Public Health Module

Venue

Duration - Date

.....

Unit: The Public Health Aspects of Coronary Heart Disease

Workbook

NAME: .....

ORGANISATION: .....

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Aims:

This unit will:

- Explore how common CHD is, including both the primary condition and its related ill-health and the evidence of its impact on quality and length of life
- Familiarise students with the major risk factors of CHD's
- Explore the efficacy and ethics of physical, clinical, psychological and social interventions for the prevention and management of CHD

Objectives:

By end of this unit participants will:

- Be aware of the impact of CHD and related ill-health, and its effect on quality of life
- Be familiar with terms such as prevalence, incidence and trends, data collection and risk factor analysis (and its limitations) for CHD
- Be familiar with the major environmental, social, cultural and genetic factors influencing CHD in the UK
- Have reviewed evidence about social deprivation and CHD prevention and how inequalities could be addressed
- Will appreciate the relevance of self-management and health literacy in relation to CHD prevention and care
- Be able to find, interpret and challenge the evidence for efficacy and ethical basis for preventative interventions at a population, community and individual level
- Be able to identify, interpret and challenge the evidence for efficacy of screening provision for CHD (risk assessments etc)
- Be able to find, interpret and challenge the evidence for interventions for the effective management of CHD
- Have identified and practised early intervention approaches for behaviour change with individuals (and/or communities)

Foreword:

This workbook addresses coronary heart disease as a public health issue. For those of you who are already very familiar with clinical medicine, you may want to work quickly through the early part of the workbook, while others will want to familiarise themselves with the clinical relevance of CHD before embarking on deeper study of its public health relevance.

By the end of the unit it is not intended that you should be a public health specialist, but you will be aware of the massive impact of CHD on the population beyond your individual patient or his/her family, and how the population impact of CHD could be lessened for everyone's benefit, all of which may well influence your future clinical practice. You will have insight into how evidence can be used to support decisions made about planning local health services, which we think you will find useful to return to as your career progresses.

An introduction to what is public health is presented at the beginning of the unit. This introduction is common to all four units in the public health module (Child Health, Stroke, Coronary Heart Disease and Diabetes) and can be passed over if required.

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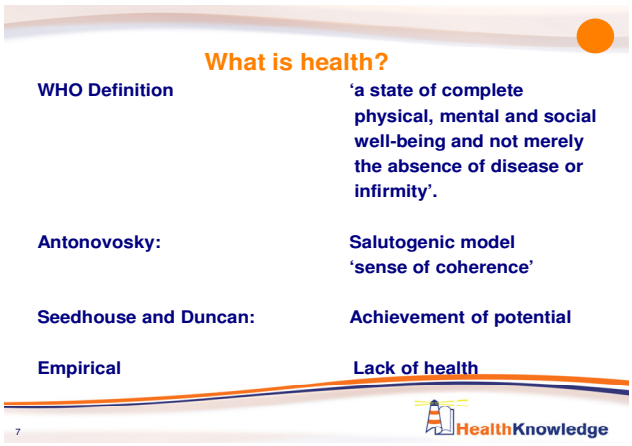
Introduction to public health

To understand public health it is worthwhile taking some time to consider the concept of health and its determinants[i]



What is health?

This is a difficult question and one that should be frequently pondered not least because there is no definitive answer but, we each have a way of defining it. From a biomedical perspective, health is defined as the absence of disease - the health of a society can be measured by the incidence and prevalence of disease. However the World Health Organisation (WHO) takes a more social perspective, defining health as a dynamic "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"[ii]. Each have their strengths and limitations.

The question of 'what is health' has been a challenge for contemporary philosophers[iii] [iv] [v]. Perhaps it is Antonovsky's Salutogenic model of health that poses the key questions and tries to explain using "the sense of coherence" framework. But Seedhouse and Duncan also suggest health is a value and concept, enabling us to achieve our potential. More empirical and objective ways of addressing what is health is associated with lack of health, being ill. For further information on issues around defining health see the sociological perspective of health and illness chapter in the Health Knowledge Textbook.

Subjective measures of health

Census data in 2001 asked those to respond if they were not in good health. About 9% of UK defined themselves as not in good health but this was as high as 18% of the population in one of the most deprived areas of UK and only 4% in one of the most affluent. Though subjective, this type of data informs planning and needs and ties in well with other epidemiological data

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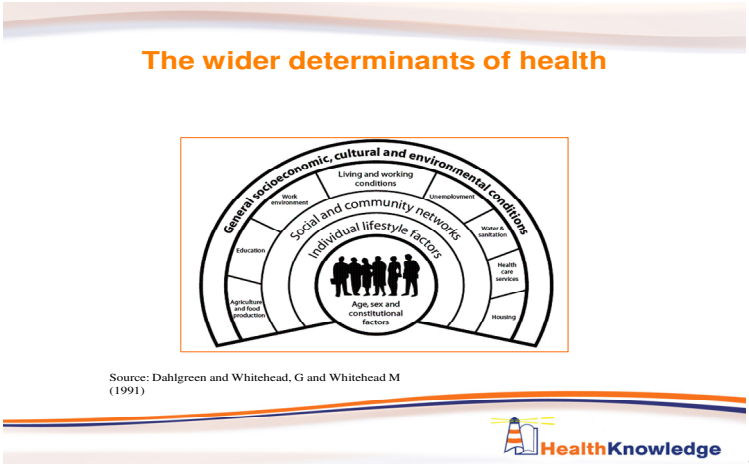
[i] The section is common to all units in the public health module and can be skipped if needed
[ii] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.
[iii] Antonovsky A. The Salutogenic Model as a Theory to Guide Health Promotion. Health Promot Int 1996;11(1):11-8
[iv] Seedhouse D. Health Promotion: Philosophy, Prejudice and Practice. Chichester: Wiley; 1997
[v] Duncan Peter. Critical Perspectives on Health. Basingstoke: Pagrave Macmillan; 2007

demonstrating how life expectancy at birth varies within nations and between nations, with the poor, more deprived populations usually having a shorter life expectancy[vi].

What is public health?

Public health is defined as 'the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society[vii]. It therefore deals with preventive rather than curative aspects of health and with population-level, rather than individual level health issues. It does this by using public health methodology of surveillance of disease cases and through promoting healthy behavior. Public health focuses on health's wider determinants and social inequalities:

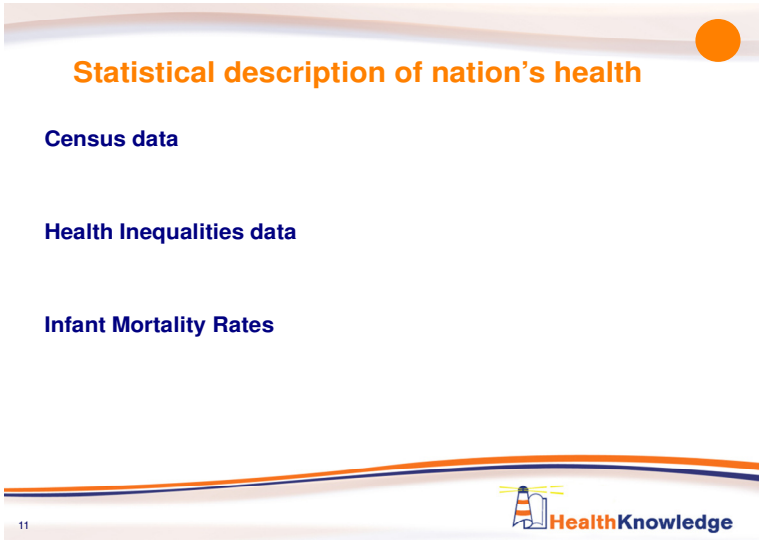


…and faces some difficult challenges – particularly around health behaviour:

[vi] http://www.statistics.gov.uk/census2001/profiles/commentaries/health.asp

[vii] C.E. A. Winslow, "The Untilled Fields of Public Health," Science, n.s. 51 (1920), p. 23

How is health measured?



Gradient of inequalities in health

Health can only be understood within the wider context in which it is shaped. Poverty is a key indicator of health outcomes but it should not be viewed as singularly causal. Social determinants play an important part in understanding the gradient of inequalities, as Michael Marmot points out: "It shows that, among other things, the nature of children's upbringing, adults' workings lives, or older people's experiences of ageing are critically shaped by the quality of social relationships, access to particular material resources and services, and the nature of our neighborhoods and wider environments. It may be uncomfortable and complicated and suggest a lack of magic bullets (or pills) to cure all ills but reflects a complex reality in which many of our health risks reflect lifetime exposure to a range of tolerated hazards."[viii]
For further information on the Social Determinants of Health look at the World Health Organisation[ix] and for world inequality statistics see Gapminder[x].

1. Coronary Heart Disease

The coronary arteries supply blood to the heart. Coronary heart disease (CHD), also described as ischemic heart disease (IHD), is the build up of fatty deposits (atheroma or plaques) along the inner lining of the coronary arteries. The build up of atheroma, called atherosclerosis, can easily go unnoticed taking many years to develop.

If the blockage deprives the myocardium of blood, and therefore oxygen, this can result in chest pain, called *Angina pectoris*.

If the heart muscle goes without sufficient oxygen cell death can occur, resulting in a heart attack or myocardial infarction (MI).

[viii] http://www.hsj.co.uk/comment/opinion/michael-marmot-on-why-health-inequalities-matter/5000345.article

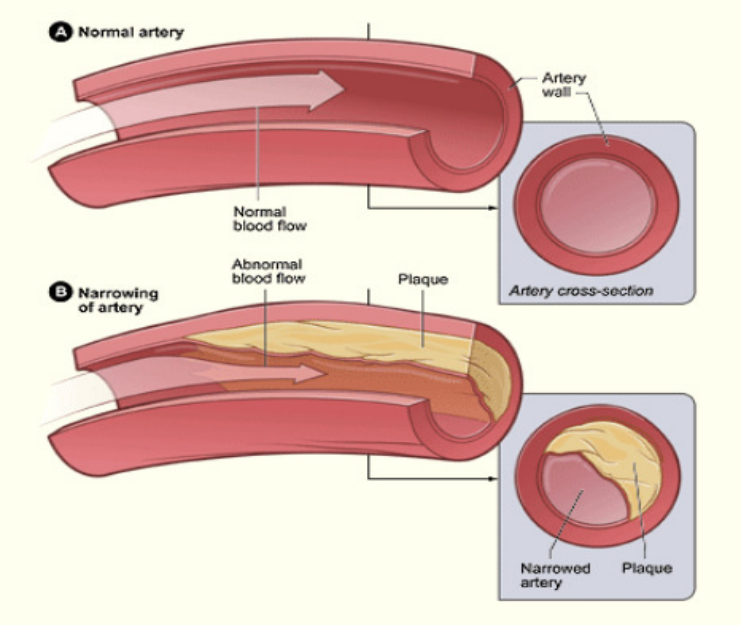
[ix] http://www.who.int/social_determinants/en/index.html

[x] http://www.gapminder.org/

Not all patients with angina progress to having a heart attack and in those who do, a proportion of heart attacks are silent infarctions (i.e. asymptomatic) and may remain undiagnosed. Not all patients who suffer a MI die, and among survivors, patients may or may not suffer from angina or have repeat MIs.

CHD includes both angina and MI and is included (along with stroke, congestive heart failure and peripheral vascular disease) under the wider heading of cardiovascular disease (CVD).

Figure 1. normal artery (A) and narrowing of an artery (B) due to atherosclerosis.



1.1 Key epidemiological concepts

The epidemiology of CHD can be described in terms of death (mortality) and illness (morbidity).

- Mortality can be defined as the number of deaths due to CHD. Premature mortality is death before 75 yrs.
- Morbidity can be described using incidence (number of new cases or events); prevalence (the percentage of the population with disease); or disability-adjusted life year (DALY). The World Health Organisation (WHO) global burden of disease measures the burden of disease using the DALY. This time-based measure combines years of life lost due to premature mortality (death before the age of 75 years) and years of life lost due to time lived with an illness (i.e. in states of less than full health).

These concepts are visited later in the workbook

1.2 Deaths and burden of disease: Global picture

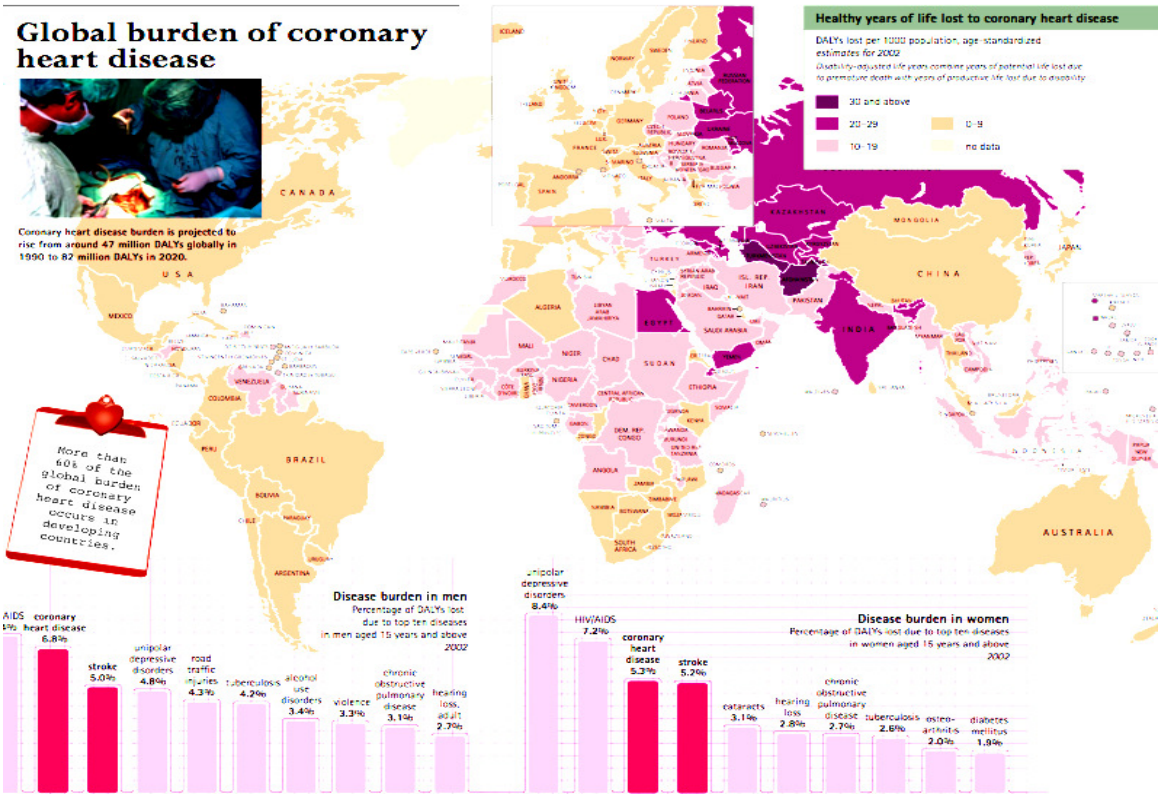
CHD is the most common cause of death in the world, accounting for 7.2 million deaths (12.2% of all deaths) globally. Over 80% of the world's deaths from Cardiovascular diseases (includes CHD and stroke) occur in low- and middle-income countries[xi].

[xi] (see: http://www.who.int/mediacentre/factsheets/fs310/en/index.html).

Q1. How would you explain a higher CHD death rate and CHD burden in low and middle income countries? (use the space below to respond)

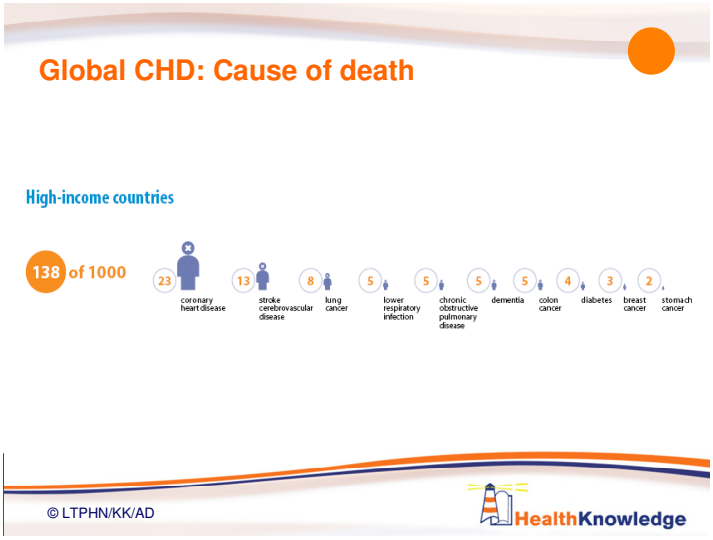
More than 60% of the global burden of disease due to CHD is in developing countries (figure 2). The burden of CHD is increasing in many developing and middle income countries, partly as a result of increasing longevity, urbanization, and lifestyle changes[xii].

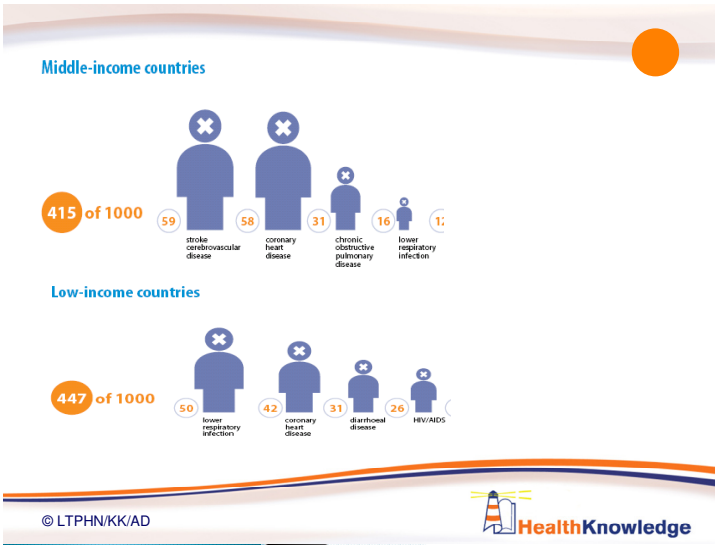
Figure 2. Global burden of CHD



Source: WHO The Atlas of Heart Disease and Stroke, downloadable at www.who.int

[xii] Such as eating healthily, undertaking regular exercise and avoiding smoking





Trends

CHD death rates have decreased in North America and many western European countries. This decline has been due to improved prevention, diagnosis and treatment in particular reduction in smoking among adults and lower levels of blood pressure and cholesterol. However, CHD death rates have been increasing in many developing and eastern European countries[xiii].

[xiii] Source: WHO The Atlas of Heart Disease and Stroke, downloadable at www.who.int

1.3 Deaths and burden of disease: UK picture

CHD is the most common single cause of death in both men and women in the UK. CHD causes approximately 91,000 deaths in the UK each year with one in five men and one in seven women dying each year due to the disease[xiv].

The British Heart Foundation estimates that approximately 4% of men and 0.5% of women in England have had a heart attack. Each year in the UK, approximately 141,000 men and women have a heart attack, and 96,000 men and women are newly diagnosed with angina[xv].

Trends

Since the 1970s, the UK has seen a decline in the number of deaths due to CHD (i.e. CHD mortality) yet the UK still has one of the highest CHD mortality rates in the world. About 45% of the reduction in CHD mortality in the UK can be attributed to an improvement in treatment of CHD and around 55% are attributable to a reduction in risk factors, in particular, stopping smoking and control of hypertension (high blood pressure). The decline in smoking, particularly amongst men and in higher socio-economic groups, is an important contributing factor, as are changes in the national diet - reflecting a reduction in saturated fat consumption. However, there are some worrying trends such as a high percentage of teenage smoking, increasing numbers of people with obesity and the lack of physical activity in the general population.

