H·E·A·R·T UK
THE CHOLESTEROL CHARITY

Cholesterol and the ageing population

Avoiding the crisis in health and pension costs

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H·E·A·R·T UK aims to help families with a high risk of premature cardiovascular disease (CVD), especially those with inherited high cholesterol. The charity seeks to break the vicious cycle of unnecessary heart attacks and death in young people from families with an inherited high risk, and to ensure that people can live healthy, active lives rather than become disabled by long-term illness. H·E·A·R·T UK provides nursing and dietetic support through a dedicated helpline, publications and its website.

The charity's work is devoted to prevention, risk management and advocacy. People with an inherited high risk of CVD must be supported so that they can make informed choices, access appropriate treatments and manage their lifestyles. However, more than three quarters of people with inherited high cholesterol are not diagnosed and therefore remain untreated.

H·E·A·R·T UK strives to encourage innovative approaches to prevention by sharing scientific and medical information, knowledge and expertise through national and international networks. The charity offers a platform for exchanging information about healthy living and state-of-the-art treatment of high-risk patients, and is committed to ensuring that all individuals affected by these conditions are able to receive the medical treatment they need. To this end, H·E·A·R·T UK works together with all partners that can contribute to helping it achieve its goals.

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Foreword

Rt Hon Kevin Barron MP, Chair Health Select Committee

Public health is much talked about, but too often it comes a long way down on the list of priorities. Action does not reap rewards tomorrow, next month or even next year. Improvements are gradual. In politics we are pressured into showing quick results and in health this often focuses the attention of Ministers and the NHS on waiting lists or other more immediate goals. But it is also the duty of politicians to do what is right.

I have been a public health campaigner for as long as I can remember. I have often commended this Government for appointing the first ever Minister for Public Health and for the many strides that have been taken. But further strides are needed, and I welcome this report from H·E·A·R·T UK for showing the true implications of cholesterol and cardiovascular disease if left unchecked in the wider population. It is an important wake up call.

More than one in three deaths every year is due to cardiovascular disease - heart disease and stroke. It is the nation's biggest killer, and unhealthy levels of cholesterol are the major risk factor. Current estimates are that over 9 out of 10 adults in the UK have unhealthy levels of cholesterol.

This report shows that the NHS is not achieving its own existing targets in identifying and treating all those with a high risk of heart disease. Many people can lower or control their cholesterol through diet and lifestyle alone, yet the report shows that public health policy to date has not included clear action for the wider population on lowering cholesterol.

With an ageing population already causing challenges for health and pension costs, a lack of focus on major health risk factors such as cholesterol threatens to derail efforts to extend our healthy working lives. We cannot work longer if we're too ill to work.

Our health is our most precious asset, but is too often squandered through a sedentary and unhealthy lifestyle, and too often through a lack of information, support and opportunity to change. This requires individuals to take responsibility for themselves. But it also requires government to drive change and to lend a hand to those who need help. I know from my own constituency in South Yorkshire, it is often those with the worst health who need the most help to make a change.

Rt Hon Kevin Barron MP, Chair Health Select Committee

Executive summary

Cholesterol: the facts

- Cholesterol is the single greatest risk factor for the nation's biggest killer, coronary heart disease, contributing to almost half of all coronary heart disease-related deaths in the UK. Cholesterol is also a major risk factor in stroke and it contributes to the increased risk of CVD (cardiovascular disease) associated with diabetes and obesity.

- In 2005 (CVD), including heart disease and stroke, killed over 120,000 people in the UK; equivalent to the population of a city the size of St Albans.

- The death rate from CVD and coronary heart disease in the UK is one of the highest in Western Europe; only Ireland and Finland have a higher mortality rate than the UK.

- CVD kills more men and women in the UK than any other disease and in 2004 cardiovascular disease was responsible for nine times more deaths in women than breast cancer.

- The real tragedy is that for most of us, unhealthy levels of cholesterol can be avoided simply by maintaining a healthy diet and lifestyle.

- However, there are some people who cannot manage their cholesterol levels through diet and lifestyle alone as they suffer from an inherited form of high cholesterol which can lead to heart attack or stroke in their 20s or 30s, often with tragic consequences.

Cholesterol and public policy

- Whilst the number of deaths from CHD (coronary heart disease) has been declining, the number of people living with heart disease and leaving the workforce prematurely is rising. By 2020 heart disease will be the leading cause of disablement in the UK.

- Whilst the Government is seeking to make the population work longer and save more, workers face the prospect of increasing ill-health and incapacity. This worsening state of health threatens to defeat the Government's efforts to ensure we can afford the pensions, social security and health funding we need. The population is ageing, but when this is combined with significant increases in ill-health, the implications rise to crisis proportions. Across Great Britain, this increase translates to over 678,000 extra GP appointments and over 36,000 extra hospitalisations each year.

- It is estimated that the cost to UK annual productivity due to coronary heart disease is £2.9bn. Most of this is due to inability to work. Current reductions in deaths from coronary heart disease will have little impact on UK productivity unless similar efforts are made to reduce the rate of morbidity.

- It is estimated that approximately 30,000 more deaths could be prevented annually in the UK by increasing treatment uptake, and over half of these deaths could be prevented by focusing on prevention of second heart attacks and strokes.

- To date much attention has been focused on the obesity epidemic, yet if increasing numbers of those aged 55 or more are to remain in the workforce, and paying taxes rather than consuming benefits, then the crisis in cholesterol management must now be addressed.

Cholesterol: the need for improved emphasis in public health policy

- Publication of the Public Health White Paper in 2004 was recognition that action was required, but implementation has been slow and targets on obesity and sexual health are unlikely to be met. By 2006 only 15% of trusts were spending the money allocated in the White Paper on public health measures.

- In London the health inequalities gap is widening amongst the Spearhead group of local authorities. The London Health Observatory believes that targets to reduce inequality in the capital will not be met unless services such as testing for cholesterol and high blood pressure are provided.

- International experience shows that public health policy can positively affect health behaviours. This was demonstrated in North Karelia in Finland where community initiatives resulted in an over 50% reduction in cardiovascular mortality rates in men aged 35-64.

- In Britain there is much work still

to be done to ensure cholesterol management is a central part of any public health programme. In 2004 less than 5% of respondents in a survey of the general public were aware that cholesterol was the highest risk factor for coronary heart disease.

The role of primary care

- Primary care is uniquely placed to address the crisis in cholesterol management, by providing information and advice on how to maintain a healthier diet and lifestyle, which for many is the most effective method of lowering cholesterol.

- For those patients who cannot manage their cholesterol levels through diet and lifestyle alone, lipid lowering drugs can be prescribed. Statins have the potential to reduce the rate of first major vascular events by about one-third.

- The number of people currently being prescribed cholesterol lowering drugs is considerably less than the number who could benefit from the treatment. This treatment gap contributes to more than 7,000 unnecessary heart attacks each year.

- Some very effective statins are now off patent and the cost of treatment has been reduced substantially using these generic statins. This should allow the targeted use of more potent proprietary statins, that have a higher acquisition cost, to achieve lower cholesterol goals in high risk individuals.

- The Quality and Outcomes Framework (QOF) in the GP contract has the potential to have a huge impact on prevention of cardiovascular disease in the UK; however the target value for cholesterol levels in QOF is now outdated. The latest guidance from the Joint British Societies (JBS2) recommends cholesterol targets which are significantly lower than current Government guidance, which must be altered at the earliest opportunity. Current targets are failing patients by only driving the NHS to achieve the minimum standard of care.

Recommended action

- A publicly funded awareness campaign is needed to increase awareness of cholesterol, its risks and how individuals can reduce and manage it through diet and lifestyle changes.

- Full implementation by the NHS of JBS2 guidelines and inclusion of a total level of cholesterol of 4mmol/l as a target for the next GP contract.

- Greater access to cholesterol testing as part of heart risk assessment.

- Training for primary care professionals on diet, public health measures and CVD prevention.

CHAPTER 1

Cholesterol: Key facts

Michael Livingston, Director, H·E·A·R·T UK

Cholesterol: the biggest risk factor for cardiovascular disease

Cholesterol is the single greatest risk factor for the UK's biggest killer, coronary heart disease. It contributed to almost half of all the 72,000 coronary heart disease-related deaths in the UK in 2005. High cholesterol is also a major risk factor in stroke, which killed 48,000 people in 2005, and it contributes to the increased risk of CVD associated with diabetes and obesity. Cholesterol only becomes a problem if someone has too much of it, as this increases the risk of heart attack, stroke and peripheral vascular disease. Unfortunately, a significant proportion of the UK population has undesirably high cholesterol levels[1], and many of us dangerously so[2]. The real tragedy is that for most of us unhealthy levels of cholesterol are avoidable.

