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The British Journal of Cardiology

Supplement 1

Volume 18 Supplement 1 | February 2011

Setting the standard for cardiac rehabilitation

ISSN 0969-6113 (Print) ISSN 1753-4313 (Online)

The supplement was sponsored by Abbott Healthcare Products Ltd.

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The British Journal of Cardiology

The peer-reviewed journal linking primary and secondary care

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Annual subscriptions for 2011
UK & Europe:
Individual GBP 110.00
Institution GBP 170.00
Elsewhere:
Individual GBP 175.00
Institution GBP 245.00

Published bi-monthly and distributed on a controlled circulation to general practitioners with an interest in cardiology, hospital cardiologists, diabetologists, vascular and cardiothoracic surgeons. The Journal may be provided, free, on request to other registered medical practitioners and GP trainees.

ISSN 0969-6113 (Print)
ISSN 1753-4313 (Online)

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SPONSORED SUPPLEMENT

Foreword

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Robust clinical and economic evidence suggests that cardiac rehabilitation (CR) should be an important and integral component of care for many patients with heart disease. Nationally, the mean uptake for cardiac rehabilitation is as low as 38% of appropriate patients, with widespread geographic variation.[1] The launch of the National Audit of Cardiac Rehabilitation (NACR) in 2007 focused attention on the importance of access to specialist rehabilitation services in the effective management of patients with coronary artery disease and heart failure. The campaign, led by the British Heart Foundation (BHF) with support from the British Association of Cardiac Rehabilitation (BACR), demands that all patients who might benefit should be able to access CR services, either in a medical setting or at home.

To address the question of increasing engagement with CR programmes in target areas, in 2009, I chaired a Steering Committee convened by Abbott Healthcare Products Ltd. (formerly Solvay Healthcare) called 'Setting the Standard for Cardiac Rehabilitation' (START). The Steering Committee advised that the existing Cardiac Networks in each region would be the best forum for disseminating information about changes in CR funding and standards of care in this field. Abbott Healthcare Products Ltd. kindly agreed to organise a series of meetings in the UK, held during 2009 and early 2010, with the aim of raising awareness of the importance of CR and reviewing best practice.

This supplement has been developed to provide insights into the issues covered by these meetings and to share important messages about modern CR from the meeting contributors.

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1. National Audit of Cardiac Rehabilitation, Annual Statistical Report 2009. www.cardiacrehabilitation.org.uk/nacr/docs/2009.pdf

Sponsorship statement

This supplement was commissioned by Abbott Healthcare Products Ltd., who also sponsored its development, print and distribution in the British Journal of Cardiology. It reports on a series of meetings recommended by the Setting the Standard For Cardiac Rehabilitation (START) Steering Committee, a committee convened by Abbott Healthcare Products Ltd. to address the question of increasing engagement with cardiac rehabilitation programmes in target areas. The supplement was written by healthcare professionals involved in these regional meetings, which Abbott Healthcare Products Ltd. were also involved in coordinating. These authors and the British Journal of Cardiology reviewed the supplement before publication. Abbott Healthcare Products Ltd. also reviewed the supplement for compliance with the ABPI Code of Practice.

Conflict of interest: Dr John Buckley, Sue Baic, Dr Adrian Brady, Judith Edwards, Dr Jane Flint, Professor Julian Halcox, Alison Mead, Dr Amarjit Sethi and Dr John Townend all received an honorarium from Abbott Healthcare Products Ltd for authoring this supplement. The honorarium for Dr John Buckley was passed to the British Association for Cardiac Rehabilitation.

Editors' note: As this supplement went to press, the British Association for Cardiac Rehabilitation (BACR) announced that it had changed its name to the British Association for Cardiovascular Prevention and Rehabilitation.

Why is cardiac rehabilitation so important?

Taking the traditional components of cardiac rehabilitation and making them fit contemporary service and patient needs

John Buckley
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Current statistics, available from outcomes following the National Service Framework (NSF) on Coronary Heart Disease,[1] show that more people are surviving longer both after an acute coronary event and after a symptom-led diagnosis of coronary artery disease. In the past, cardiac rehabilitation (CR) played a key role in preventing premature mortality[2] but more recently the greatly enhanced emergency services, better public education and more aggressive and widely available medical interventions may have diminished the effect of CR on premature mortality. There is now an increasing focus on productivity of life in those surviving acute myocardial events. Productivity refers to people's active involvement in the local social and economic fabric of their families, friends and community. Some of these matters are less likely to be a function of technical medical care but rather a function of healthcare professionals providing therapeutic and health-promoting support for people to manage the physical, mental, domestic, occupational and social aspects of their lives – all of the goals at the heart of a good CR and chronic disease management and prevention programme.

WHO definition

The World Health Organization (WHO) defined CR in 1993 in a timeless way that is inclusive and sensitive to the psychosocial, biomedical, professional expertise and service delivery mode and location elements required of a contemporary CR service.

"The sum of activities required to influence favourably the underlying cause of the disease so that (people) may by their own efforts preserve, or resume when lost, as normal a place in the community…

…it must be integrated within secondary prevention services of which it forms one facet".[3]

BACR definition

This article reflects on how this definition dovetails with the BACR Standards and Core Components and the various considerations required for delivering a successful CR service.

