British Heart Foundation

The National Audit of Cardiac Rehabilitation

Annual Statistical Report 2007

BEATING HEART DISEASE TOGETHER

Foreword

Dr Mike Knapton
Director of Prevention and Care
British Heart Foundation

Cardiac rehabilitation is a vital part of the care pathway for patients with heart disease. It is an evidenced based intervention which reduces future mortality and morbidity, is cost effective and is recommended by many national and international guidelines.

The findings of the National Audit of Cardiac Rehabilitation (NACR) confirm the impression of many patients and staff that the majority of patients with heart disease do not get cardiac rehabilitation. It is also reported that in England some cardiac rehabilitation schemes are under the threat of closure due to financial pressures.

Responding to these findings, the BHF, the British Association of Cardiac Rehabilitation and the BHF Care and Education Research Group at the University of York have agreed to use a national campaign to support patients and providers of services to improve the current unsatisfactory situation. The aims are:

- that every heart patient who is suitable and wishes to take part is offered a rehabilitation programme
- that patients should be offered alternative methods such as home-based rehabilitation, if they prefer not to take part in a group programme or attend hospital as an out-patient
- that efforts be made to ensure that rehabilitation programmes meet the needs of under-represented groups, particularly ethnic minorities and women
- that each programme should meet the minimum standards set out by the British Association for Cardiac Rehabilitation
- that this be monitored though the National Audit of Cardiac Rehabilitation.

We support the infrastructure that supports this audit but it is the hard work of the rehabilitation programmes that makes the audit possible. Not all programmes have begun to return data and it is essential that in the next year they do so. We can then track the success of the campaign and tackle inequalities at the local as well as the national level.

Mike Knapton
British Heart Foundation, 14 Fitzhardinge Street, London W1H 6DH
Phone: 020 7487 9411

The cover shows the rehabilitation programmes of the UK mapped to postcode areas. Areas with a greater population density have a smaller postcode sector footprint (Northern Ireland is mapped to Ordnance Survey counties).

Acknowledgements

The National Audit of Cardiac Rehabilitation is entirely funded by the British Heart Foundation. It relies on the good will of the patients and staff of the cardiac rehabilitation programmes of the UK, who collect and provide the data, often with no support and in their own time. We would like to thank the Heart Improvement Team of the Department of Health, Lee Panter and Margaret Leid of Cheshire and Merseyside Cardiac Network and the BHF Heart Health Co-ordinators whose hard work has made the project possible. This report was compiled the National Audit Team at the British Heart Foundation Care & Education Research Group at the University of York.

Introduction

What are the aims of the NACR?

The NACR aims to improve cardiac rehabilitation by:

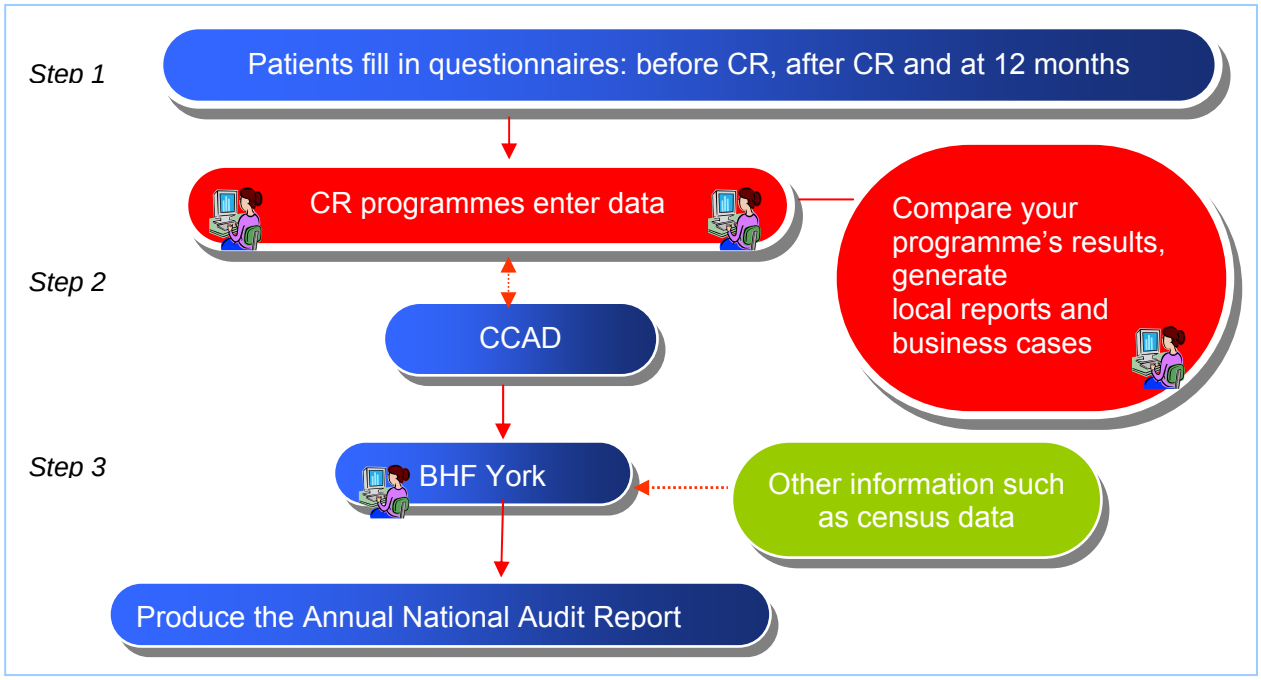
- showing locally and nationally where services are not reaching acceptable standards
- identifying inequitable provision where some groups of patients, for example women, the elderly or people from ethnic minorities are not attending in the number expected
- benchmarking outcomes to describe the typical benefits that a patient should expect and to allow programmes to measure their performance against others
- finding out which ways of working are most helpful so that guidelines for best practice can be evidence based
- making information about local provision available to providers, cardiac patients and the general public.

How does the National Audit work?

Step1. The patients fill in questionnaires three times: before they start their rehabilitation, after the rehabilitation programme and 12 months later. The cardiac rehabilitation (CR) programme staff score the questionnaires into a special database.

Step 2. The data is uploaded to the Central Cardiac Audit Datasets Project (CCAD). They add national benchmarks, anonymise the data and make it available to the York NACR Team. CR staff can also download their data to analyse themselves, for example to create local reports or business cases.

Step 3. The York team combines the data with other sources of information and write reports.



You can find more about the NACR at **www.cardiacrehabilitation.org.uk/dataset.htm** or by writing to Corinna Petre, BHF Research Group, Department of Health Sciences, University of York, Seebohm Rowntree Building, York YO10 5DD, UK. Phone: 01904 32 1336 Fax: 01904 321388 Email: cbp1@york.ac.uk.

Progress with the National Audit

So far, 240 of the 360 UK programmes have agreed to join the national audit. Of these 157 have installed the software and are returning patient level data electronically. With Dr Hugh Bethell of Alton we have continued the annual paper-based survey which collects programme level data about staffing, budgets and the number of patients seen each year in each diagnostic group.

Summary of what we found

- The great majority of people with heart problems *do not* attend cardiac rehabilitation, despite the significant reduction in risk of an early death that this would provide.
- Around 38% of heart attack patients, 55% of coronary artery bypass patients and 45% of angioplasty patients took part in cardiac rehabilitation in 2005-2006.
- Less than 1% of the people taking part are referred because they are one of the 66,000 people newly diagnosed with heart failure each year and only 4% are referred from amongst the 345,000 people newly diagnosed with angina each year.
- There is a geographical lottery for access.
- The multi-disciplinary staff mix and staffing level per patient is very poor when compared to the British Association of Cardiac Rehabilitation minimum clinical standards.
- Around 20% of cardiac rehabilitation programmes have no way of recording the number of patients attending.
- Many rehabilitation programmes do not have the funding necessary to deliver a good quality programme. The average cost per patient was £550 but costs reported ranged from £17 to £2186.
- Nearly 70% of programmes in 2005-6 were not aware of their budget and many have no established business case, placing them at significant risk of closure. Some programmes have closed down in the last year.
- A significant proportion are largely, or in part, dependent on charity
- Many programmes have no established business case, placing them at significant risk of closure. Some programmes have closed down in the last year.
- Around 30% of programmes depend on charity for at least 25% of their funding
- The percentage of programmes predominantly funded by charity is highest in Wales (23%), followed by Northern Ireland (20%), Scotland (15%) and England (5%).
- In England there has been no real progress with the targets set by the Department of Health in 2000. Attendance is less than half of the target figure.
- It appears that no targets have been set for uptake in Scotland, Wales or Northern Ireland.
- Most programmes in the UK still centre around a group-based exercise programme and educational talks. Individualised programmes and alternative choices of methods such as home-based programmes are not sufficiently used.
- In programmes contributing to the NACR, all of the patient benefit outcomes set as targets by the Department of Health were significantly exceeded at the end of rehabilitation.
- In programmes contributing to the NACR comparing people before and after their rehabilitation, 26% *fewer* were completely sedentary, 20% *more* met the national target for activity. Body Mass Index (BMI), smoking, anxiety and depression were significantly reduced and some key aspects of health-related quality of life were greatly improved.

