Cardio & Vascular Coalition
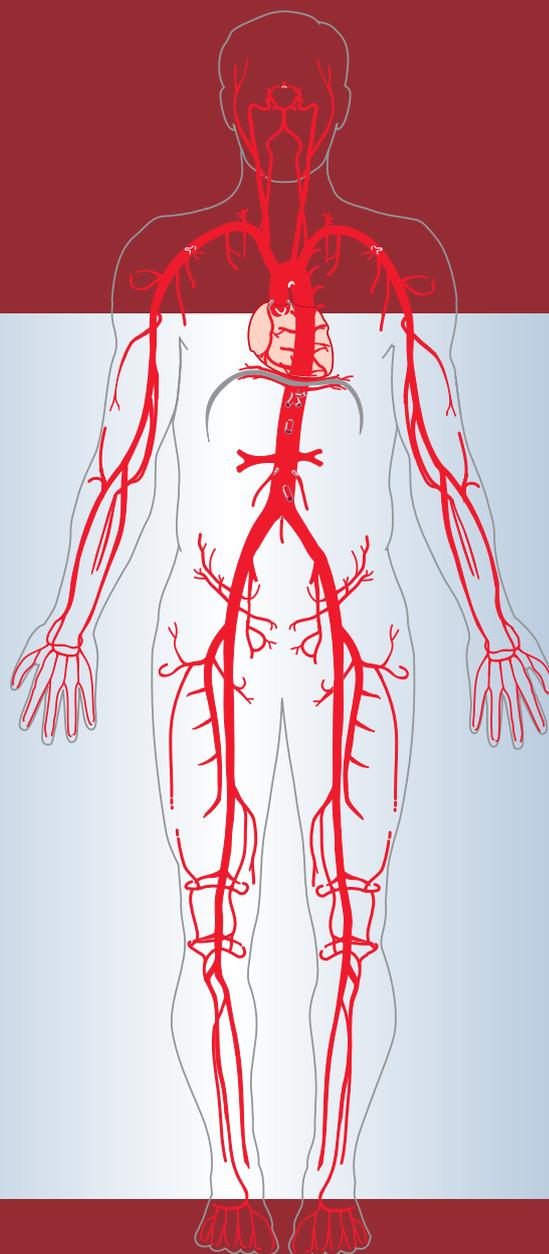
Cardiovascular Disease in England: Opportunities and Challenges Over the Next Ten Years

10 years

Cardiovascular Disease in England:
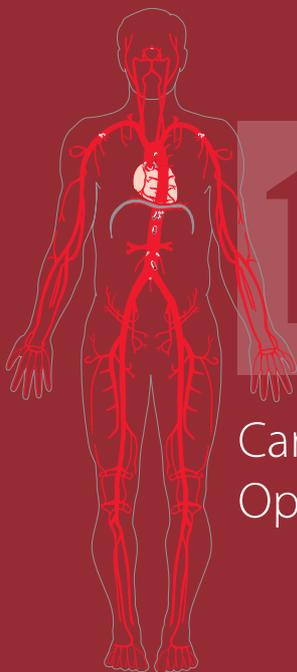# Opportunities and Challenges Over the Next Ten Years

YORK
Health Economics
C O N S O R T I U M

CARDIO & VASCULAR COALITION

Cardiovascular Disease in England: Opportunities and Challenges Over the Next Ten Years

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INVESTOR IN PEOPLE

THE UNIVERSITY *of York*

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Foreword

Cardio & Vascular Coalition

**Cardiovascular Disease in England: Opportunities and Challenges
Over the Next Ten Years
York Health Economics Consortium**

There is no doubting the progress made in the fight against cardiovascular disease in England over the past decade. Premature death rates are down, waiting times for surgery have been slashed, smoking rates have reduced and better treatment, more specialists and new technologies are making real differences for people living with diseases of the heart and circulation.

But even the most avid supporters of cardiovascular services in England would be foolhardy to declare "mission accomplished." Cardiovascular disease remains the number one killer in England. While fewer people are dying prematurely from heart disease, stroke, diabetes and renal disease, more people are living with debilitating cardiovascular conditions. Set against this, the declining premature mortality rates are being threatened by rising levels of obesity. All of this has major consequences for our health care services.

The Cardio and Vascular Coalition (CVC) was formed in 2007. Our 31 members are committed to working with Government to ensure that developments in cardiovascular health are maintained and improved upon. We intend to produce a Cardiovascular Health Strategy for 2010 – 2020 that joins up prevention, diagnosis and care from pre-birth to end of life.

This report by the York Health Economics Consortium is a first step in this process. It highlights many of the strengths and weaknesses of existing services and some of the opportunities and threats that lie ahead. Much of the report is based on the views of eleven key figures and opinion formers in cardiovascular health. Their views represent a snapshot in time and we are therefore indebted to them for their contribution. Their views are wide ranging and sometimes contradictory. As the authors note, "the range of often conflicting views expressed by the experts helped to identify issues where more research is needed, and within which the CVC can focus its future activities." We hope that the views of these leaders in cardiovascular health and social care will stimulate discussion and debate.

This report, and the reaction it engenders, will help inform the next phase of CVC activity. In the autumn of 2008, we will be embarking on an ambitious national consultation exercise to confirm which elements should be in our Cardiovascular Health Strategy for 2010 – 2020. We look forward to your contribution.

Betty McBride
Chair, Cardio & Vascular Coalition

Executive Summary

1   BACKGROUND

The Cardio and Vascular Coalition (CVC) is a national coalition of 31 voluntary organisations with an interest in promoting and protecting cardiovascular health in England. The CVC has commissioned York Health Economics Consortium to undertake an independent review of the:

- Opportunities and challenges facing cardiovascular disease;
- Pressures that face people who care for, or live with, somebody diagnosed with a cardiovascular condition.

The project comprised three main approaches:

- Interviews with experts;
- Modelling exercise;
- Survey of people who care for, or live with, somebody diagnosed with a cardiovascular condition.

2   INTERVIEWS WITH EXPERTS

Eleven experts in cardiovascular disease, including several consultants, a primary care specialist nurse, academics and representatives from patient groups were interviewed by telephone. They were asked a series of questions focusing on the strengths, weaknesses, opportunities and threats that would affect cardiovascular disease over the next ten years.

Interviewees provided a varied range of responses in regard to all aspects of cardiovascular services. Key points included:

- Changes to the organisation of cardiovascular services, rather than development of new technologies, would have the biggest impact on cardiovascular services;
- Future cardiovascular strategies should focus on tackling the prevalence of cardiovascular risk factors through improved public health campaigns, education in schools, and the progression of screening and prevention services;
- Cardiovascular services need to focus future prevention strategies on marginalised groups, and ensure that adequate culturally and socially sensitive services are provided;
- Over the next ten years obesity would be the major contributor to an increasing prevalence of cardiovascular disease;
- Co-ordination between primary and secondary care, and between cardiovascular services and other specialists and services should be improved.

3 MODELLING EXERCISE

A model, based on the QRISK equation[1] was developed in MS Excel. It was populated with data from the Health Survey for England[2], the Office for National Statistics[3] and published journal articles. The model shows how changes in demographic and epidemiological trends influence risk of cardiovascular disease over time.

The model predicts that, at baseline, a total of 2.33 million people in England are at high risk of cardiovascular disease, this equates to 9.5% of the 35 - 74 year old population. If, over the next ten years, current levels of obesity were to rise in line with trends observed in the USA (i.e. a weight gain of 7kg for an average height man and 6kg for an average height woman), then in ten years time the predicted number of people at high risk of cardiovascular disease would increase to 2,432,077. To ameliorate this increase it would be necessary to reduce the proportion of adults in England who smoke by 2.9% each year, bringing the prevalence of smoking in England down from a current level of 22% to 15%.

4 CARER SURVEY

Questionnaires were circulated to people who had links with CVC member organisations. This suggests that respondents may be well-informed individuals who take a proactive interest in cardiovascular disease. However, it is not unreasonable to suggest that a number the issues faced by the respondents will also affect carers from a wider background.

Many of the reported difficulties focused around:

- Obtaining financial support (uncertainty about eligibility, complex forms, bureaucratic system);
- Fear of what the future might bring (in terms of not being able to cope with the increased disability the person to whom they provided care) and of losing their loved one;
- Coping with the way that their lives had changed due to becoming a carer. In particular, the restrictions on their day to day activities and the increased responsibility.

Changes that respondents felt would make caring for, or living with, somebody with a heart condition or stroke easier included:

- Greater access to advice from health care professionals with knowledge of the relevant condition;
- Better integration of care;
- More information about the cardiovascular condition and aftercare, especially at the time of the event. It was also suggested that more of the available information should be directed at the carer;
- Practical help with every day life, including:
  - Better access to personal care and household help;
  - Help with heavy tasks such as gardening and decorating;
  - Having a car for hospital appointments;

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[1] Hippisley-Cox J, Coupland C, Vinogradova Y, Robson J, May M, & Brindle P. Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: prospective open cohort study. British Medical Journal 2007; 335: 136.

[2] http://www.dh.gov.uk/en/Publicationsandstatistics/PublishedSurvey/HealthSurveyForEngland/index.htm (accessed March 2008).

[3] http://www.statistics.gov.uk (accessed March 2008).

- Better access to exercise facilities locally for both the person cared for and the carer, at reasonable cost;
- Access to respite care.

Acknowledgements

Section 1:   Introduction

1.1   BACKGROUND TO THE PROJECT

The Cardio and Vascular Coalition (CVC) is a national coalition of 31 voluntary organisations with an interest in promoting and protecting cardiovascular health in England. A list of the member organisations may be found in Appendix A. The CVC is committed to working with and influencing central and local government, health and social care commissioners, service planners and policy makers to ensure that cardiovascular health is high on their agendas. With the National Service Framework for Coronary Heart Disease due to conclude in 2009, the CVC is working to highlight the need for a comprehensive Cardiovascular Health Strategy for 2010 – 2020. The CVC intends to utilise this strategy to inform government policy and planning over the next decade, with the ultimate aim of improving population health and outcomes for people with cardiovascular conditions, their families and carers.

The CVC wants to see:

- A Cardiovascular Health Strategy for 2010 – 2020 that joins up prevention, diagnosis and care from pre-birth to end of life;
- Patients who are living with cardiovascular disease placed at the centre of policy and services to improve standards of care;
- Clinical and policy leadership on best practice at the national and local levels;
- A model to predict the future burden of cardiovascular disease both in terms of economic costs and quality of life;
- Action that addresses the inequalities that exist in cardiovascular disease, prevention, diagnosis and care;
- A renewed commitment to basic bio-medical and applied research that will improve the provision of cardiovascular services;
- Central government and local commissioners working closely with the voluntary sector in the planning and development of cardiovascular policy and services.

For more information on the Coalition see www.cardiovascularcoalition.org.uk

The CVC commissioned York Health Economics Consortium (YHEC) to undertake an independent review of the opportunities and challenges facing cardiovascular services. The study addresses the following areas:

- Current strengths and weaknesses in cardiovascular services in England;
- Opportunities and threats to cardiovascular services in England over the next ten years;
- Modelling the burden of disease under a selection of future scenarios;
- Pressures faced by people who care for, or look after, individuals diagnosed with cardiovascular conditions.

Section 2:   Methodology

KEY POINTS
•   This report provides an overview of issues facing cardiovascular services in the UK.   •   The method consisted of a combination of literature review, expert consultation, modelling and questionnaire survey

2.1   INTRODUCTION

This project was undertaken between December 2007 and April 2008. A Research Working Group was established at the start of the project to direct the focus of the research and comprised the following members:

David Geldard/Ken Timmis	Heart Care Partnership (UK)
Trudie Lobban	Arrhythmia Alliance
Simon O'Neill	Diabetes UK
Dr Kiran Patel	South Asian Health Foundation
Steve Shaffelburg	British Heart Foundation (BHF)
Dr Fran Sivers	Primary Care Cardiovascular Society
Bernie Stribling/Michael Nation	Kidney Research UK
Slade Carter	Cardio & Vascular Coalition

The methodology was designed to address the following areas:

- Current strengths and weaknesses in cardiovascular services in England;
- Opportunities and threats to cardiovascular services in England over the next ten years;
- Modelling the burden of disease under a selection of future scenarios;
- Pressures faced by people who care for, or look after, individuals diagnosed with cardiovascular conditions.

The approach comprised four main information sources:

- Literature review;
- Interviews with experts;
- Model development and output;
- Questionnaire survey.

It also utilised the existing knowledge held by YHEC and the CVC.

2.2 LITERATURE REVIEW

A review of recently published literature was undertaken to:

- Provide background information to remind experts of current trends in disease, risk factors and innovations;
- Inform the design of the carer survey;
- Find background information on cardiovascular disease in England and comparative information for Europe;
- Populate the model.

Members of the YHEC research team met with an Information Specialist from the Centre for Reviews and Dissemination at the University of York to discuss and agree the search strategy for each element of the review. A broad range of databases were searched, including:

- MEDLINE;
- EMBASE;
- Health Management Information Consortium (HMIC);
- NHS Economic Evaluation Database (NHS EED);
- Health Economic Evaluation Database (HEED).

In addition, internet searches were carried out using specific organisation websites, including:

- Department of Health;
- British Heart Foundation;
- Heart of Mersey;
- Mental Health Foundation;
- HeartCare Partnership (UK);
- Diabetes UK;
- Stroke Association;
- British Cardiovascular Society and Kidney research UK;
- National Institute for Health and Clinical Excellence.

To manage the issue of duplication, the titles and abstracts of bibliographic records were downloaded and imported into Reference Manager software which enabled the removal of such records.

2.3 MODEL DEVELOPMENT

2.3.1 Background of the QRISK Model

Historically, the models most commonly used to predict risk of cardiovascular disease in the UK have been based on the Framingham equation. The Framingham equation predicts the risk of Coronary Heart Disease (CHD) (including Myocardial Infarction (MI), CHD death, angina pectoris and coronary insufficiency) in populations, based on their levels of a set of cardiovascular risk factors. Equations have been developed for populations with and without a history of cardiovascular disease.

The continued appropriateness of the Framingham equation, especially in the UK context, has been questioned for a number of reasons including:

- Framingham cohort is almost entirely a white population;
- The equation was developed during the peak incidence of cardiovascular disease (CVD) in the USA;
- The equation does not include factors such as Body Mass Index (BMI) and social deprivation.

Amongst the alternative models, the QRISK equation can be used to estimate the number of patients at high risk of cardiovascular disease. High risk is defined as having a 20% or more chance of developing CVD over a ten year period.

The two approaches use largely the same factors in the risk equations; however, the QRISK equation includes the following additional risk factors:

- BMI (this is defined as weight in kilograms divided by the square of the height in metres to give a measure of weight which is comparable across people of different heights);
- Townsend Score;
- Blood pressure treatment;
- Family history of CVD.

A limitation of the QRISK model is that it does not account for the additional risk of CVD that arises from a current diagnosis of CVD or diabetes and thus estimates may be considered conservative.

The QRISK cardiovascular disease risk score was estimated by using a prospective cohort study on a large UK primary care population from the QRESEARCH database[4]. This database contains the health records of 10 million patients over a 17 year period from 529 general practices using the Egton Medical Information Systems (EMIS) computer system[5].

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[4] www.qresearch.org (accessed March 2008).
[5] http://www.emis-online.com

All contributing practices in the UK that had been using the EMIS system for at least one year were included in the study. Two-thirds of the data were randomly selected and used to derive the risk equation with the remaining third used to validate the results[1].

This equation is a multivariable mathematical function that assigns weights to major CHD risk factors, namely:

- Sex;
- Age;
- Townsend score;
- Body mass index;
- Systolic blood pressure;
- Smoking;
- Total/HDL-cholesterol level;
- Family history of cardiovascular disease;
- Receiving treatment for blood pressure at baseline.

The methods to calculate the risk equation are detailed fully in Hippisley-Cox J et al[1]. Hazard ratios for each of these risk factors were used as weights for the cardiovascular disease risk equation and were combined with a baseline survivor function[6],[7] to estimate a patient's probability of experiencing a cardiovascular event within 10 years.

The model was developed in MS Excel. It was populated with data from the Health Survey for England, the Office for National Statistics and published journal articles. Model results show how changes in demographic and epidemiological trends influence risk of cardiovascular incidence over time.

2.3.2 Populating the QRISK Model

Information on risk factors was obtained from a number of sources, see Table 2.1 overleaf.

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[6] Wilson P, D'Agostino R, Levy D et al. Prediction of coronary heart disease using risk factor categories. Circulation 1998; 97:1837-1847.

[7] Woodward M et al. Adding social deprivation and family history to cardiovascular risk assessment: the ASSIGN score from the Scottish Health Heart Extended Cohort (SHHEC). Heart 2007; 93:172-176.

Table 2.1:   Data sources for values input into the QRISK equation

Data Category	Source
Demographic data	Projections estimated from the 2001 census Office for National Statistics
Systolic Blood Pressure	Health Survey for England 2003
Prevalence of Smoking	Health Survey for England 2006 National Centre for Social Research and Department of Epidemiology and Public Health at the Royal Free and University College Medical School
Total/HDL Cholesterol	Health Survey for England 2003 National Centre for Social Research and Department of Epidemiology and Public Health at the Royal Free and University College Medical School
Townsend Score	Hippisley-Cox J, Coupland C, Vinogradova Y, Robson J, May M, Brindle P. Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: a prospective open cohort study. BMJ published online 5 Jul 2007
Receiving treatment for blood pressure	Hippisley-Cox J, Coupland C, Vinogradova Y, Robson J, May M, Brindle P. Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: a prospective open cohort study. BMJ published online 5 Jul 2007
Family History of premature CVD	Hippisley-Cox J, Coupland C, Vinogradova Y, Robson J, May M, Brindle P. Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: a prospective open cohort study. BMJ published online 5 Jul 2007
Body Mass Index (BMI)	Health Survey for England 2006 National Centre for Social Research and Department of Epidemiology and Public Health at the Royal Free and University College Medical School

The current population and projected changes over the next ten years for England were derived from data collected in the 2001 census published by Offices of National Statistics (ONS)[8]. Data on systolic blood pressure, total/HDL cholesterol data were extracted directly from the 2005 Health Survey for England trends, this is the latest year that this data are available.   BMI and smoking data were taken from the 2006 Health Survey.   For the remaining risk factors, the average values used in the Hippisley-Cox J *et al.* paper were used.

