CHAPTER 1

The Evolution of Cardiac Rehabilitation and Future Directions

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Chapter outline

There has been a dramatic development in medical and rehabilitative care for cardiac patient and family over the last 10–15 years in the UK. This chapter reviews the evolution of contemporary cardiac rehabilitation (CR) and the content of CR in the UK. The chapter also poses some questions and directions that CR may develop into the twenty-first century. This provides the context for the involvement of higher risk patients that this book addresses.

The evolution of cardiac rehabilitation

In the 1950s, CR consisted of extended periods of immobilisation, particularly post-myocardial infarction (MI), for up to 6 weeks. The theory at that time was that reduced workload on the myocardium would allow myocardial healing. Furthermore, patients were informed that return to work and normal activity would be unlikely.

The pioneering work of Levine and Lown (1952) was innovative and radical for that time. In 1952 they introduced ‘armchair management’, where cardiac patients could recover by sitting for a period of 7 days, rather than the traditional bed rest that lasted up to 6 weeks. This early study of a more active approach to recovery after a cardiac event included 81 (16% women) ‘post-coronary thrombosis’ patients aged between 42 and 80 years. Levine and Lown were primarily interested in minimising the problems of bed rest and long periods of inactivity. It became clear that when the patients in this study were mobilised out of bed, stood up and took a few steps, their outcomes improved, or they at least had no more complications than before. Furthermore, the researchers claimed there were psychological benefits from early mobilisation, although they did not describe how these were measured.
Other clinicians in cardiac care at that time were becoming aware that extended immobility and bed rest were causing many psychologically and physiologically harmful effects. Newman et al. (1952) also encouraged an early ‘active’ approach to rehabilitation and had patients sitting, walking and stair climbing by their sixth week post-MI.

A further significant step was taken by Hellerstein and Ford in 1957. They advocated that not only was the traditional ‘passive’ bed rest approach detrimental to the rehabilitation of cardiac patients, but graded exercise should be included in the hospital phase along with early mobilisation. Although their early study was limited in that the exercise design was poorly described, their overall management post-event could be identified as one of the first comprehensive views of CR, as it included diet and stress management and other aspects of a holistic approach to a healthy life in their programme.

Once the misconception that inactivity was a requirement for recovery from a coronary event was dispelled in the 1950s, many researchers and clinicians started evaluating the effects of exercise for coronary heart disease (CHD) patients. This explosion of research was primarily driven by the growing evidence that not only was exercise post-event safe, there was compelling evidence that habitual exercise provided not only a measure of primary prevention (Morris et al., 1953, 1966) but also secondary prevention benefits. The case for the possible benefits to CHD patients included in the work described by Hellerstein et al. (1967) who evaluated the physiological outcomes of 67 post-MI patients enrolled in a structured cycling exercise programme. The programme involved exercising three times per week for 4 months, training at a heart rate intensity of 150 beats/min. The researchers found a significant increase in work capacity and a significant reduction in the rate–pressure product. These findings from Hellerstein and colleagues’ work, along with the work of others in the 1960s, were to change significantly the established cautious attitude to CHD patients and exercise.

In the early 1970s there was a dramatic change in attitude towards individuals who had CHD, and post-MI patients in particular. World leaders in exercise-based CR at this time included Kavanagh and Shephard (1973), who found that habitual structured exercise was not only safe after a coronary event but also afforded many physiological and psychological benefits. Thus, there was, in a 20-year period, a move away from the passive, and what we would now consider ‘dangerous’, bed rest for cardiac patients to an acceptance of early mobilisation and structured exercise as part of CR.

**Cardiac rehabilitation in the UK in the early days**

In 1970 Groden and colleagues carried out a survey of the then membership of the British Cardiac Society (BCS). One hundred sixty-four doctors replied. Findings revealed that 15% of them gave some advice about return
to work and/or an advisory leaflet and 6% provided some form of exercise-based CR. Although there was very little comprehensive CR provision, one significant finding by Groden and colleagues (1970) was that 51% of the doctors who responded favoured development of CR in their units. Five years later, however, the Royal College of Physicians and the British Cardiac Society (RCP/BCS) (1975) reported that little had changed in the provision of CR. This report was not based on any new evidence, as they referred only to Groden et al. (1970). Like the 1970 survey the RCS report strongly supported the development of CR.

It took 12 years for any real developments in the UK. This occurred in 1987 with the London Symposium on ‘Exercise-Heart-Health’, hosted by the Coronary Prevention Group (CPG). This was followed by the establishment by the CPG of a committee led by Dr Hugh Bethell to address secondary prevention and rehabilitation. The first national conference, ‘Recovering from a Heart Attack or Heart Surgery’, was held in 1988 and was a great success, bringing together the supporters and advocates of CR.

The BCS report by Horgan et al. (1992) took a further significant step by making clear and important recommendations:

- Every major district hospital that treats patients with heart disease should provide a cardiac rehabilitation service.
- The programme should be multidisciplinary and usually exercise based. (Horgan et al., 1992, p. 417).

