A cardiac prevention and rehabilitation programme for all patients at first presentation with coronary artery disease

K F Fox, M Nuttall, D A Wood, M Wright, B Arora, E Dawson, P Devane, K Stock, S J Sutcliffe, K Brown

Abstract

Objective—To develop and test a cardiac prevention and rehabilitation programme for achieving sustained lifestyle, risk factor, and therapeutic targets in patients presenting for the first time with exertional angina, acute coronary syndromes, or coronary revascularisation.

Design—A descriptive study.

Setting—A hospital based 12 week outpatient programme.

Interventions—A multiprofessional family based programme of lifestyle and risk factor modification.

Main outcome measures—Non-smoking status, body mass index, blood pressure, plasma cholesterol, use of prophylactic drugs.

Results—158 patients (82% of 194 possible cases) were recruited over 15 months, with 72% completing the programme. Targets for achieving non-smoking status, blood pressure < 140/90 mm Hg, and total cholesterol < 4.8 mmol/l were achieved in 92%, 73%, and 62%, respectively, and the proportion on aspirin, β blockers, and lipid lowering treatment was 95%, 58%, and 64% on referral back to general practice for continuing care.

Conclusions—A comprehensive cardiac prevention and rehabilitation programme can be offered to all patients presenting for the first time with coronary heart disease, including those with exertional angina who are normally managed in primary care. Lifestyle, risk factor, and therapeutic targets can be successfully achieved in most patients with such a hospital based programme.

(*Heart* 2001;**85**:533–538)

Cardiovascular Medicine, Imperial College School of Medicine, National Heart and Lung Institute, Charing Cross Campus, Fulham Palace Road, London W6 8RF, UK
K F Fox
D A Wood
M Wright
S J Sutcliffe

Bromley Hospitals NHS Trust, Farnborough Hospital, Farnborough Common, Orpington, Kent BR6 8ND, UK
M Nuttall
B Arora
E Dawson
P Devane
K Stock
K Brown

Correspondence to:
Professor Wood
d.wood@ic.ac.uk

Prevention of coronary heart disease is one of the central targets of the *National service framework for coronary heart disease*.[1] This can be achieved by primary prevention, improved treatment of acute disease episodes, revascularisation, and secondary prevention. A community register of coronary heart disease in Bromley in south east London has recently shown that exertional angina is the most common presentation of coronary heart disease.[2] Sudden cardiac death accounts for less than one in five, and acute myocardial infarction for about one third of all *first* presentations of coronary heart disease in the community. Thus the opportunities for secondary prevention before loss of myocardium from infarction (the most important determinant of mortality in patients with coronary heart disease)[3] are considerably greater if patients with angina are targeted. The risk of a major coronary event is increased in the first year after presentation with exertional angina,[4] and therefore prevention should start soon after diagnosis.

There is strong scientific evidence for coronary prevention through lifestyle measures,[5] aspirin,[6] post-myocardial infarction treatment with β blockers,[7] statins,[8–10] and angiotensin converting enzyme (ACE) inhibitors,[11 12] and surgical revascularisation.[3] This evidence applies to patients with angina (lipid lowering treatment[8] and aspirin[6]) as well as to those who have had an infarct or a revascularisation procedure. However, the full potential of these secondary prevention measures has not been realised in clinical practice: in the ASPIRE (action on secondary prevention through intervention to reduce events) survey of secondary prevention practice in 2583 patients from 24 specialist cardiac centres and district general hospitals in the UK,[13] 19% were still smoking cigarettes, 18% had a blood pressure of > 160/90 mm Hg, and 72% had a total cholesterol of > 5.0 mmol/l. Traditional cardiac rehabilitation programmes have focused on patients after myocardial infarction or revascularisation, thus excluding the majority of patients with incident (new) coronary heart disease. Among those patients currently targeted for rehabilitation uptake is low.[14]

The recent Joint British Societies recommendations on coronary prevention[15] advocate that the care of coronary patients should embrace all aspects of cardiac prevention and rehabilitation, and such an integrated service should be available to all patients with coronary heart disease, including exertional angina and acute coronary syndromes.

