Chronic diseases and associated risk factors in Australia, 2001

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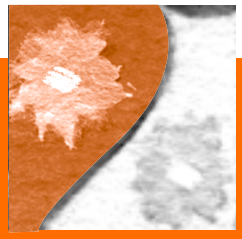


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Preface

We have marked the end of the twentieth century, and proudly reflect upon the advances in health and health care that have been achieved in that period. Technological and biological breakthroughs over the last several decades have led to exciting, even startling, advances in the fight against disease. But we still have a long way to go in meeting significant challenges to the health of Australians, in particular those imposed by the chronic diseases and their risk factors.

This report documents just how much of the burden of disease in Australia is due to major chronic diseases. But, we can not reasonably expect to meet this challenge by breakthroughs in biological and medical sciences alone because a significant proportion of these diseases is behavioural in origin. Progress must occur by focusing on modifiable risk factors such as smoking, poor nutrition, alcohol misuse and physical inactivity.

Recognising the need to respond to this growing challenge, the Australian Health Ministers' Advisory Council has endorsed a Chronic Disease Prevention Framework, and requested the National Public Health Partnership Group to develop a national agenda on the issue and advise it on an action plan. This is in step with the World Health Organization's global strategy for the prevention and control of non-communicable diseases. Effective surveillance and monitoring are integral to both strategies.

The National Public Health Information Working Group, a subgroup of the National Public Health Partnership, is progressing the surveillance and monitoring of chronic diseases nation-wide. A first step in this direction is to take stock and generate baseline information. The Working Group has established a subcommittee to oversee this work.

This report, produced by the Australian Institute of Health and Welfare, examines the most significant chronic diseases affecting Australians including cancer, coronary heart disease, stroke, chronic obstructive pulmonary disease and depression. The focus of the report is also on common behavioural risk factors that significantly contribute to the development of these diseases and conditions. In addition to providing information on death, disease and disability associated with chronic diseases, the report attempts risk factor profiles of the Australian population as a whole and its population subgroups where possible.

It is hoped that the report will be useful to policy makers, risk factor prevention specialists, the wider health community, the non-government sector and consumers.

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Co-chairs, National Public Health Information Working Group

Acknowledgments

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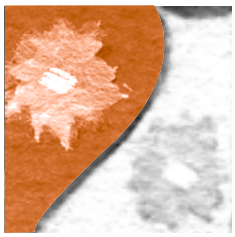
Abbreviations

AACR	Australian Association of Cancer Registries
ABS	Australian Bureau of Statistics
AGPS	Australian Government Publishing Service
AIHW	Australian Institute of Health and Welfare
ANZDATA	Australia and New Zealand Dialysis and Transplant Registry
AusDiab	The Australian Diabetes, Obesity and Lifestyle Study
BEACH	Bettering the Evaluation And Care of Health
BMI	Body mass index
CHD	Coronary heart disease
COPD	Chronic obstructive pulmonary disease
CRC	Colorectal cancer
DALY	Disability-adjusted life year
DHAC	Department of Health and Aged Care
DSRU	Dental Statistics and Research Unit
ESRD	End-stage renal disease
ETS	Environmental tobacco smoke
GP	General practitioner
ICD-9	International Classification of Diseases, 9th Revision
ICD-10-AM	International Classification of Diseases, 10th Revision, Australian modification
NCSCH	National Cancer Statistics Clearing House
NDSHS	National Drug Strategy Household Survey
NHFA	National Heart Foundation Australia
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
OECD	Organisation for Economic Co-operation and Development
RRMA	Rural, Remote and Metropolitan Areas classification
SLA	Statistical Local Area
WHO	World Health Organization
YLL	Years of life lost due to premature mortality
YLD	Years of healthy life lost due to disability



Introduction

Chapter 1

1 Introduction

Chronic diseases and conditions lead mortality, morbidity and disability statistics of the industrialised, Western societies and are responsible for a large proportion of their burden of disease. Their rapid rise represents one of the major health challenges this century—chronic diseases are now of epidemic proportions globally and in Australia (AIHW 2000). Yet many of these diseases and conditions are largely preventable and much could be achieved by attention to just a few behavioural risk factors (WHO 2000). Effective management should further reduce the problems, complications, disability and excess mortality associated with these diseases and conditions (Brownson et al. 1998).

No clear, agreed definition of this important set of diseases and conditions has emerged (see Box 1.0.1 for a list of characteristic features). They occur across the whole spectrum of illness, mental health problems and injuries. Chronic diseases tend to be complex conditions in how they are caused, are often long-lasting and persistent in their effects, and can produce a range of complications (Thacker et al. 1995). Both communicable and non-communicable diseases can become chronic, although the term 'chronic disease' is often used as a synonym for 'non-communicable disease'. Chronic diseases have also been referred to as chronic illnesses and degenerative diseases (Stein 1989; Taylor et al. 1993; Crews & Gerber 1994).

A concept of time is inherently built into the term 'chronic'. Though open-ended, it is usually defined by a minimum duration (for example, diseases lasting 3 or 6 months, continuously or intermittently, may be termed chronic). While some chronic diseases may last indefinitely, others that are ongoing for long periods may resolve over time. Leading immediate killers such as heart attack and stroke are also termed chronic because of the prolonged, underlying processes leading up to the event. Although not directly implied, the construct also involves the concept of persistent, underlying change—mostly deleterious. Chronic diseases are not conditions suspended in time; they are continuing processes that generally progress for the worse.

Chronic diseases are often seen as age-associated changes. Starting early, they continue to occur throughout life but with greater frequency in older persons. This suggests the role of certain, underlying ageing processes in increasing susceptibility to these diseases. However, the fact that many external risk factors contribute greatly to their onset and precipitation suggests there is a window of opportunity to prevent some of these diseases and conditions.

Chronic diseases are a cause of significant illness and disability because of their incessant, if variable, attack on different organ systems. However, there is no one-to-one correspondence between the presence of a chronic disease and disability. Most people with chronic diseases function very well, and often without much evidence of physical vulnerability. Similarly, although large contributors to mortality, most of the chronic diseases are not immediately life-threatening.

Thus chronic diseases may be conceptualised, at a minimum, as conditions that are prolonged, do not often resolve spontaneously, and are rarely cured completely. Chronic diseases also entail high mortality, either directly or by contributing to other causes of death.

Box 1.0.1: Defining chronic diseases

Chronic diseases are difficult to define by using the well-known criteria of causeation, acuteness, age of onset, activity restriction, period of illness and premature mortality. They are mostly characterised by complex causality, multiple risk factors, a long latency period, a prolonged course of illness, and functional impairment or disability.

Causation

Most chronic diseases have a complex aetiology and multi-factorial causation. Causal pathways that lead to the onset and progression of these diseases are poorly understood.

Acuteness

A majority of chronic diseases are the end-product of a complex and poorly defined series of events, initiated at an unknown point and progressing over a good portion of an individual's life. More often than not, the onset is gradual. Nonetheless, diseases classified as chronic can be insidious or sudden in onset, or even have acute phases.

Age of onset

Chronic diseases are not necessarily diseases of the old or consequences of ageing although age is an important determinant. They occur across all the stages of the life cycle. Type 1 diabetes, juvenile rheumatoid arthritis and childhood asthma are classic examples of chronic diseases that begin early in life.

Activity limitation

Most chronic conditions significantly compromise quality of life through activity limitations and impairments, and may require assistance over an extended period of time. Long years of life lived with disability is not an uncommon feature of chronic diseases.

Period of illness

Most chronic diseases are long-term and persistent, leading to a gradual deterioration of health. Prolonged illness, often equated with long-term conditions, is a useful adjunct to identifying a disease as chronic. Symptom-free, prolonged biological phenomena such as high blood pressure may also be designated as chronic conditions. Many people may be exposed to the precipitating agents and risk factors of a disease over a long period before symptoms appear or the disease is diagnosed, but are referred to as having the chronic disease because of these hidden antecedents. Prolonged illness is therefore not a prerequisite to designate a disease as chronic in some cases.

Premature mortality

Most chronic diseases are not immediately life-threatening, yet they are the most common and leading causes of premature mortality. Chronic diseases are also indirect contributors to premature mortality resulting from other underlying causes.

Arrival of the chronic disease epidemic

Chronic diseases are not new to human societies. Prehistorical and historical evidence clearly shows that our ancestors suffered from a variety of chronic diseases including osteoarthritis and diabetes (Hinkle 1987). However, it was not until the twentieth century that chronic diseases began to dominate the health scene; their prevalence is now greater than at any earlier period in human history (Crews & Gerber 1994).

It has taken us a brief period to evolve from an epoch of acute and dramatic illnesses to the current era of chronic diseases and conditions. Up until the nineteenth century, infectious diseases and injury dominated the health of all populations even though descriptions of chronic diseases and conditions such as coronary heart disease, atherosclerosis and diabetes among affluent sections of the society were beginning to accumulate (Cohen 1989). The growing impact of chronic diseases and conditions such as stroke, cancer, renal disease and high blood pressure was not fully appreciated until the early part of the twentieth century. A major

epidemiological transition began to unfold around this time, with infectious diseases largely being brought under control but only to be replaced by chronic diseases (AIHW: de Looper & Bhatia 2001). The transition was relatively quick—more like a transformation—culminating in an epidemic within a few short decades.

Several factors have contributed to the emergence and maintenance of this epidemic. Demographic and lifestyle changes, accompanied by increases in the prevalence of a variety of risk factors along the causal chain, have contributed to the rising incidence of various chronic diseases (Crews & Gerber 1994). For the twentieth century's greatest epidemic, coronary heart disease (CHD), a major feature has been its extension from small, affluent sections of society to the whole of society, especially the socioeconomically disadvantaged (Marmot 1992). Similar trends are noted for many other chronic diseases; however, there is significant disease-specific heterogeneity in their spread across the socioeconomic divide (Adler & Ostrove 1999).

Demographic changes

An increase both in the absolute number and relative proportion of people aged 65 and over has contributed significantly to the high prevalence of chronic diseases. Chronic disease is not an inevitable consequence of ageing; however, the greying of a population is a useful marker of the prevalence of chronic diseases and their associated risk factors. Declining health status and increasing numbers of co-morbid chronic diseases and conditions are common among older persons (Crews & Gerber 1994). The burden of chronic conditions among those aged 80 and over is an issue of particular public health concern.

In the first quarter of the twentieth century, less than 5% of the Australian population was aged 65 and over; the proportion of those aged 80 and above was less than 1%. These proportions increased consistently throughout the twentieth century, with 12% of Australia's population in 2000 aged 65 and over. The proportion of those aged over 80 more than doubled during the same period. Although some of this increase in the proportion of older people has resulted from declines in fertility rates, mortality reductions among those aged 65 and above have contributed substantially to this ageing of the population (AIHW: de Looper & Bhatia 2001).

Lifestyle changes

Complex social, cultural and technological changes have exerted, and will continue to bring to bear, a significant influence on the health of the population. Increased prosperity has led to the perils of overconsumption and overindulgence, the creation of an 'obesogenic' environment (Swinburn et al. 1999). Cardiovascular diseases, cancer, diabetes, osteoporosis, hypertension and obesity closely follow from diets high in calories and social changes predisposing to low levels of habitual physical activity (McGarvey et al. 1989).

Increased uptake of hazardous habits such as tobacco smoking and excessive alcohol consumption further created opportunities and an environment for the increase in the frequency of chronic diseases. The epidemic of tobacco smoking, which reached its peak in the 1960s, contributed to an increase in the incidence of a variety of chronic diseases (AIHW 2000). Because of this, lung cancer—the disease most strongly associated with tobacco smoking and the one that was virtually unknown in the early part of the twentieth century—is now a major cause of death. The proportion of smokers in the population has decreased lately, with consistent declines,

especially among males, noted over the last three decades, yet smoking remains the greatest single risk factor for chronic diseases.

Misuse of alcohol has been shown to increase risk for a variety of chronic diseases. Potentially a positive influence on cardiovascular health, if consumed in moderation, excessive alcohol consumption has significantly contributed to a variety of chronic diseases in Australia including chronic liver disease, some cancers and cardiovascular diseases (AIHW: Ridolfo & Stevenson 2001). There has been a decline in alcohol consumption in the last three decades; however, Australia still ranks tenth amongst 20 developed countries in terms of per capita alcohol consumption (AIHW: de Looper & Bhatia 1998).

The role of behaviour in health is not a new finding. However, the importance of behaviour in health has become increasingly relevant in recent times because chronic diseases have emerged as the principal threats to the health of Australians. Most of the chronic diseases have their roots in these risk-taking behaviours.

Changes in risk factor profile

Changes in lifestyle described above have influenced chronic disease outcomes through a variety of intermediate biological factors in the causal chain. These biological intermediates include excess weight, high blood cholesterol, high blood pressure and high blood glucose. Studies of newly industrialising societies suggest that certain lifestyle changes may adversely alter the risk factor profile of a population, as measured in terms of these biological intermediates, although there is no one-to-one correspondence at an individual level (Wessen et al. 1992).

Historical evidence in Australia as to the underlying trends in the prevalence of most of these risk factors is sketchy. There is recent evidence that Australians are getting fatter (Dunstan et al. 2000; AIHW: de Looper & Bhatia 1998, 2001), a trend that may continue for some time, in view of shifts in the patterns of eating and physical activity. On the other hand, the levels of blood pressure have also declined lately in Australia (AIHW 2001a). However, the evidence as to when blood pressure, blood cholesterol and blood glucose levels initially started affecting large segments of the Australian population has not been well documented.

Nonetheless, on the basis of information from a variety of indirect sources, it can be concluded that the increases in the incidence of chronic diseases in Australia would have been preceded by an unfavourable risk factor profile.

Magnitude of the problem

In Australia, as in other developed countries, chronic diseases and conditions are large contributors to illness, disability and premature mortality (AIHW: Mathers et al. 1999). They are estimated to be responsible for around 80% of the total burden of disease, mental problems and injury, as measured in terms of disability-adjusted life years, or DALY—a summary statistic that combines years of healthy life lost due to disability (YLD) and premature mortality (YLL).

The magnitude of the problem can be viewed more comprehensively in terms of disease prevalence, associated illness and disability, use of services and other health-related costs incurred for their prevention and management, and their contribution to premature mortality. Information given below provides an overview of the extent of the problem in some of these terms using a variety of statistics. It must be noted, however, that none of the statistics described below provides by itself a complete

view of the extent of the problem. The information provided therefore must be viewed as cumulative evidence.

Prevalence of chronic diseases, illnesses and conditions

Chronic diseases and conditions are highly prevalent in Australia. According to the Australian Bureau of Statistics (ABS) 1995 National Health Survey (ABS 1997), highly prevalent chronic diseases and conditions (lasting at least 6 months or more and affecting at least 10% of the population in Australia) include arthritis (15%), hay fever (14%), asthma (11%) and high blood pressure (10%). Diabetes, depression, chronic obstructive pulmonary disease (COPD), osteoarthritis and angina are other commonly reported chronic diseases. These high proportions are also reflected in the disease prevalence estimates generated by the Australian Burden of Disease and Injury Study (AIHW: Mathers et al. 1999).

Clearly, chronic diseases and conditions (including those under control) are large contributors to ill health in the population, either continually or intermittently. In addition, many of the recent illnesses (for example, those reported by the respondents as occurring in the 2 weeks preceding the ABS survey) may include the exacerbation of symptoms or presentation of complications associated with one or more chronic diseases and conditions. Many of the minor or temporary conditions may also have their origin in the susceptibility created by an existing chronic disease.

While the high prevalence of some of the chronic diseases, such as depression and asthma, may reflect their long-term persistence, several of these diseases have high associated mortality or resolve over time. In the latter case, their prevalence may represent a large proportion of new cases.

Disability

Chronic diseases often lead to disability, the sequela of a disease affecting an organ system and beyond. Physiological limitations associated with various chronic diseases deplete reserve, ultimately causing an individual to lose independence.