This significant and extensive report identified that exercise of a suitably dynamic nature over a prolonged period up to 1 year could improve physiological outcomes, including central and peripheral cardiovascular adaptations. Furthermore, psychological outcomes could be improved, including elevation of mood and overcoming mild depression and anxiety (Horgan et al., 1992). In addition, the report encouraged active involvement of the patient’s family, especially in the educational aspect of CR, in order to support the adoption of other health-related behaviours. A more disappointing aspect of Horgan and colleagues’ (1992) report was the continued lack of CR provision. They established that less than 50% of hospitals in the UK with cardiac units provided a CR programme. More disconcerting was the continued divergence of opinion among cardiologists and physicians about the potential for exercise-based CR to impact on physiological and psychological benefits. Horgan et al. (1992) emphasised this negative approach by some cardiologists to CR:

The level of direct involvement by cardiologists in rehabilitation in the British Isles is very low, with less than one third of established CR courses retaining the support of the local cardiologist. It is perhaps surprising that although most cardiologists make extensive use of exercise testing after myocardial infarction, so few use this to aid exercise training. This may reflect the current emphasis in training on ‘high-tech’ procedures rather than a more holistic approach to patient care (Horgan et al., 1992, p. 417).
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There was reluctance by some cardiologists in the UK to accept the evidence that CR had potential physiological and psychosocial benefits for cardiac patients and families, but the tide was slowly turning. In concordance with the BCS (Horgan et al., 1992) recommendations on CR provision, another eminent body, the Joint Cardiology Committee of the Royal College of Physicians endorsed CR in 1992:

Cardiac rehabilitation should be available to all patients in the United Kingdom (Joint Cardiology Committee of the Royal College of Physicians, 1992, p. 106).

The British Association for Cardiac Rehabilitation (1992)

There was now considerable support for CR being generated in the UK. A historic development in CR occurred in September 1992, with a meeting of members of the CPG to establish a lead body for CR in the UK. This group produced the first constitution of the British Association for Cardiac Rehabilitation (BACR). The BACR was established in 1995 by some of the champions for CR, who recognised the need to provide a vehicle for galvanising those who had enthusiasm and belief in CR. It was intended to provide the first coordinated approach to CR in the UK, with the following aims:

- To promote a greater awareness and understanding of cardiac rehabilitation throughout the health care system.
- To facilitate communication and support among multidisciplinary professionals concerned with the rehabilitation of cardiac patients.
- To set national standards for cardiac rehabilitation and monitor the evaluation of these standards.
- To develop training programmes encompassing a multidisciplinary philosophy.
- To promote and facilitate research.
- To liaise with other national and international organisations working in this field.


The establishment of the BACR was a key development for cardiac care and rehabilitation in the UK. Until the BACR was established, CR practitioners were relatively isolated and had few forums for sharing or networking. The BACR filled a much-needed gap. In addition, since the inaugural meeting it has hosted an annual national conference, which gives members the opportunity to expand their network and hear about current research and best practice initiatives. The conference is a 2-day event that addresses current issues and incorporates eminent and acknowledged experts in the field of CR, such as Dr Stephen Blair, Dr Barry Franklin and Dr Erika Frolicher.
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Publication of the 1995 BACR guidelines
The publication of the first BACR (1995) CR guidelines was a significant milestone for CR professionals. Until this important publication, CR professionals depended on evidence and guidelines from associations in other countries, primarily the US. The BACR guidelines were devised by experts working within CR at that time and provided a template for the UK to establish and deliver CR for a UK audience.

The 1995 BACR guidelines were produced by the early champions of CR, including Andrew Coates, Hanna McGee, Helen Stokes and David Thompson. The 13 expert contributors to the guidelines represented the multi-professional nature of CR. These guidelines provided purchasers and providers of CR with a working template to establish a comprehensive programme. The objective of the guidelines was to establish a benchmark for CR, which, for the first time in the UK, was based on the best available evidence at that time. The guidelines provided eight sections:

1. Historical background
2. Cardiac rehabilitation: programmes, content, management and administration
3. Medical aspects of CR
4. Exercise testing and prescription
5. Enhancing exercise motivation and adherence in CR
6. Psychosocial aspects of CR
7. Dietary aspects of CR
8. Funding issues in CR

The 1995 guidelines were a significant contribution to the expansion of effective and safe CR in the UK and continued to be highly relevant for practitioners into the early twenty-first century. Furthermore, as the UK 1995 guidelines were being launched, the World Council for Cardiac Rehabilitation was established, including Australia, Canada, South Africa and the US. Thus, the UK now had a forum, along with other associations, to promote and share research and good practice in order to enhance the provision of CR for all patients and families.

The authors of the 1995 guidelines acknowledged that they had only provided an overview of the available evidence. They had not carried out a full, ‘in-depth’ assessment of all aspects of CR.

National Service Framework for Coronary Heart Disease (2000)
In 2000 the National Service Framework (NSF) for CHD was published (DH, 2000). This was a further significant publication that acknowledged the place of CR in the management of heart disease. This ambitious document was the ‘blueprint’ for tackling CHD. It was developed by 38 experts and patient representatives in the field, chaired by Professor Sir George Alberti, President of the Royal College of Physicians, London. It aimed at
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prevention, treatment and care for CHD patients in England. The document contained seven chapters (relating to 12 standards):
1. Reducing heart disease in the population (standards one and two)
2. Preventing CHD in high-risk patients (standards three and four)
3. Heart attack and other acute coronary syndromes (standards five, six and seven)
4. Stable angina (standard eight)
5. Revascularisation (standards nine and ten)
6. Heart failure (standard eleven)
7. Cardiac rehabilitation (Standard twelve)

(DH, 2000, p. 1).