2.4   INTERVIEWS WITH EXPERTS

At the beginning of the project a list of potential interviewees was agreed with the Research Working Group.   This list included several consultants, a primary care specialist nurse, academics and representatives from patient groups.   A representative from the CVC made initial contact with each expert, inviting them to participate in the project.   This contact was followed-up by contact from YHEC who arranged the specifics of each interview.   This approach resulted in nine interviews. Subsequently, to collect a broader range of views, two more experts were interviewed.   A full list of interviewees may be found in Appendix B.

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8   http://www.statistics.gov.uk/census2001/census2001.asp (accessed March 2008).

The interview questions were devised by YHEC in collaboration with the Project Working Group. The questions were informed by the literature search and covered the following topics:

- Trends in incidence and prevalence;
- Impact of new technologies;
- Opportunities and challenges;
- Impact of Government health strategy;
- Issues facing ethnic and marginalised groups;
- Changes in the organisation of cardiovascular services;
- Costs of cardiovascular services.

An information sheet and a copy of the core interview questions were sent to interviewees at least one week before their interview. Establishing core interview questions allowed the interviews to take a semi-structured format and ensured that important areas were not overlooked. The information sheet contained information on trends in cardiovascular disease and trends in behavioural risk factors (including smoking and physical activity)[9].

All interviews were conducted by telephone. Interviews lasted between 30 minutes and one hour. With the permission of interviewees, all interviews were taped[10]. Interview responses were analysed to identify common themes. These are reported and discussed in Section 4.

2.5   QUESTIONNAIRE SURVEY

A questionnaire survey was used to gather information on issues faced by carers and family members. The questionnaire was designed with input from members of the CVC Research Working Group and piloted with a number of British Heart Foundation members before being circulated to a wider audience. The questionnaire is made up of three parts:

- Background information;
- Information about the person receiving care;
- The life of the carer and effect on family members.

All CVC member organisations were given the opportunity to participate in the questionnaire survey. Packs of envelopes, each containing a hard copy of the questionnaire and a pre-paid envelope addressed to YHEC were forwarded to representatives from three CVC member organisations who had volunteered to play an active role. The participating CVC members added a letter (on their own letterhead) providing information about the research and asking members to pass the questionnaires to their carers. Depending on the size of their membership, the participating CVC organisations either sent questionnaires via surface mail to all, or a selection, of their members. This approach to questionnaires distribution was

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[9]   Please see Appendix C for access to full Appendices including copy of Information sheet and summary of interview responses.
[10]   Recordings will be deleted or destroyed six months after completion of the project.

used to ensure that YHEC was not provided with any personal information about the questionnaire recipients. Questionnaire recipients were given the option to complete the paper questionnaire and return it to YHEC in a Freepost envelope or to complete the questionnaire electronically.

YHEC supplied a total of 825 questionnaire packs to CVC member organisations (see Table 2.2 below).

Table 2.2:   Recipients of questionnaire packs

CVC Member Organisation	Number of Questionnaire Packs Supplied by YHEC
British Heart Foundation	800
South Asian Health Foundation	20
Heart Care Partnership (UK).	5

Please see Appendix C for access to full Appendices, which include a copy of the questionnaire.

Section 3:   Cardiovascular Disease

KEY POINTS

•   Definition of cardiovascular disease includes coronary heart disease (MI, angina, heart failure), cerebrovascular disease (stroke and TIA), peripheral vascular disease, and congenital heart conditions.

•   Modifiable risk factors for CVD include smoking, sedentary lifestyle, hypertension and high cholesterol.

•   Non-modifiable risk factors include age, gender and genetic factors.

•   In 2006 the direct health care costs of managing CVD in the UK were £17.38 billion.

•   Per capita expenditure on stroke care in UK is the second highest in Europe.

•   UK has reduced mortality from MI and stroke since 1994 but still lags behind other Western European countries.

3.1   WHAT IS CARDIOVASCULAR DISEASE?

Cardiovascular disease (CVD) is a general term used to describe disorders that can affect your heart (cardio) and/or your body's system of arteries and veins (vascular). Disease may or may not be caused by atherosclerosis. Non-atherosclerotic heart disease includes, for example, congenital heart disease, cardiac genetic disorders, trauma, infection, etc. This section focuses on cardiovascular disease caused by atherosclerosis. Some of the classifications of which are:

•   Coronary heart disease (CHD);
•   Cerebrovascular disease (CVD);
•   Peripheral arterial disease (PVD).

Coronary heart disease is also known as coronary artery disease (CAD) or ischaemic heart disease. It is caused by the narrowing of the arteries that supply the heart. The narrowing is due to a gradual build-up of fatty material and debris. CHD may lead to:

•   Myocardial infarction (MI [Heart Attach]);
•   Angina (chest pain due to insufficient oxygen reaching the heart) and other forms of CHD;
•   Congestive heart failure.

Cerebrovascular disease is a disease of the blood vessels that supply the brain and may lead to:

- Transient ischaemic attack (TIA), also known as 'mini-stroke';
- Stroke.

Peripheral arterial disease is a disease of blood vessels supplying the arms and legs and can lead to:

- Claudication – partially obstructed blood flow in arteries causing pain on exercise;
- Gangrene – death of tissues in legs due to insufficient blood flow;
- Aneurysm (localised bulging or enlargement) in the aorta or other blood vessel.

Cardiovascular disease includes coronary heart disease (about 50%), stroke (about 25%), and all other diseases of the circulatory system.[11]

3.1.1 Risk Factors for Cardiovascular Disease

Major risk factors which increase the chances of people developing coronary heart disease or having a stroke can be categorised as un-modifiable or modifiable. The modifiable or lifestyle risk factors include:

- Smoking or exposure to environmental tobacco smoke;
- Obesity;
- Sedentary lifestyle (not enough physical activity);
- Diabetes;
- High cholesterol or abnormal blood lipids (fats);
- Hypertension (high blood pressure).

Excess alcohol intake is an important additional risk factor for stroke. Many of these risk factors are unevenly spread across society, with poorer people often exposed to the highest risks.

Non-modifiable risk factors include:

- Age (older than 50 years);
- Gender (men under the age 64 are much more likely to die of coronary heart disease than women[12]);
- Genetic factors/family history of cardiovascular disease.

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[11] http://www.heartstats.org/glossary.asp?id=5 (accessed April 2008).
[12] Jousilahti P, Vartiainen E, Tuomilehto J, Puska P. Diabetes mellitus Sex, age, cardiovascular risk factors, and coronary heart disease: a prospective follow-up study of 14,786 middle-aged men and women in Finland". *CIRCULATION* 1999; 99 (9): 1165-1172.

Attempts to reduce the incidence of cardiovascular disease tend to focus on encouraging the modifications to risk factors through promoting lifestyle changes, for example:

- Smoking cessation programmes;
- Campaigns to promote healthy eating;
- Promotion of increased physical activity.

Therapeutic approaches may also be employed, for example, prescribing:

- Cholesterol lowering drugs (statins);
- Aspirin (this has been shown to decrease the clot formation that may lead to myocardial infarction and stroke);
- Anti-hypertensives.

3.2 CARDIOVASCULAR DISEASE IN ENGLAND

3.2.1 Key Facts and Figures

3.2.1.1 Prevalence

Table 3.1 shows the prevalence by age and sex of cardiovascular disease in England. It can be seen that, in both men and women, prevalence increases with increasing age and that prevalence rates are higher in men than they are in women.

Table 3.1:   Prevalence of any CVD by age and sex (2006)[13]

Age Group	16 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75+	Total
	%	%	%	%	%	%	%	%
Men	3.2	4.7	5.6	10.9	18.5	34.1	44.4	13.6
Women	4.5	5.7	7.8	10.3	15.2	21.2	36.9	13.0

3.2.1.2 Mortality

World Health Organisation (WHO) statistics[14] report that, in 2002, ischaemic heart disease was the leading cause of death in the United Kingdom, causing 20% of all deaths, with a further 10% of deaths attributable to cerebrovascular disease.

3.2.1.3 Geographical variation[15]

It has been shown that there is considerable variation in mortality rates within regions and countries of the UK. Prevalence rates of CVD reported by the Health Survey for England

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[13] Health Survey for England 2006: Vol 1: Chapter 2: Cardiovascular Disease. Information Centre 2006. Available at www.ic.nhs.uk/pubs/HSE06CVDandriskfactors (accessed March 2008).

[14] http://www.who.int/countries/gbr/en/ (accessed April 2008).

[15] British Heart Foundation. Regional and Social differences in Coronary Heart Disease 2008. BHF 2008.

2003 show that 20% of men in Yorkshire and the Humber and 19% of men in the West Midlands report ever having some form of CVD diagnosed, compared with 15% of men in the South West and 16% in London and the East of England. Similarly, for women, CVD prevalence rates range from 14% in London to 20% in the West Midlands.

3.2.1.4 Deprivation

Among men in England the prevalence of heart disease increases markedly with deprivation. The rate of CHD among men in the most deprived group is one third higher than among men in the least deprived group. This pattern is even more marked among women where those in the most deprived group have a rate of CHD at least 50% greater than those in the least deprived group.

Similar patterns are seen in the prevalence of stroke. Men in the most deprived group have at least 60% greater risk of stroke than those in the least deprived group. Among women the difference is just under 50%.

3.2.1.5 Cost[16] of Cardiovascular Disease

The costs presented in Table 3.2 show that in 2004 57.1% of costs could be attributed to hospital inpatient care. The second largest source of costs was drugs (16% of total costs).

Table 3.2:   Healthcare costs of cardiovascular disease in the UK (2004)[17]

Resource Used	Cost Estimate (million £s)	Percentage Cost
Primary Care	584.3	3.4%
Accident & Emergency	47.6	0.3%
Hospital Outpatient Care	202.2	1.2%
Hospital Inpatient Care	9,933.3	57.1%
Hospital Day Case	149.8	0.9%
Drugs	2,772.8	16.0%
Cardiac Rehabilitation	259.6	1.5%
Community Health/Social Services	1,793.5	10.3%
Healthcare Cost Adjusted for Private Care	1643.0	9.5%
Total	**17,386.2**	**100%**

In 2004 an estimated 503,940 people provided informal care to people with CVD, with 522 million hours of care being provided. Informal care for CVD was estimated to cost £5.06 billion.

3.2.2   Government Policies

In 1999 the UK government acknowledged coronary heart disease and stroke as a major priority by setting a target[18] to:

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[16] Luengo-Fernandez, Leal J, Gray A, Petersen S, Rayner M. Cost of cardiovascular diseases in the United Kingdom. Heart 2006; 92: 1384-1389
[17] Note that percentages may not sum to 100% due to rounding.

> *'reduce the death rate from coronary heart disease and stroke and related diseases in people under 75 years by at least two fifths by 2010'*

The Department of Health website describes approaches which indicate the Government's commitment to reducing death rates from cardiovascular disease[19]. These include the initiatives on the following pages.

3.2.2.1 The National Service Framework for coronary heart disease

In 2000 the National Service Framework (NSF) for coronary heart disease[20] set out a ten year strategy for modernising CHD services. Table 3.3 below details the progress made on each of the 12 standards for improving prevention, diagnosis, treatment, and rehabilitation.

Table 3.3: Improvements in delivery of services for coronary heart disease

	Baseline Figure (Date)	Progress Figure (Date)
Adult smoking prevalence	28% (2000)	22% (2006)
Number of children receiving free fruit at school	Zero (2000)	Nearly 2 million (2006)
Number of patients waiting for over 12 months for heart surgery	1,093 (March 2000)	Zero (December 2002)
Number of patients waiting for over 9 months for heart surgery	2,694 (March 2000)	Zero (March 2003)
Number of patients waiting for over 6 months for heart surgery	2,766 (April 2002)	Zero (March 2004)
Number of patients waiting for over 3 months for heart surgery	5,663 (April 2002)	Zero (March 2005)
Estimated number of lives saved with statins	2,900 (2000)	Up to 10,000
Percentage of heart attacks treated with thrombolysis within 60 minutes of a call for help	24% (2001)	68% (2007)
Consultant cardiologists	467 (1999)	752 (2006)
Heart surgeons	182 (1999)	240 (2006)

Source: The Coronary Heart Disease National Service Framework: Building for the Future, Progress Report for 2007[21].

3.2.2.2 Extending choice for patients

This initiative aims to give patients more choice over when and where they receive treatment. In 2002 patients waiting over six months for heart surgery were given the choice to have faster treatment elsewhere. As an extension of this pilot, in 2005 all patients requiring a coronary artery bypass graft, angioplasty, or heart valve operation were offered a choice of hospital at the point of referral by the cardiologist.

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[18] Department of Health. Saving lives: our healthier nation. London: The Stationery Office, 1999
[19] Available at: http://www.dh.gov.uk/en/Healthcare/NationalServiceFrameworks/Coronaryheartdisease/index.htm (accessed March 2008).
[20] Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4094275 (accessed March 2008).
[21] Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_083060 (accessed March 2008).

3.2.2.3 Reducing CHD in the population

Several Government initiatives are underway to tackle the risk factors associated with CHD. These include:

- NHS 'Stop Smoking' services (which have helped to reduce smoking prevalence from 28% in 2000 to 22% in 2006);
- Food and Health Action Plans including 'Choosing Health?' and 'Choosing a better diet';
- The national fruit in schools scheme (which has resulted in nearly two million children receiving free fruit at school);
- Local Exercise Action Pilots (LEAP) which have identified locally effective methods for encouraging people to participate in more physical activity;
- Health Weights Healthy Lives is a cross-departmental strategy to support people in maintaining a healthy weight. Its ambition is to reverse the rising tide of obesity and overweight in the population by ensuring that everyone is able to achieve and maintain a healthy weight.

3.2.2.4 Preventing CHD in high-risk patients

The National Service Framework and General Medical Services contract state that general practitioners and primary care teams should develop a register of CHD patients, through which they can review medication, offer advice on diet and lifestyle, and maintain the necessary contact with patients most at risk of suffering renewed heart problems. Once those at risk have been identified, they should be offered lifestyle advice and prescribed lipid lowering statins. Over 3% of the population are now prescribed statins[22].

3.2.2.5 Reducing waiting times

In April 2004 the NHS delivered a maximum six month wait for heart surgery. This has now been reduced even further, and from 2008 no-one should wait more than 18 weeks from GP referral to hospital treatment, including all diagnostic procedures and tests.

3.2.2.6 Better, faster treatment: Thrombolysis and Primary Angioplasty

In 2003 a target was set of administering thrombolysis to all eligible patients within one hour of calling for professional help ('60-minutes from call-to-needle'). In 2007/08 approximately 68% of people treated with thrombolysis received it within one hour. The National Infarct Angioplasty Project (NIAP) began in 2005/06 with the aim of testing the feasibility of implementing a countrywide primary angioplasty service. The final report is due in spring 2008. However, the interim report[23] suggests that primary angioplasty is feasible in a variety

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[22] http://www.dh.gov.uk/en/Healthcare/NationalServiceFrameworks/Coronaryheartdisease/ DH_4097422 (accessed April 2008)
[23] Available at http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidanc e/DH_083061 (accessed March 2008).

of locations, though this will require a multidisciplinary approach and good communication between all stakeholders.

3.2.2.7 National Defibrillator Programme

Since the initiative was announced in 1999 the Government has invested £1 million in installing automatic external defibrillators (AEDs) in busy public places and £1 million in training people at the site in basic life saving skills. This has resulted in nearly 700 AEDs being placed at 110 locations across England and more than 6,000 volunteers being trained in Basic Life Support skills. A Big Lottery Fund award of £6 million has allowed the British Heart Foundation to buy 2,300 AEDs on behalf of ambulance trusts in England.[24] Current evidence suggests that 74 lives have been saved as a direct result of the work of the programme[25].

3.2.2.8 Tackling inequalities

In recognition of the increased risk of cardiovascular disease faced by South Asian populations, the Department of Health has released a series of documents providing Strategic Health Authorities and Primary Care Trusts with information on how best to provide equitable cardiovascular services to South Asians. These include:

- A guide to including black and minority communities in your events;
- Access to primary health care services for South Asian cardiovascular disease patients.

3.2.2.9 Cardiac rehabilitation

The BHF has noted that:

> *Investment in cardiac rehabilitation has not kept up with the increase in the number of patients surviving heart attacks or having revascularisation. The BHF strongly believes that the Healthcare Commission's Annual Health Checks is currently the key lever to improve the quality and coverage of cardiac rehabilitation in England and Wales.[26]*

The National Service Framework states that prior to leaving hospital, all heart patients should be invited to participate in a multidisciplinary programme of secondary prevention and cardiac rehabilitation. This is predicted to reduce cardiovascular mortality by as much as 25%. The National Audit of Cardiac Rehabilitation found that by 2006 only around 46% of eligible cardiac patients were attending rehabilitation[27].

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[24] http://www.bhf.org.uk/annualreport/2006v2/emergency_life_saving/local_lifelines.htm (accessed April 2008).
[25] http://www.dh.gov.uk/en/Healthcare/NationalServiceFrameworks/Coronaryheartdisease/ Coronarypromotionproject/index.htm (accessed April 2008).
[26] http://www.bhf.org.uk/news_and_campaigning/our_policies/care/role_of_annual_health_checks_i.aspx (accessed April 2008).
[27] The National Audit of Cardiac Rehabilitation: Annual Statistical Report 2007. Available at http://www.cardiacrehabilitation.org.uk/docs/NACR_2007.pdf (accessed April 2008).

3.3   EUROPEAN COMPARISONS

A literature search was carried out to identify studies comparing cardiovascular services in England with other countries in Europe. Studies were only reviewed if they directly compared data from England with international data. Data were identified from two main sources: Euro Heart Survey 2006[28] and European Cardiovascular disease statistics 2008[29]. Unless otherwise stated, all statistics presented are sourced from these reports.