The International Classification of Functioning (ICF) conceptualises disability as multidimensional—relating to the body functions and structures of people, the activities they do, the life areas in which they participate, and the factors in the environment which affect these experiences (AIHW 2001b). A notion of homogenous patterns of disability resulting from a variety of biological processes underlying chronic diseases can be entertained. However, it is possible to compare the ICF outcomes by positing various diseases as main conditions for disability—a person's main condition is 'a long-term condition identified by a person as the one causing the most problems' (ABS 1999).

The concept of disability is operationalised by identifying limitations, restrictions or impairments that may have lasted, or are likely to last, for a certain period. This approach was used in the ABS 1998 Survey of Disability, Ageing and Carers, by defining disability as 'one or more of 17 limitations, restrictions or impairments that have lasted or are likely to last for 6 months or more and which restrict everyday activities' (ABS 1999).

According to the ABS survey, arthritis and related disorders constitute a leading main condition related to disability among Australians, followed by asthma (Figure 1.0.1). It may be noted that these major causes of disability are not the major underlying causes of death in Australia. Diabetes, stroke, depression, emphysema and kidney disorders are other large contributors to disability.

Physical disability is also a known risk factor for several chronic diseases and conditions, in particular depression, and for a variety of other risk factors. The vicious cycle set up by the simultaneous presence of a chronic disease and a disability may lead to further complications.

Mortality

Chronic diseases, by definition, typically are not life-threatening emergencies; nonetheless, they are large contributors to mortality. Cardiovascular disease, cancer and lung diseases together are listed as the underlying cause of death for more than 76% of all deaths in Australia. These numbers do not include the contributions to all deaths made by several of the chronic diseases and conditions where they are an associated cause of death.

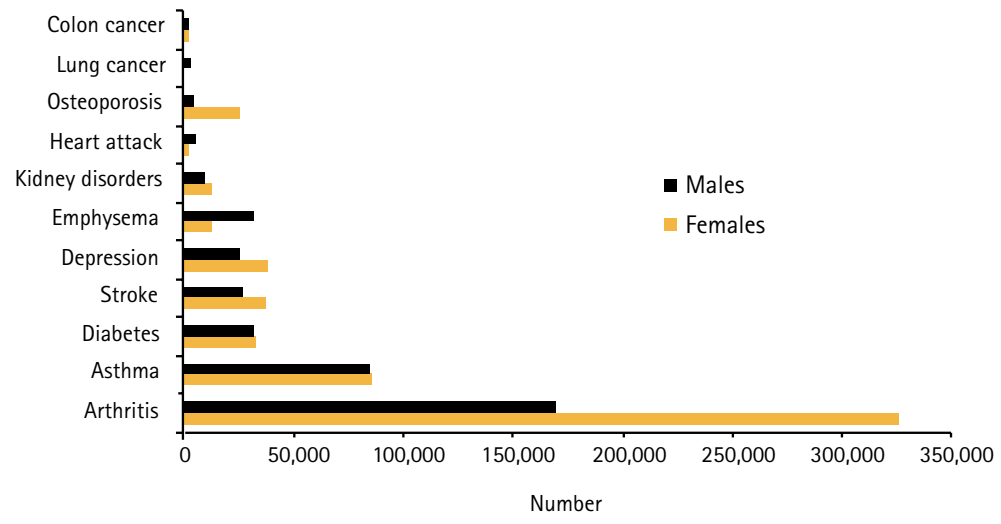
In 1998, the set of 12 chronic diseases and conditions reported here were listed as the underlying cause for almost 68,000 deaths, about 53% of all deaths. CHD was the major cause of death, accounting for 28,103 deaths, followed by stroke (Figure 1.0.2).

The relative contributions of various chronic diseases and conditions to the number of deaths may alter considerably if attributable fractions of mortality are also taken into consideration. Not only are some of the chronic diseases not listed as the underlying cause of death, but their input to premature mortality also largely remains undocumented. Some of the chronic diseases are useful predictors of premature mortality irrespective of the underlying cause of death.

Disability-adjusted life years

The 12 chronic diseases and conditions reported here accounted for an estimated 42% of total DALYs in 1996 (Figure 1.0.3). Since some of the chronic diseases reported here are also the leading causes of death, they accounted for 47% of YLL in that year.

Figure 1.0.1: Number of people with a disability associated with various chronic diseases and conditions, 1998



Source: 1998 ABS Survey of Disability, Ageing and Carers, unpublished data.

Attributable burden of chronic disease risk factors

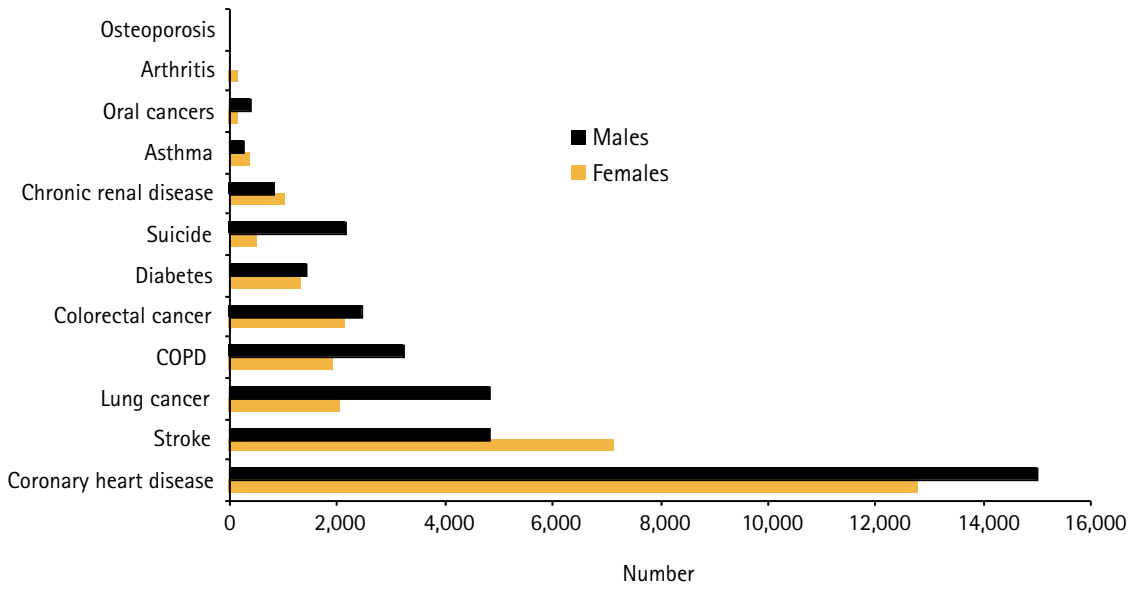
No assessment of the extent of the burden of chronic diseases would be complete without some insight into the risk factors that cause or contribute to their precipitation and continuity. Since most of these risk factors are further away from, or are intermediaries in, various disease outcomes, it is useful to determine the fraction of the outcome that is attributable to them (the attributable fraction).

The behavioural risk factors account for the loss of about 21% of DALYs. Tobacco smoking is the risk factor responsible for the greatest burden of chronic disease in Australia (9% of total DALYs, 12% among males and 7% among females), followed by physical inactivity (7% of total DALYs), poor diet (as measured by lack of fruit and vegetables, 3% of total DALYs), and the net harm from alcohol consumption (2%). The biomedical risk factors are estimated to be responsible for another 12% of DALYs: high blood pressure contributes nearly 5%, excess weight 4%, and high blood cholesterol another 3% (AIHW: Mathers et al. 1999:102–3). However, the role of various behavioural risk factors in biological intermediates needs to be accounted for in the latter estimates.

Disparities

While chronic diseases are common in all sections of the Australian society, large disparities exist in their prevalence and outcomes between different segments of the population (AIHW: Strong et al. 1998; AIHW 2000). For example, there are large differences between higher and lower socioeconomic groups in relation to chronic diseases and conditions in Australia. Death rates for coronary heart disease are nearly twice as high

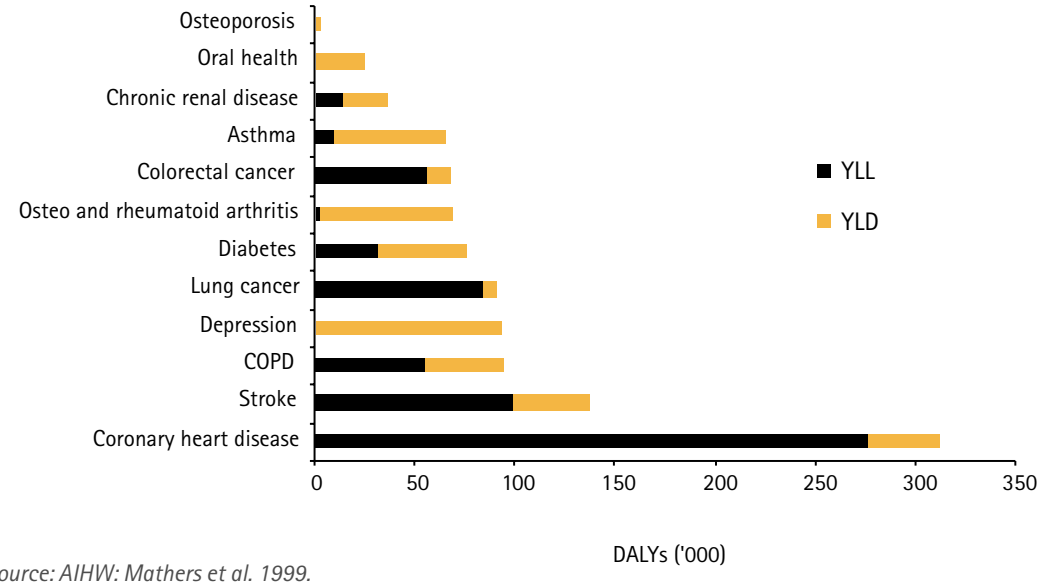
Figure 1.0.2: Number of deaths due to various chronic diseases and conditions, 1998



Note: Suicide is used here as a proxy measure of mortality from depression.

Source: AIHW National Mortality Database.

Figure 1.0.3: DALYs attributed to various chronic diseases and conditions, 1996



Source: AIHW: Mathers et al. 1999.

in people living in the socioeconomically most disadvantaged areas of Australia as compared with those living in the areas of least disadvantage (Glover et al. 1999). Over time social gradients have developed even for those risk-taking behaviours that are now recognised as habits independent of socioeconomic status.

Another example of this disparity is the high prevalence of chronic diseases among Indigenous Australians. Some of the highest rates of chronic diseases in Australia, in particular cardiovascular disease, diabetes and renal disease, are noted in the Indigenous population. Cardiovascular disease is the single largest contributor to the higher death rate among Indigenous Australians. The prevalence of diabetes and end-stage renal disease are also respectively 2–4 and 10–12 times that of the non-Indigenous population.

Some of the risk factors contributing to these chronic diseases, such as overweight and obesity, have higher prevalence in Indigenous Australians (ABS & AIHW 2001). It is, however, important to view this disparity in the broader context of the socioeconomic and sociocultural disruptions experienced by Indigenous Australians.

Primary prevention of chronic diseases

Many of the chronic diseases are highly preventable. Continuing declines in death rates for CHD, stroke, lung cancer and COPD in Australia are good examples of what is achievable (AIHW 2000; AIHW: de Looper & Bhatia 2001). Morbidity and disability associated with chronic diseases can also be significantly reduced.

To a certain degree, the burden of disease associated with chronic diseases is an extension of what individuals choose to do or not do, and the influences and impacts of the environment in which they live (Kaplan et al. 1993). General health can be significantly improved by controlling four major health-damaging behaviours, namely tobacco smoking, poor

nutrition, alcohol misuse and lack of physical activity (JAGGPPH 2001). These factors, referred to as SNAP, are not only major contributors to the development of cardiovascular diseases and cancers but also exacerbate life-threatening complications of diabetes (CSTE, ASTCDPD & CDC 1999).

The 53rd World Health Assembly promulgated this approach by endorsing the Global Strategy for the Prevention and Control of Non-Communicable Diseases (WHO 2000). The need for more effective action on major chronic diseases including their risk factors has been recognised in the agreement by Australian Health Ministers to designate some of these leading causes of mortality and morbidity as National Health Priority Areas.

More recently, the Australian Health Ministers' Advisory Council (AHMAC) has endorsed a national framework for chronic disease prevention developed by the National Public Health Partnership Group (NPHP 2001). Key elements of this framework have been adapted into a simplified version for the development of this baseline report, as shown in Figure 1.0.4. State and Territory Governments are also developing their own jurisdictional initiatives in chronic disease prevention and management—for example, the Northern Territory Preventable Chronic Diseases Strategy.

Secondary prevention

Chronic diseases and conditions run their course through life, with a natural history that tends towards gradual degeneration. Many of these diseases and conditions contribute to or facilitate other diseases or conditions in their course. A classic example is diabetes: if not well-managed or its risk factors not controlled, it can lead to a variety of diseases and complications such as kidney and eye diseases. Together with high blood pressure and high blood cholesterol, diabetes also becomes a major biomedical risk factor for cardiovascular diseases.

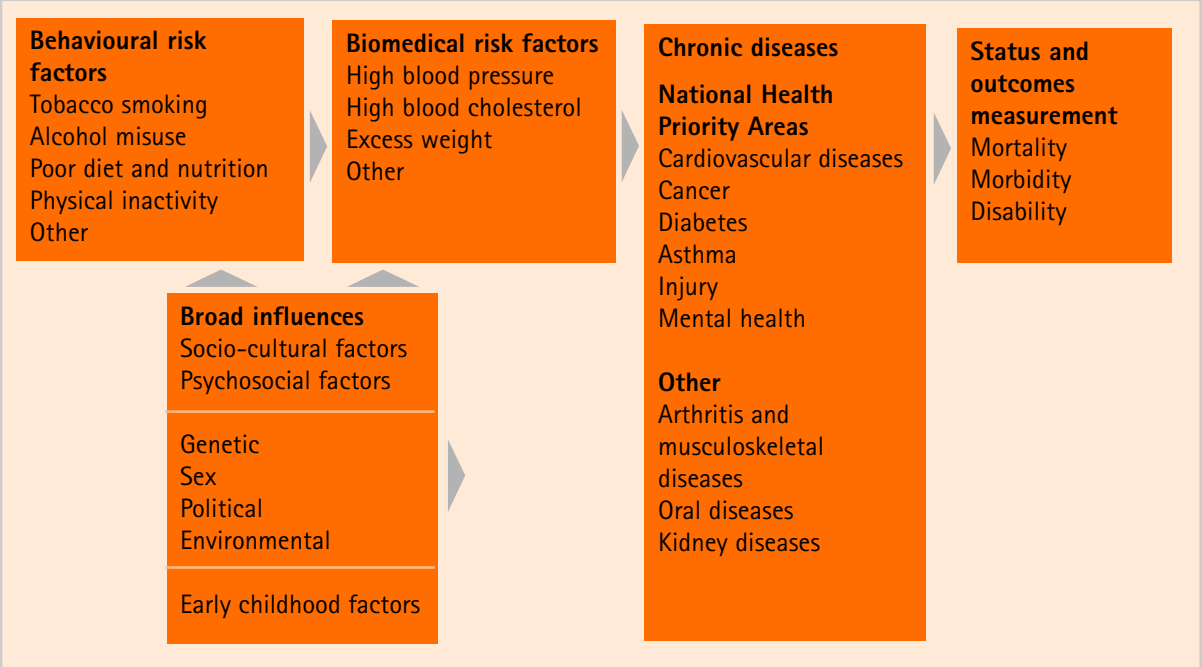
It is now possible to detect certain chronic conditions early in their progression, when treatment is most effective. Regular screening can detect several types of cancer and can also be critical in preventing some complications of diabetes. Regular measures of blood pressure and blood cholesterol and appropriate follow-up of high levels are recommended for helping to avoid or delay cardiovascular problems. Attention to intermediate or more proximal risk factors such as high blood pressure, high blood cholesterol, impaired glucose tolerance and excess weight is therefore important in any chronic disease prevention strategy.

