# SCOTTISH NEEDS ASSESSMENT PROGRAMME

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# Provision of Cardiac Rehabilitation Services in Scotland –
## Needs Assessment and Guidelines for Decision-makers

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Scottish Needs Assessment Programme

# Provision of Cardiac Rehabilitation Services in Scotland – Needs Assessment and Guidelines for Decision-makers

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**Note:**
**Cardiac Rehabilitation: Literature review** is also published by PHIS and is intended to accompany this needs assessment report. It contains the full literature review, which is summarized in this document.

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# EXECUTIVE SUMMARY

- Cardiac rehabilitation (CR) services can be defined as comprehensive, long term programmes encompassing medical evaluation, cardiac risk factor modification, prescribed exercise, education and counselling.

- The aim of this document is to provide current, relevant information to inform local decision making on the provision of cardiac rehabilitation services.

- The goals of CR are:

| | |
|---|---|
| Physical: | Improved fitness, lifestyle change |
| Psychological: | Restoration of self confidence, relief of anxiety /depression in patients and partners, improved adaptation to stress, restoration of enjoyable sexual activity |
| Social: | Return to work (if appropriate), independence in daily living, resumption of hobbies/chores, optimising quality of life |
| Medical: | Reduced death and re-infarction, improved symptoms and medical compliance |
| Health Service: | Less direct medical costs and re-admissions, earlier discharge and rehabilitation |

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- The conclusion drawn from the evidence reviewed is that **exercise based CR has** modest but **measurable benefits on mortality and morbidity** in patients with established CHD. Exercise based CR can be recommended for low risk middle aged men with previous MI. It is likely that other risk groups such as women, the elderly, and patients with heart failure will also benefit, although these groups have not been studied in as much detail. **The other aspects of cardiac rehabilitation reviewed (see box below) offer definite benefits.**

- **Education** – to reduce misconceptions and promote understanding and self-efficacy
- **Exercise –** for secondary prevention and/or symptom relief
- **Relaxation & Stress Management –** to reduce anxiety and associated physical symptoms
- **Lifestyle advice –** to support behavioural change
- **Goal Setting –** to assist lifestyle change and return to activities
- **Vocational Rehabilitation –** for those returning to work or retiring
- **Psychological Treatment –** for those with continuing psychological needs

- There are four phases of rehabilitation and all should be available to CHD patients, at the time of the incident event and at step changes in the disease. A step change is defined as any MI, the onset of angina, any emergency hospital admission for CHD (not MI) (although the category of more than two emergency hospital admissions for CHD in twelve months has also been considered in this document), any CABG (or other cardiac surgery) or angioplasty and the first diagnosis of heart failure.

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- In developing CR for all eligible patients, an incremental approach to providing services can be based on incrementing recruitment within step change groups; or incrementally adding different step change groups.

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- A menu-based approach to CR incorporates a range of components with individual interventions utlising the components appropriate to individual patients. Menu-based packages of intervention are tailored to the patient's need and readiness to make lifestyle changes; and delivered in relation to core and supplementary services. Core rehabilitation services are provided by rehabilitation staff depending on their individual skills, knowledge and resources and supplementary services are provided by specialist professionals.

- Programmes to supplement the core services in smoking cessation, nutrition, weight management, physical activity, health psychology and pharmacology should be available locally.

- The setting for delivering rehabilitation should be that most suitable to local circumstance and can safely include community settings outwith health service premises for Phase III (and of course Phase IV). It can be offered by primary or secondary care staff but in either case with links to the other.

- CR staff must develop good links across the primary/secondary care interface to ensure a common approach to health behaviour change, advice giving and secondary prevention.

- All CR programmes should participate in a common minimum dataset.

- The annual numbers eligible for CR in Scotland range from around 35,160 to 66,460 for different step-change definitions. Pro rata numbers for individual Boards will depend inter alia on the prevalence of disease and local uptake rates of programmes.

- The indicative annual costs of providing a menu based CR programme for Scotland range from £4.8M to £10.1M depending on patient eligibility, staff experience and, crucially, level of attendance per group. The incremental cost for Health Boards in moving from the status quo to the level recommended, will depend on current levels of provision and the qualifications and grades of staff employed in the new service.

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- The difficulties in estimating current provision of CR, costs, content, clients and staffing, should not be underestimated.

- A menu-based approach to CR is recommended as the most effective way of meeting the individual needs of patients and all health boards should have, as part of the Coronary Disease Strategy, a plan to commission services to deliver CR as recommended in this document.

# CHAPTER 1: INTRODUCTION

## 1.1. Background

Rehabilitation programmes for patients with heart disease have evolved from the recognition that patients would undergo physical deconditioning as a result of prolonged bed rest as part of the traditional treatment for myocardial infarction, and the evidence that regular exercise is protective against cardiovascular disease. With time, other elements of care were included to improve patient's recovery. Within the U.K. rehabilitation programmes are often "creeping" developments driven by enthusiastic nursing staff and physiotherapists with limited input from medical staff, clinical psychologists, pharmacists, dietitians, other therapists or exercise physiologists. They vary considerably: in content; client groups offered the service; length of intervention; the type of health professionals involved in their delivery; and the setting for that delivery.

The most recent evidence supports programmes that can be tailored to suit individual requirements (a 'menu-based approach') over the more traditional standard package of care, which was found not to meet the needs of many patients. Despite this, there seems little evidence that menu based services are currently being commissioned.

## 1.2 Aims and objectives

A multi disciplinary working group undertook this needs assessment using existing literature and research and their combined experience following a request from the Coronary Heart Disease Task Force.

The aim of this document is to provide current, relevant information to inform local decision making on the provision of cardiac rehabilitation services.

**Objectives:**

- To review current literature to identify the most effective components of cardiac rehabilitation programmes and the patient groups which have the capacity to benefit from such programmes.
- To make estimated projections of the eligible numbers and associated costs of providing 'menu-based' cardiac rehabilitation programmes in Scotland.
- To make recommendations for the health service in Scotland, and other partners in cardiac rehabilitation programme provision, to facilitate the implementation of effective cardiac rehabilitation for all eligible patients.

# CHAPTER 2: DEFINITIONS AND GOALS OF CARDIAC REHABILITATION

## 2.1 Definitions

Cardiac rehabilitation (CR) services can be defined as "comprehensive, long term programmes encompassing medical evaluation, cardiac risk factor modification, prescribed exercise, education and counselling."

CR is routinely advocated for patients who have suffered myocardial infarction (MI) (1, 2) and, with increasing evidence of effectiveness, can also be offered to patients who have undergone surgery (2, 3, 4), those suffering from heart failure (5, 6) and angina patients (7, 8). The Scottish Office Policy Review of Coronary Heart Disease in Scotland (9) recommended that rehabilitation should be available for all suitable patients.

CR programmes are designed to limit the physical and psychological effects of cardiac illness, reduce the risk of sudden death or re-infarction, control cardiac symptoms, stabilise or reverse the atherosclerotic process and enhance the psychosocial and vocational status of selected patients (10). Patient responsibility is also vital; CR can only be a successful intervention if the individual collaborates in change management.

## 2.2 Phases of CR

CR is divided into several phases each with different components - starting with psychological support and education while still in hospital, continuing through to an individual rehabilitation package after discharge.

Historically, CR has been divided into four distinct phases, although variations in the optimum length of each phase are less well agreed.

Phase I: Occurs during the inpatient stage or after a 'step change' in the patient's cardiac condition. A 'step change' is defined as "any MI, the onset of angina, any emergency hospital admissions for CHD (not MI) (although category of more than two emergency hospital admissions for CHD in twelve months has also been considered in this document – where this occurs it is highlighted by *), any CABG (or other cardiac surgery) or angioplasty and the first diagnosis of heart failure". During phase I medical evaluation, reassurance, information/education, risk factor assessment, mobilisation and discharge planning are the key elements. It is customary to involve family and partners from this early stage.

Phase II: This immediate post discharge period can vary in length from 4 - 6 weeks, depending on the cardiac condition (e.g. post surgery this phase will be approximately 6 weeks, whereas post MI this period may last only 4 weeks). During this outpatient phase, patients and family receive follow up contact from hospital or community based personnel. Additional education and information is provided during this phase to support risk factor modification. Further medical evaluation risk stratifies the individual for future management.

Phase III: This is commonly in the form of a structured programme comprising different components: i.e. prescribed exercise, risk factor modification, education and counselling. This can last anything from 6 - 12 weeks.

Phase IV: This phase involves the long term maintenance of physical activity and lifestyle change. Ideally it would be offered in a community setting. Fitness professionals now have access to training in Phase IV CR (British Association for Cardiac Rehabilitation, Phase IV Training Module). This will enhance exercise opportunities for coronary heart disease patients in leisure centres.

## 2.3 Goals of CR

Coronary Heart Disease is a progressive disease and the patients' condition will fluctuate. However, during the many phases of the disease process, whether it be post myocardial infarction, angioplasty, angina, post coronary artery bypass (CABG) or heart failure, the goals of CR remain the same. These goals of can be divided into four groups. These are:

Physical:

- Improved fitness
- Lifestyle change

Psychological:

- Restoration of self confidence
- Removing misconceptions about the disease
- Relief of anxiety /depression
- Improved adaptation to stress
- Restoration of enjoyable sexual activity
- Relief of anxiety and depression in partners and carers

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Social:

- Return to work if appropriate
- Independence in activities of daily living
- Resumption of hobbies/chores

Medical:

- Prevention of death and re-infarction
- Decrease in cardiac morbidity
- Relief of symptoms
- Improved medical compliance

Health Service:

- Reduction in direct medical costs
- Early discharge and rehabilitation
- Fewer re- admissions

## CHAPTER 3: THE SIZE OF THE PROBLEM

### 3.1 ‘Step changes’ in disease

Traditionally CR has been provided as a standard package of care to patients following an acute cardiac event such as myocardial infarction (MI) or coronary artery bypass surgery. However, it is now recognised that other patients with established coronary heart disease (CHD), such as angina, chronic heart failure and cardiac transplantation, would also benefit from this multiphasic intervention.

Patients with CHD fall into several groups. Each is a separate manifestation of the same disease. Some patients may move from one to another and some may only ever have one manifestation. Those with a first manifestation will have a requirement for rehabilitation and those who move from one group to another may well have similar requirements. Although other definitions of ‘step change’ are possible, for the purposes of this document it has been defined as “any MI, the onset of angina, any emergency hospital admissions for CHD (not MI) (although the category of more than two emergency hospital admissions for CHD in twelve months has also been considered in this document – where this occurs it is highlighted by *), any CABG (or other cardiac surgery) or angioplasty and the first diagnosis of heart failure”. Thus a ‘step change’ in the disease (moving from one group to another) could be considered as an ‘incident’ event and such patients should be counted in total numbers eligible for a rehabilitation programme. Total numbers of patients therefore will include some double counting to account for those having step changes in disease manifestation.

### 3.2 Potential numbers eligible for CR

The potential annual new number of clients in each group has been estimated by extrapolating existing data on MI survival rates and the incidence, prevalence and hospital admission rates for CHD. This indicates that a potential 66 500 patients per year might be eligible for CR (excluding prevalent cases of CHD and heart failure) nationally. This total comprises 8,000 MI survivors, 33,000 incident cases of angina, 13,000 patients having an emergency CHD admission (not MI), 6,000 incident cases of heart failure and 3,000 patients having had CABG (450 post MI) and 3,000 post PTCA and perhaps 500 additional patients having other forms of cardiac surgery (appendix one details how these numbers were calculated). This is described in Table 1. Table 2 describes the potential annual new numbers of clients in each Health Board area.

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In developing this document, there was debate as to whether all ‘step changes’ should be included in the potential numbers of patients eligible annually for rehabilitation. Inclusion would mean that some patients would be eligible for entry to rehabilitation several times over a period of a few years. Since there is no evidence about the additional benefits of successive interventions, nor whether the uptake of second and subsequent programmes is good or otherwise, the numbers for each client group and for those with “repeated” admissions for chest pain are shown separately in Tables 1 and 2 to allow choices to be made in commissioning services and planning incremental expenditure.

If all prevalent cases of CHD i.e. those who have had angina for some time, those who have had an MI, CABG or PTCA in the past and have developed heart failure some time ago, were also to be entered into a rehabilitation programme then the numbers will be considerably greater than if the incident and ‘step change’ numbers are considered, as has been done in Tables 1 and 2.

## TABLE 1

## POTENTIAL ANNUAL NEW NUMBERS IN EACH CLIENT GROUP IN SCOTLAND
**(Numbers rounded to nearest hundred)**

| | **POST MI** | **ANGINA** | **EMERGENCY ADMISSION for CHEST PAIN (repeat admissions only)*** | **POST CABG** | **OTHER SURGERY**** | **POST PTCA** | **HEART FAILURE** | **TOTAL** |
|---|---|---|---|---|---|---|---|---|
| POSSIBLE NUMBER | 8,000 | 33,000 | 13,000<br>(1,700) | 3,000 | 500 | 3,000 | 6,000 | 66,500<br>(55,200)* |
| POSSIBLE NUMBER ELIGIBLE Excluding “step change” | 5,200 | 33,000 | 0*** | 0*** | 0 | 0*** | 1,000 | 39,200 |

* Including only patients with more than 2 admissions in a twelve month period – see 3.1 above

**Includes transplantation

*** “0” is in “Post CABG” as such patients must already must have had angina or an MI. “0” is in “Emergency admission for chest pain” as such patients are already represented in the “Angina” box although the admission episode may be the first manifestation of angina. “Angina” has been used as proxy for all incident cases. “0” is in “Post PTCA” as such patients must already have had angina or MI to be eligible for this intervention.