We have confirmed that many of the problems of uptake, staffing, funding, organisation and quality that have been reported anecdotally exist often to a significant degree. We have also shown that patients who attended those cardiac rehabilitation programmes reporting patient outcomes to NACR made very real and important changes to their lifestyle and their quality of life. As more centres are linked electronically we will begin to be able to answer more detailed questions about local levels of uptake and benefits, about inequalities in uptake and about the most effective ways of providing cardiac rehabilitation.

Professor Bob Lewin for the NACR Team, University of York, UK. July 2007.

The questions answered in this report

How many CR programmes are there in the UK?

Why is this important?	We need to include all of them in the audit
What did we know already?	The BHF and BACR maintain a voluntary register of CR programmes which holds details of around 340 programmes.
How did we try to find out?	We asked the Cardiac Networks in England to check the list for their area. We wrote to all known CR programmes in the UK asking if they knew of others in their area. We have recently put the register online and have written to all of the programmes on it to check that the information is correct.
What did we find?	At present we believe that there are around 400 programmes, of which 360 are six or twelve week, multi-disciplinary outpatient (phase 3) programmes. The others are pre-discharge programmes (phase 1), immediate post-discharge (phase 2) or long term exercise groups (phase 4) alone.
How confident are we that this is correct?	We believe that the e-register contains almost every CR programme in England and Wales. The position for the rest of the UK is less clear.

The e-register of cardiac rehabilitation programmes

The online register is at **www.cardiac-rehabilitation.net/**

Anyone can use it to search for their three nearest rehabilitation programmes, by entering a postcode, a town name or a street name.

Programmes can edit their own entry and each has a page to 'sell' their programme. In this way we hope that rehabilitation programmes will update the information when changes take place and the register will be kept up to date.

The register can also be downloaded as a PDF file. This file is automatically updated each month from information entered by the CR programmes.

Who is attending CR programmes?

Why is this important?	National and international guidelines say that CR should be available to all people with heart disease except those whose condition is unstable or who require palliative care. It is important to check that no group of patients is being excluded.
What did we know already?	There has been much speculation about groups who may be under-represented, such as women, elderly people and those from ethnic minorities, but little is known for certain.
How did we try to find out?	The audit collects demographic information for every patient and asks for the reason for referral to rehabilitation.
What did we find?	Three cardiac conditions: heart attack (MI), angioplasty (PCI) and coronary artery bypass (CABG) accounted for 81% of referrals. On average women attending CR are six years older than men (65 for men, 71 for women). This is mainly because women attending due to heart attack are, on average, eight years older. (Table 1 page 18). Men outnumber women attending by around 2 to 1. This may be because there is a greater prevalence of heart disease in men, but women live longer and catch up in the prevalence of heart disease after the menopause. This differential may represent the often suggested poorer uptake by women. The great majority of those taking part are White British. Certain ethnic groups are not attending and the numbers in some other groups appear very low. In the coming years we will try to establish if this is due to a low number of potential patients or a genuine inequality. 40% of patients had high blood pressure, 36% angina, 20% arthritis and 19% diabetes. Less than 25% of patients are in full-time employment and 58% are already retired. This may be due to their age but it may also be due to employed patients having returned to work before the rehabilitation programme can take them. We will be investigating this in the coming year. About 30% of patients are borderline or clinically anxious when they start their rehabilitation and 18% are borderline or clinically depressed. The Quality of Life measures show that patients are particularly likely to have poor physical fitness and their perception of their overall health is very low. The data used to answer this question is presented in Tables 1-9 on pages 18-22.
How confident are we that this is correct?	This is a large sample drawn from around a third of all cardiac rehabilitation programmes and it is likely to be fairly representative. Next year, when more programmes are contributing data, we will use other national datasets such as the census data to see if certain groups are under-represented.

What percentage of people with heart attack, angioplasty or coronary artery bypass surgery attend cardiac rehabilitation in the UK?

Why is this important?	Each country of the UK has different policies about which patients should attend cardiac rehabilitation. However, all agree that patients with heart attack (MI), angioplasty (PCI) or coronary artery bypass surgery patients (CABG) should attend.
What did we know already	Previous surveys have suggested that only 30-40% of these patients attend rehabilitation.
How did we try to find out?	We conducted a survey of all of the cardiac rehabilitation programmes on the BACR/BHF register, asking them how many patients they had seen in each group in the year April 2005-March 2006. If they did not know or did not reply we took the average reported for that country and added it in. This gave us the number treated. To find out the number who were eligible to attend we took the number of patients recorded in the Department of Health Hospital Episode Statistics for England and calculated what percentage had attended.
What did we find?	Combining the three groups of patients across the four countries of the UK showed that there were 152,417 new patient in the year April 2005 to March 2006. Of these only 65,012 received rehabilitation, around 40%. Of people suffering an MI, 38% had rehabilitation, of angioplasty patients 45% and of bypass patients 55%. England and Wales appear to be doing equally poorly, with only around 46% of patients in England and 41% in Wales attending rehabilitation. Northern Ireland and Scotland *appear* to be doing worse across some diagnostic groups (but not CABG), with only 25% and 26% taking part, However the total percentages may be misleading for the reasons explained below.
How confident are we that this is correct?	We believe the English and Welsh results to be largely accurate. Further details of how we conducted the survey and analyses are given in Appendix 1 (page 17). The information used to answer this question is presented in Table 10, which can be found on page 23. The survey returns from Scotland were poor (24 out of 36) and there was also significant under-reporting from Northern Ireland. For technical reasons (explained in Appendix 1 page 17) the measures we took to account for missing data may have been less effective in those countries. Therefore the total percentage uptake figure for those two countries probably represent an underestimate of the actual number seen. Despite this we have presented the data for Scotland by Health Board (including the return rate for each Board) because some areas had a 100% return rate and this information is important to us and for those who provided it. We hope to have better Scottish data for 2006-7.
What does this mean?	In each of the three countries of the UK the majority of patients who are supposed to be attending cardiac rehabilitation are not. This means that there are premature deaths and many people left unnecessarily disabled.

Are the Department of Health targets for England for the uptake of CR being met?

What are the targets?	In 2000 a target was set for England that, by 2002, 85% of patients who had had a heart attack (MI), angioplasty (PCI) or coronary artery bypass surgery (CABG) would be invited to attend cardiac rehabilitation. After that had been achieved CR should have been rolled out to all other cardiac patient groups, apart from those with unstable conditions. This would include patients with heart failure, acute coronary syndrome, angina, congenital heart disease, valve and other cardiac surgery and people with implanted devices.
What did we know already?	We knew that around 30-40% of patients in these immediate target groups were attending rehabilitation in the year April 2005 to March 2006.
How did we try to find out?	We conducted a paper based survey of all of the cardiac rehabilitation programmes on the BACR/BHF register, asking them how many patients they had seen in the year April 2005-March 2006. We compared this with the number of patients for each diagnosis recorded in the Department of Health's Hospital Episode Statistics, to work out what percentage had attended CR.
What did we find?	The English NSF-CHD target for 2002 is far from being met. If we take this target only 46% of the patients with a heart attack (MI), angioplasty (PCI) or coronary artery bypass surgery (CABG) took part. If we take the post 2002 target to roll out to other groups such as those with heart failure and angina, this has not started.
How confident are we that this is correct?	There may be a few programmes missing from the register and only 80% of questionnaires were returned with data. Where data was not returned by a CR programme we added in an average for that area, this may have *overestimated* the number being treated. Despite these caveats the result is in line with previous surveys and we are confident that it is a fair representation of the current situation.
What does this mean?	There has been little improvement in the uptake of cardiac rehabilitation in the seven years since the National Service Framework for Coronary Heart Disease targets were set.

Is CR uptake geographically equitable?