Primary prevention, based on attention to both behavioural and biomedical risk factors, is a central part of chronic disease control. However, attention to these and other factors should also be a focus of care in those who already have chronic diseases—that is, secondary prevention of various risk factors. The scope of prevention in the context of chronic diseases therefore is wide and includes effective management.

Surveillance and monitoring of chronic diseases

Regular surveillance and monitoring is a central plank in any strategy aimed at prevention and management of chronic diseases and their risk factors. Any policy initiatives for chronic disease prevention and management should be supported and underpinned by timely and accurate data (CSTE, ASTCDPD & CDC 1999).

Figure 1.0.4: A framework for the surveillance and monitoring of chronic diseases



In addition to information derived from mortality, morbidity and disability data, surveillance of risk factors is required to generate critical information for the planning and evaluation of preventive programs for chronic diseases (Bonita et al. 2001). There is also the need to integrate information from a range of administrative and non-administrative data sources for effective surveillance and monitoring (Thacker et al. 1995). The national framework for the prevention and management of chronic diseases and the approaches proposed therein broadly outline information requirements for the surveillance and monitoring of chronic diseases in Australia (NPHP 2001).

However, given the multitude of chronic diseases and a large range of associated risk factors, it is important that some priorities are established in chronic disease surveillance and monitoring. To ensure comparability over time and across locations, the surveillance system also requires standardisation of data collection and analysis (Bonita et al. 2001).

The first step in establishing regular surveillance and monitoring of chronic diseases is to take stock and develop baselines about the state of play. Not only should such an exercise lead to an assessment of the burden of disease associated with major chronic diseases and conditions, but it should also provide an overview of the associated risk factors, co-morbidities and complications. An assessment of the burden of disease from a risk factor perspective would be highly useful in this context (see, for example, AIHW: Mathers et al. 1999).

Surveillance and monitoring of chronic diseases is made difficult by their complex origins, long period between exposure to a risk factor and symptoms, and lack of one-to-one correspondence between risk factors and disease outcomes. The disease outcomes also show significant variation, with many chronic diseases often acting together with other diseases, conditions and risk factors rather than being the only underlying factor causing illness and death (Thacker et al. 1995). Some of these

factors may lead to a perceived lack of urgency in regular surveillance and monitoring of chronic diseases (Remington & Goodman 1993).

Any surveillance and monitoring of chronic diseases and their risk factors needs to consider all these issues in totality rather than piecemeal.

Outline of this report

This report provides baseline information on a select set of chronic diseases and conditions and their associated risk factors that should form the basis for more comprehensive coverage later. It not only compiles information from existing administrative and other data collections, but also takes a broader approach to common risk factors and determinants, co-morbidities, causal pathways and complications. The report highlights the connection between chronic diseases and several major risk factors, and collects in one document the available information for both. As such, the report is intended as an important tool to support national efforts to reduce the burden of chronic disease and illness.

The report covers 12 non-communicable diseases and conditions that fit the broad definition of a chronic disease. That is, they pose a significant burden in morbidity, mortality and health system costs in Australia, and are mostly preventable. Chapter 2 of the report provides statistical overviews of their impact and outlines the opportunities and challenges they provide for early prevention and management.

Risk factors selected for inclusion are those that have a high likelihood of causality associated with at least one of the diseases detailed in the report, are large contributors to the burden of chronic diseases in general, and are potentially modifiable (Chapter 3). All these risk factors can be identified and managed at an individual level; however, it is commonly accepted that a broader population approach is the most effective way of reducing their levels and therefore those of the chronic diseases to which they contribute. This is because these risk factors are widespread and are either behaviours or factors influenced by behaviours.

No attempt has been made to put the risk factors into a broader psychosocial or socioeconomic perspective, although these latter determinants strongly influence the behavioural and biomedical pathways for most of the risk factors (Berkman & Kawachi 2000).

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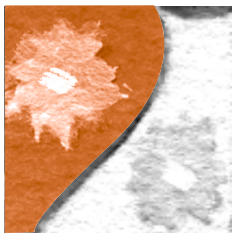
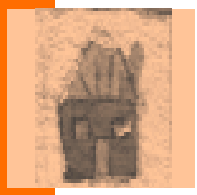




Chronic diseases

Coronary heart disease
Stroke
Lung cancer
Colorectal cancer
Depression
Diabetes
Asthma
Chronic obstructive pulmonary disease
Chronic renal disease
Oral diseases
Arthritis
Osteoporosis

Chapter 2

2 Chronic diseases

This chapter provides brief statistical overviews of 12 chronic diseases and conditions that have a large impact on the health and quality of life of Australians. The diseases and conditions selected for this baseline report are:

- coronary heart disease
- stroke
- lung cancer
- colorectal cancer
- depression
- diabetes
- asthma
- chronic obstructive pulmonary disease
- chronic renal disease
- oral diseases
- arthritis
- osteoporosis.

The choice of chronic diseases was determined by the following criteria:

- They show features typical of chronic diseases in their development or clinical course.
- They make up a major part of the burden of chronic diseases.
- As a group, they are strongly influenced by a limited number of risk factors.
- Those risk factors are all modifiable at the population and individual level and offer major prospects for prevention.

The overviews cover disease incidence and prevalence, risk factors (both causal or contributory to their development and continuity), associated complications, disability and mortality. Information from several different sources—including disease registers, population surveys, general practitioner visits, hospital separations and death certificates—has been compiled to generate a statistical profile of each disease. The impact of various diseases in terms of the use of health services and other health system costs is also reported.

Since each disease has been presented in a 'stand-alone' fashion, there has been some unavoidable repetition. Also there is limited cross-referencing from the discussion of one disease to another.

Seven of the chronic diseases covered in this report—coronary heart disease, stroke, lung cancer, colorectal cancer, diabetes, asthma and depression—are the focus of action under the National Health Priority Areas initiative. Some of these conditions are also subject to priority attention by various State and Territory Governments.

2.1 Coronary heart disease

Coronary heart disease (CHD), also known as ischaemic heart disease (ICD-9 codes 410–414; ICD-10-AM codes I20–I25), is the largest single cause of premature death in Australia. While mortality from CHD is most common among elderly people, it also affects many in middle age. The morbidity and disability associated with CHD is also considerable.

Description

The two main forms of CHD are heart attack and angina. Both involve an inadequate blood flow (ischaemia) to the heart itself, resulting from blockages in the coronary arteries that supply blood to the heart muscle. A heart attack (often also referred to as acute myocardial infarction) occurs when a coronary artery is suddenly blocked completely by a blood clot. If the flow cannot be restored quickly enough, the heart muscle downstream may begin to die. Angina refers to bouts of chest pain that arise when a diseased coronary artery cannot meet a temporary demand to increase the blood flow to the heart, or can occur with physical exertion or emotion. Heart attacks are often fatal, while angina can cause much disability and those with the condition are at greater risk of heart attack.

One form of angina is known as 'unstable angina'. It usually occurs in someone who already has angina, and is marked by pain occurring at rest or a significant increase in the frequency or severity of attacks. It predicts a greater risk of heart attack than occurs with normal angina.

In both heart attack and angina, the underlying problem is a condition known as atherosclerosis. This refers to abnormal build-ups of fatty and fibre-like substances that form in the inner wall of the artery, narrowing the channel through which the blood flows. An individual build-up of atherosclerosis is known as a plaque. If the plaque ruptures, a blood clot will be formed which may partially or completely block the artery. The process leading to atherosclerosis may start in childhood, but it usually does not develop to the point where associated disease symptoms appear until at least middle age or older.

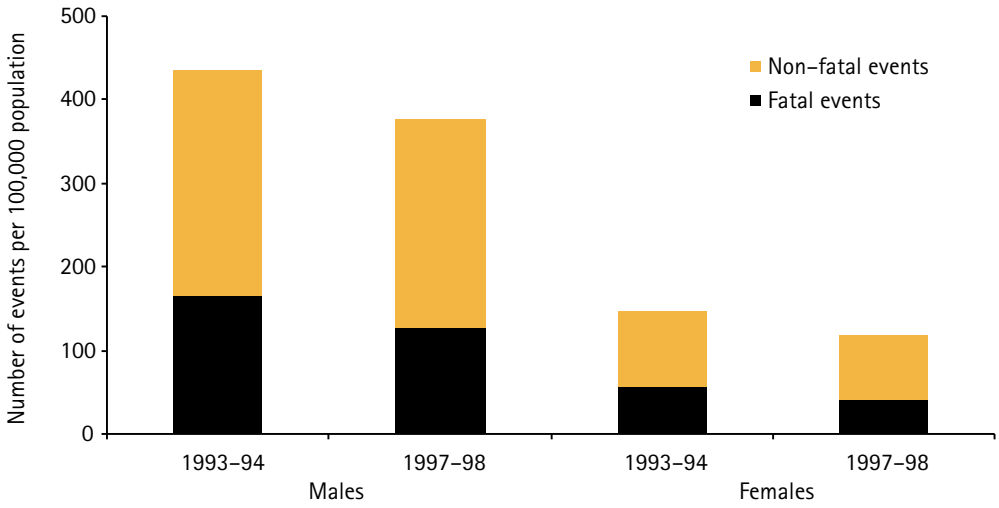
Signs and symptoms

The most common symptom of a heart attack is severe chest pain, but there can also be a sudden and often fatal collapse from a major disturbance in the rhythm of the heartbeat. Before a heart attack, the plaque involved has often not been large enough to limit blood flow, so the person has often had no previous symptoms. Angina, by contrast, is marked by temporary chest pains caused by reduced blood supply to the heart muscle and does not cause permanent damage to the heart muscle.

Disease severity and survival

CHD, in particular heart attack, is highly fatal. Those who survive may continue to have significant morbidity. In 1993–94, about 38% of those aged 35–69 years having a heart attack died within a year. This proportion declined to 34% in 1997–98 (Figure 2.1.1). The likelihood of a heart attack being fatal within a year increases with age, especially for males. Among those aged 65–69, the proportions in 1997–98

Figure 2.1.1: Fatal and non-fatal heart events among those aged 35–69 years, 1993–94 and 1997–98



Source: Based on AIHW National Hospital Morbidity Database and AIHW National Mortality Database.

were 46% for males and 37% for females. Furthermore, the risk of a fatal heart attack is much higher among persons who have previously experienced a heart attack (AIHW 2001:20).

Co-morbidities

Persons with CHD often have or are at increased risk for other vascular conditions (such as stroke or peripheral vascular disease), or diabetes, as these conditions share many of the same risk factors. Depression is also a common problem associated with heart disease, with some studies showing that 10–20% of patients with CHD have depressive symptoms, and 5% may suffer from major depression (DHAC & AIHW 1999:19).

Risk factors

Major risk factors for CHD are listed in Box 2.1.1. Males are much more likely to have CHD than females and for both sexes the risk greatly increases with age. From a behavioural viewpoint, the major preventable risk factors are physical inactivity, poor nutrition, and tobacco smoking. Physical inactivity and poor nutrition, principally a high intake of saturated fats and salt, are expressed through the biomedical factors of high blood pressure, high blood cholesterol and excess body weight.

Box 2.1.1: Risk factors for coronary heart disease

Predisposing factors

Age

Sex

Family history of heart disease

Behavioural factors

Tobacco smoking

Physical inactivity

Alcohol misuse

Poor nutrition

Biomedical factors

High blood pressure

High blood cholesterol

Excess body weight

Source: AIHW 2001:20.

In addition to the risk factors shown in Box 2.1.1, diabetes is recognised as a contributing factor in the development of atherosclerosis, and therefore is a major risk factor for CHD.

Because many factors contribute to CHD, it is difficult to precisely quantify their specific contribution. However, estimates can be made of the population impact of each risk factor, based on how many people have the factor and how much the factor increases the risk of disease or death for an individual. These estimates (also called attributable fractions) suggest that in Australia the preventable risk factors that contribute to the greatest number of deaths from CHD are high blood pressure, physical inactivity, and high blood cholesterol (Table 2.1.1).

Table 2.1.1: Coronary heart disease deaths attributable to various risk factors, 1996

Risk factors	Attributable proportion of deaths (%)
High blood pressure	24
Physical inactivity	21
High blood cholesterol	20
Tobacco smoking	8
Excess body weight	7

Source: AIHW: Mathers et al. 1999:101–31.

Impacts

Deaths

CHD accounted for 28,103 deaths (22% of all deaths) in Australia in 1998. Death rates for CHD in Australia peaked in 1968 for males at nearly 500 deaths per 100,000 and for females at 250 per 100,000 (Figure 2.1.2). These rates have declined by about 65% since then, to 173 and 94 per 100,000 for males and females respectively in 1998. The fall in death rates was initially due to lower heart attack rates but, more recently, improved survival after a heart attack has played an important part. Despite these large declines, CHD is still the leading single cause of death in Australia.

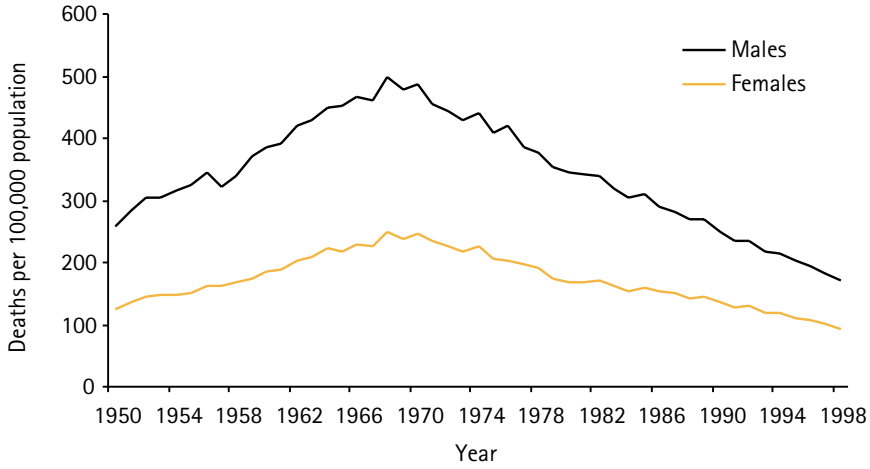
Male CHD death rates in Australia have consistently been nearly twice those of females, a finding common to most affluent Western societies. It is also recognised that socioeconomically disadvantaged groups have higher CHD death rates than those who are better off. Australians (aged 25–64) from the lowest socioeconomic category are twice as likely to die from CHD as those from the highest socioeconomic category (AIHW 2001:22).

CHD death rates increase rapidly from about age 50. The pattern of higher male rates is consistent across all age groups, with the ratio of male to female death rates decreasing with age, from 4.6 at ages 50–54 to 1.2 at ages 85 and above (Figure 2.1.3).

Death rates for CHD are slightly higher in males from rural areas than in those from metropolitan areas. No significant differences in CHD death rates across metropolitan, rural and remote areas of Australia have been noted among females (AIHW 2001:22).

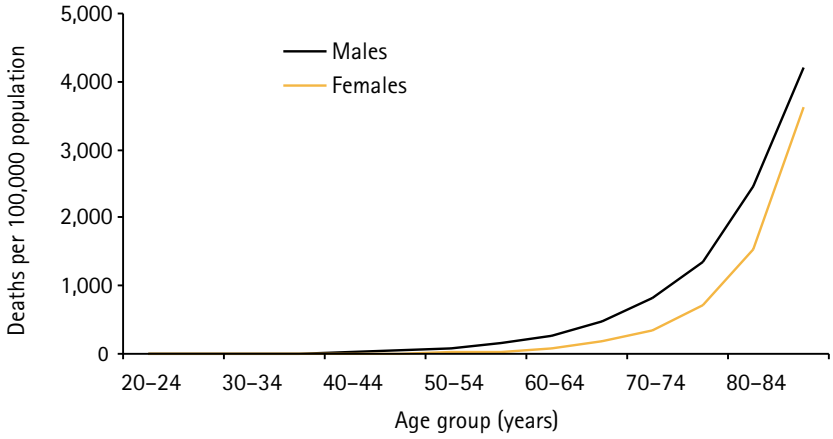
Indigenous Australians have much higher CHD death rates than the rest of the Australian population. In South Australia, Western Australia, and the Northern Territory (the three jurisdictions with adequate Indigenous identification on death certificates), CHD death rates for the Indigenous population in 1996–98 were twice the rates of other Australians in those jurisdictions. The ratios were much higher in the younger age groups. In the 25–64 years age group, the rates for Indigenous males and females were six and eight times the rates for non-Indigenous males and females respectively (AIHW 2001:22).