## TABLE 2***

## INDICATIVE POTENTIAL ANNUAL NEW NUMBERS BY HEALTH BOARD
## (Including step change) (OPTIONS A, B, C – See page 31)

| | POST MI | ANGINA | EMERGENCY ADMISSION for CHEST PAIN (repeat admissions only) | POST CABG | OTHER SURGERY** | POST PTCA | HEART FAILURE | TOTAL*** excluding "step change" **(Option C)** | TOTAL **(Option A)** (repeat admissions only) **(Option B)** |
|---|---|---|---|---|---|---|---|---|---|
| % OF TOTAL | 12% | 50% | 20%<br>(3%) | 4.5% | <1% | 4.5% | 9% | 100% | 100%<br>(83%) |
| A&C | 664 | 2739 | 1079<br>(141) | 249 | 42 | 249 | 498 | 3256 | 5520<br>(4582) |
| A&A | 584 | 2409 | 949<br>(124) | 219 | 37 | 219 | 438 | 2864 | 4855<br>(4030) |
| BORDERS | 168 | 693 | 273<br>(36) | 63 | 11 | 63 | 126 | 824 | 1397<br>(1159) |
| D&G | 232 | 957 | 377<br>(49) | 87 | 15 | 87 | 174 | 1138 | 1929<br>(1601) |
| F | 544 | 2244 | 884<br>(116) | 204 | 34 | 204 | 408 | 2667 | 4522<br>(3754) |
| FV | 432 | 1782 | 702<br>(92) | 162 | 27 | 162 | 324 | 2118 | 3591<br>(2981) |
| G | 824 | 3399 | 1339<br>(175) | 309 | 52 | 309 | 618 | 4040 | 6850<br>(5686) |
| GGHB | 1416 | 5841 | 2301<br>(301) | 531 | 89 | 531 | 1062 | 6942 | 11771<br>(9770) |
| H | 328 | 1353 | 533<br>(70) | 123 | 21 | 123 | 246 | 1608 | 2727<br>(2263) |
| LAN | 880 | 3630 | 1430<br>(187) | 330 | 55 | 330 | 660 | 4315 | 7315<br>(6072) |
| LOT | 1216 | 5016 | 1976<br>(258) | 456 | 76 | 456 | 912 | 5962 | 10108<br>(8390) |
| O | 32 | 132 | 52<br>(7) | 12 | 2 | 12 | 24 | 157 | 266<br>(221) |
| S | 32 | 132 | 52<br>(7) | 12 | 2 | 12 | 24 | 157 | 266<br>(221) |
| T | 608 | 2508 | 988<br>129) | 228 | 38 | 228 | 456 | 2981 | 5054<br>(4195) |
| WI | | 165 | 65<br>(9) | 15 | 3 | 15 | 30 | 173 | 293<br>(236) |
| TOTAL | 7960 | 33000 | 13000<br>(1700) | 3000 | 500 | 3000 | 6000 | 39200 | 66,460<br>(55160) |

Numbers may not total exactly due to rounding
**Other surgery includes transplantation
***This table has no exclusion for overlaps except second last column.
***The numbers are prorated according to total Health Board populaton. No account has been taken of disease prevalence which varies widely by social class and age, nor of local uptake rates of rehabilitation programmes

# CHAPTER 4: CURRENT PROVISION

## 4.1 CR Programmes

Historically, the delivery of CR has varied considerably across Scotland. The majority of CR programmes are hospital based and run by a multi-disciplinary team. They encompass education, secondary prevention (both pharmacological and behavioural risk modification), counselling, relaxation and stress management with a structured exercise training programme being the usual focus. Community based CR programmes are a recent development to improve access, but can prove expensive compared to centralised programmes. Despite funding problems, the majority of hospitals in Scotland now claim to provide a rehabilitation programme. Recent documents from the National Service Framework in England and the Clinical Standards Board in Scotland recommend setting standards, assessing performance and conducting clinical audit in CR.

## 4.2 CHD Task Force Study results

A recent survey led by the CHD Task Force was completed in both primary and secondary care to attempt to determine the current provision of CR and secondary prevention services (Appendix two). Additional information about provision in secondary care was derived from the BACR national database and later supplemented by telephone survey (Appendix three). Despite a poor response to the primary care arm of the CHD task force survey, the following broad conclusions can be drawn from the responses received to the task force survey, the BACR national database information and the subsequent telephone survey.

- Despite the ongoing development of cardiac CR programmes in Scotland and an increase in the number of patients who receive CR, the provision of CR still focuses on two main client groups – those post MI and post CABG. There is limited provision for other client groups.

- The provision and delivery of CR programmes remains varied from one centre to another, and few are in line with the evidence.

- Phase III CR programmes are offered in a hospital setting in 75% of centres. Within primary care, CR is delivered by only 10% of practices

- The programme components vary.

- The length of out-patient education programmes ranges from 2-12 weeks (median 6 weeks) and may be delivered once or twice per week from between 30-90 minutes.

- Out patient exercise classes are offered as a group session in 75% programmes with approximately 50% offering a home based programme (27% offer both). The duration is between 5 and 13 weeks (median 11.5). Less than 1/3 of programmes offer exercise once per week, less than half twice per week and only one class three times per week (total less than 100% because of non-response)

- There is little information about the specific content of the programmes e.g. all provide information on CHD but the detail of this is unknown. 47% use the Heart Manual either alone or in addition to a conventional programme. Twenty four programmes (54%) reported having a cardiac support/self help group.

- There are no accurate data about the uptake of Phase III programmes, nor about attrition rates from Phase I to II/III, nor about non-completion of Phase III CR.

- Resources are varied. The lead is mainly taken by nurses, of varying levels of seniority and expertise, and PAMs. Additional members of the multi-disciplinary team provide input on a ‘grace and favour basis’ without adequate resourcing. The resources in terms of personnel are very low thus restricting the provision

- There is limited, if any, evaluation of outcomes nor of the effectiveness of CR.

- Response to the survey from primary care was poor (around 30%)

- Within primary care, secondary prevention activity was reported in the majority of practices which responded (representing approximately 1/3 of all GP's).

- Data collection was difficult. The amount of missing data and the accuracy of some of the data collected (possibly because of difficulties surrounding the definition of CR and secondary prevention) limits the interpretation of the results.

The full details of the surveys used to inform this chapter, including the content of the programmes, assessment information, duration of programmes and staffing levels, can be found in Appendices two and three of this report.

# CHAPTER 5: THE EVIDENCE OF BENEFIT

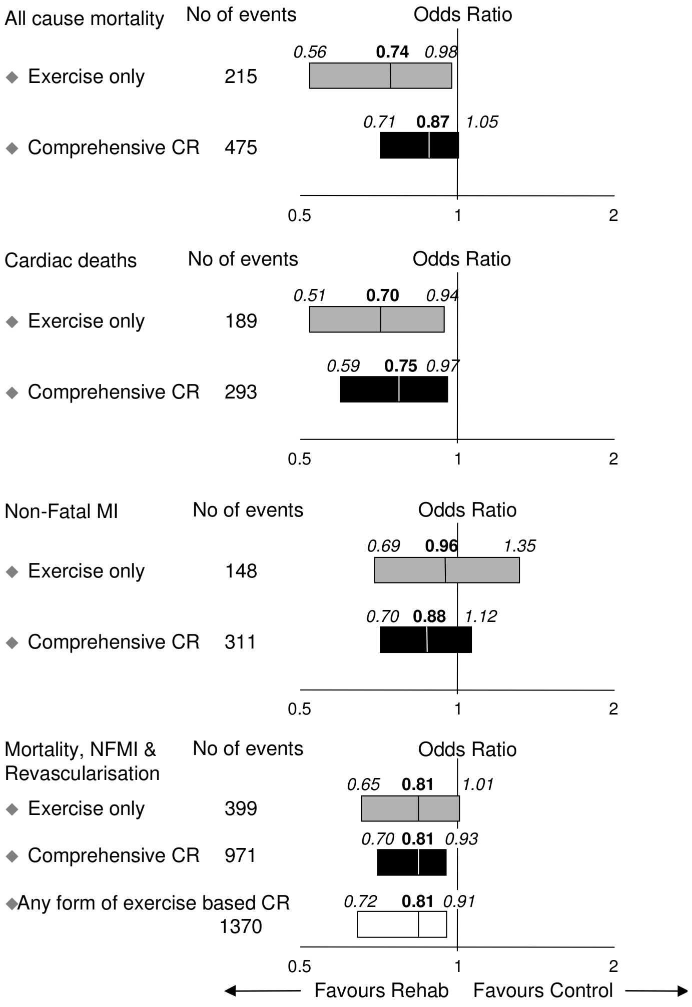
This chapter offers a summary of the current evidence of the benefits of CR. The full review, including the methodology, can be found in the publication **Cardiac Rehabilitation: A Literature Review**, also published by PHIS.

## 5.1 Cochrane systematic review

The largest and most recent systematic review of exercised-based CR included 7683 patients in 34 RCTs and was published by the Cochrane Group in August 2000 (11). Men and women of all ages with previous MI, revascularisation or angina were eligible for analysis, although most subjects were low risk middle-aged men post MI. Patients with heart transplants, artificial valves and heart failure were excluded.

This and previous meta analyses reported benefits of around 20% for all cause mortality and 25% for cardiac death with no effect on non-fatal MI. The confidence intervals were wide, however, indicating that the analysis did not have the statistical power to detect such differences in outcome reliably (Figure 1). The most robust result was for any form of exercise based CR on a composite end point of mortality, non-fatal MI or revascularisation, suggesting a 19% (9-28%) risk reduction.

**FIGURE 1**



The effect of exercise based CR on Health Related Quality of Life (HRQoL) following MI was also explored in the Cochrane Review. Five of 14 exercise-only and 6 of 23 comprehensive CR programmes reported HRQoL outcomes. Surprisingly, only 4 studies used a validated disease specific questionnaire. One trial of comprehensive CR reported significant reduction in anxiety and depression with intervention, which was home based exercise using the Heart manual. The others showed only small or variable effects in a number of HRQoL measures.

Meta analyses of this sort raise as many questions as they answer. There were trends for a larger effect size in trials which lacked a clear description of the randomisation methods, and in which loss to follow up was greater than 20%. Such findings raise the possibility that inclusion of poor quality data may exaggerate estimates of benefit. It is unclear from this meta analysis whether exercise based CR adds value in an era in which many patients will have received thrombolysis and prophylactic medication or have been revascularised. It is also possible that patients who would have benefited most from exercise based CR were excluded from the trials on the grounds of age, sex and co-morbidity. In relation to this last point we note that observational and non randomised trial data have reported benefits for women, the elderly and those with heart failure (see 'Cardiac Rehabilitation: A Literature Review').

Other issues not considered by the Cochrane Group but which were the subject of subgroup analyses in an earlier review include the timing of entry into a CR programme, the duration of the exercise component and the time of entry. These are discussed in the full literature review in appendix seven.

In addition, the content of the programmes reviewed was heterogeneous apart from the exercise base. There is evidence for the benefit of relaxation and stress management, lifestyle advice and psychological treatments delivered appropriately (see 'Cardiac Rehabilitation: A Literature Review'). Current programmes rarely achieve that appropriateness and it was not a factor reviewed by the Cochrane group.

### 5.2 Limits to generalising study results

Apart from the Cochrane meta-analysis, the literature review carried out for this document (Appendix seven) presents an optimistic view of the benefits of rehabilitation. However, it is important to recognise the difficulties in generalising the findings from different and geographically diverse studies and those carried out in different time periods. Additionally, compliance in formal trials is likely to be greater than in practice, perhaps because of the greater individual attention required in trials, the patients enrolled being often atypical of the population requiring a service, the intervention being offered by those with a vested interest in obtaining the best outcomes, and conditions which are often optimised e.g. gym space, equipment and staff time will be adequate. Further, differences in health care systems make the applicability of studies in one system to another system problematical. Translating RCTs into reality in other settings has been shown to diminish the size of benefit.

Many trials reviewed are of an individual intervention e.g. an exercise programme, whereas a rehabilitation service offers a package – no matter whether or not, at present, that package is optimal. Meta analyses incorporate several client groups making it difficult to tease out the benefits of rehabilitation for each. Perhaps the overall benefit is limited to one group of the heterogeneous population in the analysis or, at least, is not the same for all groups. Should all patients be offered all interventions and if they are, do all get the same benefit from each part? Do all patients benefit similarly if offered repeated entry to rehabilitation programmes at each step change in the disease? If, as we suggest, a menu based approach is best practice, do we know that the size of the benefits indicated by the studies are additive? We think not.

This review highlighted a lack of evidence of benefit for some client groups. This does not mean that there is negative evidence, just that studies have focused more on some groups than others.

### 5.3 Summary

The detailed review of the current evidence of the benefits of CR undertaken for this needs assessment suggests that exercise based CR has modest but measurable benefits on mortality and morbidity in patients with established CHD. Exercise based CR can be recommended for low risk middle aged men with previous MI. It is likely that other risk groups such as women, the elderly, and patients with heart failure will also benefit, although these groups have not been studied in as much detail. Exercise based programmes should last a minimum of 12 weeks. In addition the general message is that there are definitely benefits from the other aspects of cardiac rehabilitation reviewed. Also, there are undoubtedly benefits from group support and easy access to a group of approachable and easily accessible health professionals which remain unquantified.

The variability of the evidence reviewed for this needs assessment and the limits in generalising study results discussed above, suggest that the results should be viewed thoughtfully.

Research action points highlighted in this review are listed in Appendix four.

# CHAPTER 6: HOW CAN WE PROVIDE IT? - MENU-BASED CARDIAC REHABILITATION

## 6.1 Background

Historically, due to resource limitations, CR programmes provided a fixed package of rehabilitation. National guidelines (12), however, propose that on diagnosis of a cardiac event or a ‘step change’ in the cardiac condition, patients should be individually assessed and directed towards rehabilitation most suited to their needs.

Adoption of a ‘menu-based approach’ would mean virtually no need for exclusion criteria. Flexible menu based programmes take into account disease complexity, as well as patients’ expectations and needs. This is a concept which could, therefore, be readily adopted both in a city or rural environment. In addition, it would allow aspects of rehabilitation services to be targeted towards those with the greatest need.

A flexible, menu based approach recognises the necessity to tailor the delivery according to individual need. Patient choice will form part of this individualised service, though it should not be ‘patient driven’. CR can only be a successful intervention if the individual patient accepts responsibility in the change management process (13). Individual baseline assessments allow trained CR staff to direct individuals to suitable risk factor management and other appropriate interventions.

One of the aims of rehabilitation is to restore personal autonomy and self-efficacy. Therefore logic dictates that a flexible ‘menu-based’ approach would be the best option.

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**Deleted:** CR can only be a successful intervention if the individual patient accepts responsibility in the change management process (13).¶

## 6.2 Core and supplementary strands of a possible “menu”

The menu within a ‘menu based’ rehabilitation package would incorporate both ‘core’ and ‘supplementary’ strands. ‘Core’ rehabilitation services are provided by rehabilitation staff depending on their individual knowledge, skills and available time resource and ‘supplementary’ services are provided by specialist professionals. Initial assessment determines the grade of intervention required for each aspect of rehabilitation and CR staff then steer the patients towards the most appropriate level of intervention, which would either be part of the ‘core’ or ‘supplementary’ service.