Why is this important?	It is a principle of the NHS that where you live should not affect your chance of receiving essential lifesaving treatments.
What did we know already?	A previous survey had looked at the uptake rates across the English Government districts. It showed that there were large differences in uptake. We have extended this to the four countries of the UK.
How did we try to find out?	We conducted a paper based survey of all of the cardiac rehabilitation programmes on the BACR/BHF register. We asked them how many patients they had seen in the year April 2005-March 2006. We mapped this information onto Strategic Health Authority (SHA) Boundaries in England and Health Boards in Scotland. We were unable to do this for Wales and Northern Ireland because it was not possible to obtain the number of patients requiring rehabilitation by region in these countries. The numbers of patients receiving cardiac rehabilitation in Wales and Northern Ireland are presented in Table 10. We compared this with the number of patients who were discharged from hospital alive recorded in the Department of Health Hospital Episode Statistics for England and their Scottish equivalent, to work out what percentage had attended CR in each area for each diagnosis.
What did we find?	There are wide disparities in the percentage of patients receiving CR according to geographical location in England and Scotland. For example the percentage receiving rehabilitation after MI by English SHA ranged from 11% to 71% (see Figures 1-6 pages 24-29 for detailed comparisons).
How confident are we that this is correct?	It is the case that while a CR programme may be located within a SHA or Health Board boundary it may take patients from a second SHA or Health Board. As a result there is a degree of uncertainty around these figures. However, despite these caveats the range in the percentage of patients taking part in rehabilitation across different areas in the UK is so wide that we believe it is correct to say that there is a clear geographical difference in uptake. More accurate comparisons between areas will become possible once all programmes are contributing patient level data to the audit. As noted on page 6, returns from Scotland were very poor and as a result some of the uptake figure for some health boards in Scotland cannot be regarded as reliable, we have provided the return rate for each Health Board. The return rate for other Boards were excellent and we have presented the Scottish data for the sake of retaining information about those areas. We hope to have better Scottish data next year.
What does this mean?	It is clear that where a patient lives will have an impact on his or her chance of getting cardiac rehabilitation and therefore of his or her risk of early mortality.

Does uptake vary across diagnoses?

Why is this important?	There is much scientific evidence that the majority of cardiac patients will benefit from rehabilitation and this is supported by recommendations from professional and scientific bodies In England the Department of Health has said that all patients who can benefit, excluding those with unstable conditions, should be invited to take part.
What did we know already?	Programmes are often restricted by local clinical protocols in the kind of cardiac patient they can accept. These are often too conservative and based on faulty understanding of risk. For example, despite national policy and the evidence base there is often a blanket edict that any patient with heart failure should be excluded. Similarly there may be a funding decision that restricts rehabilitation to certain groups.
How did we try to find out?	We took the annual survey results and compared the percentage of patients attending for each of MI, PCI and surgery. We also asked each programme which patients they were able to accept on their programme. Finally we looked at the patient level data in our audit, to see to what extent patients which patients are attending.
What did we find?	A greater percentage of CABG patients than MI patients attend rehabilitation. Angioplasty patients were accepted by less than half of CR programmes. Only a tiny fraction of the 66,000 people newly diagnosed with heart failure each year will receive rehabilitation. There are around 345,000 new cases of angina each year and practically none will attend rehabilitation. Similarly, people with acute coronary syndrome, that is people with acute symptoms in whom the threshold for cardiac damage does not reach the 'heart attack' level, are mostly excluded from rehabilitation. This is despite their obvious need and the huge potential to prevent them going on to have a heart attack.
How confident are we that this is correct?	The survey data is we believe largely correct, The patient level NACR data is from a very large number of cases and a sample of about a one third of all rehabilitation programmes and is also likely to be substantially correct.
What does this mean?	Rehabilitation services are seeing only a fraction of the number of patients who would benefit.

How many programmes have an established NHS budget?

Why is this important?	In the last decade new financial controls have been introduced in the NHS. Programmes that have no identified budget are vulnerable to closure.
What did we know already?	Many CR programmes receive some of their income from charities or fundraising events. Some programmes do not hold a budget but exist on a grace and favour basis, 'borrowing' time from different departments in the hospital.
How did we try to find out?	We asked all of the CR Programmes on the register if they knew what their budget was and what percentage of their budget was funded by the NHS?
What did we find?	Across the UK only 32% of programme co-ordinators knew what their budget was and had an accepted business case. Table 13 on page 30 shows how many programmes still depend on non-NHS funding. In Wales 23%, in Northern Ireland 20% and in Scotland 15% of programmes had less than 75% of their funding from non-NHS sources. In England this applied to only 5% and across the UK as a whole 8%. Table 13 on page 30 shows the full results across countries.
How confident are we that this is correct?	This survey question was not well completed (the completion rate is shown in Table 13 on page 30). However the survey had a return rate of 92% so some caution must be exercised in interpreting these results.
What does this mean?	We know of several that have closed in the last year for this reason. Others have been threatened but have survived, mainly due to local campaigning by patients. This situation appears to be an anomaly. We know of no other evidence based, life-saving, cardiac treatment that has to depend in part on charity.

What is the average budget per patient?

Why is this important?	We suspect that many rehabilitation programmes do not have the funding necessary to deliver a good quality programme.
What did we know already?	Work done at Bristol University suggested a cost of £486 per patient successfully completing a cardiac rehabilitation programme (2000/01 prices).
How did we try to find out?	We asked every programme in the survey what their budget was. A large number did not know (see previous question). We also asked for the hours per week and grade of the staff working on the programme. To establish the *budget per patient* we divided the budget reported to us by the number of patients seen that year, to arrive at the 'budget per patient treated' figure. We also used a formula developed in the study by Bristol University to establish the full cost to the NHS (including the overheads of accommodation, depreciation on gym equipment etc). We divided this by the number of patients treated to arrive at the *cost per patient*.
What did we find?	The average programme costs around £550 per patient, allowing for inflation since 2001. This was in keeping with Bristol's estimate but there was an enormous range of costs per patient, from £17 to £2186. Further information is in Table 14 on page 31
How confident are we that this is correct?	The questions were not well completed *and* many programmes did not know what their budget was. There was so much missing data that reporting for the smaller countries like Wales and Northern Ireland may not be reliable. There is probably a bias towards higher cost data because it is usually the better organised and funded programmes that hold a budget and therefore could report the cost to us. Despite these caveats we believe that for the UK as a whole the results are likely to be reasonably accurate.
What does this mean?	Firstly it emphasises the cost-effectiveness of cardiac rehabilitation and the low cost in the healthcare context, for example a single day in a cardiac care unit cost £1,400. Secondly it revealed the huge disparities between programmes. Some exist on a quarter of the 'recommended' budget and it would be very surprising if patients who attend such programmes are not being disadvantaged. In future years we will examine this hypothesis and compare budgets against outcomes at the patient level.

How long are patients waiting to start CR?

Why is this important?	All modern authorities agree that post-MI rehabilitation should start in hospital and that the programme should start from the first week post-discharge. This is made even more important because many patients go back to work after six weeks and may be unable to come to rehabilitation after that time.
What did we know already?	We know that post-CABG rehabilitation is often not commenced for six weeks to allow the scar to heal although there is no clear evidence for this practice. We know little about variations in waiting times in cardiac rehabilitation.
How did we try to find out?	The NACR asks for the date of the event leading to rehabilitation, the date of referral to rehabilitation and the date the patient started on their rehabilitation programme.
What did we find?	There is very little delay in the referral being made, however the median delay between MI and rehabilitation starting is around 2.5 weeks and for angioplasty nearly a month. CABG rehabilitation, as expected, is around six weeks, although in some CR centres patients start immediately after discharge (see Table 15).
How confident are we that this is correct?	The programmes contributing to the NACR data are mostly the better organised and staffed and it would not be safe to assume these relatively good performance indicators are also found in programmes that are not contributing data.
What does this mean?	The waiting time, although not excessive, is too long. Ideally the patient should start post-MI rehabilitation within a few days of the event.

How multi-disciplinary are the programmes?

Why is this important?

Cardiac rehabilitation is a multi-disciplinary activity, helping with the medical, behavioural, psychological and social restitution of the whole person. It requires the skills of several professions.

What did we know already?

CR programmes are often short of resources and may not have the full range of professional expertise required. The staffing recommendation from the Scottish Intercollegiate Guideline Network (SIGN) clinical guideline for cardiac rehabilitation appropriate for 500 patients is:

Staff	*Whole time equivalent (WTE)*
Nurse	3.0
Physiotherapist	2.0
Dietitian	0.3
Pharmacist	0.2
Clinical psychologist	0.2
Clerk	0.5

These standards have been adopted by the British Association of Cardiac Rehabilitation as the minimum clinical standard for the UK.

How did we try to find out?

We asked all of the CR programmes on the register how many different professions took part in their programme and for how many sessions a week.

What was the answer?

The majority of programmes do not come close to meeting the national standard for staffing. Moreover there was a huge disparity. In some centres a single handed nurse or physiotherapist was attempting to provide rehabilitation for 600 patients a year whereas in others there might be three members of different professions for a similar number.

The median number of professions was three and the range was from one to seven professionals. In the UK, 93% of programmes had a nurse and 60% a physiotherapist, but only around 20% had a dietitian or occupational therapist, 10% a psychologist and 1% a doctor or social worker. The full data can be seen in Tables 16 to 19 on page 31-32.

How confident are we that this is correct?

This question had very high completion rate and we believe that this information is correct.