In 2004 cardiovascular disease was responsible for nine times more deaths in women than breast cancer.

What is cholesterol?

Cholesterol is a white waxy substance, essential for life and present throughout the body. Cholesterol can be made in the liver from foods high in saturated fat or absorbed from the intestine from foods with a high cholesterol content such as egg yolks, but most cholesterol is produced in the liver. There are two main types of cholesterol: low-density lipoprotein (LDL) cholesterol and high-density lipoprotein (HDL) cholesterol. LDL cholesterol is considered as 'bad' cholesterol as it deposits itself in the arteries leading to a build up and a narrowing of the arteries. HDL is the 'good' cholesterol as it picks up excess cholesterol and takes it away from the arteries.

High cholesterol levels exist because our body's ability to process newer diets has not evolved at the same rate as our intake of high saturated fat foods. It takes thousands of years for any species to adapt to a completely different diet and we have tried to adapt to the current "Western" diet in the past 200 years. The levels of cholesterol that our bodies have historically been designed to work with are now only found in hunter/gatherer populations such as Eskimos, Pygmies or San Bushmen, who do not suffer from cardiovascular disease at all. In fact, Western populations have by far the highest cholesterol levels in the whole animal kingdom. In 2003 over two-thirds of adults in the UK had a total blood cholesterol level over 5.0mmol/l[3]. Since 2003, this figure is likely to have increased to as much as nine out of ten adults.

CVD: The silent killer

Cardiovascular disease (CVD, including coronary heart disease and stroke) is the main cause of death in the UK. As shown in figures 1 and 2, CVD kills more men and women in the UK than any other disease. Shockingly, in 2004 cardiovascular disease was responsible

The risks

Key risk factors associated with CVD include:

- increasing age;
- a family history of heart and vascular disease; and
- Type 1 diabetes.

Other CVD risk factors, which can be modified, include:

- a diet high in saturated fats;
- elevated total blood cholesterol;
- a raised level of LDL ('bad') cholesterol and a low level of HDL ('good') cholesterol in the blood;
- elevated blood pressure;
- smoking;
- obesity;
- Type 2 diabetes;
- inactivity;
- excessive alcohol; and
- stress.

When several such risk factors exist together, the risk of CVD is significantly increased. It is not enough to consider just one CVD risk factor; all aspects of an individual's health, nutrition and lifestyle should be kept under review.

for nine times more deaths in women than breast cancer.

Moreover, CVD is one of the main causes of premature death in the UK, leading to almost one third of premature deaths in men and one fifth of premature deaths in women[4]. CVD also contributes to something of a survival postcode lottery in the UK, with both men and women in the North of England living at least one year less than those in the South[5], and the chances of being affected by coronary heart disease are considerably higher if you live in Newcastle, Glasgow or Manchester.

What are optimal levels of cholesterol?

The average total cholesterol level in the UK is approximately 5.5mmol/l in men and 5.6mmol/l in women, although many people have much higher levels[6].

Latest UK guidelines for optimal treatment targets (2005)[7]	**Current guidelines from the National Service Framework for Coronary Heart Disease (2000)**
Total cholesterol level of less than 4.0mmol/l or a 25% reduction (whichever is lower)	Total cholesterol level of less than 5.0mmol/l (or a 30% reduction, whichever is lower)
LDL-cholesterol of less than 2.0mmol/l (or a 30% reduction, whichever is lower)	LDL-cholesterol of less than 3.0mmol/l (or a 30% reduction, whichever is lower)

Whilst it is recommended these targets are aimed for, it should be emphasised that the lower your cholesterol is, the better it is for you.

Figure 1: Deaths by cause, women, 2004, United Kingdom

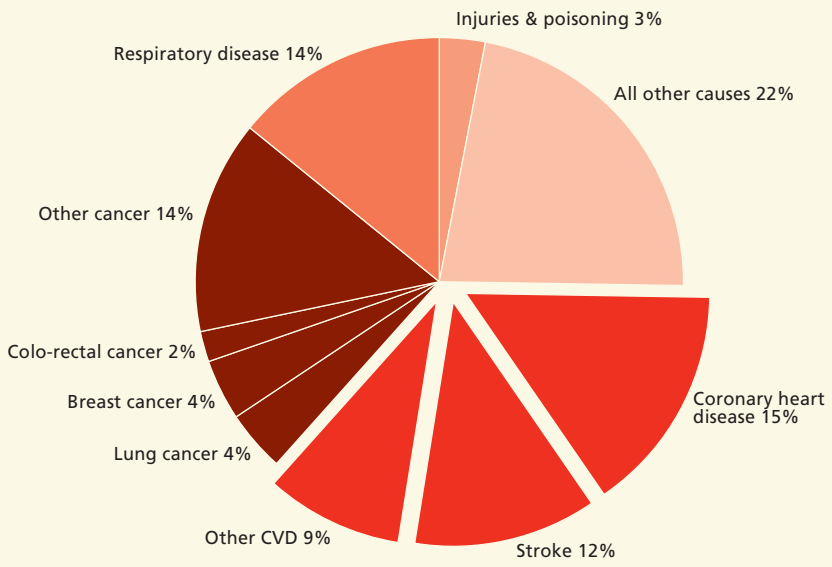
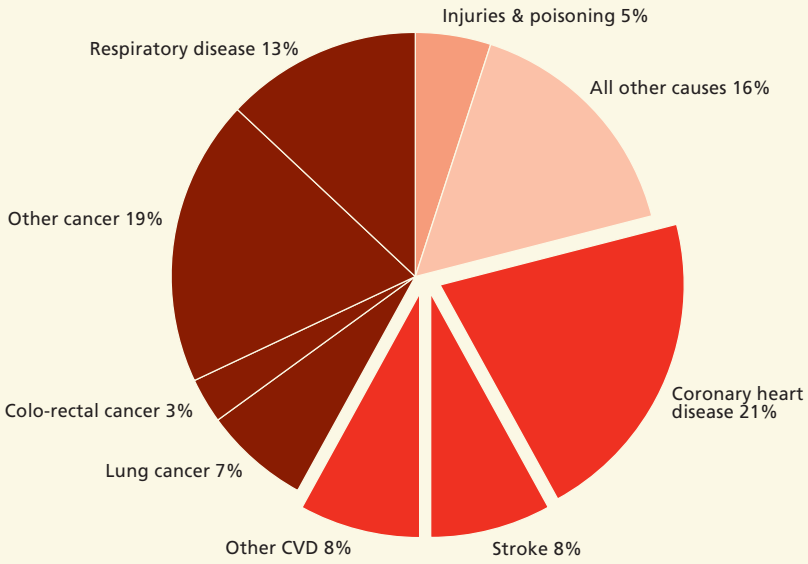


Figure 2: Deaths by cause, men, 2004, United Kingdom



Coronary events: UK versus Europe

The death rate from CVD and coronary heart disease in the UK remains one of the highest in Western Europe, at 40%. This compares to just 28% in France and 32% in Spain[8] with only Ireland and Finland having a higher mortality rate than the UK. Across Europe in 2005, CVD caused over 4 million deaths which represents nearly half of all deaths in Europe during that year. Just under half of these were due to coronary heart disease. In the same period in the UK, CVD-related deaths totalled almost 120,000 - equivalent to the population of a city the size of St Albans, of which 60% were due to coronary heart disease.

Recent data from the Department of Health[9,10] shows that CVD and CHD mortality has dropped significantly, however despite the fall in deaths the number of people living with coronary heart disease has continued to rise.

How to maintain a healthy heart

Simple ways to manage cardiovascular disease risks, to lower cholesterol and to maintain heart health include:

- eat a balanced diet with plenty of fruit and vegetables, based on wholegrain foods and low in fat, especially saturated fat. A specific 'portfolio' combination of proven cholesterol-lowering foods, when eaten regularly, has been shown to lower LDL-cholesterol ('bad' cholesterol) by 29% which compares favourably with the 30.9% reduction in those taking a statin drug[11];
- aim for a healthy weight and shape. Women should aim for a waist measurement below 80cm (32inches) and men below 94cm (37inches).
- take regular physical exercise - at least 30 minutes on most days of the week;
- avoid or stop smoking;
- reduce stress levels;
- have regular blood pressure checks;
- control diabetes (if appropriate); and
- better understand your personal risk factors by having a comprehensive cardiovascular risk assessment.