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## 6.3 Assessment

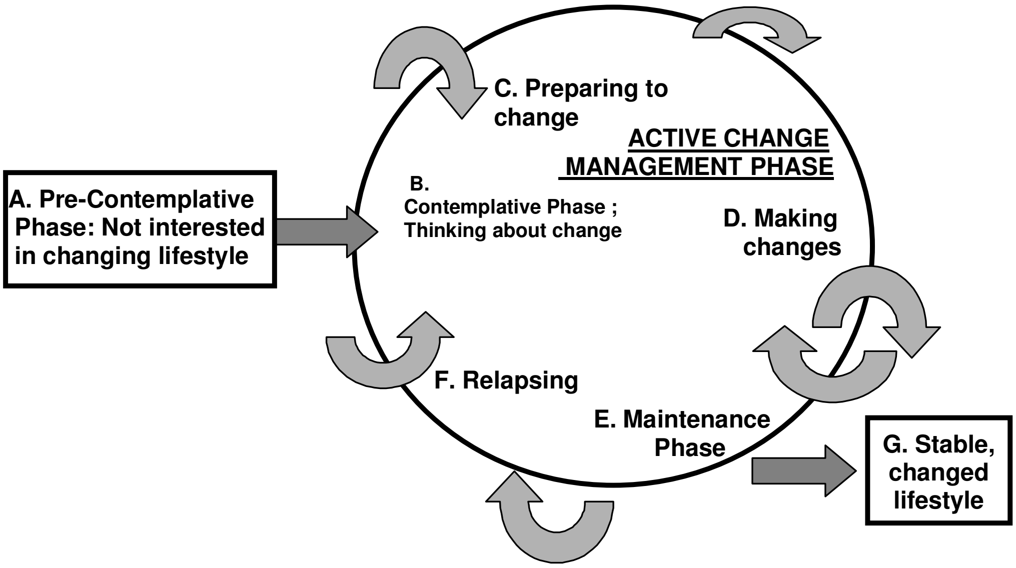
On diagnosis of a cardiac event or at each subsequent ‘step change’ in the disease process, a baseline assessment of “risk” would be carried out by trained rehabilitation staff. This baseline assessment would use standard tools to examine lifestyle and psychological status e.g. Alcohol Consumption Table, Hospital Anxiety and Depression scale (HADS) (14) (Appendix six). Patients would then be offered a tailored rehabilitation programme from a wide ranging menu, based on the objective assessment of need and the patient’s readiness to make lifestyle changes for different behaviours (see below). Depending on the intensity of intervention required and the available time resource and expertise within the rehabilitation team, ‘core’ services could provided by either trained rehabilitation staff or ‘specialist’ services by specialist professionals (e.g. psychologists, dieticians etc).

## 6.4 Facilitating and maintaining change

Theoretical models developed by psychologists, describe the factors relevant to facilitating and maintaining change. The most commonly adopted model in CR is the Transtheoretical Model of Prochaska and Diclemente (15). The focus here is to determine where in the ‘cycle of change’ an individual is placed in relation to a specific behaviour. The stages vary from a “pre-contemplative stage” to an “active change management” phase (Figure 2). This process is a cyclical process and individuals may move forwards and backwards throughout the stages at various times.

FIGURE 2

STAGES OF CHANGE ADAPTED FROM PROCHASKA AND DICLEMENTE 1983[15]



The role of the rehabilitation team is to support behavioural change. However acknowledgement must be given to the numerous barriers perceived by the patient to initiating this change. It is important therefore, in order to be effective, that the level of intervention should always be specific to each stage of change. For example, the most appropriate intervention for those individuals who are at the contemplative stage may simply be to help dispel myths and address barriers to change. The provision of information or leaflets may suffice.

Prochaska & Diclemente's model also highlights the importance of the patients taking active responsibility for lifestyle change i.e. an exercise prescription will not be of any value if the individual has not reached the active change stage.

## 6.5 Goal Setting

In addition to assisting lifestyle change, goal setting techniques may be used to assist patients return to activities which they have given up as a result of their illness. This may avoid the pitfalls experienced by patients "overdoing" things and experiencing symptoms that reduce their confidence and likelihood of trying the activity again. This often applies to exercise related activities but can include stressful activities, sexual relations or return to work. All patients should have the opportunity to discuss such goals and receive advice on how to achieve them at appropriate times.

## 6.6 Phases

### 6.6.1 Phase I

Although there is little evidence to show how or by whom this phase should be delivered, Johnston et al (16) show that the effects of a nurse counsellor offering on average around 3.5 hours of contact during a hospital admission can improve both the patient's and the partner's knowledge – including a reduction in uncertainties and misconceptions - and a reduction in anxiety and depression compared with those receiving routine care. Patients also had less functional limitation. Some of these effects persisted to the one year follow-up. Training to offer this intervention could be offered to ward staff dealing with cardiology admissions or could be offered by a dedicated rehabilitation team. Ward staff should also have input to addressing risk factors and reducing anxiety through offering appropriate information about the disease and its effects on the individual, and should be trained to offer the appropriate interventions.

Over optimism on the part of health professionals can be counterproducive. If a patient's experience of recovery does not match "official information" then faith in advice from health professionals can be lost. Regarding myocardial infarction as a self-limiting episode without putting it in the context of the ongoing disease process links lifestyle change to short term as opposed to longer term horizons (17).

Having a myocardial Infarction, receiving a new diagnosis of CHD or having cardiac surgery are all life events which are triggers to lifestyle change; and the opportunity to intervene and support efforts to change health related behaviours should not be missed. It is also important to offer information about prognosis and discuss what this means for the individual patient. Re-assurance is a most important part of this phase and addressing misconceptions at an early stage minimises the potential for problems later on. It should involve partners or carers if that is at all possible.

### 6.6.2 Phase II

This intervention would be offered to those following a hospital admission or following a new diagnosis of CHD. It involves an extension of the Phase I interventions with frequent contact to re-inforce advice and support regarding behaviour change, to encourage compliance with secondary prevention pharmacology and to repeat and extend education, reassurance and advice during recovery and further investigation. Again there is little evidence to support a particular type of service

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The intervention can be offered by home visiting (18) which could be carried out as an outreach of a hospital based rehabilitation service. But close links with primary care are important during this phase and are perhaps best developed using community based staff e.g. health visitors who have had additional training in CHD e.g. from expert hospital based rehabilitation teams who provide Phase III services, with whom they also should have close links. The skills required are certainly those used by rehabilitation staff but also by health visitors. Home visiting has also been shown to improve the uptake of Phase III CR (19).

Home visiting allows good insight into patient's lives and social circumstances and can therefore help facilitate appropriate educational and psychosocial interventions to reduce anxiety, improve physical and psychosocial functioning, address family held misconceptions and support behaviour change. However it is an expensive resource and could be supplemented by phone contact. There is ample evidence that encouraging and facilitating contact between the patient (and their partner/carer) and the health professional (both from and to the patient) by telephone is effective in improving compliance (20), is regarded as helpful by patients (21), provides reassurance (22), can reduce hospital re-admissions (23) and can support behaviour change (24, 25) and reduce anxiety (26). One option would be to offer one home visit and to have local protocols to determine in which circumstances further home visits are necessary or whether telephone follow-up thereafter is appropriate until Phase III services are offered.

In Scotland, a mixed home visiting and telephone contact service for heart failure patients post discharge has been shown to be effective in reducing hospital readmissions, decreasing anxiety, increasing compliance and improving the uptake of secondary prevention. The mix of home visiting and telephone contact is decided by protocol and is determined by the educational and psychosocial interventions required as well as by the pharmacological and biochemical monitoring requirements of the patient (27). The service forges close links with primary care.

The Heart Manual (28) is widely used with telephone support. It is offered before discharge and so bridges the gap between Phases I and II. It can be used into Phase III and is particularly useful for those who cannot or will not join groups. This manual has been evaluated and is designed to be used by trained staff. Forty seven per cent of current programmes report using it either alone or in addition to a conventional programme.

### 6.6.3 Phase III

A menu based rehabilitation service can be offered in a hospital setting, in community settings or indeed by "book" (see the Heart Manual above in Phases I and II) although the group dynamic is often considered an important element in the success of CR programmes.

The evidence of the safety of the exercise component of CR has been described above. For those at higher risk e.g. those with heart failure of those awaiting by-pass surgery, the option of supervised exercise in circumstances where full resuscitation facilities are available may be appropriate. For others in community and hospital settings the availability of an airway, an automatic defibrillator, and staff trained in basic resuscitation should be sufficient with back-up from a rapid response ambulance if required.

Community settings have been used in Scotland and are reduced in cost if the group is at maximum capacity. This will not happen in an individual locality if only post MI patients are included since the numbers are too small in any 12 week period for a relatively small population. Since this document recommends that such facilities are available for other groups e.g. those with angina and post CABG and angioplasty, there should be no difficulty in providing locally accessible supervised exercise opportunities with well subscribed groups in most areas.

One important requirement is the small amount of equipment required for the exercise part of the programme. The evidence base does not indicate that more hi-tech equipment improves outcomes or compliance.

The provision of other aspects of the menu based programme of CR can be provided in any setting where there are appropriate facilities. A warm comfortable room is necessary for most educational components, cooking facilities may be required, space to lie down and mats to lie on may be required for learning relaxation and breathing techniques. In addition, overhead or other projection as well as educational materials in their widest sense will be required and so storage may be important both for the exercise part of the programmes and for the other aspects.

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### 6.6.4 Phase IV

Close links between rehabilitation staff involved in Phase III and leisure services staff can provide extension of exercise opportunities beyond the time of Phase III. Exercise consultation is an intervention which may be useful at the end of Phase III to promote and maintain physical activity levels. This involves a one to one discussion with the client which determines barriers to exercise, sets physical activity goals and develops relapse prevention skills. BACR provide suitable training programmes for leisure staff to give them the additional knowledge required to provide help confidently and safely to patients with CHD. Other community services and primary care can offer support and encouragement for perseverance with lifestyle change and this longer term change is often helped by patient support groups. For the most part, health services should not be involved in Phase IV except that regular reviews, as part of systematic secondary prevention, will allow identification of problems that have recurred or that the patient wishes to address having positively altered his/her stage of change. However, close links between Phase III and Phase IV are essential to ensure seamless care with patients moving between primary care, secondary care and community settings appropriately.

## 6.7 Recommendations

- All Health Boards should have, as part of the Coronary Disease Strategy, a plan to commission services to deliver CR as recommended in this document. Because of the size of the problem this may involve an incremental approach towards a complete service. Part of this strategy will be to identify a strong clinical leadership for the totality of CR and its links with other aspects of secondary prevention.

- All phases of rehabilitation should be available to CHD patients, at the time of the incident event and at 'step changes' in the disease.

- Packages of intervention should be menu based and tailored to the patient's need and stage of change and delivered in relation to core and supplementary services which are determined by the individual skills and knowledge of the rehabilitation team.

- Programmes to supplement the core services in smoking cessation, nutrition, weight management, physical activity, health psychology and pharmacology should be available locally.

- Phase II CR should be delivered by the appropriate combination of home visiting and telephone contact with close links between those delivering that phase, primary care and the Phase III service

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- The setting for delivering rehabilitation should be that most suitable to local circumstance and can safely include community settings outwith health service premises for Phase III as well as Phase IV. It can be offered by primary or secondary care staff but in either case with links to the other.

- Delivery of a service to those who are housebound or otherwise unable (e.g. because of distance particularly in rural areas) or unwilling to attend group sessions should be commissioned. One route is to use the Heart Manual facilitated by telephone outreach and perhaps home visits.

- CR staff must develop good interagency links with social work departments within the community to ensure appropriate social support and assistance. Knowledge of the benefits available and how to get advice about these to minimise the economic effects of the disease are part of a core service of CR.

- Links should be developed between the specialist smoking, nutrition, exercise and psychology services at a local level to further support behaviour change.

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- CR staff must develop good links across the primary/secondary care interface to ensure a common approach to health behaviour change, advice giving and secondary prevention in general. Local protocols of care for "secondary prevention" – in this context the thresholds for intervention and targets for hypertension and cholesterol – should be agreed and common between primary and secondary care.

- Patient support groups should be encouraged if there is a desire for these among patients who have undertaken Phase III rehabilitation.

- Phase IV activities in primary care should involve supporting those who have undertaken behavioural change at regular reviews for secondary prevention; and offering appropriate interventions for those at different Stages of Change with regard to health related behaviours, who have not yet undertaken appropriate behavioural change.

- In Phase IV specialist exercise counselling and support should be available for those least active and for those who are having difficulty maintaining an active lifestyle. BACR trained leisure staff can fulfil that role.

## CHAPTER 7: WHAT THE PATIENTS NEED – THE BUILDING BLOCKS OF CR

This section follows the evidence base outlined in Chapter five and other evidence about interventions which may have been studied individually and not necessarily as part of rehabilitation programmes as such. It offers suggestions as to how the interventions can be best provided.

### 7.1 The building blocks of rehabilitation

**What the Patients Need**

- **Education** – to reduce misconceptions and promote understanding and self-efficacy
- **Exercise –** for secondary prevention and/or symptom relief
- **Relaxation and Stress Management –** to reduce anxiety and associated physical symptoms
- **Lifestyle advice –** to support behavioural change
- **Goal Setting –** to assist lifestyle change and return to activities
- **Vocational Rehabilitation –** for those returning to work or retiring
- **Psychological Treatment –** for those with continuing psychological needs

There are various areas in which all patients presenting with CHD may benefit from input during the early stage of their illness (Phases I and II) and these are described below. This input may take many forms including the use of written materials, audio and video tapes, and individual or group input.

### 7.2 The menu-based approach

While it would be agreed that all patients need education, it might be less clear-cut for exercise or relaxation. However, the components of rehabilitation act synergistically – exercise aids relaxation, relaxation enhances learning etc. For example, anxiety levels are generally high just after discharge in post-MI patients and so relaxation coupled with education may be an appropriate prescription for all at this time. During Phase III, however, it might be more appropriate to be selective and provide more individualised input where need and/or motivavtion is greatest. There should also be some ongoing resource to provide more long-term monitoring and support. While most research has concentrated on post MI and CABG patients, this should not be seen as an indication to exclude other manifestations of CHD from the process.

There is a need to consider group and individual requirements in deciding how to allocate resources.

### 7.3 Education

The fundamental requirement of any rehabilitation process is that it should impart knowledge and understanding. While patients often present with an acute manifestation such as MI, coronary heart disease is a chronic condition with life-long implications for the patient, which have a direct bearing on their social functioning. There is therefore a very real need for advice on disease management. There is evidence that misconceptions held by the patient have a significant impact on psychosocial outcomes (29, 30) and, in the post MI population at least, some data to support the view that rehabilitation which is aimed at correcting misconceptions and associated behaviours can improve both long and short term outcomes (28). The same preventative data for patients with other manifestations of CHD such as angina or heart failure, have not been sought in a rigorous way but there are data to suggest that an approach aimed at reversing misconceptions in patients disabled with angina can reduce disability and handicap (8). For heart failure there are data to support the view that helping the patient to understand and better manage their disease can reduce hospitalisation (31, 32, 33). As medical management becomes more complex while hospital contact becomes shorter, so there is a need for a model which provides this basic understanding and support to all patients. On an individual level there is a need to monitor the effectiveness of this educative process and provide additional targeted input where needed.

Education programmes for patients and partners improve knowledge (34), decrease disability (35) and produce changes in health behaviours. The most important predictor of outcome and compliance are patients' beliefs about the cause and course of the disease and the number of misconceptions held (28).

Information given should cover the aetiology of CHD in a way that enables the patient to understand the real cause of their own CHD and to engage in the process of identifying secondary prevention goals. It should also, where appropriate, include an explanation of the mechanisms that lead to such manifestations as MI, angina, or heart failure. The patient also needs to understand the implications of their condition and be adequately advised where there are potential effects on their lifestyle and prognosis. These explanations should be holistically based and acknowledge the psychological implications of CHD as well as the physical. Finally they should seek to empower the patient, encouraging them to take greater responsibility for the management of their disease and its manifestation.

### 7.3.1 Education/advice about medication.

Little evidence exists on the benefits of education on medication in CR. Most studies however show an improvement in patients' knowledge and increased satisfaction. Patients benefit from both written and oral information.