Q2. What effect will *adverse* trends in risk behaviours be likely to have on CHD mortality rates?

Inequalities

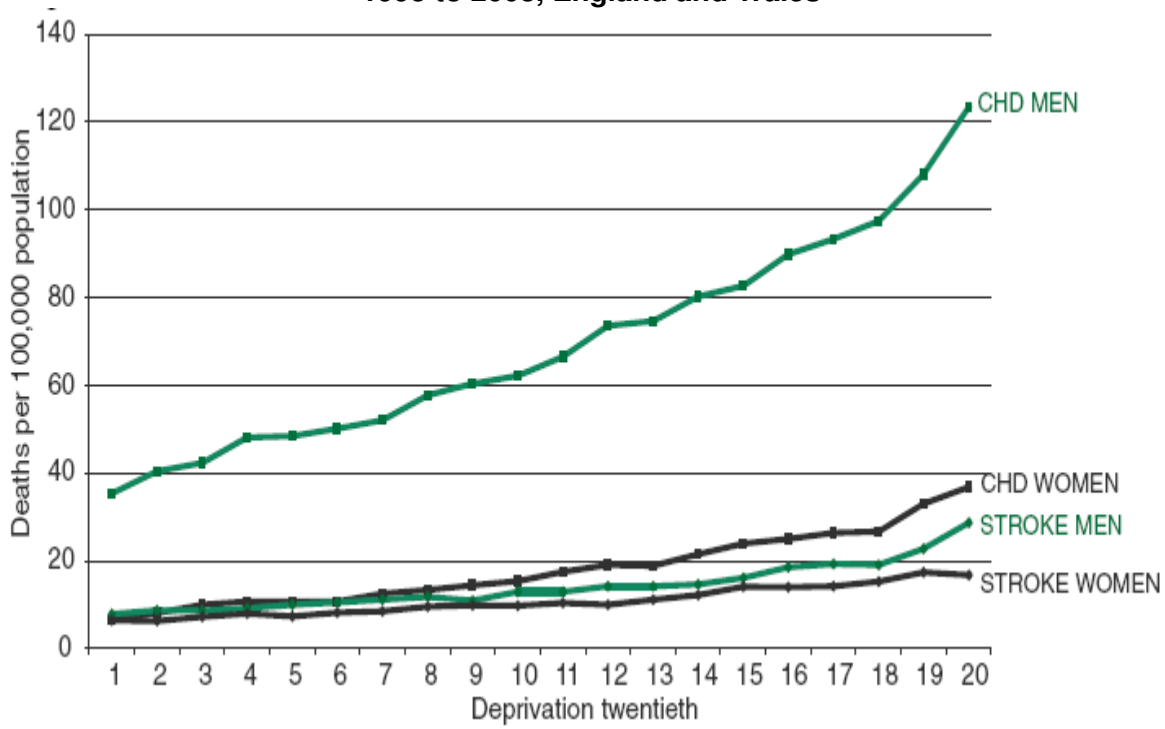
In the UK there are large regional, socio-economic and ethnic differences in the number of people suffering from CHD (morbidity) and deaths due to CHD (mortality). There is strong evidence to show that those of low socio-economic status, South Asian origin and living in Scotland, Northern Ireland and the Northern areas of England are at greater risk of CHD morbidity and mortality[xvi]. An example of the socio-economic gradient of CHD mortality is given below:

[xiv] British Heart Foundation, Stats factsheet 2009

[xv] British Heart Foundation, Coronary heart disease statistics 2008

[xvi] British Heart Foundation, Coronary heart disease statistics 2008

Age-standardised death rates for CHD and stroke, adults aged 15 to 64, 1993 to 2003, England and Wales

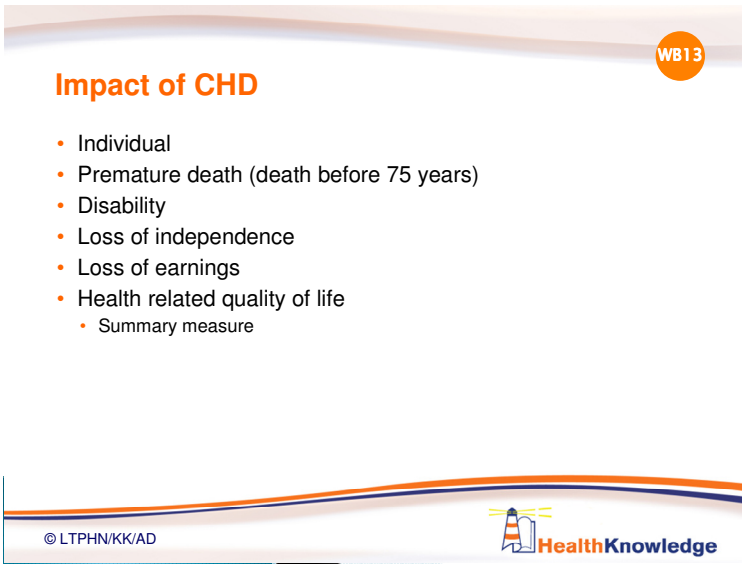


Source: British Heart Foundation

This graphs shows that, in England and Wales, the higher the deprivation the larger the risk of CHD and stroke mortality.

1.4 Impact of CHD

The impact of CHD can be considered at an individual and society level.



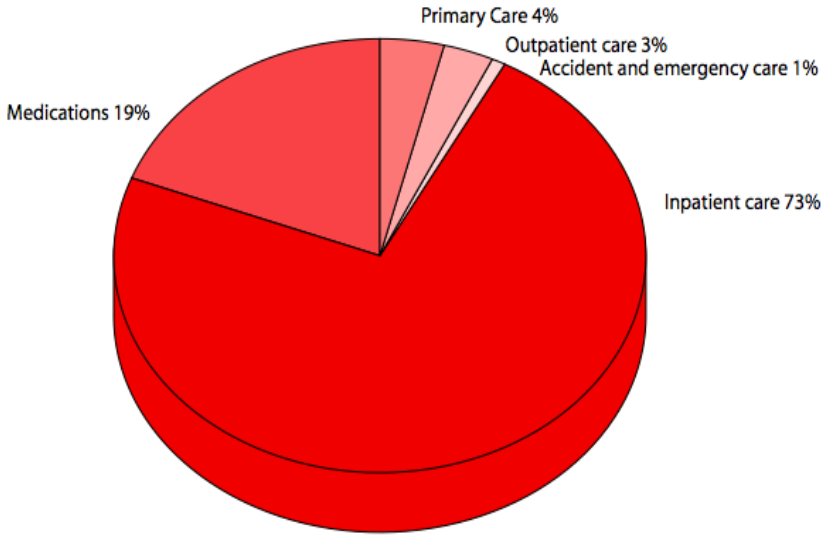
Individual

CHD can result in premature death, disability and reduced activities of daily living (often due to chest pain and breathlessness), loss of earnings and independence, anxiety and depression. All of these factors may have a detrimental impact on an individual's quality of life.
Health related quality of life (HRQL) is a measure used to collate information on an individual's symptoms, ability to function, feeling and overall well being. Medical interventions to manage CHD are often considered in terms of reduced mortality, but HRQL can be a useful indicator of the wider benefits of medical interventions. It is measured by asking individuals to complete standard questionnaires to determine an individual's "health status" before and after an intervention is implemented[4]. For an example of a standard HRQL questionnaire (SF36), see appendix 1.

Society

CHD has a significant economic impact on society – there is an increase cost to the healthcare system as well as to the wider economy (due, for instance, to loss of productivity among those suffering from CHD and their informal carers).
In 2006, CHD cost the UK health care system around £3.2 billion. The large majority of these costs were due to hospital inpatient care, which accounted for 73% of the total CHD related health care costs in the UK in 2006 (figure 3).

Figure 3. Health care costs of CHD, 2006, United Kingdom[5].



Overall, CHD is estimated to cost the UK economy nearly £9.0 billion a year. Of the total cost of CHD to the UK, around 36% is due to direct health care costs, 43% to productivity losses, and 21% to the informal care of people with CHD[xvii].

[xvii] European cardiovascular disease statistics, European Heart Network (2008) at www.heartstats.org

Q3. Why is CHD a major concern for UK society?

1.5 Public health issues

CHD is a major health problem that is largely both treatable and preventable. It remains the most common cause of premature death in the UK and, despite downward trends, the UK still has the one of the highest death rates from CHD in Western Europe, and the economic burden of the disease is high. Many of the major risk factors could be managed by public health interventions such as modification of individual behaviour and the use of preventive medicine. In response to this epidemic, a number of health promotion and prevention programmes have been initiated by various national and global organisations[xviii], providing guidance on prevention of CHD.

The Government's White Paper *Saving Lives: Our Healthier Nation*, published in 1999, made heart disease and stroke a priority by setting the following target to be achieved by the year 2010: 'to reduce the death rate from coronary heart disease and stroke and related illnesses amongst people under 75 years by at least two fifths" i.e. to a mortality rate of 83.8 deaths per 100,000 population. Other target setting government policies have followed, specifically around reducing difference in socio-economic inequalities for premature mortality from CHD, stroke and related illnesses in England, Scotland and Wales, by 40% by the year 2010. Recent trends indicate that these will be met[xix].

2. Risk factors

Many large epidemiological studies have helped our understanding of the risk factors for CHD, including the Framingham Heart Studies[6, 7, 8], Whitehall studies[9, 10, 11], British Regional Heart Study[12], British Women's Heart and Health Study[13] and the World Health Organisations (WHO) Monitoring trends and determinants of cardiovascular disease (MONICA) project[14].

Key studies

- Framingham: Cohort of men and women followed up through 1950 to 1999 in the USA
- Whitehall studies: Cohort of 17,530 British male civil servants recruited in 1967 and followed up over 10 years. A new cohort of male and female civil servants aged 35 to 55 years (n=10,314) was established in London in 1985 to 1988 called Whitehall II

[xviii] Joint British Societies guidelines for the prevention of CHD – Heart 2005,91,suppl 5, v1-52 http://www.bcs.com/download/651/JBS2final.pdf
[xix] www.heartstats.org

- British Regional Heart Study: A socio-economically representative cohort of men aged 40 to 59 years (n=7,735) from 24 British towns recruited in 1978/80 and followed up for more than 10 years
- British Women's Heart and Health Study: A cohort of women aged 60 to 79 years (n=7,173) were recruited from 22 of the same British towns as the British Regional Heart Study participants between 1999 and 2001

Risk factors can be divided into modifiable and non-modifiable factors:

Non modifiable factors:

- Age
- Male sex
- Familial[xx] (including race)

Advancing age is the most important risk factor for CHD, with the risk of new CHD events and mortality increasing with increasing age in both sexes. Determining whether sex is an independent risk factor for CHD is difficult as the effect changes with age.

Men are at greater risk of developing CHD than women, but there is evidence to suggest that this difference is lost once women pass the menopause. However, women are at greater risk of death following a MI[15]. Gender differences in CHD risk may reflect differences in the underlying risk factor behaviour and health seeking behaviour among men and women.

For further information on models of health behaviour, please see section of this name in ***HealthKnowledge***.

Modifiable risk factors

The INTERHEART study is the largest standardised case control study investigating risk factors for acute MI. The results showed that nine modifiable factors (listed below) accounted for over 90% of the risk of a first MI, in men and women, across ten different global geographical regions spanning Europe, Australasia and America[16] . The two most important risk factors were smoking and abnormal lipid levels (high blood cholesterol).

1. Tobacco smoke
2. High blood cholesterol
3. Obesity
4. High blood pressure (hypertension)
5. Diabetes
6. Psychosocial well being (includes job control, lack of social support, depression including anxiety, and individual personality)
7. Physical inactivity
8. Alcohol
9. Daily consumption of fruit and vegetables

[xx] Heredity links including family history of CHD or genetic links – such as being in a high risk racial group, such as South Asians living in the UK

Other factors: Socio-economic status and deprivation

There are a number of other risk factors for CHD which are likely also to be important, such as socio-economic status and job control.

The INTERHEART study did not include a measure of socio-economic status (SES) or deprivation as a risk factor for CHD. The importance of socio-economic factors on health was highlighted by The Working Group on Inequalities in Health report published in 1980[17]. In a more recent review the possible pathways of how an individual's socio-economic position, be that measured by education attained, income, or occupation, at a single point in life or across an individual's life course, impact on health were discussed[18]. For further information on job control see evidence from the Whitehall Studies[xxi] [xxii].

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2.1 Data sources on risk factors

Data on the prevalence of risk factors are generally collected by representative surveys such as the Health Survey for England, Welsh Health Survey and the Scottish Health Survey. These are population based surveys carried out in private households to provide information about various aspects of people's health.

Q4. What are the strengths and limitations of using health surveys to record information on risk behaviours?

These surveys can provide accurate estimates for large areas (i.e. countries of the UK, regions of England) but the sample frame and sample size do not allow for estimates to be made for small areas (local authorities, wards). A variety of small area estimation techniques have been developed to address this issue, one of which (synthetic estimation) is the basis for the local level estimates of risk factor prevalence data.

It has been shown that the technique is likely to lead to an **under-estimation** in areas where prevalence rates are very high, and **over-estimation** in areas where prevalence rates are very low. Despite this, synthetic estimates are generally agreed to be effective at producing an accurate ranking of the prevalence rates in areas, allowing for effective identification of areas where rates are high, low or average.

[xxi] Stansfeld et al, Int J Epi, (2002),31:248-255
[xxii] Marmot et al, Lancet, (1997),350:235-9

2.2 Tobacco smoke

Definition

Tobacco is used across the world in many forms including cigarettes, chewing tobacco and snuff.

Evidence

- Smoking is a major risk factor for CHD.
- British Doctors 50 yr cohort Study[19] showed that CHD mortality was 60% higher in smokers, and 80% higher in heavy smokers, compared with non-smokers.
- INTERHEART case-control study[16] showed 29% of MIs in Western Europe were due to smoking. The risk of a MI is two times higher in smokers and ex-smokers compared to non smokers
- Meta-analysis - regular exposure to second hand smoke increases the risk of CHD by 25%[20]

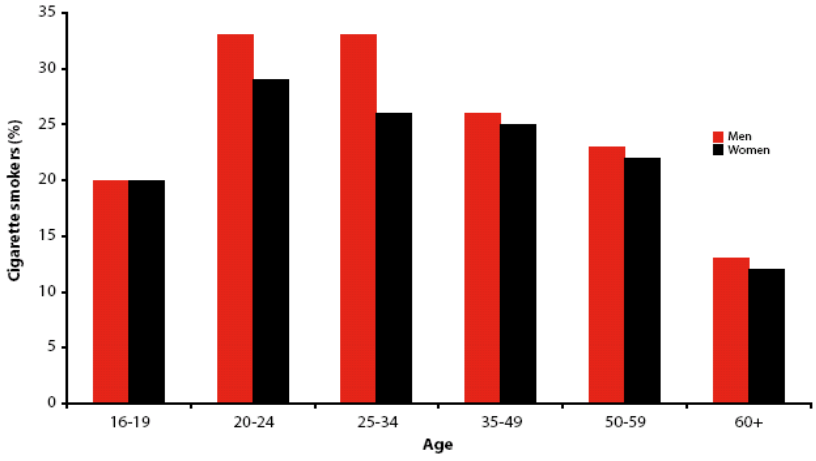
Prevalence

Current estimates suggest there are over 12 million adult cigarette smokers in the UK. In 2006, 23% of men and 21% of women in Great Britain smoked (Source General Household Survey).

In the 1970s, the prevalence of smoking is greater in men than women, but from 1990 onwards the difference has much reduced.

In men and women, the prevalence of smoking declines with increasing age (figure 4). The percentage of adults who smoke is highest in those aged 20 to 34 years and reflects the large proportion of men and women smokers over 35 years who have given up smoking (figure 4).

Figure 4. Prevalence of cigarette smoking by sex and age, 2006. Great Britain[xxiii]



[xxiii] (Source: General Household Survey 2006 (2008)

Trends

Decline in smoking rates over last 30yrs, but the rate of decline has slowed in recent years.
From 2000 to 2006 the prevalence in men declined from 29% to 23%, and in women from 25% to 21%.
The decline has been faster in men than women.

Increased smoking prevalence among teenagers since 1990s, particularly girls

Geographic

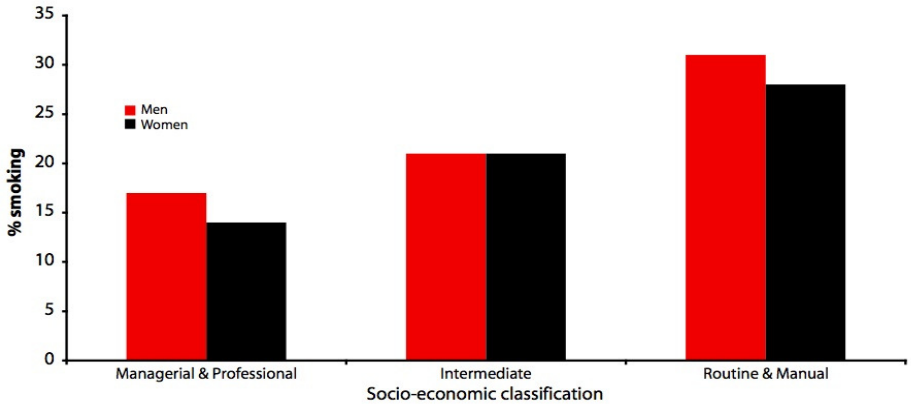
The prevalence of smoking in the UK is, by international standards, relatively low in men (within the second lowest quintile) and relatively high in women (within the highest quintile).

Smoking prevalence is higher in Scotland compared to the rest of the UK. Within England, the prevalence of smoking is higher in the northern regions compared to southern England

SES

There is a strong association between cigarette smoking and socio-economic position[xxiv] (figure 5). Smoking is more prevalent among manual social groups.

Figure 5. Cigarette smoking by sex and socio-economic classification, adults aged 16 and over 2006, Great Britain[xxv]



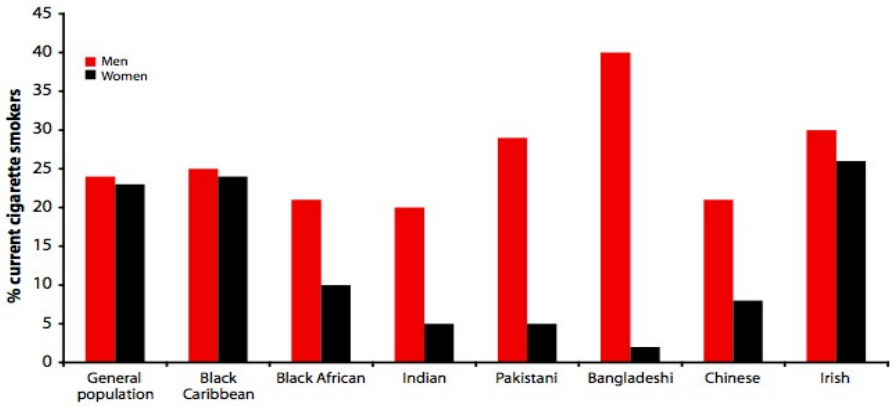
Ethnicity

The prevalence of smoking varies considerably between ethnic groups in the UK. In 2004, the smoking prevalence for men were particularly high in the Bangladeshi communities (40% current smokers). (figure 6)

[xxiv] Smoking prevalence is also measured in the ONS Omnibus Survey. Recent data from this source show no narrowing between 2001 and 2002 of the gap between manual and non-manual classes. Office for National Statistics (2004) Smoking Related Behaviour and Attitudes, 2003. The Stationery Office: London.