Family history

For some people cardiovascular disease cannot be managed through diet and lifestyle alone.

Over 120,000 people in Britain have a form of inherited high cholesterol called Familial Hypercholesterolaemia (FH) which can lead to heart attack or stroke in their 20s or 30s, often with tragic consequences. It is estimated that over 85% of people living with FH in the UK are unaware that they have the condition and are therefore untreated, even though making the diagnosis is usually straight forward and is based on a cholesterol test, the family history and a clinical examination.

FH is a genetic condition with each new family member born having an even chance of inheriting the condition. When an individual is diagnosed with FH, it is essential that all close relatives have their cholesterol levels measured so they too can start lifestyle modifications and preventative treatments if necessary. In families where coronary heart disease has occurred early in adult life it may be advisable to test for FH in childhood.

There are two main forms of FH:

- Heterozygous FH (inherited from one parent) which affects about 1 person in every 500, and is caused by a genetic defect resulting in exceptionally high cholesterol levels, which can be more than four times the national average.

- Homozygous FH is inherited from two parents and occurs in only 1 in 1,000,000 people. However, the effects are very dramatic; angina from the age of 5 and heart attack at the age of 6 have been clinically observed. Often these patients do not respond to medication and lifestyle changes and a procedure called LDL apheresis is required to treat their condition.

This procedure works in a similar way to kidney dialysis, and filters out the LDL cholesterol from the blood.

A further genetic condition is Familial Combined Hyperlipidaemia (FCH), which occurs in at least 1 in 300 people. Although relatively common, this condition is difficult to diagnose because there is no fixed pattern of clinical or laboratory features and therefore remains largely undetected and untreated. People with FCH tend to develop CVD later in life than those with FH[12].

Conclusions

Coronary heart disease is the UK's biggest killer and cholesterol is the disease's greatest risk factor. As has been shown, this situation is avoidable for many people by making simple adjustments to their diet and lifestyle. However, without greater awareness of cholesterol and greater access to cholesterol testing as part of a heart risk assessment to enable better understanding of personal risk, we face a future where coronary heart disease continues to be the UK's greatest and most enduring public health legacy.

Healthy heart foods

Food group	Examples
Nuts, seeds, rapeseed oil or olive oil	These contain unsaturated fats which can help reduce total cholesterol levels and may also improve the balance of the HDL-cholesterol and LDL-cholesterol. However, these foods are a very concentrated source of calories, so if you're watching your waistline, consume in small amounts or cut out the equivalent calories elsewhere in your diet.
Fruits and vegetables	Colourful antioxidant-rich types of fruit and vegetables such as carrots, mangoes, apricots, blueberries, tomatoes, spinach etc, help prevent the LDL-cholesterol becoming more damaging by being oxidised in the body.
Phytosterol/stanol enriched foods	Consuming 2g per day of plant sterols/stanols can help reduce levels of LDL-cholesterol. Plant sterols and stanols are found margarine spreads, yoghurts, milk and mini- drinks. They also occur naturally, in small amounts, in fruits, vegetables, nuts, seeds, cereals and vegetable oils.
Soya	25g of soya protein a day can lower LDL-cholesterol. Soya protein-rich foods include soya milk, soya yogurts and soya mince.
Beans, pulses and oats	These foods are rich in soluble fibre that help lower cholesterol by binding to it in the gut and preventing absorption. To lower cholesterol levels you need to eat two good portions daily, such as porridge oats for breakfast and beans/pulses for lunch.

CHAPTER 2

Cholesterol & UK public policy[13]

Tony Hockley, Director, Policy Analysis Centre

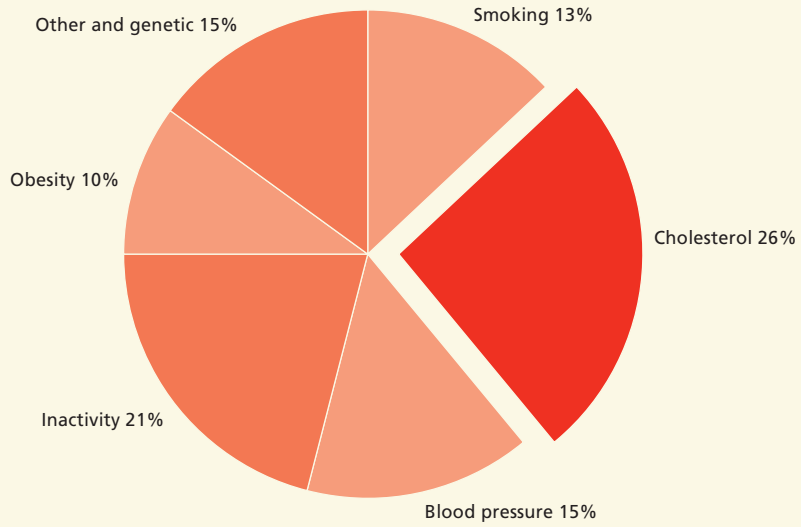
Introduction

The future for UK workers looks morbid. At a time when governments are seeking to make the population work longer and save more, in order to defuse the demographic "time bomb" workers face the prospect of increasing ill-health and incapacity. This worsening state of health threatens to undermine Government efforts to defuse the demographic "time bomb" and maintain the affordability of the welfare state. Tragically, much of this ill-health is avoidable.

There is already great concern and much debate over an epidemic of obesity amongst the "baby boom" generation, and associated increases in diabetes. Both of these are proving difficult to tackle and are major factors in the UK's poor record on heart disease. The World Health Organisation has calculated that 60% of coronary heart disease and 40% of stroke is due to elevated cholesterol[14]. Department of Health analysis suggests that a quarter of years of life prematurely lost to coronary heart disease (CHD) are attributable to cholesterol levels[15].

The number of deaths from CHD has been declining[16]. However, the number of people living with heart disease, including following heart attacks, and the number who are suffering ill-health and leaving the workforce prematurely is rising. By 2020 heart disease will be the leading cause of disablement[17]. An American study predicts a rise in CHD in the next 25 years of more than 50%, as "baby boomers" continue to swell the ranks of the older age groups. Decreases in mortality are being offset by increases in morbidity,

Impacts on CHD Mortality



and the trend looks set to worsen.

This trend adds to the growing costs of social security, health, and long-term care; which are already provoking concern at present levels. The Chief Medical Adviser to the English Department of Work and Pensions has said that the health and wellbeing of people of working age is of "fundamental importance to our future"[18]. Neglecting CHD morbidity presents a bleak prospect, yet this is the present position. Cholesterol management in the UK falls well below standards of best practice, despite the existence of simple and effective prevention and treatment strategies.

For the NHS, poor prevention of heart disease places a large and expensive burden on hospitals to treat acute coronary and cardiovascular events that could have been avoided. It also threatens to overwhelm already hardworking GPs and primary care professionals with significantly greater demand for appointments and care.

This burden of disease threatens not only the NHS, but also the wider economy. A recent study of the economic burden of CHD alone put the annual cost to the UK economy at more than £7bn . Half of this (£3.5bn) is the direct cost to the health system of CHD and stroke. The other half is through productivity losses in the UK economy mainly due to incapacity to work[19].

Demographic and health trends

The UK faces the consequences of an ageing population, which are challenging its health, work, and pensions systems. But the ageing profile alone does not represent the full scale of this challenge. Not only is the population ageing, but when this is combined with significant increases in ill-health, the implications rise to crisis

proportions. Much of this is due to rising levels of obesity and diabetes. The British Heart Foundation has estimated that the number of people in the UK living with CHD is already 2.7 million.

Much of this change is due to rising levels of obesity and diabetes. Diabetes increases the risk of CHD by as much as four times compared to risk levels in the general population, and the proportion of the population that is obese has already grown by almost 400% in 25 years. The Health Select Committee even suggested that obesity could make the publicly funded health service unsustainable[20]. The World Health Organisation forecasts that the number of individuals with diabetes in the UK will increase from around 1.7m in 2000 to 2.7m in 2030[21]. But, as has been shown, these important risk factors are both preventable and treatable, whether or not any possible steps to tackle the obesity epidemic see any success in the years to come.