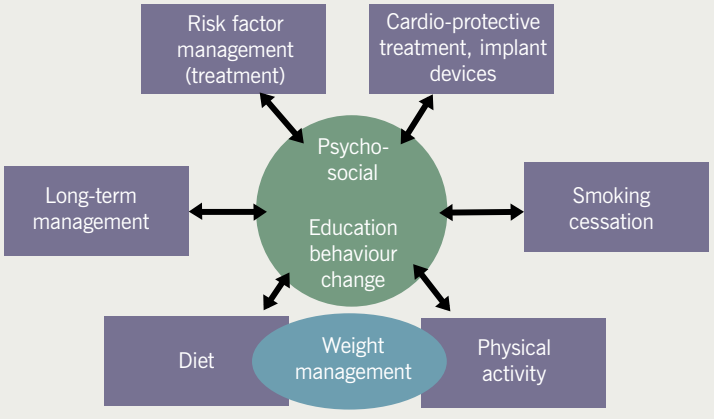
The WHO definition starts with the words, "the sum of activities"; the BACR describes these activities as its core components, including:[4]

- physical activity and exercise
- diet and weight management
- smoking cessation
- education
- risk factor management
- psychosocial elements
- cardioprotective drug therapy and implantable devices, and a
- long-term management strategy.

Figure 1 illustrates a model to show how the psychosocial and educational (health behavioural) component of CR has a central core role that is linked with the successful management or change of each of the other components.[4] **Figure 1** also aims to represent a patient-centred approach, again reflecting the WHO definition (*…by their own efforts preserve, or resume when lost, as normal a place in the community*).

In this schematic, the patient's psychosocial status and mental well-being as well as his or her readiness and ability to make health behaviour changes, supported through education and 'motivation-to-change' techniques, are at the core of achieving each of all the other components.

Figure 1. An integrated representation of the BACR core components[4]



This figure has been created with the permisson of the BACR

In facilitating the patient to take control of managing his or her own condition, CR services ideally need to provide each patient with the choice of receiving his/her programme in the setting most conducive to achieving the greatest chance of long-term adherence to a healthier lifestyle. Typical choices are a hospital, community or home-based programme; each of these venues has benefits and drawbacks. Without going into further detail, there is one underlying factor that needs to be ensured; that all the BACR Standards and Core Components should be provided, wherever the patient participates in the programme. Patients should all receive expert support, care and guidance in each of the components required to meet their individual needs.

Creation and definition of the success of a CR programme are concepts determined from examples of good practice. The BACR Standards are built on a foundation of scientifically proven studies.[4] Contemporary work defines the need for an integrated multidisciplinary team of specialised practitioners who can demonstrate expertise and leadership in the core components. Two factors make programmes successful: the ability to recruit a large percentage of eligible patients to join and then complete the programme; and a programme that delivers what is required in the BACR Standards. The required health outcomes are then more likely to be achieved.

Creating a successful programme

Currently, the National Audit for Cardiac Rehabilitation (NACR) reports that fewer than 40% of eligible patients take up CR.[5] There are model programmes throughout the UK, however, that do meet National Service Framework (NSF) targets of 85%.[6] In my observations and discussions of these programmes there seem to be two key ingredients that lead to such success:

- A doctor specialising in cardiovascular disease who is an integral part of the CR team and who uses his/her influence not only clinically but in management and service delivery/funding issues and planning.
- A lead clinician who is experienced in cardiac care and service management and who has the initiative and ability to integrate many people, facilities and departments. This is all done with the aim of recruiting the highest proportion of eligible patients, by managing an information and communication system that encourages patients to recognise the value of the CR service as a key part of their cardiac care and hence the need for them to participate in the programme.

The final statement of the WHO definition highlights the importance of integrating with secondary prevention services. In the UK, this responsibility lies mainly with the GPs and local primary care teams. Therefore, there has to be good communication, with referral and re-referral systems in place between the CR team and the primary care services. Furthermore, many of the elements of the core rehabilitation components are also delivered by other teams within a given community or primary care service (exercise referral and physical activity leisure services, diet, weight management, counselling and mental health and smoking cessation services). Each CR team needs to think and plan carefully how it wishes to integrate with these services, either by incorporating them into their CR programme or as part of the BACR Component identified as long-term management. The recognition and integration of primary care through Quality and Outcomes Framework (QoF) standards is one of the key facets related to CR. With the development of service commissioning guides to be released by the Department of Health, the value of CR will be brought into much sharper focus

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Overview of UK cardiac rehabilitation services: a West Midlands perspective

Dr E Jane Flint

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Cardiac Rehabilitation (CR) provision in cardiac care remains the 'unfinished business' of the National Service Framework (NSF) for Coronary Heart Disease 2000. The Cardiovascular Networks always promised to be effective health communities across which sharing good practice, and ultimately designing ideal care pathways including CR, to be commissioned against key defined outcomes, could be made. The Myocardial Ischaemia National Audit Project (MINAP) initially overestimated referral to CR, as clarified by the first National Association for Cardiac Rehabilitation (NACR) audit of 2005/2006.[1]

In fact, fewer than half of networks have ever benefited from Patient Choice Revascularisation Pathway monies, which were originally intended to support CR also.[2]

The START meeting in Birmingham in December 2009 was an opportunity to celebrate the innovative approach undertaken by the West Midlands' Regional NSF Implementation Group for Cardiac Rehabilitation and Secondary Prevention, describing local CR pathway service standards against which West Midlands' CR programmes could be audited to inform commissioning.

The subsequent proportional allocation of 'Patient Choice' rehabilitation funding across Birmingham and the Black Country was a shared model. The West Midlands' Standards have been updated annually, incorporating Scottish Intercollegiate Guidelines Network (SIGN) 2002 in the second 2002/2003 edition, and were presented at the British Association for Cardiac Rehabilitation (BACR) in 2006. The launch of the National Campaign for CR in 2007 was supported by NACR audit findings that year, the National Institute for Health and Clinical Excellence (NICE) post-myocardial infarction (MI) guideline, and the new BACR core standards. British Heart Foundation (BHF)/New Opportunities' Fund (NOF) funding had been the only ring-fenced money going into CR and heart failure following the NSF, and it did help a minority of networks. The National Priority CR project with NHS Improvement began in 2008: key work streams are addressing commissioning relationships, improving CR pathways following earlier revascularisation, aiming to reduce inequalities and to offer genuine choice of centre- or home-based (Heart Manual best proven) programme.