3.3.1   Epidemiology

Incidence and prevalence data of cardiovascular disease have not been systematically collected at an international level and therefore comparisons of epidemiology are based on cardiovascular mortality rates.

Although the burden of cardiovascular disease in the England is high, cardiovascular mortality rates are lower in the UK than in many European countries. The Euro Heart Survey found that in 2004 only France, Spain and Switzerland had lower cardiovascular mortality rates than the UK. Specifically, compared with most of Europe, the UK has relatively low rates for coronary heart disease and stroke mortality, although UK rates are not as low as those in France, Spain, Italy and Portugal.

In Europe there is a sharp west-east gradient in cardiovascular mortality rates, with the rates being generally higher in the east. Unlike eastern European countries, the trends in cardiovascular death rates have been declining over the last 20 years in the UK. From 1994 to 2004 death rates from coronary heart disease fell by 42% in the UK but in this same period mortality rates increased by 57% in Albania and 19% in the Ukraine. Stroke death rates are also decreasing in the UK (31% decrease from 1994 and 2004); whereas these rates are increasing in eastern European countries (for example in Albania there was a 15% increase between 1994 and 2004). Table 3.4 provides comparative figures for CHD and stroke death rates in the UK and other western European countries.

Table 3.4:   Percentage decline in CHD and stroke death rates from 1994 to 2004 in selected western European countries (men aged under 65)

	CHD			Stroke		
	1994 deaths/ 100,000	**2004 deaths/ 100,000**	**% decline**	**1994 deaths/ 100,000**	**2004 deaths/ 100,000**	**% decline**
UK	76	44	42%	13	9	31%
France	24	17	29%	10	7	30%
Germany	55	33	40%	14	8	43%
Ireland	86	44	49%	12	7	42%
Spain	33	25	24%	13	9	31%

Source: European Cardiovascular Disease Statistics 2008

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[28] Scholte op Reimer W, Simoons M.L., Boersma A, & Gitt A.K. (Eds). Euro Heart Survey. Cardiovascular Diseases in Europe 2006. European Society of Cardiology. http://www.escardio.org/knowledge/ehs/publications/reports.htm (Accessed March 2008).

[29] Allender S et al. (Eds). European Cardiovascular Disease Statistics: 2008 Edition. European Heart Network.

Comparisons of cardiovascular risk factors are important to consider, as these may explain many cross-national differences in mortality rates.

3.3.1.1 Smoking

Data from the World Health Organisation's database 'Health for All'[30] shows that in all European countries (except Sweden) the prevalence of smoking is higher in men than in women. In 2006 22% of adults in the UK were smokers[31]. The Government target for smoking prevalence is to reduce adult smoking rates to 21% or less by 2010[32]. The prevalence figures in the UK are similar to prevalence rates in other western European countries; however, the prevalence of smoking in many eastern European countries is often much higher than those found in western European countries (see Table 3.5).

Table 3.5:   Prevalence of smoking in a selection of European countries (adults aged 15 and over)

Country (year figures published)	Prevalence (%)	
	Men	**Women**
Belgium (2003)	23	16
Czech Republic (2005)	42	25
France (2003)	30	21
Germany (2003)	37	31
Ireland (2005)	24	24
Kazakhstan (2004)	41	9
Lithuania (2004)	42	10
Netherlands (2005)	35	26
Norway (2005)	26	24
Sweden (2005)	14	18
Spain (2003)	34	22
United Kingdom (2004)	26	23
Ukraine (2005)	62	17

3.3.1.2 Obesity

Compared with the rest of Europe, the UK has a high rate of obesity (BMI ≥ 30). In 2005 nearly a quarter (24%) of UK adults were classified as obese[33], compared with 17% in France, 14% in Germany and 10% in Italy[34]. The Government's Foresight Programme is investigating the issue of obesity in its Tackling Obesities: Future Choices project[35]. This project aims to identify factors which influence obesity and predict how future levels of obesity might change. It predicts that, based on recent trends, by 2015, 36% of males and

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[30] http://www.euro.who.int/hfadb (accessed March 2008).

[31] Craig R, & Mindell J (Eds). Health Survey for England 2006: Cardiovascular disease and risk factors: Volume 1. http://www.ic.nhs.uk. (accessed March 2008).

[32] PSA Delivery Agreement 18: Promote better health and wellbeing for all, The Treasury, 2007. Available at http://www.hm-treasury.gov.uk/media/5/A/pbr_csr07_psa18.pdf (accessed April 2008).

[33] Health Survey for England 2006 Latest Trends. Available at http://www.ic.nhs.uk/pubs/hse06trends (Accessed March 2008).

[34] International Obesity Task Force: Obesity Prevalence Data. http://www.iotf.org/database/index.asp (accessed March 2008).

[35] http://www.foresight.gov.uk/Obesity/Obesity_final/Index.html (accessed April 2008).

28% of females will be obese. By 2025 these figures are estimated to rise to 47% and 36%, respectively, and by 2050 60% of males and 50% of females could be obese[36].

3.3.1.3 Diabetes

The reported prevalence for diabetes is low compared with that found in other European countries. In 2003 4.1% of UK adults were diagnosed with diabetes, compared with 10% in Germany, Bulgaria, and Spain, and a European average of 7.8%.

3.3.1.4 Diet

The quantity of fruit and vegetables consumed in the UK has been steadily increasing since the 1960s. However, figures in Table 3.6 suggest that consumption may still be lower than in much of western Europe but higher than in much of eastern Europe.

Table 3.6:   Fruit and vegetable consumption

Country (year figures published)	Year of Survey	Age Group Surveyed	Fruit and Vegetables (g/person/day)
Belgium	1980/84	24 - 74	360
France	1993/94	19 - 64	288
Germany – East	1991/92	18 - 80	349
Germany – West	1987/88	18 - 88	244
Ireland	1990	18+	229
Kazakhstan	1996	18+	168
Lithuania	1997	18+	359
Norway	1993/94	16 - 79	341
Spain	1992	18 - 60	480
United Kingdom	1986/87	16 - 64	248
Ukraine	1997	18+	285

Note: Vegetables does not include potatoes, except in Germany

The Government recommends an intake of at least five portions of fruit and vegetables per person per day[37], but in 2006 only 30% of UK adults were consuming this level of fruit and vegetables[38].

3.3.1.5 Physical activity

The proportion of adults who, in a typical week, do no 'moderate level physical activity' is above the European average (54% in the UK compared with a European average of approximately 40%). The level of inactivity in the UK is similar to that reported in France and Italy (52%), higher than Germany (27%), but lower than Ireland (58%) and Spain (61%). The Government recommends that for general health benefit adults should achieve a total of

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[36] McPherson, K., Marsh, T. & Brown, M. 2007. Modelling Future Trends in Obesity and the Impact on Health. Foresight Tackling Obesities: Future Choices. Available at http://www.foresight.gov.uk/Obesity/obesity_final/14.pdf (accessed April 208).

[37] http://www.dh.gov.uk/en/Publichealth/Healthimprovement/FiveADay/index.htm (accessed April 2008).

[38] Health Survey for England 2006 Latest Trends. Available at http://www.ic.nhs.uk/pubs/hse06trends (accessed March 2008).

at least 30 minutes a day of at least moderate intensity physical activity on 5 or more days of the week[39], but in 2006 only 34% of adults were achieving this recommendation[40].

3.3.2 Comparisons of Health Systems and Services

3.3.2.1 Expenditure

In 2005 the UK had a total Health Expenditure of 8.3% of Gross Domestic Product (GDP)[41]. This is similar to other European countries (see Table 3.7). Despite the UK's average health expenditure, it has a relatively low number of hospital beds, physicians, and nurses per 1,000 habitants.

Table 3.7:   Health expenditure in Europe

	Total health expenditure as % of GDP
United Kingdom	8.3%
Spain	8.3%
France	11.1%
Italy	8.9%
Germany	10.7%
European average*	7.6%
European Union average*	8.9%

Source: OECD Health Data 2007
*Source: Euro Heart Survey 2006

3.3.2.2 Costs

Tiemann (2008)[42] found that in England, compared with the rest of Europe, a relatively high percentage of total costs of treating myocardial infarction was attributable to drugs. It was suggested that this was due to the use of expensive glycoprotein IIb-IIIa inhibitors. Conversely, in England the relative spend on diagnostic costs was comparatively low, with less than 7% of the cost of myocardial infarction care was spent on diagnostics.

Epstein et al. (2008)[43] found that England have a relatively high number of acute stroke units in hospitals (100% of English hospitals sampled in this study had an acute stroke unit, compared with 25% in France and 20% in Spain). Of the countries sampled in this study (Denmark, England, France, Germany, Hungary, Italy, The Netherlands, Poland, and Spain)

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[39] Department of Health. At least five a week: evidence on the impact of physical activity, The Department of Health; 2004. Available at http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4080994 (accessed April 2008).

[40] Health Survey for England 2006 Latest Trends. Available at http://www.ic.nhs.uk/pubs/hse06trends (accessed March 2008).

[41] OECD Health Data 2007. Organisation for Economic Co-operation and Development. Available at http://stats.oecd.org (accessed April 2008).

[42] Tiemann O. Variations in Hospitalisation Costs for Acute Myocardial Infarction – A comparison across Europe. Health Economics 2008; 17: S33-S45.

[43] Epstein D, Mason A, & Manca A. The Hospital Costs of Care for Stroke in Nine European Countries. Health Economics 2008; 17: S21-S31.

England's hospitals had the second highest costs for stroke care (after The Netherlands). This was mainly due to the high costs of overheads and of the stroke units themselves. Conversely, England had relatively low costs for drugs and diagnostic procedures (see Fig 3.3).

Fig 3.3: **Costs of stroke care (as a percentage of total cost) according to category of resource use**
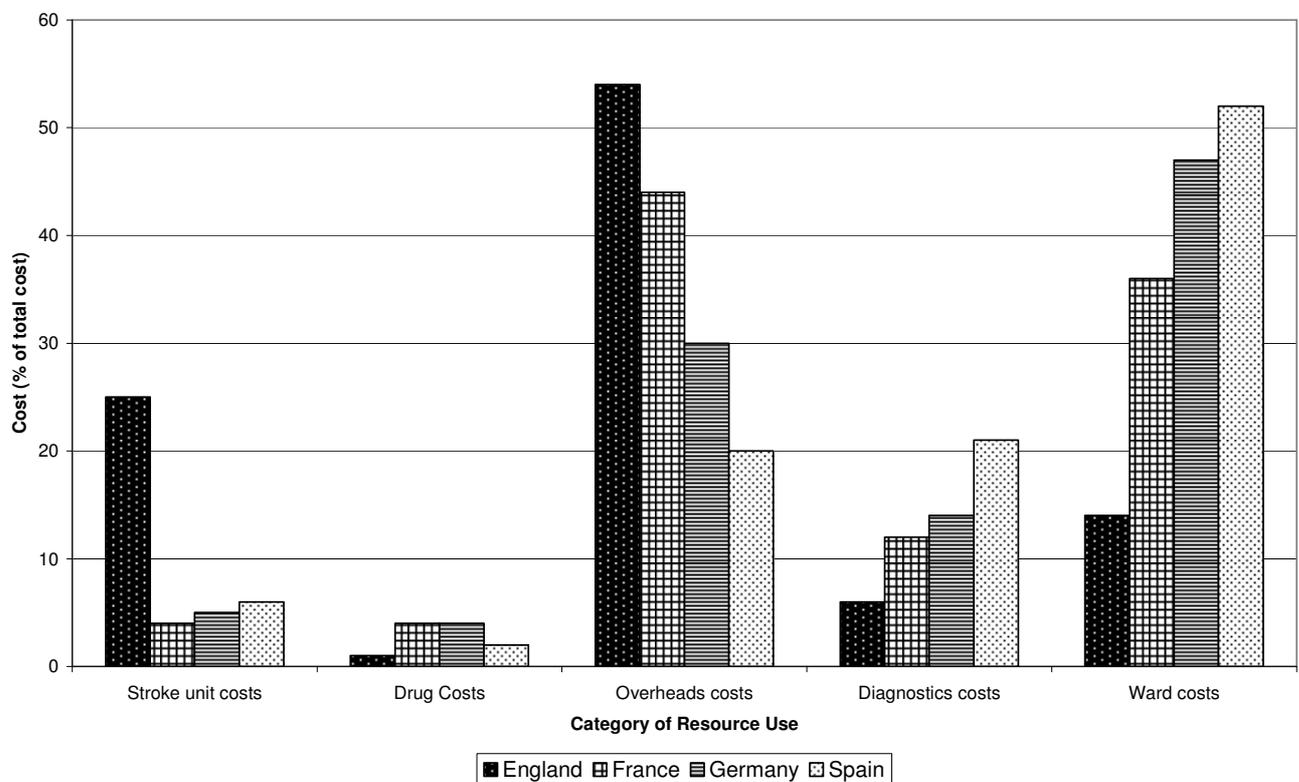
Source: Epstein et al. (2008)

3.3.2.3 Care

With regard to cardiovascular treatments, the UK performs a relatively low rate of Percutaneous Coronary Interventions (PCI) (compared with other European countries and also relative to the burden of disease), but a relatively high rate of Coronary Artery Bypass Surgery (CABG). See Figs 3.1 and 3.2 for levels of PCI and CABG.

Fig 3.1: **European Rates of PCI (latest available figures for each country)**
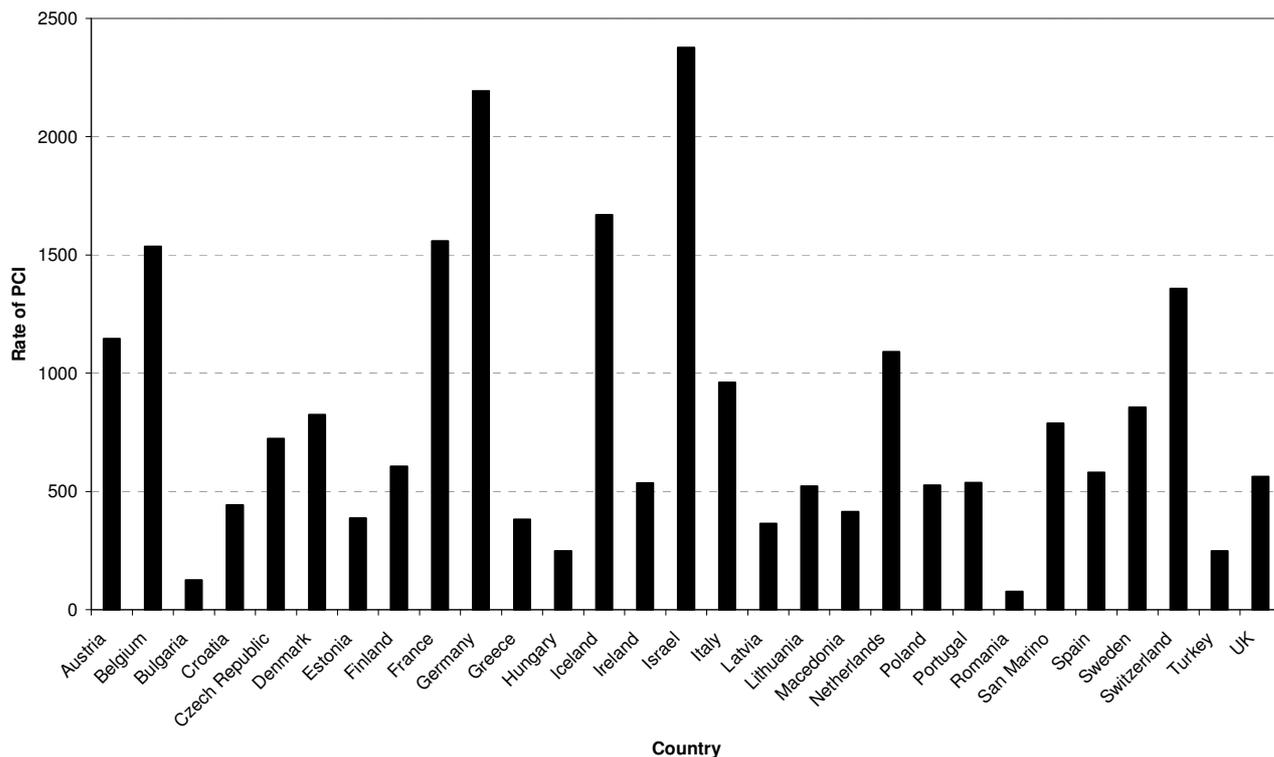
Source: European Cardiovascular Disease Statistics 2008

Fig 3.2: **European Rates of CABG (latest available figures for each country)**
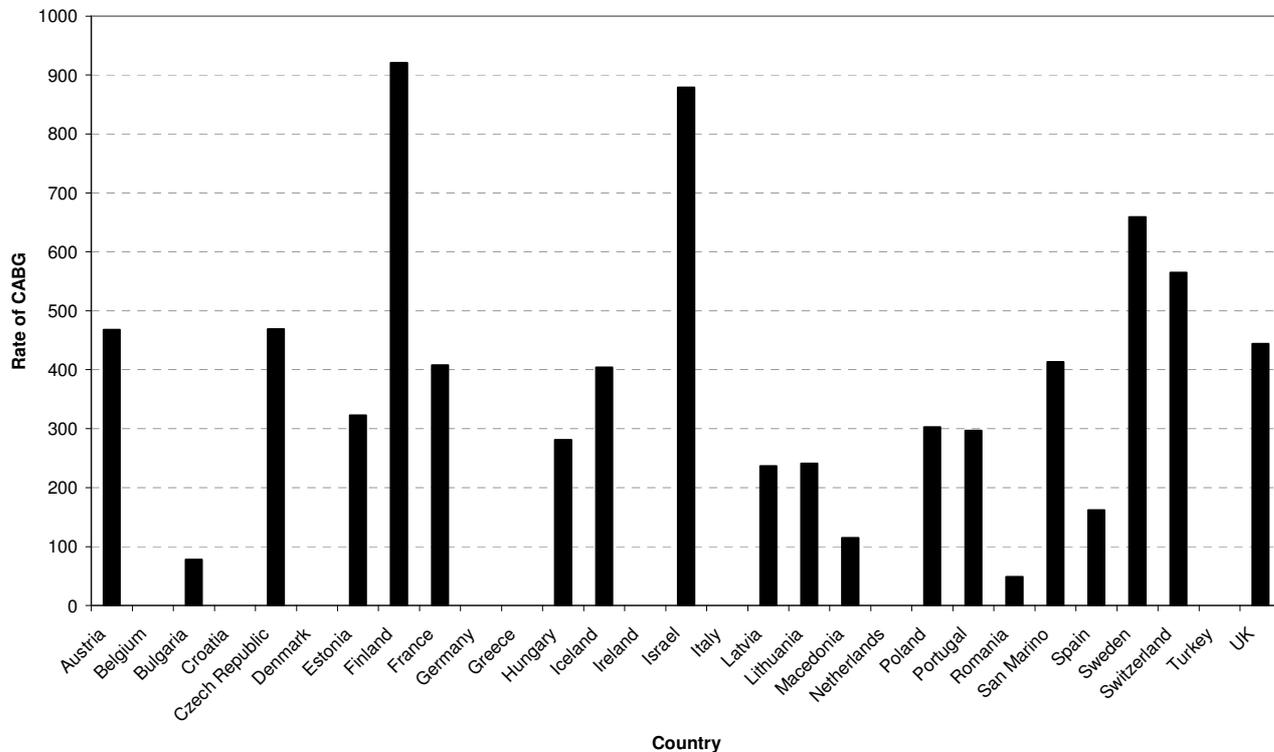
Source: European Cardiovascular Disease Statistics 2008

Section 4: Interviews with Experts

4.1   INTRODUCTION

Experts in the field of cardiovascular disease were asked a series of questions to gain their views on the current state of cardiovascular disease and services in England. They were also asked to outline the changes they thought would occur over the next ten years. This section provides an overview of main topics and themes that were contained in the experts' responses. A number of the questions provoked very varied responses[9].

