BJC
www.bjcardio.co.uk

The British Journal of Cardiology

Supplement 3

Volume 20 Supplement 3 I October–December 2013

Cardiovascular health and disease prevention in clinical practice

This supplement was conceived by the MyAction group and funded by MSD. It is based on the studies that compiled the rationale for MyAction, the experience in delivering the programme in different communities, and education/training through the MSc in Preventive Cardiology at Imperial College London.

MSD

CARD-1089754-0000 December 2013

BJC
1993–2013
www.bjcardio.co.uk

The British Journal of Cardiology

The peer-reviewed journal linking primary and secondary care

Editors
Kim Fox
Terry McCormack
Henry Purcell

Associate Editor
Katharine White

Editorial Assistant
Tim Kelleher

Administrative Assistant
Mary Robbins

Editorial Office and Publishers
MediNews (Cardiology) Limited
657 Fulham Road, London, SW6 5PY
(production@bjcardio.co.uk)
Tel: +44 (0)20 7731 4945

Design and Layout
Consultants in Design

Authors instructions
See www.bjcardio.co.uk

Advertising and sales enquiries:
Nik Screen
(nscreen@bjcardio.co.uk)
Tel: +44 (0)7710 442911
Messages: +44 (0)20 3255 3154

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

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

www.bjcardio.co.uk

SPONSORED SUPPLEMENT

Introduction

Promoting cardiovascular health is central to the national strategy to reduce premature mortality in our population. In this supplement, we offer a new approach to cardiovascular disease (CVD) prevention through the MyAction preventive cardiology programme, developed by Imperial College London. This nurse-led, multi-disciplinary, family-centred service embraces all patients with atherosclerotic disease – coronary heart disease, stroke and peripheral arterial disease – together with those identified through Health Checks to be at high risk of developing CVD in one community-based programme. In this supplement, we describe the studies that compiled the rationale for MyAction, our experience in delivering this programme in different communities and our approach to education and training through our Imperial College Masters degree programme in preventive cardiology: cardiovascular health and disease prevention. All health professionals are welcome to visit MyAction and join us in our ambitions to achieve excellence in preventive care for all our patients.

The ASPIRE-2-PREVENT study was partly funded through an unrestricted educational grant by MSD and the DYSIS study was sponsored by MSD. These studies were conducted together and we thank all the participants, local clinical staff and the scientific committee members.

Kornelia Kotseva
Mary Seed
David Wood

Sponsorship statement

MSD provided financial support for this publication. The supplement was conceived by the authors. Content and articles were fully developed and written by the authors except the DYSIS article, which was written in collaboration with MSD. Full editorial control of the supplement rested with the authors. The ASPIRE-2-PREVENT study and the Croi MyAction programme, Ireland, were partly funded though unrestricted educational grants by MSD UK and MSD Ireland, respectively. DYSIS was an MSD sponsored study. The supplement was reviewed by MSD for ABPI compliance only.

Conflicts of interest

Vian Amber is employed by MSD

Alison Atrey has received honoraria for advisory boards/travel/lectures from Unilever and TMW.

Susan Connolly has received honoraria from Astra Zeneca, MSD and Unilever.

Gerard Flaherty has received education and travel grants from Astra Zeneca and MSD Ireland.

Kornelia Kotseva is a senior project manager for the DYSIS and ASPIRE-2-PREVENT studies, sponsored by MSD.

Mary Seed has recieved honoraria for lectures from MSD.

David Wood has received an independent investigator's grant for ASPIRE-2-PREVENT from MSD to Imperial College London; he has received honoraria for invited lectures from MSD/Schering Plough, and for consultancy/advisory boards from MSD.

The following authors all declared no conflict of interest: Suzanne Barr, Paul Bassett, Timothy J Bowker, Adrian Brown, Sarah Jane Clements, Caroline Costello, Jim Crowley, Anne Dornhurst, Gary Frost, Irene Gibson, Tim Grove, Catriona Jennings, Jennifer Jones, Claire Kerins, Elizabeth Turner, Anne Marie Walsh, Jane Windle, Christine Yates

Front cover credit: MyAction

Supplement editors: Drs Kornelia Kotseva and Mary Seed

Authors

The following authors all contributed to one or more of the papers in this supplement

Dr Vian Amber[7]
Senior Medical Advisor, MSD; Honorary Senior Clinical Lecturer, Imperial College London; Honorary Consultant Physician, Imperial College Healthcare NHS Trust

Ms Alison Atrey (née Mead)[6]
MyAction Chief Dietitian

Ms Suzanne Barr[6]
Programme Leader, MSc Preventive Cardiology

Mr Paul Bassett[10]
Statistician

Dr Timothy J Bowker[4]
Consultant Cardiologist

Dr Adrian Brown[9]
Consultant in Public Health Medicine

Ms Sarah Jane Clements[5]
Lead Nurse, MyAction Westminster Programme

Dr Susan Connolly[5]
Clinical Lead, MyAction Westminster Programme; Consultant Cardiologist, Imperial College Healthcare NHS Trust

Ms Caroline Costello[1]
Physical Activity Specialist

Dr James Crowley[1,11]
Consultant Cardiologist and Croí Medical Director

Dr Anne Dornhurst[3]
Consultant Physician, Imperial College Healthcare NHS Trust; Honorary Senior Lecturer Imperial College

Dr Gerard Flaherty[1,8]
Croí MyAction Medical Officer; Physician and Senior Lecturer in Clinical Medicine and Medical Education

Professor Gary Frost[3]
Professor of Nutrition and Dietetics; Head of the Nutrition and Dietetic Research Group

Ms Irene Gibson[1]
Prevention Nurse Lead and Programmes Manager; Honorary Clinical Fellow, NUI Galway

Mr Tim Grove[6]
Teaching Fellow and Exercise Specialist, Imperial College London; MyAction Westminster Physical Activity Specialist

Ms Catriona Jennings[6]
Cardiovascular Specialist Research Nurse Imperial College London; President, British Association for Nursing in Cardiovascular Care; Vice Chair Council on Cardiovascular Nursing and Allied Health

Ms Jennifer Jones[1,6,8]
Director of Croí Prevention Programmes, Training and Education; Honorary Senior Lecturer, NUI, Galway; Honorary Research and Teaching Associate, Imperial College London

Ms Claire Kerins[1]
Cardiac Specialist Dietitian; Honorary Clinical Fellow, NUI, Galway

Dr Kornelia Kotseva[6]
Senior Clinical Research Fellow, Imperial College London; Consultant Cardiologist, Imperial College Healthcare NHS Trust

Dr Mary Seed[5]
Honorary Consulting Physician

Ms Elizabeth L Turner[2]
Statistician

Ms Anne Marie Walsh[1]
Nurse Coordinator

Ms Jane Windle[1]
Senior Physiotherapist

Professor David A Wood[6]
Garfield Weston Professor of Cardiovascular Medicine; NIHR Senior Investigator

Ms Christine Yates[5]
MyAction Westminster Programme Manager

Affiliations

1. Croí, West of Ireland Cardiac Foundation, Croí House, Moyola Lane, Newcastle, Galway, Ireland

2. Department of Biostatistics and Bioinformatics and Duke Global Health Institute, Duke Box 2721, Durham, NC 27710, USA

3. Hammersmith Hospital, DuCane Road, London, W12 0HS

4. Homerton University Hospital, Homerton University Hospital NHS Trust, Homerton Row, London, E9 6SR

5. Imperial College Healthcare NHS Trust, Charing Cross Hospital, Fulham Palace Road, London, W6 8RF

6. International Centre for Circulatory Health, Imperial College London, 59–61 North Wharf Road, London, W2 1LA

7. Merck Sharp & Dohme Ltd, Medical Affairs-General Medicine, Hertford Road, Hoddesdon, Hertfordshire, EN11 9BU.

8. National University of Ireland (NUI), Galway, University Road, Galway, Ireland

9. NHS England

10. Statsconsultancy Ltd, 40 Longwood Lane, Amersham, Bucks, HP7 9EN

11. University Hospital Galway, Newcastle Road, Galway, Ireland

SPONSORED SUPPLEMENT

MyAction and the new cardiovascular outcomes strategy

David A Wood

Introduction

Cardiovascular diseases (CVDs) are a single family of diseases with common antecedents requiring a holistic approach to prevention. This is the central theme of the new cardiovascular outcomes strategy for NHS England.[1] Atherosclerosis is ubiquitous in the population, manifesting itself in different ways – acute coronary syndromes, transient cerebral ischaemia or claudication – but linked by a common pathology and underlying causes in terms of lifestyle and related risk factors. Many with one expression of this disease commonly suffer from another, and yet each is managed in silos of care through cardiology, stroke and vascular services, and while appropriate for acute disease, not so for prevention. All these patients require a professional lifestyle intervention, risk factor and therapeutic management to reduce risk of disease progression, the need for further hospitalisation, revascularisation, and, ultimately, prevention of recurrent events leading to greater life expectancy.

If true of manifest disease, it is even truer for the antecedents of atherosclerosis, namely hypertension, hypercholesterolaemia, diabetes and chronic kidney disease. These very terms also lead to silo approaches for risk factor assessment and management in primary prevention, now replaced by the new paradigm of total cardiovascular risk, central to the national Health Checks programme. Those at highest multi-factorial risk, including all those with type 2 diabetes mellitus, also require an integrated prevention programme, but are commonly signposted to silo services for smoking cessation, weight management, exercise referral schemes, as well as specialist clinics in hypertension, lipids and diabetes. Dividing the patient into all these specialist areas leads to uncoordinated care, multiple visits to different health professionals and services, which can offer confusing and contradictory advice.