In obese individuals and those with undiagnosed diabetes, the gradual congestion and clogging of arteries with cholesterol can be well underway years before any medical problems become evident[22]. One survey of general practices in southern England found that well over half of those with diabetes were undiagnosed, and therefore untreated, and that those who were treated were falling well below existing targets[23]. A survey of English NHS patients with diagnosed diabetes found, for example, that even in the 55 to 64 age group more than 1 in 6 also had CHD, rising to 1 in 3 men aged 65 to 74. The survey also found that rates of obesity amongst patients with diabetes were highest in the 45 to 54 age group[24].

The Government has set itself a target to move one million people in England off disability benefits and into work.

Cardiovascular disease (CVD) has become a major contributor to ill health and disability. Forecasts for Scotland suggest that "unless rapid and major changes occur in the incidence of heart failure, the burden of this disorder will continue to increase in both primary and secondary care over the next two decades"[25] with a rise of almost one third amongst men, leading to a 40% increase in GP appointments and 34% in hospitalisations by 2020. This amounts to an extra 52,000 GP appointments each year in Scotland associated with heart failure, and an extra 2,700 hospitalisations. Across Great Britain, this increase equates to over 678,000 extra GP appointments each year and over 36,000 extra hospitalisations each year.

This unwelcome scenario is of a large elderly population that is in a worse state of health yet living longer than its predecessors. Despite these worrying trends in ill-health the Government has set itself a target to move one million people in England off disability benefits and into work.

Most people with type 2 diabetes without cardiovascular disease (CVD) have dangerously high cholesterol[26]. In addition, the UK now has the worst obesity rates in Europe[27], and the World Heart and Stroke Forum points to increasing obesity as an underlying risk factor for CVD in future years[28].

Targeting weight reduction and glucose control in the elderly will be important in preventing CVD. As explained in the previous chapter, harmful levels of cholesterol are easily identifiable, and the diet, exercise, weight loss (where necessary), and medical steps that can be taken to tackle them are readily available and effective. But they appear to be steps that are not yet routine in Britain.

The focus of much public policy has been on nutrition in the context of rising levels of obesity. This has, however, focused largely on childhood obesity and nutrition (e.g. school food) rather than on the "baby boomers" who will face the most challenging consequences of demographic change in the coming two decades.

In addition, the Food Standards Agency has spent millions of pounds on advertising to raise awareness of the dangers of excessive salt levels in our diets. Whilst salt is an important factor in CHD, much less emphasis has so far been placed on other aspects of nutrition, including saturated fats. Food Standards Agency figures in 2006 show that the nation is taking 15% of its total food energy from saturated fat, instead of the recommended level of not more than 11%[29].

Government guidelines - soft on cholesterol

The Government has called for a 40% decrease in the number of deaths caused by CHD in England by 2010[30]; but this would be achieved even without additional measures[31]. Decreases in smoking have helped to reduce the number of CVD deaths, including coronary heart disease and stroke, alongside improvements in hospital care following a heart attack or other cardiac event. The Medical Research Council / British Heart Foundation Heart Protection Study concluded that statins alone have the potential to reduce the rate of first major vascular events by about one-third[32].

About 30,000 more deaths could be prevented annually in the UK by increasing treatment uptake. Although CHD mortality has fallen considerably, only around a third of eligible patients in Scotland have been receiving appropriate therapy; so that a further 4,078 deaths could be prevented or postponed if these patients received appropriate treatment, and by implication a further 30,000 annually in England and Wales. Over half this figure could be achieved by focusing on appropriate secondary prevention alone[33].

Analysis suggests that reductions in cholesterol seem to have considerable potential to further reduce coronary heart disease mortality rates, because CHD mortality is reduced more by a 1% relative reduction in cholesterol than by a 1% mean reduction in blood pressure.

English guidance in the National Service Framework (NSF) for Coronary Heart Disease, published in 2000, falls well below standards of best practice in the identification and treatment of those who are placed at risk of early ill-health due to their cholesterol levels.

The NSF recommended, amongst other things, that statins and dietary advice should be used to lower cholesterol in high risk patients either to less than 5mmol/l or by 30%, whichever was greater.

In November 2005 the expert Joint British Societies updated their guidance on CVD prevention[34]. The JBS guidance, written by the leading clinical organisations in the field and recognised as the gold standard guidance in the UK, sets tougher cholesterol targets by recommending that people at high risk should achieve cholesterol levels of less than 4mmol/l (or a 25% reduction, whichever is lower). The guidelines also state that the cholesterol target of 5mmol/l set in the NSF as the optimum targets is only the minimum level of care.

The maintenance of the old higher cholesterol target is undermining patient care and threatens to undermine wider government policies which depend on a healthy population. Maintaining the old target means that the NHS is not even aiming to achieve the best for patients.

The treatment gap

Despite the National Service Framework for CHD lagging behind latest best practice, the NHS still fails against its own NSF standards of care.

Whilst the UK has a relatively high usage of cholesterol lowering drugs in those identified with CVD, the overall rate of use appears to be low compared with what could be expected for the size of the UK population[35] and what is cost effective. This suggests a significant shortfall in the diagnosis of patients who would benefit from treatment, and in the treatment of those identified.

The authors of a recent extensive NHS audit in England calculated that more than 7,000 unnecessary heart attacks each year can be attributed to this "treatment gap"[36]. Given that the NHS National Tariff sets a hospital price of at

least £3,100 per heart attack, this could represent an unnecessary direct hospital care cost of as much £21 million[37].

There are significant local variations in cholesterol measurement of at-risk patients in primary care; covering just 10% of patients with heart disease in some primary care organisations, but almost 90% in others[38].

Despite a very high risk of heart disease amongst individuals with diabetes, as many as half of all people with diabetes are undiagnosed, and therefore untreated. Rates of obesity amongst those diagnosed with diabetes are highest in the 45 to 54 age group, thus placing these working-age people at very high health risk, and 15% of people with diabetes of this age already have heart disease.

Even amongst those fortunate few patients who are receiving preventative treatment for CVD perhaps half are not being treated sufficiently to achieve common targets on cholesterol levels; Up to 30,000 deaths each year could be prevented if this "treatment gap" is eliminated[39].

Lost productivity

UK policymakers' economic hopes rest on the assumption that the "baby boom" generation will enjoy longer working lives than their predecessors, whilst improvements in health and health care will mean that they still benefit from a similar number of years in retirement thereafter. If this scenario was to hold in the decades ahead and full employment is extended to those between 50 and 65 (or more) years of age, then much of the impact of demographic change and a worsening dependency ratio would be mitigated without increases in taxation which could threaten Britain's competitive position. To achieve this it has been estimated that the economically active population would need to increase by one million by 2015, and by three million by 2042[40]. Improvements in the employment rate of older workers will be an important part of the solution.

At the moment about one quarter of men between 50 and 64 are economically inactive and one third of women between 50 and 59. In total this amounts to about two and half million people. The required change will be harder to achieve than might at first appear to be the case. A study in 1997 found that the UK has a relatively high proportion of those who are economically inactive in these age groups who would like to work. Indeed, at more than 20% it is almost double the European Union average[41], and the average age of male transition from activity to inactivity declined consistently from 67.2 in the 1950s to 62.7 in 1995[42].

Disability is an important reason for inactivity in the UK, particularly amongst people in their 60s. Just one quarter of those aged 60 to 64 with a long-standing illness, disability or infirmity are employed, compared to half of those without long-standing health issues[43].

Losing those aged between 50 and the state pension age from the workforce can not only worsen the dependency ratio but can also lead to significant commercial opportunity costs for industry and trade. Age Concern refers to evidence on turnover rates to argue that employers receive a better return from investment in training a 50 year old, who will stay with the same employer for another 10 to 15 years, than a 20 year old, who will stay for two or three years[44].