Patients' knowledge improves with time post MI, following in-patient and formal pharmacy teaching sessions. Most patients, however, do not absorb all the information given to them in hospital and it is only when they have been taking their medication in the community that they are able to assimilate information and ask relevant questions.

The report of the Royal Pharmaceutical Society (36) recognised that traditional methods of persuading patients to take medicines have not always produced good results. The recommendation is that an alternative method of consultation – concordance - is used. In this an agreement between doctor and patients is reached about medication thus optimising health gain.

### 7.3.2 Recommendations

Educational programmes should be centred around clear specific items for discussion. Any programme should cover the patient's diagnosis and its implications, medication and its effects as well as methods and help available to address lifestyle changes. It should be offered to all patients at the varying stages of the disease process.

## 7.4 Exercise

There is a widely held belief among the general public and perhaps also among health professionals that patients with CHD should "take things easy" and avoid the strain which exercise might put on their heart. This belief may be reinforced by exercise induced symptoms of chest pain, breathlessness, and fatigue. Exercise can reduce symptoms in patients with heart disease associated with angina or heart failure (37, 38), and it is important in secondary prevention post MI reducing mortality by around 25% (11, 37). There is a lack of convincing evidence that it improves psychological outcomes but patients often report a sense of well-being and confidence through attending exercise classes. All patients should have an assessment of their pre-morbid physical activity level and be given advice and assistance to return to that level or greater to improve outcome (secondary prevention) or reduce symptoms. Exercise support may be provided in a hospital or community setting, and may be given at any time during Phases I to III. There is evidence that those patients previously considered to be high risk for Phase III exercise classes, such as those with angina or impaired left ventricular function, fair as well as post MI or CABG patients and have more to gain symptomatically. It would seem sensible that the specialist expertise of hospital based rehabilitation teams should be used to treat the more complex or high risk cases, while community based initiatives can deal with more routine clients.

### 7.4.1 Patient groups

Age, present physical capacity, other health problems and the patient's willingness to take part will determine the advice given in terms of activity levels. Although difficult to provide set criteria determining the level of intervention, absolute contra-indications preclude participation in exercise. These include unstable angina, serious ventricular arrhythmias, severe aortic stenosis and grade IV (NYHA) heart failure.

Since exercise has been shown to be safe for those with CHD and with no definite contraindications (39, 40, 41), it can be recommended with confidence as long as the limits are carefully set and explained to the patient. Patients should exercise below their angina threshold defined by heart rate or Borg during exercise testing. The question of exercising to the point of experiencing angina should not occur if this method is used to define the exercise limits.

### 7.4.2 Exercise prescription

In recent years the approach to recommending exercise prescription has changed radically. The traditional approach was very prescriptive as suggested by the American College of Sports Medicine (20-30 minutes of vigorous exercise three times per week) (42). It is now recognised that this restricted approach does not meet the varied needs and goals of the CHD population. The shift is towards exercising habitually at a moderate intensity which is easier to deliver and more readily accepted by the general public. Incorporating physical activity into the activities of daily living often produces better adherence in the longer term than separate planned programmes of exercise. However supervised group exercise can give patients confidence to become more physically active.

Exercise prescription may be assisted by the exercise capacity measured in metabolic equivalents (METs) from either exercise treadmill testing or walk tests (i.e. Shuttle walk test). Ischaemic threshold levels from ETT may also help determine level of exercise intensity. Teaching self monitoring techniques such as the Borg scale (43) or self-measuring pulse rate are useful tools to indicate what intensity level the patient is actually reaching and what is safe for them to attempt.

To achieve measurable improvements in aerobic fitness patients must maintain an exercise intensity of approximately 60 to 75% of their maximal effort capacity. This can be calculated for an individual by using maximal heart rate on exercise testing – either when the patient is exhausted or when ischaemic symptoms or ECG changes (2mm ST depression is the usual indicator) occurs. If this method is not available then a simple calculation using the patient's age (maximum heart rate = 220 for males or 200 for females less the patient's age in years) can be used. In either case the patient should aim for around 60% of the maximum heart rate when exercising. This applies to those on B-blockers also. Aiming for around two thirds of the perceived exertion at maximum heart rate (12 – 13 on the 15 point scale – see Appendix five) is another way of deciding the upper limit of exertion for an individual patient (43).

The mode of exercise should be aerobic training using repetitive movement of large muscle groups. This can be translated into brisk walking, low intensity swimming etc. Some patients may benefit from a strength training programme which has been used safely in cardiac patients following several months of aerobic training (44). Increasing muscle strength is important for the most impaired patients and some patients have strength requirements to allow them to return to work.

The length of training should start at 20-30 minutes with an additional warm up and cool down phase. This should be attainable if the correct intensity of training is used. The length of sessions can be gradually increased to 45 minutes as fitness improves.

A minimum of three training sessions a week is required to get benefit and the national recommendations (for the general population) now are for 30 minutes of brisk walking or the equivalent on most days of a week. Not all of these require to be supervised sessions. The TORONTO Programme recommends five sessions a week with only one supervised (45).

The level of supervision will depend on the ability of the patient to self monitor, their confidence in exercising, individual patient risk and the requirement to encourage perseverance. Since the purpose of a rehabilitation programme is to maximise a patient's independence, the sooner they feel able to exercise on their own the better.

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7.4.3 Compliance

As described above, perseverance with exercise is best attained when it becomes part of normal daily activities. Exercise does not require to be class based (when the patient has acquired confidence in self monitoring) and there are many opportunities for patients to take part in a variety of different kinds of physical activity. Finding the one that suits them best will maximise adherence. Small changes in physical activity levels bring benefit – goals should not appear unattainable.

7.4.4 Recommendations

- The evidence base for exercise is substantial therefore all those without contraindications should be encouraged to take up the exercise component of programmes.
- Exercise support can be provided in a hospital or community setting.
- The exercise component of rehabilitation should be delivered for those at highest risk (determined from the results of exercise testing, thallium scanning or echocardiography as appropriate) at a venue where access to resuscitation is available. The availability should include trained personnel, an airway, a semiautomatic defibrillator and access to a telephone to call "999" if required.
- Rehabilitation programmes should offer group exercise opportunities of varying intensity and modality to suit the individual. It is also important to encourage incorporating additional physical activity into the activities of daily living and discouraging a sedentary lifestyle.
- Training sessions should be a mimimum of 3 per week, not all of which require supervision.
- Training sessions should last 12 weeks.

## 7.5 Relaxation and Stress Management

Studies have shown that 30-50% of survivors of MI are clinically anxious or depressed at some point during their recovery (46, 47). There are in addition many psychological responses to CHD including anger, denial, and grief reactions. While it is simplistic to suggest that relaxation therapy is a panacea for all psychological distress, there is evidence to support its use alongside education and exercise to help reduce the effects of psychological distress. It has also been argued that many patients perceive stress to have contributed directly or indirectly to the development of their disease or its presentation (48). Again symptomatic forms of CHD such as angina or heart failure, in which anxiety or emotion can precipitate symptoms, may be more likely to benefit from the use of appropriate relaxation techniques. There are no data to clarify the relative merits of providing relaxation therapy to all patients or on the basis of assessed need (anxiety levels). It is often provided by default to patients attending exercise classes, and while this may act synergistically with exercise and education, it may not be the most logical option as the more anxious patients are less likely to attend for exercise. Significant reductions in cardiac events have been demonstrated following interventions aimed at reducing stress (49). Stress management techniques (SMT) are an extension of relaxation and teach additional techniques for dealing with stress. Evidence exists that incorporation of SMT within CR produce still further benefits in terms of cardiac events and deaths post MI (50). The psychosocial aspects of CR are fully discussed in the BACR guidelines for CR (12).

7.5.1 Recommendations

- Psychological morbidity such as anxiety, depression, cardiac misconceptions, anger and sleep disturbance should be addressed early (Phases I and II) within the CR setting using educational and stress management techniques.

## 7.6 Smoking cessation

All patients should be encouraged to give up smoking. Socio-demographic, clinical and psychological characteristics are predictors of difficulty with smoking cessation in CHD patients. Consideration of these factors in relation to individual patients may assist in the delivery of optimal and individualised interventions to facilitate sustained smoking cessation.

Numerous strategies have been used to facilitate smoking cessation. Brief advice from a doctor, structured interventions from nurses, individual and group counselling, individualised self-help materials (standard self-help materials are no better than brief advice) are all effective. The evidence of effectiveness for aversion therapy, mecamylamine, acupuncture, hypnotherapy and exercise is uncertain. The antidepressants bupropion and nortriptyline increased quit rates in a small number of trials. The two bupropion trials involved heavier smokers and included behavioural support (51).

A higher prevalence of heavy smoking has been found in those who relapse after a cardiac event. These individuals have greater difficulty in quitting, more problems with withdrawal symptoms, stronger urges to smoke and higher levels of addiction.

Nicotine replacement therapy (NRT) aims to reduce withdrawal symptoms in those attempting to quit smoking. Overall it increases quit rates by 1.5 to 2 times no matter what other support was offered. No one product is better than another. The choice should depend on which formulation addresses the patient's problems best. Patches give an even, sustained release; inhalers may substitute for the manual habit of smoking and nasal spray gives a rapid response to the surges of craving. There is no added benefit in a course of patches longer than 8 weeks and no benefit in tapering the dose. Higher doses are more effective in more dependent smokers. NRT is used frequently as part of a smoking cessation strategy and is safe for those with CHD except in the immediate post MI period. Research has shown NRT to be an effective component of smoking cessation, particularly in heavier smokers, i.e. those smoking more than 10 cigarettes per day (51).

Rehabilitation staff should offer advice about smoking cessation and be able to offer continued support to those attempting to quit. Information about the way to use NRT should also be offered.

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### 7.6.1 Recommendations

- All patients with demonstrated CHD should be actively encouraged to stop smoking using appropriate interventions depending on the patient's stage of change. Rehabilitation staff should offer continued to support to those attempting to quit.
- Appropriate support for smoking cessation should be offered to patients with CHD.
- NRT should be recommended routinely to heavier smokers as a smoking cessation strategy with advice about is use.
- Specialist smoking cessation services should be available to those who still wish to quit but who have been unable to do so with the standard support and advice – usually the heavier, more addicted smoker. This may include pharmacological intervention.

## 7.7 Eating

Most individuals presenting either with a first manifestation of CHD or with a 'step change' of their disease state, would benefit from dietary education and advice. Despite the fact that most of the population are able to demonstrate knowledge of healthy eating, the general population do not adhere to this advice to any great extent.

Barriers to changing eating habits have been identified as awareness (both of the content of a healthy diet and of preparation and cooking skills); access (both in terms of local or accessible shopping facilities and in the food available at workplaces and commercial outlets); affordability and availability (depending on what kind of shops are accessible).

Programmes to help patients change what they eat need to address these barriers and others, such as cultural aspects – which apply not only to ethnic minority populations but also to social and geographical variation in diet, knowledge of food labelling, what processed foods contain – where the salt is, where the fat is, and personal choice.

Setting goals for change in an achievable framework with small steps towards a larger target and being aware always of culture and cost, will help a change programme to be successful. Groups have been shown to be more effective for many than individual interventions in terms of weight control (52). Using an innovative approach and best methods for engaging and holding interest among patients – good visual aids, interactive sessions, motivational interventions, personalised patient literature, will help towards success. Frequent support over the longer term for patients changing eating habits (perhaps a phone line) (53) and dealing with families rather than individuals (54), are also important and should be part of a programme of nutritional intervention for those with CHD. Practical help with recipes, meal planning and food tasting are paramount for changing eating habits and can add a sense of enjoyment and fun to all concerned with CR.

### 7.7.1 Recommendations

- At each ‘step change’ of the cardiac disease process, re-inforcement of healthy eating advice is essential.
- Weight management should be offered to all those with a BMI >25.
- Specialist nutrition group support (and individual support where necessary) should be available for those who wish it and need it to optimise diet and achieve weight loss.

## 7.8 Lifestyle advice and goal setting

The rehabilitation setting often provides a first opportunity to consider health related lifestyle changes and using a goal setting approach and identifying a timetable of change. One goal of the rehabilitation team should be to assist with the decision making stage of such behavioural change by making the link with heart disease and providing an environment in which consideration of change is encouraged. It is but one of the aspects of rehabilitation which must be managed seamlessly between primary and secondary care.

### 7.8.1 Recommendations

- A goal setting approach should be adopted to encourage compliance with behaviour change and adherence to changes made.
- Links should be developed between the specialist smoking, nutrition and exercise services at a local level to further support behaviour change.

## 7.9 Vocational Rehabilitation

Generally regarded as the province of occupational therapists, this area has been neglected in cardiac disease. This may reflect the limited involvement of occupational therapy in CR. Often a cursory assessment of the patient’s job is followed by advice to go back at “x” weeks or retire early. Employers and their medical advisers are not always able to provide the best advice for the patient. There is a need for rehabilitation teams to provided greater support to the patient where there is doubt about fitness to work; and to provide assessment of the patient and workplace to facilitate successful return to work. For those patients for whom return to work is not possible, there may be a need to assist with the implications of enforced early retirement.

### 7.9.1 Recommendations

- Advice should be offered on functional activities and guidance given on how to apply pacing and goal setting to angina management thus maintaining functional independence.

### 7.10 Psychological treatments

Psychological distress is not only very common among CHD sufferers, but such variables are also better predictors of outcome and response to treatment than are physical variables (55). It is important therefore that all rehabilitation programmes have a good psychological basis and that psychological outcomes are assessed routinely. In doing so it is inevitable that a group of patients will be identified with ongoing psychological problems. These may be disease related or predate their CHD. Either way they will have implications for the patient's recovery. While one might expect the depressed patient to rehabilitate less well, there is also evidence that such patients have a higher mortality (56). Managing ongoing psychological distress in cardiac patients requires an understanding of the interplay between their physical and psychological illness, and there is a need therefore for access to health psychology input for such cases. One way of measuring "caseness" in patients who may be suffering from depression is by using the Hospital Anxiety and Depression Scale (HADS) (14) (Appendix six). Other measuring tools are also available.

7.10.1 Recommendations

- If there is prolonged evidence of misplaced anger or sleep disturbance or an inappropriate respones to symptoms then referral to specialist health psychology services should be considered.
- Using the Hospital Anxiety and Depression Scale, patients with scores greater or equal to 11 require additional support. For patients with persistent scores of 11 or closer monitoring should be carried out and referral to specialist health psychology services considered.

# CHAPTER 8: POTENTIAL COSTS OF PROVIDING CR TO ELIGIBLE PATIENTS

## 8.1 Evidence to date

The true costs of CR services are very difficult to determine because programmes are heterogeneous. They have evolved as 'creeping' developments with limited resources as a result of the enthusiasm and dedication of interested staff. Therefore the cost of staff involved in programmes is wide ranging between centers as are the costs of providing and maintaining exercise facilities. Gray et al in 1997 (57) reported staffing costs between £10,000 to £62,000, average costs per patient of £370 and a total cost to the NHS of around £17.76 million per annum. This did not include costs of exercise equipment or maintenance of facilities. The cost per life gained by CR is estimated at £15,700 by Taylor and Kirby 1997 (58) which compares favourably with the costs of statin prescription for cholesterol lowering estimated at £38,300. The cost per quality adjusted life year of CR has been estimated at £6,900 compared with £4,100 for coronary artery bypass surgery for left main coronary artery disease.