The CR standards clearly set out the aim, rationale, effective interventions, service models, immediate priorities, milestones and goals, holding the National Health Service (NHS) to account for their delivery:

NHS Trusts should put in place agreed protocols/systems of care so that, prior to leaving hospital, people admitted to hospital suffering from coronary heart disease have been invited to participate in a multidisciplinary programme of secondary prevention and cardiac rehabilitation. The aim of the programme will be to reduce their risk of subsequent cardiac problems and to promote their return to full and normal life (DH, 2000, Ch. 7.0, p. 2).

As in the 1995 BACR guidelines, the NSF used the four phases of CR to describe the journey that cardiac patients should take through rehabilitation. Each phase gave clear guidelines on the intervention and care for that phase. Phase III included structured exercise sessions delivered to meet the assessment needs of individual patients. The NSF recommended the following:

Exercise sessions may be structured in a variety of ways to meet the needs of individual patients. Typically they will be provided to groups, last at least 6 weeks, but normally 12 weeks or more and comprise at least 3 sessions per week with a minimum of 2 supervised exercise sessions (individual programmes often in a group environment) and 1 session of education and information for patients, partners, carers and families (DH, 2000, Ch. 7.0, p. 5).

The NSF CR standard recommended exercise as part of phase III and into phase IV, but the content and delivery of the exercise sessions were not fully described. The standard acknowledged that considerable lifestyle change is required by cardiac patients and families in order to reduce coronary risk. In addition to exercise, education, lifestyle, vocational and psychological support is part of comprehensive CR. Thus, this document embedded CR within comprehensive care for cardiac patients and families.

Early in 2000 the Scottish Intercollegiate Guideline Network (SIGN) was commissioned to produce a guideline on CR. SIGN is a collaborative
network of clinicians, health professionals and patient organisations. It is funded by the Clinical Resource and Audit Group (CRAG) of the Scottish Executive Health Department. Guideline for SIGN is developed by multidisciplinary teams invited to be part of the development group. The chairman of the group was Dr Chris Isles, a consultant physician, who invited 18 expert members to form the development group. Like the BACR, they represented the multi-professional nature of CR.

All SIGN expert groups use a standard methodology to provide systematic review of the available evidence. For the SIGN 2002 CR guideline, all evidence up to 2000 was systematically synthesised by members of the group. The evidence for a SIGN guideline is based only on publications that adhere to recognised scientific principles of methodology, including sample size, clear hypothesis and outcomes and accurate reporting of the results. The SIGN 2002 CR guideline drew on peer-reviewed papers, systematic reviews and meta-analysis, including Jolliffe et al. (2000), Goble and Worcester (1999) and Oldridge et al. (1988). Once the SIGN group produces the draft guideline, further rigorous consultation and peer-reviewing process follows. For the CR guideline a national open meeting was held in March 2001, and comments were gathered from key specialists attending the meeting. In addition, the SIGN 57 CR guideline was made available on the SIGN website for further comment. Lastly, 20 independent expert referees were canvassed for comment on the accuracy and completeness of the interpretation of the available evidence supporting the recommendations in the guideline.

The main difference in the SIGN 2002 CR guideline from the first BACR 1995 guideline was that evidence and recommendations were assigned grades and levels of evidence. These were based on the quality and amount of available evidence. The recommendations for each section and subsection identified were given a grade, from A to D, with supplementary good practice points. The SIGN 57 2002 CR guideline contained 12 A recommendations, 9 B, 2 C, 8 D and 9 good practice points. The SIGN CR 57 guideline was published in January 2002. It was supported and endorsed by the BACR as a national UK guideline. Thus, it superseded the 1995 BACR guideline.

Although there had been definitions of CR in the past, in other publications the SIGN group identified key elements in CR. The authors also acknowledged the involvement of family, partners and carers in the rehabilitation process. The following definition was provided:

Cardiac rehabilitation is the process by which patients with cardiac disease, in partnership with a multidisciplinary team of health professionals, are encouraged and supported to achieve and maintain optimal physical and psychosocial health (SIGN, 2002, p. 1).

This definition is still relevant today and is applicable in the present CR context. When this definition was proposed, the majority of patients
entering CR programmes, with a few exceptions, were post-acute myocardial infarction (AMI) and had experienced revascularisation procedures, including coronary artery bypass grafting (CABG).

The SIGN guideline comprised eight sections:

1. Introduction
   Remit and definitions, four phases of CR, need for a guideline, current provision, uptake and review and updating

2. Psychological and educational interventions
   Psychological predictors of risk, measurement of psychosocial well-being, effectiveness of psychosocial and educational interventions, principles of behaviour change, educational and psychosocial interventions and aspects of behavioural change

3. Exercise training
   Benefits of exercise training, safety issues, assessment before exercise training, staffing, location, exercise content, monitoring of exercise training, resistance training and long-term exercise training

4. Interventions in specific patient groups
   Post-MI, post-coronary bypass and angioplasty, stable angina, chronic heart failure, older patients, women, other groups

5. Long-term follow-up
   Transition to primary care, follow-up in primary care, shared care, self-help groups and long-term exercise programmes

6. Information for patients and professionals
   Notes for discussion with patients, sources of further information

7. Implementation and audit
   Statement of intent, implementation, resource implications of implementing the guidelines, audit

8. Development of the guideline
   The guideline development group, systematic literature review, consultation and peer review.