Assessing the change needed

A survey of CR development across the English networks between 2007 and 2009 has assessed and encouraged serial change over the last three years.[3] The absence of a Lead Cardiologist for every CR programme led to a NHS Improvement Development event in 2009, with 57% positive impact on network champions.[3] The CR pathway following earlier revascularisation had been reviewed in 93% of networks by 2010, compared with only 10% in 2007, and 32% in 2008.[3] An improved commissioning relationship is now present in 78% of networks, whereas a good relationship had only been reported in 34% in 2007, and 36% in 2008, before projects took hold.[3] A majority of networks look forward to working with the new Commissioning Pack for CR. The improved provision of a real choice of centre- or home-based CR for the majority of patients is also reflected in the 2009 re-audit, initially presented to National Cardiac Conference 2010 before publication.[2]

There is commitment, but there remains a significant challenge to record NACR data uniformly across networks, and to achieve sufficient investment in CR services so that NSF and NICE goals for all MI, revascularisation, heart failure and angina patients may be realised.

We look forward to a future interface between NACR and other key national cardiac audits. Although much work remains to be done, the sustained support of appreciative patients will help ensure that national commitment is maintained

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Tackling dietary issues

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Recent data from the 2009/10 national diet and nutritional survey show that the national dietary pattern has improved.[1] Intake of saturated fats, trans fats and added sugar is lower than it was 10 years ago.[1] Nonetheless, saturated fat intake remains greater than the 11% recommended level, at 12.8%; fruit and vegetable intake is estimated to be 4.4 portions/day; fibre 14 g/d and oily fish <1 portion per week. So improvements are still required in order to meet recommended targets.[1]

Post-MI patients are often very keen to make dietary changes. Many make drastic changes to their dietary pattern stimulated by their frightening experiences. EUROASPIRE III, a survey of risk factor management in coronary patients, showed that 92% of patients reported that they had made some sort of dietary change since their event: 73.5% changed the fat type they used, 77.9% increased fruit and vegetable intake and 64.9% increased fish intake. Unfortunately, these data are subjective and the patients' intake was not quantified. Neither do the data identify the type or length of intervention these patients received in order to achieve these reported changes or for how long they were maintained.[2]

Changing lifestyle through diet

As many cardiac rehabilitation (CR) staff see patients frequently, they have unique opportunities to help patients change their lifestyles, including their diet. This frequent patient contact can provide continued support and maintain changes, helping patients to address difficulties if and when they occur. A previous survey of CR programmes in England indicated that there is a lack of dietetic support for many cardiac patients attending CR programmes.[3] All too often, dietitians provide just a one-hour talk to the group during the education part of the programme. Consequently, it is essential that all rehabilitation staff have a clear understanding of the most important dietary messages.

Patients face many challenges when changing their diet. One of these is that they are bombarded with information about what foods they should or should not consume. Information about healthy eating is available in many formats and from many different sources, and identifying a suitable source of information can be difficult. It is essential that any team working with post-MI patients should ensure that the information they are providing is clear, consistent and based on data proven to reduce the risk of further illness (so-called secondary prevention).

Changes in dietary habits during CR, following individual and group sessions with a dietitian, were shown to be possible and maintainable after one year in both the EUROACTION study[4] and a study completed by Leslie *et al*.[5] Both these studies reported success in enabling patients to lower their fat intake, whilst increasing fruit, vegetable and fish intake. In addition, there was a significant increase in the number meeting the oily fish target in EUROACTION (although still only in 17% of patients),[4] but this change in oily fish intake was not duplicated in the Leslie study. The barriers identified for the lack of oily fish intake in the latter included: smell, bones, cost and taste.

Setting realistic goals

To help patients make appropriate dietary changes and to reduce their risk, staff must work with the patients to identify realistic and achievable goals. All dietary advice and goals should be individualised and defined using SMART (Specific, Measurable, Achievable, Realistic, Timely) criteria. Advice provided to patients should be practical and in a format that they will be able to understand. This includes, for example, discussion of foods rather than nutrients. Providing support, motivation and help for the patients to develop strategies and goals to achieve their aims is essential. As with any behaviour change intervention, it is necessary that the patients be taught skills and awareness of barriers and problems such as relapse. Having the skills to cope with relapse will enable the patients to achieve longer-term objectives.

What advice should be given to patients?

Focus should be given to the advice that has been shown to reduce morbidity and mortality:

namely, a change in fat use from saturated to unsaturated, increased intake to 7 g of omega-3 fatty acids a week (from fish or supplement, see **box 1**) and a Mediterranean-style diet.[6,7] This diet is varied, with a high level of fresh fruit and vegetables, regular fish and oily fish consumption, lean meats, plenty of pasta, rice, wholegrains, nuts and seeds and the use of unsaturated fats, such as olive and rapeseed oil rather than butter and cheese. Once these objectives are achieved, then additional recommendations can be made to improve patients' diet further

Summary

- The national dietary pattern is improving but there remains room for further improvement.
- Like all lifestyle changes, dietary changes can be difficult for patients, especially in the longer term.
- Dietary advice should focus on the changes that can reduce mortality and morbidity (type of fat, omega-3 fatty acids, Mediterranean dietary pattern).
- CR staff are ideally suited to help patients make SMART goals and to monitor their progress to help prevent and deal with relapse.