Figure 2.1.2: Death rates for coronary heart disease, 1950 to 1998



Source: AIHW National Mortality Database.

Figure 2.1.3: Age-specific death rates for coronary heart disease, 1998



Source: AIHW National Mortality Database.

In comparison to other developed countries, CHD death rates in Australia are in the middle range. Australia's rates in 1997 were below those of the United Kingdom, Germany and the United States, but much higher than those of Italy, France and Japan (Figure 2.1.4).

Incidence and prevalence

There are no established national data on the incidence (number of new cases) or prevalence (number of persons with the disease) of CHD. Estimates from the Burden of Disease and Injury Study (AIHW: Mathers et al. 1999:208) indicate that the prevalence of angina was close to 1% of the population in 1996.

The lifetime risk for CHD is considerable. For a 40-year-old, the risk of having CHD at some time in future life is 1 in 2 for males and 1 in 3 for females (AIHW 2001:23).

Complications

There can be a range of complications from CHD that immediately or more gradually affect the heart's ability to pump blood or that can cause further pain. This can be due to disturbed heart rhythm, to weakening of damaged heart muscle, or to residual artery blockage. In some cases, a heart attack may damage the heart muscle so severely that the heart cannot pump blood around the body well enough, a condition known as heart failure.

Disability

According to the 1998 ABS Survey of Disability, Ageing and Carers, nearly 8,000 people, all aged 45 and over, reported that they had a disability due to a heart attack. This figure translates to a rate of 126 per 100,000 persons in that age group.

Use of health services

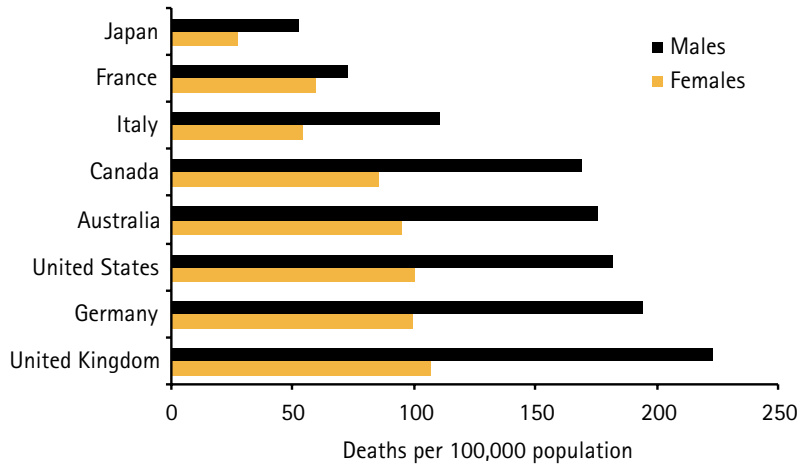
In 1999–00, there were 157,913 hospitalisations for CHD. Males accounted for 65% of these. The hospital separation rate for CHD increased with age, from 799 per 100,000 males aged 35–54 to 5,859 per 100,000 for males over 75. Comparable rates for females were 227 and 3,615.

Just over 1% of problems managed by general practitioners (GPs) in 1999–00 were CHD-related; a further 1% were for cardiac check-up. This equates to abut 1.6 million GP encounters for CHD yearly (AIHW: Senes & Britt 2001:xi).

Several risk factors for CHD were also among the major problems managed by GPs, including high blood pressure (5.7% of problems) and high blood cholesterol (1.8% of problems) (AIHW: Britt et al. 2000:35–6). While high blood pressure remained the most common problem managed by GPs, the rate per 100 encounters has declined slightly over the past 10 years. In contrast, the management rate for blood cholesterol has increased, probably because of raised awareness both among GPs and the public of the need to monitor and control cholesterol levels (AIHW 2000:57).

In 1993–94, CHD accounted for an estimated $894 million (3%) of total direct health system costs, or $50 per person. Hospital costs

Figure 2.1.4: International comparison of death rates for coronary heart disease, 1997



Note: Rates standardised to the total 1980 OECD population.

Source: OECD 2001.

accounted for about 64% of this amount, pharmaceuticals and nursing homes for about 12% each, and medical services (general practitioners and specialists) for 10%. Per capita costs were higher for males than for females, and increased sharply with age (AIHW: Mathers & Penm 1999:7, 11).

Management

There are several aspects to the management of CHD, both in acute (heart attack) and chronic (angina) situations.

A heart attack is a life-threatening emergency and must receive immediate treatment. Some techniques used to manage heart attack are outlined in Box 2.1.2. Cardio-pulmonary resuscitation (CPR) can be performed by bystanders if the person suffering a heart attack is unconscious and has no detectable pulse. Most ambulances have defibrillators. Management in hospital aims to remove the blockage in the coronary artery and restore blood flow to the threatened muscle as soon as possible, through thrombolytic ('clot-busting') drugs, coronary artery bypass grafting, or coronary angioplasty.

Box 2.1.2: Emergency management for heart attack

Cardio-pulmonary resuscitation (CPR): *external chest compression to maintain blood circulation in a person who has collapsed and has no detectable pulse.*

Defibrillator: *a machine that delivers external electric shocks to the chest to restore normal pumping action of the heart.*

Thrombolytic drugs: *administered to dissolve the clot in the coronary artery.*

Coronary bypass grafting and angioplasty: *see Box 2.1.3.*

In its most common form, angina is not an emergency, although it may at first be treated as one until it is distinguished from a heart attack. Once angina is diagnosed, the initial treatment will be with drugs to reduce the severity and frequency of attacks, along with counselling and treatment for risk factors. People with angina often undergo procedures such as coronary bypass surgery and angioplasty, described on the next page. Unstable angina, however, needs to be treated as an emergency.

A number of procedures have been developed in recent years to treat CHD, and their use in Australia has increased steadily (Box 2.1.3). In 1998, coronary angioplasty (18,094 procedures) replaced coronary artery bypass grafting (17,448 operations) as the most common procedure. The use of stents is also becoming a routine procedure, with stents being inserted in 82% of all coronary angioplasty procedures in 1998 (AIHW 2001:74).

Cardiac rehabilitation aims to maximise physical, psychological and social functioning to enable patients to live productively and with confidence, and to assist and encourage behaviours that are likely to minimise the risk of further heart attacks (AIHW 2001:77). Such measures include dietary changes, increased exercise, weight control, and cessation of smoking (Newschaffer et al. 1998:310).

Prevention and screening

Despite the declines in death rates for CHD in the past three decades, considerable potential remains for reducing both the incidence of and mortality from CHD. Key factors for further reductions include lowering the levels of excess body weight, reducing dietary fat and salt intake, and increasing levels of physical activity in the general population. For individuals at risk, reductions in tobacco smoking and high blood pressure are also important strategies (DHAC & AIHW 1999:83).

Box 2.1.3: Procedures for treating coronary heart disease

Coronary artery bypass grafting: *blood vessel grafts used to bypass blockages in the coronary arteries to restore adequate blood supply to the heart muscle; less invasive techniques for performing the procedure are being introduced.*

Coronary angioplasty: *inserting a catheter with a balloon into a major artery via the skin and threading it to the area of coronary blockage; the balloon is then inflated to create a wider passage for blood flow.*

Coronary stenting: *placing a metal mesh tube within the artery to form a supporting structure to hold the artery open at a point previously narrowed.*

Source: AIHW 2001:74; AIHW: Davies and Senes 2001: 1.

Models have been developed to estimate the possible reductions in coronary events and deaths that could be achieved by (a) partial improvements in national levels of blood cholesterol, blood pressure, tobacco smoking, and physical activity, and (b) more extensive use of medical and surgical treatment and optimal acute treatment of people with a heart attack. Applying these models to the Australian population aged 35–79 suggests that 38% of coronary events and 41% of deaths could be prevented with these improvements (DHAC & AIHW 1999:86–9).

The National Health and Medical Research Council (NHMRC) has published guidelines for prevention of CHD (NHMRC 1997). Although these guidelines do not recommend that healthy people should be routinely screened for CHD (e.g. given exercise stress or electrocardiogram tests), they do suggest that attention should be given to preventable risk factors, including smoking, high blood pressure, obesity, lack of exercise, diabetes, and high blood cholesterol. Another recommendation is for general practitioners to consider low dose aspirin therapy for the prevention of CHD in males aged 50 and over.

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2.2 Stroke

Stroke (ICD-9 codes 430–438; ICD-10-AM codes G45, G46, I60–I69) includes a group of diseases that affect the arteries supplying blood to the brain. Stroke is also known as 'cerebrovascular disease'. It is the second leading cause of death in Australia, a large contributor to disability, and places a heavy burden on family members and care providers.

Description

Stroke can take a number of forms (see Box 2.2.1). Ischaemic and haemorrhagic strokes are much more severe than transient ischaemic attacks. Of the former, about 85% are ischaemic or 'blockage' strokes, and 15% are haemorrhagic or 'bleeding' strokes. Both ischaemic and haemorrhagic strokes can damage part of the brain, resulting in the impairment of a range of functions, especially movement of body parts and communication (AIHW 2001:24). Transient ischaemic attacks are a risk factor for an impending, more permanent, stroke event, and individuals who experience these should seek immediate medical advice for preventive steps.

The principal cause of ischaemic stroke (as with many vascular and heart diseases) is atherosclerosis, the partial or complete blocking of arteries due to abnormal build up of fatty and fibre-like substances on the inner surface of the artery wall, with further blockage by clots formed around such build-ups. These clots may form in vessels of the neck (or less commonly in the heart) and move to the brain, or less often may form in the brain itself.

Box 2.2.1: Types of stroke

Ischaemic stroke: *when an artery supplying blood to a part of the brain suddenly becomes blocked.*

Haemorrhagic stroke: *when an artery supplying blood to a part of the brain suddenly bleeds.*

Transient ischaemic attack: *a 'mini stroke' resulting from a temporary reduction of blood supply to part of the brain; over 75% are believed to last less than 5 minutes, but by definition they can last up to an hour.*

Source: Newschaffer et al. 1999:315–6.

Disease severity

Death and disability are two common outcomes of stroke due to a severe lack of oxygen in areas of the brain and the resulting death of affected brain cells. Death can occur very soon after the stroke; about one-quarter of all people who have a stroke die within a month and one-third within a year. A further one-third are permanently disabled, with some degree of paralysis, difficulty with speech, or a range of other problems that may affect their quality of life and their ability to function in society (AIHW 2001:24, 27). Some patients, particularly those with 'transient' attacks, recover within 24 hours. However, transient strokes are a major risk factor for disabling stroke, with a 13-fold increase in risk of such a stroke in the following year (Allen & Lueck 1999:974).

Co-morbidities

Persons who have suffered a stroke are often predisposed to other vascular diseases such as coronary heart disease (CHD) and peripheral vascular disease. This is because these diseases have similar underlying disease processes and risk factors. Persons with diabetes are more prone to stroke as high sugar levels increase the effect of elevated blood pressure (DHAC & AIHW 1999:18).

Risk factors

The risk of stroke increases significantly with age. Males have a slightly higher risk of stroke than females. Because of the common underlying condition of atherosclerosis, stroke has many risk factors in common with CHD (Box 2.2.2). These include high blood pressure, physical inactivity, tobacco smoking and high blood cholesterol. Some risk factors, such as atrial fibrillation and transient ischaemic attack, are specific to stroke. The use of oral contraceptives has also been linked to a higher risk for stroke in females (Allen & Lueck 1999:982).

While some risk factors contribute more to a particular type of stroke, high blood pressure is considered to be the major risk factor for all types. The risk of stroke increases rapidly as diastolic blood pressure increases, with an increase of 7.5 mmHg doubling the risk (Newschaffer et al. 1999:319).

Box 2.2.2: Risk factors for stroke

Predisposing factors

Age
Sex
Family history of stroke

Biomedical factors

High blood pressure
High blood cholesterol
Atrial fibrillation
Transient ischaemic attack

Behavioural factors

Tobacco smoking
Alcohol misuse
Excess body weight
Physical inactivity
Poor diet and nutrition

Source: DHAC & AIHW 1999:14.

Estimates of the population impact of the various risk factors, based on how many people have the factor and how much the factor increases the risk for the person affected, indicate that about one-third of stroke deaths are attributable to high blood pressure (Table 2.2.1). Physical inactivity is also a major risk factor.

Table 2.2.1: Stroke deaths attributable to various risk factors, 1996

Risk factor	Attributable proportion of deaths (%)
High blood pressure	34
Physical inactivity	22
Tobacco smoking	6
Excess alcohol consumption	5
Excess weight	3

Source: AIHW: Mathers et al. 1999:101–31.

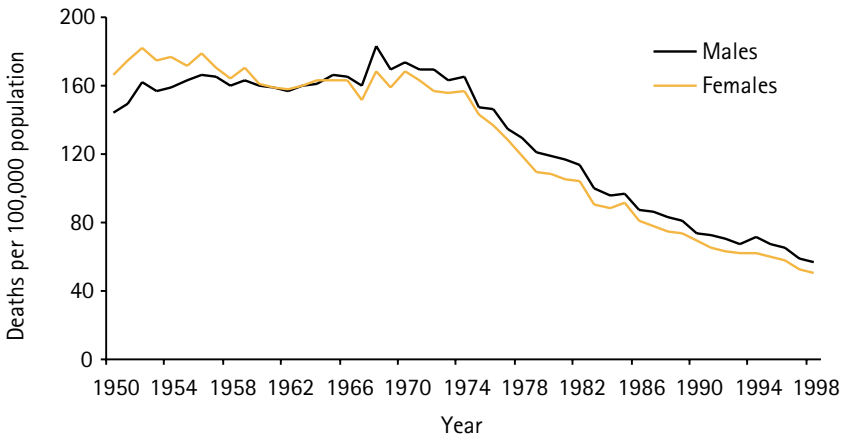
Impacts

Deaths

Stroke claimed 12,613 lives in 1998, representing more than 9% of all deaths. The death rates were 59 per 100,000 males and 54 per 100,000 females. These rates are less than one-third the prevailing rates three decades earlier, reflecting a progressive decline over that period (Figure 2.2.1).

The declines in stroke death rates are similar to those for CHD. Unlike CHD, there is much less difference in the rates between the sexes. The stroke death rate for males has consistently been about 10% higher than the rate for females since about 1978, while for CHD the male rate has always been about double the female rate.

Figure 2.2.1: Death rates for stroke, 1950 to 1998



Source: AIHW National Mortality Database.

Death rates for stroke rise steeply after age 60, doubling for each increasing 5-year age group (Figure 2.2.2). The rate for males is generally higher than that for females, except in the oldest age group of 85 and over, with the female rate (2,340 per 100,000) being 13% higher than the male rate (2,067 per 100,000). The lower rate for females notwithstanding, the number of female deaths from stroke is greater than the number of male deaths (7,170 compared to 4,812 in 1998). This is due to the greater number of women who survive into old age, where deaths from stroke are much higher (AIHW 2001:24).

There are considerable differences in stroke death rates among population groups in Australia. In 1997, people (aged 25–64) from the most socioeconomically disadvantaged category were almost twice as likely to die from stroke as those in the least disadvantaged category. Similarly, Indigenous Australians in 1996–98 had stroke death rates twice the rate of non-Indigenous Australians. At ages 25–64, the Indigenous male death rate was seven times that of non-Indigenous males, and for females the ratio was eight times (AIHW 2001:26).