Although SIGN in 2002 acknowledged that more complex and higher risk groups had the potential to benefit from CR programmes, there was less evidence for these groups. However, since then, with publication of our first text *Exercise Leadership in Cardiac Rehabilitation* (Thow, 2006), a significant body of evidence has developed, acknowledging that CR is safe and effective for these other groups. Thus, in 2008 not only is there an increase in the number of ‘conventional’ patients in CR, but there is also a need to integrate higher risk groups into CR programmes.

One point of note in the SIGN guideline was that the section on Exercise Training and Long-Term Exercise Programme comprised the largest part of the publication. This reinforced the important contribution exercise has to make in terms of the cardioprotective effects of habitual exercise in CR. Furthermore, this section, unlike the NSF 2000 publication, provided exercise professionals with guidelines on the assessment, monitoring and content of the exercise component of CR.
BACR Standards and Core Components for Cardiac Rehabilitation (2007)

This standards document was developed by 16 experts, primarily working or associated with CR in the UK. The group was co-chaired by Professor Patrick Doherty and Mrs Bernie Downey. The standards were devised to assure the BACR membership and the public that agreed best practice is available to all eligible patients. The 2007 standards replaced any previous standards, and the recommended six minimum standards in this document were to be audited from data that the National Audit of Cardiac Rehabilitation (NACR) would gather. The standards group advised that the standards be reviewed in 2010.

For these six standards, each must achieve core requirements:
- A coordinator who has overall responsibility for the CR service
- A CR core team of professionally qualified staff with appropriate skills and competencies to deliver the service
- A standard assessment of individual patient’s needs
- Referral and access for targeted patient population
- Registration and submission of data to the NACR
- A CR budget appropriate to meet the full service cost

(BACR, 2007, p. 2).

This thorough standards document outlines the content and components for CR. This document interestingly does not describe CR in the traditional phases of CR. It will be interesting to see in the future, when the NACR audit database is measured, if CR across the UK reaches these ‘minimum’ standards and core components.


The recent consultation document, Service Framework for Cardiovascular Health and Wellbeing (SFCHW, 2008), by the Department of Health, Social Services and Public Safety for Northern Ireland, is a far-reaching document, led by Dr David Stewart. It was developed by 25 members of a broad range of clinicians, service users and carers. In addition, like the NSF (2002) standard, these standards should be measurable.

Several of the standards in this document are condition specific, with CHD being one condition. The service framework embraces prevention, diagnosis, treatment, care, rehabilitation and palliative care of both individuals and communities who have greater risk of developing cardiovascular disease (CVD). Standard 24 includes CR:

All patients identified as requiring cardiac rehabilitation, in line with the British Association for Cardiac Rehabilitation guidelines, should be offered this service. Percentage of patients eligible for cardiac rehabilitation who receive the components of the service based on assessment of their need March 2009–60%, March 2010–70%, March 2011–85% (SFCHW, 2008, p. 17).
It will be interesting to see, in the future, how this extensive and ambitious project impacts on the cardiovascular health and well-being of the Northern Ireland population. Furthermore, of more interest will be the demand and need for comprehensive menu-based CR in Northern Ireland in the future.

**Content of contemporary CR**

The SIGN 2002 and NSF 2000 guidelines identified four phases of CR, progressing from the early hospital admission stage to long-term maintenance of lifestyle changes:

- **Phase I – Inpatient period or after a ‘step change’ in cardiac condition**
- **Phase II – Early post-discharge**
- **Phase III – Supervised outpatient programme including structured exercise**
- **Phase IV – Long-term maintenance of exercise and other lifestyle changes**


**Phase I**

Phase I is recognised as the first point of contact within the acute setting. It is considered to be either the inpatient stage or after a ‘step change’ in the patient’s cardiac condition. A step change may include presentation of an MI, cardiac surgery, angioplasty/stent and acute coronary syndrome, first diagnosis of heart failure (McKenna and Forfar, 2002; SIGN, 2002). In this phase, patients may be anxious and/or depressed regarding the threat to their health. It is important that support and reassurance are given by the CR team, with misconceptions being addressed (SIGN, 2002).

Phase I CR has traditionally included assessment, education, risk stratification and exercise/mobilisation. Assessment involves identifying risk factors and risk stratification, with the educational aspect providing patients with appropriate individual information regarding CHD, risk factors and lifestyle (Proudfoot et al., 2007; SIGN, 2002). The patients and families are prepared for transition to phase II, and links are made with the phase III team. This stage is a short phase of approximately 3–4 days, or until the patient is stabilised. Other early interventions include the ‘Heart Manual’, a 6-week comprehensive home-based programme that has been well evaluated and is especially useful in rural locations (Lewin et al., 1992).