Box 1. How to achieve 7 g omega-3 fatty acid in a week from fish

Week 1: 1 tin mackerel, 1 tin sardines, 100 g smoked salmon	7.6 g
Week 2: ⅓ large tin pilchards, 1 large mackerel fillet	9.6 g
Week 3: ½ tin pink salmon, 1 tin mackerel, 1 trout fillet	7.5 g
Week 4: ½ small tin pilchards, 1 salmon fillet	3.8 g
Average intake	**7.1 g**

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Sue Baic

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Q: Who is the best person to advise the post-MI patient about fish consumption?

A: Lifestyle factors play a vital role in secondary prevention of cardiovascular disease, so advice on any aspect can be a valuable way for a healthcare professional to reduce health risk in their patients.

Any healthcare professional can advise on fish consumption but what matters most is that the message is consistent and practical. Patients tend to disengage from the change process if they receive mixed or confusing dietary advice from different sources, and an opportunity is missed.

We have the evidence base to support a clear message to aim for at least two servings of oily fish a week (a portion size is around 140–150 g). Types of oily fish to recommend include salmon, mackerel, sardines, pilchards, trout and herring; these can be fresh, frozen, smoked or canned. We can also help by suggesting ways to use these fish economically and sustainably.

Q: With so many types of fish oil supplement, how do you recommend a good one?

A: As a dietitian, I always recommend aiming for food first. However for patients who have had an MI within three months and cannot, for whatever reason, achieve adequate dietary fish intake, NICE guidelines advise considering at least 1 g a day of a licensed omega-3-acid ethyl ester in supplement form.

Fish liver oils, such as cod liver oil, are not particularly good sources of omega-3 and tend to be high in vitamin A (retinol). Vitamin A can be toxic, especially to the bones and the liver, if taken in high doses over a long period.

Fish body oils are lower in vitamin A but some brands remain high in marine pollutants. Many, even those advertised as 'high strength', contain low levels of n-3 PUFA per capsule, meaning multiple capsules need to be taken daily to achieve adequate intakes. To improve compliance, a concentrated source containing 1,000 mg n-3 PUFA in a once-daily tablet may be most practical. To reduce gastrointestinal side effects, supplements can be taken as capsules rather than in liquid form and on an empty stomach just before a meal.

Sharing best practices: a nurse-led cardiac prevention and rehabilitation service

Judith Edwards

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The Cardiac Prevention & Rehabilitation Service (CP&R) at Imperial College Healthcare NHS Trust in London uses both community- and hospital-based programmes. A community-based programme, called MyAction, serves the Westminster population, while a hospital-based service from Charing Cross Hospital serves the Hammersmith and Fulham population, and also accepts patients from Hounslow, Ealing and other areas.

The service at Charing Cross was used as the model for EUROACTION, a randomised, controlled trial of a preventive cardiology programme, conducted in eight European countries, including the UK. This nurse-led multidisciplinary programme significantly improved the management of lifestyle and medical risk factors for cardiovascular disease prevention in coronary patients and patients at high multifactorial risk for developing heart disease.[1] The principles of the EUROACTION programme were used to found The MyAction community programme, commissioned in 2008 by NHS Westminster as a model for preventive cardiology care for its residents.

The Imperial College Healthcare NHS Trust CP&R programmes follow relevant guidelines and targets set out by the National Service Framework (NSF) for Coronary Heart Disease,[2] the National Institute for Health and Clinical Excellence (NICE) guidance on secondary prevention post-myocardial infarction;[3] the Joint British Societies' recommendations on prevention of coronary heart disease in clinical practice;[4] and the British Association for Cardiac Rehabilitation (BACR) Standards and Core Components for Cardiac Rehabilitation.[5]

In-patient care

Patients are admitted to the Trust from Primary Care Trusts within North West London for investigation and treatment. They are identified by a CP&R nurse, receive education and support (**table 1**), and are referred to their local cardiac rehabilitation centre on discharge. Between April 2009 and March 2010, a total of 1,100 patients received this service from the Charing Cross Hospital team.

Table 1. Cardiac prevention and rehabilitation advice

- Education
- Discharge advice
- Psychosocial support
- Medication review
- Smoking cessation advice
- Healthy eating advice
- Risk factors
- Chest pain management
- Cardiac rehabilitation discussed
- Sexual activity advice
- Written information
- Driving advice
- Physical activity advice
- Advice for travel
- Personalised health plan
- Return to work advice

The Charing Cross programme

Initial assessment

Patients referred to the Charing Cross Hospital programme are seen with family members in a nurse-led clinic within two weeks of discharge. Unless there is a specific clinical issue, patients will not see a doctor at this initial assessment. During the two-hour out-patient appointment (see **table 2**), a clinical nurse specialist (CNS) will undertake a holistic assessment of the patient and arrange any test or referrals required. A dietitian and an exercise specialist will also assess the patient.

A personalised CP&R plan which addresses individual needs and priorities is developed; all patients are offered the opportunity to undertake a group or home CP&R programme.

The multi-disciplinary team

At Charing Cross Hospital the multi-disciplinary team (MDT) meets weekly to discuss all patients who have had an initial assessment: the team includes a consultant cardiologist, nurse specialists, a dietitian, a cardiac exercise specialist and a clinical psychologist. Lifestyle, medical risk factors and laboratory results are reviewed. Medication is also reviewed, changed and up-titrated as required to national targets. Patients with psychological issues, such as high anxiety and depression scores, are discussed with the clinical psychologist and referred if necessary.