We established a cardiac prevention and rehabilitation programme at Bromley Hospitals NHS Trust, south east London, for all incident (new) cases of coronary heart disease. The objective was to achieve defined lifestyle, risk factor, and therapeutic targets.
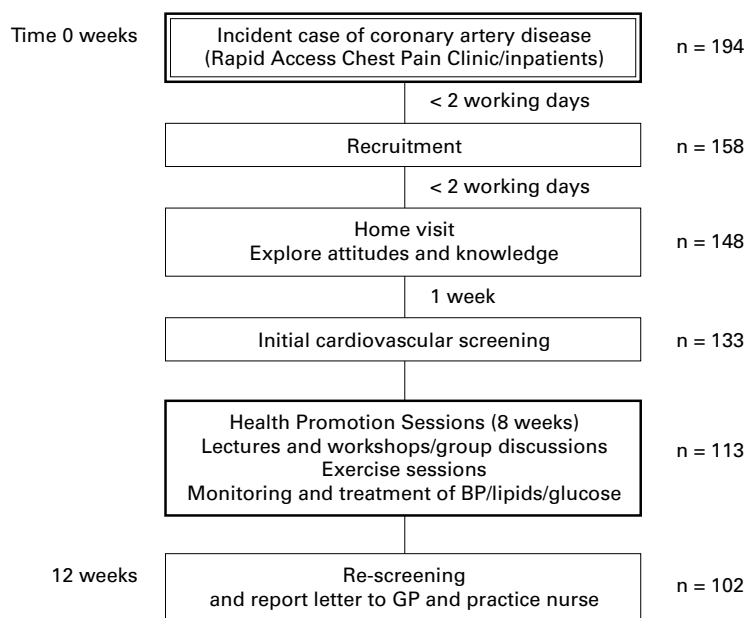
Figure 1 The Changes for Life programme and the flow of patients.

Methods
Bromley Health Authority (population 292 000) is served by 151 general practitioners in 59 practices. All patients registered with 80 general practitioners, selected at random from all practices, were eligible for the programme. Bromley Hospital (with the cardiac care unit and accident and emergency department) and Farnborough Hospital provide secondary cardiac care, while the specialist cardiac centres at King's College Hospital, the Royal Brompton, and St Thomas' Hospital provide tertiary care.

All new cases of coronary heart disease could be identified because of a contemporaneous epidemiological study of the incidence of coronary heart disease within the same population.[2] All records of admissions through the accident and emergency department were screened by a research nurse and presentations consistent with coronary heart disease identified. Patients were followed up on the wards, and incident (new) cases of exertional angina, unstable angina, or myocardial infarction identified. All identified patients presenting in primary care with suspected cardiac chest pain but not requiring acute hospital admission were referred to a dedicated rapid access chest pain clinic (RACPC) for evaluation. The RACPC opened in 1996 and the majority of incident (new) exertional angina cases were identified through this service. Completeness of case identification for new exertional angina has been confirmed by an audit of nitrate prescriptions in a random sample of general practices.[2]

A small traditional cardiac rehabilitation programme already existed for patients after myocardial infarction or coronary revascularisation. The new programme, "Changes for Life", (fig 1) was established in October 1997 for all cases of incident coronary heart disease, and replaced the traditional service. Two full time nurses, a physiotherapist (one fifth time), and a dietician (one fifth time) ran the programme with the support of other health care professionals.

RECRUITMENT
Inpatients with a first diagnosis of coronary heart disease and registered with a general practitioner allocated to the new programme were visited on the ward by one of the cardiac prevention nurses and offered a place. This nurse would remain as the patient's primary nurse throughout the duration of the programme. If the patient agreed to participate, a home visit followed, usually within two working days of hospital discharge.