**Phase II**

This is the early post-discharge stage back to the community and home. It is a time when patients feel isolated and insecure, and when high levels of anxiety may be present in both patient and family. To minimise this psychological impact of return home, the CR team can maintain contact by phone or home visit. Furthermore, the primary care team may also be involved at this stage and can minimise the impact. This is the stage where early modification of risk factors will start and goals set in phase I CR should start
Phase III
Traditionally this phase is hospital based, though it is increasingly recognised that it can be undertaken safely and successfully in the community (SIGN, 2002).

Exercise training is acknowledged as the key component of phase III CR, but psychosocial counselling, education on risk factors and lifestyle risk factor changes that are identified from phases I and II are equally important. As with earlier phases of CR, the involvement of family and significant others continues to be important. Home-based exercise is prescribed using self-monitoring skills, with, for example, Borg (1982) rating of perceived exertion being used by the patients. The exercise programme should be tailored to the needs and agreed goals of the patient. The latter is important to encourage adherence to exercise. Motivational interviewing and exercise consultation are key features of promoting exercise adherence in this phase (Thow, 2006). This phase varies between 8 and 12 weeks, often depending on local protocols and facilities.

Phase IV
Phase IV CR is the long-term maintenance of exercise and continued risk factor modification, with support and follow-up from the primary care setting (SIGN, 2002). It is important that the patient is aware of the exact nature of the follow-up system available. This stage is similar to phase II, in that patients have little support from the clinical team in CR. The patient by this stage is required to be more self-directed and be in the ‘action’ stage of behaviour change (SIGN, 2002). The BACR phase IV training course for exercise professionals has had a significant impact on phase IV provision across the UK, by increasing the number of qualified instructors and thereby increasing access to quality community-based exercise (Thow et al., 2006).

Trends in CHD and demand for CR in the twenty-first century
It is estimated that 1.5 million men and 1.1 million women have CHD in the UK. Trends in CHD over time indicate that the prevalence in the UK is rising. From 1994 to 2003 the prevalence increased from 6.0 to 7.4% in men and from 4.1 to 4.5% in women (BHF, 2006). This change in prevalence and, in particular, the increasing numbers of survivors of MI represent an increased demand and need for CR. This is reflected in one of the targets for CHD care by the NSF: over 85% of patients discharged with a heart attack or coronary revascularisation should receive CR (Department of Health, 2000).
This increased number receiving CR translates to a 52% increase, to 104,985 eligible patients in England (in 2000, 51,216 received CR). In Northern Ireland similar goals have been set by the SFCHW (2008): by March 2009 60% and by 2011 85% of patients, on the basis of need and eligibility, will be offered CR. In Wales, the Welsh Assembly has funded strategies to increase access to CR with the inequalities in health fund. With the emphasis on targeting areas of poorer health, several areas were identified. If these numerous incentives produce results and increase access to CR, we will see a substantial increase in the numbers of patients requiring exercise-based CR.

In 2008 CR was evidence based and embedded in many government policies and national guidelines, for example, the NSF (Department of Health, 2000), SIGN (2002), the Coronary Heart Disease and Stroke Strategy for Scotland (Scottish Executive Health Department, 2002), the Association of Chartered Physiotherapists in Cardiac Rehabilitation (ACPICR, 2006), the BACR Standards and Core Components for Cardiac Rehabilitation (2007) and the Northern Ireland Service Framework for Cardiovascular Health and Wellbeing (SFCHW, 2008). All these documents and guidelines acknowledge exercise-based rehabilitation as an integral part of the CHD patient’s complete journey of care. Although a key element in CR is acknowledged as structured exercise, not all patients in 2008 were accessing or being offered CR, with as much as 60% of cardiac patients not having access to CR services in the UK and 40% in Wales. This has been acknowledged by the British Heart Foundation (BHF), BACR, Chest Heart and Stroke and many other regional groups. In 2008 a national campaign was established to raise awareness, increase funding and facilities for CR. The campaign demands that by 2010 every heart patient has access to a high-quality CR programme. In 2008 numerous events had been held in at Westminster, Edinburgh and Cardiff to highlight and champion CR. It will be interesting to revisit these statistics in 2010 to see if these targets are reached.

More challenging patients in cardiac rehabilitation

Since CR programmes were first established in the early 1960s–1970s, there has been a steady increase in the established patient groups, that is post-AMI (and now acute coronary syndrome), post-revascularisation groups, including CABG and PCI. There is also a steady increase in the number of patients who, in the past 20 years, would have been excluded or deemed as ‘too high risk’ and therefore not suitable for exercise-based CR, for example, chronic heart failure and type 2 diabetes. As this book explores, there is now growing and compelling evidence that these high-risk patients can be involved in exercise-based rehabilitation and may indeed gain many health and psychosocial benefits. In addition, guidelines and policy documents acknowledge that it is not only patients with post-AMI
and revascularisation procedures but the broader spectrum of patients with cardiac and CVD who should be included in exercise-based CR. Furthermore, many patients do present to CR exercise programmes not only with cardiac problems but often with other comorbidities and age-related changes (Bethell et al., 2001; Thow et al., 2003). The CR leader in the 2000s must be able to adapt exercise prescription and delivery of exercise classes to accommodate these more challenging patients. This book focuses on this group of patients who are increasingly being offered CR.