Patients who have already started the programme are also reviewed at the MDT meeting. Feedback is given at the start of each class by the CNS or, for those patients undertaking a home programme, via the GP.

The programme

Patients begin the programme within two weeks of the initial assessment. Those

Table 2. Initial assessment for the Cardiac Prevention and Rehabilitation programme

- Discussion of progress
- Blood pressure and heart rate recorded
- Assessment of wounds and advice as necessary (post-operative patients)
- Fasting lipid profile/blood glucose/ HbA_{1c}/ microalbuminuria, other blood tests
- Smoking cessation
- ECG, echocardiography, oral glucose tolerance test etc, as required
- Medication review and information
- Discussion of psychological needs (HAD and QoL)
- Advice on sexual activity, where appropriate
- Dietary assessment and advice
- Anthropometry
- Physical activity assessment and walk test
- Risk stratification for exercise programme

attending the group session are invited to eight weekly sessions and are given a concurrent home physical activity programme to follow. They receive a weekly health education talk and ongoing risk factor management and support. The programme has the capacity for a seated exercise circuit and, more recently, a separate low functional capacity class (including those with heart failure) has been set up. The nurse specialist reviews each patient's personal plan, blood pressure, medication and blood test results throughout the programme.

Home programmes are delivered via the Heart Manual, a pedometer programme or a home exercise programme. The Heart Manual is used to provide health education and support for all three home programmes. Patients choosing this option are reviewed in the nurse-led clinic after four weeks and any set targets and medication are reviewed.

The re-assessment appointment

All patients are reviewed after completion of the programme, with the appointment having a similar content to the initial assessment. Progress is summarised and patients are referred to a community-based cardiac exercise class if they wish. Any outstanding issues, such as further improvement in lipid control, are discussed at the MDT and are then communicated to the patient and the GP.

Results

For the period 2008–2009, a total of 240 patients completed the programme and attended a re-assessment appointment. Results are summarised below.

Physical activity: at the initial appointment, 7% of patients reported undertaking 30 minutes of moderate intensity activity five days of the week. After the programme this had increased to 58%.[6]

Anthropometry: data for body mass index (BMI) and waist circumference show little difference from the start to the end of the programme. A snapshot of patients' views on weight loss indicated that priority was given to other issues, such as smoking cessation, lipid modification and coping with anxiety. As a result, a weight management class was established for patients with a raised BMI at re-assessment. The first three cohorts achieved an average weight loss of 3 kg over 12 weeks.[6]

Smoking: only 20% of smokers had stopped at the time of their re-assessment. Following discussion with the MDT, a CP&R nurse has been given specific responsibility for smoking cessation. Smokers are now more intensively monitored as they pass through the programme.[6]

Achievement of blood pressure targets: **figure 1** shows that by the end of the programme, 70% of patients were achieving the relatively stringent target of a systolic blood pressure (BP) of <130 mmHg, with 76% achieving a diastolic BP <90 mmHg.[6]

Achievement of lipid targets: **figure 2** shows that a total cholesterol level of less than 4 mmol/L was achieved in 81% of patients on completion of the CP&R. In all, 72% achieved low-density lipoprotein cholesterol (LDL-C) levels of less than 2 mmol/L. Lipids were checked several times during the programme and medication changed as indicated.[6]

Figure 1. Achievement of blood pressure (BP) targets

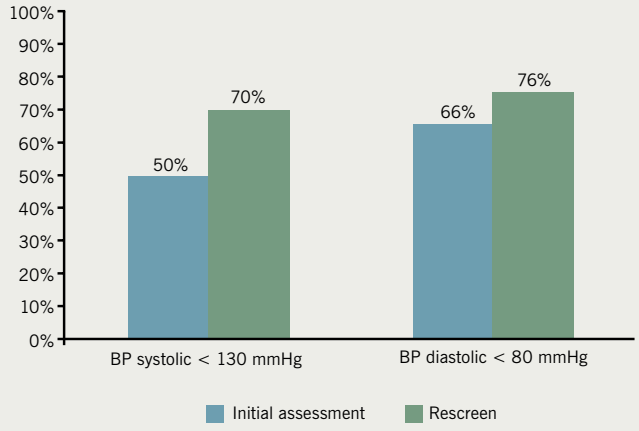
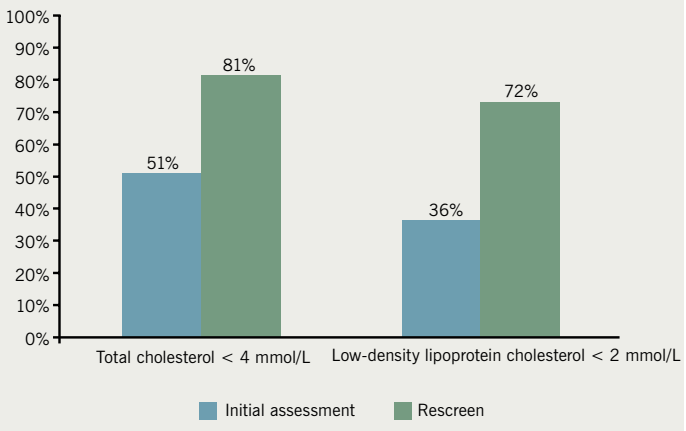


Figure 2. Achievement of lipid targets



Cardioprotective medication: by the end of the programme, 98% of patients were on aspirin, 80% were taking a beta blocker, 88% were taking either an angiotensin-converting enzyme (ACE) inhibitor or angiotensin receptor blocker, and 98% were on a statin.[6]

Patient satisfaction: at the re-assessment, 83% of patients rated their satisfaction with the CP&R programme as either excellent or very good. When asked if they had made lifestyle changes during the programme, 92% said that they had.[6]

