

CARDIOVASCULAR DISEASE

Cardiovascular disease (CVD) includes all the diseases of the heart and circulation, including coronary heart disease (CHD – angina and heart attack), heart failure, congenital heart disease and stroke. It is also known as heart and circulatory disease (Figure 1). These non-communicable disorders had reached epidemic levels by 2008, responsible for 30% of all global morbidity and the number one cause of death across the world (World Health Organisation). This health risk pattern is projected to continue until 2030, yet unlike many other acute diseases, most CVD can be prevented by reducing the risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised cholesterol.

CVD health risks have distinct geographical patterns in terms of risk factor prevalence, health outcomes and management strategies on national, regional and local scales.

What is CVD?

Heart attacks and strokes are usually what medics term ‘acute events’, and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason is a build-up of fatty deposits on the inner walls of the blood vessels supplying the heart or brain. When blood flow to the heart is limited there is a lack of oxygen supply (ischaemia); this causes pain in the chest, which can be a warning of underlying disease. Strokes are caused by either a blood clot or bleeding from a blood vessel in the brain. Often there are no warning signs. CVD causes 17m annual deaths, 42% are related to ischaemic heart disease, 34% to cerebrovascular disease, and 12% to rheumatic heart disease (Figure 1).

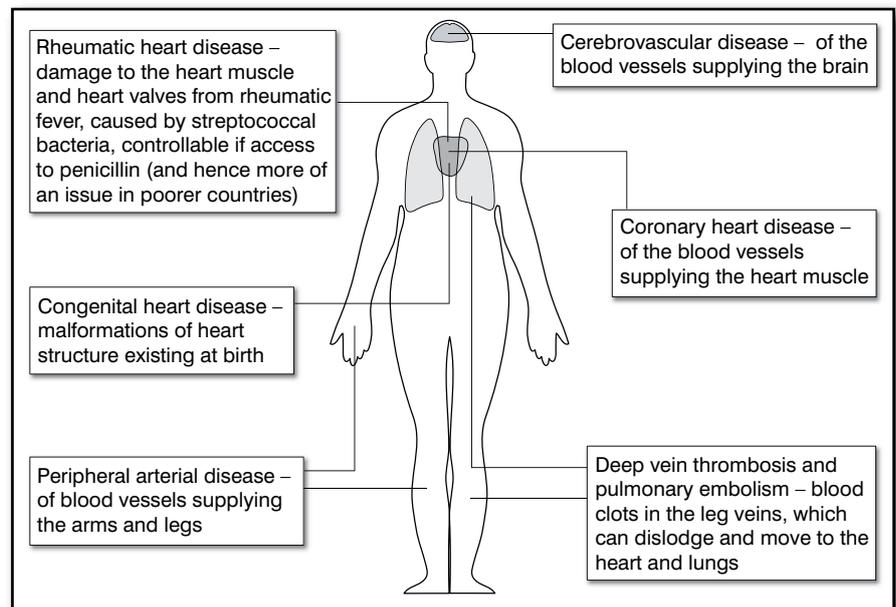
Causes and risk factors

Figure 2 shows how the Dahlgren and Whitehead model is used to map the relationship between the individual, their environment and disease. There are two types of risk factors:

1. Modifiable risk factors

Modifiable risk factors include certain behaviours that increase your risk of developing disease, as well as diseases that can be treated with medications to reduce CVD risk (Figure 3).

Figure 1: The CVD group of diseases



The WHO suggests that there are various root causes of these factors: globalisation, urbanisation (Figure 4), and population ageing. Other determinants of CVD include poverty, stress and hereditary factors. Foetal development and low birth weight, nutrition and education about a healthy lifestyle during infancy and early childhood, affects the risk for developing CVD later in life. There are also localised risk factors such as cultural views on body image.