Other contribution of BACR to CR development in the UK

Affiliation to the British Cardiac Society

The BACR, since its inception, has had strong links with the BCS and, along with many other affiliated groups, has strengthened those links over the years. As a result, this has strengthened the position of CR, through the larger network of contacts and influence this society has at political and academic levels.

The BCS contributes greatly and supports the BACR by providing the administrative support, official address, creation and update of the BACR website. It also provides legal advice and links with other appropriate bodies. Through the host journal *The British Journal of Cardiology*, published bimonthly, it provides a forum for research dissemination and comments on CR in the UK by the BACR membership. For affiliate members this provides an opportunity to participate in BCS annual meetings and proposes topics for presentation to raise the profile of CR. Thus, the BCS acts as a strong advocate for BACR.

Membership of the BACR

In 2008 BACR membership had expanded to over 600 members, with the multi-professional dimensions that reflected the context of contemporary CR included in the membership BACR (2008):

- Nurses, 253
- Phase IV BACR instructors, 121
- Physiotherapists, 90
- Exercise professionals, 77
- Exercise physiologists, 39
- Doctors, 19
- Other/unknown, 19
- Academic, 8
- Psychologist, 6
- Dietician, 3

The membership has seen a steady increase and continues to reflect the diversity of professions involved in CR delivery and research.
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BACR newsletter
The BACR always recognised the need for a newsletter as a vehicle for communication between members. Initially, the BACR produced an in-house newsletter. In collaboration with the BHF, the BACR now produces a regular newsletter for CR across the UK. It is produced and supported by the NHS Heart Improvement Programme. This high-quality newsletter provides clinicians with a forum to exchange and keep up to date with developments across the UK. It provides information on education and training opportunities provided by the BACR, ACPICR and other academic institutions.

Educational developments of BACR
In 1999 Cardiac Rehabilitation: An Educational Resource was edited by Professor David Brodie (BACR, 1999). This educational resource was aimed at health care professionals for education and training. The resource utilised a problem-based approach, using six patient-based scenarios to integrate the different aspects of CR. It also provided some of the learning resources from the 1997 Phase IV Exercise Training Module.

The British Association for Cardiac Rehabilitation Phase IV Exercise Training Module
It was evident from the literature that lifetime exercise and health behaviour was a key outcome of CR. In the 1990s phase IV exercise programmes across the UK were patchy, with a few enthusiasts delivering phase IV or ‘maintenance classes’ for patients graduating from phase III. In 1997 Dr Jenny Bell, with a small steering group of both clinical and exercise professionals, developed a programme and course content for a phase IV course for exercise professionals. These pilot BACR phase IV courses were held in Maidenhead and Glasgow. The pilot courses were very successful, and the phase IV BACR courses have rolled out over the last 11 years. In addition to the course in 1997, the first education pack for the module was devised and delivered. This was followed by revision of the Phase IV Exercise Training Module, with the third edition in 2002 (BACR, 2002). This excellent education pack is a valuable resource for all exercise professionals working across phases III and IV of CR in the UK. In addition, a workbook and video were produced in 2002 to be used along with the exercise training module. In 2008, over 110 courses had taken place across all of UK. Over 2000 qualified instructors had taken part and completed the course. Funding initially for the development of the training course came from BHF, but it is now self-funded by participants. The phase IV course in 2007 costed £595 (€855) for the participants. There is a rigorous selection process to enter the course, with students required to have previous qualifications equal to a National Vocational Qualification at level 2. They must have previous experience of teaching land-based exercise of 150 hours, accrued over the previous 2 years. In addition, they must
have endorsement from a phase II exercise professional and a character reference. This prestigious course is recognised by the Register of Exercise Professionals, Skills Active, BHF and the BCS and contributes significantly to the participants’ continuing professional development (CPD).

The BACR phase IV has administrative support from two full-time members of staff. Over the last 11 years, 40 BACR tutors have been trained. The material delivered includes a standardised course manual, accompanying DVD and workbooks. The course is delivered UK-wide in ten regional centres. The content of the course includes 5 days, 35 hours contact, 100 hours of independent study and a visit to a phase III programme. The students have one day to review and prepare assessment material. The assessment is carried out over a half-day and includes a written multiple-choice question paper, a written case study and a viva. Every 3 years students are required to revalidate their qualification with a 1-hour paper and evidence of working with phase IV participants. Once the students qualify, they automatically become members of the BACR phase IV instructors’ network.

In 2006 a survey was carried out on the provision of phase IV in the UK (Thow et al., 2006). Of the BACR phase IV members, 498 from 800 (63%) members replied to a postal survey. The main findings of the survey were that 65% of programmes were held in a community setting, and referrals from phase III constituted over 75%. Weekly, there were over 600 classes in the UK, with approximately 12 000 participants exercising in phase IV. The more negative outcome of the study highlighted the disparity of funding across the UK: some areas had good support from NHS sources (28%) and leisure services (24%), while the rest were self-funding and less financially secure. There was overwhelming support for the BACR course providing a quality educational experience by 80% of the respondents. This course has been one of the most significant and valuable contributions to ongoing care in CR in the UK.

Association of Physiotherapists in Cardiac Rehabilitation

The ACPICR is acknowledged by the Chartered Society of Physiotherapy (CSP) as a clinical interest group for physiotherapists in CR. This group is affiliated to the BACR. The group was established in 1995 and was called initially the Association of Physiotherapists Interested in Cardiac Rehabilitation. This organisation has a dynamic committee and regional representatives contributing to the national body. In 2008 the membership of ACPICR was 169, with 139 physiotherapists and the rest of the membership being a variety of professionals and exercise professionals.

