should be kept in mind that this accumulated exercise dose is considered minimal and that further increases in physical activity may offer other benefits that are important to the patient, such as weight loss or athletic achievement (Whaley 1996). It is, of course, possible to do too much physical activity (Blair et al. 1989). Patients may become unduly fatigued or become susceptible to musculoskeletal injuries as a consequence of over-exercise. There should be a balance between the patient's goals, health status and current physical abilities.

Intensity

Low intensity exercise has been shown to provide similar benefits to high intensity exercise for those with cardiovascular disease. It also encourages many patients to comply with a regular physical activity regime (Goble et al. 199 I; De Busk 1985). However, the intensity of an exercise program will vary depending on the risk stratification of the patient, their goals and their perceived level of comfort and enjoyment. For example, some patients will want to return to a physically demanding job or playing vigorous sport. Others will aim to do the minimum amount of exercise necessary to promote cardiovascular health.

A number of methods can be used to prescribe exercise intensity. It is imperative that the clinician has a knowledge of the patient's cardiovascular exercise ability before prescribing exercise intensity (see Assessing functional capacity, p.85).

Heart Rate (HR)

HR measured during an ETT can be used to determine a safe starting point for a patient's exercise program.

Some commonly used equations for prescribing exercise intensity for an outpatient based on HR include:

- Light activity: 40-65% of maximum HR achieved on a symptom-limited ETT
- Moderate activity: 60-75% of maximum HR achieved on a symptom-limited ETT
- (HR maximum - HR at rest) x 60-75% + HR at rest
- -HR corresponding to an RPE of 11-14.

Medications

If medication changes are imposed after an ETT or during the exercise rehabilitation period, BP and HR may become inaccurate methods for prescribing and assessing exercise progress. In such cases, it is appropriate to reassess the individual's responses to exercise in order to determine new HR and BP responses. Alternatively, the patient can be advised to exercise at a workload equivalent to an RPE of 11-14,that is, a workload they perceive as comfortable.

Workload

The workload a patient achieves on an exercise test, or just about any type of physical activity can be expressed in units of measurement known as metabolic equivalent (MET) or ventilatory oxygen uptake (V02). Converting workloads into METsorV02 units of measurement, allows for easy comparison of different physical activities. The conversion requires some mathematical manipulation (ACSM 1995). However, there are many tables, for example, Ainsworth et al. (1993), that display an array of activities and their corresponding MET/$V0^2$ level.

Once an initial exercise workload is determined, it can be equated to activities that require a similar amount of effort (Ainsworth et al. 1993).

Progression and compliance

Each exercise prescription should be reviewed weekly or thereabouts, so individual components can be modified as required. Patients should be asked regularly whether they would like to do different exercises and when they want to resume their previous activities, such as golf, tennis and bowls. These items are usually discussed at the first interview. At each exercise session it is important to spend time talking with each patient and sometimes the spouse or family member, to assist in making further activity recommendations.

It is important for exercise sessions to be fun and one of the roles of the staff is to create such an environment. Exercise that is dull promotes non-compliance.

It is now clear that moderate amounts of daily, physical activity (for example, 30 minutes brisk walk, 30 minutes lawn mowing) reduces the risk of coronary heart disease and other chronic disease states in individuals who are apparently healthy. In addition, intermittent, daily physical activity (3 x 10 minutes) provides similar health and fitness benefits to those attained with participation in a single bout of daily activity (1 x 30 minutes).

More research is needed to determine the effect of intermittent activity in the secondary prevention of cardiovascular diseases. However, the process of encouraging patients to increase daily physical activity, rather than to adhere to a prescribed exercise program, may help patients develop regular and maintainable levels of physical activity (U.S. Surgeon General 1996).

Exercise prescription - resistance training (RT)

Mode

Resistance training (RT) involves the use of weights and other resistive devices to provide muscular conditioning. There are two broad types of resistance training to consider in cardiac rehabilitation. These have been classified according to the desired outcome of the training method. Comprehensive cardiac rehabilitation exercise programs should include some degree of RT, the choice of which depends on the individual patient's rehabilitation goals, lifestyle and clinical status.

Stage one (restoration) - restores muscle tone and basic functional muscular strength and endurance. It involves the use of light hand-held weights, therabands, aquatic resistance and body-weight exercises and other similar activities. It may provide a progression to stage two or be used as a maintenance program.

Stage two (developmental) - increases muscular strength and endurance to optimize functional capacity. It involves moderate intensity exercises using free weights (barbells and dumb-bells), body-weight and/or machines. It is especially valuable for patients whose lifestyle or occupational demands involve the lifting of heavy objects.

Studies have demonstrated the benefits of RT. The benefits include:

- Muscle strength has increased 15-30% during 10-12 week programs involving 40-60% maximum voluntary contraction (MVC) (Kelemen et al. 1986; McCartney et al. 1991; Wilke et al. 1991; Maiorana et al. 1997).

- Muscle endurance has increased with increased exercise time to exhaustion on treadmill (Kelemen et al. 1986).
- .Patients have a reduced perception of effort during resistance activity (McCartney et al. 1991). Hence, everyday tasks involving a resistance component may be completed with greater ease and less fatigue.
- Specific increases in self-efficacy(Stewart et al. 1994).

It should be noted that the evidence is inconclusive about the benefrts of RT on cardiovascular fitness (Kelemenet al. 1986;McCartney et al. 1991;Haennel et al. 1991).

Methods of RT and resistance equipment

These include:

- resistance exercise machines (hydraulic, air pressure, pin-loaded weights and isokinetic)
- free weights (barbells and dumb-bells)
- occupational weights
- body segment exercises (for example, lying leg raise)
- therabands
- other exercise resistance devices (for example, chest expanders)
- water based resistance.

Circuit training

Circuit training is a method of exercise that uses time and space efficiently. Some of the equipment that may be used during a circuit class includes RT equipment, rebounder; stationary bicycle, treadmill, floor mats, timer/tape and whistle.

Two common programs used for circuit classes are:

1. Resistance exercises only
   Alternate upper and lower body resistance exercises. Work to rest ratio (for example, 30sec:30sec) increasing to 2:1 (for example, 40sec:20sec).
2. Combined resistance and aerobic
   Alternate aerobic and resistance exercises. Aerobic stations can be substituted for rest to maintain training heart rate.

There is an increased likelihood of cardiovascular training effect with the combined program.

Safety

Resistance training of up to 40 to 60% MVC produces significant strength benefits at a haemodynamic response that is safe for cardiovascular patients at low clinical risk for subsequent events (Haslamet al. 1988;Wiecek et al. 1990).