2. Non-modifiable risk factors

- **Age:** the efficiency of the heart reduces.
- **Gender:** males have a higher risk than pre-menopausal females.
- **Family history:** close blood relatives with coronary heart disease or stroke before 55/65 years (for both males and females).
- **Ethnic background:** Bangladeshi, Indian, Pakistani and Afro-Caribbean are pre-disposed.

Figure 2: Dahlgren and Whitehead determinants of health model for CVD (adapted)

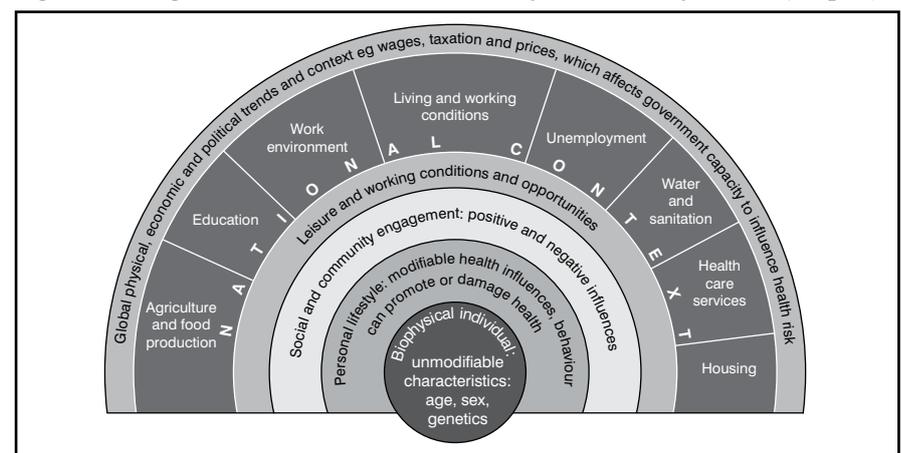


Figure 3: Some modifiable risk factors

• tobacco use	• hypertension(high blood pressure)
• poor diet with high fat/salt/sugar content	• high levels of cholesterol/lipids
• overweight/obesity	• diabetes types 1 and 2
• lack of physical activity	• stress (increases blood pressure)
• excessive alcohol consumption	

UK geography of CVD

In 2013 The British Heart Foundation estimated CVD caused 159,000 deaths in the UK per year, with CHD responsible for almost 74,000 of these, and 2.3 million lived with the debilitating effects of CVD. The predisposition for any individual to CVD is due 50% to genetics, 10% to health care, but 40% to lifestyle choice.

CHD risk has interesting geographical patterns. There is a distinct North-South divide, with mortality 50% lower in the South than in the North of England and Scotland. The CVD national average for England in 2013 was 74.21 per 10,000 people, yet Tameside in Greater Manchester had 132 deaths (the highest in the UK), and Glasgow 128. Meanwhile Kensington and Chelsea residents had a rate of 39 per 10,000 (Figure 5).

There are also great variations by sub-group, especially by age and ethnicity. In the last decade the difference in risk for young and middle-aged adults living in most and least deprived areas of the UK has reduced. This has not been the case for the over 65s, resulting in a widening gap in mortality between rich and poor older people.