Australia's stroke death rates in 1997 were well below those in Japan, Germany, Italy and the United Kingdom, but above those in France, Canada and the USA (Figure 2.2.3).

Incidence and prevalence

It has been estimated that each year around 40,000 Australians have a stroke, with 73% of these being first-ever strokes. The 1995 ABS National Health Survey estimated that 116,500 Australians, or 0.6% of the total population, had ever had a stroke (AIHW 2001:24).

The incidence rates for stroke have been estimated to be 2.9 per 1,000 for males and 3.3 per 1,000 for females, with corresponding prevalence rates of 7.4 per 1,000 and 5.9 per 1,000 (AIHW: Mathers et al. 1999).

Complications

Depending on the severity of the stroke, there may be numerous complications. These include pneumonia, dehydration, seizures, deep vein thrombosis, frozen shoulder, pressure sores, urinary infection and constipation. Stroke patients often require careful nursing care to avoid or mitigate these, especially when they are unconscious or bed-ridden for long periods (Allen & Lueck 1999:982).

People with stroke are more prone to have emotional problems, particularly post-stroke depressive disorders, which may be severe and lengthy if untreated (DHAC & AIHW 1999:19).

Disability

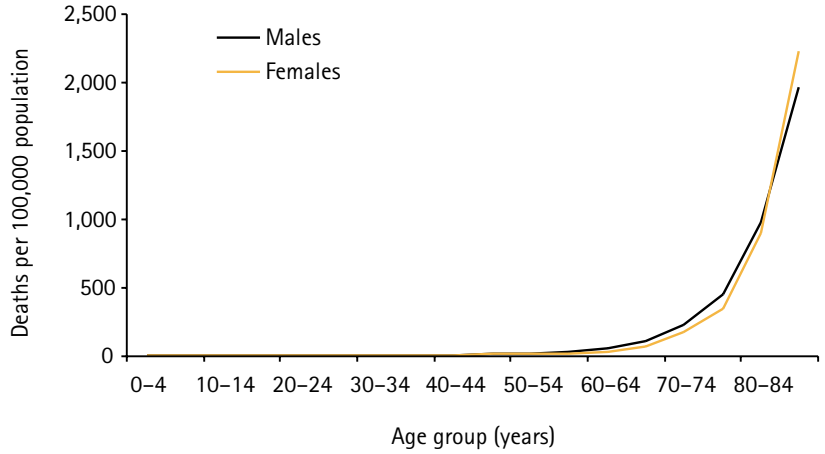
Stroke is a major cause of disability. In 1998, more than 63,500 Australians, or 0.3% of the total population, were classified as disabled with stroke as the primary cause of their disability.

The rate for the population aged 45 and over was nearly 1% and for the population aged 85 and over almost 6% (1998 ABS Survey of Disability, Ageing and Carers, unpublished data). Over 75% of stroke sufferers with a disability need assistance with self-care, mobility or communication (AIHW 2001:24).

Use of health services

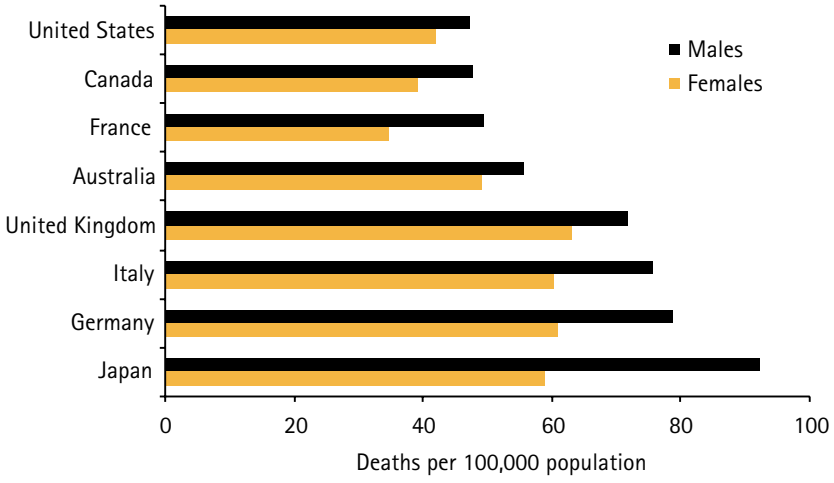
In 1999–00, there were 52,843 hospitalisations for stroke, accounting for 0.9% of all

Figure 2.2.2: Age-specific death rates for stroke, 1998



Source: AIHW National Mortality Database.

Figure 2.2.3: International comparison of death rates for stroke, 1997



Note: Rates standardised to the total 1980 OECD population.

Source: OECD 2001.

separations. Hospital use for stroke increases rapidly with age, with the rate exceeding 2,600 per 100,000 persons aged 75 and over.

Stroke is one of the main reasons for service usage in hospitals. Over 2% of hospital beds on average are occupied by a person hospitalised for stroke (AIHW 2001:24–5). In 1999–00, there were 512,264 bed days for stroke. The average length of stay for stroke was 9.7 days.

Limited information is available regarding primary care for stroke. Several disorders that are major risk factors for stroke and other vascular and heart diseases, including high blood pressure, are among the most frequently managed problems by general practitioners (AIHW 2000:57).

In 1993–94, stroke accounted for $630 million (2%) of total direct health system costs. Hospital and nursing home costs each accounted for about 45% of this amount, medical services (general practitioners and specialists) for 5%, and pharmaceuticals for another 2% (AIHW: Mathers & Penm 1999:7).

Management

There is increased emphasis on the need to provide urgent medical attention to commence appropriate treatment for stroke, which reduces the chances of complications and improves the likelihood of better outcomes.

The management of stroke patients is influenced by the cause, type and severity of the stroke. Most non-transient cases require most or all of the elements of stroke management described in Box 2.2.3. Accurate diagnosis is essential to distinguish between ischaemic and haemorrhagic stroke, as anti-clotting agents are routinely used for treating the former, but may be hazardous for the latter (Ebrahim & Harwood 1999:59).

Box 2.2.3: Elements in the management of stroke

Diagnosis: *computerised tomography (CT) scanning of the brain is used in most patients suspected of suffering a stroke; its main role is to confirm a stroke and distinguish between the various stroke types.*

Dedicated stroke units: *provide a coordinated approach to the management of stroke, with staffing by a multidisciplinary team of experts.*

Drugs: *to date, the only anti-clotting agent proven to be effective in acute management is aspirin.*

Surgery: *when swelling compresses the brain stem due to cerebral haemorrhage or blockage, surgery can be a life-saving treatment; the relative risks and benefits of surgery for other haemorrhages in the brain remain uncertain.*

Source: DHAC & AIHW 1999:59–61.

Aspirin is the only anti-clotting agent proven to be effective for acute stroke. Thrombolysis (treatment by clot-dissolving drugs) is being used in the USA, but is still regarded as experimental in Australia and other countries. Nerve-protecting therapies to prevent death of brain cells following stroke are also being assessed, but to date no clear proof of benefit has been found (DHAC & AIHW 1999:60–1).

There is some evidence that management in special stroke units improves the outcome from stroke, with one study reporting reductions in the risk of death and dependency after stroke of about 29%. In 1998, there were 20 stroke units in Australia, managing about 25% of the total stroke burden (DHAC & AIHW 1999).

Persons who have survived a stroke are at high risk of having another, and thus need a program of secondary prevention. Most important are blood pressure reduction and smoking cessation, with due attention also

being given to other factors mentioned in Box 2.2.2 where they apply. Regular use of drugs such as aspirin and warfarin are helpful in many cases. Surgery may also be recommended in patients with severe carotid stenosis (internal haemorrhage of a neck artery that supplies the brain) (DHAC & AIHW 1999).

Rehabilitation is an integral part of the immediate and long-term care of those who have had a stroke. The process of rehabilitation requires the active participation of the person with stroke and of family members and other supporters. A multi-disciplinary team approach is used, involving doctors, nurses, physiotherapists, occupational therapists, speech pathologists, and neuropsychologists (AIHW 2001:78).

Prevention

The greatest reduction of stroke burden may be achieved by control of modifiable risk factors. Small reductions in diastolic blood pressure (reductions of as little as 5 mmHg) are associated with significant reductions in the incidence of both fatal and non-fatal strokes. Smoking cessation also reduces the risk of stroke. Within the first 5 years of quitting, the risk for quitters approaches those of people who never smoked (Newschaffer et al. 1999:320).

The National Health and Medical Research Council (NHMRC) has produced guidelines for preventing stroke (NHMRC 1997). The most effective prevention is to encourage lifestyle measures to control blood pressure and reduce smoking, along with regular checks of blood pressure in the general population, with treatment where necessary.

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2.3 Lung cancer

Lung cancer (ICD-9 code 162; ICD-10-AM codes C33, C34) is a chronic disease with a high burden of mortality, morbidity and associated costs. It is a major cause of death in Australia, accounting for about 7,000 deaths annually (approximately 5% of all deaths). The prognosis for persons with lung cancer is usually poor and only a small proportion survive beyond 1 year.

Description

Lung cancer is an aggressive form of cancer originating in the trachea, windpipe and lung. There are often no symptoms until the cancer has progressed to the point where treatment is unlikely to be successful. The typical symptoms of lung cancer are blood-stained sputum or a new or changed cough, but can take many other forms (Crompton et al. 1999:359).

Lung cancer is often diagnosed after complaint of other conditions such as persistent coughs, pneumonia or bronchitis. It is confirmed by chest x-rays, analysis of cells in the sputum, imaging tests to detect cancerous growth, or by a tube passed down into the lungs to examine and sample any growth.

Disease severity and survival

Most people diagnosed with lung cancer will die of it. It has low cure rates and a short survival time, with the worldwide annual survival rate estimated to be just 14% (Presant & Kaiserman 2000:24).

The mortality to incidence ratio (MIR), which can be used as a proxy measure of the likelihood of survival from cancer, is 0.88 for persons with lung cancer in Australia. The ratio is much greater than that for most other cancers including melanoma (0.12), breast cancer (0.24) and colorectal cancer (0.41) (Figure 2.3.1).

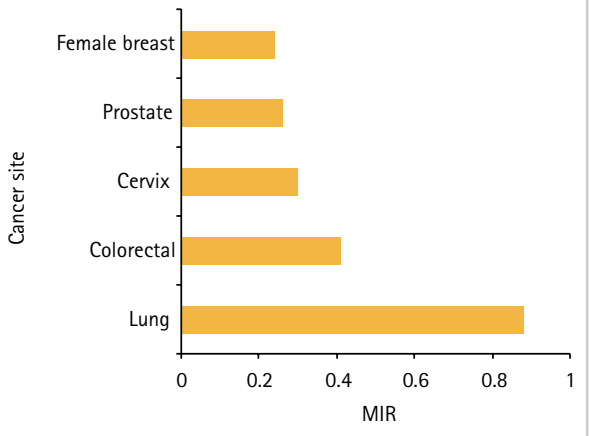
Risk factors

There are several, well-known risk factors for lung cancer (see Box 2.3.1), the foremost among these being tobacco smoking. There is an overwhelming body of evidence implicating tobacco smoking as the major cause of lung cancer (Rothenberg et al. 1987)—tobacco smoke contains approximately 60 known or suspected cancer causing chemicals (NHMRC 1997).

In 1996, smoking was estimated to be responsible for approximately 92% of lung cancer cases in Australia (AIHW: Mathers et al. 1999:106). A lifetime smoker has a relative risk of developing lung cancer some 20–30 times that of a non-smoker (WCRF & AICR 1997).

Exposure to environmental tobacco smoke is also a risk factor for lung cancer. An analysis of 34 studies has ascertained an increased risk of about 30% in never-smokers who live

Figure 2.3.1: Mortality to incidence ratio (MIR) for selected cancers, 1998



Source: AIHW National Cancer Statistics Clearing House.

with a smoker, compared with never-smokers living with a non-smoker (NHMRC 1997).

Both asbestos (a fibrous, incombustible mineral, commonly used at one time as a building material) and radon (a naturally occurring radioactive gas released when uranium decays in the soil) increase the risk of lung cancer, but are minor contributors when compared to tobacco smoking.

The risk for developing lung cancer increases with age. This is partly due to the accumulation of random genetic mutations with age and the failure of the DNA repair mechanisms. Age can also be a proxy for the length of time spent as a smoker and exposure to tobacco. The risk is higher in males, reflecting their higher levels of tobacco smoking and exposure to environmental tobacco smoke.

Box 2.3.1: Risk factors for lung cancer

Tobacco smoking
Environmental tobacco smoke
Exposure to asbestos or radon
Age
Sex

Source: WCRF & AICR 1997; Schairer & Schoniger 2001.

Impacts

Deaths

Lung cancer is the third-largest cause of death overall in Australia, surpassed only by deaths from coronary heart disease and stroke. In 1998, there were 6,893 deaths from lung cancer (4,817 males, 2,076 females), a death rate of 34 per 100,000 population.

Death rates for lung cancer increase dramatically with age (Figure 2.3.2), and are greatest in males aged 80 and above (472 per 100,000) and females aged 80–84 (140 per 100,000). These patterns may represent lifetime exposure to cancer-causing agents in tobacco.

Lung cancer death rates in Australia are declining overall. The decline is mainly due to reduction in death rate among males, which has declined from 66 per 100,000 in 1978 to 53 in 1998 (Figure 2.3.3). In contrast, the lung cancer death rate among females is on the increase (from 12 per 100,000 in 1978 to 19 per 100,000 in 1998).

Trends in lung cancer death rates largely reflect smoking trends, with a time lapse of about 20 years (AIHW: de Looper & Bhatia 2001). As overall tobacco consumption has declined, mortality from lung cancer has followed. For example, the male smoking rate started to fall decades ago and the benefits have had time to flow through. For females, the fall in smoking has been too recent to show this benefit and the female lung cancer death rate is still rising (Figure 2.3.3).

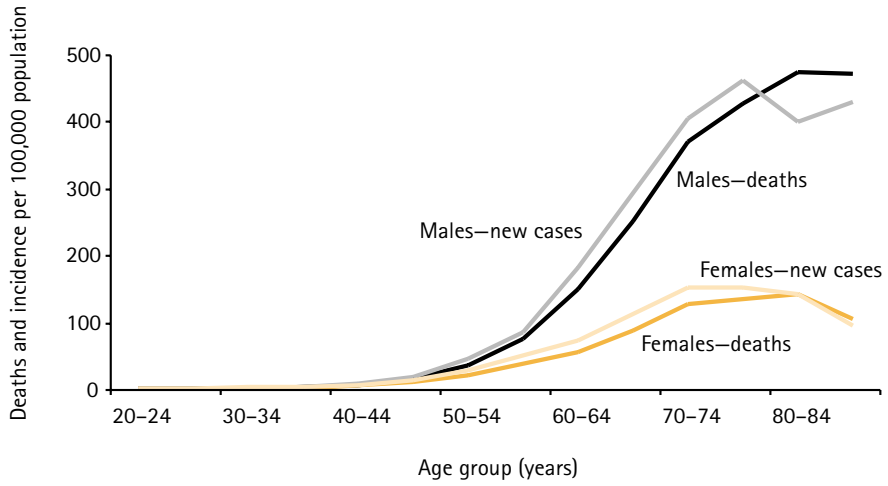
Lung cancer mortality patterns vary internationally. Australian males have relatively lower death rates for lung cancer, whereas Australian females show a slightly higher ranking in comparison to other countries (Figure 2.3.4).

Incidence

Lung cancer is the fifth most commonly diagnosed cancer in Australia after colorectal, breast and prostate cancers, and melanoma. There were 7,795 new cases in 1998, with an incidence rate of 39 per 100,000.