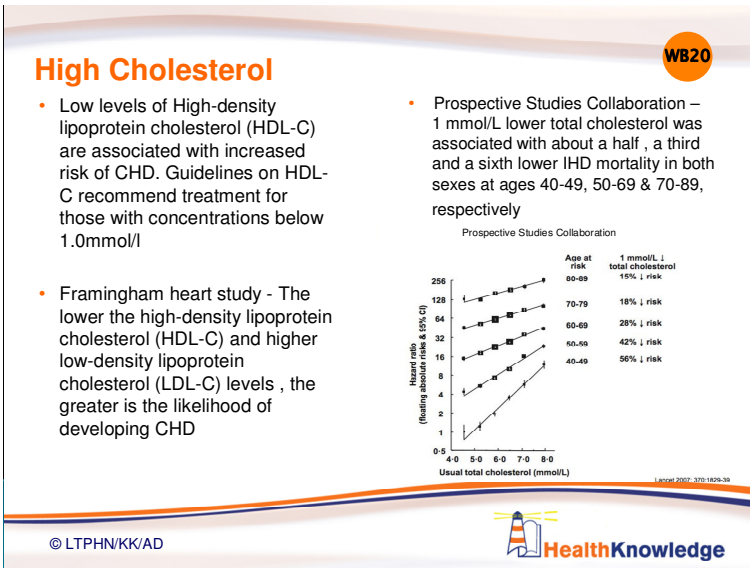
[xxv] Source: Office for National Statistics (2008) Results from the 2006 General Household Survey (www.ons.gov.uk/ghs) and previous years.)

Figure 6. Cigarette smoking by sex and ethnic group, adults aged 16 and over, 2004, England[xxvi]



Q5a. What government policies might be expected to reduce smoking?

2.3 High blood cholesterol



[xxvi] Source: Health Survey for England 2004. The Health of Minority Ethnic Groups. http://www.ic.nhs.uk/pubs/ hlthsvyeng2004ethnic

Definition

A high blood cholesterol level is called hyperlipidaemia. Cholesterol can be measured as the level of Total Cholesterol in the blood. National guidelines suggest a challenging target of total cholesterol of less than 4.0mmol/l for individuals with established cardiovascular disease, diabetes, or at high risk of developing cardiovascular disease[21].
Total cholesterol has two components;

- High-density lipoprotein cholesterol (HDL-C) is the fraction of cholesterol that removes cholesterol (via the liver) from the blood. i.e. a low levels of HDL-C are associated with increased risk of CHD. Guidelines on HDL-C recommend treatment for those with concentrations below 1.0mmol/l.
- High levels of Low-density lipoprotein cholesterol (LDL-C) is positively correlated with correlated with CHD mortality(22)

High saturated fat dietary intake can raise cholesterol levels.

Evidence

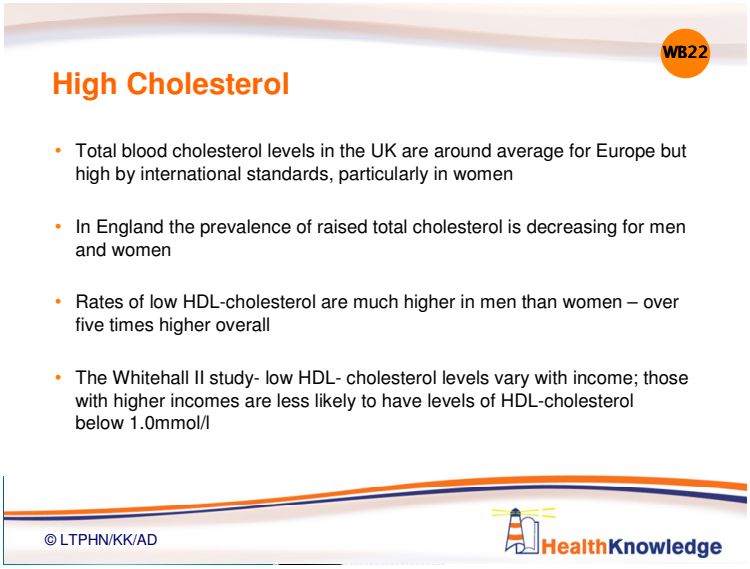
The World Health Report 2002(23) estimates over 60% of CHD in developed countries is due to total blood cholesterol levels in excess of 3.8mmol/l.

The Framingham Heart Study(24) demonstrated the lower the HDL-C and higher LDL-C levels, the greater is the likelihood of developing coronary artery disease. The level of risk increases 3-fold when LDL-C is 220mg/dL and HDL-C is 25mg/dL (or 12.2mmol/l and 1.4mmol/l).

The Whitehall II study (male and female civil servants aged 35 to 55 in 1985 to 1988 from London) found a slight gradient with higher total cholesterol levels in the lower social classes(25). Total blood cholesterol levels show little social class variation in either sex. However, low HDL-C levels vary with income; those with higher incomes are less likely to have levels of HDL-cholesterol below 1.0mmol/l.

Prospective Studies Collaboration (PSC)[xxvii] showed 1 mmol/L lower total cholesterol was associated with about a half, a third and a sixth lower CHD mortality in both sexes at ages 40-49, 50-69 & 70-89, respectively.

[xxvii] Blood cholesterol and vascular mortality by age, sex, and blood pressure: a meta-analysis of individual data from 61 prospective studies with 55 000 vascular deaths. Prospective Studies Collaboration ,Lancet 2007; 370: 1829–39



Prevalence

The prevalence of raised cholesterol increases with age in men and women.

In 2006, the proportion of men with total cholesterol levels of 5.0mmol/l or above was 20% in those aged 16 to 24 years compared to 75% in those aged 55 to 64 yrs.
(figures for women: 16 to 24 yrs 31%; 55 to 64 years 84%).

The prevalence of low HDL-cholesterol is over five times higher in men than women. The greatest difference being in the 75 and over age group in
which the prevalence of low HDL-cholesterol was 8.3% for men and 0.2%
for women.

Trends

The prevalence of raised total cholesterol is decreasing for men and women.

In England the prevalence of raised total cholesterol in men and women decreased in all age groups, with the greatest decline in the 75 yr+
age group.

Geographic

Total blood cholesterol levels in the UK are around average for Europe, but high by global standards, particularly in women.

In the UK, the proportion of people with total cholesterol levels of <5 mmol/l is lowest in London (52% men, 58% women) and highest in Yorkshire & Humber for men (62%), and the South East for women (66%).

SES

Total blood cholesterol levels show little social class variation in either sex.
However, low HDL- C levels do vary with income; those with higher incomes are less likely to have low levels of HDL-C.

The evidence from two longitudinal cohort studies in the UK is conflicting;

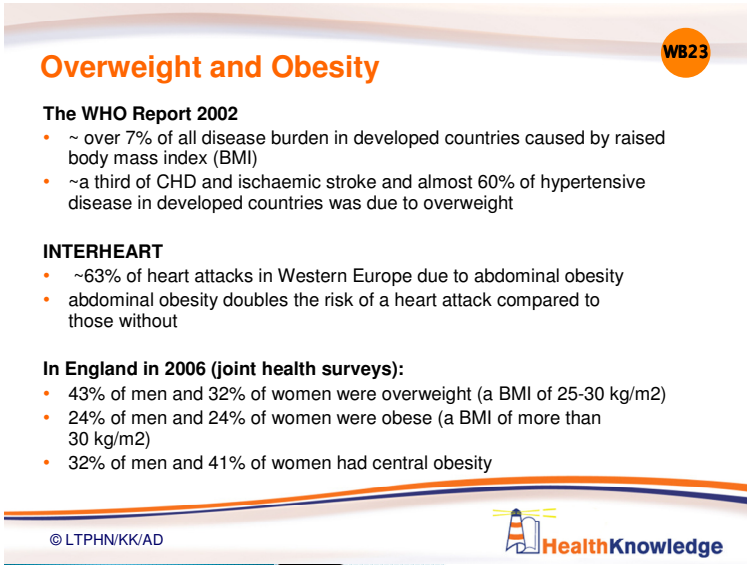
- The West of Scotland cohort data (employed men aged 35 to 64 in 1970 to 1973 from West of Scotland) showed lower total cholesterol levels in the lower social classes[26]
- The Whitehall II study (male and female civil servants aged 35 to 55 in 1985 to 1988 from London) found a slight gradient with higher total cholesterol levels in the lower social classes[25]

Ethnicity

The Indian, Pakistani and Bangladeshi communities have the highest rates of low HDL-C.

Q5b. What government policies might be expected to improve cholesterol levels in the population?

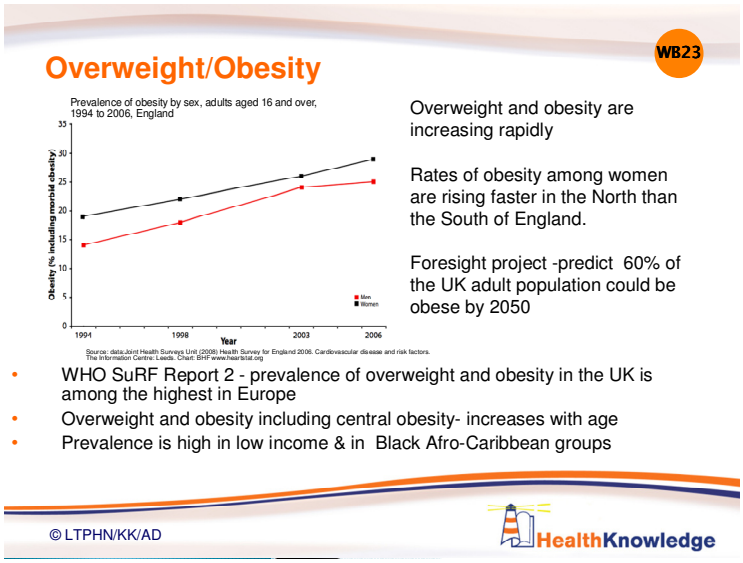
2.4 Overweight and obesity



Definition There are a number of different measures used to describe an individual's weight distribution.

Body Mass Index (BMI) is weight (in Kg) divided by height squared (in m) (kg/m2)
Overweight is defined as a BMI of 25-30 kg/m2
Obese is defined as BMI of more than 30 kg/m2

Abdominal obesity is a high waist to hip ratio.



Evidence Overweight and obesity (especially central or abdominal) increases the risk of CHD. As well as being an independent risk factor, obesity is also a major risk factor for high blood pressure, raised blood cholesterol, diabetes and impaired glucose tolerance[27].

The World Health Organization's World Health Report (2002) estimated that over 7% of all disease burden in developed countries was caused by raised BMI, and that around 33% of CHD and ischaemic stroke and almost 60% of hypertensive disease in developed countries was due to overweight.

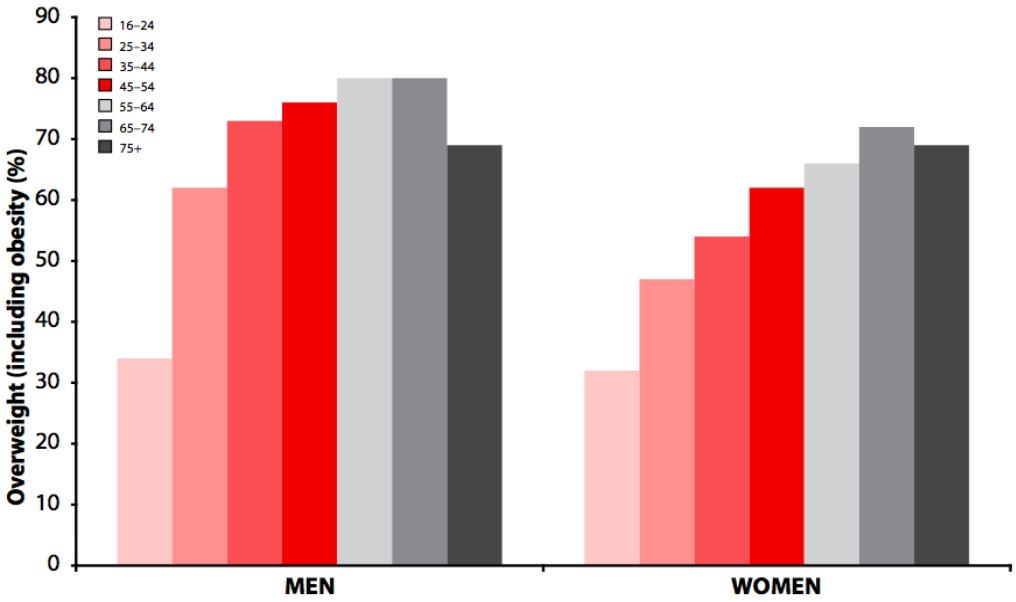
INTERHEART estimated that 63% of heart attacks in Western Europe and 28% of heart attacks in Central and Eastern Europe were due to abdominal obesity, and those with abdominal obesity were at over twice the risk of a heart attack compared to those without[16]. This study also found that abdominal obesity was a much more significant risk factor for heart attack than BMI.

Prevalence In England in 2006:
43% of men and 32% of women were overweight
24% of men and 24% of women were obese
32% of men and 41% of women had central obesity.

The prevalence of overweight and obesity increases with age in men and women (figure 7).

In each age group, with the exception of the youngest (16 to 24 yrs) and the oldest (75+yrs), the prevalence of overweight and obesity is greater in men than women (figure 7).

Figure 7. Prevalence of overweight and obesity by sex and age, adults aged 16 and over, 2006, England[xxviii]



Trends

The prevalence of overweight and obesity are increasing rapidly.

In England the percentage of men aged 16 to 64 who are obese increased from 14% in 1994 to 25% in 2006, and for women from 19% in 1994 to 29% in 2006. The increase in obesity was particularly marked among men aged 55 to 64, doubling from 18% to 36% between 1994 and 2006. (figure 8).

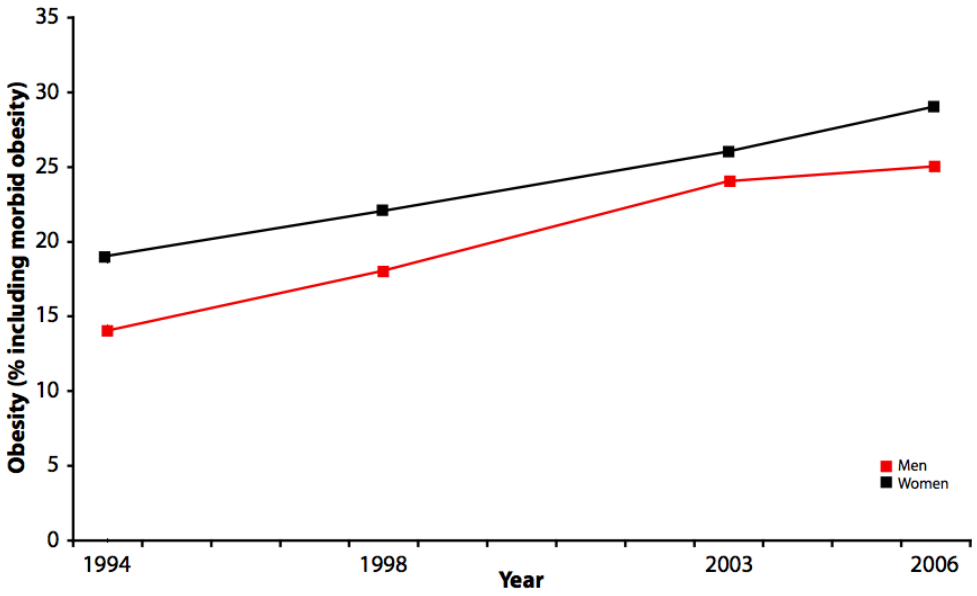
The increasing levels of overweight and obesity among children are likely to exacerbate the trend towards overweight and obesity in the adult population, since compared to thin children, obese children have a high risk of becoming overweight adults[28]. Between 1995 and 2006 the prevalence of obesity among English boys increased from 11% to 17% and from 12% to 15% among English girls.

In 2008, the Foresight Report predicted that nearly 60% of the UK adult population could be obese by 2050[xxix]

[xxviii] Joint Health Surveys Unit (2008) Health Surveys for England (2006) Cardiovascular disease and risk factors, the Information Centre, Leeds

[xxix] See: http://www.foresight.gov.uk/Obesity/Obesity.html

Figure 8. Prevalence of obesity by sex, adults aged 16 and over, 1994 to 2006, England[xxx]



Geographic

Data from the WHO SuRF Report show that the prevalence of overweight and obesity in the UK is among the highest in Europe. The prevalence of overweight and obesity in the UK is in the highest quintile for men and the second highest for women worldwide.

There are regional differences in the UK. The highest prevalence of adult obesity or overweight is found in the West Midlands (76%) and the lowest in London (61%).

Recent evidence suggests the prevalence of obesity among women is rising faster in the North than the South of England. This pattern is not observed in men, where prevalence appears to be rising uniformly across England[29].

SES

Among women, obesity rates vary considerably by household income – prevalence is high in low income and low prevalence among high income households.

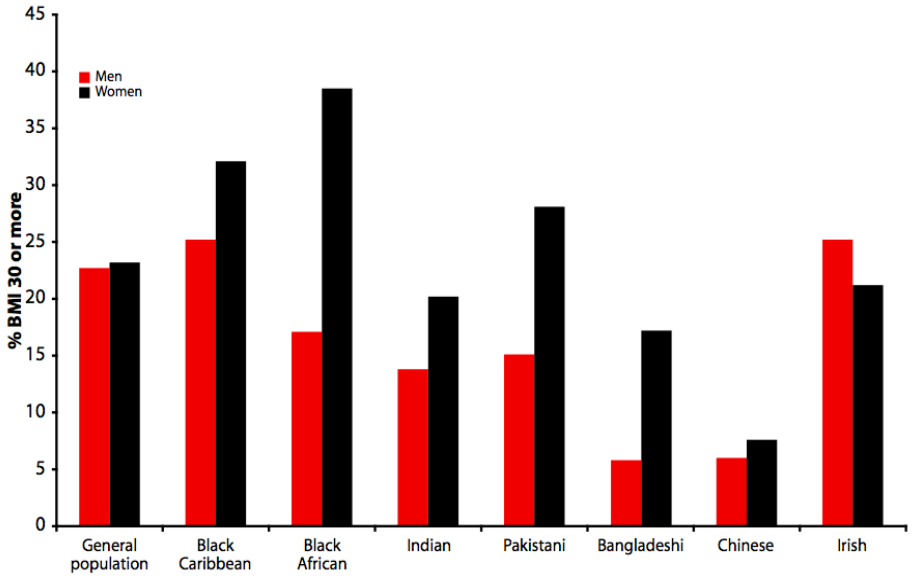
In both men and women, the prevalence of central obesity was highest in households with the lowest income.

Ethnicity

Levels of general and abdominal obesity vary with ethnicity in both men and women in England (figure 9).

[xxx] Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds

Figure 9. Prevalence of obesity by sex and ethnic group, adults aged 16 and over, 2004, England[xxxi]



Q5c. What government policies might be expected to reduce obesity?

[xxxi] Source: Department of Health (2005) Health Survey for England 2004. See http://www.ic.nhs.uk/pubs/hlthsvyeng2004upd

2.5 Hypertension

Hypertension

Risk of CHD is directly related to both systolic and diastolic blood pressure levels.

- Hypertension can be defined as systolic blood pressure (BP) of 140mmHg or greater, or diastolic blood pressure greater of 90mmHg or greater
- Recommendations for BP no greater than 140mmHg systolic and less than 85mmHg diastolic for those with a history of CHD, and no greater than 130mmHg / 80mmHg for those at risk of CHD e.g. those with a history of diabetes or chronic renal failure
- The 2004 British Hypertension Society guidelines for hypertension recommend treatment should be considered for blood pressure of 140/90mmHg

Both drug treatment **and** lifestyle changes - particularly weight loss, an increase in physical activity, and a reduction in salt and alcohol intake - can effectively lower blood pressure.