Uptake and attendance 2009 – 2010

- Between April 2009 and March 2010, a total of 477 patients were referred from phase 1 to the Charing Cross Hospital programme. Of these, 374 (80%) attended the initial assessment.[6]
- Of the 374 patients who attended the initial assessment, 332 (87%) attended the programme, with a completion rate of 305 (92%).[6]
- Of the 305 who completed the class, 244 (80%) attended a re-screen appointment.[6]

Summary

The Imperial CP&R programme demonstrates that a nurse-led service, supported by a multi-disciplinary team, can produce a high-quality service which helps patients to achieve the recommended lifestyle and risk factor reduction targets for cardiovascular disease prevention.[3,4] A flexible, menu-based approach to service delivery ensures that uptake of the programme is extremely high, achieving the requirements of the NSF and significantly exceeding the findings of the 2009 National Audit of Cardiac Rehabilitation[6,7]

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Exercise: tipping the balance towards sustained participation and lasting benefits

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Current data from the National Audit for Cardiac Rehabilitation (NACR) report that the average uptake of cardiac rehabilitation (CR), which includes exercise, is about 38%; ranging from 30% in patients following angioplasty to 68% for patients following bypass surgery.[1] The NACR has highlighted numerous potential reasons for this lower than desired uptake, including the quality of local referral and patient recruitment processes, patient education and socio-cultural barriers to access.[1] These problems are not exclusive to the exercise component of CR but affect the whole programme. This article will focus on the factors that CR professionals must consider in order to influence favourably the sustained longer-term participation in beneficial exercise for those patients who have taken up CR.

What is beneficial exercise?

A prime question needs to be considered before furthering this discussion: what is meant by beneficial exercise? The benefits of exercise impact on all aspects of health – physiological, psychological and social. A study by Fox (1999) found that short bouts of any activity, even low-intensity activity that may not bring about a significant physiological risk factor change, if it is performed regularly, will provide psychological benefits to self-esteem and self-efficacy, and reductions in anxiety and depression.[2] Angina patients engaging in regular walking on a similar premise to that expressed by Fox show significant reductions in a number of psychological parameters and symptoms, including anxiety and depression, frequency of angina, use of glyceryl trinitrate, and perceived physical limitations.[3]

An important determinant and/or barrier to participation in physical activity is mental health and well-being.[4] A beneficial and important first step in CR is therefore to encourage patients to be more active in their daily lives, especially those patients whose mental health has been affected by their diagnosis of cardiovascular disease. Longer-term participation, required to sustain the benefits, is reliant upon motivation directly linked to self-efficacy, mood, health beliefs and mental health.[5] Best practice in CR would recommend the use of motivational interviewing techniques and cognitive behaviour strategies, which respect the states of behaviour and mental health noted above.[6]

Managing the message

The minimum that a CR team should do, including volunteers and administration staff who regularly come into contact with patients, is to create a culture that respects that all patients hold different beliefs about their health and can be at very different stages of behaviour change. Common sense suggests that consistency in messaging from all staff is good practice, but it is important to remember

that the same message can mean different things to different people. For some, this can certainly influence behaviour favourably but for others it may have the opposite effect. Good patient interaction and education sessions (both formal and informal) help the CR team to determine the variety of health beliefs that are held within a group of patients. Involving more than just the exercise staff in the exercise programme provides an opportunity for all staff to observe how patients respond psychologically and socially to physical activity, which can help highlight aspects of their psychological health and health beliefs that may be guarded when in a more formal education or counselling session. By using multidisciplinary team meetings, staff can then agree on what approaches they wish to take to support the behaviour change of those patients with the greatest need for overcoming barriers, support and encouragement.

Most randomised controlled trials on the benefits of CR used to justify its provision have similar key features, including mortality as a key outcome and aerobic exercise training of moderate to vigorous intensity at least three times a week, and performed within structured periods of 20 to 60 minutes.[7] The underpinning feature to this is that the total weekly caloric expenditure should exceed 1,000 kcals.[8] When energy expenditure exceeds 1,000 kcals/week, key risk factors (lipids, blood pressure, body mass, blood glucose and aerobic endurance) are reduced.[9] When 1,500 kcals/week is exceeded, not only are aerobic endurance and power significantly enhanced but so are arterial plaque stability and endothelial vasodilatory function.[10]

Tailoring fitness training to the patient

In the past decade, the benefits of strength training and interval training (short bouts of higher-intensity activity interspersed with periods of 'active recovery' or lower intensity) have been shown to be beneficial to low-capacity patients (those with heart failure and older patients), with benefits including enhanced physical functioning, quality of life, reduced symptoms and in some cases longer life.[11,12] Many CR professionals think that simple activities of daily life are low intensity, but for a patient with a limited capacity, even walking slowly will require more than 50% of that patient's aerobic power; a threshold associated with 'fitness training'. Herein lies the fact that, for these patients, just being more active in day-to-day life could equate to fitness training. Thus, the advice we do give must be tailored and individualised.

Summary

A graded approach to introducing patients to the 'behaviour of physical activity' needs to be respected on an individual basis. The main aim is to guide gradual increases in the weekly frequency, intensity and duration of physical activity in keeping with both the patient's psychological and physiological status. This can be achieved either through more activity within patients' daily lives, or in more formalised exercise sessions, or more likely a combination of the two. A clear and thorough assessment of the patient's psychological and physiological function, needs and constraints, followed by an agreed plan that is led by the patient of his/her goals and progress (physical and psychologically), is vital to the success of this behaviour we call exercise

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START: insights from the regions

North West London

To try and identify local barriers and share good practice, we have been regularly reviewing our cardiac rehabilitation (CR) services in North West London. Through this process we hope to increase the average uptake in a step-wise fashion from 50–60% to the national target of 85%.[1] Lack of appropriately funded services and low staffing levels are real problems across the sector, unfortunately.