What does this mean?

Patients in many centres will not get the range of professional help that clinical guidelines suggest they should be able to access. In future, work will examine the effect this may have on outcomes.

Those purchasing and providing rehabilitation services need to ensure that all of the patient's needs are being met, not just those for education and exercise.

What do patients receive in CR programmes?

Why is this important?	Comprehensive cardiac rehabilitation includes attention to medical, psychological and social needs of patients. Patients should be offered a menu of methods for reaching their individually set goals for rehabilitation.
What did we know already?	We have little knowledge about the patient experience in taking part in rehabilitation.
How did we try to find out?	The NACR records the activities which patients take part in during their rehabilitation programme.
What did we find?	All patients took part in some kind of exercise or activity programme. 32% had a home-based exercise component, with 27% having an individualised programme. Group exercise was still the most common method, used with nearly 80% taking part. Around 60% of patients took part in group talks, including discussions about diet. Only 18% had an individual dietary session and only half of the patients were given accompanying written materials. Around half took part in relaxation training and a third in a talk about the psychological aspects of heart disease. Few patients had individual sessions with staff for any reason. Home-based programmes are not widely used: only 10% completed any kind of home-based programme. Less than 1% had a vocational assessment.
How confident are we that this is correct?	NACR data is currently contributed by about one third of CR programmes. In the main it is likely that it is the better organised programmes that take part so any bias is likely to be towards presenting better practice than is the norm.
What does this mean?	Most programmes are still based around a group-based exercise programme and educational talks. A lot of work remains to be done to move to the individualised, menu-based programmes and choice of methods and venues that are promoted in recent clinical guidelines.

Are the patient outcome targets of the English National Service Framework for Coronary Heart Disease being met?

Why is this important?

In England, the National Service Framework for Coronary Heart Disease (2000) set some outcome targets for cardiac rehabilitation . These recommended that at twelve months at least 50% of people who took part are

- taking regular physical activity of at least 30 minutes duration on average five times a week
- not smoking
- have a Body Mass Index (BMI) < 30 kg/m^2.

In addition 90% should be taking aspirin, 80% statins and 80% beta-blockers or ACE inhibitors.

What did we know already?

Until now we have had little knowledge about whether the outcome targets were being met.

How did we try to find out?

The NACR records these outcomes.

What was the answer?

The targets for aspirin and statins, BMI and smoking were all exceeded *before* rehabilitation but showed significant further improvement following CR.

The biggest effect on these outcomes was on activity levels. There was a 20% increase in the number of people exercising five or more times a week and a 26% reduction in people who never exercise.

CR also significantly increased the number of non-smokers from 86% to 92% and reduced BMI.

Tables 21 and 22 showing these changes can be seen on pages 33-34.

How confident are we that this is correct?

The programmes contributing to the NACR data are mostly the better organised. It would not be safe to assume these benefits are also found in programmes that are not contributing data.

These changes were at the end of the programme when motivation is still high. At present we do not have enough twelve month data to look at longer term success with these outcomes.

What does this mean?

People who take part in CR make significant improvements in a number of important health behaviours that will help to keep them alive longer and give them better heath in general. CR has a particularly marked impact on activity levels.

Do patients have less anxiety and depression and a better quality of life after cardiac rehabilitation?

Why is this important?	Cardiac rehabilitation is about more than changing health behaviour and taking exercise. It also aims to improve quality of life and reduce the anxiety and depression that many people experience when they realise that they have a serious health problem. It reduces the disability that can result from misunderstandings about the illness and how best to cope with it.
What did we know already?	We knew very little about how anxiety, depression and quality of life change in people attending cardiac rehabilitation programmes in the UK. Evidence from randomised trials is conflicting. In some it improved anxiety and depression, in others it did not. Furthermore the rehabilitation programmes provided in trials are often better staffed and more comprehensive that those in the NHS
How did we try to find out?	The NACR includes the Hospital Anxiety and Depression Scale (HADS) and the Dartmouth COOP Quality of Life Charts.
What was the answer?	It seems that people who take part in CR programmes contributing data to the NACR do experience significant improvement in quality of life. The biggest improvement in the CooP Quality of Life Charts scores was in the perceived fitness and activity domain. The number of people low in fitness declined by 25%. The number of people who said they could do heavy exercise rose from 14% to 28%. To a lesser but still worthwhile extent problems with social activities and the patients' perceptions of their overall health all changed significantly for the better. This is important because perception of overall health has been shown to predict recovery and health cost. Tables 23-25 showing these changes can be seen on pages 34-35
How confident are we that this is correct?	The programmes contributing to the NACR data are mostly the better organised. It would not be safe to assume that these benefits are also found in programmes that are not contributing data. These changes are those recorded at the end of the programme. They will be of little benefit if they have disappeared at twelve months. At present we do not have enough longer term data to answer this question.
What does this mean?	CR appears to be associated with changes in HRQOL but more needs to be done for patients with clinical levels of anxiety or depression.

Appendix 1

Methodology for the Annual Survey of CR programmes

A questionnaire was sent to the co-ordinator of every rehabilitation programme on the register. If they did not respond they were reminded again by letter and then by phone. The response rate across the UK was excellent at 92%. The table below shows the return rate by country and the number of programmes that were unable to answer the question because they had no way to record numbers.

Coping with missing data

A number of centres reported having no way of counting how many patients of each diagnosis they had seen in the year April 2005- March 2006. Where data for patients receiving CR was not returned, values were estimated using the median proportion of eligible patients receiving CR for that particular country. This was used to calculate an estimate of the total number receiving CR .

Finding out how many were eligible

We took from the Department of Health Hospital Episode Statistics for England, or their equivalent in the other countries of the UK, the number of patients who were *discharged alive* following a heart attack, angioplasty or coronary artery bypass surgery. We compared the number of people eligible with the number of people who received rehabilitation to work out the percentage uptake.

Caveats

Clearly not every patient is well enough to take part in rehabilitation, nor will every patient ever choose to take part, so the total uptake will never be 100%. This is why in setting targets in England the Department of Health specified a figure of 85% of those eligible. This figure is a guestimate and is probably too low for use in bypass surgery but may be too high to be applied for heart failure.

Scottish data

For Scotland there was a particularly high proportion of centres not returning survey data (71% versus 92% in the UK as a whole). The poor return was often from areas with particularly high (for Scotland) population density, for example Tayside (1 out of 4 centres returned data), Lanarkshire (2 out of 4 centres returned data) and Lothian where two of the major trusts did not make a return). Because we have better return rates from places with fewer patients this means that our method for compensating for missing data (given above) most likely leads to an underestimate of the total Scottish % uptake, this figure should be treated with great caution. We did consider not presenting Scottish data, however in a number of Health Board areas the survey return rate and data completeness was excellent and we have decided to present this because it is only fair to those who went to the trouble of taking part to see how they are performing against the rest of the UK (often very well). We hope that better data will be available from the survey for 2006-7.

Return rate for the Annual Postal Survey of CR Programmes in the UK: 2005-2006

	UK	Eng	NI	Scot	Wales
% of questionnaires returned	92	94	92	71	100
% unable to give number of patients	16	18	18	0	10

Appendix 2 Tables and figures

Table 1. The gender and age by gender of patients attending cardiac rehabilitation in the three largest diagnostic groups

Diagnostic group	% males	male mean age	% female	female mean age
Heart attack (MI)	70	65	30	71
Angioplasty (PCI)	74	64	26	68
Bypass surgery (CABG)	82	66	18	69
All three conditions	73	65	27	71

(N=19592)

Table 2. Marital status of patients undergoing cardiac rehabilitation

Status	%
Married	74
Widowed	12
Single	6
Permanent partnership	4
Divorced	4

(N=18798)

Table 3. Ethnicity of those undertaking cardiac rehabilitation

Ethnicity	%
White (British)	84
White (Irish)	1
White (Other)	1
Mixed White/Black Caribbean	<1
Mixed White/Black African	<1
Mixed Other	<1
Indian	2
Pakistani	1
Bangladeshi	<1
Other Asian	1
Black Caribbean	<1
Black African	<1
Black Other	<1
Chinese	<1
Other ethnic group	<1
Not stated	10

(N=22152)

Table 4. The reasons for referral to CR as a percentage of all referrals

Reason for referral to CR	% of cases
Myocardial infarction	52
Bypass surgery	15
Angioplasty	14
Acute coronary syndrome	5
Other surgery	4
Other	3
Angina	3
Cardiac arrest	<1
Heart failure	<1
Pacemaker, ICD, LV Assist	<1
Congenital heart disease	<1
Transplant	<1
Not stated	4

(N=38936)

Table 5. Percentage of patients undertaking cardiac rehabilitation who have various co-morbidities