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The economic benefits of CR have been mainly assessed in terms of hard outcome measures – mortality, repeat hospital admission and intervention. There is clearly a need to look at patient orientated outcome measures such as stage of behaviour change, quality of life and morbidity including symptoms. This document recommends the provision of a 'menu based approach' to CR that offers a formal assessment of patients at entry to a rehabilitaion programme resulting in an individualised plan of care. This allows resources to be targeted to those who need them offering a "core" and "supplementary" approach.

## 8.2 Staffing and the menu based services

Various staff can be involved in providing the different phases of rehabilitation. Phase I will involve hospital staff who could be nurses, physiotherapists, pharmacists, doctors etc. Phase II may be provided as an outreach of the hospital services either as a phone based service or by home visiting, but can also be provided by community staff e.g. health visitors or practice staff with additional training in CR and in either case partly by phone. Phase III has been described in some detail as part of the menu based approach and Phase IV will involve staff outwith the NHS e.g. local authority leisure staff, perhaps with re-inforcement of lifestyle advice at regular intervals from either a rehabilitation team attached to a hospital or a community or primary care team as other aspects of secondary prevention are reviewed. The approach to be taken will have to be decided locally, based on existing service provision and local decisions about service development.

## 8.3 Cost estimates for phases I-III

To give an indication of the economic implications, the costs associated with the delivery of menu based CR for a population of 205 000 patients in a catchment area of a district general hospital (Royal Alexandra Hospital, Paisley) were estimated. The menu of CR services is defined in chapter seven. Table 3 shows estimates of staff costs for a comprehensive menu based programme for Phases I to III compared to a traditional packaged programme for the Paisley population.

The figures in Table 3 give an order of magnitude of the potential costs for offering a menu-based rehabilitation programme to all those having a 'step change' in their disease, thus they are indicative costs only. The current costs (labelled the "packaged" column) are for those currently identified for a traditional packaged rehabilitation programme in Paisley. This does not include all patients eligible for menu based CR for reasons such as location, intercurrent disease, no menu based approach and so patients not eligible for an exercise based programme, patient unwillingness, etc.

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Table 3 includes estimates for salary costs only. However various staff can be involved in providing the different phases of rehabilitation and the approach to be taken will be decided locally based on existing service provision and local decisions about service development.

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Such decisions will have other cost implications.  The figures do not included start up costs (equipment, computers, printing, training, etc), hospital overheads, costs of medical input, capital charges or maintenance costs of the facilities, nor the potential for rental charges for premises outwith the NHS (since space is frequently unavailable for group based rehabilitation programmes in hospital or out-of-hospital NHS premises).  The figures do not take account of the costs of Phase IV programmes which often involve staff outside the NHS.

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The numbers in the three 'menu based' columns describe various options:

A	the possible number of patients eligible, defined as those having a 'step change' in their condition (pro rata to the A&C row (last column) in Table 2 for the 205 000 Paisley population).

B	The possible number of patients eligible, defined as only those with more than two hospital admissions in twelve months (pro rata to the A&C row (last column) in Table 2 for the 205 000 Paisley population).

C	The possible number of patients eligible, excluding those having a step change i.e. one entry point to rehabilitation only (pro rata to the A&C row (second last column) in Table 2 for the 205 000 Paisley population.

The costs listed in Table 3 are for the current 'packaged' programme in Paisley with current patient numbers, and the costs for a menu-based package for the number of patients in Option A.

## TABLE 3

## COMPARATIVE COSTS OF A TRADITIONAL CR PROGRAMME AND A MENU BASED CR PROGRAMME FOR 205,000 POPULATION

| **No Of Patients** | **Packaged*** | **Menu Based**** | | |
|---|---|---|---|---|
| | **(current provision)** | **OptionA** | **Option B** | **Option C** |
| Post MI | 300 | 320 | 320 | 208 |
| Incident Angina | | 1321 | 1321 | 1321 |
| Emergency hospital CHD admission | | 520 | 68 | |
| Post CABG | 100 | 120 | 120 | |
| Other surgery | | 20 | 20 | |
| Post PTCA | 100 | 120 | 120 | |
| Heart failure | | 240 | 240 | 40 |
| **Total** | **500** | **2661** | **2209** | **1569** |

**Costs**

| **Staff** | **Salary Scales** | | **Hrs/wk** | **Cost for current packaged CR** | | **Hrs/wk** | **Cost for Option A for 205,000 pop.** | |
|---|---|---|---|---|---|---|---|---|
| | min | max | | Min | Max | | min | max |
| **Nursing** | | | | | | | | |
| H grade | 23,270 | 26,610 | | | | 1.5WTE | 34,905 | 39,915 |
| G Grade | 20,830 | 24,090 | 52.5 | 29,162 | 33,726 | 1.5WTE | 31,245 | 36,135 |
| F Grade | | | | | | 1 WTE | 13,331 | 15,417 |
| G Grade (community liaison) | 20,830 | 24,090 | | | | 1.5WTE | 31,245 | 36,135 |
| G Grade (heart failure liaison) | 20,830 | 24,090 | | | | 1.5WTE | 31,245 | 36,135 |
| **Physiotherapy** | | | | | | | | |
| Sen 1 | 20,310 | 23,915 | 37.5 | 20,310 | 23,915 | 1.5WTE | 30,465 | 35,873 |
| Sen 2 | 17,090 | 21,290 | 23 | 10,481 | 13,057 | 1.5WTE | 25,635 | 31,935 |
| Basic Grade | 14,845 | 17,240 | 9 | 3,562 | 4,137 | 1.5WTE | 22,268 | 25,860 |
| **Occupational Therapy** | | | | | | | | |
| Sen 1 | 20,310 | 23,915 | | | | 8.5 | 4,604 | 5,420 |
| **Nutrition** | | | | | | | | |
| Sen 1 | 20,310 | 23,915 | 6 | 3,249 | 3,826 | 1.5WTE | 30,465 | 35,873 |
| Sen 2 | 17,090 | 21,290 | | | | | | |
| **Psychology** | | | | | | | | |
| Clinical psychologist | 39,186 | 65,251 | 3 | 3,135 | 5,220 | 0.5 WTE | 19,593 | 32,626 |
| Psychology assistant | 13,069 | 17,884 | | | | 1 WTE | 13,069 | 17,884 |
| **Sports Scientist** | 13,200 | 25,000 | 6 | 2,112 | 4,000 | 1 WTE | 13,200 | 25,000 |
| **Vocational Counsellor** | 15,000 | | | | | 12.5 | 5,000 | 5,000 |
| **Pharmacist** | 20,724 | 25,673 | | | | 8.5 | 4,697 | 5,819 |
| **Secretarial support** | | | | | | | | |
| Grade 3 | 10,643 | 12,358 | | | | 1.5WTE | 15,965 | 18,537 |
| **Totals** | | | | **72,011** | **87,881** | | **326,932** | **403,564** |

## 8.4 Cost estimates for Scotland and each Health Board area

Table 4 shows the indicative cost for Scotland (based on Table 3) and each Health Board pro rata for each of the three options in terms of numbers of eligible patients. In the Paisley example the costs of providing Option A (all those eligible at each step change entering a CR programme) are approximately 4.5 times the current costs (bottom line of Table 3). For other areas this multiplier may differ since current costs may be of a greater or lesser magnitude than in Paisley due to the variability of current provision and content of CR across Scotland.

### TABLE 4

### POTENTIAL INDICATIVE COSTS OF PROVIDING A COMPREHENSIVE, MENU BASED REHABILITATION PROGRAMME (PHASES I - III) FOR PATIENTS WITH CHD WITH DIFFERENT ELIGIBILITY CRITERIA

**(Board costs are pro rata for Scotland♦)**

| | OPTION A | | OPTION B | | OPTION C | |
|---|---|---|---|---|---|---|
| | MIN (£) | MAX (£) | MIN (£) | MAX (£) | MIN (£) | MAX (£) |
| | | | | | | |
| **SCOTLAND** | **8,164,050** | **10,077,682** | **6,776,775** | **8,365,234** | **4,812,493** | **5,940,528** |
| **A&C** | 677,616 | 836,448 | 562,472 | 694,314 | 399,437 | 493,064 |
| **A&A** | 595,976 | 735,671 | 494,705 | 610,662 | 351,312 | 433,659 |
| **BORDERS** | 171,445 | 211,631 | 142,312 | 175,670 | 101,062 | 124,751 |
| **D&G** | 236,757 | 292,253 | 196,526 | 242,592 | 139,562 | 172,275 |
| **F** | 555,155 | 685,282 | 460,821 | 568,836 | 327,250 | 403,956 |
| **FV** | 440,859 | 544,195 | 365,946 | 451,723 | 259,875 | 320,789 |
| **G** | 840,897 | 1,038,001 | 698,008 | 861,619 | 495,687 | 611,874 |
| **GGHB** | 1,445,037 | 1,783,750 | 1,199,489 | 1,480,646 | 851,811 | 1,051,473 |
| **H** | 334,726 | 413,185 | 277,848 | 342,975 | 197,312 | 243,562 |
| **LAN** | 898,046 | 1,108,545 | 745,445 | 920,176 | 529,374 | 653,458 |
| **LOT** | 1,240,936 | 1,531,808 | 1,030,070 | 1,271,516 | 731,499 | 902,960 |
| **O** | 32,656 | 40,311 | 27,107 | 33,461 | 19,250 | 23,762 |
| **S** | 32,656 | 40,311 | 27,107 | 33,461 | 19,250 | 23,762 |
| **T** | 620,468 | 765,904 | 515,035 | 635,758 | 365,749 | 451,480 |
| **WI** | 40,820 | 50,388 | 33,884 | 41,826 | 24,062 | 29,703 |

♦Scottish costs calculated pro rata from Paisley estimated in Table 3 for a 205,000 population for Option A. Costs for other options pro rata from numbers in Table 2.

♦Costs will vary not only by population size but also by CHD prevalence and local uptake rates. No account has been taken of this in the above Table.

### 8.5 Summary

- Estimates of the numbers eligible for CR vary from 39,200 to 66,500 each year depending on the criteria used to determine eligibility e.g. to include those having a ‘step change’ in disease (and the definition of the 'step change').
- The numbers currently having rehabilitation are estimated to be around 10,000 – between a sixth and a quarter of the potential number.
- Response rates – particularly for those having second and subsequent invitations to join a CR programme – are not well known.
- Current levels of provision are very variable.
- Current service content is very variable although it is unlikely that a ‘menu based approach’ has been fully adopted anywhere in Scotland.
- The costs described do not take account of the costs of Phase IV programmes.
- Costs will vary in any geographical area not only by the population size, whether it is urban or rural, but also by the prevalence of the disease and local uptake rates. No account has been taken of this in Table 4.
- The costs described take no account of data collection costs and audit; nor of capital costs, training, capital charges, maintenance of equipment, setting up and training costs nor of potential rental for premises.

The cost per case will vary depending on the size of the class. Filling class to maximum capacity produces lowest cost per case (to be considered in relation to local access).

The cost of providing a menu based CR programme for all those having a ‘step change’ in their condition in a population of 205 000 (the population in Paisley, Scotland) is estimated to fall in the range of £326 932 to £403 564.

**NB** The SIGN cardiac rehabilitation guideline group are currently considering the costs of rehabilitation. The views expressed here are based on “best practice” and consensus among the group. We did not find the evidence to allow a better description of staffing levels (which are the most substantial part of the cost) but only to describe the aspects of rehabilitation which staff must deliver. The costs offer an estimate of the size of the cost and should only be taken as indicative.

# CHAPTER 9: MONITORING, EVALUATION AND AUDIT

There is a requirement for audit in CR as in any other part of medicine to allow accurate, timely information to support statements of effectiveness and efficiency, and comparison between different centres so that robust assessment of what works best can be made.

## 9.1 Previous work

The Coronary Disease Task Force audit of CR in Scotland (Appendix two and below) has confirmed the need to rationalise the collection of data related to CR and secondary prevention throughout Scotland, a process which could clearly be facilitated by the introduction of IT systems and databases. This could improve both the accuracy and accessibility of such information in the future. In many instances specific figures were unavailable and estimates were given. In addition much of the data referred to patients seen only between Phases I and III of CR. No figures were available related to the number of people who did not attend, or who only partially completed the Phase III programmes

The British Heart Foundation (BHF) in 1995 in conjunction with the British Association of Cardiac Rehabilitation (BACR) conducted an audit of existing rehabilitation programmes in the United Kingdom, focusing on the organisation, programme components and mode of delivery. This provides data on the personnel involved and the number of patients per annum seen in each client group. It demonstrated major differences in service provision throughout the country. The survey was incomplete however and such a database requires continuous updating as services expand and change. It should be a function of the NHS to collect such information relating to both primary and secondary care to allow monitoring of progress towards agreed targets for availability and service content (including staffing levels).

## 9.2 Current work

The BHF is presently piloting a database in a number of centres throughout the U.K. to define and collect a common data set, to help to standardise provision of services and determine outcomes in CR. The database is comprehensive and allows data to be collected retrospectively for patients throughout all 4 phases of CR. It includes a risk factor profile, medical complications, result of exercise testing and pharmacological secondary prevention. It also allows formal psychological assessment using the HADS scale (14) and a Quality of Life questionnaire. It allows measurement of process outcomes from CR such as uptake and drop-out. The database is user friendly. However, the dataset is large and data collection may prove time consuming and may also result in duplication of data collected in other settings e.g. in general practice or medical review clinics.

There is a need for a common Scottish dataset to be agreed. Its content should be determined by having an agreed use for the data. Easy expansion for local purposes on an ad hoc and short term basis should be possible. The CHD Task Force has an opportunity to lead such a process and the dataset should be based on the elements of rehabilitation described above, including stage of change. It should also include common assessment tools to allow comparison of outcomes. Currently for example, the Task Force audit indicates that many different ways of assessing risk factors and behaviours are used. The dataset should be compatible with use across the primary/secondary care interface and consideration given to the integration of pharmacological secondary prevention (e.g. the management of hypertension and raised lipid levels, the use of aspirin), and symptom control into the record.

Duplication of data collection and patient care should be avoided. One simple way forward is a paper based patient held record, which could be electronically generated when electronic links have been developed to a sufficient degree between rehabilitation personnel, specialist support, primary care teams and hospitals. Patient held records empower the patient to take some ownership of their own problems and how they are managed. At some stage, however, with paper based records, the data require to be put into electronic format to facilitate analysis and underpin audit and to produce an output that is suitable for the purpose.