The patient should be at the centre of preventive care, based on holistic assessment and management. As stated in the national strategy a "more coordinated and integrated approach is needed to assessment, treatment and care to improve outcomes". The report recommends developing and evaluating service models to manage CVD as "a single family of diseases" applicable to both manifest atherosclerotic disease and those at high multi-factorial risk of developing this disease. In the context of prevention, distinguishing secondary from primary prevention is, to a large extent, artificial, as all patients require lifestyle, risk factor and therapeutic management to reduce their overall risk of developing, or having recurrent, disease.

MyAction

MyAction is an innovative, nurse-led, multi-disciplinary programme, which manages cardiovascular disease as "a single family of diseases" and integrates secondary and primary prevention in one community-based service.[2] It is founded on the principles of EUROACTION – a nurse-led, multi-disciplinary programme evaluated in a cluster randomised-controlled trial in hospital and general practice across eight European countries.[3] MyAction accepts all patients with coronary artery disease, with transient cerebral ischaemia or minor stroke and with claudication. At the same time, MyAction takes high-risk patients identified through the Health Checks programme because of a CVD score of ≥20% over 10 years, diabetes or chronic kidney disease. The MyAction team comprises full-time specialist cardiac nurses, full-time dietitians and full-time physiotherapists or physical activity specialists, supported by a psychologist and a community cardiologist and led by a central team at Imperial College London. Patients are recruited together with their partners because there is concordance for lifestyle – smoking, eating habits and physical activity levels – and achieving healthy lifestyle changes is more likely if the intervention is offered to the whole household rather than the patient in isolation. The MyAction programme is located in community leisure centres, rather than hospital or general practice, as the facilities in these centres provide a more conducive health-promoting environment.

The concept of the MyAction programme meets the requirements of the new cardiovascular outcomes strategy to improve outcomes for people with or at risk of CVD. We are managing CVDs as a single family of diseases with common antecedents – through complete integration of secondary and primary prevention – a new paradigm for cardiovascular prevention compared with traditional service models of cardiac rehabilitation, limited to those following myocardial infarction or coronary revascularisation, and silo services for smoking cessation, weight management, exercise prescription, hypertension, lipids and diabetes. If we are to reduce premature mortality from CVD, reduce inequalities and improve quality of life we need to take an innovative holistic approach to cardiovascular prevention

References

1. Department of Health. Cardiovascular disease outcomes strategy: improving outcomes for people with or at risk of cardiovascular disease. London: DoH, 5th March 2013. Available from: https://www.gov.uk/government/publications/improving-cardiovascular-disease-outcomes-strategy

2. Connolly S, Holden A, Turner E *et al*. MyAction: an innovative approach to prevention of cardiovascular disease in the community. *Br J Cardiol* 2011;**18**:171–6. Available from: http://bjcardio.co.uk/2011/08/myactionaninnovativeapproachtothepreventionofcardiovasculardisease/

3. Wood DA, Kotseva K, Connolly S *et al.*; on behalf of EUROACTION Study Group. Nurse-coordinated multidisciplinary, family-based cardiovascular disease prevention programme (EUROACTION) for patients with coronary heart disease and asymptomatic individuals at high risk of cardiovascular disease: a paired, cluster-randomised controlled trial. *Lancet* 2008;**371**:1999–2012. http://dx.doi.org/10.1016/S0140-6736(08)60868-5

What is cardiac rehabilitation achieving for patients with CHD? The ASPIRE-2-PREVENT results

Kornelia Kotseva, Elizabeth L Turner, Catriona Jennings, David A Wood, on behalf of ASPIRE-2-PREVENT Study Group

Introduction

The main objective of cardiovascular prevention and rehabilitation in clinical practice is to reduce the risk of future vascular events, to improve quality of life and increase life expectancy. Cardiac rehabilitation (CR) is recommended by the British Association for Cardiovascular Prevention and Rehabilitation (BACPR).[1] This second edition of the Standards and Core Components (SCC) for Cardiovascular Disease Prevention and Rehabilitation from the BACPR, define CR through seven standards and seven core components for assuring a quality service of care using a multi-disciplinary biological and psychosocial approach.[2]

However, the implementation of secondary prevention of coronary heart disease (CHD) in the UK is still far from optimal. The results of the ASPIRE-2-PREVENT (Action on Secondary Prevention through Intervention to Reduce Events) (A-2-P) survey showed poor lifestyle and risk factor management in patients with established coronary disease.[3]

The aim of this paper is to describe lifestyle and risk factor management, and the use of cardioprotective drug therapies in a representative sample of coronary patients participating in a cardiac rehabilitation programme (CRP) compared with those who did not.

Methods

Detailed description of study design and principal results has been published in detail elsewhere.[3] Briefly, A-2-P survey was conducted in 19 randomly selected hospitals in 12 geographical regions in England, Northern Ireland, Wales, and Scotland. Consecutive patients, men and women younger than 80 years of age, with one or more of the following diagnoses: elective or emergency coronary artery bypass surgery (CABG), elective or emergency percutaneous coronary intervention (PCI), acute myocardial infarction (AMI), unstable angina (UA) and exertional angina (EA), were identified retrospectively, and interviewed and examined at least six months after their index event or procedure.

Data collection was conducted by centrally trained research nurses and was based on retrospective review of individual medical notes, and interview and examination of patients at least six months and at most three years after the recruiting coronary event or procedure, using standardised methods and instruments. Venous blood was drawn for serum total cholesterol, high-density lipoprotein cholesterol (HDL-C), triglycerides (TG) and plasma glucose. Fasting time was recorded. The low-density lipoprotein cholesterol (LDL-C) was calculated using the Friedewald formula. The central laboratory was the School of Clinical and Laboratory Sciences, Faculty of Medical and Human Sciences, University of Manchester, UK. The laboratory takes part in the Lipid Standardization Program organised by CDC, Atlanta, USA. Data management was undertaken by the Euro Heart Survey department of the European Society of Cardiology, European Heart House, Sophia Antipolis, Nice, France.

The main outcome measures were the proportions of coronary patients achieving, at interview, the lifestyle, risk factor and therapeutic targets as defined in the Joint British Societies (JBS2) guidelines for cardiovascular disease (CVD) prevention.[4] Patient demographics were summarised as counts and percentages, or means and standard deviations, as appropriate. These demographics were presented for those who were advised to participate and according to participation, both for those who were advised and of the whole study group. Logistic regression was used to identify patient demographic variables and risk factors associated with participation in a CRP. Unadjusted and adjusted p values were reported, with adjustment for age at index event, sex and index event.

Results

A total of 1,522 medical records (26.1% women) were reviewed and 676 patients were interviewed, of whom 663 (74.5% men and 25.5% women) had valid information about their participation in a CRP and are included in the present analysis. Patients were interviewed at a median interval of 13 months (interquartile range [IQR] 10–16 months) after the recruiting index coronary event. The

Table 1. Proportion of patients advised to attend a cardiac rehabilitation programme (CRP) and participation, by age, sex, index event and educational level among those advised (n=466), and among the whole study group with valid CRP information (n=663)

	Advised to participate in a CRP % *(n/total)*	Participated* in a CRP, if advised % *(n/total)*	Participated* in a CRP (from the whole study group) % *(n/total)*
Age at index event			
Mean (SD)	63.7 (9.5)	63.6 (9.5)	63.6 (9.5)
<60 years	74.4% (154/207)	74.7% (115/154)	55.6% (115/207)
≥60 years	68.4% (312/456)	73.7% (230/312)	50.4% (230/456)
Sex			
Female	63.3% (107/169)	67.3% (72/107)	42.6% (72/169)
Male	72.7% (359/494)	76.0% (273/359)	55.3% (273/494)
Index event			
CABG	91.5% (86/94)	77.9% (67/86)	71.3% (67/94)
PCI	81.8% (180/220)	76.1% (137/180)	62.3% (137/220)
AMI	73.8% (127/172)	72.4% (92/127)	53.5% (92/172)
UA	42.7% (47/110)	76.6% (36/47)	32.7% (36/110)
EA	38.8% (26/67)	50.0% (13/26)	19.4% (13/67)
Educational level§			
Low	36.5% (19/52)	73.7% (14/19)	26.9% (14/52)
Higher	73.2% (446/609)	74.2% (331/446)	54.4% (331/609)
Total	70.3% (466/663)	74.0% (345/466)	52.0% (345/663)

*At least half of the sessions

§Low = primary school completed or less; Higher = more than primary school completed

Key: AMI = acute myocardial infarction; CABG = coronary artery bypass graft; EA = exertional angina; PCI = percutaneous coronary intervention; UA = unstable angina

characteristics of patients who were advised and participated in a CRP by age, gender and diagnostic category are presented in **table 1**. Overall, 466 (70.3%) patients were advised to participate in a CRP and 345 (74.0%) of them attended at least half of the sessions (52.0% of the whole study population). Participation rates ranged from 19.4% in the exertional angina group to 71.3% in the CABG group. **Table 2** shows patients characteristics and risk factor prevalence and control at interview according to participation in a CRP. There were significant differences by age, gender, diagnostic category, educational level, prevalence of diabetes, smoking, obesity, achieving physical activity target, total cholesterol control, and use of antiplatelets, angiotensin-converting enzyme inhibitors/angiotensin receptor blockers (ACEIs/ARBs) and calcium channel blockers (CCBs).