4.2   EPIDEMIOLOGY AND DEMOGRAPHY OF CARDIOVASCULAR DISEASE IN ENGLAND

KEY POINTS
• Better outcomes will result in some conditions through better use of existing technologies.
• Prevalence of CVD will grow because of improved survival after major events.
• Incidence will also increase unless there is a significant impact from public health programmes.

A literature search was conducted to identify the current trends in incidence and prevalence of the following conditions:

- Coronary heart disease;
- Chronic heart failure;
- Congenital heart failure;
- Arrhythmia;
- Stroke;
- Peripheral vascular disease;
- Diabetes;
- Renal disease.

Recent trends in coronary heart disease, stroke, diabetes, and renal disease were extracted from the British Heart Foundation Heartstats[44] website, the Health Survey for England[45], and the UK Renal Registry Annual Report[46]. Current incidence data for the remaining conditions could not be identified from the literature.

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[44] http://www.heartstats.org (accessed March 2008).
[45] http://www.ic.nhs.uk/pubs/hse06trends (accessed March 2008).
[46] http://www.renalreg.com/reports/renal-registry-reports/2006/ (accessed March 2008).

Interviewees were asked their views on how the incidence and prevalence of the above conditions would change over the next ten years. Many interviewees felt that changes in trends would be similar for all conditions due to the fact that the conditions shared key risk factors.

The majority of interviewees felt that the incidence and prevalence of cardiovascular disease would increase over the next ten years. The main reason given for this prediction was an anticipated growth in the prevalence of a number of risk factors, including smoking (especially amongst young people), obesity, unhealthy diet, lack of physical activity, and aged people. Several interviewees simply cited "an increase in risk factor prevalence" as the reason for their predicted increase of cardiovascular disease. It was pointed out that there is strong published evidence to show that the incidence and prevalence of atrial fibrillation is increasing.

Conversely, a minority of interviewees felt that the incidence of cardiovascular disease would decrease over the next ten years. The reasons given for this change included: an increase and improvement in primary prevention, better assessment and management of risk factors, health education in schools and Government health messages, and improved treatments. Several interviewees predicted that although the incidence of cardiovascular disease would decrease (due to the factors mentioned above), the prevalence would increase. This was thought to be due to a greater number of people living for longer with a cardiovascular condition (as a result of prevention and treatments which would reduce case fatality), and the ageing population. In the cases of chronic heart failure, congenital heart disease, arrhythmia, and renal disease, it was mentioned that improvements in diagnosis may suggest an increasing incidence, but that this would be an increase in detection only, and not an increase in genuine new cases.

For some conditions, specific predictions were made, namely:

- People would present with CHD at a younger age over the next ten years, as a result of trends in obesity in the young;
- A decrease in congenital heart disease would result from genetic counselling and scanning, the capacity to do more operations, and the development of Magnetic Resonance Imaging (MRI);
- The increasing public awareness of arrhythmia, as well as improved treatments such as implantable devices and better chronic disease management would lead to a decline in arrhythmia;
- Better management of hypertension and atrial fibrillation were seen to be important factors contributing to a decrease in stroke incidence. Conversely, one interviewee predicted an increase in haemorrhagic and ischemic stroke due to increasing cerebral amyloid angiopathy and increased number of patients surviving from coronary heart disease;
- Trends in peripheral vascular disease were felt to be closely linked to smoking prevalence, with many interviewees suggesting the trends in peripheral vascular disease would mirror trends in smoking rates;

- A large increase in the incidence and prevalence of diabetes was predicted by some interviewees as a result of the increasing prevalence of obesity in the population;

- An increase in the identification of congenital heart disease was predicted. This was thought to be due to improved screening ("4-chamber" and "Outflow Tracts" as part of the NICE Antenatal update 2008[47]). It was also predicted that, as a consequence of better care after detection and better outcomes from surgery, the prevalence of congenital heart disease in adults would increase.

4.3   TRENDS IN CARDIOVASCULAR RISK FACTORS

KEY POINTS

- The increasing trend in obesity is a major concern.

- Modifiable risk factors can be further reduced with behavioural change interventions and wider use of pharmaceuticals.

- These interventions may be taken up more by higher socioeconomic groups increasing the imbalance in CVD risks between social groups.

- Prevalence of CVD will grow because of increasing burden of diabetes and pre-diabetes.

A literature search was conducted to identify the current prevalence trends of the following cardiovascular risk factors: smoking, obesity, physical activity, and diet. The Health Survey for England[48] was the main source of information. During their interview, interviewees were asked to predict changes in these cardiovascular risk factors. Their responses are summarised below.

4.3.1   Smoking

Most interviewees were optimistic about smoking prevalence; many predicted a decline in smoking due to public health measures such as the Government ban on smoking in public places, heavy publicity from Action on Smoking and Health (ASH), improved 'Stop Smoking' services, and increasing costs of tobacco products. However, several interviewees felt that smoking would increase in the younger population due to peer pressure and role model smoking, and it was suggested that pressure should be kept on the Government to support initiatives aimed at decreasing smoking prevalence, for example, through education and increased taxes. One interviewee predicted that smoking prevalence would only decrease in higher socioeconomic groups.

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[47] http://www.nice.org.uk/guidance/index.jsp?action=byId&o=11649 (accessed April 2008).
[48] http://www.ic.nhs.uk/pubs/hse06trends (accessed March 2008).

4.3.2   Obesity

All the interviewees predicted a continuing increase in obesity over the next ten years. Many interviewees were extremely concerned about the increasing prevalence of obesity, some describing it as "an epidemic". The reasons given for this increase were: decrease in physical activity, poor diet (including large portion sizes, high fat foods, high sugar drinks, increased calorie intake), loss of sports facilities in schools, town planning (for example, out of town shopping centres, lack of cycle routes and exercise facilities), increasing numbers of people conducting a sedentary lifestyle, and the lack of a Government national food policy. Several experts thought that the increase in obesity would be limited to lower socioeconomic groups who, they commented, do not have the luxury of choice over their eating and exercise habits.

4.3.3   Physical Activity

Predictions relating to the future trend in physical activity levels were varied. On one hand, interviewees predicted an increase in physical activity due to public awareness campaigns, obesity concerns, town planning changes, incentives to walk and not drive, and increasing exercise in schools. On the other hand, interviewees predicted a decrease in physical activity due to increasing numbers of people leading a sedentary lifestyle and increasing stress in the general population. Socioeconomic disparities were again predicted; there was a view that although higher socioeconomic groups may increase their physical activity levels, lower socioeconomic groups would have other priorities such as housing and security.

4.3.4   Diet

Most interviewees predicted an increase in healthy eating due to increase in education regarding healthy foods, food labelling, more advertising and lower prices of healthy foods. However, socioeconomic disparities were again predicted by several interviewees who stressed that lower socioeconomic groups have less choice over where they can shop and how much they can spend. One interviewee predicted a continuing trend away from saturated fats and cholesterol-rich foods, but only in certain segments of the population.

4.3.5   Other Risk Factors

Interviewees were asked to highlight any other behavioural factors which they felt would have an influence on cardiovascular disease and cardiovascular services over the next ten years. A continuing increase in alcohol consumption was predicted and it was suggested that market regulation and Government intervention were necessary to combat 'problem drinking'. One interviewee predicted that cycling would increase, as a consequence of improved facilities for cyclists in many cities. Another interviewee predicted that an increase in maternal diabetes may lead to increasing foetal cardiac problems (such as malformations in neonates and myocardial hypertrophy).

4.4 THE IMPACT OF NEW TECHNOLOGIES ON CARDIOVASCULAR SERVICES

KEY POINTS

- Improved diagnostic technologies will increase service demand by earlier identification of those at risk.

- More precise diagnosis will allow extended use of interventional treatments (stents, ICDs) and further reduce mortality.

- Developments in genetic testing present future possibilities for quantifying risk and predicting responses to therapies.

A literature search was conducted to identify pharmaceutical and technological advances that may impact upon treatments for cardiovascular conditions over the next ten years. The most comprehensive source found was National Horizon Scanning Centre[49] which provides news on emerging technologies in health care in England. A list of recent advances extracted from National Horizon Scanning website was used as the basis for discussions. Interviewees were asked to predict how each of these advances would influence treatment of cardiovascular conditions and to highlight other advances that they felt would have a major impact over the next ten years. Their responses are summarised in Table 4.1.

In addition, interviewees stated that recent literature and conferences have been dominated by new information on the genetics of cardiovascular disease including atrial fibrillation, valvular heart disease, coronary artery disease, peripheral vascular disease, stroke, hyperlipidaemia, and high blood pressure. It seems likely that within a few years an individual will be able to quantify his/her risk of developing any or all these conditions far more exactly than has hitherto been possible. It will be possible to identify some types of disease and genetic mutations that augment or diminish an individual's response to any given therapy. Moreover, stem cell therapy and many other promising new technologies offer immense potential for new treatments for cardiovascular disease.

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[49] http://www.pcpoh.bham.ac.uk/publichealth/horizon (accessed March 2008)

Table 4.1: **Predicted impact of technological and pharmaceutical advances on cardiovascular disease and cardiovascular services**

Name of Technology	Predicted Impact
Late gadolinium enhancement magnetic resonance imaging (LGE-MRI) for the assessment of myocardial viability	• Increase rates of revascularalisation, biventricular pacing, and implantable defibrillator use for primary prevention; • Treatment will be more precisely targeted.
Magnetic resonance angiography (MRA) imaging for the detection of coronary artery disease	• Will make management easier; • May detect a much larger number of people than we currently know about.
Myocardial stress perfusion magnetic resonance imaging (MRI) for the assessment of myocardial blood flow in coronary artery disease	• Increase rates of revascularisation; • Increase in detection of coronary heart disease.
Prasugrel for acute coronary artery syndrome with percutaneous coronary intervention	• Interventional cardiology will take precedence over coronary surgery; • Will impact favourable on case fatality and prognosis.
Rivaroxaban (Bay 59-7939) for prevention of venous thromboembolism after major orthopaedic surgery	• May reduce deep-vein thrombosis and pulmonary embolism.
Computed Tomography (CT) angiography for the diagnosis and management of coronary artery disease	• Improved accuracy; helpful because current angiography technology is limited in assessing prognosis and in localisation; • Increasing detection of coronary heart disease.
Computed Tomography (CT) screening in Risk assessment for coronary artery disease.	• Possibility of unnecessary intervention of healthy people; • May not be widely used due to high radiation exposure; • Increasing detection of coronary heart disease.
Remote monitoring of implantable cardiac devices	• Significant shift to remote monitors. Driven by commercial (rather than professional) side of industry; device companies may take over monitoring of their devices; • Will reduce secondary care follow-up; • Needs thorough evaluation.
Drug eluting stents	• Use will be very physician-dependent; • CABG could prove to be better in the long term; • Increasing role for stents in secondary intervention; • Evidence from randomised controlled trials raises safety issues.
Implantable devices for atrial and ventricular fibrillation, Arrhythmia, congenital conduction defects.	• Lots of potential to save lives; • Seem to be interesting developments in this area at the moment.
Video assisted minimally invasive thoracoscopic ablation of the left atrium for intermittent Atrial Fibrillation.	• Simpler than catheters and major surgical intervention which are currently used; • Increased use with increasing incidence of Atrial Fibrillation.
Left ventricular assist devices for heart failure.	• Increasing use; • More interest and investment; • Needs an independent cost effectiveness study.
Natriuretic peptides for diagnosis and monitoring.	• Improve detection and management.
Systematic cardiovascular risk assessment and coordinated primary prevention programs.	• Tackle issues related to deprivation and ethnicity.
Leadless implantable cardioverter-defibrillators.	• Improve primary prevention of death post-myocardial infarction.
Biventricular pacing or CRT.	• Improve case selection leading to lower hospitalisation rates.
Ezetimibe (lipid lowering drug)	• Its use should be reviewed in the light of recent trial data.
Thrombin antagonists as an alternative to Warfarin for systemic anticoagulation.	• Significant impact.
Clot retrieval devices such as the Merci© Clip	• Will have a big impact but only in small subsets of stroke patients.
Fetal ECG	• May enable a better understanding and detection of the adaptive physiology of the foetus and enable a reduction in stillbirth that affects .5 per 1,000 live and still births in England and Wales.
Doppler Ultrasound	• Improve antenatal detection of congenital heart disease in the first trimester and allow new improvements in assessment of function and detection on heart disease before birth.
Technologies and devices for management of arrhythmias	• Make management of arrhythmias less complex and time-consuming (than current invasive management techniques).

4.5 CURRENT STRENGTHS AND WEAKNESSES OF CARDIOVASCULAR SERVICES

KEY POINTS

Strengths
- Quality of acute services.

- Training of specialists and GPs.

- Policy framework through NSF and NICE guidance.

Weaknesses
- Lack of co-ordination between primary and secondary care.

- Limited provision of palliative care.

- Geographical and social inequalities in access to services.

Interviewees were asked to comment on what they considered to be the current strengths and weaknesses of cardiovascular services in England. Responses to this question were varied and incorporated aspects of both primary and secondary care as well as external factors influencing cardiovascular services.

4.5.1 Strengths

Several interviewees considered England's doctors to be a great strength. General Practitioners were described as "well educated and supported", and cardiovascular specialist physicians were also deemed an asset. NHS initiatives such as the NSF for CHD and the Quality and Outcomes Framework were also cited as strengths; the NSF was considered to have already improved priorities in secondary prevention, care, and rehabilitation. Other initiatives also cited as strengths were:

- Specialist cardiac centres - one interviewee stated that "England has excellent specialist cardiac centres offering a full range of interventional techniques, including angioplasty, stinting, electrophysiology, and surgery"; and
- Rapid access chest pain clinics - it was felt that these had greatly improved the assessment and management of angina patients.

Congenital heart disease (Cod) services were considered to be a significant strength of cardiovascular services in England. One interviewee stated that England was probably at the forefront of Cod services in Europe. More specifically, the comprehensive screening

programme for antenatal abnormalities and the Central Cardiac Audit Database (CCAD)[50] were cited as strengths of Cod services.

The fact that cardiovascular care in England is NHS-funded was cited as strength because it aims to result in equity (as compared with commercially-funded healthcare systems). Some strength of cardiovascular services that fell outside the responsibility of the NHS and the Government were highlighted, namely:

- Increase in public and professional awareness of what can actually be done to combat cardiovascular disease (including the increase in the number of people taking statins, and improving the diet and exercise regimes); and
- The work of non-governmental organisations, in particular that of the National Institute for Health and Clinical Excellence (NICE) in reviewing technologies and producing guidance, and also the co-ordination that has resulted from the establishment of the Cardio and Vascular Coalition (CVC).

4.5.2 Weaknesses

Integration of care was seen as a major weakness of cardiovascular services in England. Several interviewees mentioned that the interaction between primary and secondary care is poor. A number of interviewees also mentioned that cardiovascular services need to build up relationships with other specialists and services. Cardiovascular services were criticised for being too "health-focussed" and failing to take in into account social care, wellbeing, and the social impact of cardiovascular disease.

Palliative care in England was seen as an area of weakness. One interviewee stated that unlike cancer and neurological diseases, heart failure is often not considered as a terminal illness. Another interviewee was concerned about the deficit in communication between health care practitioners and patients and families regarding choices and opportunities at the end of life. Other aspects of care that were seen as weak were prevention and rehabilitation. It was noted that many cardiovascular patients and people with high cardiovascular risk often do not have access to professional lifestyle and risk factor management services. These issues highlight the need for the development of a vascular prevention service which compliments the acute management of vascular disease.

The commercialisation of the NHS and the increasing burden of budgets and targets were seen as significant weaknesses of cardiovascular services. Budgets were perceived as leading to less effective treatments, and commissioning by Primary Care Trusts was perceived as inhibiting access to expensive cardiac services. One interviewee felt that competition had become more important than collaboration within cardiac networks. An additional weakness, linked by this interviewee to the commercialisation of the NHS, is the perceived power wielded by the pharmaceutical industry through its input into the NICE guidelines development process.

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[50] http://www.ccad.org.uk/congenital (accessed April 2008).