Patients identified through the RACPC as a first diagnosis of coronary heart disease, and also registered with a general practitioner allocated to the programme, were contacted to arrange a home visit, usually within two working days of being assessed in the RACPC. At the home visit the patient was given a copy of the "Cardiofax" (a filofax format) containing information about the Changes for Life programme, the causes of coronary disease, lifestyle, other risk factors, and other documentation. The patient's partner was encouraged to be present at this home visit and at all subsequent meetings, and cardiovascular screening was offered to partners and offspring (⩾ 16 years old). Patients who did not wish to participate in the programme received usual care.

THE CHANGES FOR LIFE PROGRAMME
The Changes for Life cardiac prevention and rehabilitation programme ran for about 12 weeks and consisted of the following:
- a home visit and questionnaire to explore patient and family knowledge and attitudes to coronary heart disease prevention;
- cardiovascular screening of patients and partners at the hospital and the offer to screen first degree blood relatives;
- an eight week rolling health promotion programme of lectures and group discussions, together with weekly exercise sessions;
- a nurse protocol for repeat assessment and management of blood pressure and cholesterol;
- a final rescreening at the hospital of patients and family members for coronary heart disease risk factors;
- a comprehensive electronic report to the patient's general practitioner specifying lifestyle, risk factor, and therapeutic targets.

Behavioural change in the programme was based on the Procheska and DeClimente cycle of change,[16] promoted by the Health Education Authority, encouraging thinking about change, preparing to change, making changes, maintaining changes, and addressing relapse. The cardiac prevention nurses and other members of the Changes for Life team were all trained in this approach by a clinical psychologist.

The initial cardiovascular screening of patients and family members included an assessment of lifestyle (smoking, diet, and physical activity), height and weight (to calculate body mass index (BMI: weight (kg)/height (m²))), blood pressure (two readings at rest), random

cholesterol and fasting lipids, blood glucose, and pharmacological treatment. A dietician was responsible for individual or family dietary assessment and advice. Lifestyle changes were negotiated and targets discussed: complete cessation of tobacco smoking by the patient and family members; BMI < 25 kg/m² (desirable body weight); blood pressure < 140/90 mm Hg; total cholesterol < 4.8 mmol/l; and compliance with prophylactic drug treatment: aspirin (or other platelet modifying drugs), β blockers after myocardial infarction, and cholesterol modification. A policy of evidence based prescribing was followed, using the doses of drugs employed in clinical trials which have reported both efficacy, in terms of clinical events, and safety.

After the cardiovascular screening the multidisciplinary health promotion programme took place over eight weekly sessions, usually starting within a week or so of hospital discharge or RACPC assessment. The following subjects were covered: coronary heart disease risk factors; family support and change; stopping smoking; diet and weight; physical activity; stress management; drug treatment; and the role of support groups. A group discussion was held one week after each lecture to allow participants time to assimilate the facts and formulate questions. At each weekly session supervised exercise for one hour was led by a physiotherapist and included a warm up period, three groups of exercises, and a cool down period.

At the end of the eight weekly sessions each patient was given an individual exercise plan by the physiotherapist. The nurses had protocols for assessment and management of blood pressure, blood lipids, and glucose. Blood pressure was monitored twice a week and the target for blood pressure was < 140/90 mm Hg. A physician was responsible for optimising antihypertensive treatment. Patients who had an acute coronary syndrome were started immediately on a statin in hospital if the initial random cholesterol concentration was > 6.0 mmol/l. If the cholesterol was < 6.0 mmol/l this was repeated eight weeks later on three separate occasions (including one fasting lipid profile). If the average total cholesterol was > 4.8 mmol/l a statin was prescribed by a physician. For all other coronary patients,

regardless of their initial cholesterol concentration, the same protocol was followed with three separate measurements (including one fasting) during the programme and treatment initiated by a physician if the average concentration was > 4.8 mmol/l. Patients with a random glucose concentration of > 6.7 mmol/l had a measurement of haemoglobin A1c. If this was abnormal they were referred to a diabetes specialist (KB) for evaluation and management.