CVD in Scotland

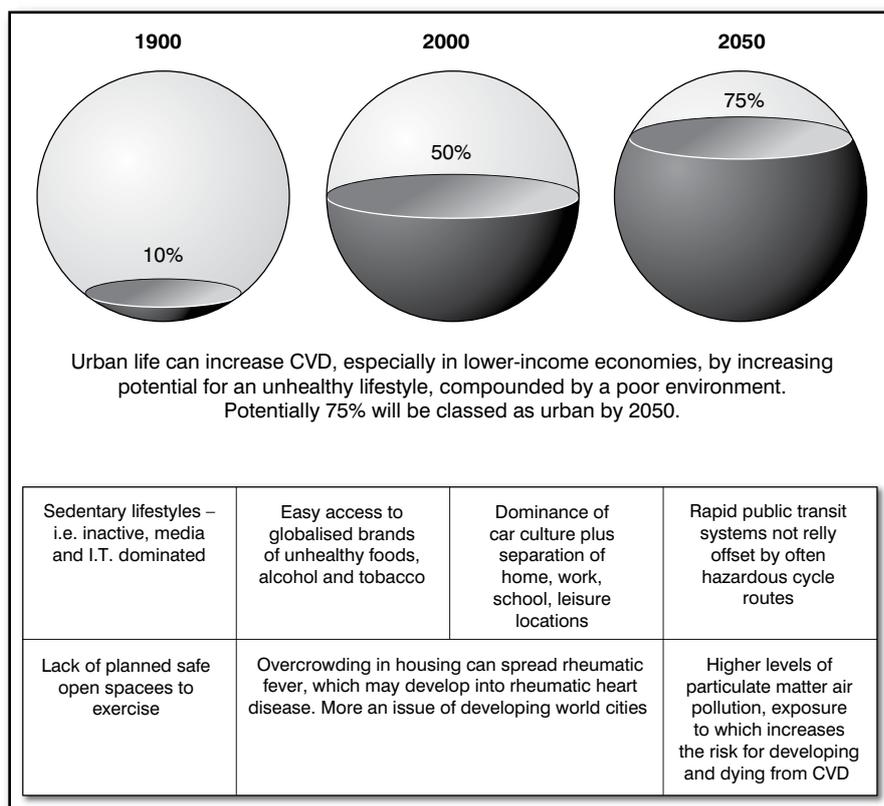
Within Scotland there is a longstanding regional difference in health risk. Highest rates are in Ayrshire, Arran and Lanarkshire, with Glasgow called 'the heart attack capital' of the UK. Meanwhile, the east of Scotland: Lothian, Fife and Tayside areas (including Edinburgh) has lower risks. Greater Glasgow has a unique socio-economic profile, called the 'Glasgow Effect', with higher levels of morbidity and negative health-related behaviours (alcoholism, drug abuse, obesity) clustered in the sub-groups of:

- Men with no qualifications and aged 45-64 years.
- Women living in the most deprived areas, in low social classes, retired or economically inactive, with low qualifications. Indeed, nationally, female workers with routine jobs have a death rate from CVD 5 times higher than those with managerial or professional jobs.

The multi-factorial reasons for CVD inequality include:

- Health may be a low priority for lower income groups because they have so many other issues to contend with. Smoking and excess alcohol are seen as a social outlet. In 2005 smoking rates were 11% for people in the 10%

Figure 4: CVD health risk from urbanisation



most affluent areas compared with 44% in the 10% least affluent areas.

- Lower income groups have a lower 'health literacy' i.e. understanding of the consequences of their life style.
- 'Postcode lotteries' in health refer to differences in health care between different NHS areas. The National Records of Scotland estimated in 2008/9 over 20% fewer surgical treatments than expected were carried out for people in the most deprived areas. These populations are also unlikely to have regular health checks or private medical care.
- Latest initial research using DNA of Glaswegians suggests the effects of habits are passed down to children genetically, predisposing them to high CVD risk too.

NHS Scotland's 'Keep Well' programme targets health checks, and other support services like smoking cessation, for 40-64 year olds living in the most deprived areas via their GPs.

Global CVD health burden

A different pattern is developing in middle and low-income countries, where the WHO estimates over 80% of the world's deaths from CVDs are clustered. Younger age groups are more affected by CVD than in high-income economies. India and much of Africa are now major hot spots with rapid increases in both genders. The result is a shift in

the 'epidemiological transition' from communicable to non-communicable diseases in countries least able to cope with this double health burden in terms of finance, infrastructure and skilled medics and technology.