Evidence

The World Health Report 2002:

- around 11% of all disease burden in developed countries is caused by raised blood pressure
- over 50% of CHD in developed countries is due to systolic blood pressure levels in excess of the theoretical minimum (115mmHg)

INTERHEART study:

- Around 22% of heart attacks in Western Europe and 25% of heart attacks in Central and Eastern Europe were due to a history of high blood pressure

Those with a history of hypertension were at just under twice the risk of a heart attack compared to those with no history of hypertension[2].

Each 20mmHg increase in usual systolic blood pressure, or 10mmHg increase in usual diastolic blood pressure, doubles the risk of death from CHD[xxxii]

Prevalence

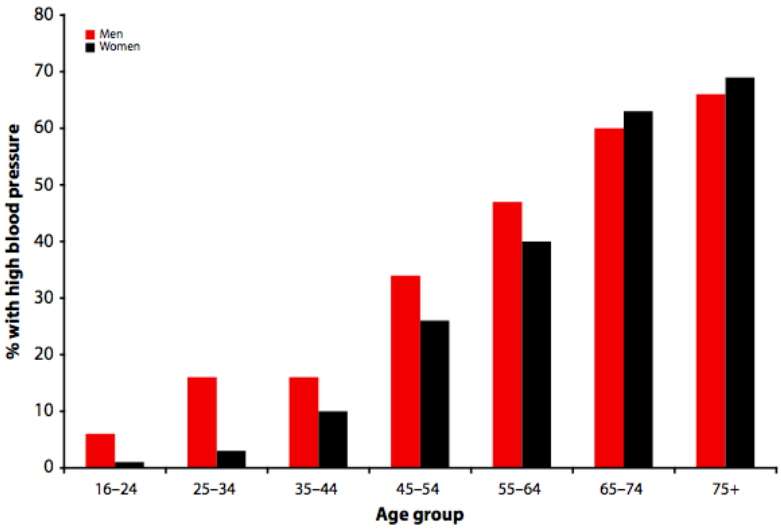
In 2006, estimated 31% of men and 28% of women in England had hypertension.

There is a large proportion of the population with high blood pressure who remain untreated.

In Western societies, the prevalence of hypertension increases with age in both sexes (Figure 10). Treatment at any age is associated with reduction in CVD risk.

[xxxii] Prospective Studies Collaboration (2002) Age-specific relevance of usual blood pressure to vascular mortality: a meta analysis of individual data for one million adults in 61 prospective studies. The Lancet; 360: 1903-1913.

Figure 10. Prevalence of high blood pressure by sex and age, adults aged 16 and over, 2006, England[xxxiii]



Trends

The proportion of the population with hypertension has dropped slightly in England since 1998, for both men and women at all ages. The largest decreases have occurred for older age groups.

Geographic

Data from the World Health Organization[xxxiv] show a wide range in mean systolic blood pressure throughout Europe.

Comparison of data from the Health Survey for England and the Scottish Health Survey suggest that the prevalence of high blood pressure is similar in England and Scotland.

SES

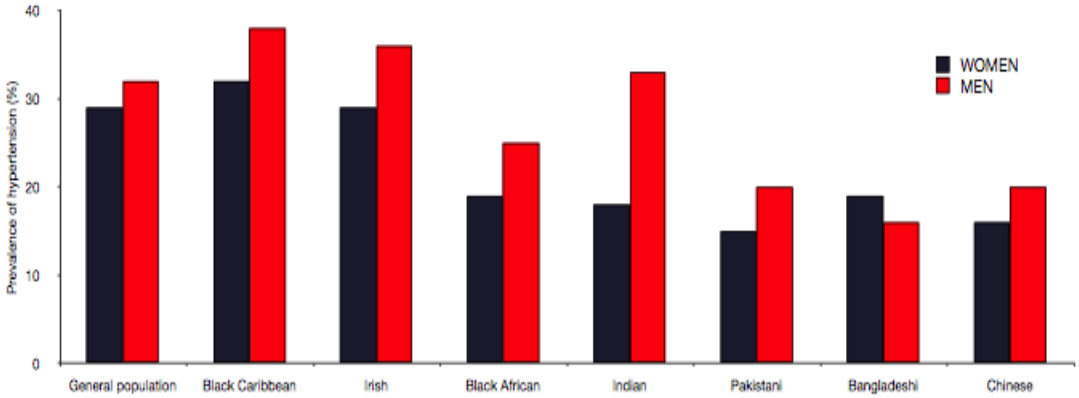
Women - prevalence of high blood pressure in the lowest income quintile is a third higher than in the highest income quintile

Ethnicity

The prevalence of hypertension differs by ethnic group. Hypertension is most prevalent in Black Caribbean group. (figure 11)
In each ethnic group the prevalence of hypertension is greater in men than women (with the exception of Bangladeshi group).

[xxxiii] Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds.
[xxxiv] World Health Organization (2005) The SuRF Report 2. Surveillance of chronic disease Risk Factors – Country level data and comparable estimates. WHO Global Infobase (www.who.int/ncd_surveillance/infobase/web/surf2/start.html)

Figure 11. Prevalence of high blood pressure by sex and ethnic group, adults aged 16 and over, 2004, England[xxxv]



2.6 Diabetes

Definition

Diabetes is associated with a markedly increased risk of CHD and other serious complications [see HK Unit on Public Health Aspects of Diabetes in this series]

- Type 1 diabetes: is due to the pancreas failing to make enough insulin (insulin dependent)
- Type 2 diabetes: is when the body cannot effectively make use of the insulin produced (non-insulin dependent). Type 2 diabetes, accounts for about 90% of all diabetes.

Diabetes is characterised by hyperglycaemia and is diagnosed by:

- Fasting plasma glucose greater than or equal to 7.0 mmol/L, or
- 2-hour plasma glucose (following a 75 g glucose load) greater than or equal to 11.1 mmol/l[xxxvi]

Evidence

Framingham Study:
Men with type 2 diabetes have a two to fourfold greater annual risk of CHD, with an even higher (three to fivefold) risk in women[30].

INTERHEART case-control study estimated that 15% of heart attacks in Western Europe and 9% of heart attacks in Central and Eastern Europe are due to diagnosed diabetes, and that people with diagnosed diabetes are at three times the risk of a heart attack compared to those without[16].

Prevalence

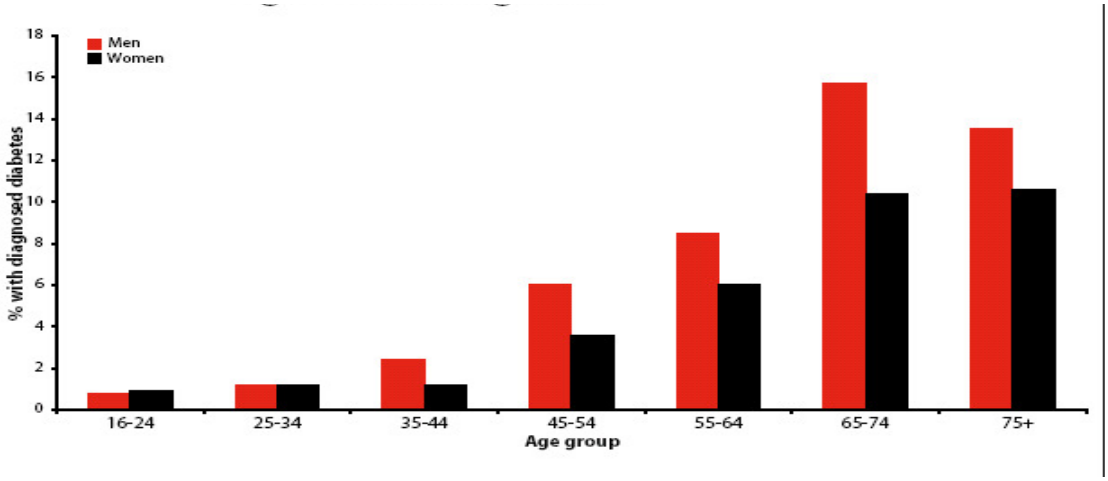
- The Quality and Outcomes Framework (QOF) provides information on the registrations in general practice for diabetes. In 2006, the overall prevalence of diabetes in Great Britain was estimated to be 4%.
- Over 5% of men and 4% of women in England have diagnosed diabetes

[xxxv] Source: Department of Health (2005) Health Survey for England 2004. The Health of Minority Ethnic Groups. The Stationery Office: London. Department of Health (2005) Health Survey for England 2004
xxxvi Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications, WHO 1999

- The Health Survey for England 2003 suggests that 3.1% of men and 1.5% of women aged 35 and over have **undiagnosed** diabetes.

For both men and women, the proportion of people with diabetes increases with age (figure 12).

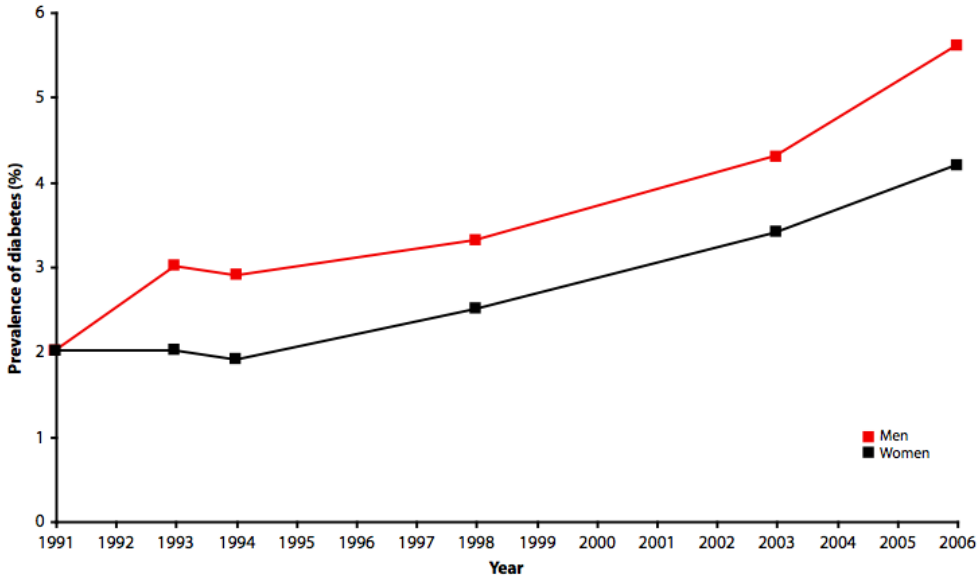
Figure 12. The prevalence of diabetes by sex and age, England[xxxvii]



Trends

The prevalence of diabetes is increasing.
Since 1991, the prevalence of diagnosed diabetes has more than doubled in men and women (figure 13)

Figure 13. Prevalence of diagnosed diabetes in adults, 1991 to 2006, England[xxxviii]



[xxxvii] Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds.

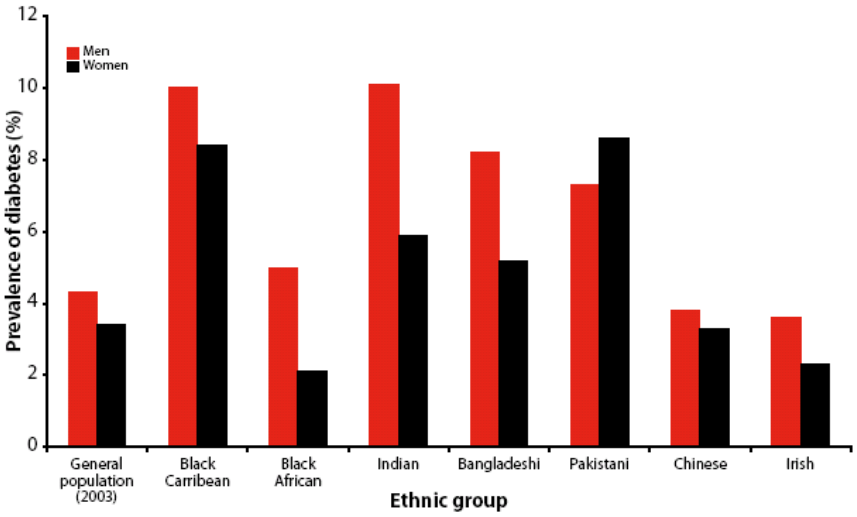
Geography Diabetes is now one of the most common non-communicable diseases globally. The International Diabetes Federation estimates that there are currently about 194 million people aged 20 to 79 with diabetes worldwide and that this will increase to 333 million by 2025.

Developed countries currently have higher rates than developing countries - prevalence rates in the UK are average for developed countries .

SES The 2006 Health Survey for England show that women living in households with the highest incomes had the lowest prevalence of diagnosed diabetes. This pattern was not found in men.

Ethnicity The prevalence of diabetes in 2004 was much higher among some ethnic minority communities than in the general population. High prevalence of diagnosed diabetes is found in those of Black Caribbean and South Asian ethnicity (figure 14).

Figure 14. Prevalence of diagnosed diabetes by ethnic group, 2004, adults aged 16 years and over, England



2.7 Psychosocial well being

Q7. How might psychosocial well-being affect CHD risk?

[xxxviii] Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds.

Psychosocial well being

Four different types of psychosocial factor have been found to be most consistently associated with an increased risk of CHD: work stress, lack of social support, depression (including anxiety) and personality (particularly hostility).

General Health Questionnaire (GHQ12) is used to assess levels of depression, anxiety, sleep disturbance and happiness in the population. A GHQ12 score of 4 or more - a 'high GHQ12 score' - indicates a high level of psychological distress.
The GHQ12 is used in the Health Survey for England and the Scottish Health Survey.

Evidence

Psychological distress may confer increased risk of CHD in men that is not explained by health behaviours, social isolation or work characteristics. Baseline psychological distress (as measured by the GHQ) was associated with an increased incidence of overall reported coronary heart disease (odds ratio 1.83, 95% CI 1.5-2.3) and ECG abnormalities (OR 1.51, CI 1.1-2.1), after adjustment for age, employment grade and length of follow-up. This risk was not consistently demonstrated in women[31].

Prospective observational studies show there is a role for social support and treating depression in reducing CHD risk. However, conflicting data exist on whether psychosocial interventions reduce mortality after MI[32].

Prevalence

The Health Survey for England showed 15% of women and 11% of men in England have a high score (GHQ12 of 4+).
Women have higher GHQ12 scores than men.

Geographic

GHQ12 scores also vary geographically across England and are highest in men and women in the North of England.

SES

There is an inverse relationship between GHQ12 scores and income: people with low incomes tended to have higher GHQ12 scores.

Ethnicity

Among South Asians, the distribution of psychosocial factors found to be consistent with ethnic differences in coronary rates[32]. South Asians report high GHQ12 scores.

2.8 Physical inactivity

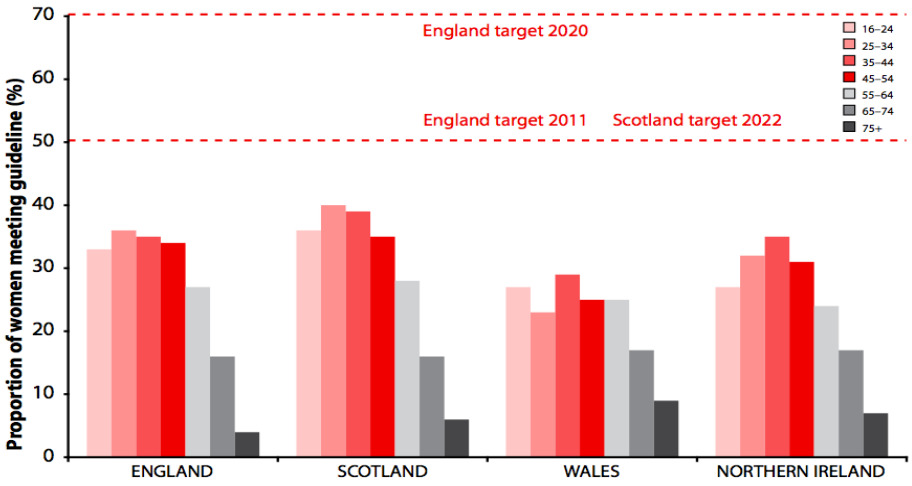
Physical inactivity

People who are physically active have a lower risk of CHD.
To produce the maximum benefit the activity needs to be regular and aerobic. Aerobic activity involves using the large muscle groups in the arms, legs and back steadily and rhythmically so that breathing and heart rate are significantly increased.

Since 2006, the Department of Health (England) recommendation is

- Adults: 30 mins of moderate intensity activity on 5 or more days a week (brisk walking, swimming, cycling).
- Children (aged 5 to 18 yrs): 1 hr of moderate intensity activity every day.

Figure 15. Proportion meeting physical activity guideline by age and country, men, year, England, Scotland, Wales and Northern Ireland[xxxix]



Evidence

The 2002 World Health Report estimated that around 3% of all disease burden in developed countries was caused by physical inactivity, and that over 20% of CHD in developed countries was due to physical inactivity (less than 2.5 hours per week moderate intensity activity or 1 hour per week vigorous activity).

Evidence from observational studies suggests that regular physical activity attenuates the risk of coronary heart disease associated with overweight or obesity and active obese individuals actually have lower morbidity and mortality than normal weight individuals[33].

Prevalence

Physical activity levels are low in the UK.
Health Survey for England 2006[xl] reported:

- 40% of men and 28% of women met the current physical activity guidelines
- Approximately 1/3 English adults are inactive (participate in less than one occasion of 30 minutes activity a week)

Women complete less physical activity than men.

Physical activity declines rapidly with increasing age. In women the decline begins in the mid forties.

In 2006 in England, 70% of boys and 59% of girls aged 2 to 15 were active for at least an hour a day.

Trends

The Health survey for England reported that the overall proportion of adults meeting the recommended level of activity increased from 32% to 40% in men and from 21% to 28% in women, between 1997 and 2006.

[xxxix] Source: Department of Health (2008) Health Survey for England 2006. The Stationery Office: London.

[xl] Cardiovascular Disease and Risk Factors, Health Survey for England, The Information Centre (2006) Statistical data presented on physical inactivity prevalence, trends, geographic, SES and ethnic factors all taken from this Survey.

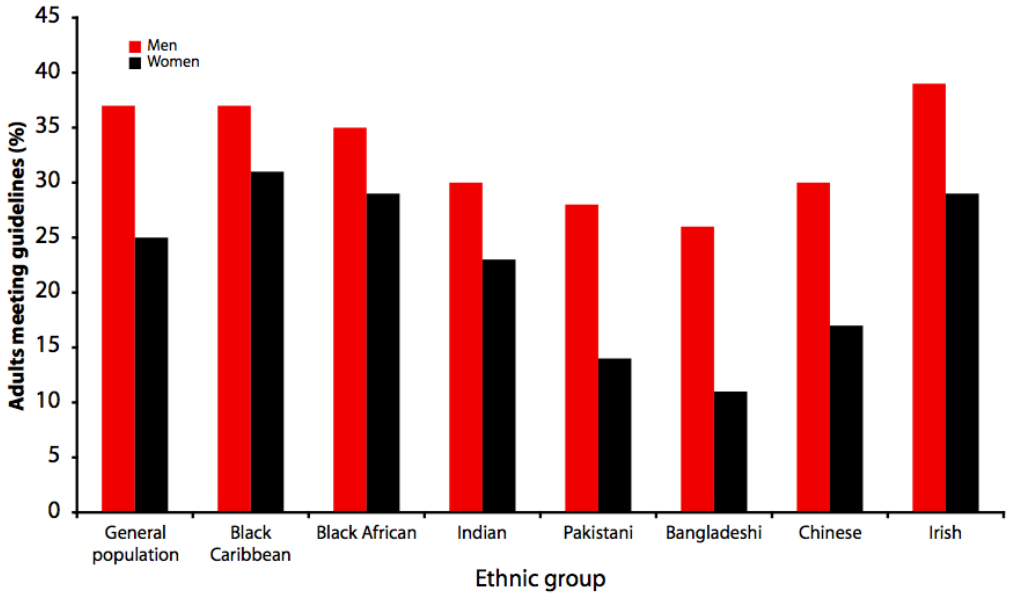
Geographic In 2003, levels of physical activity in Scotland were generally higher than in England. In 2006 Levels of activity vary across European member states, with levels of activity in the UK falling just below the EU average.