Some weaknesses specific to Cod services were mentioned. Although the antenatal screening programme was considered strength, the training and support of monographers was thought to be insufficient. It was also mentioned that there is no audit mechanism for linking information obtained from foetuses with that from childhood through the Central Cardiac Audit Database (CCAD). In relation to adult Cod patients it was felt that there was a lack of organised Cod service. The NHS Grown Ups Congenital Heart Patients (GUCH) guide (May 2006)[51] states that "all adults with congenital heart disease, whatever the complexity" are to be seen "by an expert from a specialist centre at least once." However, it was felt by one interviewee that there was no determination or definition of where the specialist centres are or who the experts are, and that there were currently no attempts to define these. It was suggested that trained Cod experts should be concentrated in a few specialist centres.

Other perceived weaknesses of cardiovascular services included:

- Lack of tertiary services;
- The fact that cardiology does not encompass all vascular diseases;
- Regional inequity of care;
- Rationing of health services due to age;
- Historical under-funding, under-staffing and under-provision of facilities;
- A lack of adult congenital heart disease nurses;
- A lack of specialist follow-ups for adult congenital heart disease patients who were treated when they were younger.

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[51] http://www.guch.org.uk/info/nhsguide (accessed March 2008).

4.6 OPPORTUNITIES AND CHALLENGES TO CARDIOVASCULAR SERVICES

KEY POINTS

Opportunities
- Increasing public awareness of the causes of CVD and the role of the individual in reducing behavioural risk factors.

- Increased investment in research into CVD

- Chance to use National Stroke Strategy and NICE Stroke Guidelines to improve outcomes.

- Updating of NSF in 2010.

Challenges
- Increasing prevalence of CVD

- Increasing need for heart failure management.

- Maintaining adequate funding to preserve and enhance services.

Interviewees were asked to predict what opportunities and challenges cardiovascular services would encounter over the next ten years. They were also asked to propose strategies for harnessing the opportunities and ameliorating the challenges. Responses were varied and there was a certain amount of overlap between opportunities and challenges as a number of interviewees felt that some of the challenges related to difficulties in harnessing some of the opportunities.

4.6.1 Opportunities

One major opportunity that interviewees felt would be encountered is an improvement in awareness surrounding cardiovascular disease. Several interviewees predicted a continuing improvement in public recognition of the severity of cardiovascular disease, and a resulting decline in behavioural risk factors. It was suggested that to harness this opportunity health services should engage proactively with the media to target hard-to-reach high risk groups.

The opportunity created by increased research investment was highlighted by one interviewee. The respondent commented that the National Institute for Health Research has made large investments in health services as has the Wellcome Trust, which has invested approximately £4billion in technologies and genetics. It was suggested that to harness these opportunities England needs to ensure it has the infrastructure to support research.

Several interviewees mentioned the opportunities for improvements in cardiovascular disease prevention over the next ten years. One interviewee identified the opportunity to develop an integrated vascular prevention programme which would reduce hospitalisation and the need for revascularisation. Another interviewee suggested that there would be an opportunity for primary care to manage preventative treatments (as well as much chronic disease). More specific opportunities for improving prevention included the development of rapid access cardiology clinics (and expansion of the current rapid access chest pain clinics) that assess breathlessness and palpitations as well as chest pain, Government health strategy relating to health checks, and the expiry of the atorvastatin patent.

Other opportunities that were identified included:

- The evolution of cardiology into "Vascular Disease" – a speciality which addresses all vascular disease;
- The updating of the National Service Framework in 2010. It was suggested that the updated framework should be evidence based;
- The implementation of the Office of Fair Trading report on drug pricing and cost efficacy[52]. Engagement with the industry to reduce costs and therefore increase access to treatment was seen as necessary to harness this opportunity;
- To extend the work that has already carried out (by the BHF) to include heart patients and their carers in policy making, to stroke patients and their carers;
- The release of NICE guidelines on management of stroke in 2008;
- The release of the National Stroke Strategy in 2008;
- Co-ordination of cardiovascular services by network and regional developments (to avoid waste and duplication).

It was suggested that cardiovascular services should provide adults with Cod the opportunity for a fuller life by ensuring they receive a proper diagnosis (through organised Cod services). It was also suggested that improvements should be made to outcomes for babies with Cod by giving all mothers a comprehensive and systematic screening at 20 weeks' gestation and by ensuring that records of a foetus are linked with their postnatal records.

4.6.2 Challenges

The biggest challenge that interviewees thought would face cardiovascular services in the next ten years was the increasing prevalence of cardiovascular disease. Several interviewees discussed their concern that services would be overloaded with large numbers of cardiovascular patients if action was not taken to address the increasing prevalence. It was also noted that the proportion of the population with multi-factorial risk is likely to increase over the next ten years and that the assessment of these people would present another challenge to cardiovascular services. Strategies suggested to ameliorate these challenges include improving health policy related to cardiovascular disease and increasing investment in public health. It was felt that these strategies would produce a decline in the

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[52] http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft885.pdf (accessed March 2008).

prevalence of risk factors and therefore help to reduce the numbers of people presenting with cardiovascular disease.

Some disease-specific challenges were mentioned, namely:

- The provision of services for heart failure (given the increasing prevalence of the condition). To ameliorate this challenge the need to provide exercise rehabilitation as well as medical management was emphasised;
- The development, over and above acute care, of interventions to help combat the unmet needs of patients who had been left disabled by stroke;
- The ageing population will result in an increased need for pacemakers and a huge burden of atrial fibrillation. It was suggest that increasing resources will be required to ameliorate this challenge;
- To have specialist CoHD centres in the right number, where they are needed (by determining where centres are needed and how many are needed);
- To ensure only those who are expert in adult CoHD medicine are treating adults with CoHD;
- To ensure there are sufficient CoHD professionals (sonographers to perform screening and foetal cardiologists/paediatric cardiologists to handle referrals). It was suggested that this could be achieved through the extension of Skills for Health and appropriate manpower planning.

One interviewee also stated that, as a result of the ageing population, there will be an increase in the number of people suffering from multiple conditions. This highlights the need for cardiovascular services to provide integrated care alongside other services.

There were seen to be a number of financial challenges facing cardiovascular services over the next ten years. One interviewee was unhappy with a number of Government targets which he felt were unrealistic and suggested that these should be given up or made more realistic. The general trend within the health care service to move towards private health care was seen as another potential challenge as it was felt that, because of the expense, private health care providers would not want to treat chronic diseases such as cardiovascular disease. A related challenge was seen to be a reduction in the level of attention given to coronary heart disease as a result of a perception that the burden of disease is no longer as severe. The Cardio and Vascular Coalition was named as an alliance that can help develop a strategy to ameliorate this challenge.

An improvement in palliative care was cited as an important challenge for cardiovascular services over the next ten years. This could be supported by an improvement in communication between health care professionals and patients and families at the end of life, and also by the inclusion of an end of life strategy within future cardiovascular service strategies.

Two challenges were identified in relation to the pharmaceutical industry. One challenge was seen to be the increasing pressure from the pharmaceutical industry to prescribe high levels of new drugs. It was suggested that this challenge could be avoided by the

eradication of industry driven guidelines. Another interviewee suggested that pushing the pharmaceutical industry to produce innovative solutions and technologies to assist in the care of patients with cardiovascular conditions would be a significant challenge to cardiovascular professionals.

4.7   THE IMPACT OF GOVERNMENT HEALTH STRATEGY

KEY POINTS

- Patient choice agenda may favour better –off and better educated increasing inequality of access to services.

- Need resources to tackle inequalities

- Payment by Results and competition between hospitals may hinder the development of co-ordinated services.

- Practice-based commissioning may help to address differing local needs but may also perpetuate historical disparities in provision.

A search of Government White Papers[53] was conducted to identify current Government health strategies that may influence cardiovascular services over the next ten years. The following list of health strategies was identified from the "Our health, our care, our say: a new direction for community services"[54]:

- Payment by Results;
- Improving Access;
- Improving Patient Choice;
- Local Commissioning (Practice Based Commissioning);
- Self Managed Care;
- Care in the Community;
- Focus on Inequalities.

The issue of funding levels was also included in this section of the interview, as it was anticipated that this factor would also influence cardiovascular services.

Interviewees were asked to predict how each of the strategies listed above would influence cardiovascular services over the next ten years. They were also asked to identify any other Governmental health strategies which they felt would have an influence on cardiovascular services.

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[53] http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/DH_4122399 (accessed March 2008)
[54] http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAnd Guidance/DH_4127453 (accessed March 2008).

4.7.1   Payment by Results (PbR)

The majority of interviewees felt that PbR would have a negative influence on cardiovascular services. It was suggested that if PbR is only applied to hospitals (and not community based services or primary prevention) then patients will not get the level of integration of care which they require.   One interviewee raised concerns that PbR may result in the closure of hospitals (to encourage those hospitals that succeed), and another interviewee predicted PbR would have an adverse effect on clinical priority setting. It was highlighted that many outpatient tasks (such as foetal cardiology scans) are not currently charged for, and that charging for these would increase costs. One interviewee predicted that PbR would drive procedure-based care, but could inhibit chronic disease management.

4.7.2   Improving Access

It was predicted that Improving Access could lead to "over-medicalisation", with increased visits to primary and secondary care which would increase the costs of cardiovascular services and de-stabilise cardiac units. It was also noted that Improving Access may only benefit those in higher socioeconomic groups and could worsen inequalities in care. One interviewee highlighted that for CoHD improving access would be of great benefit, as adult CoHD patients would then know where to go to receive specialist treatment.

4.7.3   Improving Patient Choice

Interviewees predicted that Improving Patient Choice would put greater pressure and strain on selected health service providers and could de-stabilise cardiac units. It was also noted that Improving Patient Choice may only benefit those in higher socioeconomic groups and could worsen inequalities in care. One interviewee highlighted that improving patient choice would have a positive impact on CoHD as currently adult CoHD patients would just like to choose somewhere they know they are going to be correctly treated.

4.7.4   Local Commissioning

Some interviewees thought that Local Commissioning would have a positive influence on cardiovascular services. It was suggested that this strategy would put the power back in the primary care arena.   It was also predicted that Local Commissioning would improve collaboration as it would lead to Primary Care Trusts taking into account how all services would be provided. Other interviewees felt that Local Commissioning would have a more negative effect on cardiovascular services.   Several interviewees suggested that this strategy may lead to regional inequalities and variability in care provision and they emphasised the importance of considering individual population needs. One interviewee felt that Local Commissioning would give Primary Care Trusts too much influence on how GPs refer patients, and another predicted that Local Commissioning could de-stabilise cardiac units.

4.7.5 Self Managed Care

It was noted by interviewees that Self Managed Care would need attached incentives (possibly financial) to succeed. Several interviewees felt that Self Managed Care is not appropriate for many cardiovascular conditions and it was predicted that many people will need continuing clinical engagement and help to self manage.

4.7.6 Care in the Community

Care in the Community was predicted to have a positive influence on cardiovascular services in several ways. Most importantly, it was felt that Care in the Community would prevent secondary care services being overloaded by the increasing number of cardiovascular patients. This strategy would allow hospitals to be reduced to their core activities i.e. the acute management of disease. It was also predicted that this strategy would promote the development of preventive cardiology services in the community. One interviewee predicted that management of cardiovascular disease would shift more to the community as it could be cheaper in this environment and therefore of benefit to commissioners. A condition specific prediction was that healthcare professionals in the community may be trained to know the clinical signs of CoHD and therefore improve the detection of CoHD shortly after birth.

4.7.7 Focus on Inequalities

Most interviewees felt strongly that Focus on Inequalities is a crucial strategy which will enable the NHS to focus cardiovascular services on those in greatest need and bring cardiovascular services to areas and regions where they are not currently provided. However, it was emphasised that this strategy will require a shifting of resources and some interviewees were sceptical about this; one stated that "Government finances are focussed on budgets, not inequalities". It was also highlighted that regional inequality still currently exists in the detection and diagnosis of congenital heart disease.

4.7.8 Funding Levels

Funding levels were seen to be key in maintaining adequate cardiovascular care in the face of increasing prevalence of cardiovascular disease. Several interviewees expressed concerns that funding strategies could lead to rationing of services, and one interviewee predicted that funding levels may inhibit the development of expensive, cutting edge technological treatments. One interviewee estimated that an increase in funding to over 10% of gross domestic product would be needed to cope with the increasing demand for cardiovascular care. It was predicted that funding levels would negatively impact on the provision of a comprehensive preventative strategy that included public health and primary prevention.

4.7.9   Other Government Health Strategies

Interviewees provided a varied discussion of other health strategies which they felt would influence cardiovascular services over the next ten years. Some interviewees mentioned existing health strategies, whilst others suggested strategies which they would like to see implemented and which they felt would positively influence cardiovascular services.

Policies to tackle climate change were thought to be resulting in an increasing recognition that a low carbon lifestyle would have a good impact on cardiovascular health. The increase in education in schools was also predicted to have a big influence in terms of reducing risk factor prevalence and therefore reducing incidence of cardiovascular disease. Other current Government health strategies which were predicted to influence cardiovascular services include:

- The Darzi Report[55];
- "Choosing Health" and "Healthy Living";
- "Smoking Kills";
- Government strategy relating to health checks;
- The National Stroke Strategy;
- The updating of the National Service Framework;
- Workforce Development (it was suggested that this is still primitive and crude);
- Incentive schemes such as Quality and Outcomes Framework (QOF) for GPs;
- Electronic patient records (particularly their potential to be linked to key databases).

It was proposed that a health strategy should be developed to raise awareness and public attitudes to end of life care. It was felt that although palliative care was implicitly considered in existing strategies, it should be more explicit in any future cardiovascular health strategy due to the high proportion of mortality in England that is attributable to cardiovascular disease.

It was suggested that, to encourage a more radical approach to protecting the population from cardiovascular disease, the Government should undertake a 'Health Impact' review of all its policies from all its ministries. The importance of linking Governmental health strategies together was stressed. It was felt that the strategies would not be influential on their own but only when considered together. It was also noted that the influence of all of the strategies will depend on the changing demographics of the population over the next ten years, and on any change of government that may occur.

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[55] Due for completion June 2008. Interim report available at http://www.ournhs.nhs.uk/?p=40 (accessed April 2008).

4.8   ISSUES FACING ETHNIC AND MARGINALISED GROUPS

KEY POINTS

- Groups with higher risks also are less likely to access services.

- Will new immigrant groups from Eastern Europe add to the high risk population?

- Trends now observed in the US indicate that risk differences between ethnic groups may decline over time.

A literature search was conducted to identify the major issues relating to cardiovascular disease which face ethnic and other marginalised groups. Three main issues were highlighted from the literature. These were issues facing people of South Asian origin, Afro-Caribbean origin, and those belonging to lower socioeconomic groups.

4.8.1   Issues Facing Ethnic Minority Groups

South Asians are defined as individuals whose ethnic roots originate from the Indian subcontinent (comprising India, Pakistan, Sri Lanka, Nepal, and Bangladesh).[56] For many years studies of South Asian migrant populations have found that, compared with the general population, they are at increased risk of coronary heart disease[57],[58],[59],[60]. The 2004 Health Survey for England[61] also found that, compared with the general population, South Asians were at increased risk, and had higher prevalence, of coronary artery disease. Interviewees were asked how they thought the increased risk of coronary heart disease facing South Asian populations would change over the next ten years.

Another issue that was highlighted from the literature search was that, compared with the general population, people of Afro-Caribbean origin are at increased risk of stroke[62],[63]. The 2004 Health Survey for England found that men of Afro-Caribbean origin were more at risk of stroke than the general population. Interviewees were asked how they thought the increased risk of stroke facing Afro-Caribbean populations would change over the next ten years.

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[56] Gupta M, Singh N, & Verma S. South Asians and Cardiovascular Risk: What Clinicians Should Know. Circulation 2006; 113: e924-e929.

[57] McKeigue PM, Miller GJ, & Maromot MG. Coronary heart disease in South Asians overseas: a review. Journal of Clinical Epidemiology 1989; 42: 597-609.

[58] Bhopal R. What is the risk of coronary heart disease in South Asians? A review of UK research. Journal of Public Health Medicine 2000; 22 (3): 375-385.

[59] Bhopal R et al. Ethnic and socio-economic inequalities in coronary heart disease, diabetes and risk factors in Europeans and South Asians. Journal of Public Health Medicine 2002; 24 (2): 95-105.

[60] Zaninotto P et al. Prevalence of Cardiovascular risk factors among ethnic groups: results from the Health Surveys for England. Atherosclerosis 2007; 195: e48-e57.

[61] Sproston K & Mindell J (Ed). Health Survey for England 2004: The health of minority ethnic groups: Volume 1. http://www.ic.nhs.uk. (accessed March 2008).

[62] Hajat C et al. Ethnic differences in risk factors for ischemic stroke: a European case-control study. Stroke 2004; 35: 1562-1567.

[63] Conway DSG, & Lip GYH. Ethnicity in relation to atrial fibrillation and stroke (the West Birmingham Stroke Project). American Journal of Cardiology 2003; 92: 1476-1479.

Many interviewees responded to the increased risks of cardiovascular disease facing South Asian and Afro-Caribbean populations as a combined issue facing black and minority ethnic (BME) groups. Most interviewees predicted that the disparities between the white population and BME populations would increase. Reasons given for this predicted increase in disparity included:

- A lack of grass roots health promotion and public health investment in BME populations;
- A lack of screening for diabetes in BME populations;
- Alternative forms of tobacco use (e.g. chewing tobacco) among BME populations;
- Obesity;
- Lack of access to medical care.

Several interviewees suggested strategies to combat increasing disparity, and these are outlined below.

One interviewee predicted that the disparity in stroke risk between white people and people of Afro-Caribbean origin will decrease over the next ten years. This interviewee commented that this trend would mirror the trend in the United States where stroke risk among people of Afro-Caribbean origin is now the same as among the white population. Another interviewee suggested that better management of hypertension may lead to decreased disparity.

Several suggestions for tackling an increase in disparities between white people and BME groups were made. Firstly, it was suggested that continuing research is necessary to identify why certain BME groups are at increased risk. Contributing factors proposed by interviewees include diet, genetic, social and cultural factors. Secondly, it was highlighted that issues such as language barriers, cultural differences and outreach programs need to be addressed to provide adequate culturally sensitive cardiovascular services. A large proportion of interviewees felt that ethnic disparities in care should be a crucial focus for the development of cardiovascular services. While some BME groups are at higher risk and therefore need more access to cardiovascular services they are in fact currently receiving fewer services.