Co-morbidity	%
Hypertension	40
Angina	36
Arthritis	20
Diabetes	19
Chronic back	13
Asthma	11
Stroke	6
Claudication	7
Cancer	6
Rheumatism	5
Osteoporosis	3
Emphysema	2
Other complaints	27

(N= 17753)

Table 6. Percentage of patients with previous cardiac events

Previous Event	%
Angina	19
Myocardial infarction	17
Unknown	6
Angioplasty	6
Other	5
Bypass surgery	5
Other surgery	2
Heart failure	2
Cardiac arrest	2
Acute coronary syndrome	2
Pacemaker	1
Transplant	<1
LV assist device	<1
ICD	<1
Congenital heart	<1

(N=24252)

Table 7. Employment status of patients

Employment status	%
Retired	58
Employed - Full time	18
Temporarily sick or injured	7
Permanently sick/disabled	5
Employed - part time	4
Self-employed - full time	4
Looking after family/home	2
Self-employed - part time	1
Unemployed looking for work	1
Government training scheme	<1
Student	<1

(N=15352)

Table 8. Percentage of patients scoring above or below the cut-off point for clinical anxiety and depression on entering cardiac rehabilitation

Scores	Not clinically significant %	Borderline clinical significance %	Clinically significant %
Anxiety	69	17	14
Depression	82	11	7

(N= 13889)

Table 9. Quality of life in patients before cardiac rehabilitation, as measured by the Dartmouth COOP Charts

	Normal range %	Poor HRQOL %
Physical fitness	39	61
Daily activities	82	18
Social activities	77	23
Social support	87	13
Pain	71	29
Overall health	62	38
Quality of life	92	8

(N=11811)

Table 10. The number and percentage of patients eligible for rehabilitation and the number and percentage receiving cardiac rehabilitation by country: April 2005-March 2006

In the UK	Eligible	Receiving CR	% uptake
MI	96498	37295	39
PCI	28710	13045	45
CABG	27209	14902	55
TOTAL	152417	65242	43

In England	Eligible	Receiving CR	% uptake
MI	76191	31687	42
PCI	25068	12120	48
CABG	20344	12537	53
TOTAL	121603	56344	46

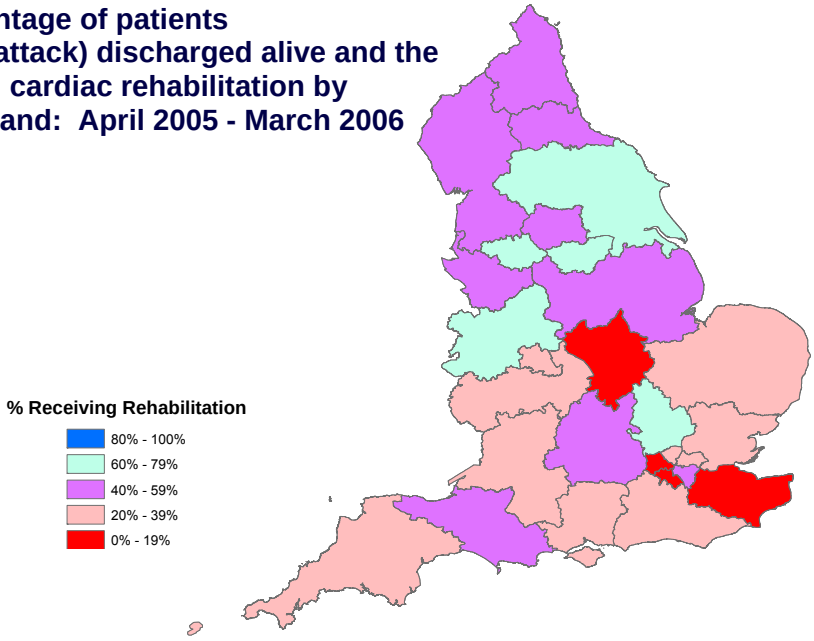
In Northern Ireland	Eligible	Receiving CR	% uptake
MI	2402	601	25
PCI	927	128	14
CABG	323	191	59
TOTAL	3652	920	25

In Scotland*	Eligible	Receiving CR	% uptake
MI	13709	3563	26
PCI	2319	675	12
CABG	5803	1545	67
TOTAL	21831*	5783*	26*

In Wales	Eligible	Receiving CR	% uptake
MI	4196	1444	34
PCI	396	122	31
CABG	739	629	85
TOTAL	5331	2195	41

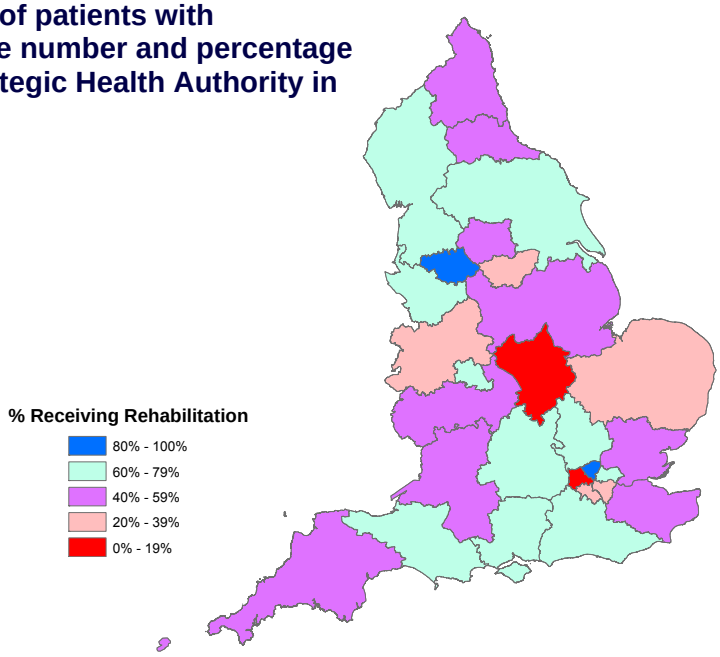
*The total figures given are unlikely to be reliable, please see page 17 for an explanation

Figure 1. The number and percentage of patients with myocardial infarction (heart attack) discharged alive and the number and percentage receiving cardiac rehabilitation by Strategic Health Authority in England: April 2005 - March 2006



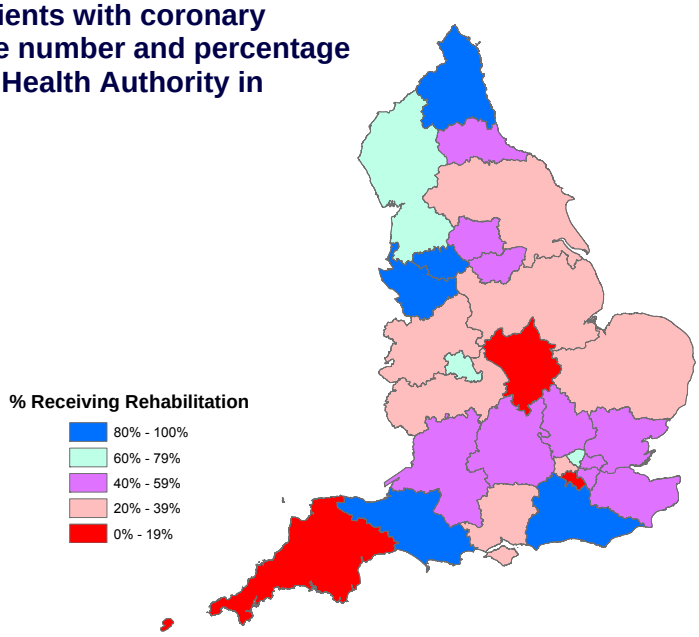
Strategic Health Authority	Eligible	Treated	% receiving rehabilitation
Avon, Glos & Wiltshire	3252	1032	32
Bedfordshire & Hertfordshire	2366	1533	65
Birmingham & Black Country	3282	1242	38
Cheshire & Merseyside	4279	2281	53
County Durham & Tees Valley	2168	1120	52
Cumbria & Lancashire	3683	1566	43
Dorset & Somerset	1922	889	46
Essex	2688	658	25
Greater Manchester	4061	2711	67
Hampshire & Isle of Wight	2670	709	27
Kent & Medway	2575	457	18
Leics, Northants & Rutland	2138	379	18
Norfolk, Suffolk & Cambs	4206	1060	25
N & E Yorks & North Lincs	2320	1648	71
North Central London	991	276	28
North East London	1021	238	23
North West London	1908	333	18
Northumberland, Tyne & Wear	2874	1588	55
Shropshire & Staffordshire	2354	1655	70
South East London	1096	503	46
South West London	1756	185	11
South West Peninsula	2901	1032	37
South Yorkshire	2636	1631	62
Surrey & Sussex	4060	1513	37
Thames Valley	2360	1079	46
Trent	5116	2028	40
West Midlands South	2490	916	37
West Yorkshire	3018	1425	47
England Total	76191	31687	42