SES Socio-economic differences in physical activity are complex. Among English men in 2006, 42% of those in the highest income quintile met current recommended levels of physical activity compared to 35% of those in the lowest income quintile.

In English women, the pattern was less clear: 28% of those in the highest income quintile met the current recommended levels of physical activity compared 26% of women in the lowest income quintile.

Ethnicity South Asian group are less likely to meet physical activity guideline compared to all other groups (figure 17)

Figure 17. Percentage meeting physical activity guidelines by sex and ethnic group, adults aged 16 and over, 2004, England[xli]



Q8. What factors are likely to influence levels of physical activities from individual and wider society perspectives? (discuss individually or in groups)

[xli] Source: Department of Health (2005) Health Survey for England 2004. The Stationery Office: London

2.9 Alcohol consumption

Definition

While moderate alcohol consumption (one or two drinks a day) reduces the risk of CVD, at high levels of intake – particularly in 'binges[xlii]' – the risk of CVD is increased.

The Government currently advises that 'regular consumption of between three and four units a day by men' and 'between two and three units a day by women of all ages will not lead to any significant health risk. Consuming in excess of four units on the heaviest drinking day of the week in men, or over three units in women, is not advised.

Evidence

The World Health Report 2002 estimates that over 9% of all disease burden in developed countries is caused by alcohol consumption and that 2% of CHD and almost 5% of stroke in men in developed countries is due to alcohol. However, the impact of alcohol consumption in women in developed countries is estimated to be positive – if no alcohol were consumed, there would be a 3% increase in CHD.

Alcohol is somewhat protective. There is a J-shaped curve for risk of CHD with alcohol consumption. Non-drinkers are at greater risk, small amounts are protective, and the risk increases with increasing consumption.

Prevalence

The General Household Survey 2006 uses an updated method for calculating the number of alcoholic units consumed. Prevalence data below taken from this survey.

In Britain in 2006, the updated method shows 40% of men and 33% of women consumed more alcohol than the recommended daily benchmarks; that is more than four units on the heaviest drinking day of the week for men and more than three for women.

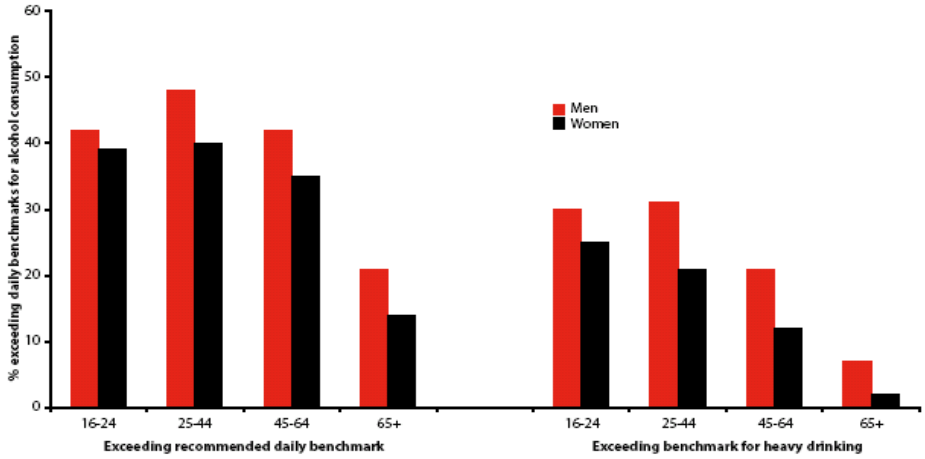
Men remain more likely than women to exceed the recommended allowance, but this gap is narrowing.

Alcohol consumption among young people is high. 42% of men and 36% of women aged 16 to 24 yrs drank more than the recommended allowance (figure 18).

In 2006, 20% of boys and girls aged 11 to 15 yrs consumed an alcoholic drink in the last week.

[xlii] The General Household Survey defines heavy drinking, or binge drinking, as more than 8 units in one day for men and more than 6 units in one day for women. While people vary in their susceptibility to the effect of alcohol, these thresholds for heavy drinking were chosen as those likely to lead to intoxication.

Figure 18 Percentage exceeding daily benchmarks for alcohol consumption by sex and age, adults over 16 yrs, 2006, Great Britain[xliii]



Note: Recommended daily benchmark is 4 units for men and 3 units for women. Benchmark for heavy drinking is 8 units for men and 6 units for women.

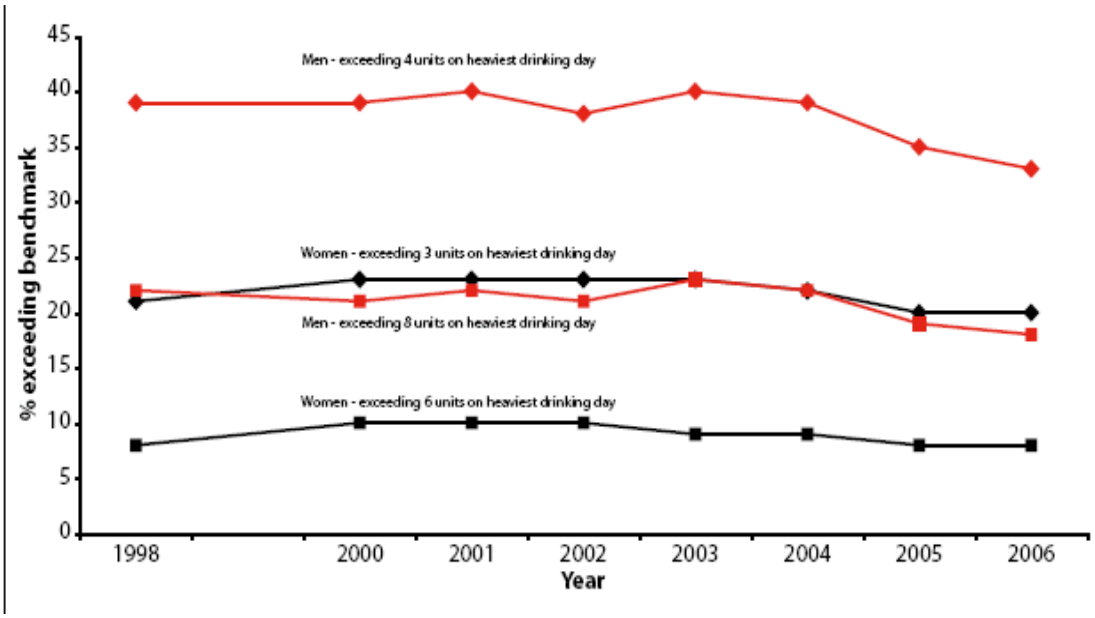
Trends

In the first half of the twentieth century per capita alcohol consumption in the UK fell rapidly, from around 11 litres per year in 1900 to around 4 litres after the Second World War. From the late 1950s to the end of the century alcohol consumption increased steadily, more than doubling overall from around four to ten litres per person per year.

More recent trends are only available from 1998 when the General Household Survey included data about maximum daily alcohol consumption (figure 19).

[xliii] Source: General Household Survey (2006) 2008

Figure 19. Percentage consuming more alcohol than the recommended daily maximum, adults aged 16 and over. 1998 to 2006, Great Britain[xliv]



Geographic

Levels of alcohol consumption in the UK in 2003 were about average for the European Union, and slightly higher than the European region average . In the EU as a whole, consumption of alcoholic drinks has steadily declined since 1980, but in the UK there has been no strong evidence of decline[xlv].

The proportions consuming more than the recommended daily level of alcohol in 2006 were lowest in London and highest in Yorkshire and the Humber for men, and lowest in London and highest in Yorkshire and the Humber and the North West for women.

SES

Managerial and professional households were the most likely to drink and the most likely to drink on five or more days a week. This socio-economic gradient was also found in the amount of alcohol drunk with the exception of binge drinking.

Ethnic

With the exception of the Irish, adults from minority ethnic groups were less likely to drink alcohol than the general population. Very low proportions of Bangladeshi (less than 5%) and Pakistani (less than 10%) adults ever drink alcohol.

Women are more likely than men to be non-drinkers in all ethnic groups. Irish men and women are more likely than those in the general population to drink more than the upper recommended daily level of alcohol.

[xliv] Source: General Household Survey (2006) 2008

[xlv] World Health Organization (2006) European Health For All statistical database. See www.euro.who.int/hfadb

2.10 Early life course

Evidence is fairly consistent that childhood socio economic position (SEP) (often measured as parents' occupation or education) is also inversely associated with CHD[34]. Cumulative exposure to socioeconomic disadvantage across the life course may be inversely associated with coronary heart disease (CHD); but the mechanisms are not fully clear[35].

Exercise 1: From the information presented on risk factors for CHD

a) summarise the key patterns by age, sex, ethnicity, deprivation and region
b) Why is it important to understand differences in risk factors between groups?
c) What do trends in the levels of alcohol, smoking and obesity suggest for future levels of CHD?

3. Prevention

CHD is a preventable disease. About half of the recent decline in CHD mortality is attributable to lifestyle changes and half due to better treatment and care.

Evidence supports the notion that it is possible to modify health behaviours (e.g smoking, alcohol intake, activity) and reduce blood pressure and cholesterol levels. Randomized trials, involving a programme of weight reduction, dietary manipulation and physical activity, reduced the incidence of type 2 diabetes among people at high risk of developing CHD. Also, trials of reduction of saturated fat and its partial replacement by unsaturated fats have improved lipid levels and lowered risk of cardiovascular events[xlvi] .

In 1989, Geoffrey Rose[xlvii] described two approaches for the practical management of risk factors: the 'population approach' and the 'high risk approach'.

In a population approach, strategies are implemented to improve health behaviours in the population as a whole, with the aim of reducing risk throughout the population e.g. healthy eating campaigns.

In a high risk approach, the intervention is targeted at those identified to be at high risk of CHD e.g. giving hypertension medications to those with high blood pressure.

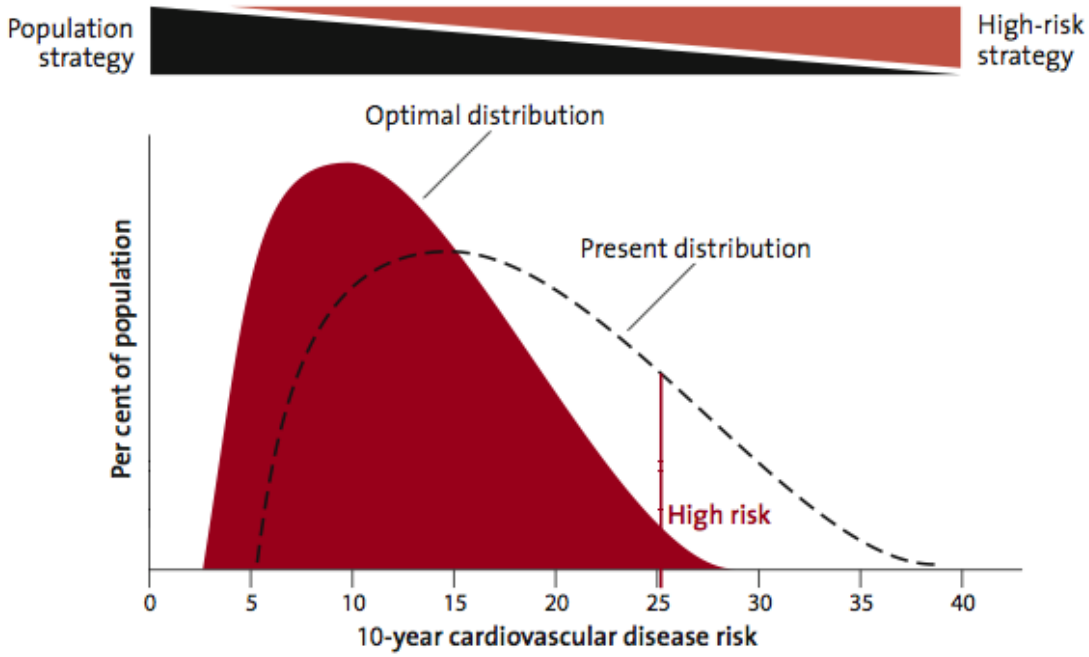
The figure below shows the distribution of cardiovascular risk in the general population (black dashed line). The distribution shows there is a small proportion of the population at very high risk (>25), with the majority of the population at some risk. A high risk approach is targeted at those on the right hand side of the distribution, and a population risk approach addresses the whole population. A combination of population-wide and high-risk strategies are required to reduce the cardiovascular disease risk distribution of the population (to shift the cardiovascular risk distribution to the left)[xlviii].

[xlvi] Prevention of cardiovascular disease : guidelines for assessment and management of total cardiovascular risk. WHO 2007

[xlvii]

[xlviii] Cardiovascular disease prevention. Translating evidence into action. Geneva, World Health Organization, 2005.

Distribution of cardiovascular risk in general population



Q 12. What are the ethical considerations in a population based approach?

3.1 Effectiveness and efficacy

Determining whether an intervention works or not can be difficult. The evidence for public health interventions may come from a variety of sources. In hierarchical order these are

1. randomised controlled trials e.g. the effect of statins at reducing the risk of CHD
2. case–control or cohort studies
3. case series
4. expert opinion

NICE guidelines, which systematically review evidence for many interventions are applied in public health (see http://www.nice.org.uk/guidance/index.jsp).

When examining the evidence to determine whether an intervention works or not there are two key concepts to consider: efficacy and effectiveness.

Efficacy	The extent to which a specific intervention produces a beneficial result under **ideal conditions**. Ideally, the calculation of efficacy is based on the results of a randomised controlled trial. *Whether a treatment can work under ideal (e.g. RCT) circumstances (compared with effectiveness which is examined in routine circumstances).*
Effectiveness	A measure of the extent to which a specific intervention when used **in the field in routine circumstances**, does what it is intended to do for a specified population. This is a measure of the extent to which a health intervention fulfils its objectives. *The degree to which a treatment or programme works in an everyday service setting rather than a research environment.*

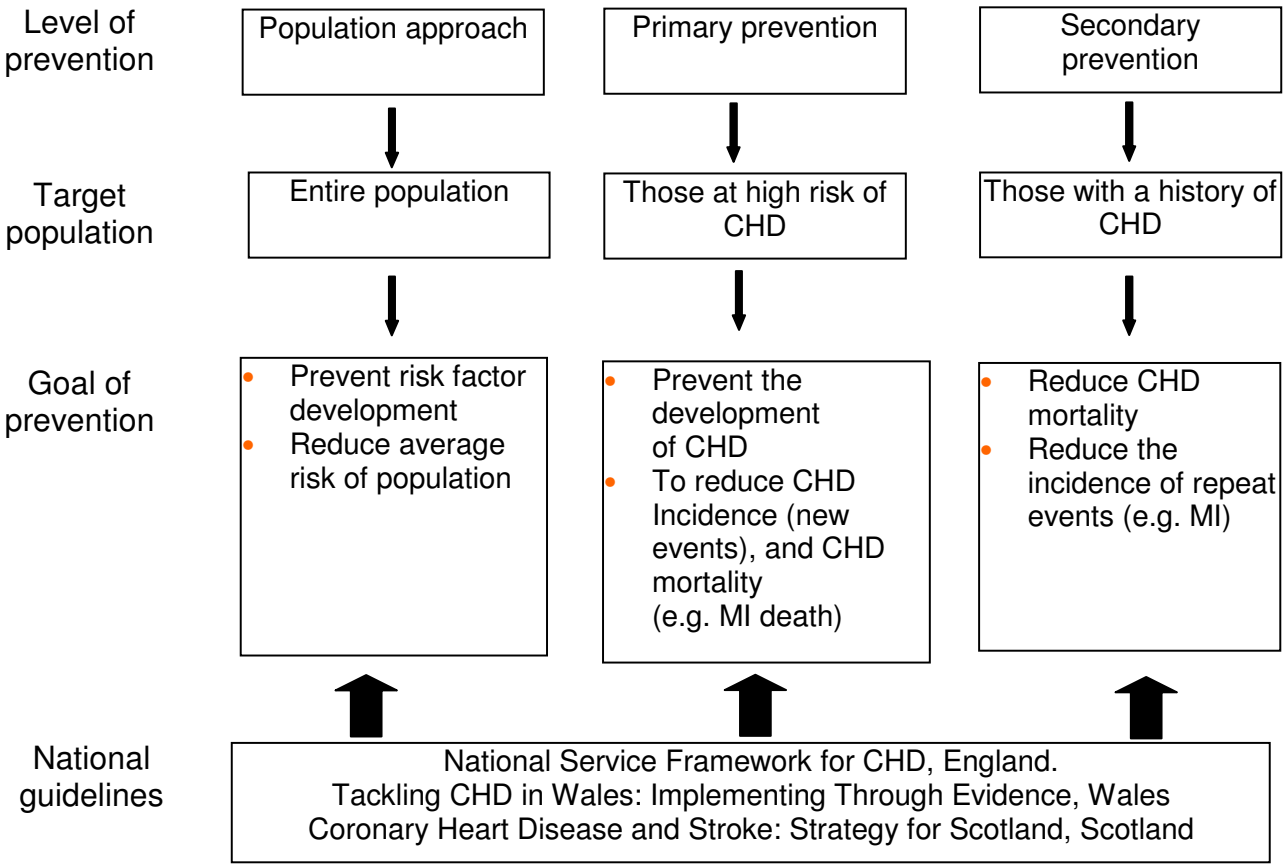
Q13. Why might the efficacy and effectiveness of an intervention differ?

3.2 Different levels of prevention

There are 3 levels of prevention:

- **Primary prevention :** Prevents the disease from occurring in those at risk. An example of primary prevention of CHD would be to provide smoking cessation advice to an individual with no history of CHD.
- **Secondary prevention**: Aims to identity high risk individuals in a population and prevent disease progression i.e. from angina to MI or death. An example would be the provision of lipid lowering medications to those with high blood cholesterol.
- **Tertiary prevention:** Aims to prevent the recurrence of a MI. An example would be revascularisation after a MI for severe cases of CHD.

Figure 20. Levels of preventions for the control of CHD



Adapted from: George A. Mensah, William H. Dietz, Virginia B. Harris, Rosemarie Henson, Darwin R. Labarthe, Frank Vinicor, Howell Wechsler. Prevention and Control of Coronary Heart Disease and Stroke—Nomenclature for Prevention Approaches in Public Health: A Statement for Public Health Practice from the Centers for Disease Control and Prevention American Journal of Preventive Medicine, Volume 29, Issue 5, Supplement 1, December 2005, Pages 152-157

The National Service Framework for coronary heart disease (NSF CHD) for England, set out a strategy to modernise CHD services in 2000. It detailed 12 standards for improved prevention, diagnosis, treatment and rehabilitation and includes goals for securing fair access to high quality services. The National Assembly for Wales and the Scottish Office published similar recommendations spanning prevention and the workforce.

3.3 Population wide approach

A population wide approach may include:

- Integrated national policies
- health promotion campaigns (e.g. Change4life see http://www.nhs.uk/Change4life) or
- disease prevention interventions (e.g. regulation to reduce the level of salt in processed food).