The patients' symptoms and medical status were monitored throughout the programme and referral back to the consultant physician(s) responsible for their care done as required.

RESCREENING
On completion of the health promotion sessions patients and screened family members were rescreened for lifestyle, blood pressure, cholesterol, glucose, and use of drug treatment.

An electronic report was prepared and sent to the patients' general practitioner and the practice nurse, giving the results in relation to the defined lifestyle, risk factor, and therapeutic targets and what further action, if any, was required.

ONE YEAR FOLLOW UP
Patients were sent a letter inviting them for interview one year after completing the programme, which included questions on lifestyle and drug treatment and measurements of BMI, blood pressure (two readings at rest), and non-fasting total cholesterol.

STATISTICS
All patient data were entered directly by the nurses onto a dedicated Microsoft Access database. Data were analysed using SPSS for Windows and Stata software. Continuous variables were analysed using t tests and discrete factors by χ^2 tests.

Results
In all, 417 incident cases of coronary heart disease were identified from the population of 292 000 over 15 months, between October 1997 and December 1998. Of these, 194 were registered with general practitioners allocated to the Changes for Life programme, and 158 (response rate 82%) were recruited to the programme (table 1). Mean age was 65 years (range 31–90 years), men 64 years; women 66 years. Eighty seven patients (55%) presented with exertional angina and the rest had an acute coronary syndrome or some other coronary heart disease diagnosis. The flow of patients through the programme is shown in fig 1; 72% completed the programme and 65% attended for rescreening. Completion of the programme did not differ significantly by diagnosis, place of recruitment, age, or sex. Ninety six (72%) patients who participated in the programme attended for the one year follow up, which was completed in December 1999.

Table 2 shows initial screening results for all 133 patients, and separately for those 102 patients who subsequently attended for rescreening at 12 weeks, together with the one

Table 1 Process of recruitment

	Total (n=194)	Recruited (n=158) (% recruited)	Completed programme (n=113)
Source			
RACPC	120	96 (80)	74
Inpatients	70	59 (84)	36
Other	4	3 (75)	3
Diagnosis			
Exertional angina	112	87 (78)	66
Unstable angina	14	9 (65)	7
Acute MI	54	50 (93)	31
Other diagnoses (eg, recent MI)	14	12 (86)	9
Sex			
Male	128	106 (83)	78
Female	66	52 (79)	35
Age (years)			
< 70	130	106 (82)	74
≥ 70	64	52 (81)	39

MI, myocardial infarction; RACPC, rapid access chest pain clinic.

Table 2 Cardiovascular risk factors at initial screening examination, rescreening at the end of the programme, and one year follow up

Characteristic	All patients screened	Patients attending for rescreening at end of programme		Participating patients
	Initial screening (n=133)	Screening† (n=102)	Rescreening (n=102)	One year follow up (n=96)
Non-smoking status (%)	87	88	92	92
Weight (kg) (mean (SD))	77.8 (12.7)	77.4 (11.8)	76.6 (12.1)	77.7 (12.5)
Body mass index (kg/m²) (mean (SD))	27.6 (4.6)	27.4 (4.6)	27.1 (4.6)	27.4 (4.5)
% BMI < 25 kg/m²	37	33	34	29
Systolic BP (mm Hg) (mean (SD))	135 (21)	132 (20)	134 (18)	134 (20)
Diastolic BP (mm Hg) (mean (SD))	80 (14)	78 (12)	77 (10)	78 (12)
% < 140/90 mm Hg	57	67	73*	58**
Total cholesterol (mmol/l) (mean (SD))	5.3 (1.1)	5.3 (1.1)	4.7 (0.84)*	4.9 (1.1)
% < 4.8 mmol/l	32	32	62	54
Plasma glucose (mmol/l)	6.3	6.3	5.5	–
Aspirin treatment (%)	95	93	95	88**
β Blocker treatment (%)	54	58	58	48
Lipid lowering treatment (%)	35	37	64*	56

†Initial screening results for those attending for re-screening; *p < 0.001 rescreening *v* screening;
**p < 0.05 one year follow up *v* rescreening.
BMI, body mass index; BP, blood pressure.

year follow up data on those patients who participated in the programme.