Furthermore, training programs at this intensity have not resulted in ischaemic signs or symptoms in low risk patients (Kelemen et al. 1986;McCartney et al. 1991;Wilke et al. 1991). Additional strength benefits associated with higher intensity RT appear to be minimal (Crozier-Ghilarducciet al. 1989).In view of the potential for an unacceptable haemodynamic response (Haslamet al. 1988)and the threat to patient compliance, RT above 60% MVC is not usually warranted.

There are specific safety issues that need to be considered during RT. These are covered in

Outpatient exercise rehabilitation, p.78 and Other considerations - Emergency procedures, p.95. The following list is a basic guide for practitioners.

- Familiarise patients with each piece of equipment. .Ensure a correct lifting technique is taught and used. The correct technique is to maintain a loose grip, keep back and neck straight when lifting, perform exercises through a full range of movement, each repetition to be completed in a controlled fashion over 3-4 seconds.
- Ensure a correct breathing technique is taught and used. This is exhaling with exertion and inhaling when lowering the weight. Avoid holding breath at any stage (for example, Valsalva manoeuvre).
- Note state of health prior to the commencement of each session. Exercise both agonist and antagonist muscle groups to prevent injury.
- RPE values should range from fairly light (11)to somewhat hard (13), employing the Borg 20 point scale (Borg 1973). Ratings of 14 or above may indicate over-exertion or excessive strain.

Eligibility for RT

Stage one RT

Low intensity RT employing light resistance has been performed safely as early as 3-6 weeks following a cardiac event (Hands et al. 1987; Squires et al. 1991).

Stage two RT

Initiate moderate intensity RT (40-60% of MVC) at least three months post cardiac event. Ideally, a period of aerobic training (up to three months) should be undertaken prior to training at this level (Verrill et al. 1992).

There are no barriers to RT based on age or gender alone. However; there are some conditions which contraindicate the participation in RT.

Screen for pre-existing pathology that may be aggravated by using weights, for example arthritis. Modify exercise before total exclusion. for example, limit exercises to within the pain-free range.
The American College of Sports Medicine (1991) states the following contraindications to RT:

- Abnormal haemodynamic responses or ischaemic changes on the electrocardiogram during graded symptom-limited exercise testing.
- Poor left ventricular function (exclude severe heart failure on catheterisation or echocardiography). Patients with moderate heart failure are now employing RT. Preliminary research evidence suggests RT to be safe in this group (McKelvie et aI.1995).
- Peak exercise capacity<6 METs.
- Uncontrolled angina, hypertension or arrhythmias.

Assessing muscular strength

Preliminary sessions, which involved low intensity orientation to exercise are valuable prior to strength assessment, to ensure correct lifting technique and establish patient confidence.

A number of procedures have been suggested (Verrillet al. 1992). However, the assessment procedures presented in Table 4.10 are recommended.

Table 4.10 An example of how to assist with a 3 repetition maximum (3RM)

• Complete a thorough warm-up and stretching routine.
• Commence intensity at approximately50% MVC (based on supervisor's prior experience or patient body weight).Complete 10 lifts at 50% MVC to warm up the specific muscle group.
• Progressively increase weight, in as few lifts as possible, until the weight can be lifted no more than 2-3 times.
• Ensure a minimum rest period of one minute between efforts, with up to two minutes rest near maximum effort.
• Equate the final weight to 90% MVC and calculate maximum value.

Table 4.11 An example of how to assist with a 1 repetition maximum (IRM)

Follow the procedure for 3RM testing, but continue until the weight cannot be lifted. The last successfully lifted weight is the IRM.

Point to consider:

- New evidence suggests that the haemodynamic stress is less during IRM than during 3RM testing.
- Alternate strength tests of upper and lower body exercises.
- Assess large muscle groups followed by small ones
- A lift is considered valid if performed through a full range of movement with correct technique and without straining.
- Record all apparatus settings for repetition on subsequent tests.

The most practical and reliable testing equipment to use is a machine stack. It is easier to use, it is less reliant on balance and novice patients feel more comfortable with these than free weights. If using free weights, ensure spotting is practiced.

Duration and frequency

RT prescription guidelines:

- An RT session may last for 20-40 minutes.
- Undertake one to three sets of exercises, 2-3 times per week.
- The program needs to last at least 8 weeks for significant strength improvements.
- Allow at least one day of rest between RT sessions for recovery.
- Aim to complete 8 – 12 repetitions in a 30 second period.

Intensity

Stage One (restoration) – choose resistance arbitrarily. For example, 0.5 – 2 kg.

Stage Two (developmental) - approximately 40% of MVC.

Progress at a rate that is comfortable for the patient. Some patients will progress quickly through the various stages, while others will remain at each stage for a longer period of time. Only progress to the next stage when the patient is confident at the preceding level.

1. Commence by performing 5-7 repetitions of one set of exercises.
2. Increase to 12-15 repetitions of one set of exercises, adding one to two repetitions per session.
3. Increase progressively to two or three sets within two or three weeks.

Progression

Increase intensity at least every month or so. Increasing sets, repetitions, resistance, work-to-rest ratio and/or training frequency can do this.

- Increase weights 2.5-5kgwhen the patient has been at a level for four weeks and is comfortable performing 8-12 repetitions in a 30 second period.
- For long term programs, reassess strength periodically (every 6-8 weeks or when practical).
- Maintain exercises within recommended training intensity

Documentation

Documentation of the preparation, implementation, evaluation and modification of exercises for each patient is of great importance for service improvement and to meet legal requirements. Home-based activity programs may make use of exercise diaries, in which the patient records the relevant information (see Chapter 2 – Program Administration,p.26).

The following is a sample of an outpatient exercise record form.

Figure 4.2 Example of an outpatient exercise record form

Name_____ Age_____
Max.HR_____
Cardiologist_____ GP_____
Medications_____
Notes_____

EXERCISE MODALITIES: Treadmill (TM), Air-dyne (AD), Bike monarch (BM),Arm ergometer (AE), Rowing machine (RM), Weights (WT)

Date:	Session:		Week:		Pre-exercise H.R._B.P._	Post-exercise H.R._B.P._
Activity/ setting	Time min.	H.R.	B.P.	R.P.E. (Borg)	COMMENTS	WEIGHT

Outcomes

Regular evaluation of the exercise program and the physical status of the patient should be incorporated into the cardiac rehabilitation process. Outcome measures should be assessed at the completion of the program and months, if not years, after program completion, to foster long term compliance.