The development of a database which is user friendly and allows electronic collection of data at the various locations associated with CR programmes would obviate the need for paper mode and facilitate audit of programmes. The use of palmtop or laptop computers at the bedside or in the Physiotherapy Department could achieve this. The development of links to a hospital based network through the NHS net would be essential to support this system. A database could then be developed to allow data entry in fields associated with the various disciplines involved in CR, e.g. dietician's fields detailing a formal assessment of dietary habits, interventions and outcomes. Such systems are in development (Royal Alexandra Hospital, Paisley). Common data could be shared between the various disciplines reducing duplication of information which is at present a problem with paper mode, each discipline having their own records. Furthermore, if electronic links are developed between secondary and primary care, communication will improve in terms of discharge information and re-referral of patients to rehabilitation services from the community. Such a network could improve adherence to lifestyle modification in Phase IV of CR if links were further extended. Electronic referral of patients is a government initiative and has been developed for other services such as chest pain

### 9.3 Recommendations

- All CR programmes should participate in a common minimum dataset which would allow evidence of outcomes, participation rates, staffing levels, programme content etc to be reviewed, and best practice shared to improve standards overall.
- The CHD Task Force should lead in the development of such a common dataset (or agree the use of an existing package as a national standard) which would include common assessment tools for standard risks and health behaviours.
- Each Health Board should have a strategy for implementing the recommendations in this document.
- Development of electronic links between the various professional groups involved in a CR programme, and across the primary/secondary care divide, should continue.

## CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

1. Delivery of CR has been historically variable in Scotland. The majority of CR programmes are run by a multi-disciplinary team encompassing education, secondary prevention (both pharmacological and behavioural risk modification), counselling, relaxation and stress management. A structured exercise training programme is the usual focus. They may be community based or hospital based.

2. Patients with established coronary heart disease such as angina or chronic heart failure as well as patients who have suffered an acute cardiac even, revascularisaton or transplantation, have the capacity to benefit from multi-phasic CR interventions.

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3. A ‘menu-based approach’ is recommended as the most effective way of meeting the individual needs of patients.

4. CR is divided into four phases, each with different components. All phases of rehabilitation should be available to CHD patients, at the time of the incident event and when there is a change in the patient’s disease condition i.e. at ‘step changes’ in the disease.

5. Rehabilitation should consist of the following building blocks. Recommendations have been made regarding each of these.

**Education** – to reduce misconceptions and promote understanding and self-efficacy.

- Educational programmes should be centred around clear specific items for discussion. Any programme should cover the patient’s diagnosis and its implications, medication and its effects as well as methods and help available to address lifestyle changes. It should be offered to all patients at the varying stages of the disease process.

**Exercise –** for secondary prevention and/or symptom relief.

- The evidence base for exercise is substantial therefore all those without contraindications should be encouraged to take up the exercise component of programmes.
- Exercise support can be provided in a hospital or community setting.
- The exercise component of rehabilitation should be delivered for those at highest risk (determined from the results of exercise testing, thallium scanning or echocardiography as appropriate) at a venue where access to resuscitation is available. For othersthe availability should include trained personnel, an airway, a semiautomatic defibrillator and access to a telephone to call 999” if required.
- Rehabilitation programmes should offer group exercise opportunities of varying intensity and modality to suit the individual. It is also important to encourage incorporating additional physical activity into the activities of daily living and discouraging a sedentary lifestyle.
- Training sessions should be a mimimum of 3 per week, not all of which require supervision.
- Training sessions should last 12 weeks.

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**Relaxation and Stress Management –** to reduce anxiety and associated physical symptoms.

- Psychological morbidity such as anxiety, depression, cardiac misconceptions, anger and sleep disturbance should be addressed early (Phases I and II) within the CR setting using educational and stress management techniques. They should continue to be re-assessed throughout the programme.

**Lifestyle advice - Smoking –** to support behavioural change.

- All patients with demonstrated CHD should be actively encouraged to stop smoking using appropriate interventions depending on the patient's stage of change.
- Appropriate support for smoking cessation should be offered to patients with CHD.
- NRT should be recommended routinely to heavier smokers as a smoking cessation strategy with advice about is use.
- Specialist smoking cessation services should be available to those who still wish to quit but who have been unable to do so with the standard support and advice – usually the heavier, more addicted smoker. This may include pharmacological intervention.

**Lifestyle advice - Eating –** to support behavioural change.

- At each 'step change' of the cardiac disease process, re-inforcement of healthy eating advice is essential.
- Weight management should be offered to all those with a BMI >25.
- Specialist nutrition group support (and individual support where necessary) should be available for those who wish it and need it to optimise diet and achieve weight loss.

**Goal Setting –** to assist lifestyle change and return to activities.

- A goal setting approach should be adopted to encourage compliance with behaviour change and adherence to changes made.
- Links should be developed between the specialist smoking, nutrition and exercise services at a local level to further support behaviour change.

**Vocational Rehabilitation –** for those returning to work or retiring.

- Advice should be offered on functional activities and guidance given on how to apply pacing and goal setting to angina management thus maintaining functional independence.

**Psychological Treatment –** for those with continuing psychological needs.

- If there is prolonged evidence of misplaced anger or sleep disturbance or inappropriate response to symptoms then referral to specialist health psychology services should be considered.
- Using the Hospital Anxiety and Depression Scale, patients with scores greater or equal to 11 require additional support. For patients with persistent scores of 11 or more, closer monitoring should be carried out and referral to specialist health psychology services considered.

6 . Recommendations have been made regarding the design of CR programmes.

- Packages of intervention should be menu based and tailored to the patient's need and readiness to make lifestyle changes and delivered in relation to core and supplementary services which are determined by the individual skills and knowledge of the rehabilitation team

- Programmes to supplement the core services in smoking cessation, nutrition, weight management, physical activity, health psychology and pharmacology should be available locally.

- Phase II CR should be delivered by the appropriate combination of home visiting and telephone contact with close links between those delivering that phase, primary care and the Phase III service.

- The setting for delivering rehabilitation should be that most suitable to local circumstance and can safely include community settings outwith health service premises for Phase III as well as Phase IV. It can be offered by primary or secondary care staff but in either case with links to the other.

- Delivery of a service to those who are housebound or otherwise unable (e.g. because of distance particularly in rural areas) or unwilling to attend group sessions should be commissioned. Staff providing such a service need not be hospital based but close links, a common approach and good communication should exist between all those involved. Strong clinical leadership is again recommended to foster a consistent team approach.

- CR staff must develop good interagency links with social work departments within the community to ensure appropriate social support and assistance. Knowledge of the benefits available and how to get advice about these to minimise the economic effects of the disease are part of a core service of CR.

- CR staff must develop good links across the primary/secondary care interface to ensure a common approach to health behaviour change, advice giving and secondary prevention in general. Local protocols of care for “secondary prevention” – in this context the thresholds for intervention and targets for hypertension and cholesterol – should be agreed and common between primary and secondary care.

- Patient support groups should be encouraged if there is a desire for these among patients who have undertaken Phase III rehabilitation.

- Phase IV activities in primary care should involve supporting those who have undertaken behavioural change at regular reviews for secondary prevention; and offering appropriate interventions for those at different Stages of Change with regard to health related behaviours, who have not yet undertaken appropriate behavioural change.

- In Phase IV specialist exercise counselling and support should be available for those least active and for those who are having difficulty maintaining an active lifestyle. BACR trained leisure staff can fulfil that role.

7. Estimates of the numbers eligible for CR vary from 39,200 to 66,500 each year depending on the criteria used to determine eligibility e.g. including those having a ‘step change’ in disease (and the definition of the 'step change' used). The numbers currently having rehabilitation are estimated to be around 10,000 – between a sixth and a quarter of the potential number.

8. All Health Boards should have, as part of the Coronary Disease Strategy, a plan to commission services to deliver CR as recommended in this document. Because of the size of the problem this may involve an incremental approach towards a complete service. Part of this strategy will be to identify a strong clinical leadership for the totality of CR and its links with other aspects of secondary prevention.

   Additional funding will be required to offer a ‘menu-based approach’ to rehabilitation for all those with CHD in Scotland. The benefits can be substantial and are estimated not only in mortality reductions but in reduced hospital admissions and improved quality of life for patients.

Appropriate provision of resources should be a priority within each Board. The provision should be based on the current starting point in terms of funding, professional groups involved and the content of rehabilitation. A strategy for change to a ‘menu-based’ service should be developed which defines eligibility based on ‘step changes’ in the disease.

Indicative costs have been included in this document to help guide decisions in Boards. Difficulties in calculating the current costs attributable to rehabilitation should not be underestimated.

9. All CR programmes should participate in a common minimum dataset which would allow evidence of outcomes, participation rates, staffing levels, programme content etc to be reviewed, and best practice shared to improve standards overall.

   The CHD Task Force should lead in the development of such a common dataset (or agree the use of an existing package as a national standard), which would include common assessment tools for standard risks and health behaviours.

10. Development of electronic links between the various professional groups involved in a CR programme, and across the primary/secondary care divide, should continue.

11. Links between health services and local authority leisure staff and others will facilitate the provision of Phase IV rehabilitation and subsequent support for behavioural change.

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## Appendix one: Numbers of patients with a new diagnosis or having a ‘step change’ in condition.

Patients with CHD fall into several groups. Each is a separate manifestation of the same disease. Some patients may move from one to another and some may ever have only one manifestation. Those with a first manifestation will have a requirement for rehabilitation and those who move from one group to another may well have similar requirements. Although other definitions of “step change” are possible we have used any MI, the onset of angina, any emergency hospital admission for CHD (not MI) (an alternative could be more than two emergency hospital admissions for CHD in twelve months), any CABG (or other cardiac surgery) or angioplasty and the first diagnosis of heart failure, as times of a “step change”. Thus a step change in the disease (moving from one group to another) could be considered an “incident” event and such patients should be counted in total numbers eligible for a rehabilitation programme. Total numbers of patients therefore will include some double counting to account for those having step changes in disease manifestation.

Heart attack

The numbers of patients surviving hospitalisation for myocardial infarction in Scotland in 1997-98 is shown in Table 5. The numbers are correlated positively with deprivation (Table 6). In the Scottish Health Survey (1) the proportion of men aged 16-64 who reported a heart attack in the previous 12 months (1995) was 0.4% - men. For women the figure is 0.1% - women.

Many of those having a first heart attack will already have had angina. The MONICA Project figures for North Glasgow indicate that for those surviving a first attack aged 25-64 years the proportion with previous angina is around 25% (first infarction) and 40% (subsequent infarction) (personal communication – Professor H Tunstall-Pedoe).

**TABLE 5**

**PATIENTS SURVIVING 30 DAYS AFTER HOSPITAL DISCHARGE FOLLOWING MYOCARDIAL INFARCTION**

| AGE | <45 | 45-54 | 55-64 | 65-74 | 75-84 | >84 | ALL |
|---|---|---|---|---|---|---|---|
| **MALE** | 304 | 918 | 1330 | 1452 | 784 | 168 | 4956 |
| **FEMALE** | 73 | 224 | 597 | 903 | 897 | 366 | 3060 |

**TABLE 6**

**RELATIVE RISKS FOR MYOCARDIAL INFARCTION BY DEPRIVATION QUARTER GLASGOW MONICA PROJECT 1985-91**

| | MEN | WOMEN |
|---|---|---|
| **Q1** | 1 | 1 |
| **Q2** | 1.35 | 1.67 |
| **Q3** | 1.57 | 2.00 |
| **Q4** | 1.74 | 2.34 |

Within these numbers of MI survivors there is a proportion who would be excluded for a variety of reasons. It is arguable if all the reasons found in one Glasgow study (2) are valid grounds for exclusion. In that study it was found that 64% of MI survivors were excluded - 59% on medical grounds (poor mobility due to arthritis, cerebrovascular disease, peripheral vascular disease, respiratory disease, severe CHD requiring cardiac surgery), 5% due to dementia or alcoholism, 5% were undergoing further investigation, 3% due to distance or the patient was the sole carer of another relative and 20% excluded due to age greater than 75 years. In 18%, no reason for exclusion was documented. Although some of these reasons might apply to an exercise component of a Phase III programme, many are not reasonable given the description of rehabilitation above. Since that study, rates of exclusion in some hospitals in Glasgow have become less than 10% (personal communication – Caroline Morrison).

Angina

The incidence of angina is hard to quantify. A study from Southampton (3) indicates that annual incidence is 1.13% for men and 0.53% for women aged 31-70 years. If this is adjusted for the different mortality rates in Southampton and Scotland, it equates to 1.6% for Scottish men and 1% for women (20,180 men and 13,186 women annually).

In the Scottish Health Survey the prevalence of angina in men and women aged 16-64 is shown in Table 7. The prevalence rises with age and deprivation. Assuming the same prevalence in older age groups (this will be a serious underestimate since the prevalence rises with age) the numbers of those with angina in Scotland are around 98,000 men and 56,000 women. Those who have also had an MI account for around 30% of all prevalent cases of angina.

**TABLE 7**

**PREVALENCE OF SELF-REPORTED ANGINA**
**Scottish Health Survey – 1995**

| | 16-24 | 25-34 | 35-44 | 45-54 | 55-64 |
|---|---|---|---|---|---|
| MEN | - | 0.2 (814) | 0.3 (1113) | 4.1 (13,243) | 14.4 (36,115) |
| WOMEN | 0.3 (954) | - | 0.9 (3366) | 3.1 (10,261) | 9.9 (27,215) |

Hospital admissions for coronary heart disease (CHD)

Many people with angina will have an emergency admission – about 13,000 in 1997. An admission may be considered a step change but may also be at the time of the first manifestation of angina. A rather harder definition – that of repeated hospital admissions for CHD (more than 2 in a twelve month period) might define another group of patients having a step change in symptomatology, poor control of symptoms or poor coping mechanisms for chest pain. In Scotland, of those having an emergency admission for CHD (not MI) in 1996-97 (12,921), 52% had no further admissions in the subsequent 12 months, 23% had one further admission, 11% had two admissions and 13% (1667) had more than 2 subsequent admissions in the 12 months following the index admission.

Heart failure

The incidence of heart failure is difficult to quantify. We know that the prevalence of LVSD in Glasgow is around 6% of the 55-74 year old group (4) (26,832 men and 31,299 women in Scotland pro rata). Assuming a 50% 5 year mortality there would be around an 0.6% annual incidence rate in this age group. This equates in Scotland to 2,683 men and 3,130 women per year. The incidence rises with age and with deprivation. The main precursor is CHD. There would therefore be an overlap with myocardial infarction – often the precipitant event – and angina. For those who develop heart failure, exercise is of proven benefit and it may be that no matter what programmes the patient had been in before, a further encouragement to exercise at a later date e.g. when function was diminishing, would be beneficial.

CABG

There were around 3,000 such procedures carried out in 1998-99 in Scotland. That number is set to increase with the target of 616/million population set by the ME. That equates to around 3,400 procedures each year. The target numbers may well increase following the guidance of the CHD Task Force which will report in the late spring of this year.

There is a great overlap between those having had angina or a previous myocardial infarction and those having CABG. However the time of CABG is a time when behaviour change is prompted and, in addition, increasing exercise may be important since many patients will be deconditioned in the period before surgery.

In 1991-93 there were 1825 MI survivors who went on to CABG within 2 years (around 5%). If the same rate is applied to the current 9,000 annual MI survivors, 450 patients undergoing CABG procedures (of 3,000) would already have been eligible for post MI rehabilitation. The rate of CABG in post MI patients may now be greater.