Eighty seven per cent of patients were not smoking at the start of the programme and this increased by a further 5% (four patients quit smoking) to 92% at rescreening.

There was a small fall in weight and BMI, but the proportion achieving the target BMI of < 25 kg/m² did not change during the programme. Although there were no significant reductions in mean systolic or diastolic blood pressure, the proportion achieving a blood pressure of < 140/90 mm Hg increased by 6%, from 67% to 73% (p < 0.001). There was a reduction in mean total blood cholesterol, and the proportion achieving a cholesterol of < 4.8 mmol/l increased by 30%, from 32% to 62% (p < 0.001).

Ninety five per cent of patients reported taking aspirin (all ≥ 75 mg a day and six were also taking ticlopidine in addition). Fifty eight per cent of patients were taking a β blocker (typically atenolol 50 mg) at rescreening, and among those with acute myocardial infarction 22 of 31 patients (71%) were on this drug. The proportion taking lipid modifying treatment (most often simvastatin 20 mg) increased by 29% from 35% to 64% (p < 0.001).

The improvements in lifestyle, risk factors, and drug treatment were not all maintained at one year, with a fall in the proportion of patients taking aspirin, β blockers, and lipid lowering treatment, and a decrease in the proportion of patients maintaining the blood pressure and cholesterol targets.

Discussion

The prevention of coronary heart disease is a government priority, and cardiac rehabilitation is one of the key elements of the *National service framework for coronary heart disease*. We have shown how a comprehensive cardiac prevention and rehabilitation programme can be organised for all patients presenting for the first time with any symptomatic manifestation of coronary heart disease, including angina pectoris. A high recruitment rate (average 81%) was achieved across all diagnoses. Our hospital based programme met targets for lifestyle

(92% non-smoking status), blood pressure control (73% < 140/90 mm Hg), total cholesterol (62% < 4.8 mmol/l), and drug treatment (95% aspirin, 71% β blocker post-myocardial infarction, 64% lipid treatment).

The Joint British Societies' recommendations on coronary prevention in clinical practice[15] define patients with established coronary heart disease or other atherosclerotic disease as the top priority; the report recommended that in hospitals the care of such patients should embrace all aspects of cardiac prevention and rehabilitation, and be offered to all coronary patients, not only those who had had a myocardial infarct or a revascularisation procedure. Providing such a service is recognised as a hospital trust responsibility in the *National service framework for coronary heart disease*.

Historically, cardiac rehabilitation focused on supervised exercise sessions but is now evolving into comprehensive lifestyle programmes providing risk factor management and psychosocial and vocational support. This evolution in cardiac rehabilitation is reflected in the World Health Organization's changed definition, with the addition of the following words " . . .the sum of activities required to *influence favourably the underlying cause of the disease, . . .*" . Our Changes for Life programme meets this definition and also fulfils the joint British Societies' recommendation of inclusivity by recruiting all patients with coronary disease, most commonly exertional angina.

Our cardiac prevention and rehabilitation programme was one part of an integrated strategy for the care of all patients presenting with coronary heart disease in Bromley, south east London. Most patients with acute coronary syndromes in this district were admitted to the coronary care unit or cardiology ward and were seen on a daily basis by the consultant cardiologist on call. The three cardiologists followed a common policy for secondary prevention and this—combined with the special interest in prevention of one of them, and two cardiac prevention nurses—meant that secondary prevention measures were commonly in place before patients entered the programme. The rapid access chest pain clinic provided a same day assessment service for new cases of chest pain in general practice or in the accident and emergency department, and this meant that all new cases of exertional angina were evaluated by the cardiology service, and the same policy of secondary prevention measures was followed throughout. This integrated approach to the care of all coronary patients presenting from the community resulted in the high use of aspirin, β blockers, and statins recorded at the start of the programme. The additional improvements achieved through the programme must be seen in this context, as not all coronary patients are as effectively managed before entering a cardiac rehabilitation service.