Nevertheless, some innovative approaches to CR are taking place. The uptake of CR services after primary percutaneous coronary intervention (PPCI) for myocardial infarction has increased from 26% to 84% at Imperial College Healthcare NHS Trust.[2] This has been achieved by funding a designated phase 1 cardiac specialist nurse to ensure all PPCI patients are seen in hospital and offered CR at a local centre, with introduction of a patient leaflet to convey important messages about heart disease and the benefits of CR and providing contact details for all the North West London CR centres.[3] At Ealing Hospital, there is a unique family-based dietary intervention programme where patients and their extended families are invited to group sessions.[4] These joint classes, run in the evenings, have high attendance rates.

By sharing these results of good practice across the sector, we are continually striving to increase our CR uptake and to make sure that each programme contains the core components of CR, namely lifestyle change, education, risk factor management, psychosocial issues, cardioprotective therapy and a long-term management strategy.[5] This will prepare each programme for the future and enable consideration and commissioning of CR across the whole patient pathway.

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Birmingham

The START meeting reminded all who attended of the prognostic and quality of life benefits of cardiac rehabilitation (CR). It also highlighted the importance of optimising attendance rates following cardiac events such as non-ST elevation myocardial infarction (NSTEMI) and elective percutaneous coronary intervention (PCI) as well as for the more traditional indications of ST-elevation myocardial infarction (STEMI) and cardiac surgery. Having reviewed our own data, we found that our attendance for exercise rehabilitation following surgery was remarkably good but was low after MI (both STEMI and NSTEMI) and PCI procedures. Efforts to improve this have centred on:

- Simplifying arrangements for attendance by providing a negotiated date for attendance at the first phase 3 visit, in written form, at the phase 1 visit.
- Re-writing a letter explaining the importance of CR, emphasising that the consultant cardiologists consider this to be important and expect patients to attend.
- Providing a text reminder the day before the first phase 3 visit.
- Changing both venues and times of phase 3 rehabilitation. Dropping a 09.00 am session in a community gymnasium for which take-up was poor and replacing this with a 3.30 pm session in the hospital has had a surprisingly good effect, illustrating the importance of time over place.
- Working closely with PCT commissioners to monitor and improve attendance rates. Targets for improvements have been agreed.
- Offering Tai Chi exercise to those patients who prefer this option.
- Making a video, to give on DVD to patients to demonstrate home exercise techniques to all, but especially those unwilling to attend for exercise.

Finally, we have reinforced the importance of dietary measures, including simple educational tools to allow patients to quantify saturated fat intake and explaining the benefits of oily fish consumption or equivalent medication.

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Glasgow

A lively and interactive meeting was held in Glasgow, attended by a multidisciplinary group of cardiologists, general practitioners, nurses, physiotherapists and dietitians from the cardiac rehabilitation (CR) service and the Nurse-Led Heart Failure Service. In Glasgow, the post-myocardial infarction clinic and CR service is consultant-directed but nurse-led. It has functioned successfully for many years. The START meeting afforded an opportunity to re-examine the core values and fundamental strategy for this service, together with consideration of ways to improve outcomes by implementation of the most modern therapy.

Five key areas within cardiac rehabilitation were determined:

1. dietary improvements and intervention
2. programmed exercise
3. pharmacological therapy
4. determination of left ventricular function
5. determination of reversible ischaemia.

The cornerstones of remaining myocardial ischaemia following myocardial infarction (MI), and residual left ventricular (LV) function, were examined. The data defining survival related to LV function were reappraised, and methods of determining further ischaemia were discussed. These include exercise electrocardiography, myocardial perfusion scanning, and further angiography. For example, in some cases of acute coronary syndrome (ACS), the culprit lesion is dealt with by primary or urgent PCI and determination of remaining ischaemia is made subsequently. My own practice is to avoid early maximal exercise testing in patients with ST-elevation myocardial infarction, because of the risk of ventricular wall rupture. Exercise testing is usually performed between four and six weeks post-MI. If there is remaining ischaemia, coronary angiography is often undertaken.

With regard to LV function, all patients undergo echocardiography post-MI. Patients with more severe LV impairment are referred for follow-up and continuing care under the Nurse-Led Heart Failure Liaison Service, and there are abundant data from Professor John McMurray and others that this nurse-led service saves lives and prolongs life.

Diet and exercise

There was lively discussion regarding the dual interplay between diet and exercise. Many patients initially adopt a healthy attitude towards diet but this can slip without reminders and reinforcement. Simple approaches, with colour-coded dietary advice and use of the British Heart Foundation materials, are valuable tools for demonstrating and implementing correct dietary intervention. The data supporting Mediterranean diet, oily fish and other omega-3 supplements were examined, together with data for high-dose omega-3 supplementation post-MI.

Exercise programmes have been very successful. It was agreed that the most important aspect was to give the individual patient an achievable target so that exercise can be sustained and gradually increased. For many patients, issuing a demand for 40 minutes of daily exercise may be too much, and the figure needs to be tailored for the individual patient, with targets and milestones set to improve performance. The benefits of exercise classes rather than individual practice were agreed, and in Glasgow there are many council-led services, facilitated by physiotherapists, which have run successfully for some considerable time.

Addressing pharmacological therapy, the cornerstones of beta blockers, ACE inhibitors, lipid-lowering therapy and antiplatelet therapy were reviewed.