Health promotion can be defined as the process of enabling people to increase control over their health and its determinants, and thereby improve their health (WHO 2005)[xlix]. The overall objective should be to make it easy for the population to make healthy choices related to diet, physical activity and avoidance of tobacco.

In England and Wales the Change4life national campaign began in January 2009 to prevent people from becoming overweight by encouraging them to eat better and become more active; it aims to raise awareness and increase understanding of obesity.

Effective policies may include:

Promote healthy eating:
- Agricultural subsidies for fruits and vegetables
- Food pricing and availability
- Labelling of food
- School health education

Promote physical activity:
- Improve access to public transport
- Pedestrian- and cyclist-friendly road planning

Reduce smoking:
- Tobacco control measures, including controls on advertising; ban in indoor public spaces
- Smoking cessation services

Prevention of sudden death by CHD:
- Availability of automatic external defibrilliators in public places – egs at stations, shopping centres, airports

3.3.1 Primary Prevention

Cardiovascular population screening in primary care is currently being introduced for the first time through the NHS Health Check programme. National screening programmes in the UK must meet the National Screening Committee criteria [derived from Wilson and Junger] listed below:

[xlix] Participants at the 6th Global Conference on Health Promotion. The Bangkok Charter for health promotion in a globalized world. Geneva, Switzerland: World Health Organization, 2005 Aug 11. Accessed 2009 Feb 4.

1. The condition being screened for should be an important health problem
2. The natural history of the condition should be well understood
3. There should be a detectable early stage
4. Treatment at an early stage should be of more benefit than at a later stage
5. A suitable test should be devised for the early stage
6. The test should be acceptable
7. Intervals for repeating the test should be determined
8. Adequate health service provision should be made for the extra clinical workload resulting from screening
9. The risks, both physical and psychological, should be less than the benefits
10. The costs should be balanced against the benefits

Patients at risk of CHD and stroke are now being detected through new patient "Health checks" which should be rolled out across England by 2012/13. The NHS Health Checks will invite all adults in England aged 40 to 74 years for blood pressure, cholesterol and glucose level checks.

Q14. Discuss the rationale for preventive interventions targeted a) high risk groups *or* b) the whole population

It is essential that a high-risk approach is complemented by population-wide strategies. Without population-wide public health prevention efforts, CHD events will continue to occur in people with low and moderate levels of risk, who are the majority in any population.

Population wide approaches can effectively slow down the development of atherosclerosis and reduce incidence of CHD. Population-wide strategies will also support lifestyle modification in those at high risk.

3.3.2 Primary prevention: identifying high risk individuals

Risk prediction charts are used in the **primary prevention** of CHD to identify those who may be at high risk of developing CHD and therefore benefit from early intervention.

The total risk approach acknowledges that many cardiovascular risk factors tend to appear in clusters; combining risk factors to predict total cardiovascular risk is consequently a logical approach to deciding who should receive treatment. There are many techniques for assessing the cardiovascular risk status of individual patients and two are described here.

Framingham risk scores

Risk scores using the Framingham equations have been widely tested in North American and among European populations. An individual's risk is calculated based on age, gender, smoking, systolic blood pressure, and ratio of TC to HDL-C.

One disadvantage of the Framingham score is that it relies heavily on age, and because the risk of CHD increases with increasing age, older individuals will have higher risk scores than younger patients. Therefore if the Framingham score is used to inform decisions about treatment older patients may be more likely to be eligible for treatment.

Joint British Societies

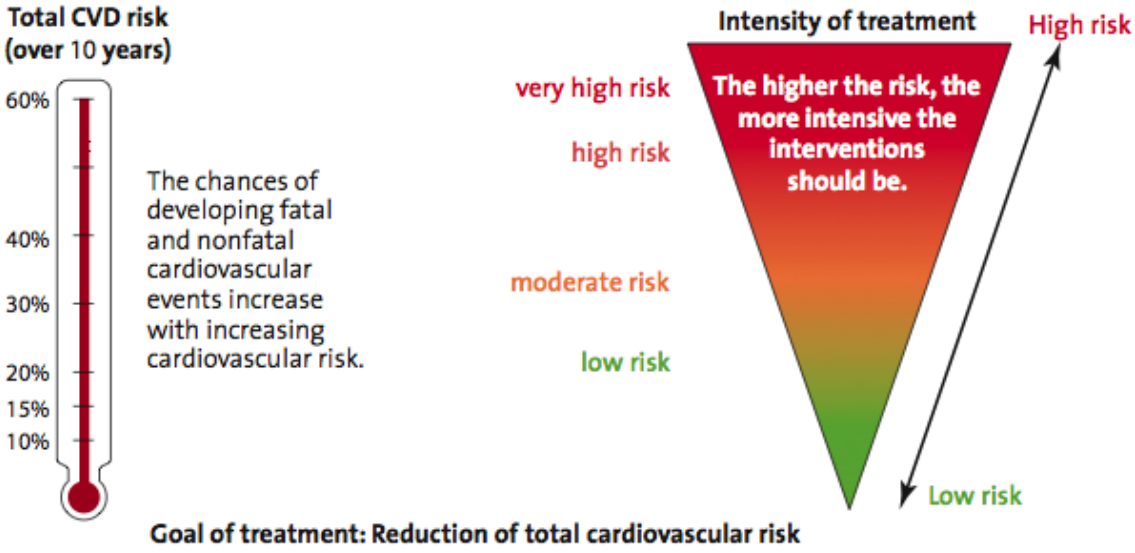
Joint British Societies[21] charts assess the ten-year risk of CVD in three age categories and recommend that CVD prevention in clinical practice should focus equally on:

i. people with established atherosclerotic CVD,
ii. people with diabetes
iii. apparently healthy individuals at high risk (CVD risk of > =20% over 10 years) of developing symptomatic atherosclerotic disease

These charts are designed as an aid to making clinical decisions, with respect to the use of lifestyle and drug interventions for modifying risk. They can also help people understand their own level of risk. They should not replace clinical judgment.

Risk estimates have not been validated in ethnic minorities. Risk scoring is a useful tool as it moves the focus of treatment from the management of specific risk factors to the best means of reducing an individual's overall risk of disease. It enables intensity of interventions to be matched to the person's overall level of risk.

Intensity of interventions should be proportional to the total cardiovascular risk



Vascular checks

There is no national screening programme exclusively for CHD, but the new NHS Health Checks programme will include heart disease. Everyone at risk of developing heart disease, stroke, type 2 diabetes or kidney disease will be screened in the NHS Health Check programme.

The new NHS Health Check is for adults in England between the ages of 40 and 74[l]. The programme will assess individual risk and provide personalised advice on how to reduce it.

[l] See http://www.nhs.uk/Planners/NHSHealthCheck/Pages/NHSHealthCheck.aspx

Effective interventions / policies for primary prevention[41]

Promote physical activity	encouraged to take at least 30 minutes of moderate physical activity (e.g. brisk walking) a day, through leisure time, daily tasks and work-related physical activity.
Smoking status	- nonsmokers should be encouraged not to start smoking. - smokers encouraged to quit smoking and other forms of tobacco be advised to stop. - Smokers with a 10 year CVD risk >20% - nicotine replacement and /or nortriptyline or amfebutamone (bupropion) to motivated smokers who fail to quit with counseling.
Overweight and obesity	Encouraged to reduce total fat and saturated fat, salt intake. Increased range of fruits and vegetables as well as whole grains and pulses. Increase physical activity.
Alcohol	Reduce alcohol intake to recommended levels.
Hypertension	Threshold for treatment: 160/100 mm Hg, or lesser degree of raised blood pressure with target organ damage should have drug treatment and specific lifestyle advice.
Serum cholesterol	All individuals with total cholesterol at or above 5 mmol/l should be advised to follow a lipid-lowering diet and given a statin to lower the risk of cardiovascular disease.
Diabetes/ plasma glucose	Individuals with persistent fasting blood glucose >6 mmol/l despite diet control – consider use of metformin.
CVD risk is 30% or more	Antiplatelet : low dose aspirin recommended

3.3.3 Secondary prevention

Risk charts are not necessary to make treatment decisions in people with established cardiovascular disease (CHD (includes angina and MI) or stroke). As these patients are at very high risk of developing recurrent cardiovascular events.

The goal of applying the **secondary prevention** measures below, is to prevent recurrent cardiovascular events by reducing their cardiovascular risk.

- Intensive life style advice (as in primary prevention) should be given simultaneously with drug treatment
- Following heart attack, drugs recommended to reduce risk of further attack and mortality, include:

- to lower high BP (egs ACE inhibitors, Beta blocker, other antihypertensives)
- to reduce clotting (Antiplatelets: include aspirin)
- to reduce cholesterol (eg statins)
- anti glycaemic (to manage high blood glucose)

3.3.4 Tertiary prevention through invasive procedures

Revascularisation procedures include coronary artery bypass grafting (CABG) and percutaneous transluminal coronary angioplasty (PTCA).

Evidence base for primary, secondary & tertiary prevention[li]

Primary prevention	Secondary prevention
Smoking Smoking cessation will reduce the risk of death by 50%. Men who stop smoking have a reduced risk of myocardial infarction[46] and within 2-3 years the risk is similar to those who have never smoked.	**Smoking** Patients who continue to smoke after a myocardial infarction had a 22-47% increase in mortality risk. In patients followed up for 15 years, 82% mortality was seen in those patients who continued to smoke after the first myocardial infarction or unstable angina. In patients who had stopped smoking, the figure was 37%.
Dietary changes Dietary changes (reduction in saturated fat, cholesterol and an increase in polyunsaturated fat) can result in decreased mortality from CHD. The addition of stanol esters and plant sterols (which reduce cholesterol absorption) to food, for example margarine, has been shown to reduce plasma cholesterol concentrations by about 10%. The effect equates with a mortality risk reduction of about 23%; lack of control over intake results in variable effects. **Cholesterol** Total serum cholesterol of >6 mmol/l is associated with an increased incidence of CHD risk and risk of CHD mortality. **Alcohol** Mortality from CHD is lowest in those who reported drinking 8 to 14 units of alcohol a week. Drinking above 21 units a week increases total mortality.	**Dietary changes** There was a 29% reduction in 2-year all-cause mortality in post-myocardial infarction patients who received advice on an increase in fatty fish intake. However the incidence of re-infarction and CHD mortality was not significantly changed. A Mediterranean-type diet (replacing red meat with poultry and increasing fish, vegetables, fruit, and use of olive oil) in myocardial infarction patients demonstrated a 76% reduction in the risk of CHD mortality.

[li] Cornel P. The current status of primary prevention in coronary heart disease. *Curr Control Trials Cardiovasc Med* 2001;2(1):24-37

Diabetes mellitus Mortality from CHD increases about 3-fold to 10-fold and 2-fold to 4-fold in patients with type 1 and type 2 diabetes, respectively. The UKPDS study indicated that for each increment of 1% increase in HbA1c there was a 1.11-fold increase in the risk of CHD. **Blood pressure** Chronic hypertension is closely related to the risk of developing CHD . A decrease of 5 mmHg in diastolic blood pressure is associated with a 21% decrease in risk of developing CHD. **Obesity** Although increased body mass index is related to increased risk of CHD, there are no clinical trials of the effect of weight reduction on CHD morbidity and mortality. **Exercise** Lack of physical fitness or physical activity are associated with an increased risk of death from all causes and from cardiovascular disease both in middle-aged and older men.	

Tertiary prevention
Cardiac rehabilitation can improve health outcomes and quality of life for people with coronary heart disease. Evidence suggests that it can reduce mortality by as much as 20-25 percent over three years. Rehabilitation offers people comprehensive and tailored help with changing their lifestyle, involving education and psychological input, as well as exercise training. Under the NSF, all heart patients, prior to leaving hospital, should be invited to participate in a multidisciplinary programme of secondary prevention and cardiac rehabilitation.

Exercise 2: (Group activity) Using the evidence in the tables above, work out a ten point action plan to reduce the risk of CHD in your local area.

Summary

- Coronary Heart Disease is a major public health issue. It is responsible for much of the global burden of disease and is the UK's biggest killer
- It has substantial impact on health and wellbeing of patients
- Costs include the individual patient, family and other carers, NHS and the wider economy
- Much of CHD morbidity and mortality is preventable
- All health professionals have opportunities to support and promote effective preventive interventions.
- Tackling the determinants and risk factors for CHD will also impact on other major diseases, such as stroke and type 2 diabetes.

Acknowledgements

Special thanks to all who helped with developing this unit. In particular, The LTPHN project and working groups, Ihab Tewfik, Katie Enock, Martyn Laycock and Marion Deacon, for reviewing and improving the drafts, Naz Khan, Pavitar Gandham, Krupa Patel, Fatima Nawrozzadeh, Jasmina Perinpanayagam, Tana Aleixo de Matos, Farah Aslam, Angula Suri, Kim Humbs, John Carroll, Sarah Newall, Kavita Nayak, Fiona Tasker, Michael Paddock, Alex Conty, Amber Appleton, Arun Sriskantharham, Oluwadamilola Haastrup, Claudi Da Rocha Rodrigues, Nicholas Ward, Jackline Odoch, Mary Paterson, Juliet Hilton, Rebecca Wade, Jayne Slonina and Claire Williams for helping pilot the unit.

Appendix 1: UK statistics on CHD Mortality

Trends by gender, age, geography, socio-economic status, ethnicity

Mortality is the number of deaths in a population in a given period.

The simplest is **crude mortality** which is expressed as the number of deaths per 1,000 population at risk of dying during a period. This is easy to calculate and useful for looking at temporal trends. However it is difficult to compare across studies as differences may reflect the age structure of the population (ie an older population would have higher crude mortality).

Specific mortality estimates calculate the number of deaths in a population by subgroup (expressed as per 1,000 population) such as age or sex specific mortality. This allows comparisons of subgroups and to identify those most at risk.

The most useful summary measure is the **standardised mortality ratios**. This allows direct comparison of mortality experience between two populations by taking into account the different age structures.

Data source

The main source of mortality data in England and Wales is from death certificates. This is routinely collected, complete, timely and relatively accurate making mortality data more reliable than morbidity data. However, circulatory diseases tend to be over-reported on death certificates, particularly in the elderly, and this may over-estimate mortality rates.

A.1 Mortality by sex

CHD causes over 90,000 deaths a year in the UK: approximately one in five deaths in men and one in six deaths in women (figures 27 and 28).

CHD is the most common cause of premature death (death before the age of 75 years) in the UK one fifth (19%) of premature deaths in men one in ten (10%) premature deaths in women were from CHD. CHD caused almost 31,000 premature deaths in the UK in 2006.

Figure 27 Deaths by cause, men, 2006, United Kingdom[lii]

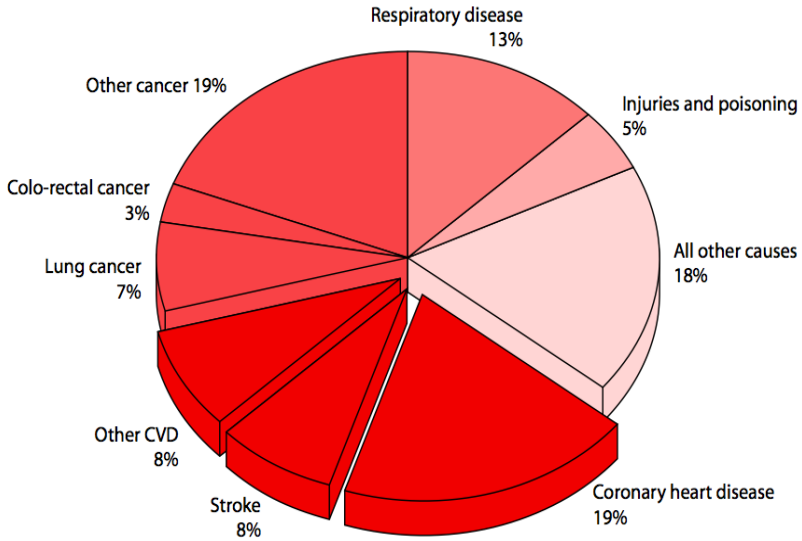
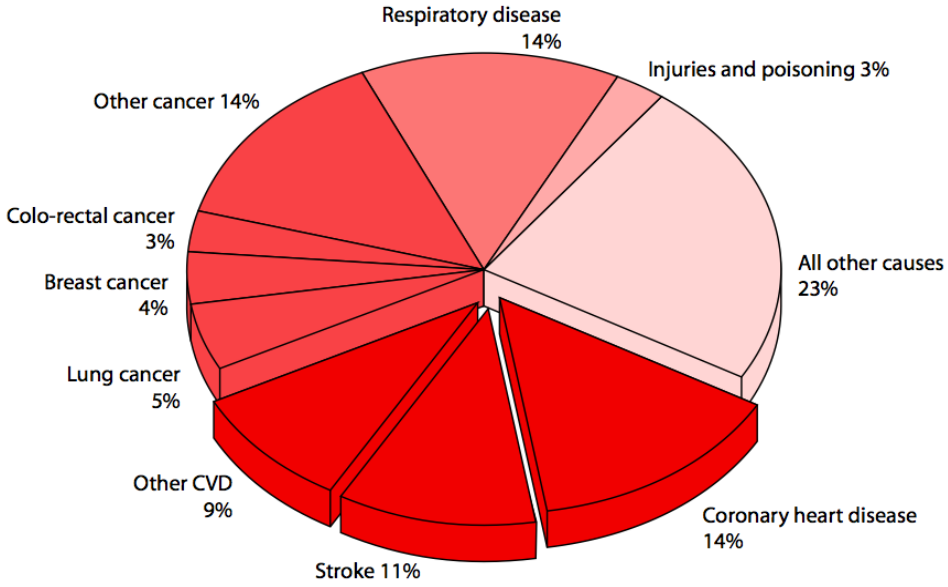


Figure 28. Deaths by cause, women, 2006, United Kingdom



[lii] Source: England and Wales, Office for National Statistics (2008) Deaths registered by cause and area of residence, personal communication. Scotland, General Register Office (2008) Deaths registered by cause and area of residence, personal communication. Northern Ireland, Statistics and Research Agency (2008) Deaths registered by cause and area of residence, personal communication (www.heartstats.org.uk)

A.2 Mortality by age group

CHD mortality increases with age in men and women. Over the past 20 years there have been marked declines in CHD mortality in all age groups. CHD mortality has been falling slower in younger age groups and fastest in those aged 55 and over (figure 29 & 30).