Figure 2. The number and percentage of patients with coronary artery bypass surgery and the number and percentage receiving cardiac rehabilitation by Strategic Health Authority in England: April 2005 - March 2006



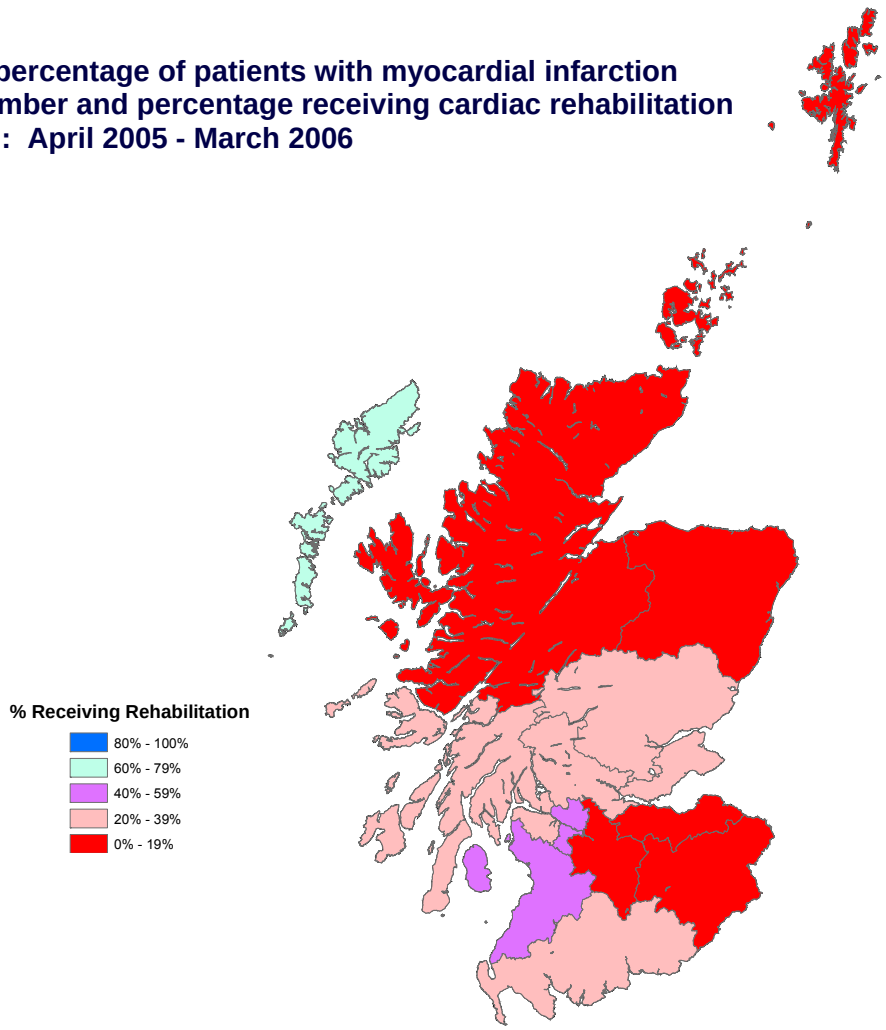
Strategic Health Authority	Eligible	Treated	% receiving rehabilitation
Avon, Glos & Wiltshire	890	483	41
Bedfordshire & Hertfordshire	749	485	65
Birmingham & Black Country	1077	699	61
Cheshire & Merseyside	1104	747	60
County Durham & Tees Valley	611	400	53
Cumbria & Lancashire	1080	902	76
Dorset & Somerset	546	457	66
Essex	840	479	47
Greater Manchester	957	803	84
Hampshire & Isle of Wight	534	369	60
Kent & Medway	746	326	44
Leics, Northants & Rutland	563	145	17
Norfolk, Suffolk & Cambs	905	475	36
N & E Yorks & North Lincs	750	523	64
North Central London	348	296	85
North East London	354	221	62
North West London	685	243	13
Northumberland, Tyne & Wear	642	367	57
Shropshire & Staffordshire	728	284	25
South East London	382	221	21
South West London	381	87	23
South West Peninsula	849	456	54
South Yorkshire	602	261	28
Surrey & Sussex	963	820	77
Thames Valley	801	595	66
Trent	1052	523	50
West Midlands South	637	483	52
West Yorkshire	568	387	53
England Total	20344	12537	53

Figure 3. The number and percentage of patients with coronary angioplasty eligible for rehabilitation and the number and percentage receiving cardiac rehabilitation by Strategic Health Authority in England: April 2005 - March 2006



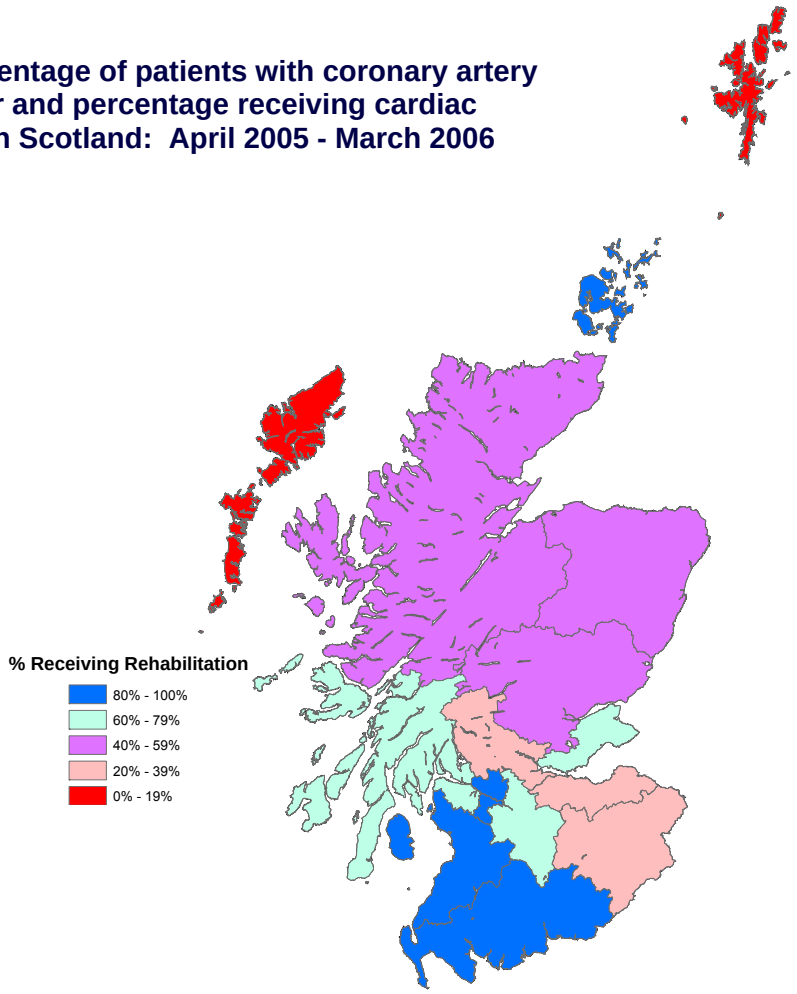
Strategic Health Authority	Eligible	Treated	% receiving rehabilitation
Avon, Glos & Wiltshire	854	359	42
Bedfordshire & Hertfordshire	886	410	46
Birmingham & Black Country	1453	1086	75
Cheshire & Merseyside	821	767	93
County Durham & Tees Valley	575	244	42
Cumbria & Lancashire	745	472	63
Dorset & Somerset	763	662	87
Essex	876	388	44
Greater Manchester	1287	1114	87
Hampshire & Isle of Wight	855	246	29
Kent & Medway	638	283	44
Leics, Northants & Rutland	763	145	19
Norfolk, Suffolk & Cambs	1109	410	37
N & E Yorks & North Lincs	888	326	37
North Central London	596	414	70
North East London	672	368	55
North West London	1251	334	27
Northumberland, Tyne & Wear	711	571	80
Shropshire & Staffordshire	640	189	30
South East London	557	222	40
South West London	698	118	17
South West Peninsula	1203	141	12
South Yorkshire	601	241	40
Surrey & Sussex	1481	1292	87
Thames Valley	1119	561	50
Trent	1072	250	23
West Midlands South	809	298	37
West Yorkshire	1145	300	46
England Total	25068	12120	48

Figure 4. The number and percentage of patients with myocardial infarction discharged alive and the number and percentage receiving cardiac rehabilitation by Health Board in Scotland: April 2005 - March 2006