Our programme focused on those presenting for the first time with coronary disease. We believe that patients at the symptomatic onset of their disease are more open to making lifestyle changes, managing risk factors, and

complying with drug treatment. This is not an argument for excluding those with existing disease, as risk factor management is very successful in reducing risk in those with prevalent disease. However, the structure and content of a programme for recurrent disease may have different emphases, particularly if patients have already been exposed to prevention and rehabilitation services in the same health care setting. Patients were actively recruited shortly after diagnosis (not simply referred) to the Changes for Life programme. This explains the very high recruitment rate—82% of all eligible patients, compared with 41% in other rehabilitation programmes.[14] There were no differences in recruitment rates by age, sex, or diagnosis. Patients with angina (either exertional or unstable) were as likely to participate in the programme as those who had had a myocardial infarct.

A home visit by the nurses provided a valuable professional bridge for patients during a vulnerable period between hospital diagnosis and the start of the outpatient phase of the programme. They were also able to assess the potential for lifestyle change by the household, and the whole family was encouraged to participate. For married couples there is concordance for lifestyle and risk factors such as obesity, blood pressure, lipids, and glucose,[17] and also concordance for changes in these risk factors.[18] Patients and families were asked to take personal responsibility for lifestyle change, and this is integral to the Procheska and DeClimente cycle of change model.[16]

Clear lifestyle, risk factor, and therapeutic targets were defined in the protocol. Most patients stopped smoking following the diagnosis of coronary heart disease, and just 8% of all patients were still using tobacco to some extent at the end of the programme. Weight loss averaged 1–2 kg and the proportion of patients with BMI of > 25 kg/m^2 remained the same. Although there is a confounding effect of weight gain in patients who stop smoking cigarettes,[19] this observation shows the difficulties in achieving substantial weight loss, despite professional dietary advice.

However, despite the small weight reduction the majority of patients achieved the blood pressure target of less than 140/90 mm Hg. This represents a substantial improvement on ASPIRE, where one in two patients had not achieved this target.[13] While the cardiac prevention nurses monitored blood pressure at each visit, and followed a blood pressure reduction protocol, they could not prescribe drugs. A physician had to modify drug treatment, and changes were not made as often as the protocol required. Extending the cardiac prevention nurse's responsibility to drug titration in a defined therapeutic protocol may further improve blood pressure control. The proportion of patients achieving the target cholesterol concentration (< 4.8 mmol/l) improved significantly between the start of the programme and rescreening, and those achieving the current Joint British Societies' target of < 5.0 mmol/l,[15] (70%) represent a substantial improvement on ASPIRE, where four of five patients had a cholesterol concentration above this value at follow up.[13] In the same way as for blood pressure control, nurse uptitration of statin treatment—with appropriate safeguards—may further increase the proportion achieving the cholesterol target. Sixty four per cent of patients were on lipid modifying treatment on completing this programme, compared with 16% in ASPIRE. Aspirin use was almost universal, reflecting the prescribing policy in the coronary care units, the wards, and the RACPC, and there was just a small (2%) further improvement during the programme. Similarly, the use of β blockers was high for the same reasons, particularly following a myocardial infarction where 68% were on a β blocker at rescreening, compared with 38% in the ASPIRE survey.