UK annual productivity losses due to coronary heart disease have been put at £2.9bn, the vast majority due to incapacity to work rather than working years lost due to death[45] (at 2006 prices). The dramatic reductions that are being achieved in mortality from CHD

will, therefore, have little impact on productivity costs unless similar improvements are made in levels of morbidity. The 2004 General Household Survey showed CVD to be the second most common longstanding illness in Britain, and reported rates have increased over time[46]. More generally dramatic and ongoing increases in obesity in the population will continue to feed through into illness, disability, and absence or early withdrawal from work. Rising obesity amongst children today can be expected to have workforce effects for many years to come. The National Audit Office calculated that in 1998 obesity accounted for more than 18 million days of sickness absence and 40,000 lost years of working life, costing the economy £2.1billion, and that the prevalence of adult obesity would rise to include around one quarter of the adult population of England by 2010, from less than 20% in 1998[47]. Forecasts for the Department of Health estimate that the number of obese adults in England will rise to more than 12 million in 2010, one third more than in 2003, and that the balance between the genders will change, so that the number of obese men will exceed the number of obese women[48].

Lost pensions

Decreasing mortality rates and increasing levels of morbidity will harm government ambitions on the reform of the pension system, which are based on people living and working for longer. In terms of pension contributions the impact of lost working years due to disability is exaggerated by the fact that earnings tend to peak in the latter years of employment, so that proportionate pension contributions do likewise.

The Government's plans to raise the state retirement age and thereby ease the financial crisis facing British pension provision is entirely predicated on the hope that people will be willing and able to spend more years of their longer lives in work, for a similar length of time in retirement. To achieve this aim the Government's plans include not only an increase in the age at which people become eligible to receive the basic state pension, but also (in 2010) preventing people from drawing on their private pensions until 55, instead of 50. At the same time the Government has passed legislation to ban age discrimination at work, including the removal of a compulsory retirement age.

The new strategy on pensions, which includes reform of disability benefit, assumes that delayed access to state and private pensions will encourage people to continue working when they would otherwise have entered retirement. If a large part of early retirement is, however, involuntary and due to long-term ill health then it would be wise to also tackle the major causes of the most important forms of ill health, such as cholesterol.

The Government's Pensions Commission did not concern itself unduly with forecasts on ill-health, and eventually relied upon the dismissal of increases in self-reported ill-health by claiming that these data are biased by increasing expectations of health, and simply expressed a wish for improved data in the future. However, in a 2002 Health Strategy Review the Prime Minister's Strategy Unit commented that the disappointing trend in self-reported health may, however, reflect some real as well as expectation driven factors. Noting that "it is clear that several lifestyle trends which influence the health of the living (as well as mortality) have become less positive in recent years."[49] While smoking has continued to decline, the rate of fall has slowed. And while some dietary factors, e.g. rising fruit consumption, are positive, obesity is rising dramatically. This is driving an increase in chronic conditions such as diabetes. One possible trend for the future is that the decline in premature mortality is partially offset by a rise in a variety of chronic conditions, both among the elderly and in the general population. Current predictions suggest that in 2020 CHD will remain the leading cause of disablement.

Conclusions

In view of the simple steps that can be taken to manage cholesterol as a major risk factor in the most significant diseases causing death and disability, it is ironic that so much attention has been directed to the obesity epidemic. Potential solutions on obesity are by no means clear, and in all probability they are highly complex and challenging to individuals, the health system, and policymakers.

Levels of cholesterol can be tackled by simple dietary changes together with increased physical activity and, if necessary, treated with lipid-lowering drugs. The significant advances in avoidable coronary heart disease mortality of recent decades look set to be followed by decades of deterioration in morbidity. Even without current dramatic increases in obesity and diabetes in the UK the ageing of the population over the coming decades makes avoidable CHD morbidity a major challenge for policy makers. If increasing numbers of those aged 55 or more are to remain in the workforce, and paying taxes rather than consuming benefits, then the crisis in cholesterol management must now be addressed. Not only are those who would benefit from cholesterol management being allowed to slip through the net, but those who are identified, too often only after suffering a heart disease event, are not receiving the full benefit of current best clinical practice. Much greater attention needs to be placed on the avoidance of premature ill-health amongst the working population, bringing substantial benefits not only to the individuals themselves and their families, but also to taxpayers and the wider economy.

CHAPTER 3

The human impact of raised cholesterol

Dawn's journey

Dawn Davies (43) is married with three children. She was diagnosed with severe Familial Hypercholesterolaemia (FH) at the age of 22. FH is an inherited condition which leads to levels of high cholesterol. Dawn inherited high cholesterol from both parents; she is not a homozygote but a compound heterozygote where both parents' defects have added together to produce her own version of the condition. Both her parents have undergone major surgery for severe heart disease.

Dawn began to develop chest pain at 27 but because of differing medical opinion this wasn't diagnosed as angina until a week before her 34th birthday. Dawn then underwent an urgent heart bypass operation because all three of her coronary arteries were 98-99% blocked. Following the operation, her condition worsened because her cholesterol levels could not be controlled, despite being on cholesterol lowering drugs. She could no longer continue to work as a nurse and had to retire. The impact this had on Dawn was huge; at only 34 she was being forced to stop working on medical grounds. Family life changed too; her eldest daughter who was only 12 at the time took on the role of a second mother in the house.

The effects of statins alone were not enough to control Dawn's cholesterol levels. She started LDL-apheresis treatment 5 years ago. This is a process that takes the blood outside the body to remove the LDL-cholesterol (the 'bad' cholesterol) and then returns the plasma and blood back to the body. This treatment has resulted in a gradual improvement in Dawn's condition and she is no longer house bound. She thinks the way forward is through research and evidence based medicine with treatments and cholesterol screening available to all. New advancements in drug treatment and surgery have meant that for the very first time one of her relatives with FH has actually lived past their 50th birthday. This is quite an accomplishment. Last year Dawn started a degree in Diet and Health at Bath Spa University and she is now looking forward to starting a new career in nutrition.

"My case is extreme but the effects of high cholesterol can affect anyone. I think that there should be more awareness of this and other risk factors. I feel so lucky that I have finally had the correct treatment, and can get on with my life".

Brian's story

Brian Ellis (62) is married with one daughter. When he was only 54 his life took a sharp turn when he had a heart attack at work. He did not have crippling chest pains and prior to this, he merely had a sore throat which Brian thought was simply a sign of being run down. His colleagues took him to A&E where, after some tests, it was decided that he needed a cardiac angiogram - an x-ray used to view the heart's blood vessels. The results of this were shocking; his arteries were 95-100% blocked, meaning that Brian had to undergo a coronary artery bypass graft operation as soon as possible.

In only a few days his world had turned upside down. Brian, like many, did not deem himself to be at risk even though he smoked, had a family history of heart attacks (his father and grandfather died aged 54 and 50 respectively from heart attacks) and followed a relatively poor diet due to pressures of commuting and a busy schedule. After some months recuperating at home, he returned to work and tried to resume a 'normal life'. However, after just four months Brian collapsed again. He was admitted to hospital to undergo further investigations, including another angiogram and electrical stimulation studies, which showed that two of the grafts were partially blocked and that he was subject to arrhythmia (an irregular heartbeat). Brian retired shortly after this on advice from his doctor. He had mixed feelings about this; although he knew he had to retire because of his health, he felt that it was not his choice to do so, and had hoped to work until well into his 60s.

Following his retirement, Brian was determined to change his lifestyle. He now exercises regularly, eats more healthily and is a member of an active retirement association.

"I would encourage everyone to be more aware of the risks of cardiovascular disease, not just those with a family history of high cholesterol. Diet and exercise play such an important role in maintaining good health from a young age. I wish that I'd had access to more information; the government needs to educate the public to help them make the right choices".

CHAPTER 4

The need for improved emphasis on cholesterol in public health policy

Dr Anthony R Leeds, King's College London and H·E·A·R·T UK

There has been much focus on public health policy by both politicians and the media in the lifetime of the current Government. It is over five years since Sir Derek Wanless authored his landmark report on the state of the National Health Service, and called for a renewed focus on initiatives to improve public health[50]. Since then we have heard much lamenting about the state of the nation's health, and it cannot be denied that tackling the problem became a clear priority of Government. In May 2006 Secretary of State Patricia Hewitt in a letter to the Prime Minister reiterated her Department's commitment to the cause. Yet it is questionable whether any tangible change has actually been delivered or whether sufficient measures are in place to achieve change.