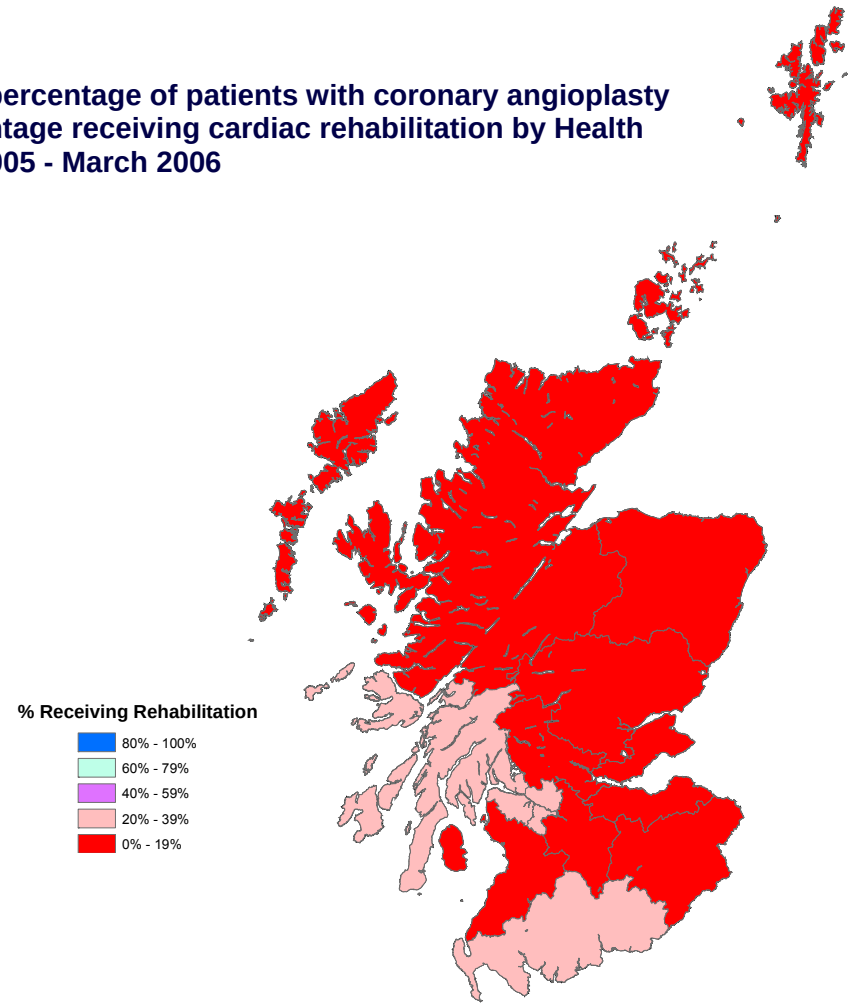
Health Board	Known centres	Centres returning data	Eligible	Treated	% receiving rehabilitation
Argyll & Clyde	4	3	965	245	25
Ayrshire & Arran	3	3	813	366	45
Borders	2	1	407	0	0
Dumfries & Galloway	1	1	227	79	35
Fife	2	1	1127	237	21
Forth Valley	1	0	581	230	40
Grampian	2	2	1553	309	20
Greater Glasgow	4	4	2264	929	41
Highland	2	1	779	154	20
Lanarkshire	4	2	1930	381	20
Lothian	4	2	1768	349	20
Orkney	1	1	62	9	15
Shetland	1	1	29	0	0
Tayside	4	1	1170	253	22
Western Isles	1	1	32	22	69
Total	36	24	13709	3563	26

Figure 5. The number and percentage of patients with coronary artery bypass surgery and the number and percentage receiving cardiac rehabilitation by Health Board in Scotland: April 2005 - March 2006



Health Board	Known centres	Centres returning data	Eligible	Treated	% receiving rehabilitation
Argyll & Clyde	4	3	235	183	78
Ayrshire & Arran	3	3	156	138	89
Borders	2	1	60	15	25
Dumfries & Galloway	1	1	72	66	92
Fife	2	1	149	94	63
Forth Valley	1	0	121	48	40
Grampian	2	2	250	146	58
Greater Glasgow	4	4	407	361	89
Highland	2	1	121	62	51
Lanarkshire	4	2	310	241	78
Lothian	4	2	273	107	39
Orkney	1	1	7	7	100
Shetland	1	1	8	0	0
Tayside	4	1	136	77	57
Western Isles	1	1	14	0	0
Total	36	24	2319	1545	67

Figure 6. The number and percentage of patients with coronary angioplasty and the number and percentage receiving cardiac rehabilitation by Health Board in Scotland: April 2005 - March 2006



Health Board	Known centres	Centres returning data	Eligible	Treated	% receiving rehabilitation
Argyll & Clyde	4	3	451	113	25
Ayrshire & Arran	3	3	388	31	8
Borders	2	1	136	19	14
Dumfries & Galloway	1	1	113	31	27
Fife	2	1	333	6	2
Forth Valley	1	0	366	26	7
Grampian	2	2	617	4	1
Greater Glasgow	4	4	1033	289	28
Highland	2	1	188	20	11
Lanarkshire	4	2	813	56	7
Lothian	4	2	952	51	5
Orkney	1	1	24	3	13
Shetland	1	1	16	0	0
Tayside	4	1	352	26	7
Western Isles	1	1	21	0	0
Total	36	24	5803	675	12

Table 11 . The number of eligible patients and the number and percentage treated, by condition April 2005-March 2006

Diagnosis	% of programmes accepting	% of annual incidence treated
Heart attack (MI)	91	38
Angioplasty (PCI)	68	45
Bypass surgery (CABG)	88	55

Table 12 . The number of patients with 'other' cardiac conditions enrolled in the NACR database in the last 12 months and as a percentage of all patients seen

Diagnosis	No. of patients with other cardiac conditions	% of all patients seen
Cardiac arrest	92	<1
Angina	1511	4
Heart failure	319	<1
Implanted cardiac devices (LV assist, pacemaker, ICD)	80	<1
Acute coronary syndrome	2129	5

(N=38936)

Table 13 . Budget questions

	UK	England	NI	Scot	Wales
% answering the question	60%	56%	45%	83 %	85%
Budget known	32%	31%	18%	42%	45%
% funded by NHS					
0-24%	8	5	20	15	23
25-49%	3	3	0	5	6
50-74%	5	3	0	5	18
75-100%	84	89	80	75	53

Fisher's exact test p=0.006

Table 14. Budget per patient and cost per patients treated in the four countries of the UK: April 2005 - March 2006

	UK	England	Scot	Wales
Budget per patient	£	£	£	£
Mean	550	523	678	728
Median	424	387	585	650
Cost per patient treated				
Mean	542	511	627	853
Median	411	385	546	687

Table 15. Median time between the event and referral and the event and starting rehabilitation for MI, PCI and CABG in days

Diagnosis	Median time (days) from the event to referral to a programme	Median time (days) from the event to the patient starting a rehabilitation programme
Heart Attack (MI)	3	18
Angioplasty (PCI)	2	28
Bypass surgery (CABG)	8	47
All diagnoses	4	27

Table 16. The percentage of programmes that replied to the survey and answered the questions about the composition of the multi-disciplinary team

UK	England	N Ireland	Scotland	Wales
84%	81%	91%	96%	95%

Table 17 The mean, median and range in the number of professions per programme

Mean	3
Median	3
Range	1 profession to 7

Table 18. Percentage of programmes which mentioned each profession as a member of the multi-disciplinary team by country

Profession	UK %	England %	N Ireland %	Scotland %	Wales %
Nurse	93	93	100	96	100
Physiotherapist	60	57	50	78	84
Instructor	49	51	0	57	42
Administrator	53	52	0	52	95
Psychologist	10	9	10	17	16
Occupational therapist	21	21	0	13	47
Dietitian	20	19	20	22	26
Doctor	1	1	10	0	0
Advisor	11	12	10	0	11
Healthcare Assistant	5	6	0	4	5
Social worker	1	1	0	0	0

Table 19. Percentage of programmes with 1, 2, 3, 4, 5, 6, or 7 professions

No. of professions	UK %	England %	N Ireland %	Scotland %	Wales %
1	12	12	50	9	0
2	21	22	30	22	5
3	27	28	0	26	26
4	21	20	10	22	37
5	9	8	10	9	11
6	7	7	0	13	11
7	3	3	0	0	11

Table 20. Percentage of patients receiving various components of CR

Activity	%	Psychosocial	%
Group Exercise Class	79	Relaxation training	53
Individual programme	27	Psychological - group talk	37
Home exercise plan	32	Individual counsellor	3
		OT group sessions	16
Lifestyle		OT individual referral	2
Education - written	46	Vocational assessment	<1
Education - Talks/Video	57		
Dietary - group class	57	*Home based / Other*	
Dietary individual	18	Home based programmes	10
		Angina plan	3
		Home visits	9

(N=5010)

Table 21. The percentage of patients meeting the English NSF targets for medication use, before and after cardiac rehabilitation