Discussion

There is a wealth of scientific evidence from randomised-controlled trials and meta-analyses that comprehensive CR can reduce the risk of future cardiovascular events in patients with CHD and improve survival.[5-8] A systematic review of 47 studies randomising 10,794 patients showed that a structured exercise-based CR, compared with usual care, was associated with a reduction in overall and cardiovascular mortality (relative risk [RR] 0.87, 95% confidence interval [CI] 0.75–0.99; and 0.74, 95% CI 0.63–0.87, respectively), and in hospital admissions (RR 0.69, 95% CI 0.51–0.93).[5] Secondary prevention, including blood pressure, cholesterol and glucose management and the use of cardioprotective medication, now also forms an integral part of an effective CRP.[6] A meta-analysis of the effectiveness of secondary prevention programmes of 63 randomised-controlled trials, including 21,295 patients, showed a summary risk ratio for all-cause mortality of 0.85 (95% CI 0.77–0.94) and for recurrent myocardial infarction of 0.83 (95% CI 0.74–0.94).[7] In the systematic review of trials of secondary prevention, multi-disciplinary disease management programmes led to a reduction in hospital admissions and a trend towards improved symptom scores, exercise tolerance, or quality of life.[8]

However, despite the strength of scientific evidence, CR in the UK is underused with a low participation rate. The A-2-P results presented here show that just over two-thirds of patients with CHD were advised to follow a CRP and just over half of all patients actually participated in some form of CR. Yet, of those who were advised, nearly four-fifths did so. The referral and participation rates in A-2-P (70.3% and 52.0%, respectively) were higher than in the EUROASPIRE III survey in 22 countries (44.8% and 36.5%, respectively).[9] In the A-2-P survey, age, gender, diagnostic category and educational level were associated with the reported advice to attend a CRP. Those who were younger, men, with higher educational status, and those who had had CABG and PCI were more likely to be *advised* to participate in a CRP. Importantly, angina patients may gain potentially more from CR than other diagnostic groups, and they, therefore, need lifestyle and risk factor management as much as those revascularised by CABG and PCI. Similarly, patients who *attended* a CRP were more likely to be younger, men, and with a higher educational level. Those who had had CABG and PCI as recruiting index event were more likely to attend a CRP than those with UA and EA.

Patients who reported attending a CRP had a significantly lower prevalence of persistent smoking, obesity and elevated total cholesterol. Significantly higher proportions of patients attending a CRP achieved

Table 2. Patient characteristics and risk factor prevalence and control at interview according to participation in a CRP for the whole study group with valid CRP information (n=663)

	Participation in a CRP[a]		p value[b]	
	No % *(n/total)*, n=318	Yes % *(n/total)*, n=345	Unadjusted	Adjusted[c]
Age at index event (mean, SD)	65.0 (9.3)	63.6 (9.5)	0.05	-
Female gender	30.5% (97/318)	20.9% (72/345)	0.004	-
Index event				
CABG	8.5% (27/318)	19.4% (67/345)	<0.001	<0.001
PCI	26.1% (83/318)	39.7% (137/345)	<0.001	0.001
AMI	25.2% (80/318)	26.7% (92/345)	0.65	0.64
UA	23.3% (74/318)	10.4% (36/345)	<0.001	<0.001
EA	17.0% (54/318)	3.8% (13/345)	<0.001	<0.001
Low educational level	12.0% (38/316)	4.1% (14/345)	<0.001	0.006
Current smoking[d]	16.7% (53/318)	11.6% (40/345)	0.06	0.006
Persistent smoking[e]	56.3% (49/87)	39.4% (39/99)	0.02	0.05
Overweight[f]	79.4% (251/316)	77.8% (263/338)	0.61	0.21
Obesity[g]	43.0% (136/316)	33.6% (114/339)	0.01	0.01
Not at physical activity target[h]	87.4% (278/318)	79.3% (272/343)	0.006	0.07
BP ≥130/80 mmHg	50.5% (160/317)	44.3% (152/343)	0.11	0.11
TC ≥4 mmol/L	57.6% (170/295)	47.9% (149/311)	0.02	0.03
Diabetes (known)	22.2% (70/315)	13.7% (47/344)	0.004	0.01
Therapeutic control of BP, lipids and glucose				
BP <130/80 mmHg in patients on BP-lowering medication	50.2% (147/293)	55.4% (181/327)	0.20	0.14
TC <4 mmol/L in patients on lipid-lowering medication	43.2% (118/273)	52.9% (155/293)	0.02	0.03
Glucose <6.0 mmol/L in patients with known diabetes	29.7% (18/64)	27.9% (12/43)	0.84	0.97
Medication				
Antiplatelets	93.9% (292/313)	97.1% (333/343)	0.03	0.26
Statins	92.3% (288/312)	93.0% (318/342)	0.74	0.51
Beta blockers	71.1% (221/311)	77.7% (264/340)	0.06	0.48
ACEIs/ARBs	74.0% (231/312)	83.3% (284/341)	0.004	0.05
Calcium channel blockers	26.3% (82/312)	9.7% (33/341)	<0.001	<0.001
Lipid-lowering drugs	93.9% (293/312)	95.3% (326/342)	0.42	0.45

[a]Attended at least half of the sessions
[b]Obtained using logistic regression
[c]Adjusted for age at index event, sex and index event
[d]Self-reported and/or carbon monoxide in breath ≥10 ppm
[e]Smoking at interview, of those reported smoking in the month prior to index event
[f]BMI ≥25 kg/m^2 (non-Asians); ≥23 kg/m^2 (Asians)
[g]BMI ≥30 kg/m^2 (non-Asians); ≥25 kg/m^2 (Asians)
[h]Patient does not take moderate/intense physical activity at least five times a week

Key: ACEIs/ARBs = angiotensin-converting enzyme inhibitors/angiotensin receptor blockers; AMI = acute myocardial infarction; BMI = body mass index; BP = blood pressure; CABG = coronary artery bypass graft; CRP = cardiac rehabilitation programme; EA = exertional angina; PCI = percutaneous coronary intervention; TC = total cholesterol; UA = unstable angina

the physical activity target and were on antiplatelets and ACEIs/ARBs. However, despite the higher use of ACEIs/ARBs, there was no significant difference in blood pressure control according to participation in a CRP. The control of total cholesterol in those on lipid-lowering medication was significantly better in those who attended a CRP. Importantly, more than 90% in both groups were on lipid-lowering medication, mainly statins, so the better cholesterol control may be probably explained by healthier lifestyle management and by up-titrating or switching to more potent statins in a CRP group.

The findings of this survey must be considered within the context of study strengths and limitations. An important strength of the A-2-P survey is that, in order to obtain a representative sample, participating centres were randomly selected from a geographically stratified sample of hospitals in the UK. Data collection was not based just on information from medical notes, but also on face-to-face interviews and examinations using standardised methods and instruments, including central laboratory measurements for lipids and glucose.

A-2-P showed considerable differences in the profile of patients who were *advised*, as well as in those who *attended* a CRP. In this context, the differences in lifestyle and risk factor management at interview should be interpreted with caution, as it is unclear whether they are related to the effectiveness of the CRP or to the selection of patients in the respective groups. These differences may influence the results not only in this study, but in the other studies that evaluate the effectiveness of CRPs.

CR has been identified in two of the indicators of the Quality and Outcomes Framework (QOF), which either currently exist or are part of the 2013–2014 planned guidelines from the National Institute for Health and Care Excellence (NICE; http://www.nice.org.uk). The two QOF indicators are the secondary prevention of coronary heart disease and the management of chronic congestive heart failure, with a special focus on improving early uptake and adherence to CR. The seven core components for cardiovascular disease prevention and rehabilitation of the BACPR include lifestyle (smoking cessation, diet and physical activity) and medical risk factor management, cardioprotective drug therapies, health behaviour change and education, psychosocial health, long-term management, audit and evaluation.[2]

In conclusion, the results of A-2-P survey show that CR in the UK is underused and only just over half of all coronary patients reported attending a CRP. There is a difference between characteristics of patients advised to attend and in those who participated in a CRP. Although the control of smoking, obesity and cholesterol was significantly better in those who attended a CRP many patients had not achieved lifestyle and risk factor targets. Better strategies are required to ensure that patients with CHD receive adequate lifestyle and risk factor management. The recent EUROACTION randomised-controlled trial and the new MyAction programme for the NHS have shown that a nurse-led multi-disciplinary programme can achieve a high standard of preventive care for patients with CHD and their families.[10,11] Cardiovascular prevention and rehabilitation must be integral to any modern cardiology service. There is an urgent need of comprehensive, multi-disciplinary rehabilitation programmes addressing all aspects of the lifestyle and risk factor management for all patients with coronary or other atherosclerotic disease

Funding

The A-2-P survey was supported by Merck Sharp & Dohme (MSD) with an unrestricted educational grant to Imperial College London, and is part of a wider international survey called DYSIS (Dyslipidaemia International Survey). The sponsor had no role in the ASPIRE-2-PREVENT design, data collection, data analysis, data interpretation, and writing of this report. The authors had full access to all data and had final responsibility for the decision to submit the manuscript for publication.

References

1. Buckley JP, Furze G, Doherty P *et al.*; on behalf of BACPR. BACPR scientific statement: British standards and core components for cardiovascular disease prevention and rehabilitation. *Heart* 2013;**99**:1069–71. http://dx.doi.org/10.1136/heartjnl-2012-303460

2. British Association for Cardiovascular Prevention and Rehabilitation (BACPR). The BACPR standards and core components for cardiovascular disease prevention and rehabilitation 2012. London: BACPR, 2012. Available from: http://www.bacpr.com/resources/8BZ_BACPR_Standards_and_Core_Components_2012.pdf [accessed November 2012].