Public health policy: the rhetoric and the reality

Following publication of the Wanless report, 'Securing Our Future Health: Taking a Long-Term View', Government immediately sought to address one of the report's central recommendations by vastly increasing the level of public investment in the NHS. Two and a half years later, the publication of the Public Health White Paper, 'Choosing Health, Making Healthy Choices Easier'[51] (in November 2004) was a signal that it was tackling the issue. However, despite a clear call for public health in Wanless's 'fully engaged scenario' it took two and a half years to publish the White Paper and implementation has been slow. The target to halt the rise in childhood obesity by 2010 now looks unlikely to be achieved, as highlighted by the Department of Health's own figures from the National Childhood Obesity Database[52]. A separate report revealed that just 15% of primary care trusts were spending the money allocated from the White Paper as the Government intended, and over a

quarter had absorbed the entire allocation to shore up financial deficits[53].

There is much to be applauded in the 'Choosing Health' proposals. However cholesterol is the most significant risk factor for heart disease and stroke, and it contributes to the increased risk of CVD associated with diabetes and obesity. A significant proportion of the adult population has high cholesterol[54], yet cholesterol is mentioned only once throughout the document.

At the time of writing, the Government is preparing to launch a high profile social marketing campaign on obesity. It is likely the initial focus will be on children, with the target to halt the rise in childhood obesity. Although important, the full implications will not be felt for a further 30-40 years. Alarmingly, the focus on childhood obesity has not been matched with resources to address the immediate problem of the growing number of adults with high cholesterol at risk of developing coronary heart disease, who continue to place a considerable burden on the UK's health and social care systems.

The Food Standards Agency's high profile campaign on salt achieved over a 30% increase in the number of people reducing their salt intake in just five months. A similar social marketing campaign, led by the Food Standards Agency highlighting the health impacts of a diet high in saturated fat, has not yet been delivered. If the same impact could be achieved through a fats campaign the UK would see a considerable reduction in the number of deaths from heart disease and stroke.

The reality of the UK's public health policy is that it has made little impact. Health inequalities are increasing in many parts of the country. In particular the inequalities gap between the North and South of England is widening, a fact which the Department of Health itself recognised in its most recent update on progress in public health policy[55]. The Spearhead areas identified in the Public Health White Paper as central to reducing health inequalities, have also seen little progress. A recent report from the London Health Observatory made clear that the inequalities gap in deaths from heart disease and stroke in London is widening[56]. In fact the report concludes that the Government's own targets on reducing health inequalities by 2010 will not be met unless Spearhead PCTs in London provide services such as detection and treatment of high blood pressure and cholesterol.

The Government's public health policy agenda represents a missed opportunity in the awareness of the management and risks of high cholesterol, as a means of significantly reducing rates of mortality from heart disease and stroke. Recognition of the role of cholesterol in previous public health initiatives could have significantly reduced health inequalities as we know that those on low incomes are those at greatest risk from cardiovascular disease. International experience shows that public health policy can have a positive effect on health behaviours and reveals some important lessons which we can no longer afford to ignore.

International experience

Extensive clinical trials and the experience of clinicians around the world shows that individual risk factors for heart disease can be influenced, and for each risk factor there is clear evidence that reduction is possible. Aside from the reductions in blood cholesterol achievable with

The North Karelia Project

During the 1960s Finland realised that death rates from coronary heart disease were the highest in Europe, by a considerable margin. In 1972 a collaborative project driven by community initiatives and led by government was started in the province of North Karelia to reverse this situation.

A variety of activities were established including:

- workplace programmes to lose weight;
- cholesterol-lowering competitions between villages;
- a nationwide TV series charting the progress of volunteers involved in the North Karelia project in implementing a healthier lifestyle;
- collaboration with food manufacturers and supermarkets to encourage dietary changes;
- education of key community leaders to encourage them to pay attention to health related issues.

The project was extremely successful with results showing that community based initiatives can have a dramatic impact on incidence of coronary heart disease:

- cardiovascular mortality rates for men aged 35-64 decreased 57% from 1970 to 1992;
- In 1972, some 90% of the population used butter on their bread. In 1992 only 15% did so;
- Fruit and vegetable consumption increased from about 20 kg per person annually in 1972 to 50 kg in 1992;
- The consumption of whole milk dropped from 70% to 14%;
- In 1972 28% of men and 42% of women reported having their blood pressure measured in the previous 6 months. By 1993 over 98% of people had had their blood pressure measured.

lipid lowering drugs, diet and lifestyle changes can achieve considerable improvements in cholesterol reduction. A recent publication shows combined dietary interventions can achieve the same blood lipid reduction as low dose statin treatment[57].

Campaigns to educate and inform the public about the importance of a healthy heart diet started in the 1970s and continue today. The highly successful Australian Heart Foundation Tick Programme and campaign (whereby food products and meals eaten out of the home receive a tick if they meet heart-healthy criteria[58]) and the even longer running American Heart Foundation heart check mark on foods based on a food certification[59], show that adequately resourced and promoted educational and labelling programs can positively change health behaviours.

There are also examples of public health policies successfully addressing management of risk factors with beneficial outcomes. The US National Cholesterol Education Program (NCEP) is an organisation set up in 1985 to help reduce illness and death from coronary heart disease by reducing the number of Americans with high blood cholesterol. Since its inception, NCEP has emphasised a broad range of risk factors and provided comprehensive management guidelines for both health professionals and the public. Between 1991 and 2003 there was a 23% increase in the number of people screened for cholesterol in the US. Awareness of risk can lead to changed health behaviours and if a similar increase in screening was achieved in the UK, it could result in increased intervention for those at risk.

The groundbreaking North Karelia project in Finland demonstrated what can be achieved through diet and lifestyle modification and targeted social marketing.

Awareness of cholesterol

In the UK, awareness of the importance of blood cholesterol is low. In a survey carried out by Cholesterol UK in 2004, less than 5% of respondents thought that raised cholesterol was the 'highest risk factor' for coronary heart disease, but 90% said that they would be fairly or very concerned to learn that their blood cholesterol level was too high.

Awareness of raised cholesterol and its risks has a role in reducing mortality for other diseases such as cancer, and reflects the need to recognise cholesterol management in any public health programme. A recent study showed that for those with familial hypercholesterolaemia, giving advice to consume a healthy diet, increase physical activity and stop smoking is associated with a substantial reduction in mortality from cancer[60]. The patients involved were on statin treatment and the possibility that statins have anti-cancer properties cannot be excluded, however a 50% reduction in the risk of fatal cancer was observed. By being aware of raised cholesterol and their individual risk, participants took greater responsibility for their own health, showing that raising awareness of cholesterol and personal risk factors is effective.

The current lack of appreciation of the importance of blood cholesterol as a risk factor needs to be corrected by further public education and the introduction of widespread cholesterol testing as part of heart risk assessment.

The London Health Inequalities Forecast, London Health Observatory November 2006

"If the 2010 targets are to be reached, primary care services in London's 11 Spearhead areas need to meet the challenge of providing cost-effective preventive services to their adult patients most at risk. This includes action to reduce smoking together with better detection and treatment of high blood pressure and high blood cholesterol."

Conclusion

Much has been said about the public health crisis facing our population, yet public health policy in the UK has missed an opportunity to prevent significant numbers of deaths from cardiovascular disease by effectively ignoring the public health threat posed by raised blood cholesterol. It would be wrong to suggest that no action has taken place. Many initiatives have focused on children, which is to be applauded. However, the role of cholesterol as the single greatest risk factor for the nation's biggest killer in adults does not receive the attention it deserves in the UK. Experience from other countries around the globe has shown the impact an integrated public health and social marketing campaign can have on incidences of CVD.

CVD is a major threat to morbidity as well as early mortality. It threatens the affordability of pensions, the NHS and other social costs associated with an increasingly older population. It is now five years since the Wanless report called for urgent action on public health to offset these problems as part of his 'fully engaged scenario'. We have yet to see some fundamental building blocks of that action put in place.

A long term strategy for the future of public health policy is required and it must include a public education campaign on saturated fat, greater awareness of the risks of raised cholesterol and wider availability of high-quality cholesterol and heart risk assessment. Only then can we begin to achieve a true step change in the health of the nation.

CHAPTER 5

The role of primary care

Dr Robert M Finnie, H·E·A·R·T UK Trustee

Introduction

Primary care is in a truly unique position, both to educate patients on the risks of raised blood cholesterol and advise about preventative action or treatment. Primary care has access to the whole population and provides the opportunity for health promotion and education through regular contact with patients and the public.

Raised cholesterol leads to blocking of the arteries causing heart attack and stroke, and many patients will present with initial symptoms, such as angina, to their GP. Patients trust their health professionals and can use their advice to make informed choices about what lifestyle changes and possible medication to pursue.