In summary, there is much enthusiasm in the West of Scotland for providing the best possible CR service. It was agreed that the setting of the principal objectives of LV function, myocardial ischaemia, diet, exercise and optimal drug therapy were achievable. A clear understanding of these goals, and how they may be reached, is fundamental to the well-being of the individual patient following MI.

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Wales

The Wales Regional START meeting was a lively affair attended by a full house of cardiac rehabilitation (CR) and specialist cardiovascular practitioners from across south and west Wales.

An entertaining presentation of the principles and practice of CR was given by Dr John Buckley, President of the British Association for Cardiac Rehabilitation (BACR), who emphasised that with a reduction of 20% in total and 27% in cardiovascular mortality at a cost per quality-adjusted life year (QALY) of £6,900,[1] CR compares favourably with many other therapies used routinely and often more frequently in high-risk cardiac patients. He also stressed the value of the educational, psychological and social benefits of CR that result in health economic benefits, which are more difficult to quantify by more conventional methodology.

Linda Edmunds, Nurse Consultant in Cardiff and Vale UHB, followed with a comprehensive overview of the core components and minimum standards required from a CR programme, including the guidance from the National Institute for Health and Clinical Excellence (NICE) and the National Service Framework (NSF) for Wales. She also emphasised the vital role of CR services in the provision of educational, psychological and social support for cardiac patients, who pass increasingly quickly through their hospital 'patient journeys'.

Data were presented from a recent review of CR services in South East Wales, which demonstrated a worrying under-provision of funding across the region, with no clearly defined funding streams. This limited funding has an impact on the ability of the services to deliver a full range of multidisciplinary services, particularly access to specialist psychologists and counsellors and also physiotherapy and qualified nutritional specialists. The results are inequities across the region in overall service provision, staffing levels and skill mix, variation in models of service and variable patient access, even for some priority patient groups such as post-elective PCI and heart failure patients. No services are currently meeting NSF standards. The CR working group is striving to ensure that systems are in place to identify and recruit all eligible patients, to collect audit data demonstrating outcomes, to identify cardiologist champions who can lobby for the service and, most importantly, to secure adequate resources such that appropriate staffing levels with the ability to deliver a high-quality service can be achieved equitably across the region.

The meeting was closed by Alison Mead, who painted a comprehensive picture of how to optimise the diet of cardiac patients. She emphasised the importance of a healthy diet for prevention of the development of diabetes and management of other risk factors for cardiovascular disease, focusing on reducing saturated fat and eliminating trans fat, increasing fruit and vegetable consumption, limiting high glycaemic index carbohydrates and drinking alcohol in sensible amounts. The particular benefit on major cardiovascular outcomes post-myocardial infarction of a Mediterranean diet and intake of 7 g/week of n-3 polyunsaturated fatty acids either as (oily) fish or a licensed supplement was also highlighted. She recognised the challenges

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faced by CR services in the region given the limited funding, which often results in dietary advice being delivered by a range of non-specialists, but reinforced the evidence demonstrating the added value provided by qualified dietitians in this area. She concluded by stressing the importance of delivering clear, consistent and repeated dietary messages to patients

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*Declaration

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Presentation: Capsules containing 1000mg of omega-3-acid ethyl esters 90 comprising 840mg eicosapentaenoic acid ethyl ester (460mg) and docosahexaenoic acid ethyl ester (380mg). **Indications:** Adjuvant treatment in secondary prevention after myocardial infarction. Endogenous hypertriglyceridaemia as a supplement to diet when dietary measures alone are insufficient to produce an adequate response: Type IV in monotherapy; Type IIb/III in combination with statins, when control of triglycerides is insufficient. **Dosage and Administration:** Post myocardial infarction: One capsule daily. Hypertriglyceridaemia: Initially two capsules daily. Increase to four capsules daily if necessary. May be taken with food. No or limited information of use in elderly (>70yrs), children, hepatic or renal impairment. **Contraindications, Warnings, Precautions etc:** *Contraindications:* Hypersensitivity to ingredients including soya. *Warnings/Precautions:* Due to risk of haemorrhage (with high dose only) monitor patients on anticoagulant therapy and those at high risk of haemorrhage (e.g. severe trauma, surgery etc). Not recommended in children. Not indicated in exogenous hypertriglyceridaemia. There is limited experience in secondary endogenous hypertriglyceridaemia and no experience of use in combination with fibrates. In hepatic impairment, regularly monitor ASAT and ALAT. *Drug Interactions:* Monitor use with oral anticoagulants. **Pregnancy and Lactation:** Should not be used in pregnancy or lactation. **Ability to Drive and Operate Machinery:** Not relevant. **Side Effects:** Common: dyspepsia, nausea. Uncommon: Abdominal pain, GI disorders, gastritis, gastroenteritis, hypersensitivity, dizziness, dysgeusia. Rare: GI pain, headache, hyperglycaemia, hepatic disorders, acne, pruritic rash, ill defined disorders. Very rare: Lower GI haemorrhage, hypotension, nasal dryness, urticaria, increased white blood cell count, increased blood lactate dehydrogenase, moderate elevation of transaminases in hypertriglyceridaemic patients. **Marketing Authorisation Holder:** Pronova BioPharma Norge AS, P.O. Box 420, 1327 Lysaker, Norway. **PL**: 15905/0001. **Basic NHS price:** £14.24 (28 capsules); £50.84 (100 capsules). **Legal Category:** P. **Further information is available from:** Abbott Healthcare Products Ltd, Mansbridge Road, West End, Southampton, SO18 3JD. **Date of Last Review:** 10th June 2010.

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Date of preparation: November 2010
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