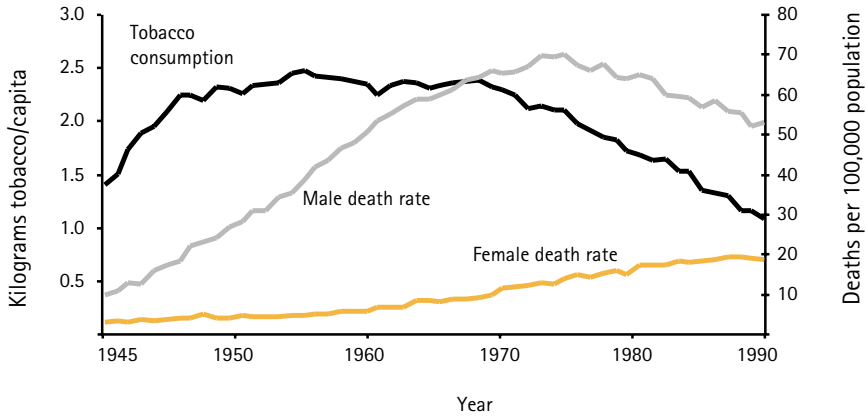
New cases of lung cancer currently occur in males at twice the rate among females: 58 per 100,000 compared to 23 per 100,000 in 1998. There were 5,307 new cases diagnosed in males, accounting for 12% of all new cancer cases in males. In females, 7% of all new cancer cases were lung cancers (2,488 new cases).

Figure 2.3.2: Age-specific incidence and death rates for lung cancer, 1998



Sources: AIHW & AACR 2000; AIHW National Mortality Database.

Figure 2.3.3: Per capita consumption of tobacco and death rates for lung cancer, 1945 to 1998



Source: AIHW: de Looper & Bhatia 2001.

Lung cancer incidence increases with age (Figure 2.3.2), with the highest incidence occurring in those aged 75–79. In 1998, new cases peaked at 460 per 100,000 in 75–79 year old males and 152 per 100,000 in 75–79 year old females. These patterns are similar to those found for lung cancer deaths, reflecting the short survival time for persons with lung cancer.

Since the early 1980s, there has been a steady decline in lung cancer incidence in males, while in females it has increased (Figure 2.3.5). These trends are also reflected in death rates for lung cancer over time (see Figure 2.3.3).

Jurisdictional and inter-population variation

Incidence and mortality

Lung cancer is disproportionately high in the Northern Territory and among Indigenous Australians.

The incidence of lung cancer is highest in the Northern Territory (80 per 100,000 males, 42 per 100,000 females in 1994–98). Lowest incidence rates are reported for males in the Australian Capital Territory (42 per 100,000) and for females in South Australia (22 per 100,000). The much higher incidence of lung cancer among Indigenous Australians is a large contributor to the higher rates in the Northern Territory. Lung cancer is reported as being among the top four most common cancers in both Indigenous males and females (ABS & AIHW 2001:95).

Death rates for lung cancer are also high in the Northern Territory, affected again by the high lung cancer mortality among Indigenous persons. Indigenous lung cancer deaths occur at a rate greater than expected, based on all-Australian rates, in all age groups above 35 (ABS & AIHW 2001:119).

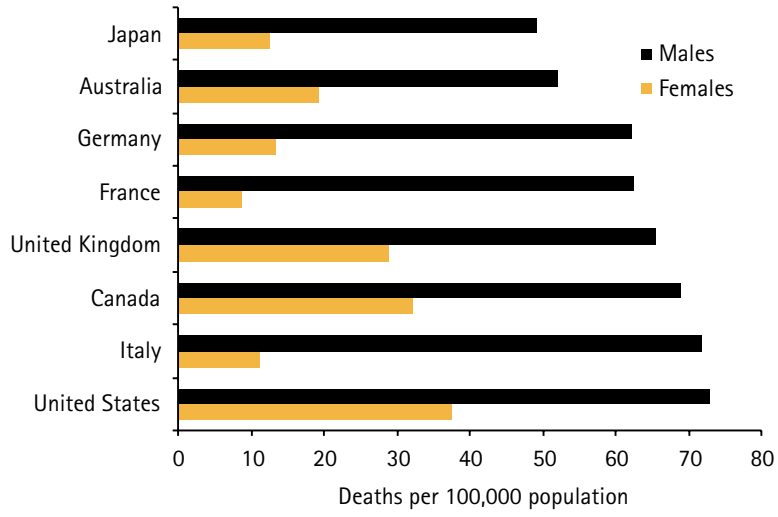
Disability

The burden of lung cancer is high, not only for the person with the disease but also for the family, community and the population. Many persons diagnosed with lung cancer will have disabilities. Secondary tumours and pneumonia are common in persons with lung cancer. Late in the disease, they may experience fatigue, loss of weight, extreme shortness of breath, hoarseness, difficulty in swallowing and accumulation of fluid in the chest cavity.

Use of health services

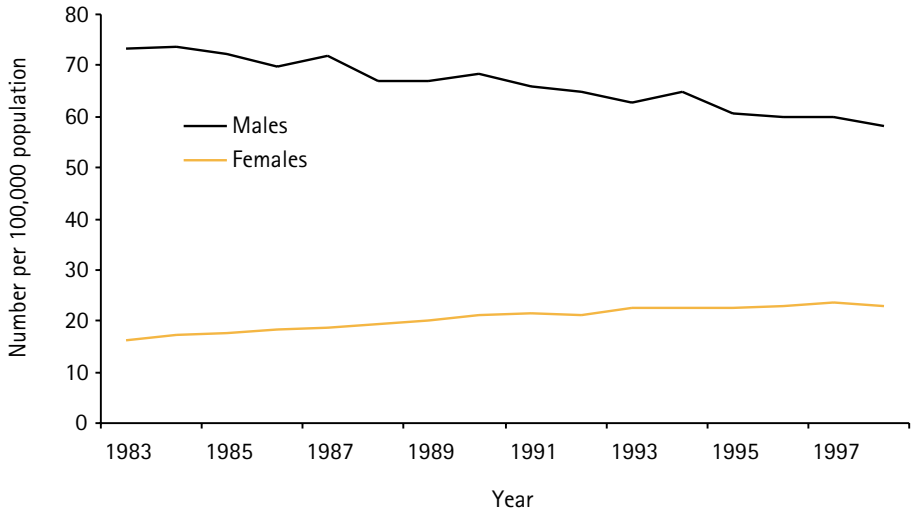
There were 16,783 hospital separations recorded for lung cancer in 1999–00 (11,153 for males and 5,630 for females), accounting for 127,409 patient days. The average length of stay for cancers of the trachea in 1999–00 was 5.1 days, whereas cancers of the bronchus and lung had an average length of stay of 7.6 days. One-fifth of lung cancer separations were same-day separations.

Figure 2.3.4: International comparison of death rates for lung cancer, 1997



Note: Rates standardised to the total 1980 OECD population.
Source: OECD 2001.

Figure 2.3.5: Incidence of lung cancer, 1983 to 1998



Source: AIHW National Cancer Statistics Clearing House.

In 1993–94, lung cancer ranked as the fifth largest contributor to direct cancer costs ($107 million). Hospital costs accounted for 76% of the cost ($81 million), medical costs were $7 million, and other costs, including pharmaceuticals and nursing home costs, contributed the remaining $19 million (AIHW: Mathers et al. 1998).

Treatment and management

Treatment options for lung cancer focus primarily on surgery, radiotherapy (x-ray treatment) and chemotherapy. If the cancer is small enough to be removed entirely and not invading vital or surrounding organs, surgery may lead to remission; however, only a small proportion of cases are considered amenable to 'curative' treatment (Crompton et al. 1999). Otherwise, radiotherapy and/or chemotherapy are the recommended treatments to 'kill' the cancer cells. Palliative care, which offers relief from pain and discomfort but does not cure the illness, is the typical form of management for lung cancer.

Prevention

Prevention of lung cancer depends primarily on reducing tobacco smoking in the population. Current prevention programs incorporate health education, price disincentives, bans on tobacco promotion and advertising, legislative changes, and restriction of tobacco sales to minors. Restrictions on tobacco smoking in public places, public transport, health care facilities and workplaces are also being increasingly imposed.

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2.4 Colorectal cancer

Colorectal cancer (CRC) (ICD-9 codes 153 and 154; ICD-10-AM codes C18–C21) is a major cause of death, illness and disability. CRC comprises cancers of the colon and rectum, the two main sections of the large bowel. It is the most commonly diagnosed cancer in Australia, after skin cancers.

A large proportion of CRC cases are preventable given its association with modifiable risk factors such as poor diet and physical inactivity. This proportion may be as high as 66–75% (WCRF & AICR 1997). Also, if detected in its earlier stages, CRC is highly manageable and treatable.

Description

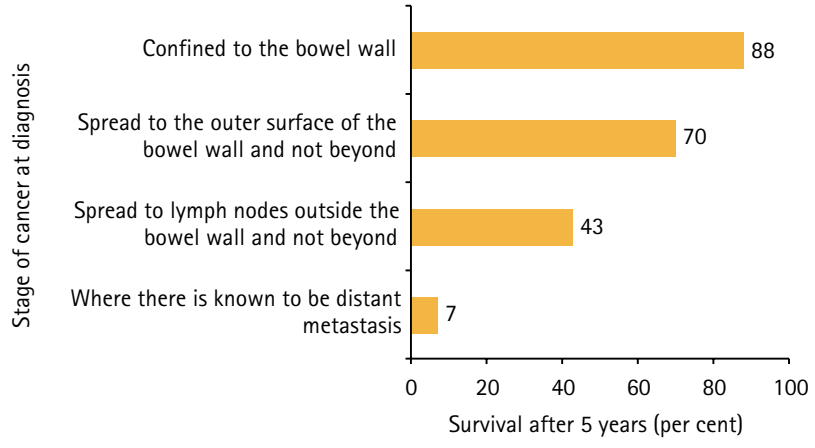
CRC typically develops from abnormal growths, known as polyps, that form on the internal lining of the colon and rectum. These polyps are usually harmless but some types can become cancerous and therefore capable of invading other tissues and spreading.

Symptoms of CRC can include blood in the faeces, anaemia, changes in bowel habits, general stomach discomfort and unaccountable weight loss (NHMRC 2000). The cancer may be detected in those with symptoms or via screening tests for people without symptoms. Tests include blood detection in faeces or examining cells of the bowel. The clinical diagnosis of CRC is made through study and examination of the tissue and cells of suspected cancerous polyps.

Disease severity and survival

CRC is a serious form of cancer. Survival for those diagnosed with CRC varies widely, depending largely on the extent of cancer development at diagnosis. The outcome for individuals diagnosed with CRC in its earliest stages is good. Currently, over 80% of those whose cancer is detected while still confined to the bowel wall are alive 5 years after treatment (NHMRC 2000). This contrasts with a survival of approximately 7% for those whose cancer at diagnosis has spread to distant parts of the body (see Figure 2.4.1). Overall, in 1992–1997, 5-year relative survival from cancer of the colon was 58%. For cancer of the rectum, the 5-year relative survival was 57% for males and 61% for females (AIHW & AACR 2001).

Figure 2.4.1: Five-year survival ratios for colorectal cancer



Source: NHMRC 2000:8.

Risk factors

Factors that may play a significant role in increasing risk of CRC include heredity, a personal or family history of CRC or polyps, poor diet, physical inactivity and excess weight (Box 2.4.1).

Box 2.4.1: Risk factors for CRC

Predisposing factors

Heredity

Personal or family history of polyps or colorectal cancer

Inflammatory bowel disease

Age

Lifestyle factors

Diet

Physical inactivity

Excess weight

Source: Winawer et al. 1997; Cancer Council Australia 2001.

As shown in Figure 2.4.2, about 6% of CRCs are due to known genetic disorders (familial adenomatous polyposis and hereditary non-polyposis colorectal cancer). A further 10 to 30% either run in families or are rare types, but the majority (66–85%) are regarded as 'sporadic'.

Risk for CRC is increased in those who have been diagnosed with polyps or had a close relative diagnosed with a pre-cancerous (adenomatous) polyp below age 60 (Stevenson 2001). People with a family history of CRC but without an apparent defined genetic syndrome account for most of those at high risk (Winawer et al. 1997:608).

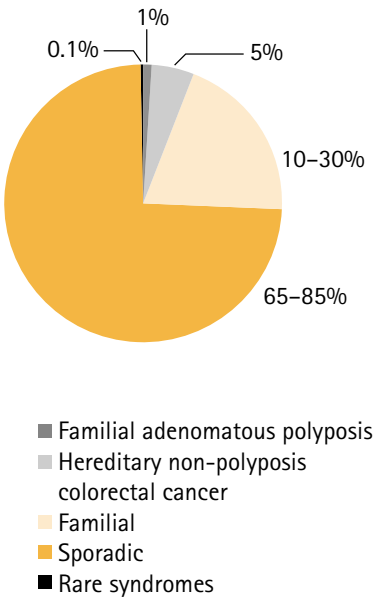
Inflammatory bowel diseases, such as Crohn's disease or ulcerative colitis, are conditions that cause the intestines to become inflamed and affect the digestive system. Persons with such diseases are at greater risk of CRC than people in the general population, but this contributes less than 1% of all new cases of CRC.

The risk for CRC increases with age. The absolute risk of an average member of the population developing colorectal cancer ranges from 1 in 7,000 for a 30-year old in the next 5 years, to 1 in 15 for a 70-year old in the next 20 years (Table 2.4.1).

The proportion of CRCs attributable to dietary factors has been estimated to be 50% (Cancer Council Australia 2001). Diets high in saturated fat (especially through meat intake), and/or low in fruit, vegetables and fibre have been associated with increased risk for CRC (Brownson et al. 1998). Fruit, vegetables and fibre, omega-3 fatty acids, calcium, folate and selenium may all play a preventive role for CRC (Tjandra 2001).

Physical activity protects against CRC and pre-cancerous polyps (AIHW: Armstrong et al. 2000) whereas physical inactivity, in particular when present with excess weight, increases the risk (WHO 2000). The estimated percentage of CRCs that could be prevented by a combination of diet and physical activity ranges from 66 to 75% (NHMRC 1999).

Figure 2.4.2: Causes of colorectal cancer



Source: Tjandra 2001. Reprinted from Australian Doctor, 16 February 2001, page II pull-out section, by permission of the publisher.

Table 2.4.1: Absolute risk of developing colorectal cancer, by age

Age of person	Risk period			
	5 years	10 years	15 years	20 years
30	1 in 7000	1 in 2000	1 in 700	1 in 350
40	1 in 1200	1 in 400	1 in 200	1 in 90
50	1 in 300	1 in 100	1 in 50	1 in 30
60	1 in 100	1 in 50	1 in 30	1 in 20
70	1 in 65	1 in 30	1 in 20	1 in 15

Note: Absolute risk is the observed or calculated likelihood of the occurrence of an event in a population under study.
Source: NHMRC 1999:23.

Impacts

Deaths

CRC is the second most common cause of cancer deaths among males after lung cancer and second equal with lung cancer among females (breast cancer is the most common cause of cancer deaths among females). There were 4,634 deaths (2,475 males and 2,159 females) from CRC in 1998, with a death rate of 22 per 100,000.

Since 1950, the male death rate for CRC remained fairly steady until the mid 1980s, and then declined from 32 per 100,000 in 1983 to 27 per 100,000 in 1998 (Figure 2.4.3). The female death rate on the other hand showed a steady decline. The reasons for these declines are not clear, but may be due to a combination of better diet and some use of screening (Stevenson 2001).

CRC is mainly a cancer of old age, with the majority of CRC deaths occurring in persons aged 50 and above (Figure 2.4.4). Death rates for both males and females are greatest in the 85+ age group (321 and 262 per 100,000 among males and females respectively in 1998). The highest proportion of male CRC deaths in 1998 was among those aged 70–74 (18% of male CRC deaths). Females aged 85 and above, account for the largest proportion of female CRC deaths (19% of female CRC deaths in 1998).

Incidence

CRC is the most commonly diagnosed cancer in Australia (excluding skin cancers), with 11,289 new cases (14% of all new cancer cases) diagnosed in 1998, an incidence rate of 56 per 100,000. CRC incidence in Australia is amongst the highest in the world, comparable with North America and New Zealand (NHMRC 2000:3).