Other approaches to raising the standard of secondary prevention have been rather disappointing. In the SHIP (Southampton heart integrated care project) trial specialist liaison nurses sought to improve communication between hospital and general practice by encouraging general practice nurses to provide structured follow up of coronary patients, including those with angina. Although BMI was slightly lower in the intervention group at one year, there were no differences in smoking, fitness, blood pressure, or lipid concentrations compared with control patients. In this trial,[20] 5% of patients had a blood pressure of > 160 mm Hg systolic or > 100 mm Hg diastolic which was untreated; 38% had a cholesterol concentration of > 5.5 mmol/l but were not taking lipid lowering drugs; and 42% of the index patients had attended at least one cardiac rehabilitation session (18% more than control) but with no significant impact on risk factor control.

In primary care, the POST (postal prompts after a coronary event) study used postal prompts to patients (myocardial infarction or unstable angina) and general practitioners at two weeks and three months after discharge from hospital. There was no difference in the use of β blockers or cholesterol lowering drugs in the intervention group compared with the controls (although a significantly higher proportion of patients had their cholesterol measured in the intervention group).[21] Ninety per cent of the intervention group in POST were taking aspirin, but only 38% were using a β blocker and 28% a cholesterol lowering drug. A health promotion trial in general practice for patients with angina reported no significant differences at two years in smoking habit, systolic or diastolic blood pressure, cholesterol concentration, or BMI.[22] Specific drug treatments were not reported. In a randomised controlled trial of nurse run clinics in general practice in north east Scotland, coronary patients experienced significant improvements in chest pain and physical activity at one year. There was no effect on blood pressure, lipid management, or smoking status.[23]

Our Changes for Life programme has several advantages over these other approaches to secondary prevention (table 3). First, the patient's

Table 3   Key features of the Changes for Life cardiac prevention and rehabilitation programme

- All incident (new) cases of coronary heart disease were eligible
- Recruitment was immediately after the diagnosis of disease
- The programme was an integral part of the cardiology department's care
- Patients were visited at home
- Partner and relative involvement
- Targets for lifestyle, risk factors, and drug treatments were defined and assessed
- Rescreening at the end of the programme enabled evaluation

cardiological management is completely integrated with all aspects of secondary prevention and rehabilitation, from CCU to the wards and the RACPC. Second, all professional staff required for this multidisciplinary programme, and the necessary resources, are available in hospital. Third, the organisation of group sessions for education, health promotion, physical activity, and so on is much easier for both patients and staff alike when centred on a single facility. At the end of the hospital phase of Changes for Life, the patient's lifestyle, risk factors, and drug treatment were re-evaluated and reports sent both to general practitioners and practice nurses. Integration of this type of hospital programme with primary care is essential for continuity of care by physicians and other health professionals over the long term. The challenge in the community is to sustain and improve on patients' lifestyle, risk factor, and therapeutic targets.

CONCLUSIONS

A comprehensive cardiac prevention and rehabilitation programme can be offered to all patients presenting for the first time with coronary artery disease. A high recruitment rate can be achieved in all diagnostic groups, including patients presenting with exertional angina through a rapid access chest pain clinic. Lifestyle, risk factor, and therapeutic targets can be successfully achieved in most patients with such a hospital based programme and therefore they can expect a corresponding reduction in coronary morbidity and mortality as long as these results are sustained in general practice.