The ACPICR has been proactive in liaising with organisations and government bodies that are the key drivers for CR, including the NICE guideline groups and national audit groups. The ACPICR also contributes to the CSP annual conference, thus providing a high profile for CR professionals. In collaboration with the CSP, in 2006 the iCSP website was established for the ACPICR interest group. This site provides exchange and dissemination
of research across the membership. The website for CR 2006 had over 1600 users, thus showing the extent of interest in CR.

To further the objectives of the ACPICR, the group produced a comprehensive guideline handbook for the delivery of phase III exercise-based CR, *The Standards for the Phase III Exercise Component of Cardiac Rehabilitation* (ACPICR, 1999, 2006). (This guideline is presently being updated.) This user-friendly guideline is evidence based and provides CR physiotherapists with up-to-date best practice guidelines for safe and effective design and delivery of CR. It was endorsed by the BACR in 2007 as part of the core competencies of CR.

In addition to the guidelines, the ACPICR produced competencies for physiotherapists involved in the care and management of CHD patients attending exercise-based phase III CR (ACPICR, 2005, 2008a) (to be updated in 2010). The authors of the competency document give the following rationale for the document:

> The overall aim is to provide clear guidelines about the expected role, standards of performance and the knowledge and skills required to achieve quality care for the exercise component of Phase III CR (ACPICR, 2008a, p. 2).

To support the delivery of the competencies, a peer review booklet was published by the ACPICR (2008b). The booklet supports peer observation of the actual delivery of the phase III exercise CR. It uses a ‘traffic light’ system to reflect if the standards are achieved, partly achieved or not achieved. The ACPIC interest group is one of the most dynamic and proactive within the CSP, in relation to the production of evidence-based guidelines and methods to help members maintain quality and standards.

The ACPICR is key deliverer of quality CPD courses in the UK for those delivering exercise-based CR. The courses are held over 1 or 2 days, and in 2007 the courses included the following:

- Exercise prescription, new insights and management of the complex patient
- Skills and techniques in delivering group exercise
- A practical course in assessing and monitoring functional capacity in cardiac patients
- Assessment, prescription and delivery of physical activity for the patient with heart failure, a nurse professional study day and an exercise professional study day.

Furthermore, the ACPICR informs the membership through the newsletter and website of validated MSc modules and courses across the UK. In 2008 over 20 academic institutions in the UK were delivering validated MSc and modular courses for CR professionals. These institutions offer a mixture of single modules or full MSc in CR.

**Exercise Professionals’ Group**

The ACPIC, BACR and the British Association of Sports and Exercise Science (BASES) make up the Exercise Professionals’ Group (EPG),
established in 2003. Other EPG members are graduate members of the BACR phase IV graduate network of over 800 graduates. This group has a yearly study day where updates in current research and developments in exercise delivery in CR are provided. All members of the phase IV graduate group receive a newsletter from the BACR. An exciting development was a pilot psychology course in 2006, with the first full course taking place in June 2008. The course is still in the developmental stage. In addition, this group is in the developmental stages of running an Introduction to Cardiac Rehabilitation for commissioners and new clinicians to the field.

Cardiac rehabilitation future directions
Since the early work of CR pioneers, over 50 years ago, we can see a massive change in attitudes to the management of cardiac patients. Furthermore, there has been a massive shift in the UK to the ‘active’ approach to rehabilitation. Early exercise and holistic management are now the norm, but how will CR develop in the near and distant future?

High-risk groups
Many patients in the 1950s and up to a few years ago were either excluded from CR, due to their apparent ‘high risk’ or by reluctant clinicians, who did not feel equipped to deal with higher risk groups. These ‘high-risk’ patients, with the increase in evidence and quality research, are more likely now to be included in comprehensive menu-based CR. In the future, will we see most, if not all, of the ‘lower risk’ patients, for example, uncomplicated MI CABG, moved quickly into community-based phases III and IV CR and increased CR for ‘high-risk’ groups in the hospital setting? This text addresses these questions.

Mentoring and self-help groups
With the projected increase in the numbers of patients accessing CR and the need for ongoing health behaviour change, there could be more expansion and use of lay health mentoring to empower people with CHD and CVD. There have been successful examples of this approach to empowerment, where support and advice are given by peers who have experienced CHD. The Braveheart Project in Falkirk, Scotland, for older people with ischaemic heart disease is one such example (Coull et al., 2004). This randomised controlled trial, over 1 year, with 289 participants aged 60 years and over diagnosed with MI or angina, found significant improvements in the mentored group in exercise participation, improved diet, improved concordance with medication, physical functioning on the SF-36 score and reduced outpatient attendance for CHD. The authors of this innovative approach found that the approach is feasible, safe and inclusive, positively influenced lifestyle, in particular exercise and diet, complements CR and, finally, is a model that can achieve measurable health gains. A similar project with older people, designed to increase exercise participation, has
seen a similar mentoring programme influence over 12,000 older people to increase exercise (Laventure et al., 2008). It could be possible in the future to utilise this approach more in order to maintain exercise and healthy lifestyle.