Approximately 54% of newly diagnosed CRCs are in males. In 1998, there were 6,131 new cases in males (67 per 100,000) and 5,158 new cases in females (46 per 100,000).

The risk of CRC increases with age, being low in people under the age of 45, with a median age at diagnosis of 70. In both sexes the incidence of CRC rises sharply after 45 years of age (Figure 2.4.5).

Disability

Disability from CRC may result following removal of parts or all of the colon or rectum; secondary tumours, especially lung and liver tumours; or spread of the cancer to other organs. In 1998, almost 5,000 people reported a disabling condition due to colon cancer (1998 ABS Survey of Disability, Ageing and Carers, unpublished data).

Use of health services

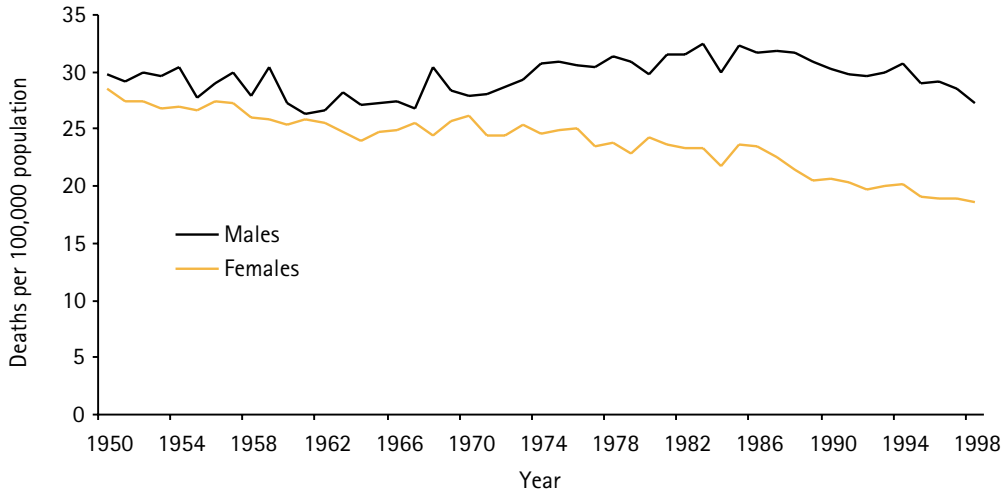
Most CRCs are diagnosed by specialists and treated in a hospital. In 1999–00, there were 23,758 hospital separations for CRC, accounting for 208,986 patient days. Information on GP encounters, management and costs associated with CRCs is unavailable.

In 1993–94, the estimated total health system expenditure for CRC was $205 million (0.6% of the total health system expenditure). The main components were hospital costs ($171 million), direct medical costs ($11 million) and pharmaceuticals ($3 million) (AIHW: Mathers et al. 1998).

Management

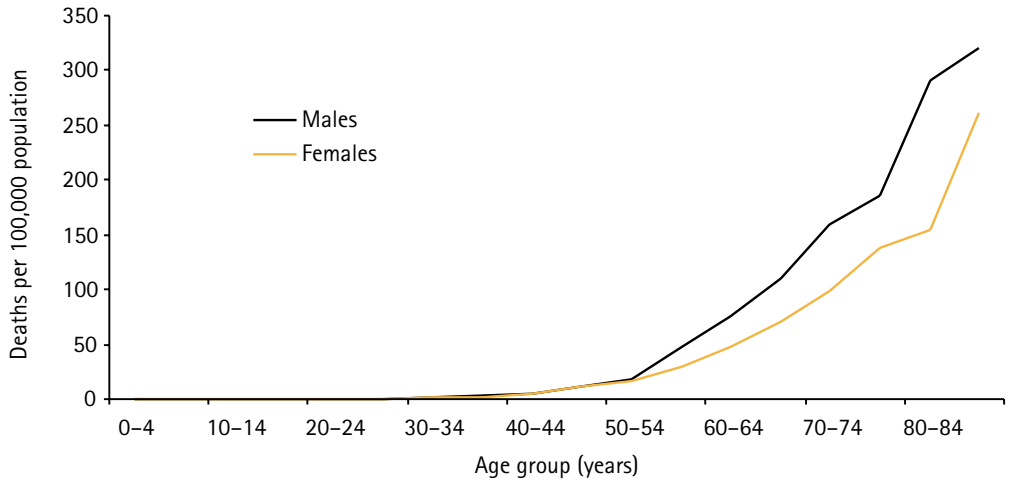
Preventive measures and early detection give great scope to reducing CRC morbidity and mortality. If CRC is detected early, treatment is highly effective. Most CRCs require surgery, commonly in combination with chemotherapy

Figure 2.4.3: Death rates for colorectal cancer, 1950 to 1998



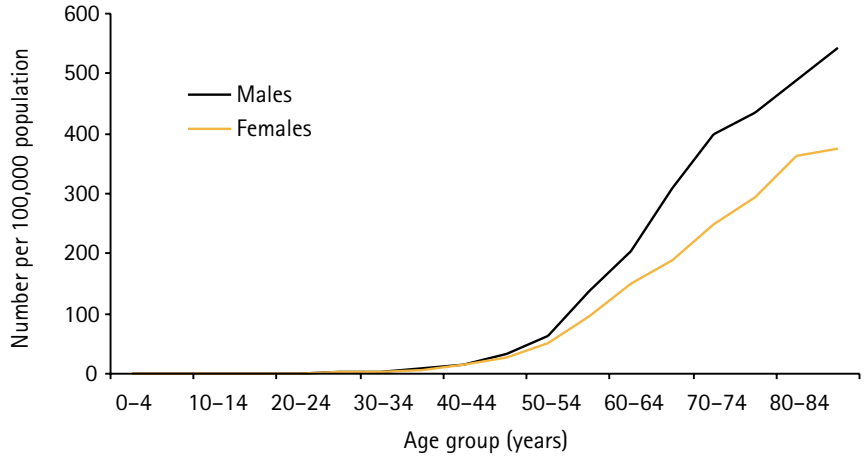
Source: AIHW National Mortality Database.

Figure 2.4.4: Age-specific death rates for colorectal cancer, 1998



Source: AIHW National Mortality Database.

Figure 2.4.5: Age-specific incidence of colorectal cancer, 1998



Source: AIHW National Cancer Statistics Clearing House.

or radiotherapy. Surgery aims to remove the cancer and could include removal of part of the colon, rectum or surrounding structures. Following the surgery, patients are monitored regularly to detect re-occurrence or new cancers. Chemotherapy may be given either before or after surgery, and is often effective for people whose cancer has spread into the lymph nodes but no further (NHMRC 2000). Radiotherapy reduces the chance of the cancer coming back and of it spreading to other parts of the body.

Prevention and early detection initiatives

The main public health recommendations for CRC prevention are for a healthy diet—high in vegetables and fruit, and low in fat, with good control of total energy intake and regular physical activity (see Box 2.4.2).

Since CRC can develop with few or no symptoms, regular population-based screening would allow early detection and removal of polyps and CRCs. A number of screening tools are currently available including sigmoidoscopy, colonoscopy and faecal occult blood testing. It is reported that an estimated 33% or more of deaths from CRC could be prevented by regular screening (NCCDPHP 2000).

Box 2.4.2: NHMRC guidelines on primary prevention of colorectal cancer

Eat a range of wholegrain cereal fibres and wheat bran

Eat five or more potions a day of a variety of vegetables and fruits

Reduce intake of fat

Restrict the amount of energy in the diet (fewer than 2,500 kilocalories a day for adult males and fewer than 2,000 kilocalories a day for adult females)

Ensure a dietary calcium intake of 1,000–1,200 mg/day

Maintain 'sufficient' levels of physical activity

Also, avoid smoking and limit alcohol consumption

Source: NHMRC 2000.

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2.5 Depression

Depression (ICD-9 codes 296.2, 296.3, 296.9, 300.4, 311; ICD-10-AM codes F32, F33) is a chronic mental disorder and a significant public health problem worldwide. It is an affective (mood) disorder characterised by feelings of sadness, loss of interest or pleasure in nearly all activities, feelings of hopelessness, suicidal thoughts or self blame.

Depression is the fourth leading cause of disease burden in Australia, with high associated costs including reduced work productivity, days of lost work, educational failure, poor family functioning, poor social functioning, diminished sense of wellbeing and increased use of medical services. It is also a major risk factor for suicide and self-inflicted injury (DHAC & AIHW 1999).

Description

The term 'depression' is used in many different ways:

1) a normal human emotion;
2) a symptom characterised by persistent low mood, unhappiness, or distress that may be associated with a depressive illness or other disorders; or
3) a specific syndrome or disorder (clinical depression) (DHAC 2000).

Clinical diagnostic systems such as the DSM IV (Diagnostic Statistical Manual of Mental Disorders) provide more specific detail regarding appropriate diagnosis and definitions of mental disorders. The symptoms as described in Box 2.5.1 represent a list of common features that may predict and follow episodes of major depression, continue between episodes, or form a spectrum of depressive psychopathology. However, a mental problem is classified as 'depression' when at least five of the nine symptoms listed in Box 2.5.1 are present (APA 1996).

The ABS defines depression as 'a state of gloom, despondency or sadness lasting at least 2 weeks'. A milder form of depression lasting more than 2 years is termed dysthymia. Other related conditions are mania, hypomania, and bipolar affective disorder. These conditions are also referred to as affective disorders.

While some mention is made below of affective disorders in general and dysthymia, much of the discussion that follows focuses on depression as defined above.

Box 2.5.1: DSM IV major depressive symptoms

Depressed mood most of the day

Loss of interest or pleasure (in all or most activities, most of the day)

Large increases or decreases in appetite (significant weight loss or gain)

Insomnia or excessive sleeping (hypersomnia)

Restlessness as evident by hand wringing and similar other activities (psychomotor agitation) or slowness of movement (psychomotor retardation)

Fatigue or loss of energy

Feelings of worthlessness, or excessive and inappropriate guilt

Diminished ability to concentrate, or indecisiveness

Recurrent thoughts of death or suicide

Source: APA 1996.

Disease severity

The severity of depression ranges from minor stress to debilitating levels requiring professional help and medication. Usually depressive episodes run a fluctuating course and most people recover within a few years. In a small proportion the symptoms persist. Some need medication or specialised psychiatric treatment. Depression can be severe enough to carry a high risk of suicide. In some cases the excessive use of alcohol or drugs may complicate the clinical picture. Because of the strength and range of effects like these, depression has a high impact on the individual's family, friends and work colleagues.

Risk factors

Many factors increase the risk of depression (see Box 2.5.2). These range from biological and psychological susceptibility of the individual to social and structural factors.

A range of health risk behaviours often occur in combination with depression. These include tobacco use, illicit drug use, alcohol misuse and dependence, eating disorders and excess weight (Sartorius et al. 1996).

Depression is often associated with anxiety, including panic disorder and social phobia (Parker et al. 1999). It is also common in people with long-term physical illness such as chronic pain and fatigue, especially chronic fatigue syndrome (Simon & von Korff 1991; Hickie et al. 1996). Depression often accompanies blindness, deafness, immobility and multiple sclerosis. Studies have also reported considerable prevalence of depression in people diagnosed with other chronic diseases, such as cardiovascular disease, diabetes, cancer, and rheumatoid arthritis (DHAC & AIHW 1999).

There are also a number of recognised protective factors for depression (see Box 2.5.3). Having an easy-going temperament and good perceived social support, especially having a relationship with a supportive adult, may help prevent depression (Werner 1992). A coping style that favours problem solving is also protective (Folkman et al. 1986).

Box 2.5.2: Risk factors for depression

Biological and psychological factors

Family history of depression

Being a female adolescent

High trait anxiety and pre-existing anxiety disorders

Temperament—reacting negatively to stressors

Negative thought patterns

Avoidant coping style

Environmental and social factors

Poverty, unemployment

Conflict, poor parenting practices

Child abuse

Exposure to adverse life events (e.g. relationship break-up, bereavements, family separation, trauma, family illness)

Caring for someone with a chronic physical or mental disorder

For older adults, being in residential care

Source: DHAC & AIHW 1999:40.

Box 2.5.3: Protective factors for depression

Good interpersonal relationships (i.e. a supportive relationship with at least one other person)

Family cohesion (i.e. positive parent–child relations)

Social connectedness

Academic/ sporting achievements

Source: DHAC & AIHW 1999.

Impacts

Deaths

While the major impact of depression is in terms of morbidity and disability, depression is a factor commonly associated with suicide (ICD-9 codes E950–E959) and attempted suicide. A majority of people who commit suicide meet the criteria for depressive disorder in the weeks before death.

Suicide rates are higher among males at all ages. High-risk groups are young males between the ages of 20 and 39 years (Figure 2.5.1). Attempted suicide (or 'parasuicide') is more common among females. A recent study has estimated that there are six attempted suicides (based on hospital separations other than death for 'self-harm') per completed suicide among young males (aged 15–29), while among young females the ratio is almost 44 to 1 (Ruzicka & Choi 1999:39).

Prevalence

The 1997 ABS National Survey of Mental Health and Wellbeing found some 700,000 Australian adults, 6% of persons aged 18 years and over, had experienced depression during the 12 months prior to the survey. Depression is more prevalent among females.

The child and adolescent component of the survey, in which parents reported about their children, found that depression was present in about 3% of children (aged 6–12 years) and 5% of adolescents (aged 13–17 years) (Figure 2.5.2).

Depression is reported to be highly prevalent in Indigenous Australians. A high proportion of people attending Aboriginal Medical Services are reported to have mental disorders or are psychologically distressed (McKendrick et al. 1992; Swan & Fagan 1991).

Complications

Depression is associated with a range of health risk behaviours and complications. Depressed smokers are less likely to give up smoking than those who are not depressed, and may have taken up smoking to self-medicate their depressive symptoms (DHAC & AIHW 1999). Furthermore, while causation is not established, there are a number of health risks associated with depression including alcohol misuse, exposure to adversity and socioeconomic disadvantage (Jorm et al. 1999).

There is accumulating evidence that depression commonly precedes progression to both alcohol misuse and dependence, especially in younger drinkers. Similarly in dieters, depression

Figure 2.5.1: Age-specific suicide rates, 1998

Source: AIHW National Mortality Database.

may cause the development of symptoms of bulimia nervosa (DHAC & AIHW 1999).

Disability

Depression is a major cause of disability. According to the 1998 ABS Survey of Disability, Ageing and Carers, 63,450 Australians (0.3% of the total population), were classified as disabled with depression as the primary cause of their disability.

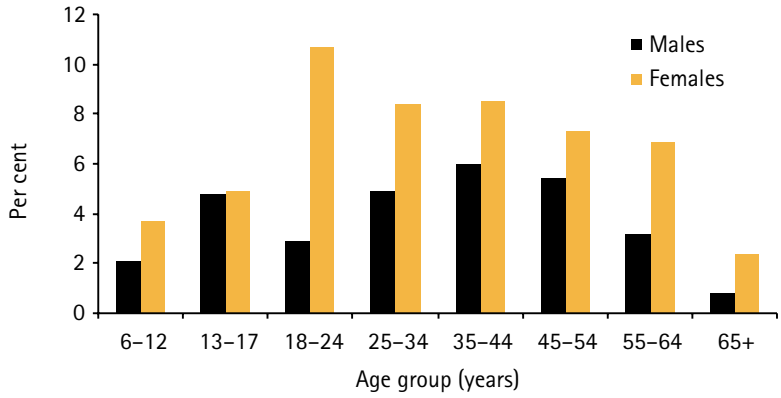
People with affective disorders (mainly depression and dysthymia) are reported to have almost three times the number of disability days (not fulfilling normal daily activities) of those who are well. This ratio rises to six times for those who have affective disorders in association with physical illness (ABS 1998:33).

Use of health services

In 1999–00, there were 59,909 hospital separations for depression (1% of all separations). Depression accounted for a quarter of all separations for mental and behavioural disorders.