4.8.2   Issues Facing Low Socioeconomic Groups

The Health Survey for England 2006[64] shows that people with lower equivalised household income have higher prevalence rates of cardiovascular disease than those with higher equivalised household income. Many independent studies have found a link between low socioeconomic status and an increased risk of cardiovascular disease[65],[66]. A higher rate of cardiovascular disease among low socioeconomic status groups has generally been

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[64] Craig R, & Mindell J (Ed). Health Survey for England 2006: Cardiovascular disease and risk factors in adults: Volume 1. http://www.ic.nhs.uk/pubs/HSE06CVDandriskfactors. (accessed March 2008).

[65] Avendano M et al. Socioeconomic status and ischaemic heart disease mortality in 10 western European populations during the 1990s. Heart 2006; 92: 461-467.

[66] Banks J et al. Disease and Disadvantage in the United States and in England. Jama 2006; 295 (17): 2037-2045.

attributed to an increased prevalence of cardiovascular risk factors among these groups[67]. It has also been found that social deprivation is linked with a reduction in quality of primary care received[68]. Interviewees were asked how they thought the increased risk of cardiovascular disease facing low socioeconomic would change over the next ten years.

Many interviewees predicted an increase in disparity between high and low socioeconomic groups. It was noted that expensive interventions can make inequalities worse as lower socioeconomic groups cannot gain access to them. Other reasons given for the predicted increase in disparity include a lack of public health investment targeted at the lower socioeconomic groups, and the increasing numbers of refugees and immigrants in England.

Conversely, several interviewees predicted a decreasing disparity between high and low socioeconomic groups as a result of inequalities being addressed more vigorously over the next ten years by the Department of Health and NICE.

The main suggestion as to how the issues facing lower socioeconomic groups could be tackled was to address the reasons why lower socioeconomic groups are at increased risk. If the behavioural risk factors that are contributing to increased incidence of cardiovascular disease in different social groups are identified appropriate services can be provided. Other suggestions included more intensive screening and prevention activities in high risk groups and the mainstreaming of issues facing marginalised groups (rather than seeing them as separate side issues). The issue of the disparity in the level of care received by people of different socioeconomic status was emphasised by the majority of interviewees. Although lower socioeconomic groups are at higher risk and therefore need more access to cardiovascular services, they are currently receiving fewer services.

4.8.3   Other Important Issues

It was suggested by several interviewees that CoHD patients are a marginalised group. Issues facing CoHD patients include:

- Regional inequity of CoHD service provision;
- Consanguineous marriages (leading to high risk of foetal cardiac malformations).

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[67] Lyratzopoulos G et al. Deprivation and trends in blood pressure, cholesterol, body mass index and smoking among participants of a UK primary care-based cardiovascular risk factor screening programme: both narrowing and widening in cardiovascular risk factor inequalities. Heart 2006; 92: 1198-1206.

[68] Ashworth M et al. The relationship between social deprivation and the quality of primary care: a national survey using indicators from the UK Quality and Outcomes Framework. British Journal of General Practice 2007; 57: 441-448.

4.9   THE ORGANISATION OF CARDIOVASCULAR SERVICES IN ENGLAND

KEY POINTS

- More emphasis on screening and primary prevention.

- Increased speed of access to acute care, especially for stroke patients.

- More collaborative working with other specialties and with primary care.

Interviewees were asked to predict what major changes would occur to the organisation of cardiovascular services in the next ten years. They were then asked if there were any further changes to the organisation of cardiovascular services which they did not currently predict would happen but which they would like to see occur.

4.9.1   Predicted Changes to the Organisation of Cardiovascular Services over the Next Ten Years

An emphasis on primary prevention and the greater provision of diagnostic tests was predicted by several interviewees. This was expected to shift the emphasis away from secondary care, and one interviewee expressed concern that the shift could marginalise and threaten secondary and tertiary care.   Another interviewee predicted that more cardiovascular services would be devolved from tertiary to secondary care centres and subsequently from secondary care to primary care services.

Several predictions were made regarding cardiac networks and collaboration of services. One interviewee felt that cardiac networks would no longer be necessary due to political targets, commercialisation and competition. However, several interviewees predicted an increase in collaboration between cardiovascular services, other services and specialists (e.g. social care). This was predicted to have a positive influence on integration of care as was the expected increase in the use of multi-disciplinary teams.

More rapid access to care was also a prominent theme. A push towards acute stroke treatment (getting patients treated within three hours of stroke) was predicted. Another interviewee suggested that expert cardiovascular centres, served by local District General Hospitals, would be developed, allowing paramedics to rapidly get patients to effective services.

Other predicted changes to the organisation of cardiovascular services included:

- The possibility of some services being made redundant due to declining incidence of cardiovascular disease over the next ten years;
- The streamlining of congenital heart disease centres for children.

4.9.2 Changes to the Organisation of Cardiovascular Services that Interviewees Would Like to See Happen over the Next Ten Years

Several interviewees stated they would like to see an increase in the co-ordination and integration of cardiovascular services. This would include greater co-ordination and integration between primary, secondary and tertiary cardiovascular care at network and regional levels, greater collaboration with other specialists, services and sectors (e.g., housing and social care), and the possibility of the integration of services to address vascular disease as a whole.

A greater focus on inequity of care was seen as important. Centrally driven standards on socioeconomic and ethnic inequalities were predicted to lead to a reduction in the inequity of service delivery. Improved health care markers such as measurement of the rates of use and yields from different diagnostics were suggested as a method for ensuring there were no disparities in care delivery between Primary Care Trusts.

Some interviewees said that they would like greater emphasis on primary prevention, including improved preventive cardiology services and additional Quality Outcomes Framework points for primary prevention strategies.

Other changes to the organisation of cardiovascular services that interviewees would like to see include:

- The development of rapid assessment vascular disease clinics, similar to existing rapid chest pain clinics;
- An increase in the development of Phase IV Trainers (health trainers, primary prevention strategists);
- More rehabilitation in the community and in patients' homes;
- More self managed care of chronic diseases with the support of specialist nurses;
- The development of an understanding of the workforce and facilities required nationally for sub-specialities in cardiology (coronary heart disease, arrhythmias and devices, and imaging modalities);
- The determination of where specialist CoHD centres should be and the combining of experts into these centres. This could lead to a higher rate of survival and a better quality of life for adult CoHD patients;
- Compulsory audit of all obstetric units' screening programmes. This could provide a denominator for the UK and improve audit and provision of neonatal care for babies with congenital heart disease.

4.10   COSTS OF CARDIOVASCULAR SERVICES

KEY POINTS

- Total cost will increase because of growth in number of cases.

- Cost per case will increase with the greater use of acute interventions and technologies.

- Primary prevention services will need extra resources for drugs and diagnostics.

- Better preventative care will lead to savings from reduced acute events but the full impact will not be felt for some time.

- Growing incidence of diabetes and pre-diabetes, or metabolic syndrome, will drive up rates of cardiovascular disease and associated costs.

The trends in cost of the following conditions to the NHS were identified from NHS Reference Costs 2005 - 2006[69]: stroke, myocardial infarction, heart failure, cardiac arrest, arrhythmia, renal disease, and diabetes.

Most of the interviewees felt that they were not qualified to predict changes in costs of cardiovascular services. Several interviewees chose not to comment on costs, and those who did comment stressed that they were responding as lay persons, not as informed experts.

Several interviewees predicted that the costs of all conditions would continue to increase due to increasing prevalence of the conditions, an increase in need for primary prevention, and increasing expectations from patients and physicians as a result of new technologies.

Some interviewee gave individual predictions for costs relating to each condition, and these are summarised in Table 4.2. One interviewee predicted that an increase in screening and prevention would result in decreased costs. Another interviewee suggested that a trend from acute care to chronic disease management will mean more resources will be required in primary care and the community.

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[69] NHS Reference Costs 2005-06, Department of Health. Available at http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_062884 (accessed March 2007).

Table 4.2:   Reasons behind predicted increases in costs associated with cardiovascular conditions

Cardiovascular Condition	Predicted Change	Reasons for predicted change in costs over the next ten years
Stroke	Increase	• Thrombolysis for stroke provision; • The ageing population; • Increasing prevalence will increase cost to healthcare economy but cost of admission won't change. • Increased number of survivors will increase overall costs of rehabilitation
	Decrease	• Increase in rehabilitation may reduce acute costs
Myocardial Infarction	Increase	• Expense of increasing Percutaneous coronary interventions (PCI)
	Decrease	• Decreasing incidence; • Treatment by primary PCI is cost-neutral or cost-saving.
Heart Failure	Increase	• Increasing technologies (such as defibrillators and left ventricular assist devices); • The ageing population; • Increasing expense of treatments.
Arrhythmia	Increase	• Increasing use of diagnostics; • Use of therapeutics like pulmonary vein isolation; • Increasing prevalence; • Increasing costs of technologies and treatments; • The ageing population.
Renal Disease	Increase	• Increasing prevalence.
Diabetes	Increase	• Due to increase (tripling) of diabetes prevalence.
Congenital Heart Disease	Decrease	• Increased detection of congenital heart disease via antenatal screening will avoid emergency situations; • Having an antenatal diagnosis can result in better outcomes for babies and so help to decrease childhood morbidity and decrease use of NHS services.

Section 5:   Modelling Exercise

KEY POINTS

- The base case predicts an increase of 80,000 in those at high risk of CVD in 10 years.

- The beneficial effects of continued reductions in smoking and increased use of drugs to control hypertension and high cholesterol will be offset by the impact of obesity.

- If the UK trend in obesity rises to current US rates the number at high risk rises to 102,000.

- To offset the impact of obesity, smoking levels would have to fall by a further 7%.

5.1   INTRODUCTION

This section reports the results of an aggregated modelling analysis of trends in the numbers of people at high risk of CVD. The methods and data sources have been described in section 2 above. A base case analysis was carried out using projections of current trends in key risk factors. In the subsequent sensitivity analysis, a series of different scenarios was examined, using the views expressed by the experts in section 4 to modify the modelling assumptions.

5.2   BASELINE ANALYSIS

The base case assumptions for the model are as detailed below:

- Predicted population growth = +0.4% per annum;
- Current smokers to fall by 23% over ten years (based on Health Survey of England trends 1996-2006) [from 29% to 22%];
- BMI to increase by 1.1 points over ten years (based on Health Survey of England trends 1996-2006) [from 26.1 to 27.2];
- Systolic Blood Pressure to fall by 4% over ten years (based on Health Survey of England trends 1995-2005) [from 136mmhg to 131mmhg];
- Total Cholesterol to fall by 5.2% over ten years for males and 6.7% over 10 years for females (based on Health Survey for England trends 1994-2003) [from 5.8mmol/l to 5.5mmol/l for males and 5.6mmol/l to 6mmol/l for females];

- Statins = 6.3% of eligible patients (based on NICE prediction[70]). Patients are defined as eligible if there is clinical evidence of CVD, or where the risk of developing CVD within 10 years is estimated to be 20% or greater.

The remaining variables in the model are assumed to stay constant over the modelled 10-year period. The baseline figures are as follows:

- Average Townsend score = -1.1 for males and -1.2 for females;
- Family history of CVD = 9.1% for males and 12.1% for females;
- The age/sex profile used can be found in Table 5.1.

Table 5.1:   Age/sex profile used for baseline analysis

	Male	**Female**	**Total**
35-39	1,934,300	1,946,800	3,881,100
40-44	1,940,800	1,970,700	3,911,500
45-49	1,717,900	1,738,700	3,456,600
50-54	1,512,700	1,547,000	3,059,700
55-59	1,608,400	1,652,200	3,260,600
60-64	1,320,200	1,376,600	2,696,800
65-69	1,074,900	1,155,800	2,230,700
70-74	905,900	1,034,700	1,940,600
Total	12,015,100	12,422,500	24,437,600

The baseline results are shown in Table 5.2.

Table 5.2:   Baseline results

	Male	**Female**	**Total**
2007	1,491,675	835,975	2,327,650
2008	1,497,275	838,562	2,335,837
2009	1,502,918	842,532	2,345,451
2010	1,508,606	845,850	2,354,456
2011	1,514,338	849,193	2,363,531
2012	1,520,114	855,433	2,375,547
2013	1,525,933	855,957	2,381,890
2014	1,531,797	859,377	2,391,174
2015	1,537,704	862,823	2,400,527
2016	1,543,655	866,294	2,409,949

Under the assumptions used for the baseline analysis the model estimates a total of 2.33 million people at high risk of cardiovascular disease in year 1, this equates to 9.5% of the 35 - 74 year old population in England. This compares to a figure of 8.45% of 35 - 74 years estimated during the development of the QRISK model[1].

Figures show that after ten years the estimated number at high risk of CVD has increased to 2.41 million. This rise is due to increasing prevalence of risk factor conditions, such as obesity.

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[70] http://www.nice.org.uk/page.aspx?o=289613 (accessed April 2008).

5.3   SENSITIVITY ANALYSES

The sensitivity analyses investigated the following scenarios:

1   Increased use of statins (2.9% per year);
2   Impact of change in average population BMI:
  2a   Applying increases in BMI observed in USA to English data;
  2b   Decrease of 1.1 points in the average BMI level
  2c   Decrease in smoking required to offset increase in CVD due to increase in BMI;
  2d   Change in Townsend score required to offset increase in CVD due to increase in BMI.

5.3.1   Scenario 1 – Increased Use of Statins

Evidence linking statins to one of the QRISK risk factors (total cholesterol) was found through a literature search. It is reported that, on average, use of statins decreases total cholesterol by an average of 20% and increases HDL cholesterol by 5%[71].

Prescription cost analysis[72] data shows that the number of prescriptions for statins has increased from 12.3 million to 16.5 million between 2001 and 2006. This is an increase of 2.9% per year.

Table 5.3 shows the impact on the QRISK predictions of increasing the number of people taking statins by 6.5% to 32.1% of the population.

Table 5.3.   Predicted number of people at high risk of CVD if the number of people taking statins increases by 2.9% per year (6.5% to 32.1%).

	Baseline	Male	Female	Total
2007	2,327,650	1,491,675	835,975	2,327,650
2008	2,335,837	1,497,261	838,555	2,335,816
2009	2,345,451	1,502,890	842,518	2,345,409
2010	2,354,456	1,508,564	845,829	2,354,393
2011	2,363,531	1,514,283	849,165	2,363,447
2012	2,375,547	1,520,045	855,398	2,375,442
2013	2,381,890	1,525,850	855,915	2,381,765
2014	2,391,174	1,531,700	859,328	2,391,028
2015	2,400,527	1,537,594	862,767	2,400,361
2016	2,409,949	1,543,531	866,232	2,409,763

The increased use of statins has little effect on the number of people at risk of CHD. The change at ten years is to decrease the numbers of people at high risk of CVD by 130. This

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[71] LaRosa JC; He J; Vupputuri S. Effect of Statins on Risk of Coronary Disease: A Meta-analysis of Randomized Controlled Trials. JAMA 1999; 282 (24): 2340-2346.
[72] http://www.ic.nhs.uk/statistics-and-data-collections/primary-care/prescriptions (accessed April 2008).

small reduction is due to the fact that the hazard ratio for total cholesterol in the QRISK equation is close to one.

5.3.2 Scenario 2 – Impact of Increases in Average Population BMI

In the UK the average height and weight of a man are 175cm and 84kg respectively; this corresponds to a BMI of 27.4. The average height and weight of women in the UK are 162cm and 70kg respectively; corresponding to a BMI of 26.7[73]. Table 5.4 details the average weight and BMI of UK adults at current levels and shows how these change if BMI were to increase at USA rates over the next ten years.

Table 5.4: **Weight and BMI of UK adults used in scenario 2**

	Average UK Man			Average UK Woman		
	Current BMI	Weight	Increase in Weight	Current BMI	Weight	Increase in Weight
Current BMI	27.4	84.0 kg	N/A	26.7	70.0 kg	N/A
US BMI	29.7	91.0 kg	+7.0 kg	29.0	76.0 kg	+6.0 kg

5.3.2.1 Scenario 2a – Average population BMI increases in line with trends in BMI observed in US data

In the USA average BMI increased from 28.675 to 30.933 from 1996-2006[74], this equates to an increase of 2.258 over ten years. Table 5.6 shows the number of people at high risk of CVD if BMI increases at this rate.

Table 5.6: **Predicted number of people at high risk of CVD if the average population BMI increases at a similar rate to that recently observed in the USA**

	Baseline	Male	Female	Total
2007	2,327,650	1,493,200	836,579	2,329,779
2008	2,335,837	1,500,338	839,774	2,340,112
2009	2,345,451	1,507,532	844,359	2,351,892
2010	2,354,456	1,514,784	848,296	2,363,081
2011	2,363,531	1,522,094	852,264	2,374,358
2012	2,375,547	1,529,461	859,147	2,388,608
2013	2,381,890	1,536,886	860,294	2,397,179
2014	2,391,174	1,544,368	864,355	2,408,723
2015	2,400,527	1,551,908	868,448	2,420,356
2016	2,409,949	1,559,505	872,572	2,432,077

If BMI increases by 2.258 points (this is equivalent to a weight gain of 7kg for an average height man or 6kg for an average height woman) then, compared with baseline estimates

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[73] http://www.ic.nhs.uk/pubs/hse06trends (accessed March 2008).
[74] http://www.cdc.gov/brfss/index.htm (accessed April 2008).

(which used a predicted increase of BMI by 1.1 over ten years) the number of people at high risk of CVD in year ten will increase by 22,128 (i.e. from 2,409,949 to 2,432,077).

5.3.2.2 Scenario 2b – Decrease of 1.1 points in the average BMI level

Table 5.7 shows the number of people at high risk of CVD if BMI has an overall decrease of 1.1 points over ten years (an increase for the first five years of the model then a decrease for the remaining five years), as opposed to the 1.1 point increase over ten years that is modelled in the baseline analysis.