3. Kotseva K, Jennings CS, Turner EL *et al.*; on behalf of the ASPIRE-2-PREVENT Study Group. ASPIRE-2-PREVENT: a survey of lifestyle, risk factor management and cardioprotective medication in patients with coronary heart disease and people at high risk of developing cardiovascular disease in the UK. *Heart* 2012;**98**:865–71. http://dx.doi.org/10.1136/heartjnl-2011-301603

4. British Cardiac Society, British Hypertension Society, Diabetes UK *et al*. JBS2: Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice. *Heart* 2005;**91**(suppl 5):v1–v52. http://dx.doi.org/10.1136/hrt.2005.079988

5. Heran BS, Chen JMH, Ebrahim S *et al*. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev* 2011;(7):CD001800. http://dx.doi.org/10.1002/14651858.CD001800.pub2

6. Perk J, De Backer G, Gohlke H *et al.* European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts). *Eur Heart J* 2012;**33**:1635–701. http://dx.doi.org/10.1093/eurheartj/ehs092

7. Clark AM, Hartling L, Vandermeer B, McAlister FA. Meta-analysis: secondary prevention programs for patients with coronary artery disease. *Ann Intern Med* 2005;**143**:659–72. http://dx.doi.org/10.7326/0003-4819-143-9-200511010-00010

8. McAlister FA, Lawson FME, Teo KK, Armstrong PW. Randomised trials of secondary prevention programmes in coronary heart disease: systematic review. *BMJ* 2001;**323**:957–62. http://dx.doi.org/10.1136/bmj.323.7319.957

9. Kotseva K, Wood D, De Backer G, De Bacquer D. Use and effects of cardiac rehabilitation in patients with coronary heart disease: results from the EUROASPIRE III survey. *Eur J Prev Cardiology* 2013;**20**:817–26. http://dx.doi.org/10.1177/2047487312449591

10. Wood DA, Kotseva K, Connolly S *et al.*; on behalf of the EUROACTION Study Group. Nurse-coordinated multidisciplinary, family-based cardiovascular disease prevention programme (EUROACTION) for patients with coronary heart disease and asymptomatic individuals at high risk of cardiovascular disease: a paired, cluster-randomised controlled trial. *Lancet* 2008;**371**:1999–2012. http://dx.doi.org/10.1016/S0140-6736(08)60868-5

11. Connolly S, Holden A, Turner E *et al*. MyAction: an innovative approach to the prevention of cardiovascular disease in the community. *Br J Cardiol* 2011;**18**:171–6. Available from: http://bjcardio.co.uk/2011/08/myactionaninnovativeapproachtothepreventionofcardiovasculardisease/

Dyslipidaemia and atherosclerotic vascular disease:
DYSIS results in the UK

Vian Amber, Kornelia Kotseva, Elizabeth L Turner, Catriona Jennings, Alison Atrey, Jennifer Jones, Susan Connolly, Timothy J Bowker, David A Wood, on behalf of the DYSIS Study Group UK

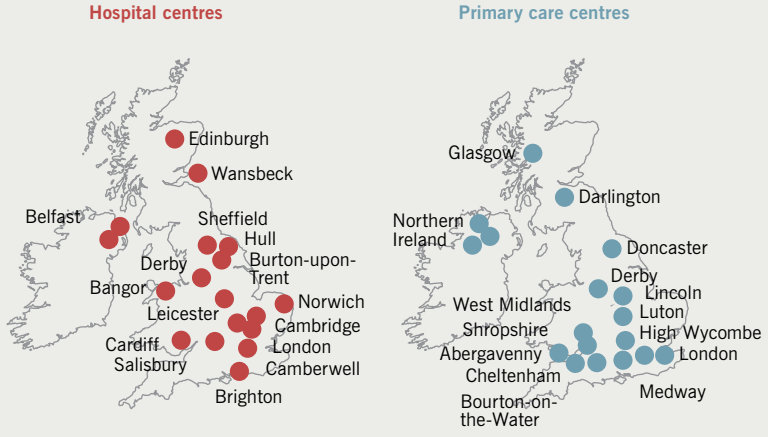
Background

Statins are first choice for treatment of dyslipidaemia in both secondary and primary cardiovascular disease prevention. For every 1.0 mmol/L reduction in low-density lipoprotein cholesterol (LDL-C), the risk of coronary heart disease (CHD) mortality decreases by 19% and overall mortality decreases by 12%.[1] Despite statin treatment, a substantial number of cardiovascular events still occur, and one reason may be persistent lipid abnormalities including total cholesterol and LDL-C not at target, or low levels of high-density lipoprotein cholesterol (HDL-C) or elevated triglycerides. Results from the DYSlipidaemia International Study (DYSIS) in 22,063 statin-treated patients across 11 European countries and Canada, assessed the prevalence and types of persistent lipid abnormalities in patients receiving statin therapy, in both secondary and primary care settings.[2] In this paper we report the UK results.

Methods

DYSIS was a multi-centre, cross-sectional, observational study of the lipid profile of statin-treated outpatients and the study design, methods and principal results are published.[2] Outpatients under the care of a specialist or primary care physician were eligible for inclusion if they were ≥45 years old, had been receiving statin therapy for ≥3 months, and had ≥1 documented fasting blood lipid profile performed while on statins. Consecutive patients, fulfilling these inclusion criteria, who visited their specialist or primary care physician for whatever reason during a six-month recruitment period were invited to participate. Routinely collected data from patient medical records were used, including the most recently recorded lipid parameters from the previous 6–12 months for total cholesterol, LDL-C, HDL-C, and triglycerides.

Figure 1. Participating centres in the UK



Results

A total of 1,277 statin-treated patients with a clinical diagnosis of coronary or other atherosclerotic disease, or at high risk of developing cardiovascular disease (CVD), were recruited from 19 hospital and 19 primary care centres across the UK (**figure 1**). The patient characteristics are presented in **table 1**: 44.3% of patients had a history of coronary artery disease, 5.4% cerebrovascular disease and 3.4% peripheral artery disease.

Lipid-lowering treatment

All patients were taking a statin.

Lipid abnormalities

The distribution of single and combined lipid abnormalities in patients with a total lipid profile is shown in **figure 2**: 25.3% of patients had no lipid abnormalities and the rest had either an elevated LDL-C (≥2.0 mmol/L) or low HDL-C (<1.0 mmol/L men and <1.2 mmol/L women) or elevated fasting triglycerides (≥1.7 mmol/L) or a combination of these abnormalities. Overall, 56.1% of patients had LDL-C ≥2.0 mmol/L, 35.7% had low HDL-C and 35.6% had an elevated triglyceride level. In addition, 25.1% had a total cholesterol/HDL-C ratio ≥4.0. The proportion of patients at the total and LDL-C goals, the proportion with normal HDL-C and the proportion with normal triglycerides are shown in **figure 3.**

Discussion

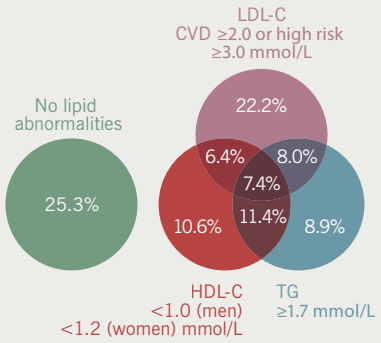
Joint British Societies' guidelines (JBS2) defined the same lipid targets for patients with atherosclerotic vascular disease, and those at high risk of developing CVD, namely a total cholesterol of <4.0 mmol/L and <2.0 mmol/L for LDL-C.[3] The same targets for coronary patients were subsequently recommended by the National Institute for Health and Care Excellence

Table 1. Patient characteristics

Age, years (mean ± SD)	63.5 ± 9.1
Female, %	34.1
Family history premature CHD, %	68.6
Current smokers, %	16.9
Hypertension, %	60.1
Ischaemic heart disease, %	44.3
Diabetes, %	27.1
Cerebrovascular disease, %	5.4
Peripheral artery disease, %	3.4
Waist circumference, cm (mean ± SD)	99.3 ± 14.3
BMI, kg/m^2 (mean ± SD)	29.4 ± 5.5
BMI ≥30 kg/m^2, %	39.4
LDL-C, mmol/L (mean ± SD)	2.2 ± 0.8
HDL-C, mmol/L (mean ± SD)	1.3 ± 0.4
TC, mmol/L (mean ± SD)	4.3 ± 1.0
TG, mmol/L (median IQR)	1.4 (1.0-2.0)

Key: BMI = body mass index; CHD = coronary heart disease; HDL-C = high-density lipoprotein cholesterol; IQR = interquartile range; LDL-C = low-density lipoprotein cholesterol; SD = standard deviation; TC = total cholesterol; TG = triglycerides

Figure 2. Distribution of single and multiple combined lipid abnormalities in patients with total lipid profile (n=1,128)*

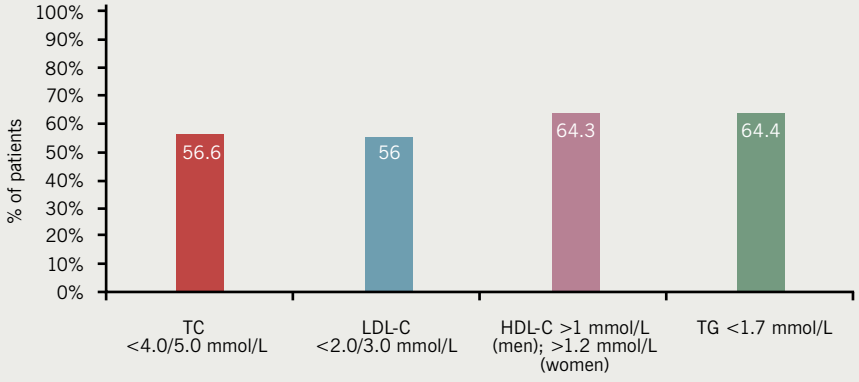


Lipid status	Normal HDL-C and TG	Low HDL-C (<1.0/1.2 mmol/L) and/or elevated TG (≥1.7 mmol/L)
LDL-C ≥2.0/3.0 mmol/L	22.2%	21.8%
LDL-C <2.0/3.0 mmol/L	25.3%	30.8%

*Prevalence based on JBS2 guidelines

Key: CVD = cardiovascular disease; HDL-C = high-density lipoprotein cholesterol; LDL-C = low-density lipoprotein cholesterol; TC = total cholesterol; TG = triglycerides

Figure 3. Total and LDL-cholesterol at goal/normal lipid levels in patients with total lipid profile



Key: HDL-C = high-density lipoprotein cholesterol; LDL-C = low-density lipoprotein cholesterol; TC = total cholesterol; TG = triglycerides

(NICE) lipid guidelines, although not for primary prevention. Yet a majority of these coronary and high-risk patients, despite being actively treated with a statin, are not achieving these targets. In addition, a substantial minority also have either low HDL-C and/or elevated fasting triglycerides, further increasing cardiovascular risk.

