1 Introduction

1.1 Background

Coronary heart disease (CHD) is the leading cause of death in Australia, claiming 26,521 lives in 2000. It contributes to significant illness, disability, poor quality of life and premature mortality, and the associated direct healthcare costs in Australia exceed those of any other disease. CHD was by far the greatest epidemic in Australia during the twentieth century. The level of CHD deaths peaked in the late 1960s and has since fallen by over 60%, but it remains a significant health problem not only in Australia but also in other developed countries. CHD kills 6.9 million people each year worldwide and is the leading cause of premature death and disability in developed countries. Due to the increasing rates of CHD in developing countries, it is predicted that by 2020 it will become the single leading public health problem for the world (Murray & Lopez 1996).

1.2 What is coronary heart disease?

CHD is the most common form of heart disease in Australia. Its primary feature is insufficient blood supply to the heart itself. The two major clinical forms of CHD are heart attack and angina. In a heart attack the insufficient blood flow is sudden and extreme. In angina the episodes of restricted flow are temporary and usually much less dangerous.

The common underlying problem in the various forms of CHD is atherosclerosis, a complex process that affects the vessels supplying blood to the heart, the coronary arteries. In atherosclerosis, build-ups called plaques form on the inside surface of the artery. When advanced, plaques can narrow the channel through which the blood flows. Plaques can be single or multiple and can affect one or more of the heart's three main arteries.

A heart attack occurs when a coronary plaque suddenly breaks open. This brings on a blood clot that completely blocks blood flow to the part of the heart muscle downstream. This is a life-threatening emergency that causes severe chest pain, and often collapse and sudden death. Apart from other emergency measures, if the clot cannot be promptly treated some of the person's heart muscle will die, a condition known as acute myocardial infarction (AMI).

In angina, a plaque has markedly narrowed a coronary artery to the point where, although the blood flow can usually meet most daily demands, it cannot increase to meet extra demands such as exercise or emotion, resulting in temporary chest pain. In typical angina, the event is not life-threatening, there is no associated blood clot and the heart muscle is not in immediate danger.

1.3 Risk factors and prevention

A large part of the death, disability and illness caused by CHD is preventable. The main behavioural risk factors for CHD are the high-fat and excess-energy Western diet, physical inactivity and cigarette smoking. The Western diet and physical inactivity interact to produce the biological risk factors of high blood cholesterol, high blood pressure and excess weight. Each of these factors increases the risk of CHD on its own, and in an individual the risk increases progressively with the number of risk factors present (AIHW 2001).

Prevention of CHD includes both public health and medical interventions aimed at reducing risk factors. Apart from efforts to encourage healthy eating, physical activity and non-smoking, there are now effective drugs for controlling high levels of blood cholesterol and blood pressure. Over the last decade the use of these drugs has increased considerably.

1.4 Medical treatment and cardiac procedures

When CHD occurs, treatment depends on whether the disease is in the form of a heart attack or angina. Heart attacks need CPR (cardiopulmonary resuscitation) if there is cardiac arrest, rapid transit to hospital, drugs to inhibit and dissolve the blood clot, and external 'countershock' if the heart's rhythm is critically disturbed. Other drugs are usually given to reduce the immediate and long-term damage to the heart. For angina, drugs can be given to reduce the episodes of chest pain and to relieve the pain when it occurs.

For patients who have persistent blockage of the coronary arteries, either in the case of angina or after a heart attack, there are several procedures to 'revascularise' the heart by removing or bypassing the blockages, to restore adequate blood flow. The revascularisation procedures are percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG).

PCIs involve inserting a catheter with a balloon into the point where a coronary artery has been narrowed by a plaque, then inflating the balloon to reduce the obstruction. Recent years have seen the introduction and rapidly growing use of coronary stents, metal tubes that are expanded within an artery to hold it open where it has been narrowed. This has improved outcomes for PCIs by reducing the risk of the artery closing acutely or in the months after the procedure.

CABG entails opening the patient's chest and using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood supply to the heart muscle.

Before either of these revascularisation procedures is performed, a procedure known as cardiac catheterisation is necessary. This identifies the location of any coronary blockages. A catheter is inserted into the bloodstream and threaded through the blood vessels to the heart and the coronary arteries. The catheter then releases a dye that outlines the arteries under X-ray.

1.5 Greater risk among the elderly

Despite great improvements, the burden of CHD is likely to remain large over the coming decades and there will be a growing number of elderly Australians among whom it is highly prevalent. CHD predominantly affects middle-aged and older Australians, with the majority of hospital admissions for heart attack and cardiac procedures occurring among the population aged 60 years and over—70% of AMI hospital admissions, 73% of CABG procedures and 61% of PCI procedures. These proportions are substantial, especially as those aged 60 years and over account for only 16% of the total population. Almost all CHD deaths (92%) occur among the population aged 60 years and over, with the population aged 80 years and over accounting for over 50% of such deaths.

Because CHD is much less common in younger ages, this report focuses on the Australian population aged 40 years and over. An upper age limit of 90 years has been imposed because multiple diseases in very old individuals may result in unreliable data.

1.6 Purpose and structure of this report

Recognising that the prevention and control of CHD has been a prominent and constant challenge in developed countries, the Organisation for Economic Co-operation and Development (OECD) compared treatments, costs and outcomes of CHD across 16 OECD countries, including Australia. The Australian data used in this international study form the basis of this report, which aims to provide the community, researchers, health professionals and policy makers with the latest available data and trends relating to the epidemic of CHD and its treatment in Australia.

Although the title of this report refers to the broad category of CHD, data limitations mean that some sections in this report relate mainly to heart attack. For example, it is difficult to adequately estimate the incidence of angina or count the number of people admitted to hospital for it, whereas this information can be reliably obtained for heart attack. On the other hand, information about mortality, risk factors and drug treatment relate to CHD generally.

The report has six chapters. Chapter 2 outlines the methods used. Chapter 3 provides an overview of CHD by presenting patterns and trends in incidence, mortality, case-fatality and prevalence. Much of the data in Chapter 3 have been presented in previous AIHW reports and the purpose of this chapter is to provide a context for the analysis presented in the remainder of the report. Chapter 4 examines possible reasons for the decline in coronary death rates and incidence observed in Chapter 3, by examining current patterns and trends in risk factors and drug treatment for CHD. Improvements in heart attack survival rates suggest that acute care cardiac interventions are becoming more and more effective and this is discussed in detail in Chapter 5. This chapter focuses on patterns and recent trends for patients admitted to hospital for a heart attack and the acute care invasive treatments that they receive (cardiac catheterisation, PCI and CABG). In-hospital case-fatality for these interventions and for heart attack patients are also discussed in Chapter 5. Chapter 6 examines economic aspects of CHD treatment in Australia. The Appendix contains supplementary tables.