Table 5.7.   Predicted number of people at high risk of CVD if the average population BMI decreases by 1.1 points over ten years

	Baseline	Male	Female	Total
2007	2,327,650	1,491,675	835,975	2,327,650
2008	2,335,837	1,497,275	838,562	2,335,837
2009	2,345,451	1,502,918	842,532	2,345,451
2010	2,354,456	1,508,606	845,850	2,354,456
2011	2,363,531	1,514,338	849,193	2,363,531
2012	2,375,547	1,517,165	854,260	2,371,425
2013	2,381,890	1,520,019	853,611	2,373,630
2014	2,391,174	1,522,899	855,847	2,378,746
2015	2,400,527	1,525,805	858,101	2,383,906
2016	2,409,949	1,528,737	860,372	2,389,108

If BMI decreases by 1.1 points over ten years then the number of people at high risk of CVD in year ten will decrease from 2,409,949 to 2,389,108. This is a fall of 0.9%.

5.3.2.3 Scenario 2c – Reduction in smoking required to offset increases in BMI

Figure 5.1 shows the percentage change of patients at risk of CVD when the percentage of current smokers in the model is increased or decreased. For example, a 1% increase in current smokers per year over ten years will result in a 0.28% increase in the number of people at risk of CVD.

Figure 5.1:   Effect of current smokers on the percentage at risk of CVD
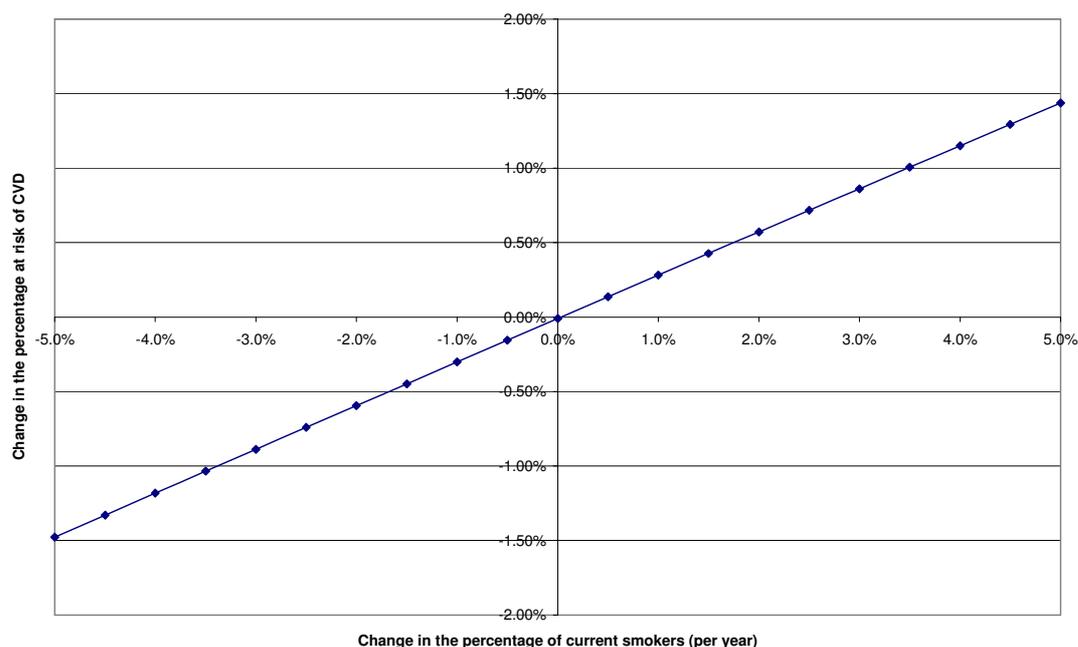
Change in the percentage of current smokers (per year)

In scenario 2a an increase of 2.258 points (USA levels) increased the number of people at risk of CVD by 0.9%, to offset this increase there would have to be year on year decrease of 2.9% in the level of current smokers in England. This means that the percentage of current smokers would have to fall to 15% from the current level of 22%.

5.3.2.4 Scenario 2d – Change in Townsend Score required to offset population increases in BMI

Figure 5.2 shows the percentage change of patients at risk of CVD when the Townsend score is increased or decreased. For example a 0.4 point increase in the average Townsend Score over ten years will result in a 0.4% increase in the number of people at risk of CVD.

Figure 5.2:   Effect of Townsend Score on the percentage at risk of CVD
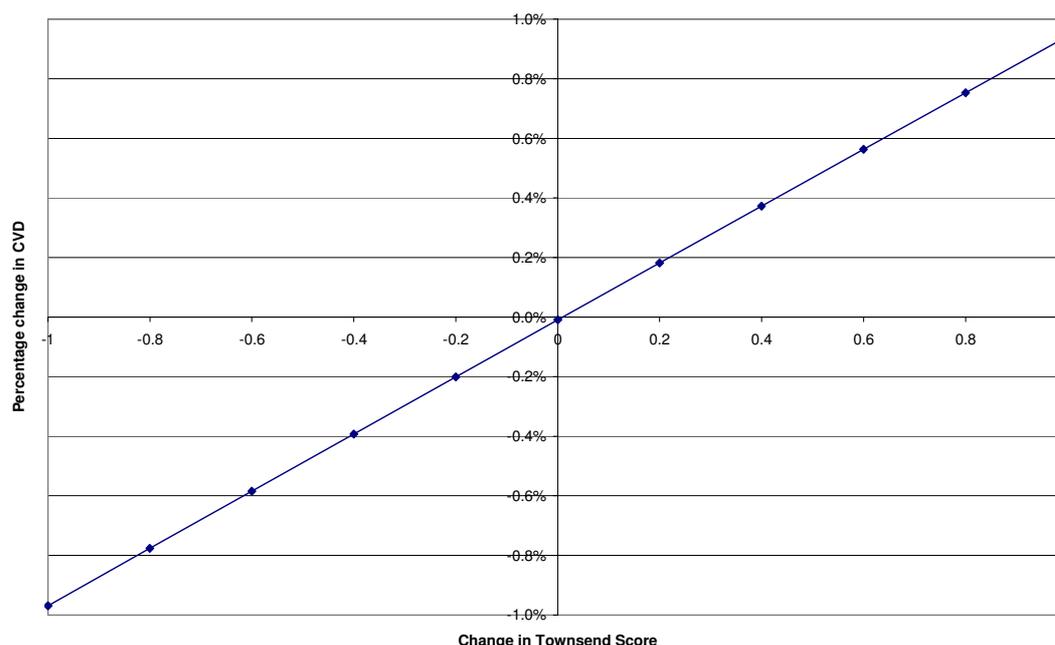
In scenario 2a an increase of 2.258 points (USA levels) increased the number of people at risk of CVD by 0.9%, to offset this increase there would have to be a decrease of 0.9 points for the average Townsend Score.

This is difficult to interpret in real terms as the Townsend Score is a tool for ranking areas within a specific part of the country rather than for rating an area and the actual score has no value i.e. a score of 4 is not twice as deprived as an area with a score of 2. Also, a score of 2 in one part of the country may not necessarily have the same characteristics as a score of 2 in another part of the country.

The following example uses data from Avon to show how much unemployment, car ownership, owner occupation and households with more than one person per room would have to change for the Townsend Score to fall by 0.8 points.

The average Townsend Score in the model is 1.1 for males and 1.2 for females, for Avon[75] this score equates to:

• Average unemployment rate of 16-64 year olds of 2.2% (Range: 1.5%-2.7%);
• Average percentage of people who don't own car of 3.4% (Range: 2.1%-3.9%);
• Average percentage of households not owner occupied of 5.8% (Range: 3.4% to 9.7%);
• Average percentage of households with more than one person per room of 0.86% (Range 0% to 1.3%).

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[75] http://www.avon.nhs.uk/phnet/Methods/townsend.htm (accessed April 2008).

For the Townsend score to fall by 0.8 points then typically unemployment would have to fall to 2%, percentage of people who do not own a car would have to fall to 3.2%, percentage of households that were not owner occupied would have to fall to 5.78% and percentage of households with more than one person per room would have to fall to 0.7%.

5.4 CONCLUSION

This exploratory exercise has identified areas for further more detailed modelling to breakdown the burden of CVD by disease area and help to predict the need for redistribution of resources or additional budget.

Section 6: Questionnaire Survey

KEY POINTS

- Improved management of patients has increased the number of longer-term survivors of CV events.

- 25% of those receiving care had multiple conditions and 25% were graded as having moderate to severe impairment.

- The majority of carers responding to the survey were the spouse or partner of the person cared for and nearly 80% were female.

- Only 13% of carers had reduced paid work as a result of caring, but 34% had experienced deteriorating health.

- Only 5% of cares had had a formal assessment of their needs for support in the caring role.

- Carers need more information about the after-care of MI and stroke patients, as well as advice on the psychological aspects of CVD.

6.1   RESPONSE RATES TO QUESTIONNAIRES

Data from 176 questionnaires were analysed. Responses have been received from a sample of users who are members of CVC organisations. This suggests that respondents are well informed individuals who take a proactive interest in cardiovascular disease. The results, therefore, should be viewed with caution. They can only illustrate areas of concern; statistical significance cannot be calculated. Nevertheless, the responses, particularly those to the open-ended questions, provide a useful insight into the experiences of people who care for those with cardiovascular disease.

Overall there was a 21% return rate, which is in line with the expected level of response. Table 1.1 shows the number of returns by distributing organisation.

Table 6.1:   Number of returned questionnaires

Distributing Organisation/ Method of Return	Number Sent Out	Number Returned
British Heart Foundation	800	163
South Asian Health Foundation	20	4
Heart Care Partnership (UK)	5	4
Returned Electronically	N/A	5

6.2   BACKGROUND INFORMATION

6.2.1   Demographic Information

Table 6.2 shows that the majority of questionnaire respondents (79.5%) were female and the majority of people to whom they provided care were male (77.8%)

Table 6.2:   Sex of carers and those receiving care

	Carer		Person Receiving Care	
	Number	**Percentage (%)**	**Number**	**Percentage (%)**
Male	35	19.7	137	77.8
Female	140	79.5	36	20.5
Blank	1	0.0	3	1.7

Most respondents (92.0%) cared for a partner or spouse (see Table 6.3)

Table 6.3:   Relationship between carer and person receiving care

	Number	**Percentage (%)**
Spouse/Partner	162	92.0
Son/Daughter	8	4.5
Friend/Neighbour	4	2.3
Brother/Sister	1	0.6
Father-in-Law	1	0.6

Respondents were predominantly white (95.5%) as were the people to whom they provided care (see Table 6.4)

Table 6.4:   Ethnicity of carer and person receiving care

	Carer		Person Receiving Care	
	Number	**Percentage (%)**	**Number**	**Percentage (%)**
White	168	95.5	164	93.2
Black	2	1.1	2	1.1
Asian	5	2.8	6	3.4
Mixed	1	0.6	3	1.7
Blank	0	0.0	1	0.6

6.2.2   Other Background Information

Survey responses showed that 93.8% of carers live with the person to whom they provide care. Further, most of the carers who responded to this questionnaire are retired (69.9%), but 24% are in full or part-time employment (see Table 6.5).

Table 6.5:   Employment status of carers

	Number	Percentage (%)
Employed Full Time	24	13.6
Employed Part-time	19	10.8
Retired	123	69.9
Unemployed – unable (Responsibilities)	5	2.8
Unemployed – unable (Disabilities)	4	2.3
Unemployed – not looking	1	0.6

When asked whether there had been a change in work as a result of caring for somebody with cardiovascular disease, most respondents felt that this question was not applicable (65.3%) or that there had been no change (18.2%). For further details see Table 6.6.

Table 6.6:   Change in work resulting from caring for somebody with a cardiovascular condition

	Number	Percentage (%)
Increased	4	2.3
No Change	32	18.2
Reduced	11	6.3
Given up	13	7.4
Not applicable	115	65.3
Blank	1	0.6

Three quarters of the respondents care for somebody who has been diagnosed with a cardiovascular condition for five years or longer (see Table 6.7).

Table 6.7:   Length of time the person receiving care has been diagnosed

	Number	Percentage (%)
Less than 1 year	4	2.3
1 – 5 years	40	22.7
More than 5 years	132	75.0

6.3   INFORMATION ABOUT THE PERSON WHO IS RECEIVING CARE

6.3.1   Cardiovascular Conditions

Table 6.8 shows that most people being cared for by questionnaire respondents had CHD/MI/Heart Attack (81.8%). The other main conditions were Heart failure (17.0%), Arrhythmia (18.2%) and Stroke (15.9%).

Table 6.8:   Conditions

	Number	Percentage (%)
CHD/MI/Heart Attack	144	81.8
Heart Failure	30	17.0
Arrhythmia	32	18.2
PVD	14	8.0
Stroke	28	15.9

Most people (74.4%) had one condition but 14.8% had 2 conditions, 7.4% had 3 conditions, 2.3% had 4 conditions and 1.1% had 5 conditions (see Table 6.9).

Table 6.9:   Multiple conditions

	Number	Percentage (%)
1 Condition	131	74.4%
2 Conditions	26	14.8%
3 Conditions	13	7.4%
4 Conditions	4	2.3%
5 Conditions	2	1.1%

The most predominant condition combinations involved CHD, with 22 people having CHD and Arrhythmia, 19 people having CHD and Heart Failure and 16 having CHD and Stroke (see Table 6.10). People with a cardiovascular condition suffered from a range of other conditions, the most frequently quoted being diabetes (20), arthritis (11) and asthma (9).

Table 6.10:   Numbers of individuals with multiple conditions

Conditions	Conditions				
	CHD	**Heart Failure**	**Arrhythmia**	**PVD**	**Stroke**
CHD		19	22	10	16
Heart Failure			15	5	5
Arrhythmia				5	8
PVD					4
Stroke					

Table 6.11 shows that most (63.4%) of the recipients of care had had their most recent cardiovascular event within the last five years and 97.6% of the recipients of care had their most recent cardiovascular event within the last 15 years.

Table 6.11:   Time since last cardiovascular event

Time since last event	Number	Percentage (%)
Less than 1	19	15.4
1 – 5 years	59	48.0
6 – 10 years	29	23.6
11 – 15 years	13	10.6
16 – 20 years	2	1.6
More than 20 years	1	0.8
TOTAL	**123**	**100.0**

6.3.2   Physical and Emotional Difficulties

Questionnaire respondents were asked to rate the level of physical impairment of the person for whom they cared using one of four categories of severity. Most respondents placed the person to whom the provided care in one of the lower severity categories, with 46.0% having no impairment, 27.8% least severe impairment and 21.6% moderately severe impairment (see Table 6.12 overleaf).

Table 6.12:   Level of physical impairment

	Number	Percentage (%)
Most severe impairment (Currently in bed or chair, having a lot of difficulty bathing or cannot bathe)	7	4.0
Moderately severe impairment (have a lot of difficulty climbing stairs or cannot do it and/or a lot of difficulty walking or cannot do it, but are not in the previously defined severity level)	38	21.6
Least severe impairment (have a lot of difficulty doing heavy work around the house or cannot do it, but hw are not in either of the two previously defined severity levels)	49	27.8
No impairment (have no difficulty bathing, climbing stairs, walking about ¼ mile, or doing heavy work, or are not in any of the previously defined severity levels)	81	46.0
Blank	1	0.6

Many of the respondents reported that the person that they cared for had not experienced emotional or behavioural difficulties, with 51.9% of responses falling in the 'Never' and 'Blank' categories. The difficulties most frequently reported in the 'Often' category were forgetfulness (42), mood swings (28), loss of confidence (27) and mild depression (25). The difficulties most frequently reported in the 'Often' and 'Sometimes' categories were forgetfulness (54%), mood swings (42%), mild depression (38.4%), anger (36.3%) and loss of confidence (37.5). Further information about emotional or behavioural difficulties can be found in Table 6.13.

Table 6.13:   Emotional or behavioural difficulties (number of responses)

	Often	Sometimes	Not Often	Seldom	Never	Blank	TOTAL
Verbally aggressive	12 (6.8)	33 (18.8)	17 (9.7)	11 (6.3)	61 (34.7)	42 (23.9)	176 (100.2)
Physically aggressive	0 (0.0)	5 (2.8)	4 (2.3)	5 (2.8)	116 (65.9)	46 (26.1)	176 (99.9)
Anger	18 (10.2)	46 (26.1)	11 (6.3)	23 (13.1)	42 (23.9)	36 (20.5)	176 (100.1)
Mood swings	28 (15.9)	46 (26.1)	16 (9.1)	21 (11.9)	40 (22.7)	25 (14.2)	176 (99.9)
Mild depression	25 (14.2)	43 (24.2)	9 (5.1)	38 (21.6)	37 (21.0)	24 (13.6)	176 (99.7)
Loss of confidence	27 (15.3)	39 (22.2)	12 (6.8)	28 (15.9)	38 (21.6)	32 (18.2)	176 (100.0)
Forgetfulness	42 (23.9)	53 (30.1)	16 (9.1)	22 (12.5)	23 (13.1)	20 (11.4)	176 (100.1)
Severe problems with speaking	8 (4.5)	7 (4.0)	7 (4.0)	6 (3.4)	107 (60.8)	41 (23.3)	176 (100.0)
TOTAL	**160**	**272**	**92**	**154**	**464**	**266**	

6.4   THE LIFE OF THE CARER

6.4.1   Carers' Health

Most of the carers indicated that they were relatively satisfied with their health, with 17% reporting to be 'Very satisfied', 41.5% 'Satisfied' and 23.3% 'Neither satisfied nor dissatisfied' (see Table 6.14).

Table 6.14:   Level of satisfaction with own health

	Number	Percentage (%)
Very satisfied	30	17.0
Satisfied	73	41.5
Neither satisfied nor dissatisfied	41	23.3
Dissatisfied	23	13.1
Very dissatisfied	8	4.5
Blank	1	0.6

Sixty-three per cent of respondents felt that their health had not changed as a result of caring for somebody with a cardiovascular condition, but 34.1% felt that their health had deteriorated.