Angioplasty

There were around 3,000 PTCAs carried out in Scotland in 1998-99. This number is increasing annually. As with CABG there is a great overlap with those having had angina or a previous myocardial infarction. However the time of PTCA is a time when behaviour change is prompted and, in addition, increasing exercise may be important since many patients will be deconditioned in the period before the intervention.

Other surgery

There are a handful of cardiac transplantation procedures carried out each year for Scottish patients. Surgery is also carried out for those with valve disease, These are around 15% of the total cardiac surgery procedures in any year.

## References for Appendix one

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## Appendix two : CHD Task Force survey : summary

A recent survey led by the CHD task force was completed in both primary and secondary care to attempt to determine the current provision of CR and secondary prevention services. A questionnaire was sent to 1000 GP practices and 30 Acute Trusts in Scotland. Additional information about provision in secondary care was derived from the BACR national database and later supplemented by telephone survey (Appendix 3).

### Primary care

Since only 346 practices responded to the questionnaires (35% response rate), the results presented should be interpreted with caution. One hundred and six (32%) said that they provided a CR service. Forty three (41%) reported that this was practice based and 61 (56%) provided a home based CR service. Only 15 (4.3%) practices had a CR database. 198 (59%) reported linking with a CR service in their local hospital and 118 (35%) linked with a liaison service in their area.

Two hundred and sixty six practices (79%) reported offering secondary prevention services. Thirty nine practices (14%) used the Grampian secondary prevention manual. In relation to prompting patient review, 218 (71%) reported this was by opportunistic consultation. 132 (47%) offered a nurse led recall system and 143 (54%) had a computerised system.

### Secondary care

Information about secondary care has been drawn from the BACR national database and the responses to the Task Force sponsored survey (44 CR programmes). Thirty three (75%) offer phase III rehabilitation in hospital (47% in hosppital alone), 9 offer a community based progamme only and 12 (27%) offer both. Eighteen programmes (41%) have a liaison nurse working across the primary-secondary care interface. Twenty four (54%) of programmes have cardiac support/self-help groups.

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Table 8 shows the numbers reported as taking part in a rehabilitation programme each year. This can be compared with Table 7 – potential annual new numbers in each client group. The difficulties with definition probably account for the high proportion of patients post MI apparently receiving CR but comparing the totals gives a better feel of the overall shortfall in provision although these figures represent only *responding* practices and Acute Trusts and are potentially an underestimate. However the audit group consider it likely that non-responders are less likely to be providing CR.

**TABLE 8**

**NUMBERS IN DIFFERENT CLIENT GROUPS REPORTED AS TAKING PART IN REHABILITATION EACH YEAR**
**(Numbers are for responding practices and Acute Trusts only)**

| Client groups | Annual numbers taking part in a rehabilitation programme |
|---|---|
| Post MI | 7148 |
| Angina | 515 |
| Other | 27 |
| Post CABG | 2082 |
| Other surgery (includes transplantation) | 159 |
| Post PTCA | 107 |
| Heart failure | 23 |
| **Total receiving rehabilitation** | **10,061** |

Table 9 shows these numbers by Health Board.

### TABLE 9

### NUMBERS IN DIFFERENT CLIENT GROUPS REPORTED AS TAKING PART IN REHABILITATION EACH YEAR IN EACH HEALTH BOARD

**(Numbers are for responding practices and Acute Trusts only)**

| | POST MI | ANGINA | OTHER | POST CABG | OTHER SURGERY♦ | POST PTCA | HEART FAILURE | TOTAL |
|---|---|---|---|---|---|---|---|---|
| A&C | 610 | 110 | 0 | 126 | 15 | 20 | 15 | 896 |
| A&A | 750 | 0 | 0 | 158 | 19 | 8 | 0 | 935 |
| BORDERS | 149 | 8 | | 18 | | | 3 | 178 |
| D&G | 240 | 150 | 0 | 80 | 20 | 10 | 0 | 500 |
| F | 550 | 5 | 0 | 80 | 17 | 0 | 5 | 657 |
| FV | 290 | | | 49 | | | | 339 |
| G | 454 | | | 120 | | | | 574 |
| GGHB | 1186 | 70 | 27 | 614 | 32 | 14 | 0 | 1,943 |
| H | 300 | 30 | 0 | 72 | 15 | 10 | 0 | 427 |
| LAN | 955 | 60 | 0 | 160 | 29 | 42 | 0 | 1,246 |
| LOT | 938 | 82 | 0 | 420 | 10 | 0 | 0 | 1,450 |
| O | | | | | | | | - |
| S | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| T | 711 | 0 | 0 | 185 | 2 | 3 | 0 | 901 |
| TOTAL | 7,148 | 515 | 27 | 2,082 | 159 | 107 | 23 | 10,061 |

♦other surgery includes transplantation

# Appendix three: The provision of cardiac rehabilitation and secondary prevention services in Scotland: A summary.

Since BACR had recently surveyed the 37 centres in Scotland who were already in their database, these hospitals were initially not asked to completed this questionnaire. The BACR were contacted and offered to provide information on the 37 centres. The aim of the hospital survey was therefore to identify centre not already in the BACR database and to cast a wide net to encompass the activity which may now be taking place in community hospitals. It later transpired that the data they had provided was almost 3 years old thus may not reflect current services. It was therefore necessary to contact these centres by telephone to obtain updated information.

## Aims and objectives

The overall aim of this survey was to describe the current national picture of the provision of CR and secondary prevention services in Scotland.

This would also identify
- which client groups currently received these services,
- in what format CR was provided
- what resources were available in the CR programmes

And to some extent
- how the effectiveness of these programmes was currently evaluated by research and audit.

The results will be presented in two sections, the first relating to services within secondary care and the second related to services in primary care. This will include the most recent data available in relation to CR services in both primary and secondary care in Scotland. The results are presented below.

## Cardiac Rehabilitation Services in Secondary Care

The survey of the centres initially identified in the BACR data base and supplemented by the questionnaire distributed by the CHD task force and generated data on an additional 8 cardiac rehabilitation programmes in Scotland resulting in a total of 44 CR programmes.

It was intended to make this as representative as possible and to try to embrace CR activity which may also have taken place in cottage hospitals. It is important to recognise at this point that the development and delivery of services has been directed by client need for example the provision of services in a rural area e.g. Dumfries and Galloway may take on a different format from the provision of services in an inner city area. The data, which will be presented, is descriptive data.

Each of the centres was asked if they had a CR database, 18 (40.9%) do have, 22 (50%) do not, 2 are in the process of developing these and 2 did not respond to this question.

### The provision of Phase III CR

In relation to Phase III 33 (75%) of programmes offer this in hospital, 21 (47%) offer a community based programme and 12 programmes (27%) offer both. 28 programmes (63.6%) offer home visits however in only 18 centres (41%) is there a liaison nurse who works across the primary secondary care interface and the hours worked per week range from (5 to 37.5). The remainder provide home visits as part of the heart manual programme or by the hospital based nurse completing one home visit. The heart manual is used in 21 (47%) of the programmes, either alone or in addition to a conventional rehabilitation programme. 24 programmes (54%) reported having cardiac support/self help groups.

### Client groups offered CR

The groups of clients seen included the following – data was unavailable from 13 programmes. A total of nineteen programmes identified exclusion criteria for attending rehabilitation. This included age (1), physical handicap (12), psychological problems (8) and other reasons (17). With reference to other reasons 12 were due to medical conditions, 3 related to fitness and in 2 other reasons were given.

Patients receiving cardiac rehabilitation

| Clients | estimated number of pts per annum |
|---|---|
| Post MI | 7148 |
| CABG | 2082 |
| ♦Other Surgery | 159 |
| Post PTCA | 107 |
| Heart failure | 23 |
| Angina | 515 |
| Other | 27 |
| Total | 10,061 |

♦Other surgery included transplantation

This data may also be considered in the following way :

| | Number of patients receiving CR |
|---|---|
| MI | 7148 |
| Post surgery/PTCA | 2348 |
| Angina | 515 |
| Other | 27 |

### CR Programme Components

The respondents were asked about the components of the CR programmes and these were reported as education, exercise and psychological input. Twenty-five programmes offered education and exercise as a combined programme.

| Education Programmes included | No. of programmes | % | Not completed |
|---|---|---|---|
| Information about the CHD process | 38 | 86.4 | 4 |
| Risk factors | 38 | 86.4 | 4 |
| Benefits of Exercise | 37 | 84.1 | 5 |
| Drug Therapy | 37 | 84.1 | 4 |
| Stress management | 30 | 68.2 | 7 |
| Relaxation training | 32 | 72.8 | 8 |
| Counseling | 25 | 56.8 | 11 |
| Job counseling | 10 | 22.7 | |

Additional components reported included dietary advice on healthy eating, smoking cessation and basic life support training.

The duration of the education programmes varied from 2-12 weeks in duration (median 6 weeks), 23 programmes offered educational sessions once per week and 6 twice per week, and the sessions lasted between 20 and 90 with the majority lasting 1 hour.

The other major component of CR is the provision of exercise, which can result in physical benefits as well as increasing confidence. Exercise was offered in the following way.

| | No of programmes | % | No response |
|---|---|---|---|
| On an individual basis | 19 | 43 | 8 |
| As a group | 35 | 79 | 4 |
| Home based | 21 | 47 | 0 |

The majority of programmes offered exercise as group classes. One programme who had identified through evaluation that many patients did not like exercising in a group session has developed an exercise video for use at home which has been received very positively by the patients.

The duration of the exercise programmes varied from 5-13 weeks (median 11.5 weeks). Many of the 19 programmes reporting individual exercise programmes provided this using the heart manual thus the median duration of the programme was 6 weeks. Similarly this was the case in the group receiving home base exercise, Of those 35 programmes offering a group class, the median value was an 11.5 week programme, in 11 cases this was offered once per week and in 16 cases exercise was provided twice per week. Only one centre offered exercise three times per week. Other programmes did not report the frequency or duration of exercise programmes.

In terms or pre and post programme assessment the following were completed

| ASSESSMENT | pre | | post | |
|---|---|---|---|---|
| | N | % | n | % |
| Risk factor | 3 | 86.9 | 32 | 72.7 |
| Psychological state | 32 | 72.8 | 25 | 56.8 |
| Quality of life | 15 | 34.1 | 12 | 27.3 |
| Usual level of physical activity | 35 | 79.5 | 30 | 68.2 |

In order to assess suitability to enter the programme as well as the fitness level of the patients before and after attending rehabilitation, a number of other measures were used. These Physical assessments included the following.

| | pre | % | post | % |
|---|---|---|---|---|
| Treadmill testing | 26 | 59 | 10 | 22.7 |
| Walking test | 8 | 18.2 | 7 | 15.9 |
| Step test | 10 | 22.7 | 9 | 20.4 |
| Bicycles | 4 | 9.1 | 4 | 9.1 |

**Research activity**

17 programmes (38.5 %) were actively involved in current research, 26 (59.1 %) had previously been involved in research, 26 (59.1%) would wish to be involved and 31(71.5%) are involved in audit of the service

**Staffing for the rehabilitation programmes**

Most programmes were co-ordinated and led by nurses (27) or physiotherapists (6) or by both disciplines (3). The others (8) included health visitors (3), Dr (1) and OT (1). Cardiac rehabilitation is a multi disciplinary programme therefore a variety of health care staff have input into the CR service. In many cases this input is part of a wider service and often provided on a voluntary basis by the individuals for example attending the education programme to deliver a 30-minute to one-hour talk. In addition they may see patients during their in patient stay but most programmes have found it very difficult to provide an accurate indication of the hours of input by PAMS staff to cardiac rehabilitation.

Whilst we have already acknowledged that most of the programmes are led by nurses the seniority of staff involved has ranged from a senior staff nurse (grade E) to an H grade nurse. The majority seems to have one G grade nurses (36 programmes) who work full time. Six programmes had a more senior H grade nurses (5 were employed full time). Eleven programmes had F grade staff involved (median 19 hours), and 5 had E grade staff nurses (median 7.5 hours).

Physiotherapists were involved in the majority of programmes either for between 20 and 40 hours. Dieticians and pharmacists were involved to varying degrees, some visiting all patients on the wards or at clinics, others having input only into the out patient phase. Few programmes had occupational therapy involvement, only one has a designated half time psychologist, social workers were involved by referral on an individual basis. An exercise physiologist was involved in 1 programme and a sports scientist in one programme. Many had access to a cardiologist or physician however only one programme was led by a medic. A variety of other staff had attachments for example physiotherapy assistants (2) audit staff, resuscitation training officers, smoking cessation counselors, fitness instructors (2) and relaxation therapists.

In conclusion, this summary has provided some indication of the provision of services within secondary care, which in the main still seem to target post MI and post surgical patients. Provision for other client groups remains limited. There are great variations in the provision of personnel. The education and psychological components of the programmes seem similar in general content but variable in duration. The exercise components are also variable with only one programme meeting the recommended provision of exercise at least three times per week. It is therefore clear that there will need to be further investigation into the provision of CR and evaluation of the clinical outcomes and exploration of alternative modes of delivery of CR in Scotland.

## Primary Care

Questionnaires were distributed to 1000 GP practices in Scotland. 346 practices responded to the questionnaires (35% response rate). This represents approximately one third of the practices in primary care therefore the results should be considered bearing in mind the limitations of the data collected. It is also possible that the practices that have responded as those which are motivated with an interest in or already active in CHD management. Even so, a number of sections were not completed and in terms of the provision of figures related to patient numbers this was often an estimate rather than derived from factual data. It would therefore not be appropriate to extrapolate these results to all practices otherwise it may be possible to grossly overestimate the activity, which is ongoing in primary care. The results presented should be therefore be interpreted with caution bearing this in mind.

### Cardiac rehabilitation services

106 practices (32%) said that they provided a CR service, which is only 10% of all general practices. The following results therefore only represent a small percentage of general practices in Scotland. Forty-three of the 106 practices (41%) reported that this was practice based and 61 (56%) provided a home based CR service. Only 15 practices (14%) have a CR database. The lack of available data via information technology again reflects that these figures may not be particularly accurate. One hundred and ninety eight practices (59%) reported linking with a CR service in their local hospital and 118 (35%) linked with a liaison service in their area.