Outcome measures that relate to exercise may include:

- cardiovascular exercise ability
- physical activity participation
- adherence to activity regime
- muscular strength and endurance
- ability to perform the same task at a lower heart rate, blood pressure, rate pressure product and rating of perceived exertion
- ratings of perceived exertion, heart rate, blood pressure or rate pressure product for specific tasks

- use of questionnaires, for example, self-efficacy. quality of life
- body composition measures, for example, skin folds, weight and girths
- physical domains of quality-of-life questionnaires.

Refer to Chapter 5 - Program Evaluation, p.98 for more detail.

Maintenance

The shift from an outpatient program to a maintenance program will depend upon the patient and the program in question. A maintenance cardiac rehabilitation exercise program is a program supervised by trained staff and designed to provide support and motivation to individuals with a history of heart disease. Generally, patients participating in maintenance programs will be at low risk of another cardiac event relative to other patients with heart disease. They will also have some previous exercise conditioning and knowledge of how to exercise independently and be able to self-monitor. However; their risk of having another cardiac event is still much higher than that of the general population.

There is some evidence to suggest that some patients at low risk of another cardiac event are able to safely participate in maintenance exercise rehabilitation without first attending a traditional outpatient exercise program (Haskell et al. 1994; De Busk et al. 1994).

Staffing

Maintenance cardiac rehabilitation exercise programs should be conducted by a qualified health professional with knowledge and experience in exercise for people with heart disease. They should have current certification in basic life support.

Staff-to-patient ratio may be 1: 10 to 1: 15, depending upon the patients, activity level and staff training.

Exercise prescription

Due to the increased independence of patients in a maintenance phase, the exercise prescription may include a wider variety of activities, such as modified team sports, advanced gym work, water activities or games. In addition, there may be some benefit to promoting increases in physical activity rather than a structured, repetitive and prescribed exercise program.

As with the other stages of cardiac rehabilitation, the activity guidelines for this period are dependent upon the goals and clinical status of each individual. For example, one patient may be happy to continue with the same activity regime as when they finished their outpatient program, while another may be aiming to further improve so they can enter a 10km fun run. For safety reasons, patients encouraged to increase daily physical activity should be aware of maximal intensity levels of safe physical activity.

The frequency, intensity and duration of the exercise for this stage are an extension or maintenance of that suggested in the outpatient program. Consequently, the same principles of variety, warm-up and cool-down, safety and enjoyment apply in this stage.

Long term compliance is crucial. Clinicians coordinating maintenance exercise sessions should discourage complete dependence on the program and also prevent individuals from remaining a 'patient'. This may be achieved by having patients taking control of monitoring and progressing their own exertion levels. Staff should avoid regular comparisons between individuals, with and without a history of cardiac problems.

One of the primary goals of cardiac rehabilitation is to support the return of individuals to an independent, healthy and satisfying life within their community.

Other considerations

Emergency procedures

All cardiac rehabilitation programs should have a documented emergency plan, which is practised regularly. Establishing such a plan should involve consultation with a cardiologist or doctor with significant cardiac experience. Suitable equipment and personnel trained to manage an emergency situation should be present or easily accessible at all times during exercise classes.

The following issues should also be considered:

- The place where the resuscitation equipment is kept should be clearly identified and known to staff.
- Resuscitation equipment must comply with relevant Australian Standards and be regularly checked according to the recommendations of the manufacturer.
- The place where an emergency drug kit is kept should be clearly identified and known to staff.
- A staff member should be delegated to ensure the contents of the emergency drug kit are intact and not time-expired. This should be done and documented daily.
- The local ambulance service or in-hospital 'code blue team' should clearly know the location and access points for the cardiac rehabilitation outpatient service.
- All team members should be qualified in Basic Life Support, in keeping with the standards of the Australian Resuscitation Council. Knowledge or qualifications in Advanced Life Support are required only if moderate to high intensity exercise training is undertaken, particularly with patients at high risk of another cardiac event.
- Team members should be familiar with the emergency protocol adopted by the program. The emergency protocol should be reviewed, signed and approved by the program's medical adviser every 6 months.
- Staff-to-patient ratios should allow adequate supervision of patients, depending on their functional capacity, symptoms, risk stratification and exercise intensity.

For high risk patients exercising at moderate-to-high intensity or patients undergoing symptom-limited ETT, the following is recommended:

- A serviceable defibrillator should be available in the exercise room.
- A fully equipped resuscitation box or trolley should be available in the exercise room.
- Oxygen should be available.
- At least one member of the team (preferably two) should be qualified in Advanced Life Support.

Chest pain during cardiac rehabilitation

Irrespective of the phase of rehabilitation, patients presenting with chest pain should not be exercised until they have recovered. The incident should be referred to either the patient's cardiologist or physician for follow-up, or if the pain is severe and unrelieved by rest or administration of nitrates the patient should be transported, preferably by ambulance, to the local Accident and Emergency Department.

Any patient developing chest pain or other symptoms or signs of cardiac decompensation should be encouraged to stop exercise immediately and to take nitrates as prescribed (plus oxygen if necessary). If there is no relief or if pain worsens, they should be transported to the Accident and Emergency Department for formal assessment. (See Outpatient exercise rehabilitation- Safety, p.78. for more guidelines).

Facilities

The facilities of a cardiac rehabilitation exercise program may be as diverse as a hospital ward, a community health centre, a gym or a local park. Expensive exercise equipment is not necessary.

Regardless of the location and whether it is indoors or outdoors, each facility must take into consideration a number of issues. These issues include ensuring that:

- there is adequate ventilation
- fluids are freely accessible
- ample space is available
- patients are provided with information concerning appropriate footwear and clothing
- in the case of outpatient programs, a staff member is the last to leave the facility
- all equipment undergoes regular safety and maintenance procedures
- there is adequate access for rapid emergency service entry and exit
- a telephone and/or some other system of summoning emergency transport or assistance is available.

Limitations of individual providers

For reasons of staffing, geography, facilities, legal and other considerations, individual units should determine the limitations of their services. Major hospitals with public funding, more diverse staff and facilities will mostly offer an array of cardiac rehabilitation services to all risk groups. At the other end of the spectrum, small, modestly funded groups in rural communities that are distant from cardiological and technological assistance may offer less comprehensive programs but still provide an invaluable service and develop a degree of public rapport not possible in large institutions. Most community and hospital rehabilitation units will fall between the two extremes.

Chapter 5 - Program Evaluation

Evaluation has become an important concept in health care in recent years.

With increasing emphasis on issues such as accountability, best practice and competition for funding in a restrictive economic climate, there is a growing need for evaluation.

Programs often need to justify their existence by demonstrating positive outcomes and value for money.

In 1993, the Australian Health Ministers' Advisory Council (AHMAC)committed itself to the achievement of optimal individual and population health, using available resources, by focusing on improving health outcomes (Commonwealth Department of Human Services and Health 1994).This commitment was strengthened by all State and Territory Health Ministers endorsing national goals as a means of making improvements in the health status of Australians.