1 Department of Health. *The National Service framework for coronary heart disease*. London: DOH, 2000.
2 Sutcliffe SJ, Sutcliffe AK, Wood DA. The clinical incidence of fatal and non-fatal coronary heart disease in the population [abstract]. *Heart* 1999;**81**(suppl 1):28.
3 Yusuf S, Zucker D, Peduzzi P, *et al*. Effect of coronary artery bypass graft surgery on survival: overview of 10 year results from randomized trials by the coronary artery bypass graft surgery trialists collaboration. *Lancet* 1994;**344**:563–70.
4 Ghandi MM, Lampe F, Wood DA. Incidence, clinical characteristics and short-term prognosis of angina pectoris. *Heart* 1995;**73**:193–8.
5 Law M, Tang JL. An analysis of the effectiveness of interventions intended to help people stop smoking. *Arch Intern Med* 1995;**155**:1933–41.
6 Antiplatelet Trialists' Collaboration. Collaborative overview of randomised trials of antiplatelet therapy. 1. Prevention of death, myocardial infarction and stroke by prolonged antiplatelet therapy in various categories of patients. *BMJ* 1994;**308**:81–106.
7 Freemantle N, Cleland J, Young P, *et al*. Beta blockade after myocardial infarction: systematic review and meta regression analysis. BMJ 1999;**318**:1730–7.
8 Scandinavian Simvastatin Survival Study. A randomised trial of cholesterol lowering in 4444 patients with coronary heart disease: the Scandinavian simvastatin survival study (4S). *Lancet* 1994;**344**:1383–9.
9 Sacks FM, Pfeffer MA, Moye LA, *et al*. The effect of pravastatin on coronary events after myocardial infarction in patients with average lipid levels. *N Engl J Med* 1996;**335**:1001–9.
10 The Long-Term Intervention with Pravastatin in Ischaemic Disease (LIPID) Study Group. Prevention of cardiovascular events and death with pravastatin in patients with coronary heart disease and a broad range of initial cholesterol levels. *N Engl J Med* 1998;**339**:1349–57.
11 Acute Infarction Ramipril Efficacy (AIRE) Investigators. Effects of ramipril on morbidity and mortality of survivors of acute myocardial infarction with clinical evidence of heart failure. *Lancet* 1993;**342**:821–8.
12 Yusuf S, Sleight P, Pogue J, *et al*. Effects of an angiotensin-converting enzyme inhibitor, ramipril, on cardiovascular events in high risk patients. *N Engl J Med* 2000;**342**:145–53.
13 Aspire Steering Group. A British Cardiac Society survey of the potential for the secondary prevention of coronary disease: ASPIRE (action on secondary prevention through intervention to reduce events). Principal results. *Heart* 1996;**75**:334–42.
14 Cooper R, Lloyd G, Weinmaman J, *et al*. Why patients do not attend cardiac rehabilitation: role of intentions and illness beliefs. *Heart* 1999;**82**:234–6.
15 Wood DA, Durrington P, Poulter N, *et al*. Joint British recommendations on prevention of coronary heart disease in clinical practice. *Heart* 1999;**80**(suppl 2):S1–26.
16 Prochaska JO, DiClemente CC. Toward a comprehensive model of change. In: *Treating addictive behaviour: processes of change*. New York: Plenum Press, 1986:3–27.
17 Sackett DL, Anderson GD, Milner R, *et al*. Concordance for coronary risk factors among spouses. *Circulation* 1975;**52**:589–95.
18 Pyke SDM, Wood DA, Kinmouth AL, *et al*, on behalf of the BHFS group. Changes in coronary risk and risk factor levels in couples following lifestyle intervention: the British family heart study. *Arch Fam Med* 1997;**6**:3254–60.
19 Thomson R, Pyke SDM, Scott EA, *et al*. Dietary change after smoking cessation: a prospective study. *Br J Nutr* 1995;**74**:27–38.
20 Jolly K, Bradley F, Sharp S, *et al* . Randomised controlled trial of follow up care in general practice of patients with myocardial infarction and angina: final results of the Southampton heart integrated care project (SHIP). *BMJ* 1999;**318**:706–11.
21 Feder G, Griffiths C, Eldridge S, *et al*. Effect of postal prompts to patients and general practitioners on the quality of primary care after a coronary event (POST): randomised control trial. *BMJ* 1999;**318**:1522–6.
22 Cupples ME, McKnight A. Randomised controlled trial of health promotion in general practice for patients at high cardiovascular risk. *BMJ* 1994;**309**:993–6.
23 Campbell NC, Ritchie LD, Thain J, *et al*. Secondary prevention in coronary heart disease: a randomised trial of nurse led clinics in primary care. *Heart* 1998;**80**:447–52.