Causes include lack of, or ineffective, prevention and detection schemes combined with higher risk exposure, especially to tobacco. Another major factor is malnutrition: 'under' nutrition has dominated countries of Africa, Latin America, and South Asia for decades, but is progressively being replaced by 'over' nutrition, with corresponding increases in CVD.

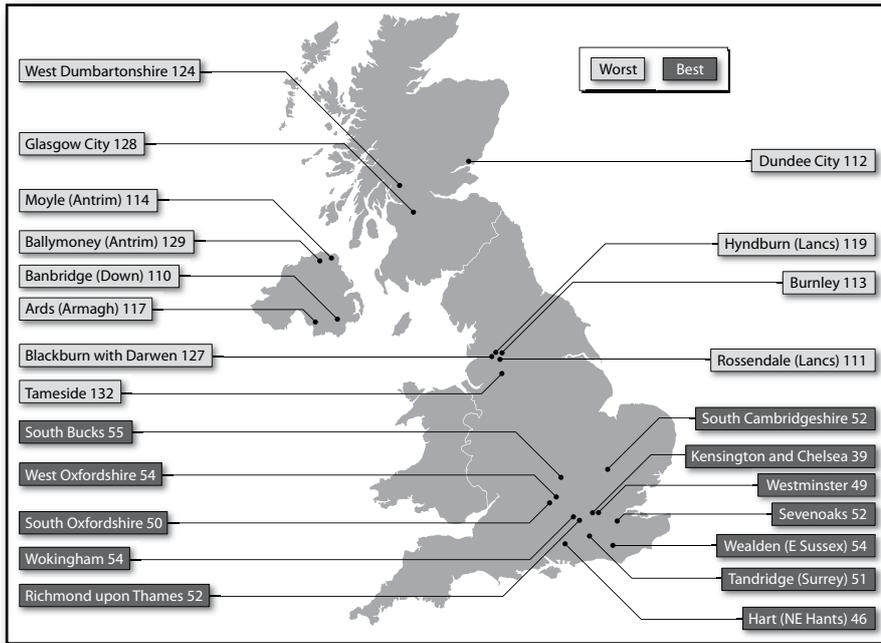
The premature loss of many young adults creates a heavy burden because these are the most productive people in any society. Non-communicable disease including CVD and diabetes are estimated to reduce GDP by up to 7% in low- and middle-income countries experiencing rapid economic growth.

The poorest people are affected most, where a disproportionate amount of income is spent on health care. Hence CVD can be said to directly create poverty as well as being the result of it.

CVD in Uganda

According to the Uganda Heart Institute, heart disease will be the country's leading 'silent killer' by 2020 in this low income country. A third of women in urban areas such as Kampala and 25% of rural women

Figure 5: CVD health risk in the UK – the 12 worst and 12 best areas for CVD – average age standardised death rates for all ages, males and females 2009–11



Source: British Heart Foundation

are overweight or obese, while up to 30% of all Ugandans have hypertension. Even in surrounding rural areas knowledge, and increasing availability, of Western style foods are encouraging a ‘food transition’. Whilst malnutrition persists, doctors report a rise of thin villagers attending clinics suffering hypertension and

diabetes. 33% of Uganda’s health budget comes from international donors, whose priority currently is HIV/AIDS and other infectious diseases.