In ASPIRE-2-PREVENT, 92.8% of coronary patients were taking a statin and, yet, 56.1% were above the LDL-C target of <2.0 mmol/L. In high-risk patients, only 61.2% were taking a statin and 74.8% were above the same LDL-C target.[4] Therapeutic control in those taking a statin was also poor with only 44.7% of coronary patients below the LDL-C target, and 36.8% of high-risk patients for the same target.

In conclusion, these results continue to demonstrate the need for more intensive and comprehensive lipid management, especially of LDL-C, and where the target is not achieved with a high-intensity statin then combination lipid-lowering therapy should be considered. Other aspects of dyslipidaemia, including low HDL-C and elevated triglycerides, may also require a therapeutic strategy beyond statins, but this requires further evidence from randomised-controlled trials

References

1. Cholesterol Treatment Trialists' (CTT) Collaboration. Efficacy of cholesterol-lowering therapy in 18,686 people with diabetes in 14 randomised trials of statins: a meta-analysis. *Lancet* 2008;**371**:117–25. http://dx.doi.org/10.1016/S0140-6736(08)60104-X

2. Gitt AK, Drexel H, Feely J *et al.* Persistent lipid abnormalities in statin-treated patients and predictors of LDL-cholesterol goal achievement in clinical practice in Europe and Canada. *Eur J Prev Cardiol* 2012;**19**:221–30. http://dx.doi.org/10.1177/1741826711400545

3. British Cardiac Society, British Hypertension Society, Diabetes UK *et al.* JBS2: Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice. *Heart* 2005;**91**(suppl 5):v1–v52. http://dx.doi.org/10.1136/hrt.2005.079988

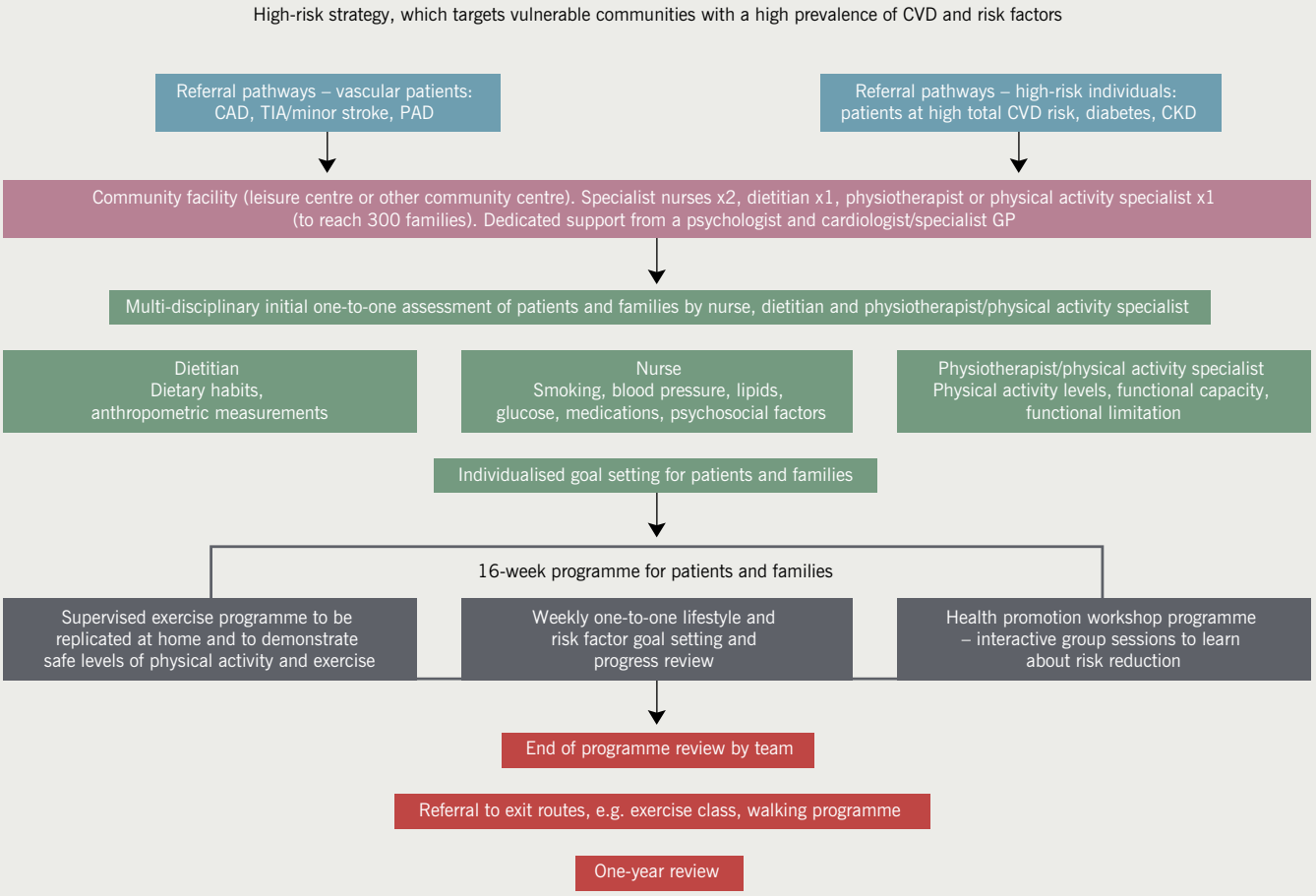
4. Kotseva K, Jennings CS, Turner EL *et al.*; ASPIRE-2-PREVENT Study Group. ASPIRE-2-PREVENT: a survey of lifestyle, risk factor management and cardioprotective medication in patients with coronary heart disease and people at high risk of developing cardiovascular disease in the UK. *Heart* 2012;**98**:865–71. http://dx.doi.org/10.1136/heartjnl-2011-301603

The principles of MyAction

Catriona Jennings, Alison Atrey, Jennifer Jones, Kornelia Kotseva, David A Wood, on behalf of the MyAction Central team

1. The programme is implemented according to national evidence-based guidelines and local policies.
2. The programme integrates primary and secondary prevention in one programme and recruits all those who will benefit the most, i.e. patients with vascular disease, those at high risk of developing disease, and the close family members of the above, and takes into account the groups in which the prevalence of cardiovascular disease and risk factors is the highest.
3. The programme is family centred and so recruits the spouse and/or others close to the patient in order to maximise the potential for adoption of positive healthy behaviours.
4. Wherever possible, the programme is based in a community setting and adopts a flexible approach, which allows easy access to the people from the community targeted for the intervention, especially when that community includes vulnerable and deprived groups.
5. The focus of the programme is on the promotion of healthy lifestyle habits using behavioural strategies and expertise from a multi-disciplinary team (nursing, dietetics, physiotherapy, exercise, psychology, cardiology).
6. Effective prescribing of cardioprotective medications is ensured with the use of protocols to facilitate the management of blood pressure, lipids and diabetes to goal, and also with dedicated nurse prescribers, cardiologists and general practitioners

The MyAction model of preventive cardiology care



Key: CAD = coronary artery disease; CKD = chronic kidney disease; CVD = cardiovascular disease; GP = general practitioner; PAD = peripheral arterial disease; TIA = transient ischaemic attack

Delivering the MyAction programme in different populations: NHS Westminster, London

Susan Connolly, Adrian Brown, Sarah-Jane Clements, Christine Yates, Kornelia Kotseva, on behalf of Westminster MyAction teams

MyAction Westminster: background

In response to the Department of Health (DoH) policy document *Putting Prevention First*,[1] NHS Westminster launched its Health Checks programme in primary care in 2009. The MyAction Westminster programme was concomitantly commissioned by NHS Westminster so that those individuals identified to be at high cardiovascular disease (CVD) risk through the Health Checks could access, with their families, an effective vascular prevention programme that would help them achieve measurably healthier lives. Imperial College Healthcare NHS Trust were successful in becoming the providers of the programme with an annual budget of £1.3 million for three years, and the programme is delivered in partnership with Imperial College.