Efforts to reduce cholesterol have not yet been addressed with the same vigour as smoking or high blood pressure

In England, the policy agendas of transferring resources and services from secondary to primary care and the focus on public health preventative measures reflects the impact primary care can have on disease prevention, including heart disease.

Action to reduce high cholesterol in the most at risk groups has been effective. However efforts to reduce cholesterol in the general population have not yet been addressed with the same vigour as smoking or high blood pressure, where considerable emphasis has been placed on both prevention and treatment. Facts are hard to come by, but there have been repeated media stories about how primary care trusts (PCTs) have diverted money away from public health to spend on reducing deficits or waiting lists.

Ageing population

In 2000 14.7% of the European population was 65 years or older and it is predicted that this proportion will rise to 23.5% in 2030[61], and will therefore be at greater risk of cardiovascular disease (CVD), potentially leading to heart attack and stroke. Thankfully, for many individuals this will not be fatal, but may instead result in physical disability and a resultant inability to work. As acute medical treatment advances and improves, many more deaths from coronary events will be prevented, but the prevalence of disability will also increase. For the state this will mean an increased pressure on already overstretched primary care resources and social care funding.

The reality is that most of these coronary events are avoidable and the key lies in primary prevention through cholesterol management. And whilst the role of primary care is paramount, it must be supported by appropriate government action promoting a healthier diet and more active lifestyle.

Taking action

The primary method of lowering cholesterol must always be through an adapted diet and lifestyle by reducing intake of saturated fat and taking regular exercise. Health care professionals working in the community, especially doctors, must take this responsibility on board but it is crucial that the whole primary care team has a role. Practice nurses are now trained to have skills in lifestyle modification and are therefore ideally placed to influence behaviours. They can have additional support in the form of specialist advice from dieticians and health visitors who focus on educating the whole family, particularly mothers, by promoting dietary and lifestyle choices from infancy. Unfortunately there is a shortage of professionals trained to give such advice, and so many at risk patients are missing out on the most basic steps to improve their diet and lifestyle. There must be greater emphasis on public health education and CVD prevention in the training of doctors and nurses to ensure lifestyle advice is central to any consultation with a patient.

Many at risk patients are missing out on the most basic steps to improve their diet and lifestyle

Primary care staff are also key to promoting greater awareness of cholesterol. Greater emphasis must be placed on individuals knowing their personal CVD risk and understanding what it means. For this to become a reality there must be greater availability of cholesterol testing as part of a heart

health assessment. Currently, few general practices will provide a cholesterol test if the patient is not considered to be 'at risk', and of those pharmacies which do offer testing most charge a small fee, placing it out of the reach of low income groups who are most at risk. Opportunistic testing, as recommended by expert advice in the Joint British Societies (JBS2) latest guidance[62], and funded by the GP contract, should be introduced in practices across the UK. This would allow patients, regardless of background, to be aware of their cholesterol levels and would prevent at risk patients from slipping through the net.

Few general practices will provide a cholesterol test if the patient is not considered to be 'at risk'

In the USA, cholesterol testing is recommended by the National Cholesterol Education Programme for all adults over 20 every five years. It may not be cost effective to replicate this in the NHS, but regular testing should be introduced for those over 40, as recommended by the Joint British Societies. Testing can take place in a variety of settings such as GP practices and pharmacies. A few more innovative parts of the NHS are now taking testing into the community, to pubs and community centres, to reach at-risk groups. Ideally, cholesterol testing should be performed as part of CVD risk assessment which can predict an individual's 10 year risk of CVD by calculating key factors including cholesterol, blood pressure and blood sugar levels with smoking status, age and gender. Crucially, testing must always involve interpretation of the results and a meaningful discussion between the patient and health care professional about an action or treatment plan, if required. The general public are becoming more informed about health issues, and it is the duty of health professionals to provide access to the information which may improve their lives.

The use of drugs, in particular statins, is a method of lowering cholesterol which can be discussed by the health care team with patients whose cholesterol cannot be managed through diet and lifestyle alone.

Statins have been shown to slow the development of heart disease, prevent the worsening of pre-existing heart disease and prevent death. In addition they can halve levels of bad cholesterol and have minor effects in increasing good cholesterol. However, despite the proven impact of drugs, they should not be regarded as the only solution. A healthy diet and lifestyle are an essential addition to any medication.

Treatment gap

The number of people currently being prescribed cholesterol lowering drugs is considerably less than the number who could benefit from the treatment. And the target levels for those receiving the drugs is usually well below the cholesterol level actually achieved. This is known as the treatment gap.

In the USA cholesterol testing is recommended by the NCEP (National Cholesterol Education Programme) for all adults over 20 every 5 years

The authors of a recent extensive audit of secondary prevention (prevention of a second heart attack and stroke) in England described a "rule of halves" in cholesterol management in CHD patients: "Half had a record of a cholesterol measurement, half of these were being prescribed a statin, and half of these had been treated to target". In fact, all should have had a cholesterol measurement, all should be on a statin, and all should be treated to target. They calculated that more than 7,000 heart attacks each year can be attributed to this "treatment gap."[63]

Since the development of the new NHS GP contract in recent years, the use of statins in the UK has become the highest in Western Europe. The cornerstone of the GP contract is the "Quality and Outcomes Framework" (QOF) which relates GP's income to attaining certain goals such as reducing cholesterol levels for at-risk patients. The GP contract has the potential to have a huge impact on prevention of CVD in the UK, however the target value for cholesterol levels in QOF is now outdated. Latest clinical guidance from both the Joint British Societies (JBS2) and the Scottish Intercollegiate Guideline Network (SIGN) recommend a significantly lower target (4mmol/l rather than 5mmol/l). Despite this, in November 2006 Professor Roger Boyle, National Director for Heart Disease and Stroke wrote to the NHS instructing them to ignore the JBS2 guidelines for at least another year, as NICE is due to report in December 2007 on whether the guidelines are affordable. Current targets are failing patients by only driving the NHS to achieve the minimum standard of care. If we are to achieve the best quality care for patients at risk of cardiovascular disease then the JBS2 guidelines must be implemented.

Given the prevalence of CVD and the evidence of the effectiveness of lipid lowering drugs, why does the treatment gap exist? Whilst statins on average reduce the risk of a coronary event by 30-40%, the effect is much

more beneficial for those patients who are high risk[64]. A recent BMJ study showed that treatment with statins is cost effective in a wider population than is routinely treated at present[65]. Yet GPs often only prescribe medication for those who are very high risk, even though those at a lower risk could also benefit. This 'high-risk only' approach simply perpetuates the current problem by waiting until people are in the late stages of CHD before beginning prevention or treatment.

The number of people currently being prescribed cholesterol lowering drugs is considerably less than the number who could benefit from the treatment.

There has been some debate about the target levels for cholesterol, which can change frequently as a result of research and updated guidance. Furthermore, the evidence of the impact of statins in men with pre-existing coronary disease is compelling, but less robust for female mortality. A degree of scepticism has therefore emerged as to their validity. To further complicate the issue, an individual's cholesterol level may vary depending on the time of day when the test was taken and the method of analysis used by the laboratory to determine the result[66]. However target levels, as outlined above, are the principal goal in general practice in the UK with the new GP contract, and are easily understandable by both patients and health professionals. There is no doubt that the lower your cholesterol the better it is for you, and patients must be fully involved in any decision about whether or not to begin medication.

Geography

There are large geographical variations in the premature death rate from coronary heart disease throughout the UK. Scotland has the worst rate of 244 premature deaths per 100,000 men, which contrasts significantly to South West England where the equivalent figure is only 146. There are difficulties analysing data from Europe because of anomalies with interpretation of statistics, however the incidence of premature sudden death from heart disease in France appears much lower than that of the UK.

Additional measures

Clearly a proportion of the population will not attain the cholesterol targets suggested by the use of statins alone. Only a few years ago the accepted drug treatment for many conditions was a single agent used to its maximum dose. Differing agents are now used much more frequently together and in small doses to achieve a similar or often additional effect. This is already the case in the treatment of hypertension and diabetes, and will no doubt become the norm for the treatment of high cholesterol.