The client groups included in the CR services are shown on the table below.

| Diagnosis | respondents | pt. numbers (median) | estimate of pts P/A (median) |
|---|---|---|---|
| MI | 71 | 10 | 710 |
| Angina | 19 | 8 | 152 |
| Pre surgical | 11 | 3 | 33 |
| Post surgery | 32 | 5 | 160 |
| Pre ptca | 5 | 3 | 15 |
| Post ptca | 8 | 4.5 | 36 |
| Heart failure | 7 | 2 | 14 |
| Transplant | 4 | 2 | 8 |
| Hypertension | 4 | 31 | 124 |
| Other | 3 | 30 | 90 |
| TOTAL | | | **1342** |

The delivery of the CR programme 77 respondents (71%) said this was through consultation with individual patients, 81 (75%) said this was individual consultation with patients and partners. 62 (57%) of practices use the heart manual. Only a small number offered group classes for patients 26 (24%), and even less offered group classes for partners 6 (6%), 15 practices (14%) offered group classes for patients and partners. In terms of the components of the group classes education classes were provided by 16 practices (15% of total practices), exercise classes by 21 (19%), combined education/exercise classes 20 (19%).

| The CR programme included; | n | % |
|---|---|---|
| Risk factor screening | 81 | 76 |
| Smoking cessation | 95 | 90 |
| Weight reduction | 90 | 85 |
| Cholesterol reduction | 91 | 85 |
| Hypertension management | 71 | 73 |
| Stress management | 82 | 77 |
| Education & counseling | 96 | 91 |
| Exercise programme | 86 | 81 |

It should be considered whilst this activity appears relatively high. The limitations of the data collection did not offer any detail of the frequency of consultations, how this was delivered nor the specific content of the programmes.

In terms or pre and post programme assessment the following were completed

| ASSESSMENT | pre | | post | |
|---|---|---|---|---|
| | N | % | n | % |
| Risk factor | 62 | 59 | 68 | 64 |
| Psychological state | 49 | 46 | 62 | 59 |
| Quality of life | 41 | 39 | 50 | 47 |
| Usual level of physical activity | 57 | 54 | 64 | 60 |

Additional assessments
47 practices (44%) completed audit, 6 practices (6%) patient questionnaires, 6 practices (6%) interviews and 4 practices (4%) involved in research.

The provision of CR in the community is very small in comparison to the data provided by the acute hospital trusts. This suggests that this service be clearly still led from secondary care.

**Secondary prevention services in primary care**

266 practices of the 336 (79%) said that they offered a secondary prevention services. And 39 practices (14%) used the Grampian secondary prevention manual. In relation to prompting patient review 208 (71%) reported that this was by opportunistic consultation, 132 offered a nurse led recall system (47%) and 143 (54%) had a computerised system

The review for patient was reported to be carried out through a pre-arranged appointment with the nurse/health visitor in 166 cases (61%), pre arranged appointment with the GP - 134 (52%). Some practices offered this as a clinic format or structured system 79 (20%). 129 practices (49%) reported that partners were involved and a further 64 (24%) said sometimes.

Client groups who were offered secondary prevention included

| Patient group respondents | pt numbers median | estimate of pts PA median | |
|---|---|---|---|
| MI | 107 | 20 | 2140 |
| Angina | 89 | 30 | 2670 |
| Pre surgical | 29 | 2 | 58 |
| Post surgery | 52 | 5 | 260 |
| Pre ptca | 26 | 2 | 52 |
| Post ptca | 43 | 3 | 129 |
| Heart failure | 45 | 10 | 450 |
| Transplant | 15 | 1 | 15 |
| Hypertension | 65 | 100 | 6500 |
| Other | 49 | 20 | 980 |
| Total | | | **13,254** |

Alternatively this may be considered in the following way

| | Patients per annum |
|---|---|
| MI | 2140 |
| Angina (inc pre ptca & surgery) | 2780 |
| Post intervention (surg & PTCA) | 389 |
| Hypertension | 6500 |
| Other | 1445 |

The programme components included

| | N | % |
|---|---|---|
| Risk factor screening | 249 | 94 |
| Smoking cessation | 249 | 94 |
| Weight reduction | 239 | 90 |
| Cholesterol reduction | 256 | 97 |
| Hypertension management | 257 | 97 |
| Stress management | 111 | 41 |
| Education & counseling | 234 | 88 |
| Exercise programme | 143 | 54 |

In terms of assessments offered during the secondary prevention service programme the following were completed

| ASSESSMENT | n | % |
|---|---|---|
| Risk factor | 235 | 88 |
| Psychological state | 91 | 34 |
| Quality of life | 126 | 47 |
| Usual level of physical activity | 195 | 73 |

Additional assessments
147 (55%) completed audit, 10 (9%) patient questionnaires, 14 (13%) interviews and 10 (9%) were involved in research.

In conclusion, it seems that there is some activity in relation to cardiac rehabilitation in primary care however at present this seems to target just over 1300 patients. This represents only about 10 % of those who are seen for secondary prevention. The principle activity is related to the provision of secondary prevention services (13,254) and ongoing monitoring in primary care. This may however be seen as the most appropriate way to deliver services in primary care. Some form of secondary prevention services were offered by most of the 108 practices who responded but the delivery of this service appears to continue in an unstructured fashion with few practices opting for a systematic (clinic type) service despite research to suggest that this was beneficial (Campbell et al).

The collection of this data has provided some insight into what is currently happening in primary and secondary care. Clearly cardiac rehabilitation remains led by acute hospital trust with much of Phase III still being completed in the hospital setting. What has increased however is the move to transfer services to primary care beginning by establishing stronger links with professionals in the community and across the primary secondary care interface.

These data have a number of limitations for example the detail of the information collected was inhibited by the manner in which the questionnaires had been completed for example in many instances specific figures were unavailable therefore estimates were given. In addition much of the data referred to patients seen between Phases I and III of CR but no figures were available related to the number of people who did not attend, or only partially completed the Phase III programmes

This exercise has confirmed the need to rationalise the collection of data related to CR and secondary prevention throughout Scotland. A process which could clearly be facilitated by the introduction of IT systems and databases. This could improve both the accuracy and accessibility of such information in the future. A number of initiatives are ongoing and some examples of this are included. BACR have a data base which principally relates to information related to cardiac rehabilitation programmes focusing on the organisation, programme components and mode of delivery. This provides data on the personnel involved and the number of patients per annum seen in each client group. Recently the BHF database has been developed and is currently being circulated throughout the UK. This database includes a demographics record for each patient, a rehabilitation record (which has a rehabilitation cycle, which relates to the 4 phases of CR, thus allowing a baseline assessment and repeat assessment s and repeat assessments). Within this record data is included on risk factors, medical and cardiac problems, medication, Exercise tolerance tests, other investigations and psychology/quality of life measures. This allows differences between the baseline and repeat assessments to be measured in an attempt to measure the efficacy of the programme. In addition this also has a discharge summary and a nurse summary used to record the various measures of the efficacy of CR. This allows collation of the information on each patient to include in the BHF annual report[1]. Another example of a database is the one in use in Ayrshire and Arran Acute Hospitals NHS Trust, which was originally developed as an audit tool for secondary prevention it has evolved into a clinical tool for the Cardiac Rehabilitation team. Information gathered in this database includes the clinical diagnosis including length of stay, complications of the in-hospital stay, administration of thrombolysis and prescribed medication. Key personnel and any referrals to the multi-disciplinary team members are also recorded. A summary of the information given to patients whilst in hospital is also given. A screen relates to the management of risk factors, which allows data to be entered at different time points thus allowing some comparison to be made. Information is also recorded related to the cardiac exercise class, which looks at attendance rates, reasons for non-completion and any complications, which have arisen during the exercise class. The system is able to produce “one year anniversary letters” which Primary care use to audit the implementation of CR. These different examples of databases demonstrate the information which could be obtained by this method. What would be essential however would be to agree minimum data set to be collected by all centres which could be accessed nationally for audit and evaluation of CR.

The next stage in this process would clearly be to facilitate the transfer of this information to primary care to facilitate the ongoing recovery and monitoring of these patients with CHD.

This has provided some indication of the provision of services, which in the main seem to target MI and post surgical patients. Provision for other client groups are limited. There are great variations in the provision of personnel. The education and psychological components of the programmes seem similar in content but variable in duration. The exercise components are also variable with only one programme meeting the recommended provision of exercise at least three times per week.

Despite the limitations of the data collected and thus reported it is encouraging to see that cardiac rehabilitation services are expanding in Scotland. The data provision of CR 3 years ago suggested that we target approximately 7,500 patients and this has now increased to an estimated 10, 061 patients per annum. It is encouraging to see the wider focus of CR an additional investment of resources to include additional client groups in particular those with heart failure and pre surgical patients.

The picture of the current provision of CR in Scotland would clearly be enhanced by the completion of further research and audit on a national basis throughout Scotland. To provide further evidence of the value and clinical effectiveness of this service it is vital to commission and conduct research into the

Provision and modes of delivery of CR, to evaluate the clinical outcomes of attendees and non-attendees and utilise this information to direct the future provision of this service in Scotland.

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[1] BHF CR Database - user guide 2000

## Appendix four : Research action points

1. While a menu-based approach is widely advocated, there is a need for research to define the beneficial components of that menu, the effectiveness and applicability of such an approach, whether different groups of patients benefit similarly or not from different parts of the menu and how to identify those who will gain that benefit.

2 Community based cardiac rehabilitation is seen as a logical development, allowing integration with existing community resources, but there is a need to research models of provision.

3 There is realistically no possibility of conducting a large multicentre trial of cardiac rehabilitation for post MI patients. The extension of rehabilitation programmes to angina and heart failure could present such an opportunity.

4 There is a need to assess, whether for unselected patients or those assessed to be particularly ready to change, attendance at rehabilitation facilitates behavioural change longer term.

5 There is a need to define and research effective phase IV elements in addition to secondary prevention clinics.

6 More research is needed into the long-term benefits of cardiac rehabilitation.

7 More research is needed into the best methods of assisting in behaviour change, and also in encouraging perseverance with behaviour change once established, for physical activity, smoking and eating habit.

8 More research is needed to investigate the effects of rehabilitation programmes and whether different approaches are required for older populations, women, and encouraging and supporting behaviour change in ethnic minority populations.

9 Research is required into the effects of rehabilitation for those with angina on the delivery of other aspects of secondary prevention, hospital admission, quality of life and mortality.

10 A stronger basis for recommending different exercise intensities and frequencies for best reductions in symptoms, reinfarction and mortality is required.

11 Rigorous qualitative research is needed to inform efforts to improve uptake and maximise completion of programmes and optimise perseverance with behavioural change. This should include aspects of health beliefs and behaviours and other sociological aspects including during the pre-morbid phase.

12 There is currently a poor evidence base for Phase IV interventions. There is a need to define and research effective Phase IV elements e.g. ways of providing ongoing support for behaviour change (Phase IV CR), outcomes of different models of Phase IV CR e.g. support groups, regular primary care review.

13 There should be monitoring of the implementation of the recommendations of this report comparing different areas and attempts should be made to correlate the extent

of the availability and uptake of rehabilitation services with the impact on cardiac services in a locally.

14 There should be further research into the role of partners and families in supporting behaviour change

15 There should be further research into the effects of the provision of rehabilitation programmes on, and the requirements of, the partners and families of patients.

16 There is a need to look at different ways of providing Phase II rehabilitation. Comparison of home visiting and telephone follow-up should be undertaken in terms of e.g. outcomes, uptake of phase I!! Rehabilitation, cost and patient satisfaction

17 Further investigation of the effectiveness and cost-effectiveness of different ways of providing Phase I rehabilitation is required.

## Appendix five: Borg scale

ASK THE PATIENT HOW HARD THEY FELT THEY WERE WORKING.
Offer them the scale so that they can choose a description and the number attached to that description is what is recorded.

**How would you describe the work you did on the Treadmill?**

(Choose a number on the line)

| | |
|---|---|
| **6** | **no effort** |
| **7** | **very very light work** |
| **8** | |
| **9** | **very light work** |
| **10** | |
| **11** | **fairly light work** |
| **12** | |
| **13** | **somewhat hard work** |
| **14** | |
| **15** | **hard work** |
| **16** | |
| **17** | **very hard work** |
| **18** | |
| **19** | **very very hard work** |
| **20** | **maximal effort** |

## Appendix six: Hospital Anxiety and Depression Scale (HADS)[14]

Patients are asked to choose one response from the four given for each interview. They should give an immediate response and be dissuaded from thinking too long about their answers. The questions relating to anxiety are marked "A", and to depression "D". The score for each answer is given in the right column. Instruct the patient to answer how it currently describes their feelings.

| **A** | **I feel tense or 'wound up':** | |
|---|---|---|
| | Most of the time | 3 |
| | A lot of the time | 2 |
| | From time to time, occasionally | 1 |
| | Not at all | 0 |

| **D** | **I still enjoy the things I used to enjoy:** | |
|---|---|---|
| | Definitely as much | 0 |
| | Not quite so much | 1 |
| | Only a little | 2 |
| | Hardly at all | 3 |

| **A** | **I get a sort of frightened feeling as if something awful is about to happen:** | |
|---|---|---|
| | Very definitely and quite badly | 3 |
| | Yes, but not too badly | 2 |
| | A little, but it doesn't worry me | 1 |
| | Not at all | 0 |

| **D** | **I can laugh and see the funny side of things:** | |
|---|---|---|
| | As much as I always could | 0 |
| | Not quite so much now | 1 |
| | Definitely not so much now | 2 |
| | Not at all | 3 |

| **A** | **Worrying thoughts go through my mind:** | |
|---|---|---|
| | A great deal of the time | 3 |
| | A lot of the time | 2 |
| | From time to time, but not too often | 1 |
| | Only occasionally | 0 |

| **D** | **I feel cheerful:** | |
|---|---|---|
| | Not at all | 3 |
| | Not often | 2 |
| | Sometimes | 1 |
| | Most of the time | 0 |

| **A** | **I can sit at ease and feel relaxed:** | |
|---|---|---|
| | Definitely | 0 |
| | Usually | 1 |
| | Not Often | 2 |
| | Not at all | 3 |

| **D** | **I feel as if I am slowed down:** | |
|---|---|---|
| | Nearly all the time | 3 |
| | Very often | 2 |
| | Sometimes | 1 |
| | Not at all | 0 |

| **A** | **I get a sort of frightened feeling like 'butterflies' in the stomach:** | |
|---|---|---|
| | Not at all | 0 |
| | Occasionally | 1 |
| | Quite Often | 2 |
| | Very Often | 3 |

| **D** | **I have lost interest in my appearance:** | |
|---|---|---|
| | Definitely | 3 |
| | I don't take as much care as I should | 2 |
| | I may not take quite as much care | 1 |
| | I take just as much care as ever | 0 |

| A | **I feel restless as I have to be on the move:** | |
|---|---|---|
| | Very much indeed | 3 |
| | Quite a lot | 2 |
| | Not very much | 1 |
| | Not at all | 0 |

| D | **I look forward with enjoyment to things:** | |
|---|---|---|
| | As much as I ever did | 0 |
| | Rather less than I used to | 1 |
| | Definitely less than I used to | 2 |
| | Hardly at all | 3 |

| A | **I get sudden feelings of panic:** | |
|---|---|---|
| | Very often indeed | 3 |
| | Quite often | 2 |
| | Not very often | 1 |
| | Not at all | 0 |

| D | **I can enjoy a good book or radio or TV program:** | |
|---|---|---|
| | Often | 0 |
| | Sometimes | 1 |
| | Not often | 2 |
| | Very seldom | 3 |

| | **Scoring (add the As = Anxiety. Add the Ds = Depression).**<br>The norms below will give you an idea of the level of Anxiety and Depression. | |
|---|---|---|
| | 0-7 = Normal | |
| | 8-10 = Borderline abnormal | |
| | 11-21 = Abnormal | |
| | | |