Is it cardiovascular rehabilitation and/or prevention?
As discussed earlier, CR patients in the past were primarily from the lower risk post-MI and CABG groups. Now we are seeing more complex and higher risk groups. As CHD is only one manifestation of CVD, there is a clear overlap of patients presenting to CR with diabetes, peripheral vascular disease and transient ischaemic attacks. Many CR patients present with many of these conditions. As we will see in Chapters 2 and 6 of this text, type 2 diabetes and peripheral vascular disease are common among CR patients. Fitzgerald-Barron (2005) acknowledges the overlap in disease management and that CR patients share many common cardiovascular risks and need cardiovascular management. It is also of interest that BACR and 15 other affiliate groups are now part of the British Cardiovascular Society. The National Service Framework for Coronary Heart Disease in England comes to an end in 2009/2010 and there is currently no strategy to replace it. The Cardio & Vascular Coalition will see in England a campaigning for a new comprehensive Cardio & Vascular Health Strategy for 2010–2020. In the future, will we see CR become a broader remit to embrace all patients with CVD?

Furthermore, will prevention of CVD become a strategy as in Northern Ireland (SFCHW, 2008)? Will proactive involvement in prevention, promotion, protection and lifestyle become the remit of the CR team? Should rehabilitation move into prevention and become more proactive in order to prevent patients who are at high risk of CHD developing CHD?

Will cardiac rehabilitation phases be redundant?
The concept of phases of CR traditionally represents parts of the journey that cardiac patients take in their pathway of care. It could be argued that the phases represent only where the patient is. For example, phase I is in hospital, phase II is at home, phase III is back in structured exercise and, lastly, phase IV is lifetime maintenance at home. These phases in the SIGN (2002) definition are not intended to relate simply to location, but are intended to tailor interventions to the individual.

Although SIGN (2002) suggests that CR is menu based, perhaps compartmentalising CR into phases is not the best design. The design at present, especially phases I–III, lasts approximately 3–4 months. However, it could be argued that this amount of time is too short to impact on behaviour change and to accrue the health benefits of exercise. Other programmes have contact with patients for much longer periods, for example, up to 1 year (Kavanagh et al., 2008). Should rehabilitation be structured in the UK to have a longer contact period, especially in the present phase III,
where the support and behaviour change is at the most intense? Other ‘packages’ of CR could be devised, such as the following two examples:

1. A 6-month phase III programme: the first 2 months (two classes per week plus one home session), followed by 4 months (one class per month plus home session and continued support calls from the CR team). This represents 20 CR contact sessions spread over 6 months, compared to the current model of 12-week phase III class of two sessions, providing 24 contacts. Another advantage of this model is that the patient is gradually being given more responsibility and increased self-management. With behaviour change strategies running over a longer period of time, not only there may be improved adherence and improved self-efficacy, but the transition to phase IV may also be smoother.

2. Instead of having phases, subjects stay in the CR programme till they reach agreed milestones or goals, for example, are able to safely self-monitor, achieve agreed BMI/waist-to-hip ratios, achieve a 6 metabolic equivalents shuttle walk test result. It could be argued that CR, particularly phase III, is not flexible to the CR individual’s goals. It would be interesting to shape a programme around goals and targets for the patient.

Key messages

- CR is now firmly embedded in cardiac care in the UK.
- The BCS, BACR and other affiliated groups have developed and led an enormous development in quality, evidence-based CR.
- There will be a substantial increased demand for CR if the targets set by national government are achieved.
- Not only will there be more demand for low- and moderate-risk CR patients, there will be more high-risk patients included in CR.
- CR is continually evolving and improving, due to research and evidence-based practice.
- There may be extended development and use of self-help and mentoring programmes to expand and support CR.
- In the future, CR may encompass all cardiovascular groups and move more into primary prevention.

Summary

In the 1950s pioneering work explored a more active approach to the rehabilitation of cardiac patients. These early developments in CR laid the foundations for others in the 1960s–1970s to devise more structured exercise-based programmes that began to turn the tide not only in attitudes but also in building the evidence base for CR. The establishment of the BACR as the lead body for CR was a significant development in the UK. This group was the first to galvanise, provide direction and a communication framework for CR professionals. Since then, CR is now firmly
embedded in cardiac care, with over 370 CR programmes in the UK. CR is now supported by education and CPD from the BACR and affiliated groups and many universities across the UK, providing quality MSc and standalone modules in CR. Furthermore, there has been much quality research on the many facets of CR, which continues to shape and improve the care for CR recipients. A major shift in the twenty-first century is that the previously branded ‘high-risk’ patients, which this book explores, can safely be included in exercise-based CR. In addition, new forms of CR are emerging: Will we see in the future increased utilisation of mentoring and self-help by ex-patients and those with CVD to empower them to change and maintain health cardiovascular behaviour? CR is still evolving. The future of CR provision may see a move towards different ‘packaging’ of CR, possibly embracing CVD prevention.

**References**


Association of Chartered Physiotherapists in Cardiac Rehabilitation (ACPICR) (2008b) *Peer Review for the Exercise Component of the Phase III Cardiac Rehabilitation*. London: CSP.


The Evolution of Cardiac Rehabilitation and Future Directions