Cardiovascular disease is considered a primary focus in the development of health goals and targets (Commonwealth Department of Health and Family Services 1998).

This chapter provides a practical overview of some of the important issues associated with evaluating cardiac rehabilitation programs. Evaluation and its links to program planning are discussed. This is followed by discussions about the different types of evaluation, a summary of evaluation designs and evaluation strategies. The chapter concludes with some recommendations that may assist in the evaluation of cardiac rehabilitation programs.

What is evaluation?

Green (1986) has described evaluation as 'a comparison of an object of interest against a standard of acceptability.'

This definition highlights three important points:

- an object of interest
- a standard
- a comparison.

In the case of a cardiac rehabilitation program, the object of interest is the outcome of the program. The standard refers to the objectives set at the beginning of the program and the comparison is the extent to which the outcomes reflect the objectives. The program objectives provide the basis for the questions that guide an evaluation.

To conduct an effective evaluation, the goals and objectives should ideally be specific and well-defined, with good program planning prior to the implementation of the program (see Chapter I - Program Planning and Strategic Management, p.15).

Why evaluate?

There are a number of reasons why programs need to be evaluated. Irwig (1993) has suggested that evaluation can answer the following questions:

What is the right program to run? (effectiveness)
Did we do the right thing? (appropriateness)
Did we do the right thing right? (performance)

Did it have the right result? (outcome)
Was the right result observed in the right people? (equity)

Other good reasons to evaluate include:

- to assess the extent to which program goals and objectives have been achieved
- to enable the continued development and refinement of methods and materials
- to identify problems and barriers to program delivery and outcomes
- to determine whether program implementation is consistent with the program plan
- to identify unexpected effects of the program
- to optimise the use of resources
- to provide feedback for stakeholders.

Possible stakeholders and decision-makers

Who are the people who will want to know the results of the evaluation and what will they want to know?

Programs usually do not occur in an organizational vacuum, so the stakeholders or key decision-makers need to be considered.

They include:

- people sponsoring the program, for example hospitals or community centres
- people who make decisions based on results, for example doctors
- people running the program, for example program staff
- people participating in the program, for example patients
- people funding the program, for example the government or health insurance funds

The contribution of stakeholders may also provide some input into evaluation questions. Consultation should occur with stakeholders in the planning of any evaluation. However, there may not be the time, resources or organizational capability to address all the issues raised by these stakeholders. Prioritising the most important questions for the sake of the effectiveness of the evaluation is one method of working with limited resources.

Why are programs not evaluated?

There are a number of reasons why programs are not evaluated.
These reasons may include the following:

- evaluation is an unfamiliar process for the organisation
- the time allocated for evaluation is minimal
- resources available for evaluation are minimal
- outcomes of evaluation are not perceived as important

By analyzing these reasons for not evaluating a cardiac rehabilitation program, the process of evaluation and the benefits gained by evaluating a program become clearer.

1. **Unfamiliarity**

Evaluation is not complex. The more evaluation is built into a program, the easier it becomes. Staff members may do a short course in evaluation or consultants may be hired to conduct the evaluation .If the program is long running it may be worthwhile to improve 'in house' skills in this area (see Appendix E- Further reading.p.129).

2. **Time and resources**

An evaluation of any program will utilise time and resources. The amount of time and resources used will depend on the scope of the evaluation. If the evaluation is properly run with clear goals and objectives, then any outcomes from the evaluation process will lead to a better quality program with improved patient satisfaction. The effort and commitment put into evaluation will be justified.

3. 'I'd rather not know' or 'No news is good news'

There are some ethical reasons to support the use of evaluation. Program administrators have an obligation to those who fund the program, participants, the staff and other stakeholders to conduct the program as efficiently and effectively as possible, preventing the waste of time and money. This is particularly important with recurrent programs, in which there is the opportunity to improve the effectiveness of each repeat of the program.

Program planning and evaluation

Evaluation relies heavily on program planning. This includes planning of goals, objectives and strategies as well as planning for evaluation. There are forms of evaluation that can take place before and/or during the program, as well as after the program is completed.

The final program plan should be precise enough for anyone to take and implement the program. An interesting exercise is to ask each member of the team to define what the program is trying to achieve. In addition, ask them to explain the program strategies to another person who is going to replicate the program. This will determine whether the team has a clear idea of the program's goals, objectives and strategies.

Well-written goals and objectives are critical for the success of an evaluation. The standard against which the program outcomes will be measured must be specific, otherwise minimal change or improvement might be seen as a success.

What are goals and objectives?

A goal is the desired long term outcome of an intervention and is usually related to a health problem. This may be achieved at the end of the cardiac rehabilitation program or up to several years after the program has been completed.

An objective is the desired short-term outcome of an intervention. It would normally be Anticipated that this outcome would occur by the time the program had been completed or in a short time afterwards. Objectives are often related to the risk factors and/or incidence of the health problem which are the subject of the program.

For example, cardiovascular disease (CVD) is the main cause of death in Australia and is therefore a major health problem. A possible goal for a cardiac rehabilitation program would be to seek 'to reduce the incidence of readmission to hospital due to CVD.'

A health problem usually has a number of risk factors. For CVD these include obesity, high stress levels, high blood lipid levels and hypertension (BP).The objectives of the program should address some or all of these risk factors. That is, reduction in body fat, reduction in blood lipid levels and reduction in BP. There might also be some related behavioural factors to address, such as increase in exercise or activity or eating a healthy diet (seeTable5.1, p.109).

To construct the goals and objectives of a cardiac rehabilitation program begin with one of the health issues involving cardiac patients. For example, this might be the high rate of

myocardial infarction (MI) patients being readmitted to hospital, due to further cardiac complications. The goal should be along the lines of 'reducing the percentage of people readmitted. 'This should be followed by an assessment of the risk factors for readmission.

Once the health issues and the risk factors have been identified, the goals and objectives need to be written for the program. They must be specific, measurable and outcome focused. For example, in the case above, it is not sufficient to say that the goal of the program is to reduce the incidence of readmission. This does not provide enough information to allow an evaluation of these factors. If a 1% reduction is achieved, is this to be regarded as success? Probably not. Margins of improvement of this magnitude could be due to many factors unrelated to the program, such as the success of other community programs, changed population trends and even measurement error.

It is important to include a time frame and to define the group of people who are to be measured, as well as the location for the evaluation. Hawe et al. (1990) claim that goals and objectives need to specifically refer to the four characteristics of person, place, time and amount. Based on these requirements, a more appropriate objective would be 'to reduce the incidence of readmissions of patients with previous MI, aged over 50 years of age, living in the Northern Health District by 3%in two years from the start of the project'.