Figure 29. Age-specific death rates from CHD, men, 1968 to 2006, United Kingdom, plotted as a percentage of the rate in 1968[liii]

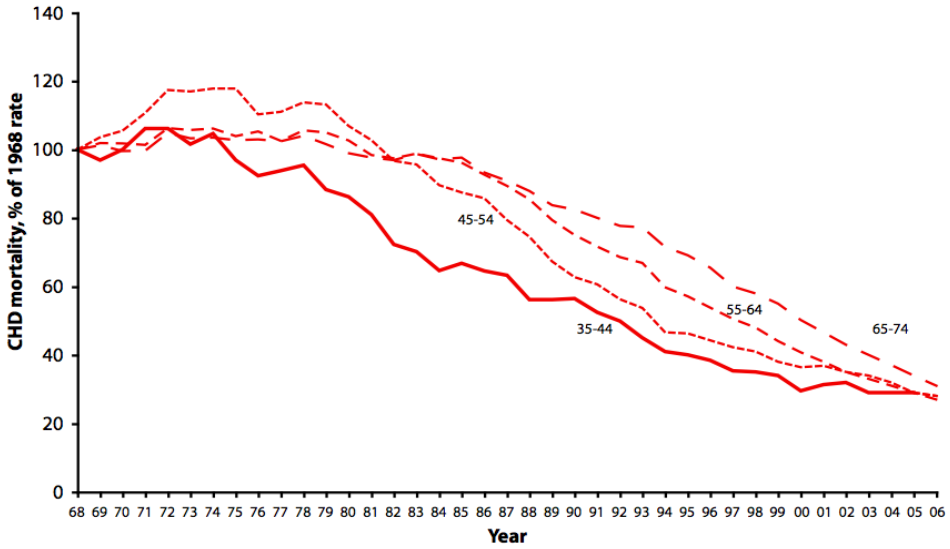
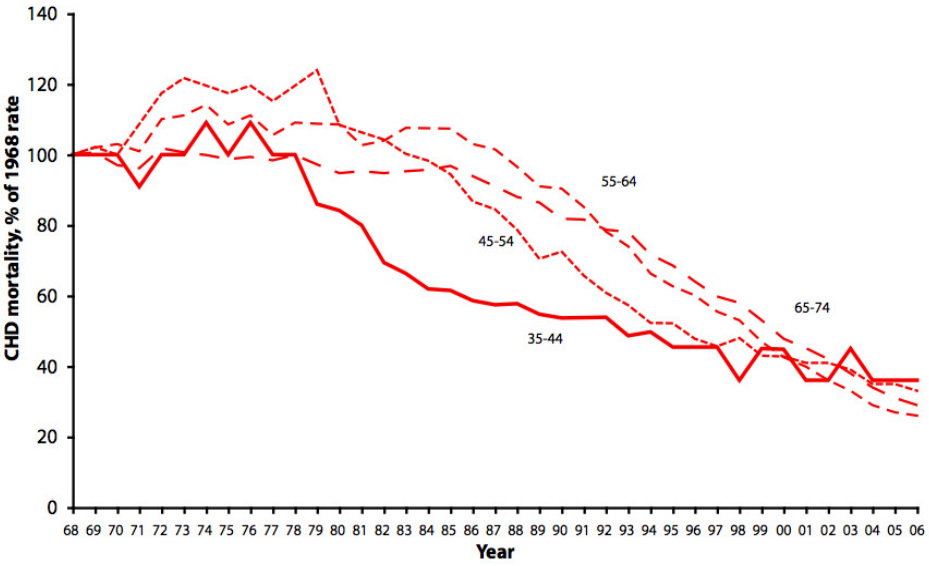


Figure 30. Age-specific death rates from CHD, women, 1968 to 2006, United Kingdom, plotted as a percentage of the rate in 1968



[liii] Source: World Health Organization (2002) and ONS (2008).

A.3 Mortality by geographical region, UK

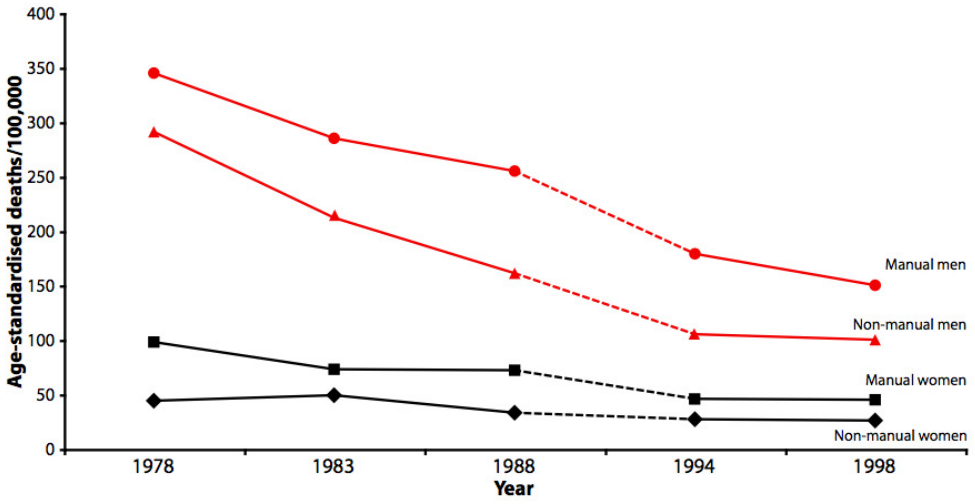
There is considerable variation in mortality from CHD across the UK. Death rates from CHD are highest in Scotland, Northern Ireland and the North of England. The premature death rate for men living in Scotland is 65% higher than in the South West of England and 112% higher for women.

A.4 Mortality by socio-economic status

In England and Wales there is a strong positive relationship between deaths from circulatory diseases and levels of deprivation (figure 31).

- Since the 1970s the premature death rate has fallen across all social groups for both men and women
- CHD Mortality has fallen faster in non-manual workers than in manual workers, that is the difference in death rates increased between these groups (figure 31)

Figure 31 CHD mortality by social class, men and women aged 35 to 64, 1978 to 1998, England and Wales[liv]



Just under one in three of all deaths under 65 years resulting from social class inequalities are due to CHD.

To help reduce these socio-economic inequalities, CVD inequalities targets have been introduced in England, Scotland and Wales . Data from the Central Health Monitoring Unit show that in England there has been clear progress towards this target: the absolute gap in CVD mortality between the fifth most deprived areas and the population as a whole, in people aged under 75, has fallen by just over 20% since the mid-1990s.

[liv] Notes: Data from 1993/96 refer to directly age-standardised rates per 100,000 person years. Data before 1993/96 refers to age-standardised death rates per 100,000 population. Men and women aged 35-64.
Source: Data from 1993/96 from Office for National Statistics (2003) Trends in social class differences in mortality by cause, 1986 to 2000. The Stationery Office: London.

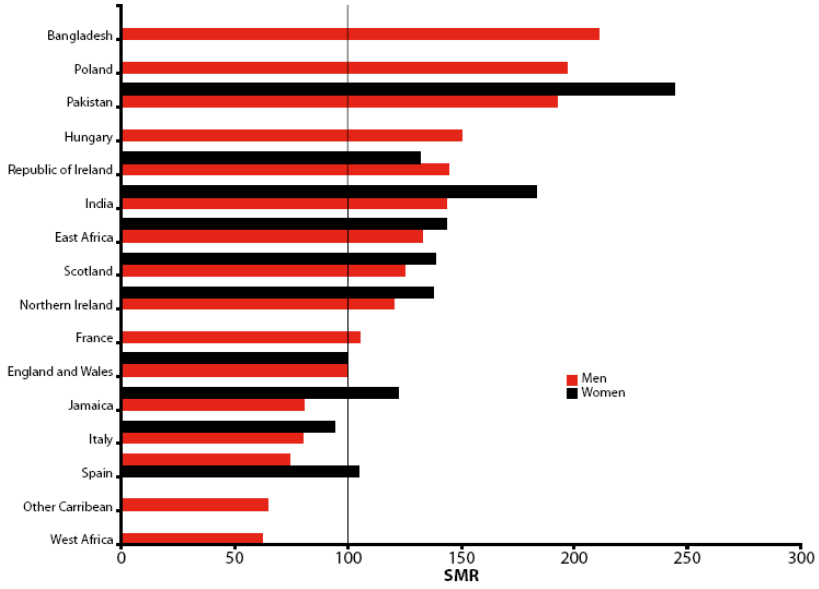
A.5 Mortality by ethnicity

Among South Asia and Eastern Europe living in the UK but born in these regions, there is a higher premature death rate from CHD than average.

Men living in England but born in Bangladesh had more than twice the chance of suffering premature death from stroke than those born in England and Wales.

The difference in the death rates between those born in South Asia and the general population increased in the 1970s and 1980s. This is because the death rate from CHD was not falling as fast in South Asian groups as it was in the rest of the population.

Figure 32. Standardised mortality ratios for CHD by country of birth, adults aged 30 to 69 years, 1999 to 2003, England and Wales[lv]



A.6 Excess winter mortality

Excess winter mortality is the mortality that occurs in winter above that which occurs in the rest of the year.

In the UK more people die of CHD in the winter months (figure 33).

Excess winter mortality more than twice as high in the over 85s compared to the under 65s

- The amount of excess winter mortality varies considerably by region – it is highest in the West Midlands and lowest in the North East of England.
- Excess winter mortality also varies from year to year. In 1999/2000, there were nearly twice as many excess winter deaths from CHD than in 2004/05 (8,960 compared to 5,450 deaths)

[lv] Source: BHF and Harding S, Rosato M, Teyhan A. Trends for coronary heart disease and stroke mortality among migrants in England and Wales, 1979-2003: slow declines notable for some groups Heart published online 3 Sep 2007; doi:10.1136/hrt.2007.122044 (Rates are age adjusted to the Europe 2000 population)

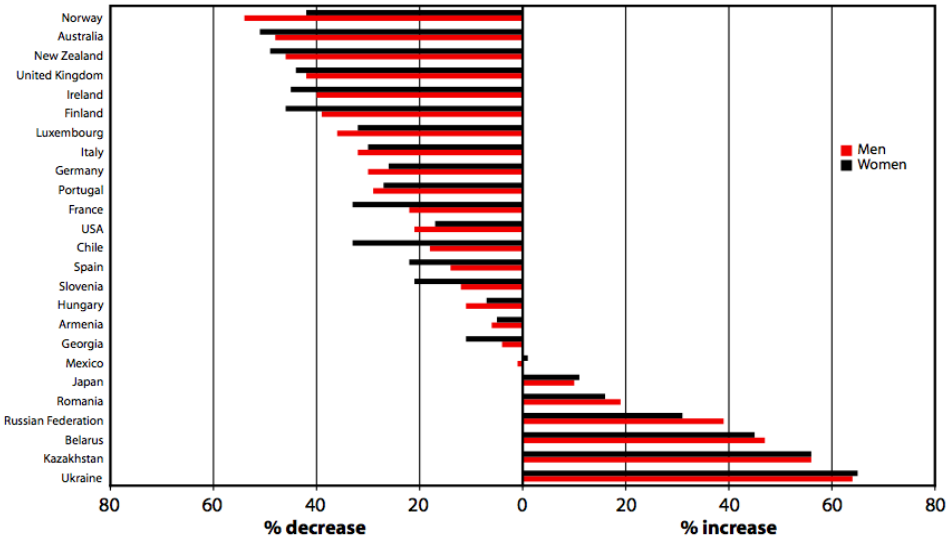
A.7 Trends in CHD mortality

Death rates from CHD have been falling in the UK since the late 1970s. For people under 65 years, they have fallen by 45% in the last ten years (figures 29 & 30).

In recent years CHD mortality has been falling slower in younger age groups and fastest in those aged 55 and over (figure 29 & 30). The slower decline in the younger age groups may reflect attitudes to risk behaviour change among younger populations – young people continuing to smoke, drink heavily and higher prevalence of obesity.

Despite this, death rates from CHD in the UK are still amongst the highest in Western Europe (figure 34).

Figure 34. Changes in death rates from CHD, men and women aged 35 to 74, between 1990 and 2000, selected countries[lvi]



A recent study aimed to explain the decline in mortality from CHD over the last two decades of the twentieth century in Britain. They concluded that more than half (58%) of the CHD mortality decline in Britain during the 1980s and 1990s was attributable to reductions in major risk factors, principally smoking. Treatments to individuals, including secondary prevention, explained the remaining two-fifths (42%) of the mortality decline[lvii].

[lvi] Notes: ICD codes 410-414 (8th and 9th Revision), I20-I25 (10th Revision). Age-standardised using the European Standard Population. Source: World Health Organization (2004) www3.who.int/whosis.

[lvii] Unal B, Critchley JA, Capewell S (2004) Explaining the decline in coronary heart disease mortality in England and Wales between 1981 and 2000. Circulation 109: 1101-1107

Appendix 2: UK statistics on CHD Morbidity

Incidence, prevalence, trends

Morbidity is the presence of disease: it has various effects on the individual, in particular it leads to an increased risk of mortality. Morbidity also leads to an increased risk of further diseases and ill health and also to a reduced quality of life – both physical and mental.

Two key measures of morbidity in a population are **incidence** and **prevalence**.

- **Incidence** is an estimate of risk of developing disease and useful for looking at causes or determinants of disease. The incidence of CHD could be defined as the number of **new** cases of CHD (angina or MI) diagnosed in a population at risk over a specific period of time.
- **Prevalence** indicates amount of illness – usually the amount requiring care, and so is useful in health service planning. The prevalence of CHD could be defined as the **proportion of the population** with a history of CHD (this will include new cases and those who are living with CHD).

Sources of morbidity data include hospital, primary care, self reported surveys and individual research studies. Each have their strengths and weaknesses.

Morbidity data are much less comprehensive and reliable than mortality data so patterns and trends (and the reasons for those patterns and trends) are much harder to discern.

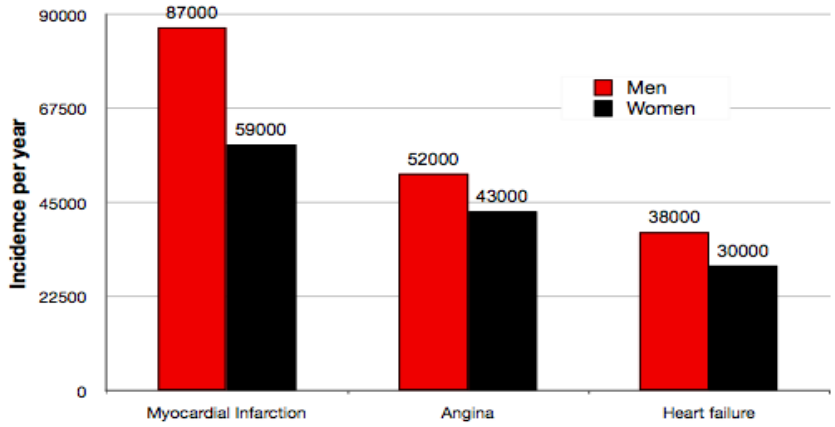
The surveys which have looked at morbidity most reliably and/or most frequently, i.e. the Health Survey for England and the General Household Survey, suggest that, whereas mortality from CHD is falling, morbidity, particularly in older age groups, appears to be rising.

Incidence

There is no available national data on CHD incidence in the UK. Estimates of CHD incidence are only available from specially conducted community surveys or research studies. This can cause problems in assessing the true burden of CHD. Applying community data to estimate national statistics can lead to overestimation or underestimation of true incidence.

Incidence by gender

Figure 20. Estimated incidence of CHD per year in the UK by gender.



Source: BHF statistics estimates based on 2006 CHD mortality data (MI), 2006 UK population estimates - Scottish Continuous Morbidity Study data & (angina), The Hillingdon Heart Failure Study.

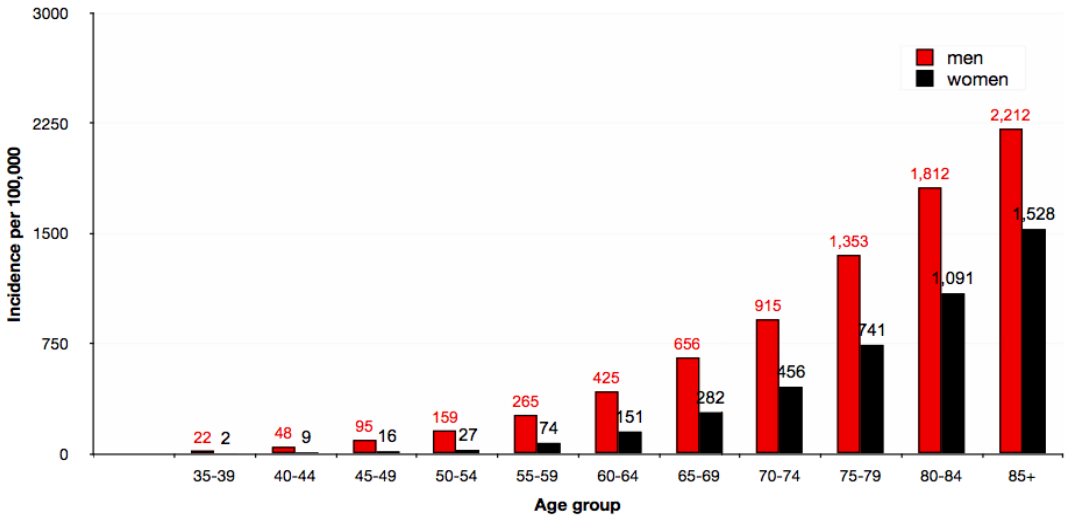
Incidence by age group

Age specific incidence estimates for the first presentation of CHD in men and women are available from QRESEARCH, a longitudinal analysis of a large validated general practice research database (see ref Hippisley-Cox et al Heart 2006, 92, 752-8).

CHD incidence increased with age group (figure 22).

The risk of CHD is higher in men compared to women in the younger age groups (45 to 54 years and 55 to 64 years) but this difference declines with increasing age. The reason for the decline may be due to hormonal factors (oestrogen lost in post-menopausal women), or differences in risk behaviours.

Figure 22. Estimated incidence of CHD per year in the UK by gender.



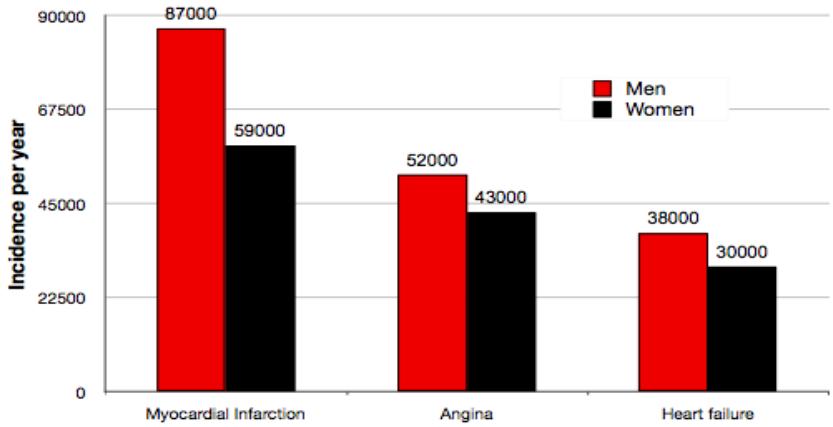
Incidence by geographical region, UK

The World Health Organization MONICA (monitoring trends and determinants in cardiovascular disease) Project collected data on the incidence of heart attack in 35 populations in 21 countries during the mid-1980s until the mid-1990s. Results showed that incidence rates in the two UK populations included in the study, Belfast and Glasgow, were among the highest in the world, particularly in women[37].

Prevalence

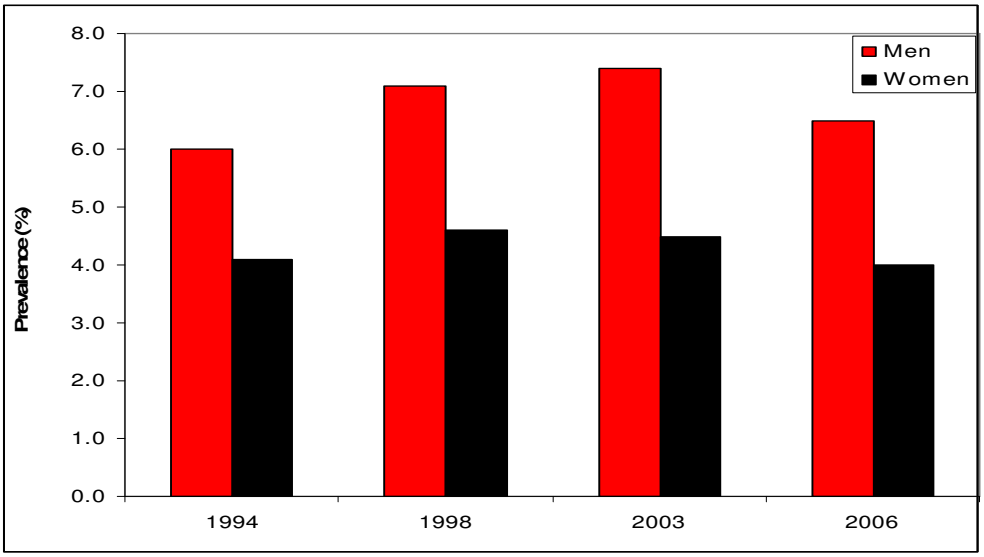
Prevalence by gender

Different studies give different estimates for the prevalence of CHD, because of differences in case definition and the age of the populations studied.