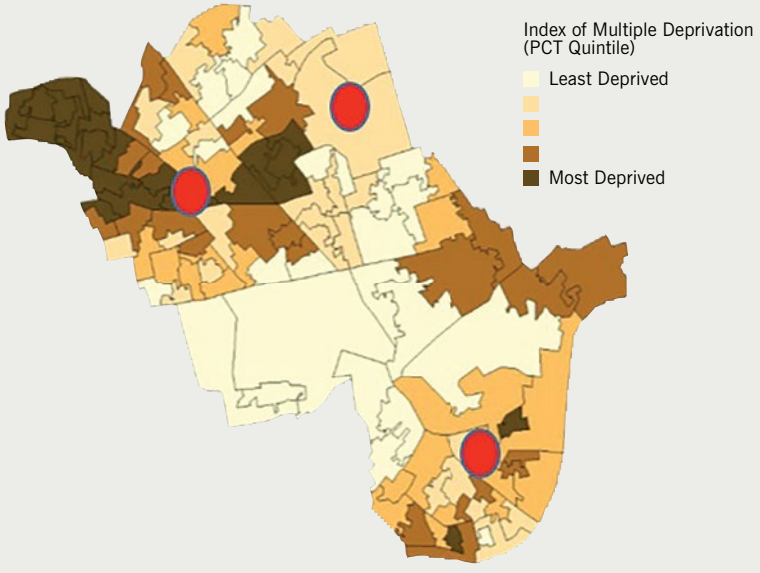
The Borough of Westminster

Westminster has a population of over 230,000, although the weekday daytime population may swell to as high as one million. Cardiovascular disease is the leading cause of premature death (below age 75 years) in Westminster, and is also the principle contributor to a 10-year gap in life expectancy that exists between the most affluent and most deprived areas (the borough is ranked 72 out of 354 local authorities in England in terms of deprivation).[2] In addition, the borough is an ethnically and culturally diverse area with an estimated 29% of the population belonging to black and minority ethnic groups (BME) and over 100 different languages are spoken throughout the borough. The largest BME groups are South Asian, Arabic and Black, respectively. South Asian Indians in the UK are well recognised as having a much higher incidence of coronary heart disease, whereas black patients have a higher risk of stroke.[3,4] The reasons for increased CVD risk in these ethnic groups remain incompletely understood, although traditional cardiovascular risk factors are still recognised to play an important role, as well as cultural and lifestyle factors.[3]

Structure of MyAction Westminster programme

The programme is led by a central coordinating team based in Imperial College Healthcare NHS Trust. The programme is delivered in three community-based hubs in the north, south and west of the borough (**figure 1**), with deliberate siting of several of the hubs in areas of social deprivation where there are large BME communities. Each hub includes a full multi-disciplinary team, which consists of two cardiovascular nurse specialists, a full-time dietitian, physical activity specialist and administrator, supported by a visiting cardiologist (Dr Kornelia Kotseva) and clinical psychologist. The teams were trained by the MyAction Imperial College academic team, who also provide regular mentoring and quality assurance visits to ensure that the programme is delivered to preset protocols and standards.

Figure 1. The MyAction Westminster sites superimposed on a map of Westminster stratified by Index of Multiple Deprivation whereby the darker the colour the higher the deprivation score



© NHS Westminster Public Health Intelligence

Figure 2. The MyAction supervised exercise class

Figure 3. The MyAction weekly education class

A truly panvascular prevention programme

The setting up of the programme was seen as an ideal opportunity to streamline preventive cardiovascular care across the borough, with the subsequent integration of the existing hospital-based cardiac rehabilitation programme into the community-based MyAction Westminster programme. In addition, as patients with other forms of atherosclerosis, such as transient ischaemic attack (TIA) or peripheral arterial disease (PAD), rarely have access to effective prevention programmes, despite being at even higher cardiovascular disease risk,[5,6] referral pathways from the acute stroke and vascular surgical services were also formalised. Referrals from primary care are principally through the NHS Health Checks service. From 2013 all primary care practices in Westminster have been offered an electronic 'Preventative Medicine Pod', which is specifically designed to assist in practice public health interventions (including the Health Check) and enables automatic electronic referral to the MyAction programme. The 'inclusive nature' of the MyAction programme, whereby all individuals with either established atherosclerotic disease or who are at high risk for developing disease are managed in the community by the same service with all their risk factors being addressed under the one roof, is what makes MyAction Westminster truly unique – and an excellent example of what the recent CVD Outcomes strategy aspires to.[7]

What are the MyAction Westminster service aims and objectives?

- To help individuals and their families reduce their risk of vascular disease through healthy lifestyle changes (stopping smoking, making healthy food choices, engaging in regular physical activity), management of their medical risk factors (blood pressure, lipids and glucose) and also the promotion of psychological well-being.
- To help reduce health inequalities by focusing efforts in areas of social deprivation and where there is a high prevalence of ethnic minorities, identified by NHS Westminster.
- To deliver a programme:

  1. That is tailored to meet the needs of individual patients and their families
  2. That is socially and culturally appropriate
  3. That is located in the heart of these communities.

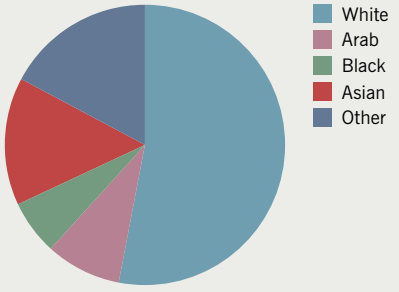
- To help ensure that changes made during the programme are maintained in the longer term:

  1. Through use of proven self-efficacy techniques for behaviour change
  2. Completion of a one-year follow-up
  3. Signposting of the use of appropriate exit strategies
  4. Provision of a dedicated phase IV exercise service.

The MyAction weekly timetable

Following referral, patients and their partners are invited to attend a comprehensive baseline initial assessment at one of the MyAction centres (**figure 2**). At the end of the programme, the patients will have a further assessment, which is repeated at the end of one year. MyAction Westminster offers both morning and afternoon appointments in one of the 14 clinics that run during the week. The patients are then invited to attend the weekly health promotion session, which includes a review of progress, supervised exercise plus

Figure 4. Ethnicity of patients attending the MyAction programme



an education/health promotion component. Each session lasts approximately two hours and patients are encouraged to attend for a maximum of 16 weeks. At present, there are nine health promotion sessions running across the borough that take place in the morning, afternoon and evening to provide maximum access to the programme.

Measuring clinical activity and patient satisfaction

MyAction Westminster has its own dedicated web-based secure database where patient records are held, including demographics and clinical measurements. This permits audit of the programme's activity and clinical outcomes on a regular basis, the latter being benchmarked against existing national targets. Data (on coronary patients only) are also electronically 'patched' to the National Audit of Cardiac Rehabilitation so that double entry of data is not required. Patient satisfaction is tracked through an electronic tablet device that patients fill in after each visit. This contains generic questions that are Trust-specified, and also questions that are specific to the MyAction programme.

Challenges faced in setting up the programme

The identification of suitable community venues where all the programme's requirements could be met, including the provision of adequate clinical and exercise space, was challenging, particularly as Westminster contains some prime London property spots. Ultimately, however, suitable community hubs were established, two of which are co-located with other primary care services, and the three exercise venues are ideally located in public leisure facilities (**figure 3**).

Another challenge that was overcome was the interfacing of the MyAction database with Trust data services, and the provision of secure communications lines (e.g. NHS N3) in community sites, ensuring that the MyAction database met Trust IT governance requirements.

Initially, to help engage primary care colleagues, the MyAction teams assisted with the delivery of Health Checks in primary care. This helped to establish relationships and engage the programme's largest stakeholder. Engaging with patients from BME groups was also key and achieved through training of staff to be culturally appropriate (e.g. the dietitians were trained in details of typical South Asian and Afro-Caribbean diets), provision of an interpreter at all appointments (including the exercise class), provision of British Heart Foundation materials in the patients' language, and particularly through establishing links with community groups who were able to promote the programme locally in their communities.

Progress to date

Over 3,000 have been received to date by the programme, with approximately 60% being from primary care and 40% from secondary care. Uptake of the programme is high at ~75% of those referred. Of those who attend for an initial assessment, one in two are from BME groups (principally South Asian, Arabic and Black), showing that the programme is indeed engaging with priority groups (**figure 4**). The principle results of the programme to date, in terms of clinical and patient-reported outcomes, will be published in a peer-reviewed paper shortly

References

1. Department of Health. Putting prevention first. NHS Health Check: vascular risk assessment and management. Best practice guidance. London: DoH, April 2009. Available from: http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_098410.pdf

2. Public Health England. Local health. Available from: http://www.localhealth.org.uk/#sly=ltla_2012_DR;z=514455,199252,26082,36873;sid=325;l=en;v=map8 [accessed September 2013].

3. Cappuccio FP. Ethnicity and cardiovascular risk: variations in people of African ancestry and South Asian origin. *J Hum Hypertens* 1997;**11**:571–6.