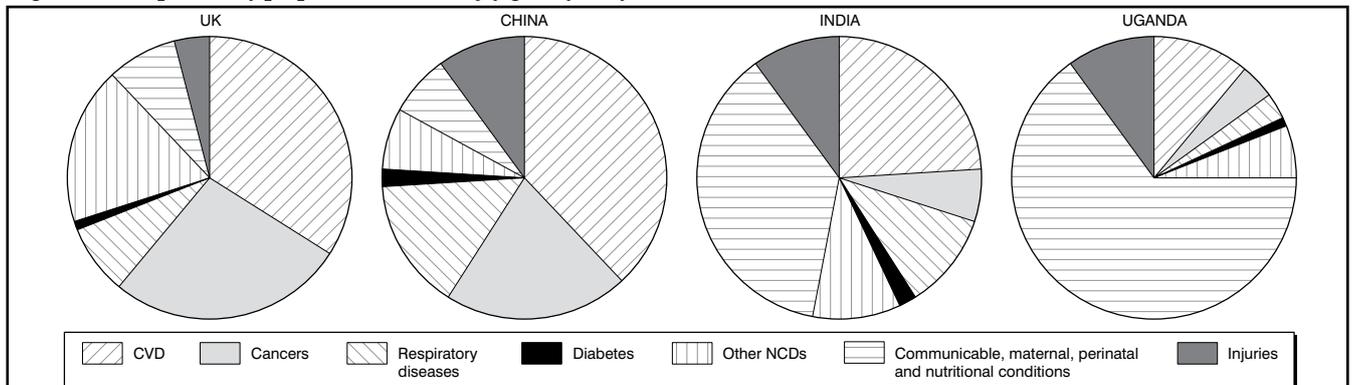
CVD in India

The first McDonald’s opened in New Delhi in 1996. The cultural preference

for sweet foods, combined with a rapidly rising more affluent middle class wanting globally branded fast foods, has resulted in 50m diabetes sufferers. Indians’ predilection to type 2 diabetes, increases their vulnerability. India spends less on publicly funded health care than most other lower middle income countries. CVD is now the largest single cause of death in both urban and rural areas, pushing India rapidly through its epidemiological transition.

A study by India’s National Diabetes, Obesity and Cholesterol Foundation on adolescents in New Delhi found that obesity prevalence had increased from 16% to 24% between 2002 and 2007. Net losses in national income from CVD and diabetes in India is estimated at \$336.6bn (WHO). India, with 50% of its 1.2 million population under 25 years, is a prime target for fast-food TNCs. Their campaigns encourage the perception that consuming western brands is a status symbol. Even the very poorest see a consumption of such products as evidence of economic ‘upward mobility’. Pizzas are marketed as ‘affordable’ and a route to ‘happiness’, and have even been used as an incentive for attendance at primary school.

Figure 6: Comparison of proportional mortality figures from four countries



Country	Total population	GNI Gross national income per capita (PPP international \$)	Behavioural risk factors est prevalence 2008 (%): 1 current daily tobacco smoking 2 physical inactivity	Life expectancy at birth males/ females	Total expenditure on health as % of GDP (2011)	Management - an integrated or topic-specific plan for cancer CVDs, diabetes, alcohol, unhealthy diet, physical inactivity, tobacco
UK	62.1m	High: 36,010	17.3 66.5	79/82	9.3	yes to all
China	1,390m	8,390 lower middle	26.3 30.6	74/77	5.2	yes for cancer and unhealthy diet
India	1,240m	3,590 lower middle	13.9 14	64/67	3.9	yes to all
Uganda	36m	lowest 1,310	6.8 no data	54/57	9.5	no to all

Source: Data from World Health Organisation

Management strategies

The best, according to the WHO, are policies which create environments allowing healthy lifestyle choices, with affordable and available options to help transform behaviour. CVD health risk could actually be largely prevented without expensive interventions, unlike many infectious diseases. Even poor people can reduce their risk by a healthy diet (avoiding foods that are high in fat, sugar and salt), by regular physical activity and by avoiding tobacco smoke and alcohol. Risk can also be reduced by preventing or treating hypertension, diabetes and raised blood lipids.

Although coronary heart disease cannot be cured, treatment can help manage the symptoms and reduce the risk of further problems.

Global and international efforts

- The United Nations WHO is an influential inter-governmental organisation (IGO), setting standards and targets, such as a worldwide smoking policy and reduction of premature CVD mortality by 25% by 2025.
- The EU has set targets and legislation, such as the Luxembourg Declaration, European Health Charter, EuroHeart strategy, anti-obesity and food packaging policies.
- International non-governmental organisations (NGOs) abound. The World Heart Federation lobbies for change especially in lower income economies, advocating 'whole life policies'.