A useful acronym to remember when writing goals and objectives is that they need to be SMART. This stands for:

- Specific- in relation to participants and the location
- Measurable- use indicators that can be measured
- Achievable- within the time period of the program
- Reviewable
- Timely - in relation to the time period required for the outcomes to be achieved.

People often mistakenly write objectives as strategies, for instance, ‘To conduct an education session on a healthy diet'.

The objective should be written along the lines – ‘To increase the level of knowledge about healthy diet in those people participating in the education sessions of the CR program at hospital, by 25%'.

The use of the statement 'increase by 25%' implies that there are at least two instances of knowledge testing that is pre- and post- testing, to detect change. Generally, programs that are going to be evaluated require baseline measures that can be used to assess changes. These baseline measures may be collected as part of a needs assessment (if one was conducted to initially identify the need for the program) or through pre-intervention testing of program participants.

Strategies

Strategies are the activities that will be conducted during the cardiac rehabilitation program (the 'doing' things). They flow from the objectives which in turn flow from the goals. For example, a strategy to increase the level of knowledge about healthy diet may be 'to offer one-on-one nutrition consultation and education with a dietitian to all patients and their partners.'

Types of evaluation

There are three commonly agreed types of evaluation:

- Process

- impact
- outcome.

Process evaluation measures the activities of the program, program quality and who it is reaching. It is, therefore, related to the strategies of the program.

Impact evaluation measures the immediate effect of the program and asks the question 'Does the program meet the objectives set?' This type of evaluation is often associated with measurement of individual characteristics such as knowledge, attitudes, behaviour or physical characteristics (including weight, blood pressure and cardiovascular fitness).

Outcome evaluation measures the long term effects of the program and asks the question 'Does the program meet the goals set?' This is usually related to the incidence or prevalence of a health problem.

It is not always appropriate or possible to evaluate at each of these levels. Outcome evaluation, for example, is concerned with the long term effects of the program and usually focuses on changes in population health statistics, such as mortality, morbidity or disability. These types of changes are often not evident for a considerable period after a program is completed, sometimes for several years. Therefore, outcome evaluation may not be suitable for a 'one off' program. However; long term or recurrent programs can benefit from this type of evaluation.

Process evaluation

Hawe et al. (1990) suggest that there are a number of evaluation questions to be asked about a program during a process evaluation.

These include:

Is the program reaching the target group? Are all parts of the program reaching all parts of the target group?

Program planners will want to know if the program is accessing the intended audience. If patients are not attending program activities, why is this so? Issues such as the time of the activities, availability of transport to activities and promotion of the activities to the target group need to be considered.

Are participants satisfied with the program?

Program planners should be interested in gathering feedback on patient satisfaction with the program. Questions could be asked about the venue, the content or activities used in the program, as well as the attitude of the facilitators.

Are all the activities scheduled for the program being implemented?
Are all aspects of the program being conducted in accordance with the program plan?
Are all the materials and components of the program good quality?
Are the content, readability and cultural aspects of the program appropriate?
Conducting focus groups and/or pilot testing are methods of assessing these factors.

Impact evaluation

This is usually concerned with measuring whether the objectives, which relate to the risk

factors for the health problem, were achieved. These may include behaviours and physical or cognitive characteristics of the program. Physical characteristics (BP, lipid levels, fitness) can be measured and recorded or the information collected from other sources, such as doctors or hospital records. Cognitive characteristics, such as knowledge and attitudes, can be assessed through questionnaires or interviews. Behavioural information can be collected through self reporting, with the use of questionnaires, diaries or observation.

Impact evaluation usually involves the comparison of measures taken at the end of the program with measures taken before the program started. It can also consider measures taken either from a comparable group of people or; for example, from population statistics.

How is an evaluation designed?

A number of commonly used evaluation designs are described below.

a) The true control group, pre-test/post-test design

Patients who experience the intervention and another control group (who possess the same characteristics)are assessed before and after the intervention.

b) The non-equivalent comparison group, pre-test/post-test design

Patients who experience the intervention and another comparison group (who do not possess the same relevant characteristics) are tested before and after the intervention.

It should be noted that the difference between a control group and a comparison group is that a control group has the same characteristics and is often drawn from the same population as the intervention group.

For example, a control group for a cardiac rehabilitation program for post-MI patients from a particular hospital would be post MI patients from the same hospital who did not participate in the cardiac rehabilitation program. A comparison group might be patients of the same age with other conditions discharged from the same hospital, or people of the same age drawn from the general population. However; the closer the comparison group is in characteristics (for example in age) to the intervention group, the stronger the evaluation design will need to be.

c) The true control group, post-test only design

Patients who experience the intervention and a control group (who possess the same characteristics) are assessed after the intervention.

d) The single group, time series design

Patients who experience the intervention are tested several times before and after the intervention.

e) The time series design with a comparison group

Patients who experience the intervention and a comparison group (who do not possess the same relevant characteristics) are assessed several times before and several times after the intervention.

f) The single group, pre-test/post-test design

Patients who experience the intervention are assessed before and after the intervention. (Fitz-Gibbon&Morris, 1987)

This is not an exhaustive list and there are also a number of variations on the above designs that have not been described. The strongest evaluation design is the pre-test and post-test method, with intervention and control groups.

There are a number of factors that place restrictions on the evaluation design used. These

factors might include insufficient resources, implementation of the program before pre-test measures could be collected, or lack of (or inability to access) a control group. The best method possible must be chosen, taking into account the limitations of the data collected that may result from a particular design.

What evaluation methods should be used?

The most appropriate method for the program evaluation will depend upon the type of information required. The methods used in the evaluation will depend upon such considerations as:

- the goals and objectives
- stakeholders' interests
- the type of program (educational, physical or skill based)
- where the program is conducted (in one location or many)
- the type of participants (children, adults, people with disabilities)
- where the participants live (in one location or across a large area)
- the resources available for the evaluation

Questionnaires, interviews, journals, observations and other techniques are used as measurement tools to, help with program evaluation.

Questionnaires

These instruments can take various forms. The most common are:

- postal questionnaires
- self-completed questionnaires
- interviewer completed questionnaires

Each method has its own advantages and disadvantages. For example, postal questionnaires are beneficial if a large number of people are to be contacted, are to be asked the same questions and are spread over a wide distance.