4. Khunti K, Samani NJ. Coronary heart disease in people of South-Asian origin. *Lancet* 2004;**364**:2077–8. http://dx.doi.org/10.1016/S0140-6736(04)17563-6

5. Alberts MJ, Bhatt DL, Mas JL *et al*. Three-year follow-up and event rates in the international REduction of Atherothrombosis for Continued Health Registry. *Eur Heart J* 2009;**30**:2318–26. http://dx.doi.org/10.1093/eurheartj/ehp355

6. Mechtouff L, Touze E, Steg PG *et al*. Worse blood pressure control in patients with cerebrovascular or peripheral arterial disease compared with coronary artery disease. *J Intern Med* 2010;**267**:621–33. http://dx.doi.org/10.1111/j.1365-2796.2009.02198.x

7. Department of Health. Cardiovascular disease outcomes strategy: improving outcomes for people with or at risk of cardiovascular disease. London: DoH, March 2013. Available from: https://www.gov.uk/government/publications/cardiovascular-disease-outcomes-strategy-improving-outcomes-for-people-with-or-at-risk-of-cardiovascular-disease

Delivering the MyAction programme in different populations: Galway, Republic of Ireland

Irene Gibson, James Crowley, Jennifer Jones, Claire Kerins, Anne Marie Walsh, Caroline Costello, Jane Windle, Gerard Flaherty, on behalf of Croí MyAction team

Background

Cardiovascular disease (CVD) is the single most common cause of death in Ireland, with diseases of the circulatory system accounting for 33.5% of deaths.[1] While there has been a significant decline in death rates over the last 30 years, CVD mortality rates in Ireland remain high in comparison with European averages.[2] There is compelling evidence that managing risk factors through lifestyle intervention and cardioprotective drug management can reduce cardiovascular morbidity and mortality by up to 90%.[3] In Ireland, high-risk approaches to prevention have traditionally targeted those with established heart disease, yet there are many asymptomatic individuals with multiple risk factors whose risk is similar to those who have overt heart disease but go unrecognised. With a high prevalence of risk factors in the Irish population,[4,5] the need to develop an effective model of prevention that would include asymptomatic individuals at high multi-factorial risk was urgent. In response to this need, Croí, an Irish heart and stroke charity, wanted to develop an effective, evidence-based intervention that would help individuals reduce their CVD risk. In 2009, following a successful business case submission to Galway Primary Community and Continuing Care, HSE (Health Service Executive) West, 'Croí MyAction' a nurse-led, community-based, multi-disciplinary CVD prevention programme was established in Galway on the West coast of Ireland.

What is 'Croí MyAction'?

'Croí MyAction' is a 12–16 week vascular prevention programme with an emphasis on lifestyle modification (smoking cessation, healthy food choices and physical activity), medical risk factor management (blood pressure, lipids and glucose) and the prescription of cardioprotective medication, where appropriate. The programme is coordinated by a specially trained multi-disciplinary team (MDT), which includes a nurse specialist, dietitian, physiotherapist, physical activity specialist and physician.

The Croí Heart and Stroke Centre

Programme recruitment

In establishing the programme, the key stakeholders were engaged from the outset, these included hospital departments (cardiology, vascular, stroke and diabetes), general practice (GPs and practice nurses), public health consultants, primary care services and representatives from relevant community groups. A standardised and efficient referral pathway was agreed, whereby high-risk individuals (score ≥5%,[6] type 2 diabetes, peripheral arterial disease) are referred to the programme through a series of pathways, which include general practice and hospital departments, such as cardiology, vascular and endocrinology. Recently, the referral pathway has been expanding to include transient ischaemic attack (TIA) and stroke patients. To date, the majority of referrals come from general practice, with 80% of GPs in the catchment area of Galway referring. Developing a strong communication link has been critical to achieving these high referral rates, and this involves regular meetings and working with referral sources in identifying high-risk patients in their practice or clinic.

One of the key objectives of the programme is to address health inequalities, thus, recruitment is targeted at high-risk, lower socioeconomic groups, such as the travelling community, low income farmers and those living in rural isolation or areas of known deprivation. Using specific pre-screening criteria, opportunistic screening and health checks were offered in local community settings, e.g. supermarkets, community centres and farmers' markets, which proved to be an effective way of reaching those most at risk. In addition, the programme was promoted using social media, radio, press, public meetings and other communication channels. This targeted approach has been successful, with 34% of patients recruited having a GMS (General Medical Scheme) card, which is a measure of socioeconomic status in Ireland.

Table 1. Characteristics of patients and partners at baseline

	Patients	Partners
Smoking		
% of current smokers	19.1%	15.3%
Blood pressure		
% BP not to target (>140/90 mmHg for high-risk individuals and >130/80 mmHg for coronary/diabetes)	50.6%	26.7%
Cholesterol		
% cholesterol not to target (TC >5 mmol/L and LDL >3 mmol/L)	64.5%	61.6%
Anthropometrics		
% BMI ≥25 kg/m^2 (overweight)	95.0%	80.3%
% BMI ≥30 kg/m^2 (obese)	68.7%	47.8%
% waist circumference not at target (male ≥94 cm and females ≥80 cm)	97.7%	88.6%
Diet		
Mediterranean score, mean	4.0	4.0
% fruit and vegetable target – 5 portions/day	11.1%	15.0%
Physical activity		
% not achieving targets (≥5 times/week ≥30 minutes)	86.6%	77.9%
Psychosocial risk factors		
% with anxiety ≥8	37.9%	32.7%
% with depression ≥8	22.1%	19.2%

Key: BMI = body mass index; BP = blood pressure; LDL = low-density lipoprotein cholesterol; TC = total cholesterol

Outcomes

The Croí MyAction programme is protocol driven, and outcomes are measured both at end of programme (16 weeks) and at one year. They include the primary end points for lifestyle, risk factor and therapeutic goals, as recommended by the European Society of Cardiology and Joint British Societies' guidelines (JBS2) for blood pressure.[6,7]

The programme is successfully recruiting participants and partners with a multiple of risk factors, as is evident in **table 1**, and is demonstrating significant outcomes for lifestyle, biomedical measures and psychosocial indices, for both patients and partners, at end of programme and at one year.[8] The uptake and retention rates are high, with 92.7% of eligible participants attending the initial assessment, 87.2% completing the programme and 93.6% of those who completed the programme attending the one-year follow-up assessment. These rates compare favourably with the 38% cardiac rehabilitation uptake rates in the UK.[9] The mean age of participants was 57.5 years, with 49.4% being male. Of those who attended the initial assessment, there was a 61% uptake of partners among those who had a partner to bring.

The majority of patients attending the Croí MyAction programme are obese (**table 1**), with obesity levels exceeding the national figures for a similar age category in both men (49%) and women (43%) in the general population.[4] The Croí MyAction programme is successfully tackling obesity as part of its multi-factorial approach to risk factor management, with significant reductions in body mass index (BMI) and abdominal obesity being achieved. There was increased adherence to the cardioprotective diet, with the observed improvements in the Mediterranean score being associated with a 9% reduction in total mortality, CVD mortality and a 6% reduction in cancer.[10] The increase in those achieving physical activity targets can be associated with a 20–30% reduction in CVD events.[11] The smoking quit rate compares favourably with specialist smoking cessation programmes in the UK.[12] There were significant improvements in blood pressure and cholesterol, the benefits of which are well established. There were also significant reductions in anxiety levels and depression levels, demonstrating the positive effect that a healthy lifestyle can have on quality of life and symptoms of anxiety and depression.[13-15] If the improvements achieved on this programme could be sustained, future CVD mortality would be reduced.

The success of Croí MyAction is due to a number of key features, which make the programme unique and innovative. Croí MyAction integrates the care of many high-risk priority patient groups for prevention and does not just care for those with established disease, as has happened in the past. This is the first time this type of 'all-inclusive'

The Croí MyAction team

Croí Nurse Coordinator Anne Marie Walsh with Croí MyAction participants

Croí MyAction Programme Manager, Irene Gibson

approach to CVD prevention has been adopted in Ireland. The programme is community-based and, thus, easily accessible to the target population, which may account for the high attendance and retention rates. Its multi-disciplinary approach places a strong emphasis on promoting healthy lifestyle habits, recognising that addressing and managing complex lifestyle behaviours requires expertise from a variety of healthcare professionals. The programme is family-based, recognising that risk factors cluster in families, and healthy lifestyle change is easier to achieve if the family changes together.[16] The success of the programme as a family-based intervention was borne out by the striking similar changes achieved by partners, compared with patients, across all risk factors.

Conclusion

'Croí MyAction' is the first and only preventive cardiovascular programme of its kind in Ireland, and already incorporates many important principles that are recommended by the recent National Cardiovascular Health Policy.[2] It is setting new standards of preventive cardiovascular care, which have been recognised through the receipt of a number of Irish Healthcare Awards. In developing excellence in CVD prevention, the programme has prompted a number of professional educational initiatives, these include the development of a specialist study module in preventive cardiology for undergraduate medical students at the National University of Ireland (NUI) Galway, short courses in diabetes and weight management, and plans are currently underway to develop a Masters programme in CVD Prevention at NUI Galway

Acknowledgements

We are grateful for the contributions of Deirdre Henry, Croí MyAction Programme Administrator, Neil Johnson, CEO Croí, West of Ireland Cardiac Foundation, Newcastle, Galway, and Croí MyAction programme participants.

Funding

Croí MyAction is funded by Croí the West of Ireland Cardiac Foundation. Part funding has been received from HSE (Health Service Executive) West, Primary Community and Continuing Care, Galway, Ireland and through an educational grant from MSD Ireland.

References

1. Central Statistics Office. Press release report on Vital Statistics 2009. Cork: Central Statistics Office, 2009. Available from: http://www.cso.ie/en/newsandevents/pressreleases/2012pressreleases/pressrelease reportonvitalstatistics2009/

2. Department of Health. Changing cardiovascular health. National cardiovascular health policy 2010–2019. Dublin: Government Publications, 2010. Available from: http://www.headway.ie/download/pdf/changing_cardiovascular_health.pdf

3. Yusuf PS, Hawken S, Ôunpuu S *et al*. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004;**364**:937–52. http://dx.doi.org/10.1016/S0140-6736(04)17018-9

4. Morgan K, McGee H, Watson D *et al*. SLÁN 2007 survey of lifestyle, attitudes and nutrition in Ireland. Main report. Dublin: Government Publications, 2008. Available from: http://www.dohc.ie/publications/slan07_report.html [accessed August 2013].

5. Gibson I. Heart Smart. A two year report on a community based cardiovascular disease prevention programme in the West of Ireland. Galway: Croí West of Ireland Cardiology Foundation, 2008. Available from: http://www.croi.ie/sites/files/croi/HeartSmartReport.pdf [accessed 29 August 2013].