Table 6.15: **Change in level of health as a result of caring for somebody with a cardiovascular condition**

	Number	Percentage (%)
Improved	3	1.7
Deteriorated	60	34.1
Stayed the same	112	63.6
Blank	1	0.6

6.4.2   Sources of Support

The times when most sources of support were provided were 'After diagnosis' (262) and in 'Current Situation' (297), in contrast with only 179 counts for the 'After most recent hospital episode' category. At each of these times about 30% of support was provided by family or friends, between 26% and 29% by GP and between 12% and 19% by condition specific support groups. See Table 6.16 overleaf for further details.

Table 6.16:   Main sources of support

	After Diagnosis (%)	After Most Recent Hospital Episode (%)	Current Situation (%)	TOTAL
GP	76 (29.0)	46 (25.7)	83 (27.9)	205
Other Professional Carer	47 (17.9)	33 (18.4)	28 (9.4)	108
Family/Friends	79 (30.2)	57 (31.8)	91 (30.6)	227
Church or Other Religious Group	11 (4.2)	10 (5.6)	13 (4.4)	34
Condition-specific Support Group	31 (11.8)	23 (12.8)	57 (19.2)	111
Counsellor	4 (1.5)	0 (0.0)	2 (0.7)	6
Social Worker	4 (1.5)	1 (0.6)	0 (0.0)	5
Other	10 (3.8)	9 (5.0)	23 (7.7)	42
TOTAL	262 (99.9)	179 (99.9)	297 (99.9)	

6.4.2.1 Other Sources of Emotional and Practical Support

Other sources of support noted by respondents were:

- • Work (it was felt that work provided a distraction);
- • Sport and social context;
- • Support workers; and
- • British Heart Foundation booklets.

6.4.2.2 Financial Support

Most respondents had not received financial support. For some this was because they felt that they did not qualify, whereas others appeared not to have been aware that obtaining financial support might be an option for them. Several respondents explained that the person for whom they cared had returned to work and therefore this question was not applicable. The comments below show, however, that a number of those who did apply for financial support did not find the process straightforward:

> *We had to fill in the attendance form many times as they kept losing them! And then it was refused.*

> *Because my husband can no longer read or write the first forms I filled in weren't processed because he could not sign them. They eventually accepted this with confirmation from the doctor but this caused a delay in getting benefit.*

> *Constant problems in obtaining help financially, lots of problems with official bodies*

> *Forms for carers received but my mother couldn't complete them so I had to do it – very challenging and I have a PhD!*

> *Applying for allowances is very complicated and changes are not fully explained*

One respondent elaborated on this, explaining:

> *My wife had her tunnel pass stopped because she is not on the 'high' rate of disability allowance. We now have to pay to go through the Mersey Tunnel. We were never informed about the change in rules or why.*

Other respondents were unhappy about the way in which benefits are allocated, commenting:

> *Due to my husband receiving disability allowance I am deemed not eligible.*

> *Over 60 so cannot claim carer's allowance.*

> *Feel it is unfair that if difficulty walking get blue badge etc and carers allowance but my husband does not know where he is, cannot get a bus, etc and needs constant watching, yet no allowance.*

6.4.3 Stress Associated with Living with, or Caring for, a Person with a Cardiovascular Condition

Results from the survey indicate that approximately half of the respondents (51.2%) found caring for somebody with a cardiovascular condition stressful. Further details may be found in Table 6.17.

Table 6.17: **Level of stress that results from caring for somebody with a heart condition or stroke**

	Number	Percentage (%)
Extremely stressful	4	2.3
Very stressful	19	10.8
Moderately stressful	67	38.1
Not really stressful	49	27.8
Not at all stressful	36	20.5
Blank	1	0.6

6.4.4 Assessment of Carer Needs

Only nine (5.1%) carers who responded to the survey had had a formal assessment of their needs (see Table 6.18).

Table 6.18: **Formal assessment of carer needs**

	Number	Percentage (%)
Yes	9	5.1
No	167	94.9

Those who had had an assessment were asked if they had found this helpful. Two carers responded positively and three said that the assessment had not been helpful; two others had mixed views, one of these commented:

> *Yes and no. Yes because without one, you can't access any help. No, because however much help is needed, available help is very limited because of cut backs and limited finances.*

6.4.5 Hardest Part of Caring for/Living with Somebody with a Cardiovascular Condition

Respondents' views fell into three broad categories:

- Fear about the future;
- Stress triggers;
- Restriction on activities.

6.4.5.1 Fears about the future

Many respondents were worried about the future and lived in fear of losing their loved one. In particular, they were worried that another cardiovascular event could occur at any time and that if this were to happen they feared that they might not be able to cope. One respondent said:

> *I live in constant worry and fear that she may die because I don't move more speedily or can't hear more clearly. When she needs help I don't sleep very well and always feel very tired.*

6.4.5.2 Stress triggers

The way that their home life had changed as a result of the person for whom they cared having developed a cardiovascular condition was an issue for many of the respondents. For some it was simply issues such as not being able to spontaneously go out; not being able to go for walks together; not being able to fly, or not being able to make plans in advance (e.g. for holidays together).

In other cases carers struggled due to pressures that had developed due to the impaired function of the individual for whom they cared. For some the stress was due to suddenly becoming the person who took the lead role and made the decisions in the relationship, for example:

> *Our marital/social/sexual life feels almost non-existent. My husband was a very active business man with a social life. This has now all ended and I now feel responsible for everything within the home. In a strange way I feel very alone.*

> *The frustration they feel is taken out on the carer but they get all the help and attention and we are supposed to do everything calmly in case of getting them stressed.*

> *Their condition never leaves you. I am always aware of the seriousness of Myocardial Infarction.*

Other comments focused on the difficulties associated with the practical aspects of looking after somebody with a cardiovascular condition, for example:

> *Making sure they get all the medical help which they should receive and knowing who to ask. I am uncertain as to what to do or who to contact.*

> *Controlling food intake and alcohol intake and maintaining the healthy diet.*

> *My care package is constantly required – I am on call 24/7*

6.4.5.3 Restriction on activities

The responses provide a sense that a number of the carers have difficulty coping with the role that they currently play. In particular several seem to resent the restriction that caring for somebody with a cardiovascular condition places on their activities.

> *[It is very hard to maintain] some independence to avoid their condition becoming all consuming and removing [any] other interests.*

> *Free time for myself - not being able to leave him for long – having to do everything together.*

> *I drive and we can go out but it is such a performance to load the car with husband and wheelchair. Everything so slow and patience wears thin. Also, everywhere we go has to be researched beforehand to see if we will be able to cope.*

6.4.6 Changes that Would Make Caring for, or Living with, Somebody with a Heart Condition or Stroke Easier.

Respondents' views fell into three broad categories:

- Health care and professional support;
- Information;
- Practical help with everyday life.

6.4.6.1 Health care and other professional support

Many respondents wanted more access to advice from health care professionals with knowledge of the relevant condition and there was frustration at the lack of integration of care. Some respondents suggested that they would find it really helpful to have regular consultations (six monthly or yearly) with health care professionals to discuss their current situation. These respondents felt that it would be easier for them to manage if they understood the situation.

A recurring theme raised by carers was their wish to have somebody to talk to - somebody who would listen and provide re-assurance. Several respondents felt that it would be helpful to have a means of accessing advice on how best to deliver care (for example when to intervene and when to leave the patient to cope) and also a source information on medical changes that might help the person to whom they provided care. One carer said that she would like to be able to contact somebody who could explain what was going on.

A number of respondents were struggling to cope, one said:

> *My wife and I feel completely cut-off and isolated. We can't afford private medical help and the NHS and social services appear to have more than they*

can cope with. Utility bills, phone bills, food constantly increasing in price. We feel we need more help but don't know how to contact or how to contact them.

Others felt let down by the services available to them. One respondent commented:

We are reasonably well-off elderly people, but feel that both the statutory services and the paid-for care agencies do not provide enough co-ordination or planning. We are often left in the dark for assistance, although often when we get it, it is of good quality, especially the district nurses and district physiotherapists.

It was suggested that the best kind of help was practical help, for example sitting with the person who has the cardiovascular condition whilst the carer goes shopping. Another respondent said that she would find it particularly helpful if she were able to

…stop the car near the hospital entrance, take my husband into the hospital into the care of a person in authority person, while parking the car.

One respondent explained how helpful she and her husband had found the rehabilitation course that they had attended. She said:

My husband attended a rehabilitation course after his first heart attack where he exercised under close medical supervision and was given advice about diet and medicines. This was very helpful, not least in showing him that he could exercise more fully than he had expected. We would both heartily endorse the continuance of these courses for people suffering heart attacks as they help to bridge the gap between immediate recovery and getting back to normal life.

A recurring theme was the lack of support for the psychological aspects of CHD. Several of the respondents had either starting or joined a support group to address this need. One respondent who had set up a support group said that he found that when people realised that they were not alone and not to blame they were very relieved.

There was a view that there was a need for more recognition that carers are people in their own right, with their own needs and feelings. There was a view that all help and support is geared to the patient while the carer becomes invisible. One respondent felt that there should be some official understanding of a carer's role and support to carry out the role.

6.4.6.2 Information

Many respondents wanted more information about the cardiovascular condition and aftercare, especially at the time of the event. Others suggested that there was a need for information to be directed at the carer rather than the patient, particularly in early years. Another respondent felt that more could be done by way of providing details about some of the side effects of heart problems, such as memory loss, forgetfulness and impotence or erectile dysfunction (ED). In particular, she felt that ED was a topic that was rarely

discussed and should be added to talks about the 'after life' that were given to people with heart problems.

One carer felt very strongly that when a hereditary condition is diagnosed it should not be left to the patient to explain the situation to close family members who may also be affected. At this point in the disease progression the patient might be under a certain amount of stress and therefore not only might the information relayed be incomplete it might not be relayed in an appropriate manner.

It was also suggested that it would be helpful to be able to attend courses on how to help somebody with a heart attack. One respondent said that she had attended such a course several years ago but was no longer confident that she had the necessary skills to cope and would like a refresher course.

6.4.6.3   Practical help with everyday life

A number of carers felt that they would benefit from practical help with every day life, including:

- Better access to personal care and household help;
- Help with heavy tasks such as gardening and decorating;
- Having a car for hospital appointments;
- Better access to exercise facilities locally;
- Access to respite care.

One respondent commented:

> *We would love the occasional weekend respite care, but there are no 'bookable' spaces for weekend care.*

Some respondents had financial concerns and expressed the view that it would be helpful to have more help towards home and heating costs. One respondent said:

> *…constant worry about finances is not good for either of our health problems.*

6.4.7   Effect of Cardiovascular Condition on Members of the Family of the Person with the Condition

Many respondents felt that having a relative with a cardiovascular condition had very little or no effect on that person's relatives. For some relatives the only impact had been a sudden awareness of their own mortality, the effect being that they now took more care of their health in terms of being more physically active and eating a better diet. In other cases it had had a positive effect, resulting in a much closer relationship between family members. A large number of respondents had found that their children had been very supportive, the support provided being both emotional and practical (for example, providing hospital

transport or respite care). However, some carers hid the extent of problems from their children and struggled alone with the burden of being a carer. One respondent said:

> *They do not see the day-to-day frustration she feels and therefore do not recognise the severity of the changes in her.*

A number of respondents who had young children or grandchildren felt that these young people had been affected. One respondent said that her children (aged 10 and 12) were suffering because their father could not stand noise of any sort and lost patience with them very quickly. Several carers felt that their grandchildren had missed out by not being able to have a closer or more active relationship with their grandfather.

Some carers feel they are pulled in multiple directions, one said:

> *My father, who is 84 and now in a nursing home, still resents the fact that I cannot give him my full attention, and my husband resents the time we need to spend with my father.*

Another respondent commented that caring for a parent involved being on call 24 hours a day and this had put a strain on her relationship with her partner.

Section 7: Discussion and Conclusions

Cardiovascular outcomes in the UK have improved markedly since 1994. However, mortality levels are still higher than in other Western European countries. The UK also lags behind other European countries in terms of adoption of new technologies despite the fact that per capita expenditure levels in the UK do not differ markedly from levels in these countries.

Despite the improvement in cardiovascular outcomes the burden of cardiovascular disease remains an issue. Although increased use of anti-hypertensives and statins, and the reduction in population smoking levels have had an impact, the numbers of people at high risk of CVD will continue to increase. The main reasons for this are demographic trends in terms of population ageing and the rising levels of obesity at all ages. Major new policy initiatives are required to ameliorate these effects.

The difficulty in reversing the demographic and obesity trends is exacerbated by the persistent inequalities in CVD risk and access to CVD services between social groups. Tacking these inequalities is a challenge, particularly as initiatives targeted at specific groups can result in increasing rather than decreasing levels of inequality.

Although in most scenarios modelled in this study the projected increase in absolute numbers of CVD cases is not unmanageable, improved screening and preventative care will be an important factor in continuing to improve outcomes and in keeping the growth of CVD cases within the capacity of current acute services. However, this will require increased resources in community-based services. Additional resources will also be needed to increase the uptake of effective acute interventions in those shown able to benefit as it is only in the longer term that resources will be freed in the acute sector by better behavioural and public health interventions.

Good acute care services are now in place for CHD and stroke patients but co-ordination with aftercare, rehabilitation and preventative services could be improved. Policy instruments such as the National Service Framework and National Institute for Health and Clinical Excellence guidance have been helpful in facilitating improvement. Recent policy initiatives in stroke services provide a further opportunity to enhance services in this major area of CVD.

More attention should be given to the needs of those caring for people with CVD. Carers bear significant economic and psychological burdens, in many cases without adequate information and support. Their role will become increasingly important as more people survive acute CVD events and live with heart disease.

7.1   LIMITATIONS OF THE STUDY

This study was intended as a high level review of issues relevant to the future development of CVD services in the England, including the perspectives of practitioners and carers. It therefore raises many questions and issues of relevance to the future development of services but does not include detailed analysis of, or solutions for, the issues raised.

The modelling used the QRISK equation, which is a relatively new approach, not universally accepted by specialists in the cardiovascular field. For example, there is debate over its treatment of diabetes. Time and resources did not permit the testing and comparison of different modelling approaches.

The expert survey included a selected sample with a wide range of interests and expertise. The sample was drawn from suggestions by members of the CVC, and the views expressed cannot be presented as being representative of those of the epidemiologists and clinicians working in CVD in England. Additionally, although interviewees commented on economic issues, they were not experts in this field.

The survey of carers used patient groups and charities to identify potential participants. Although a good response was received, the respondents are likely to be predominantly from those in higher socio-economic groups, with above average interest in, and knowledge of, CVD and NHS services.

7.2   STRENGTHS OF THE STUDY

Literature reviews were used to focus the interviews and inform the design of the questionnaire survey. This approach ensured that the study was based on the latest published information and statistics.

Two of the main attractions of the QRISK equation as a basis for modelling are that it is derived from UK data and that it adjusts for existing levels of treatment in the population at risk of CVD. Although the prevalence of diabetes is not included explicitly as a risk factor, previous work has shown that several other risk factors that are highly correlated with diabetes, including BMI and hypertension, are incorporated into the QRISK equation.

The modelling was not carried out at the level of detail necessary for the planning of capacity in different aspects of cardiovascular services. Whilst showing worrying trends in some risk factors, it showed that the aggregate increase in demand for CVD services over the next 10 years is manageable within current structures if additional resources are made available. It also showed that to make this happen the downward trend in some risk factors must be maintained and enhanced, while increased efforts are devoted to addressing obesity.

The range of often conflicting views expressed by the experts helped to identify issues and areas where more research is needed, and within which the CVC can focus its future activities. Carers welcomed the opportunity provided by the survey to articulate their views

and experiences. Information that they have provided will also prove very useful in helping to inform future CVC initiatives.

APPENDIX A

List of CVC Member Organisations

A.1 List of CVC Member Organisations

Arrhythmia Alliance
Blood Pressure Association
British Association of Cardiac Rehabilitation
British Association for Nursing in Cardiac Care
British Cardiac Patients Association
British Cardiovascular Society
British Heart Foundation
British Hypertension Society
British Society for Heart Failure
British Society of Echocardiography
Cardiac Risk in the Young
Cardiomyopathy Association
Children's Heart Federation
Coronary Prevention Group
Diabetes UK
Genetics Interest Group
Grown Up Congenital Heart Patients Association
Heart Care Partnership (UK)
Heart of Mersey
H.E.A.R.T UK
The Kidney Alliance
Kidney Research UK
Little Hearts Matter
Marfan Association
Mental Health Foundation
National Council for Palliative Care
National Heart Forum
Primary Care Cardiovascular Society
South Asian Health Foundation
Stroke Association
Tiny Tickers

APPENDIX B

List of Interviewees

B.1　List of Interviewees

Name	Job Title / Position
Michael Cumper	Chair of Board of Trustees of Grown Up Congenital Heart Patients Association
Sir Terence English	President of British Cardiac Patients Association
Dr Fiona Godlee	Editor of BMJ
Dr David Hackett	Vice-President of British Cardiovascular Society
Professor Richard Hobbs	Professor of Primary Care and General Practice and Head of Department at University of Birmingham
Mr Paul Lincoln	Chief Executive of the National Heart Forum
Dr Kiran Patel	Consultant Cardiologist and Honorary Senior Lecturer
Mrs Jan Procter-King	Primary Care Specialist Nurse
Eve Richardson	Chief Executive of the National Council for Palliative Care
Dr Liz Warburton	Consultant in Stroke Medicine
Professor David Wood	Professor of Cardiovascular Medicine

APPENDIX C

Link to Access Full Appendices

C.1   Link to Cardio and Vascular Coalition Website for Access to Full Appendices

http://www.cardiovascularcoalition.org.uk

About the Cardio & Vascular Coalition

The Cardio and Vascular Coalition (CVC) is a
national coalition of 31 voluntary organisations
with an interest in promoting and protecting
cardiovascular health in England.

The CVC is committed to working with and
influencing central and local government, health
and social care commissioners, service planners
and policy makers to ensure that cardiovascular
health is high on their agendas.

In 2008-09 the CVC is working to highlight the
need for a comprehensive Cardiovascular Health
Strategy for 2010 – 2020.