The disadvantage of this method is in ensuring a good/high response rate. Questionnaires rarely obtain a 100% response rate after the first distribution. It is important to consider whether a reminder protocol is appropriate for the program's data collection strategy. A general rule is that reminder letters for postal questionnaires provide a 50% response. This means that after the initial questionnaire and one follow-up letter, the response rate could be as high as 75%.This figure will be lower for harder-to-reach groups or patients who are less inclined to respond. The higher the response rate, the more likely that the data gathered will accurately represent the sample or population that is being targeted. A response rate of at least 70% of the original sample is desirable.

If a follow-up protocol is to be implemented, the maintenance of accurate records of the patients who have responded becomes crucial. This will necessitate the identification of respondents, often through the use of identification numbers associated with questionnaires.

Postal and self-completed questionnaires are also disadvantaged by the fact that the respondents cannot ask for help in understanding a question. This may mean the respondents do not understand what is being asked or they might misunderstand a question without even realizing it.
It is therefore important when constructing a questionnaire to ensure that, as far as possible, questions will be understood by the respondent as intended by the researcher and that the

answers are understood by the researcher as intended by the respondent (Foddy 1993).

Questionnaires have two main types of response format - open and closed. The open format requires respondents to write out their answers in their own words. This will produce qualitative data, although there can be further coding of the responses to produce quantitative data. With the closed response format, respondents are presented with a question and a limited number of options for the person to indicate their response. This type of question produces quantitative data. Each format has its advantages and disadvantages and the format which best suits the type of information needed should be chosen.

The advantage of the open format is that respondents can express themselves in their own words and answers are not suggested. However, the broad scope of answers produced is often time consuming and difficult to analyse. The closed response format is more restrictive, which may create difficulties for respondents. However, it provides less variability, making the data easier to analyse. The closed response format makes the questions more of an exercise in recognition than recall, which makes it easier for respondents to complete (Foddy 1993).

Interviews

Focus group interviews

A focus group interview involves a small group, usually numbering 8-12 people. A facilitator guides the discussion on a particular topic and records the interview. The discussion can be specific to a particular topic or free ranging. The benefit of this type of group interview is that participants are able to 'bounce' ideas off each other. This means issues raised by one patient can be supported or contradicted by others in the group. It is helpful if the group members are similar in personal characteristics, so that they feel comfortable in each other's company and are able to express their feelings and opinions. The facilitator's role is to help draw out information on relevant points and to draw out people who might not be contributing to the discussion.

Group interviews

Group interviews are similar to the focus group interview, although with less restriction on the number of people and the mode of interaction between group members. The topics discussed are often more wide-ranging, with the facilitator allowing group members to raise their own issues rather than restricting the discussion to a few set topics.

Individual face-to-face interviews

Face-to-face interviews are an ideal method for obtaining in-depth information from an individual. However; it can be quite time consuming to collect and analysethe data if a large number of people are to be interviewed.

Journals

Journals can be used to measure behaviour; feelings and attitudes over a sustained period. Journals are particularly useful when it is important to collect accurate records or when the characteristic of interest may change on a daily basis, for instance, diet, exercise or feelings after the death of a spouse or friend.

Observations

Observations can be used to collect data on numbers of participants in a program or on the

performance of certain behaviours of interest. This may be important when the respondent's self-report seems unreliable or not valid. This can be particularly useful when the behaviours of interest are sensitive or socially undesirable, for example smoking.

Document review and other data sources

Hospitals and other health and government agencies routinely collect health information. It may be easier or more reliable to gather information from these sources than to obtain the information from the subjects themselves. However; it is important to remember that there may be issues of confidentiality associated with collection of this type of data, and/or a requirement for ethical approval before the data will be released.

When collecting data, information should be sought from every member of the program. In evaluation terms, this is called the population. If collection of data on the whole population is not possible, but data that represents the target population is still needed, data can be collected from a smaller group of people, or a sample. The greater the sample as a percentage of the population, the more closely the sample data will represent the population data.

To ensure that the data collected is representative of the whole target population it is important to use a random sample. When a random sample is used, every person in the population has an equal chance of being in the sample.

Examples of measurement tools for program objectives

Medical outcomes study short form -36

This tool (Stewart et al. 1988) is a general health profile which has a 36-item scale providing eight separate multi-item sub-scales which assess physical functioning, physical role functioning, emotional role functioning, social functioning, bodily pain, mental health, vitality and general health perceptions.

It takes the patient 5 -I 0 minutes to fill out the questionnaire and then another five minutes for the cardiac rehabilitation staff to complete the form. It has been validated in Australian cardiac populations (Heart Failure Trial, LIPID Trial, Implantable Cardioverter Defibrillation Trial). It is available for both acute and chronic illnesses and comes in several common languages other than English.

Cardiac depression scale

Rather than a general quality of life questionnaire, this questionnaire (Hare 1993) has been developed specifically to measure depression in the cardiac patient. It has been validated in the Australian cardiac population and is reliable, simple to use and interpret. Depression is also an independent predictor of non-compliance and/or dropout.

Sign and/or symptom-limited graded exercise test

This is a multi-function assessment tool. It is used for risk stratification post-event. It can measure work/functional capacity (see Chapter 4 - Activity and Exercise, p.65).

Lipid profile

A fasting blood test will provide an accurate lipid profile. However; the timing of a test must be considered, as it is generally not reliable if done shortly after cardiac surgery. Routine lipid profiles can be used to evaluate drug and/or dietary efficacy.

Non-compliance

Patients who are frequently readmitted to hospitals and/or associated cardiac rehabilitation programs can be tracked through accurate record keeping and follow-up evaluation. Readmissions can be appropriate or due to failure of interventional strategies. However; they can also be inappropriate, due to non-compliance, for example not following Anginine protocol. Non-compliance can be measured by non-attendance at cardiac rehabilitation programs for any reason, non-adherence to a prescribed medication regimen, return to previous lifestyle and return to a behavioural status which is not conducive to better cardiac health, for example, return to smoking, not exercising or increasing weight (Old ridge 1995).

Short Fat questionnaire

This simple questionnaire (Dobson 1993), with only 17 items, provides a guide to fat intake and can be used as a basis for further discussion about eating habits.

Victorian Cardiac Rehabilitation Questionnaire

This simple, multiple choice questionnaire (Robinson et al. 1994), assesses knowledge, health behaviour and symptom management.

How to analyse the data

Data should be analysed in such a way that it can be easily understood and interpreted. If quantitative data is held, that is data based on numbers of responses, descriptive or inferential statistics can be quoted in relation to it. Descriptive statistics summarise the characteristics of a set of measurements, for example '50% of participants had recently recovered from an acute MI'. They also summarise the relationship between different variables, for example 'Females were more likely to participate in education sessions'. When the data sets are large and require complicated analysis, descriptive statistics should be conducted with a calculator or a statistical computer program.