6. Perk J, De Backer G, Gohlke H *et al*. European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts). *Eur Heart J* 2012;**33**:1635–701. http://dx.doi.org/10.1093/eurheartj/ehs092

7. British Cardiac Society, British Hypertension Society, Diabetes UK *et al*. JBS2: Joint British Societies' guidelines on prevention of cardiovascular disease in clinical practice. *Heart* 2005;**91**(suppl 5):v1–v52. http://dx.doi.org/10.1136/hrt.2005.079988

8. Gibson I, Flaherty G, Cormican S *et al*. Translating guidelines to practice: findings from a multidisciplinary preventive cardiology programme in the west of Ireland. *Eur J Preventive Cardiol* 2013;published online. http://dx.doi.org/10.1177/2047487313498831

9. British Heart Foundation. The National audit of cardiac rehabilitation. Annual statistical report 2009. London: BHF, 2009. Available from: http://www.cardiacrehabilitation.org.uk/docs/2009.pdf

10. Sofi F, Cesari F, Abbate R, Gensini GF, Casini A. Adherence to Mediterranean diet and health status: meta-analysis. *BMJ* 2008;**337**:a1344. http://dx.doi.org/10.1136/bmj.a1344

11. Manson JE, Greenland P, LaCroix AZ *et al*. Walking compared with vigorous exercise for the prevention of cardiovascular events in women. *N Engl J Med* 2002;**347**:716–25. http://dx.doi.org/10.1056/NEJMoa021067

12. The NHS Information Centre, Lifestyle Statistics. Statistics on NHS Stop Smoking Services: England, April 2009–March 2010. London: The Health and Social Care Information Centre, 2010. Available from: https://catalogue.ic.nhs.uk/publications/public-health/smoking/nhs-stop-smok-serv-eng-2009-2010/nhs-stop-smok-serv-eng-2009-2010-rep.pdf

13. Conn VS. Depressive symptom outcomes of physical activity interventions: meta-analysis findings. *Ann Behav Med* 2010;**39**:128–38. http://dx.doi.org/10.1007/s12160-010-9172-x

14. Conn VS. Anxiety outcomes after physical activity interventions: meta-analysis findings. *Nurs Res* 2010;**59**:224–31. http://dx.doi.org/10.1097/NNR.0b013e3181dbb2f8

15. Kuczmarski MF, Cremer SA, Hotchkiss L, Cotugna N, Evans MK, Zonderman AB. Higher Healthy Eating Index-2005 scores associated with reduced symptoms of depression in an urban population: findings from the Healthy Aging in Neighborhoods of Diversity Across the Life Span (HANDLS) study. *J Am Diet Assoc* 2010;**110**:383–9. http://dx.doi.org/10.1016/j.jada.2009.11.025

16. Pyke SDM, Wood DA, Kinmonth AL, Thompson SG. Change in coronary risk and coronary risk factor levels in couples following lifestyle intervention. The British Family Heart Study. *Arch Fam Med* 1997;**6**:354–60. Available from: http://triggered.stanford.clockss.org/ServeContent?url=http%3A%2F%2Farchfami.ama-assn.org%2Fcgi%2Freprint%2F6%2F4%2F354

SPONSORED SUPPLEMENT

Training opportunities in preventive cardiology: MSc, Diploma and Certificate in Preventive Cardiology

Jennifer Jones, Suzanne Barr, Catriona Jennings, Tim Grove, Kornelia Kotseva, Susan Connolly, Anne Dornhorst, Gary Frost, Paul Bassett, David A Wood

Introduction

The scientific evidence for cardiovascular (CVD) disease prevention is compelling but, as demonstrated by the EUROASPIRE and ASPIRE-2-PREVENT surveys, translating this evidence into effective patient care in the real-world in clinical practice is challenging.[1,2] However, the same academic group have undertaken a number of trials and have shown that it is possible to implement national and international clinical guidelines and achieve the lifestyle, medical and therapeutic targets associated with reduced cardiovascular events and improved health outcomes.[3-5] In recognising the need to bridge the implementation gap for prevention and control of cardiovascular diseases, the combined research, teaching and clinical expertise at the National Heart and Lung Institute of Imperial College London launched a Masters (MSc), Postgraduate Diploma (PGDip) and Postgraduate Certificate (PGCert) in Preventive Cardiology. This programme was initiated in October 2008, offers many unique features and consequently remains the only one of its kind worldwide (**box 1**).

Programme content

The scientific foundation of the programme is lifestyle change (smoking cessation, healthy food choices and physical activity) through behavioural approaches, together with weight management, medical management of blood pressure, blood lipids and blood glucose, and use of cardioprotective drug therapies. All students complete a core compulsory module entitled *'Preventive Cardiology Theory and Practice'*, which includes six themes (**box 2**). These themes are then explored in greater detail in specialist optional modules. Students, depending on the direction of their studies, also engage in modules in clinical practice (clinical placements), research methods and complete an original research project in the field of preventive cardiology.

Blended programme

This programme aims to be flexible and accommodate each individual's needs, this arrangement is particularly important for those who are at work and also studying in the programme. Each module starts with a block of face-to-face teaching followed by a number of purposefully designed online learning resources. All of these teaching sessions are recorded using lecture captures,

Box 1. Preventive cardiology at Imperial College London

Unique qualities creating a highly fulfilling student experience

Interdisciplinary and international: Inclusive of health professionals from a variety of backgrounds from all over the world

Flexible learning: All programmes include a taught component, which is combined with online learning, enabling students to work flexibly around other commitments. Students are able to interact with their tutors and fellow students via an advanced online virtual learning environment

Comprehensive and integrated: Our programme includes all aspects of preventive cardiology to include patients with established atherosclerotic disease, the relatives of patients with premature atherosclerotic disease, and also individuals who are asymptomatic, for example those with diabetes and those who are at high multi-factorial risk for cardiovascular disease

Knowledge, practical application and research skills acquisition: Clinical placements are completed across key areas of preventive cardiology practice, e.g. cardiovascular risk reduction clinics, cardiac rehabilitation, diabetes and heart failure, providing the opportunity to be immersed in the practicalities of current service delivery, rather than only learning the theory. The research component provides a strong foundation in practical use of research methods in preventive cardiology, and the translation of research evidence into best practice

Interaction with world leaders: Our teaching faculty comprises national and international leaders and clinical specialists from cardiology, nursing, nutrition, exercise and behavioural medicine. Our programme is based in the International Centre for Circulatory Health and, as a result, draws on considerable teaching expertise and provides high-quality research opportunities in a range of relevant subjects. We also have an expert lecture series allowing our students to interact with world leaders in the prevention and management of cardiovascular disease

Imperial College London: Imperial College has a world-renowned reputation and is currently rated in the top 10 universities worldwide

giving our part-time students some flexibility to either attend or alternatively participate via our monitored virtual-learning environment at a convenient time to each individual (**figure 1**).

Centres of excellence in preventive cardiology

This programme aims to produce graduates equipped to fill specialist posts and set up centres of excellence in preventive cardiology by combining knowledge and skill acquisition with real-world application and research practice – ambassadors of preventive cardiology trained to 'raise the standards of care in the prevention and management of cardiovascular disease'.

For further information contact: preventive.cardiology@imperial.ac.uk or visit:

http://www1.imperial.ac.uk/medicine/teaching/postgraduate/preventivecardiology/

Box 2. Main themes of study

- Risk estimation
- Smoking cessation interventions
- Nutrition and weight management
- Physical activity and exercise
- Prevention and management of diabetes
- Medical risk factor management and cardioprotective drug therapies

Graduates of the preventive cardiology course

"Despite medical training this programme has provided me with a lot of information related to cardiovascular disease I had never encountered before. It has made me look at my practice and delivery in a new perspective"

Graduates of the Imperial College course enjoyed:

- Flexible mobile learning at a distance
- Virtual lectures with specialist recordings
- Interactive e-tasks to consolidate learning

References

1. Kotseva K, Wood D, De Backer G *et al.*; EUROASPIRE Study Group. Cardiovascular prevention guidelines in daily practice: a comparison of EUROASPIRE I, II, and III surveys in eight European countries. *Lancet* 2009;**373**:929–40. http://dx.doi.org/10.1016/S0140-6736(09)60330-5

2. Kotseva K, Jennings CS, Turner EL *et al.*; ASPIRE-2-PREVENT Study Group. ASPIRE-2-PREVENT: a survey of lifestyle, risk factor management and cardioprotective medication in patients with coronary heart disease and people at high risk of developing cardiovascular disease in the UK. *Heart* 2012;**98**:865–71. http://dx.doi.org/10.1136/heartjnl-2011-301603

3. Wood DA, Kotseva K, Connolly S *et al.*; EUROACTION Study Group. Nurse-coordinated multidisciplinary, family-based cardiovascular disease prevention programme (EUROACTION) for patients with coronary heart disease and asymptomatic individuals at high risk of cardiovascular disease: a paired, cluster-randomised controlled trial. *Lancet* 2008;**371**:1999–2012. http://dx.doi.org/10.1016/S0140-6736(08)60868-5

4. Connolly S, Holden A, Turner E *et al.* MyAction: an innovative approach to prevention of cardiovascular disease in the community. *Br J Cardiol* 2011;**18**:171–6. Available from: http://bjcardio.co.uk/2011/08/myactionaninnovativeapproachtothepreventionofcardiovasculardisease/

5. Jennings CS, Kotseva K, De Bacquer D *et al.* EUROACTION preventive cardiology programme plus intensive smoking cessation with Varenicline. *Eur J Cardiovasc Nurs* 2012;**11**(suppl 1):S4. http://dx.doi.org/10.1177/1474515112441129