Medication	Before rehabilitation	After rehabilitation	Significance
Aspirin/Anti-platelet	95	95	p<0.01
ACE inhibitor	71	74	p<0.01
Beta blocker	78	77	p<0.01
Statin	94	94	p<0.01

(N=5759)

Table 22. The percentage of patients meeting the English NSF targets before and after cardiac rehabilitation from the NACR database

	Before rehabilitation %	After rehabilitation %	Change	Significance
BMI BMI<30	74	75	+1	p<0.01
YES to - exercise 5 x30 min sessions per week or more	37	57	+20	p<0.01
Exercise				
Often	13	25	+12	p<0.01
Sometimes	33	48	+15	
Rarely/Never	54	28	- 26	
Non-smoker	86	92	+6	p<0.01

(N=4401)

Table 23. The change in the number of patients not anxious or depressed or borderline or clinically anxious or depressed before and after rehabilitation

Scores	Not %	Borderline %	Clinically significant %	After rehab %
Anxiety	69	17	14	11
Depression	83	11	6	5

(N=4843)

Table 24. The change in health-related quality of life (HRQOL) scores after rehabilitation

Dartmouth COOP Domain	Poor HRQOL Before rehab %	Poor HRQOL After rehab %	Change %
Physical fitness	59	34	- 25
Feelings			
Daily activities	16	7	- 9
Social activities	20	9	- 11
Social support	11	14	+ 3
Pain	26	20	- 6
Overall health	34	24	-10
Quality of life	6	4	- 2

(N=4417)

Table 25. The percentage of patients giving their maximum level of effort as light, moderate, heavy or very heavy before and after CR

COOP HRQOL Charts - Physical fitness question

	% Before	% After	%Change
Very heavy	5	10	+5
Heavy	14	28	+14
Moderate	22	28	+6
Light	31	22	-9
Very light	28	12	-16

X^2 ($p<0.01$)

(N=4417)

Appendix 3 Members of the NACR Team and Project Steering Committee and contributors

Members of the NACR Team

At York

Name	*Post*	*email*
Professor Bob Lewin	Project Lead	rjpl1@york.ac.uk
Corinna Petre	Project Manager (p/t)	cbp1@york.ac.uk
Simon Coulton	Data Manager and Analysis (p/t)	sc21@york.ac.uk
Veronica Morton	Statistician (p/t)	vm9@york.ac.uk
Sally Baker	Survey and e-register (p/t)	sb52@york.ac.uk
Steph Prady	Survey and e-register (p/t)	slp505@york.ac.uk
Roz Thompson	Admin (p/t)	mrt4@york.ac.uk

For the Cardiac Networks

Name	*email*
Margaret Leid	margaret.leid@cmcn.nhs.uk
Lee Panter	leepanter@nhs.net

For the BHF

Name	*email*
Diane Card	cardd@bhf.org.uk
Stephanie Dilnot	dilnots@bhf.org.uk
Shirley Hall	halls@bhf.org.uk
Stephanie Lillie	lillies@bhf.org.uk
Elaine Tanner	tannere@bhf.org.uk

Members of the Project Steering Group

Name	*Organisation*
Professor Peter Weisberg	BHF Medical Director
Dr Mike Knapton	BHF Director of Prevention and Care
Jackie Lodge	BHF Head of Heart Care
Shirley Hall	BHF Heart Health Coordinator Manager
Stephanie Dilnot	BHF Heart Health Coordinator

External experts

Hugh Bethell	GP Researcher, Alton
Linda Binder	Intern Director, NHS Heart Improvement Programme
John Birkhead	Clinical Director, MINAP
Nick Black	Professor of Health Services Research
Roger Boyle	National Director for Heart Disease
Mel Clark	Patient Representative
David Cunningham	Central Cardiac Audit Database
Karen Dunderdale	Lead Cardiac Specialist Nurse
Linda Edmunds	Consultant Nurse Cardiac Care
Nadeem Fazal	Heart Disease Service Manager
Richard Hobbs	Head of Department of Primary Care and General Practice, Birmingham University
Tessa Ing	DH Vascular Programme
Helen Laing	Health Care Commission
Elizabeth Lynam	Branch Head, Vascular Programme
Liam McLaughlin	CCAD Programmer
Martin Old	NCASP Programme Manager
Clare Valentine	Scarborough Cardiac Rehabilitation Programme
Malcolm Walker	Consultant Cardiologist

Organisations which are contributing patient data to the National Audit Programme

Aberdeen Royal Infirmary
Adur; Arun and Worthing PCT
Balfour Hospital
Basildon Hospital
Bedford Hospital
Bexley Care Trust
Birmingham Heartlands Hospital
Bishop Auckland General Hospital
Blackwater Valley and Hart PCT
Brecon War Memorial Hospital
Bristol Royal Infirmary
Bronglais General Hospital
Burnley General Hospital
Caerphilly District Miners Hospital
Calderdale Royal Hospital
Cardiothoracic Centre Liverpool
Central Suffolk PCT
Charing Cross Hospital
Chorley Hospital
City Hospital
Colchester General Hospital
Countess of Chester Hospital
County Hospital Hereford
County Hospital Louth
Craigavon Area Hospital
Cumbria PCT
Darent Valley Hospital
Darlington PCT
Dartford; Gravesham and Swanley PCT
Daventry and South Northants PCT
Derriford Hospital
Derwentside PCT
Durham and Chester-le-Street PCT
Durham Dales PCT
Easington PCT
East Cambs and Fenland PCT
East Yorkshire PCT
Eastbourne DGH
Eastern & Coastal Kent PCT
Eastern Birmingham PCT
Eastern Wakefield PCT
Exeter PCT
Fairfield General Hospital
Freeman Hospital
Frenchay Hospital
Furness General
Gateshead PCT
George Eliot Hospital
Grantham And District General Hospital
Halton General Hospital
Harefield Hospital
Harrogate District Hospital
Harrow PCT
Hemel Hempstead General Hospital
High Peak and Dales PCT
Hillingdon Hospital
Hillingdon PCT
Hinchingbrooke Hospital
Horton General Hospital
Hospital of St Cross
Huddersfield Royal Infirmary
John Radcliffe Hospital
Kent & Sussex Hospital
King's College Hospital
Kings Mill Hospital
Leeds General Infirmary
Leeds North West PCT
Leighton Hospital
Lincoln County Hospital
Lister Hospital
Llandough Hospital
Luton & Dunstable Hospital
Macclesfield District General Hospital
Manchester Royal Infirmary
Medway PCT
Mendip PCT
Mid Highland CHP
Neath Port Talbot Hospital
Nevill Hall Hospital
New East Surrey Hospital
Noble's Hospital
Norfolk and Norwich Hospital
North and East Cornwall PCT
North Hampshire Hospital
North Manchester General Hospital
North Middlesex Hospital
Northumberland CT
Northwick Park Hospital
Nottingham City Hospital
Nottingham City PCT
Peterborough District Hospital
Pilgrim Hospital
Pinderfields General Hospital
Pontefract General Infirmary
Poole General Hospital
Prince Charles Hospital
Prince Philip Hospital
Princess Elizabeth Hospital
Princess Of Wales Hospital
Princess Royal Hospital; Telford
Princess Royal University Hospital (Bromley)
Queen Elizabeth II Hospital (Welwyn)
Queens Hospital
Queens Park Hospital
Raigmore Hospital
Rochdale Infirmary
Rotherham PCT
Royal Bolton Hospital
Royal Cornwall Hospital
Royal Glamorgan
Royal Hampshire County Hospital
Royal Lancaster Infirmary

Royal Oldham Hospital
Royal Preston Hospital
Royal Shrewsbury Hospital
Royal Surrey County Hospital
Salford PCT
Salisbury District Hospital
Sandwell District Hospital
Scarborough; Whitby and Ryedale PCT
Scunthorpe General Hospital
Sedgefield PCT
Somerset Coast PCT
South Sefton PCT
South Tyneside District Hospital
Southampton City
Southend Hospital
Southmead Hospital
Southport and Formby District General
St Albans City Hospital
St Peter's Hospital
St Woolos Hospital
Tameside General Hospital
Taunton & Somerset Hospital
Taunton Deane PCT
Tendring PCT
The Great Western Hospital
University College Hospital
University Hospital Aintree
University Hospital Coventry
University Hospital Lewisham
University Hospital of North Durham
University Hospital of Wales
University Hospital Queens Medical Centre
University Hospitals of Leicester
Victoria Hospital
Warrington PCT
Watford General Hospital
West Suffolk Hospital
West Wales General
Western Sussex PCT
Westmoreland General Hospital
Weston General Hospital
Whittington Hospital
William Harvey Hospital
Wirral PCT
Withybush General Hospital
Wolverhampton City PCT
Wycombe General Hospital
Wythenshawe Hospital

Appendix 4 Index of tables and figures

Registered Charity Number 225971

 Registered Charity Number 225971