Government and other organisations

National health policy is the responsibility of governments, though most countries also have private sector health care. The UK has a Cardiovascular Disease Outcomes Strategy, which provides advice to local authorities and NHS, the main state health provider. The NHS divides care into:

- Primary: tackling factors that increase risks (smoking, poor diet, little physical exercise)
- Secondary: preventing CHD in high-risk patients and for those suffering it reducing its progression using aspirin, statins and betablockers
- Tertiary: specialised centres which can provide rapid diagnosis and surgical treatments: medications to angioplasty, bypasses and transplants

2013 reforms of the NHS include new Health and Wellbeing Boards (HWBs),

which aim to identify local needs and target initiatives more effectively through integrating previously separate methods and policies. The charity HEART UK endorses their establishment, but suggests wider initiatives to include more than lower socio-economic groups (tackling ethnicity, gender and disability inequalities) are needed to reduce CVD. 'Out in the community' advisors can help more top down strategies. Community organisations like churches can spread the word in a more 'bottom up' style about healthy life style and importance of clinic check-ups.

Other policies include Sure Start, supporting the early years of children in disadvantaged families and Spearhead Areas targeting the highest deprived areas with worst health rates. Tackling food issues are 'carrot and stick' food policies such as the 2013 'front-of-pack traffic light' food labelling system adopted by all the UK major supermarkets. Most major suppliers have complied.

In India, the ratio of junk food marketing to health food marketing is about 500:1. If the target market doesn't understand the implications of fast food, then advertising and labelling is ineffective. The state government of Uttar Pradesh is banning the sale of fast food in and immediately around government-run schools.

Charities fundraising for research and education like the British Heart Foundation are important, together with celebrities like Jamie Oliver. His campaigns on school dinners and the 'Feed me better' campaign, and recent attempts to influence USA habits by Food Revolution Days, are famous.

Conclusion

CVD is a multifactorial, 'hidden killer', with a complex set of mainly behavioral causes, most of which may be prevented. The main risk factors relate to lifestyle

choice in an increasingly globalised world. Belonging to a 'switched on world' means pressure to consume fast foods, work and take leisure time in a sedentary way. The survival of individuals after a cardiovascular event has increased in high-income countries, because of better provision and access to medical care and education about lifestyle. This trend has caused an increased prevalence of CVD in many high-income countries like the UK, despite decreasing incidence over time.

CVD as a global epidemic is now affecting young adults in middle and lower income economies, creating a double burden of health, as in India and Uganda. The spectres of obesity and diabetes are increasing rapidly in urban areas. Health managers in the past have focused on infectious diseases, especially the 'big three' of HIV/AIDs, TB and malaria. CVD was seen as a Western problem, but no longer. It is increasingly common to find under-nutrition and obesity juxtaposed within the same country, the same community and even the same household. In the UK a distinct North-South divide is evident in CVD prevalence, and in Scotland an East-West divide.

Unfortunately even boosting budgets immediately on CVD management is no quick fix, since initiatives have a lag time, although lifestyle changes can give a faster health risk reduction. Any management, from global to local scale, voluntary or forced, official or via charities and celebrities needs to be integrated to tackle cradle-to-grave aspects of life. Tackling health inequalities is an integral part of creating a fairer and healthier society.

FOCUS QUESTIONS

1. Apply the content of Figure 2 causes of risk to the Scotland case study. Explain why Scotland has such high rates of CVD.
2. Analyse the national CVD data in Figure 6. Is there any correlation in CVD prevalence and GDP spent on healthcare?
3. Use websites like the WHO country profiles to investigate the patterns and causes of national differences in Europe's CVD health risk.
4. Discussion/debate/short AS essay: To what extent do you agree CVDs are a health risk due to poverty?