In 2006, the Health Survey for England reported that 6.5% of men and 4.0% of women in the UK had a history of CHD (figure 23).

Figure 23. Estimated prevalence of CHD per year in the UK by gender.



Estimated number of people who report having a history of myocardial infarction, angina and heart failure by gender, 2006

	Prevalence men	Prevalence women	total
Myocardial infarction (age 35yrs +)	970000	439000	1.4 million
Angina (35yr +)	1132000	849000	1.98 million
CHD*	1.5 million	1 million	2.5 million

Source: BHF www.heartstats.org
MI and angina estimates are derived from applying age-specific rates to the UK population estimates for 2006. *CHD from self reported doctor diagnosed CHD (angina or heart attack)

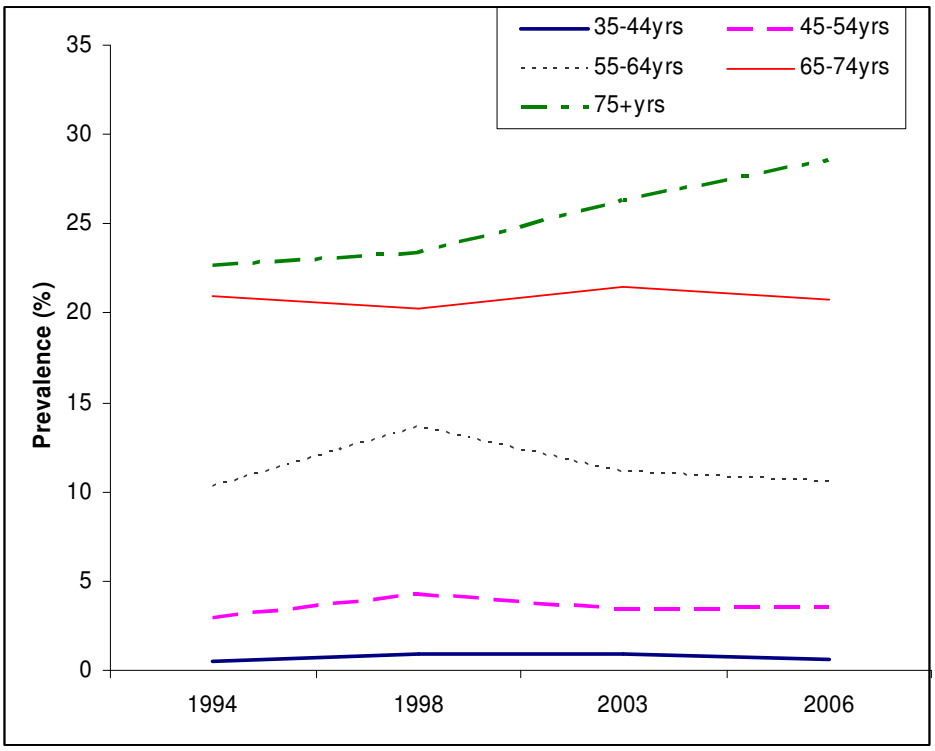
Data from the General Household Survey allow comparisons to be made between the prevalence of cardiovascular diseases (CVD) and conditions with that of other diseases and conditions. In 2006, CVD (includes CHD and stroke) was the second most commonly reported longstanding illness in Great Britain after musculoskeletal conditions.

The Quality and Outcomes Framework (QOF) became part of general practice contracts on 1 April 2004 and provides information on the registrations for a number of different diseases. A very high proportion of practices (>98%) participate in the scheme making the register a good measure of prevalence for particular diseases in the population. The prevalence of CHD in Britain was 3.7% of all GP registrations.

Prevalence by age group

Figure 24 shows the prevalence of CHD by age group for men. The pattern is similar among women, with increasing prevalence with age.

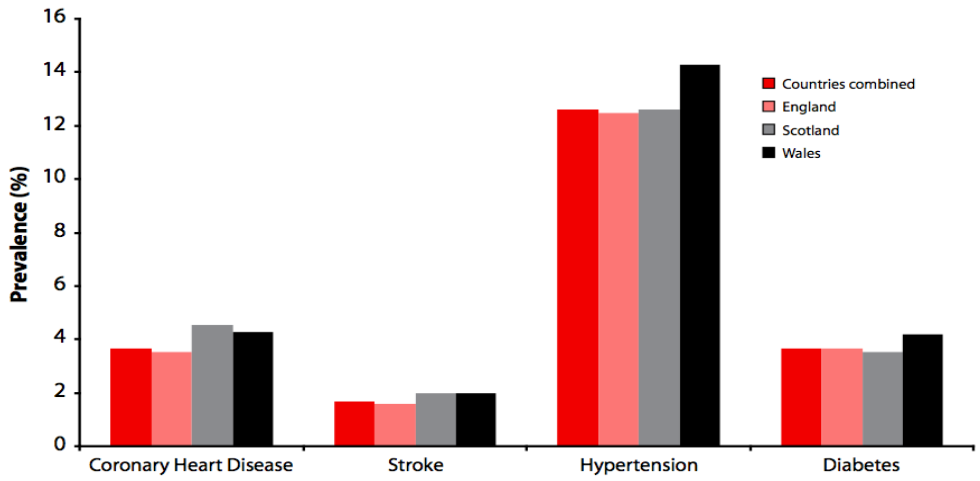
Figure 24. Estimated prevalence of CHD per year in the UK by age group among men.



Prevalence by geographical region, UK.

Regional differences in CHD prevalence are found with higher prevalence in Scotland and Wales than England (figure 25). Data from the key statistics from General Practice on the prevalence of *treated* CHD, suggest that the prevalence was higher in Northern England and Wales than in Southern England, and was also higher in lower socio-economic groups.

Figure 25. Prevalence of disease 2006/07, England, Wales and Scotland[lviii]



Trends in Incidence

There is little information available on trends in the incidence of CHD in the UK overall. One study used data from another large primary care database and showed that over the period 1996 to 2005, the incidence of CHD declined in men and women in the UK[lix].

Other smaller studies which have examined trends in the incidence of MI are presented in the table below.

Change in incidence of myocardial infarction, adults aged between 30 and 69, between 1966 and 1996, UK studies compared[lx]

Study	Years	Place	Sex	Age group	% change in incident rate per year
OXMIS	1966/67 - 1994/95	Oxfordshire	Men	30-69	-1.2
			Women	30-69	-0.3
MONICA	1985 - 1994	Glasgow	Men	35-64	-1.4
			Women	35-64	0.2
MONICA	1983 - 1993	Belfast	Men	35-64	-4.6
			Women	35-64	-2.4

[lviii] Heartstats 2009, British Heart Foundation

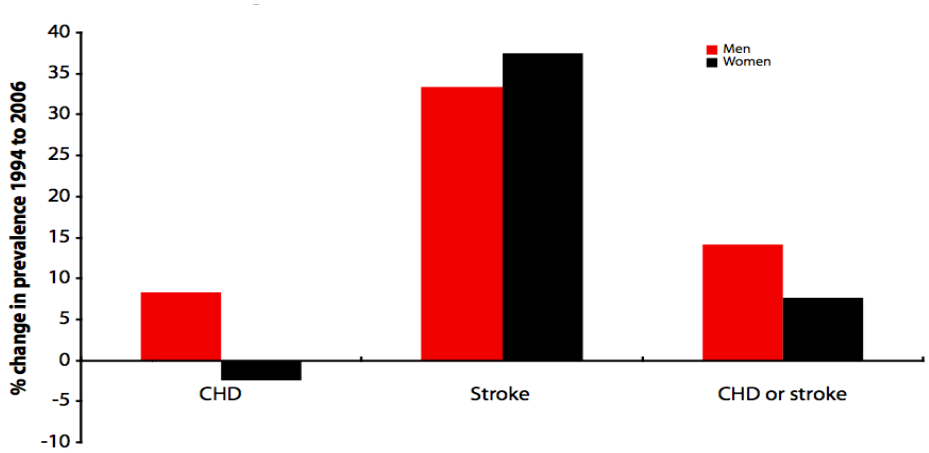
[lix] see Davies, et al European Heart Journal 2007 28(17):2142-2147; doi:10.1093/eurheartj/ehm272

[lx] Source: British Heart Foundation

Trends in Prevalence

CHD prevalence has increased for men over the period 1994 to 2006 and slightly decreased for women during the same period (figure 26).

Figure 26. Changes in prevalence rates in CHD, stroke and CHD or stroke by sex, 1994 to 2006, England[lxi]



[lxi] Source: Joint Health Surveys Unit (2008) Health Survey for England 2006. Cardiovascular disease and risk factors. The Information Centre: Leeds; and previous editions.

Appendix 3 Tackling Coronary Heart Disease: Case Study

Tackling Cardiovascular risk strategy in Doncaster

The Issue

In line with the rest of England, the health of Doncaster's population has continued to improve, as measured by life expectancy and more recently by the Department of Health's indicator All Age All Cause Mortality.

Despite this improvement there remains a persistent gap between the health of the most disadvantaged people and the better off. Male life expectancy in Doncaster is 75.4 years, 1.5 years less than the national figure. Female life expectancy is 80.1, one year lower than the national figure (2003-05 figures). In particular, Doncaster has significantly higher death rates from circulatory diseases (including coronary heart disease) in addition to cancer and chronic lung disease (COPD).

The Department of Health has identified over 80 districts that have a significant number of disadvantaged local areas compared to the national average and agreed to target action here to narrow the gap. These communities are designated as 'spearhead' communities and include Doncaster. As part of the Local Area Agreement, Doncaster has targets for focused work on reducing the gap between local experience and the England average.

Given that premature mortality and morbidity from cardiovascular disease is a major contributory factor towards the current inequalities in health in Doncaster, the development of a structured approach to cardiovascular risk management has been identified as a key priority by Doncaster Primary Care Trust (DPCT). It is anticipated that sustained work in this area will contribute towards achievement of the 2010 Spearhead PCT targets with regard to reduction in health inequalities and morbidity and mortality from cardiovascular disease.

What They Did: Overview of the initiative?

The cardiovascular risk management programme in Doncaster essentially comprises two components- a specific service aimed at identifying people at risk of developing cardiovascular disease (the 'Test Your Heart' scheme) and ongoing management in primary care via a Local Enhanced Service (LES).

The programme is aimed at people living in the 20% most deprived communities of Doncaster who are over 40 years old and are potentially at risk of developing cardiovascular disease. People who have been diagnosed with diabetes, hypertension and coronary heart disease, and who are on an existing primary care disease register are excluded from this programme, as their health needs are managed within existing services.

The PCT drew up a comprehensive service specification1 for the 'front end' initial identification of those at risk detailing every aspect of the proposed service from scope and target populations to the model of service and service delivery, marketing and communications, quality assurance and performance management.

Following a robust tendering process, Innovex (UK Ltd) was appointed to provide the service for a period of 12 months on behalf of Doncaster PCT.

'Test Your Heart' is effectively an 'outreach' service delivered in a variety of community settings, including community centres, libraries, local chemists, leisure centres and workplaces in addition to primary care venues.

Clinics are operated at various times throughout the day and week (including evenings and weekends) to ensure that the needs of local communities are met. Experience has shown that Saturdays and weekday evening slots are not well attended unless the clinic runs alongside a community event that people are already attending. Core hours now tend to be 9am – 6pm Monday to Friday, with clinics running outside these times to target specific groups or events. Close liaison with community workers has proved invaluable in terms of advising when community venues are likely to be used for other events, so that clinics can be scheduled to run alongside them and reach a larger audience.

Leaflets and posters advertising the service with a contact number to book appointments, and a website (www.testyourheart.org.uk) for further information, were distributed at a local launch event and have continued to be displayed/distributed in the target areas. The phone number is given to anyone who uses the service and they are asked to pass this on to family and friends who also meet the criteria for a check. 'Word of mouth' is a very powerful tool in getting people to attend clinics, as they hear about the value of the service from their peers. The service had been advertised at local community events and there has been some coverage of these events on local radio and in the local papers, again containing details of how to book an appointment.

Clinic consultations are carried out by a registered nurse who has received additional training to conduct the screening. The equipment is transported by the nurse to each venue, and it takes around 20 minutes to set up a clinic room.

Each consultation lasts at least 30 minutes and informed consent is obtained and documented prior to the start of the consultation. The nurse measures blood pressure, height (Leicester Height Measure), weight, waist circumference, blood sugar, total cholesterol and HDL cholesterol via near patient testing. Smoking history and family history of heart disease are also recorded. An offline version of the Framingham CHD risk calculator is used to calculate a risk score, and the patient is offered diet and lifestyle advice as appropriate. They are advised to contact their GP if they are at high risk of developing heart disease, or if there is an individual clinical need. (Approximately 2% of patients seen to date had a random blood sugar greater than 11.1mmol).

Patients receive a copy of their results with the advice given documented at the end of their appointment, and a copy is retained to be passed on to their GP should it be requested.

The cardiovascular risk management programme has a stand-alone IT system that does not link automatically with any other NHS organisations but information is sent to other organisations via hard copy proforma.

The service is expected to achieve the following outcomes:

- Agreed number of people living in the 20% most deprived communities being assessed for their risk of developing cardiovascular disease;
- Increased number of the target population who have been assessed provided with a personalised education package to enable them to take action in order to reduce their risk factors, i.e. lifestyle interventions;
- Increased number of the target population who have been assessed and identified as being at increased risk of developing cardiovascular disease, prescribed appropriate medication to reduce their risk;
- An increase in the number of referrals to appropriate mainstream services, for example stop smoking services;
- Reduced non-elective admissions for cardiovascular conditions;
- A reduction in premature morbidity and mortality in the 20% most deprived communities;
- Substantially reduced mortality rates from heart disease, stroke and related diseases by at least 40% in people under 75, with a 40% reduction in the inequalities gap between the fifth of areas with the worst health and the population as a whole (Public Service Agreement Target).

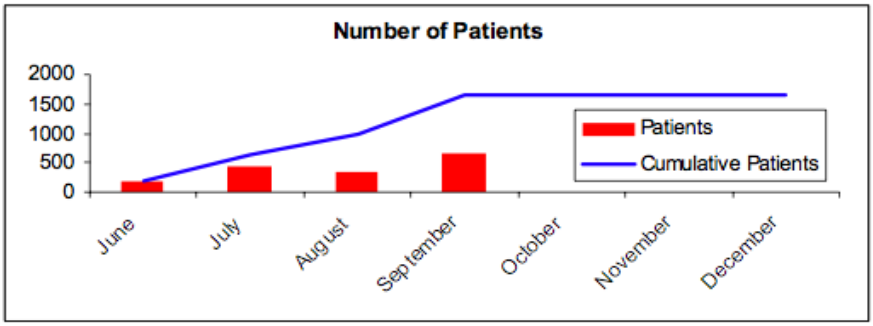
The Impact
The service provider sends performance monitoring information to the PCT on a monthly basis in the form of a performance 'dashboard'. This effectively comprises graphical information on a minimum dataset supplied by the PCT.

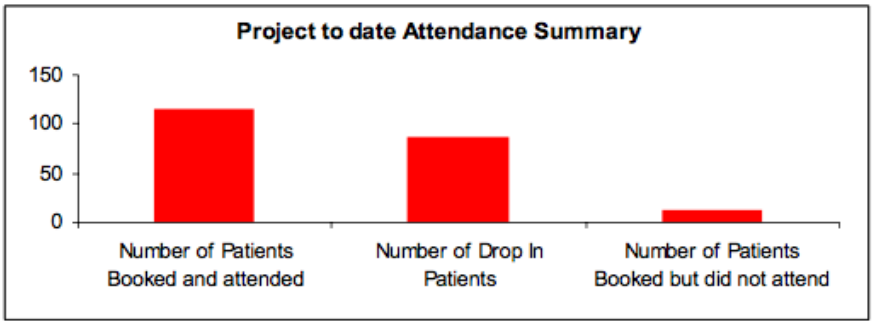
Key performance indicators include:

- The number of people who have accessed the service who are referred to mainstream services;
- The extent to which the activity within the various areas reflects the demographics of the populations;
- The uptake of the service as measured against an agreed trajectory.

Over 2000 patients have been seen so far with a 'did not attend' rate of 11%. To the end of September 2008, 7% of patients had a risk score of 20 or above.

More detailed results to date are shown in the following excerpts from the data dashboard.





Further recommended reading

L J Donaldson, R J Donaldson. Essential Public Health. Ch 1 Assessing Health of the Population (2003)

Rose, G. Rose's strategy of prevention, 1992; new edition ed. Rose, Khaw, Marmot. OUP, 2008 ISBN 978-0-19-263097-1

G Lewis, J Sherringham, K Kalim, T Crayford. Mastering Public Health. Ch 1 and Ch 3 (2008)

British Heart Foundation www.heartstats.org.uk

Department of Health "Coronary heart disease: national service framework for coronary heart disease - modern standards and service models" http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4094275

Appendix 4: Standard tool to measure health quality of life

SF-36(tm) Health Survey

Instructions for completing the questionnaire: Please answer every question. Some questions may look like others, but each one is different. Please take the time to read and answer each question carefully by filling in the bubble that best represents your response.

Patient Name: _____

SSN#: _____ Date: _____

Person heling to complete this form: _____

1. In general, would you say your health is:

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

2. Compared to one year ago, how would you rate your health in general now?

- ☐ Much better now than a year ago
- ☐ Somewhat better now than a year ago
- ☐ About the same as one year ago
- ☐ Somewhat worse now than one year ago
- ☐ Much worse now than one year ago

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.
- ☐ Yes, limited a lot.
- ☐ Yes, limited a little.
- ☐ No, not limited at all.

b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?
- ☐ Yes, limited a lot.
- ☐ Yes, limited a little.
- ☐ No, not limited at all.

c. Lifting or carrying groceries.
- ☐ Yes, limited a lot.
- ☐ Yes, limited a little.
- ☐ No, not limited at all.

d. Climbing several flights of stairs.
- ☐ Yes, limited a lot.
- ☐ Yes, limited a little.
- ☐ No, not limited at all.

e. Climbing one flight of stairs.
- ☐ Yes, limited a lot.
- ☐ Yes, limited a little.
- ☐ No, not limited at all.

f. Bending, kneeling or stooping.
- ☐ Yes, limited a lot.
- ☐ Yes, limited a little.
- ☐ No, not limited at all.

SF-36 1

Glossary

Angina	Most usually chest pain due to CHD; critical risk factor for heart attack (myocardial infarction); pain can affect arm, neck, jaw or abdomen
Cardiovascular disease (CVD)	Usually used to describe coronary heart disease and stroke together since the risk factors are very similar
Case control study	Experimental intervention using cases compared with people who do not receive the intervention or who may not have the disease, known as control group
DALY	Disability adjusted life year – used in economic appraisal to model total costs of disease
Epidemiology	the study of the causes and prevention of disease in populations or communities, making it the main source of evidence for public health decision making
Incidence	a measure of the risk of developing some new condition within a specified period of time
NICE	The National Institute of Health and Clinical Excellence (England)
Prevalence	the frequency of a particular condition within a defined population at a designated time
SES, SEG	Socioeconomic status, group – population classification based on occupation, often used as a proxy for income
Risk behaviour	a behavioural pattern associated with increased frequency of specified health problems; for example, high salt, high fat, low fibre dietary intake, and cigarette smoking are all associated with cardiovascular disease
Risk factor	an individual characteristic associated with increased frequency of specified health problems or risk behaviours

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