The target value for cholesterol levels in QOF is now outdated

Primary care will certainly wish to take on the mantle of combined drug prescribing but such are the financial penalties bestowed upon practitioners who prescribe these relatively expensive drugs that they are discouraged from doing so. There must be a greater awareness that spending in the short-term may in fact result in saving lives as well as, in the long term, saving money. Some statins are now off patent and the cost of treatment is substantially reduced by the use of an equivalent generic rather than propriety drug. This should allow the targeted use of more potent proprietary statins, with a higher acquisition cost, to achieve lower cholesterol goals in high risk individuals.

Conclusions

Significant advances have been made in the treatment of high cholesterol in primary care, particularly with the advent of the GP contract and increased prescribing of statins. However there is much more still to do. In particular, as a matter of urgency the treatment target for cholesterol must be revised to take account of the latest Joint British Societies guidance. Diet and lifestyle modification should be the primary form of cholesterol management and greater training and resources must be dedicated to supporting CVD prevention in primary care. The treatment gap must also be closed to ensure that all those who could benefit from medication, do benefit.

There is no doubt that the lower your cholesterol the better it is for you

Primary care is the most important interface for tackling CVD and patients must be empowered to help themselves. Greater population wide awareness raising is needed, as well as wider cholesterol testing as part of CVD risk assessment to enable individuals to understand their own risk and make their own healthier choices.

Author biographies

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Michael Livingston is Director of H·E·A·R·T UK, and joined the charity ten years ago from the field of education for disadvantaged city teenagers. Prior to working in the charity sector Michael began his career with the Royal Navy, before moving into industry in leather tanning and chemicals. Michael has more than 15 years of experience in the voluntary and commercial sectors and a proven track record in business development.

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Tony Hockley is Director of the Policy Analysis Centre, a public policy research consultancy based in Westminster. He is also a Research Associate at the LSE. Tony has extensive experience of public policy including roles as a Government special adviser, and head of research at an independent think-tank. He has also worked as an economist and policy director in the international air transport and pharmaceutical sectors.

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Dr Anthony Leeds is Principal Investigator and Senior Lecturer in the research division of Nutritional Sciences at Kings College, London. He has been seconded to the Department of Health as head of the Nutrition Unit, and has served two terms on the Council of the Nutrition Society. Dr Leeds is a H·E·A·R·T UK Trustee and a member of the charity's Product Approval Working Group. His current research interests concern complex carbohydrates in relation to metabolic and physiological responses in diabetes, hyperlipidaemias, and obesity.

Dr Robert M Finnie BSc, MB, ChB, FRCP (Edin)

Dr Robert Finnie is a GP based in Edinburgh. He is also a Trustee of H·E·A·R·T UK, chairman of H·E·A·R·T UK's 'Health Care' committee, a committee member of SHARP (Scottish Heart and Arterial disease Risk Prevention), and has also hosted the British Hyperlipidaemia Association International Scientific Meeting at the Edinburgh Conference Centre in 2001. Dr Finnie's current research interests are primarily focused on familial hypercholesterolaemia

Heart health glossary

Angina - Heaviness or tightness in the centre of the chest which may spread to the arms, neck and jaw.

Artery - A main blood vessel carrying blood with oxygen from the heart to the rest of the body.

Atheroma - Fatty material that can build up within the walls of the arteries.

Atherosclerosis - The build up of fatty substances within the wall of the arteries.

Blood glucose - The main sugar found in the blood and the body's main source of energy. Also called blood sugar.

Blood lipids - Fatty substances found in the blood.

Blood pressure - The pressure of blood in the arteries. The heart is a pump that beats by contracting and then relaxing. Blood pressure is measured in millimetres of mercury (abbreviated to 'mmHg'). A blood pressure reading gives two numbers, for example 140/90. The first number is the systolic pressure and the second is the diastolic pressure.

Blood vessels - tubes that carry blood to and from all parts of the body. The three main types of blood vessels are arteries, veins and capillaries.

BMI - Body Mass Index. This is a way of finding out if your weight is putting your health at risk. It is based on your height and weight and can be worked out by taking your weight in kilograms and dividing it by your height in metres (squared). For any height there is a range of healthy weights. BMI is classified in the following way:

- A BMI of less than18.5 kg/m2 means you are underweight and you may need to gain weight
- 19 to 24 kg/m2 means you are a healthy weight and should aim to stay that way
- A BMI of 25 to 29 kg/m2 means you are overweight. For your heart's sake it is a good idea to lose some weight
- A BMI of over 30 kg/m2 is defined as obese and can have a big impact on your heart health. Losing weight will help to keep your heart healthy.
- If your BMI is greater than 35 kg/m2 you should visit your GP or practice nurse for a health check to get advice and support to manage your weight and health.

Calorie - The energy supplied by food is measured in calories, also called kilocalories (kcal). Protein, fats and carbohydrates all provide the body with calories but in different amounts.

Cardiac - related to the heart

Cardiac arrest - When the heart stops pumping, and quivers instead.

Cardiovascular - Anything to do with the heart and blood vessels.

Cardiovascular disease (CVD) - Disease of the heart and blood vessels. The two main types of CVD are coronary heart disease (CHD) and stroke, but CVD also includes congenital heart disease and other disease of the heart and blood vessels.

Central obesity - When you carry too much weight around your middle, also known an 'apple' shaped, this increases your risk of developing heart disease and diabetes.

Circulation - The flow of blood through the body's blood vessels and heart

Congenital heart disease - Heart disease caused by abnormalities of the heart or major blood vessels which are due to the abnormal development of a baby during pregnancy and which are present at birth.

Coronary artery - The main artery supplying blood to the heart.

Coronary heart disease (CHD) - When the walls of the coronary arteries become narrowed by a gradual build-up of fatty material called atheroma. When atheroma affects the coronary arteries, it can cause angina, heart attack or sudden death.

Cholesterol - A fatty substance mainly made in the body by the liver. Cholesterol plays a vital role in the functioning of every cell wall throughout the body. However, too much cholesterol in the blood can increase the risk of getting coronary heart disease. Cholesterol is measured in units called millimoles per litre of blood, usually shortened to mmol/litre or mmol/l.

Diastolic blood pressure - When measuring blood pressure the lowest number is called diastolic pressure, this show the pressure in the arteries when the heart rests.

Diabetes - A condition in which the amount of glucose (sugar) in the blood is too high because the body cannot use it properly.

Dietitian - A qualified health professional who can advise on healthy eating and special diets.

GP - General Practitioner or family doctor.

HDL (High Density Lipoprotein) cholesterol - Known as good cholesterol, it takes cholesterol away from the arteries to be disposed of by the liver. This type of cholesterol is good for keeping your heart healthy.

Heart - A muscular organ that pumps blood throughout the body.

Heart attack - When one of the coronary arteries becomes blocked by a blood clot and part of the heart is starved of oxygen. A heart attack usually causes severe pain in the centre of the chest. A heart attack may cause the rhythm of the heart to become disturbed.

Hypercholesterolaemia - When there is an excessive amount of cholesterol in the blood.

Hyperlipidaemia - When there is an excessive amount of fatty substances in the blood.

Hypertension - High blood pressure.

LDL (Low Density Lipoprotein) cholesterol - known as bad cholesterol, it takes cholesterol from the liver to the body tissues. If there is too much of this cholesterol in the

Heart health glossary

Continued

blood it can build up in the walls of the blood vessels and cause them to narrow.

Lipids - Fatty substances in the blood, including good (HDL) cholesterol, bad (LDL) cholesterol and triglycerides.

mmHg - Millimetres of mercury. This is the unit for measuring blood pressure.

mmol/l - Millimoles per litre. This is the unit used for measuring the level of cholesterol and other fats in the blood.

Myocardial infarction - A heart attack.

Obesity - Excessive weight or carrying an excessive accumulation of fat (see also BMI).

Peripheral obesity - When you have excess weight around your hips, this is also known as 'pear' shaped.

Risk factor for cardiovascular disease - something that can increase your chances of developing heart disease or having a stroke. For example smoking, high blood pressure or high cholesterol.

Sphygmomanometer - an instrument used to measure blood pressure.

Stroke - A stroke is what happens when the blood supply to part of the brain is cut off. Blood carries essential nutrients and oxygen to the brain. Without a blood supply, brain cells can be damaged or destroyed and won't be able to do their job.

Systolic blood pressure - When measuring blood pressure the highest number is called systolic pressure, this show the pressure in the arteries when the heart is pumping blood through them.

Triglycerides - a fatty substance found in the blood.

Veins - A vessel carrying blood back from various parts of the body to the heart.

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