Inferential statistics refer to statistical methods used to generalize from data collected from a particular; smaller sample, to a larger population. This type of analysis may be required if the program has a large number of participants and a smaller number; or sample, is being selected as part of the evaluation. However; there are certain requirements for this type of analysis, which include the need for a random sample of people, an adequate sample size and a high response rate from people in the sample. This type of evaluation requires specialist knowledge.

What to do with the evaluation results

Evaluation is a means to an end. At the planning and during the evaluation process, the results must be given value by everyone involved. Documentation of the evaluation process is paramount to program status, justification, effectiveness and outcomes.

The process of evaluation is congruent with the continuous quality improvement framework (Crosby 1984;Walton 1986).

How long should patients be followed up for assessment?

The literature is divided on this subject, but ACRA recommends that the minimum amount of follow-up should be at least one year. This is because risk factor modification strategies, for example weight loss, lipid control and smoking cessation, require long term evaluation due to the high risk of non-compliance.

Evaluation considerations

Cost of evaluation

Roughly 10%of the program budget should be set aside for the purpose of conducting evaluation. However; the amount that the program can dedicate to evaluation will depend on a number of factors, including the extent of the evaluation, the type of evaluation methods used and the number of participants included.

Ultimately, the money set aside for the evaluation will reflect the decision-makers' understanding of evaluation and the value placed upon it.

External evaluations

Even if the staff have the knowledge and skill to run an effective evaluation of the program, an external evaluation may increase the perceived legitimacy of the results of the evaluation.

Data collection

Due to the time and expense involved in conducting other more formal evaluations, it can be useful to gain as much information as possible from the respondents. This information may be related to other topics of interest as well as the program that is the subject of the evaluation.

Expansion to include other topics of interest will affect the data collection, perhaps by Increasing the size of the questionnaire or lengthening the time of the interview. There is some justification for doing this but there is also an increased risk of reducing the response rate for the evaluation tool (patients might not return lengthy questionnaires) or reducing the amount of useable data (patients begin the interview or questionnaire but do not complete it).

The opportunity to gather as much information as possible should be balanced against the ethical consideration not to abuse the trust and goodwill of possible respondents.

A related issue is the careful planning of the data collection instrument. The questions should be structured so as to determine the type and format of the answers. There is no point obtaining information in a format that makes the data impossible to use.

Ethics

Many organisations, including hospitals and schools, require ethical approval to conduct programs or research. Ethical approval is often also required for evaluations. In some instances, the ethics or research committees of these institutions meet infrequently and there may be a wait of several months before approval to conduct an evaluation is given. This should be factored into a timeline for the evaluation program.

Evaluation of outpatient services

It is essential that cardiac rehabilitation be evaluated in a reliable and valid manner. This approach ensures that individual programs not only gather useful data but can also support the rigorous scientific investigation which is required to assess the effectiveness of various components of cardiac rehabilitation.

A number of organisations have developed examples of data that should be gathered during and after outpatient cardiac rehabilitation. These include:

- NSW Health Department. 1997,ImprovingCardiac Care and Outcomes: NSW Policy

Standards for Cardiac Rehabilitation. pp.5S-S7

- Queensland Cardiac Rehabilitation Association and National Heart Foundation of Australia (QLD), 1999, Outpatient Cardiac Rehabilitation Minimum Data Set, unpublished.

The National Cardiac Rehabilitation Advisory Committee of the National Heart Foundation of Australia (1998) has suggested that the following process-related data be collected during cardiac rehabilitation:

Program ID	Additional diagnosis
Patient ID(eg Medicare number	Reason for drop out
or other unique identifier)	Date of Birth
Gender	Home address postcode
Marital status	Preferred language
Aboriginality	Date of hospital discharge
Country of birth	Principal diagnosis
Date of entry to program	Date program completed
Occupation	

Impact-related data that are desirable to evaluate during an outpatient cardiac rehabilitation program include, but are not limited to:

- symptom reduction
- exercise tolerance improvement
- normalised blood lipids and glucose levels
- cessation of cigarette smoking
- weight loss in the overweight
- normalised blood pressure
- improvement in quality of life
- compliance with medication
- compliance with exercise
- compliance with healthy eating habits
- attendance at cardiac rehabilitation
- return to work
- reduced readmission rate to hospital

It is important to translate these areas of evaluation into objectives that are specific, measurable, achievable, reviewable and timely. For example, 'All cardiac patients in the Northern Hospital cardiac rehabilitation program will have ceased smoking by the end of their eight week program.'

Table 5.1 Examples of impact evaluation, parameters and measurement tools for outpatient cardiac rehabilitation

Impact evaluation	**Parameters to be achieved by patient 'X' by the end of an 8 week outpatient cardiac rehabilitation program**	**Measurement tools**
Symptom reduction	Reduce angina pain experienced while doing activity 'X', from 'Y' to 'Z'. "	• Subjective pain scale (1-10)
Exercise tolerance improvement	Increase amount (intensity and duration) of activity that can be undertaken from level 'X' to	• Graded exercise test • Borg scale of perceived exertion.

	acceptable level for age and gender, while maintaining a perceived exertion rating of between 11-14.	• A specific activity questionnaire (Rankin et al. 1996).
Normalised blood lipids and glucose levels	Fasting: T chol -< 4.5mmol/L LDL- < 3.5 mmol/L HDL - > I.0 mmol/L Trig- <2.0mmol/L Glucose- 3-6mmol/L	• Fasting blood test
Cessation of cigarette smoking	Stop using tobacco substances	• Self-report • Family report
Weight loss in overweight	Reduce body weight from level 'X' to a body mass index less than 25.	• Body Mass Index BMI=weight (kg)/height(m)^2 • Hip-waist ratio.
Normalised blood pressure	Reduce blood pressure to less than 140/90 mmHg on three consecutive, but separate occasions.	• Resting seated blood pressure with sphygmomanometer.
Improvement in quality of life	Improve quality-of-life score from level 'X' to a level deemed 'healthy'.	• SF36. • Cardiac depression scale interview assessment
Compliance with medication	Take all medication as prescribed by doctor	• Self report
Compliance with exercise	Undertake a minimum of 4 days per week of 30minutes of cardiovascular activity(accumulated or continuous)	• A specific activity questionnaire (Rankin et al.1996). • Activity diary
Compliance with healthy eating habits	Reduce fat intake to less than 30%of all calories consumed.	• Short fat questionnaire • Food diary.
Attendance at cardiac rehabilitation program	Attend 75% of total program (activity and education) with no more than one week break throughout	• Attendance record by cardiac rehabilitation staff. • Self-managed log book • Documentation of reasons for drop out
Return to work	Return to same work duties as prior to cardiac event within 'X' months of event.	• Self report
Reduced readmission rate to hospital	No readmissions to hospital due to coronary artery disease.	• Medical record keeping and tracking by staff and self-report

Evaluation of inpatient services

Cardiac rehabilitation staff can find the evaluation of outcome and impact results in their inpatient programs challenging. While demographic and diagnostic data are often easily measured, the impact and outcome of psychological, educational and mobilisation interventions can be more difficult to evaluate, particularly given the shortening length of stay of patients.

As stated earlier; cardiac rehabilitation personnel should only concern themselves with

measuring those factors that will lead to the results being acted upon (see Table 5.2).

Table 5.2 Examples of impact evaluation, parameters and measurement tools for inpatient cardiac rehabilitation

Impact evaluation	**Parameters to be achieved by patient 'X' by the end of an 8 week inpatient cardiac rehabilitation program**	**Measurement tools**
Exercise tolerance improvement	Increase amount (intensity and duration) of activity that can be undertaken from level 'X' to a level that allows self-care and simple home duties, while maintaining a perceived exertion rating of between 11-14.	• Graded exercise test. • Timed walking test (Steele 1996). Documentation of reaching final stage of mobilisation program. • Borg scale of perceived exertion. • A specific activity questionnaire (Rankin et al. 1996).
Improved understanding of health problem, treatment and self management	Successfully describe to staff their diagnosis, the reasons for their medication regimen, their personal risk factors and how these can be modified and the guidelines for their return to activities.	• Victorian Cardiac Rehabilitation questionnaire (Robinson et al. 1994). • Staff interpret and document patient understanding. • Referral to outpatient cardiac rehabilitation program.
Improved understanding of psychological recovery	Successfully describe and discuss personal and common coping mechanisms and reactions to situation.	• Interview assessment.

More information on evaluation

If the planned cardiac rehabilitation program is to be involved in evaluation on a relatively small scale, reading of this chapter can be complemented by a text which provides more specific information on planning and conducting evaluations.

A useful guide is Hawe, Degeling &Hall (1990). This book outlines a step-by-step approach to the writing of specific program goals and objectives and the methods employed in evaluating program goals, objectives and strategies.

A survey by the American Association of Cardiovascular and Pulmonary Rehabilitation (Frid et al. 1994) detailed the lack of consistency in assessment of outcomes in outpatient cardiac rehabilitation services in North America. This led to the formulation of a position paper by the same authors about outcome measurement in cardiac and pulmonary rehabilitation and the use of appropriate (both valid and reliable) tools for measurement (Pashkow et al. 1995).This may also be of use.
If it is envisaged that a heavier or more sustained interest or participation in evaluation will be developed, short courses in evaluation are often conducted by health services or educational institutions.

References

1. **Commonwealth Department of Human Services and Health, 1994**, *Better Health Outcomes for Australians: National Goals, Targets and Strategies for Better Health Outcomes Into the Next Century*, AGPS, Canberra.
2. **Commonwealth Department of Health and Family Services, 1998**,*NationalHealth Priority Areas Report: Cardiovascular Health,* National Health Priority Committee Canberra.
3. **Crosby, P.B.1984**, *Quality Without Tears: The Art of Hassle-Free Management*, McGraw-Hill BookCompany.
4. **Dobson,A., Blijlevens, R..Alexander, H.M., Croce, N., Helier. R. & Higginbotham, N. 1993,** 'Short Fat Questionnaire: Self-administered Measure of Fat-intake Behaviour', *Australian Journal of Public Health*, vol. 17, pp.144-149.
5. **Foddy, W. 1993**, *Constructing Questions for Interviews and Questionnaires: Theory and Practice in Social Research*, Cambridge University Press, Melbourne.
6. **Frid, D.J., Pashkow, P. 1994**, for the AACVPR Outcomes Committee, 'Assessing Outcomes in Cardiopulmonary Rehabilitation - How are We Going?', *Journal of Cardiopulmonary Rehabilitation*, vol. 14, no. 5, pp.334.
7. **Green,L.W. & Lewis, F.M. 1986**, *Measurement and Evaluation in Health Education and Health Promotion*, Mayfield, Palo Alto, California.
8. **Fitz-Gibbon c.T. & Morris,l.l. 1987**, *Program Evaluation Kit*,2nd edn, Sage Publications, Newbury Park, California.
9. **Hawe, P., Degeling. D. & Hall. J.** 1990, *Evaluating Health Promotion: A Health Worker's Guide,* MacLennan and Petty, Sydney.
10. **Hare. D.L. 1993**, *Cardiac Depression Scale*, Department of Cardiology, Heidelberg, Victoria.
11. **Irwig, l. 1993**, *An Approach to Evaluation of Health Outcomes*, NSW Public Health Bulletin, vol.4, pp. I35-1 36.
12. **National Cardiac Rehabilitation Advisory Committee of the Heart Foundation. 1998,** *Recommendations For Cardiac Rehabilitation*, National Heart Foundation of Australia.
13. **Oldridge, N.B. 1995**, 'Patient Compliance', in *Heart Disease and Cardiac Rehabilitation*, eds Pollock & Schmidt, 3rd edn, HRP.
14. **Pashkow, P., Ades, P.A., Emery, G.F., Frid, D.J., Houston Miller, N., Peske, G., Reardon.J.Z., Schiffeert, J.H., Southard, D., Zu, Wallack, R.L. 1995**, 'Outcome Measurement in Cardiac and Pulmonary Rehabilitation', *Journal of Cardiopulmonary Rehabilitation*,vol. 15, no. 6, pp.394-405.
15. **Rankin, S., Briffa,T., Morton, A.R., Hung, JA 1996**, 'A Specific Activity Questionnaire To Measure the Functional Capacity of Cardiac Patients', *American Journal of Cardiology*.vol. 77, pp. 1220-1223.
16. **Robinson, P., McBurney, H. & Bunker. S. 1994**, 'The Development of the Victorian Cardiac Rehabilitation Questionnaire', [abstract] *Proceedings of the 4th Annual Scientific Meeting of Australian Cardiac Rehabilitation Association*, Adelaide, Australia.
17. **Steele, B. 1996**, 'Timed Walking Tests of Exercise Capacity in Chronic Cardiopulmonary
18. Illness', *Journal of Cardiopulmonary Rehabilitation*, vol. 16,pp.25-33.
19. **Stewart,A., Hays, R..Ware, J.J. 1988**, 'The MOS Short Form General Health Survey: Reliability and Validity in a Patient Population', *MedicalCare*,vol.26, pp.724-735.
20. **Walton, M. 1986**, *The Demming Management Method*, Perigee, New York.