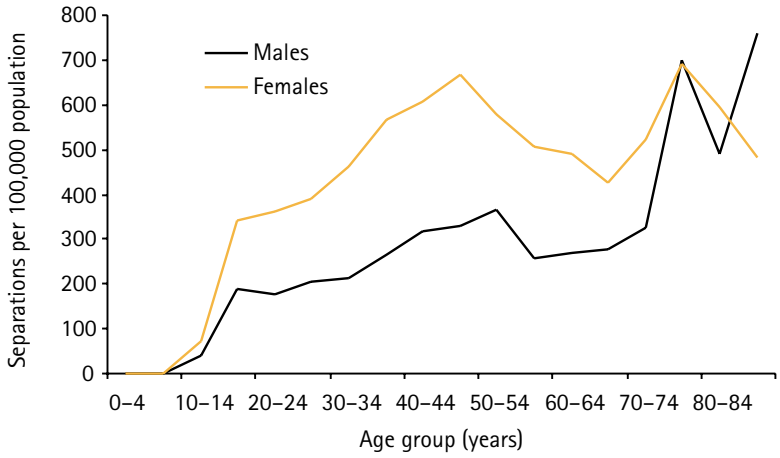
More females than males were hospitalised with a principal diagnosis of depression, with hospital use highest among females aged 45–49 and among males and females aged 75 and over (Figure 2.5.3).

Figure 2.5.2: Age-specific prevalence of depression, 1998



Sources: ABS 1998:19; Sawyer et al. 2000:20.

Figure 2.5.3: Age-specific hospital use for depression, 1999–00



Source: AIHW National Hospital Morbidity Database.

Depression is the fourth most common problem managed by general practitioners. The majority (68%) of patients are females between the ages of 25 and 64 (AIHW: Britt et al. 1999). There is some evidence that depression is under-diagnosed and under-treated in primary care settings.

Management

Effective management of depression depends on the early recognition of the symptoms and identification of all contributing psychological and social risk factors as well as co-morbidities and complications.

Many people attempt to cope with the situation without professional help, by using their social relationships for informal 'counselling' and support. Others might turn to telephone counselling, naturopathy, exercise, relaxation and meditation.

Psychological interventions, such as cognitive, behavioural and interpersonal psychotherapies, have been found to be effective in some cases (Brown & Schulberg 1998; Clarkin et al. 1996; Jacobson & Hollon 1996). Cognitive and behavioural therapy involves teaching individuals to identify their maladaptive and/or irrational patterns of thinking and to challenge these in the light of evidence. This could be done by participation in pleasant events, training in problem-solving skills, self-monitoring, self-evaluation, self-reinforcement, relaxation, and social skills.

The interpersonal approach involves the therapist helping the person to systematically identify and resolve relationship problems that may contribute to depressive symptoms. It aims to improve the person's relationships and communications with others. In most instances, treatment involves a combination of these approaches rather than any one element in isolation.

Several medical interventions are available to manage depression. Antidepressant drugs play an important role in the treatment of depressive disorders. Such drugs are targeted to address changes in the patterns of brain neurotransmitters. The type of drug, dosage and length of treatment must be managed carefully by prescribing medical practitioners. Electroconvulsive therapy, the passing of electric current through the brain to produce a convulsion, is a safe and effective treatment for depressive disorder that either fails to respond to antidepressants or is of delusional intensity (DHAC & AIHW 1999:68–74).

Prevention

Depression can afflict anyone. Primary prevention strategies are relevant for the whole population; some strategies are more usefully targeted at groups with particularly high risk.

The development of depression and depressive symptoms may be averted through recognition of and response to risk factors. The National Action Plan for Depression, a major initiative under the National Mental Health Strategy, provides a framework encompassing the health care continuum for a coordinated approach for prevention, assessment and treatment of depression nationally. The plan aims to reduce the prevalence and impact of depression through interventions and activities at all sectors of government, health education and human services (DHAC 2000).

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2.6 Diabetes

Diabetes mellitus (ICD-9 code 250; ICD-10-AM codes E10–E14) is a major cause of death, illness and disability in Australia. It is also a leading cause of blindness and lower limb amputations, and can lead to pregnancy-related complications for both the mother and foetus or newborn child. Diabetes is an important risk factor for several other chronic diseases including heart disease, stroke and renal disease.

Description

Diabetes is classified as a metabolic disorder (disturbances of carbohydrate, fat and protein metabolism), marked by high levels of blood glucose (hyperglycaemia). This is caused by either a deficiency of the hormone insulin or a decreased ability of the body to use it.

Insulin is produced by the pancreas and helps glucose (sugar) enter cells for conversion into energy. It is also needed to help synthesise protein and store fat.

In uncontrolled diabetes, glucose builds up in the bloodstream; this, along with the inadequate supply of glucose to the cells, can lead to a range of short- and long-term problems, including damage to vital organs.

There are three main types of diabetes: Type 1, Type 2 and gestational (see Box 2.6.1). The focus of this report is on Type 2 diabetes (ICD-9 code 250.X0; ICD-10-AM code E11), which accounts for 85–90% of all cases of diabetes in Australia and is largely preventable. A person with Type 2 diabetes may have the disease for many years before the symptoms become apparent. The main symptoms are excessive thirst, frequent urination and weight loss. Diagnosis is by identifying elevated blood glucose concentrations (Bishop et al. 1998:423–5).

Box 2.6.1: Major types of diabetes

Type 1 diabetes: *results when the pancreas stops producing insulin. This condition often arises in childhood, and persons with this type of diabetes require daily injections of insulin to survive. Type 1 diabetes lasts through life and can lead to a variety of complications if not managed properly.*

Type 2 diabetes: *results from reduced production of insulin or the inability of the body to use insulin properly. The condition more commonly develops in people over 40, in particular among those with excess weight and a family history of the disease. Type 2 diabetes is usually managed by diet control, exercise and oral drugs that lower blood glucose. Insulin therapy may be required in some cases.*

Gestational diabetes: *first occurs during pregnancy in about 4–6% of females not previously diagnosed with diabetes. Gestational diabetes typically resolves itself soon after the delivery. However, those diagnosed with this form of diabetes are at greater risk of developing Type 2 diabetes later in life.*

Co-morbidities

Diabetes overlaps with and contributes to the development of a number of other diseases and conditions, particularly vascular and heart diseases such as coronary heart disease (CHD), stroke and peripheral vascular disease. Diabetes-shares common risk factors with these diseases, but is also an independent risk factor for them.

CHD appears earlier in life and is more often fatal among those with diabetes. People with diabetes may have a worse prognosis after stroke, and the role of elevated blood pressure in stroke may be accentuated by the presence of diabetes. Mortality is also increased among people with diabetes and peripheral vascular disease, in particular if foot ulcerations,

infection or gangrene occur (DHAC & AIHW 1999:26–7).

Risk factors

Both genetic and environmental factors contribute to the onset of Type 2 diabetes (see Box 2.6.2), although the genetic basis has not been fully explained. The genetic component in Type 2 diabetes determines which individuals are more likely to develop it under certain environmental conditions. However, it is recognised that environmental risk factors play a large role in the development of diabetes.

Box 2.6.2: Risk factors for Type 2 diabetes

Predisposing factors

Heredity
Pregnancy
Low birthweight
Age

Behavioural and biomedical factors

Excess weight, particularly obesity
Impaired glucose tolerance
Physical inactivity
Poor diet and nutrition

Source: DHAC & AIHW 1999:13.

Prominent among the risk factors for Type 2 diabetes is obesity. Males aged 30 and over with Type 2 diabetes in Australia are almost two-and-a half times more likely to be obese than males in the general population. Females with Type 2 diabetes are more than three times as likely to be obese than females in the general population (Figure 2.6.1).

The risk of developing diabetes rises continuously with increasing obesity (DHAC & AIHW 1999:13). In addition, an increased central distribution of body fat (when fatness is concentrated in the abdomen) also appears to be associated more often with Type 2 diabetes (Bishop et al. 1998:430–1).

Low birthweight has been identified as a marker of lifetime risk for developing diabetes, probably because of a link with poor nutrition in foetal and early infant life (AIHW 2000:85). Advancing age is associated with diabetes due to increasing insulin resistance in older persons.

People with diabetes often have a clustering of risk factors for heart and vascular diseases, a condition called the metabolic syndrome (AIHW 2001a:63). That is, a person with diabetes with one risk factor, typically obesity, is likely to have other heart and vascular risk factors, such as high blood pressure and high blood cholesterol. While high blood pressure and high blood cholesterol are not in themselves risk factors for diabetes, they contribute to increased complications from the disease.

Physical activity plays a protective role against Type 2 diabetes. All other factors being equal, people who undertake regular exercise have a 30 to 60% lower risk of developing Type 2 diabetes than those who do not (DHAC & AIHW 1999:13).

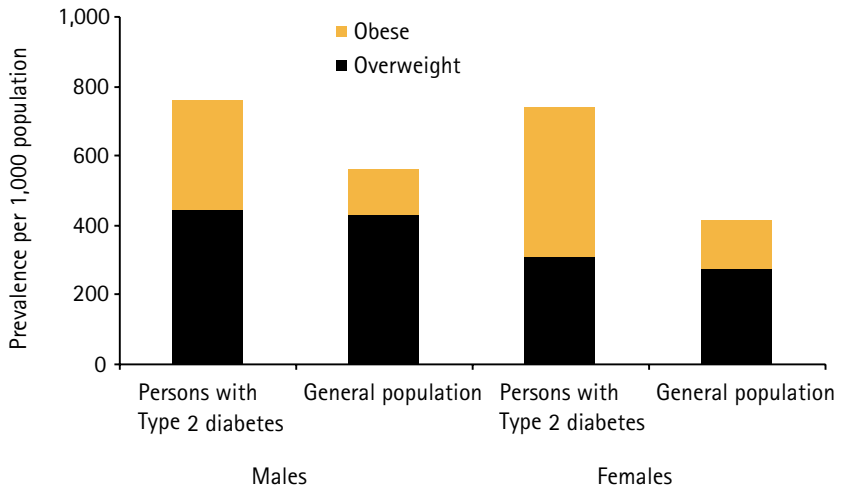
Impacts

Deaths

Diabetes is a major cause of mortality in Australia. The cause-of-death statistics do not distinguish between the various forms of diabetes; the information presented here therefore does not pertain to Type 2 diabetes alone.

As the underlying (primary) cause of death, according to information on death certificates, diabetes ranked seventh in Australia in 1998, with 2,927 deaths (over 2% of total deaths). Because it often leads to other, more fatal conditions, diabetes is more often listed as an associated cause of death. The total number of deaths involving diabetes in 1998, either as

Figure 2.6.1: Prevalence of overweight and obesity among persons aged 30 years and over with Type 2 diabetes and in the general population, 1995



Source: ABS 1997.

an underlying cause or as an associated cause, was 9,454 (7.5% of all deaths) (AIHW 2001a:65).

People with diabetes are at increased risk of death from a variety of other causes. Analysis of deaths from the National Diabetes Register indicates that the death rate for registrants in 1999–2000 was three-and-a-half times that of the general population (AIHW 2001b:15).

Trends over the past half a century indicate that diabetes death rates in males are now higher than in 1950, but lower than their peak in 1968 (Figure 2.6.2). In females, the diabetes death rates are now about half the level they were in 1950, and well below those for males.

Indigenous Australians have much higher death rates for diabetes than non-Indigenous Australians. In 1995–97, the death rate for diabetes among Indigenous males was nine times that of all Australian males, and among Indigenous females it was 16 times that of all Australian females (Cunningham & Paradies 2000:40).

Prevalence

Estimates of the prevalence of diabetes in Australia are based on surveys using self-reported information and blood tests. However, self-reported information is known to underestimate the true prevalence of diabetes, as many people may not know that they have the disease. Nearly 430,700 persons (2.4% of the total population) reported having had diabetes at some time during their lives in the 1995 ABS National Health Survey. This figure is however a significant underestimate, as a large proportion of diabetes in the community remains undiagnosed and thus not reported (DHAC & AIHW 1999:8).

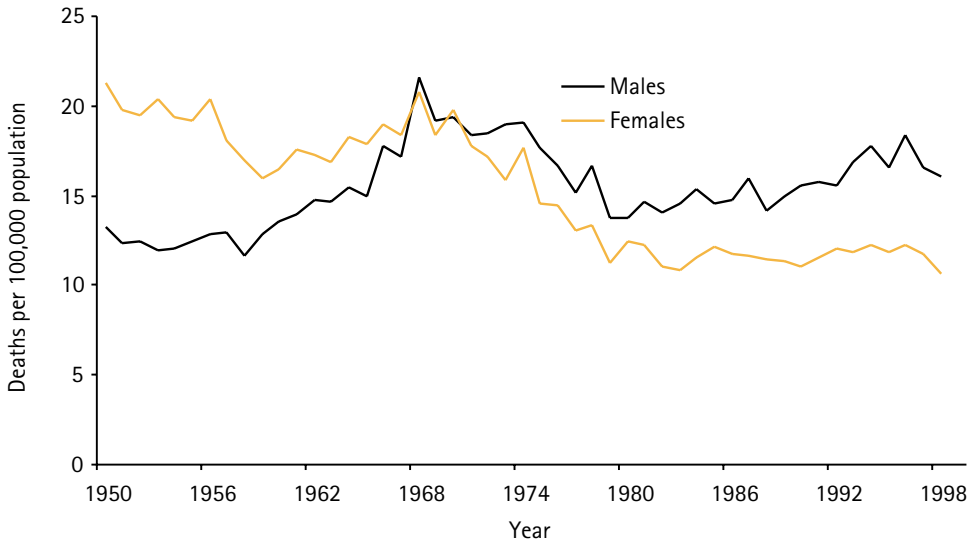
The Australian Diabetes, Obesity and Lifestyle (AusDiab) Study, conducted in 1999–2000, estimated that 938,700 Australians aged 25 and over had diabetes, a prevalence rate of 7.5% (8.0% for males, 7.0% for females) (Dunstan et al. 2001:7–8). The prevalence of diabetes increases with age, approaching 25% among those over 75 (Figure 2.6.3). It should

be noted though that the effect of any non-response bias on estimates from AusDiab is yet to be determined. Approximately 50% of eligible households participated in the household interview, and 55.2% of eligible adults in these households took part in the physical examination.

Prevalence of Type 2 diabetes in Indigenous Australians is among the highest in the world. In 1995, the self-reported prevalence of diabetes for Indigenous Australians aged 25–54 was seven to eight times that for non-Indigenous people. Among those aged 55 and over, it was more than twice as high (AIHW 2001a:64).

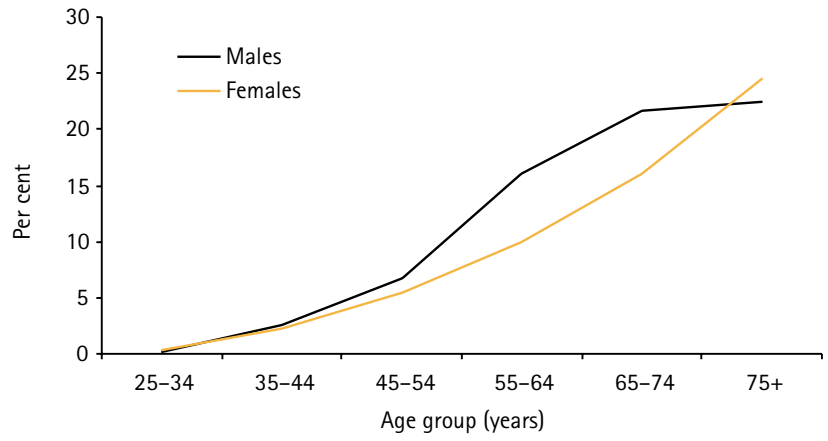
The 1995 ABS National Health Survey indicated that diabetes is almost two-and-a-half times as high among the lowest socioeconomic

Figure 2.6.2: Diabetes death rates, 1950 to 1998



Source: AIHW National Mortality Database.

Figure 2.6.3: Age-specific prevalence of diabetes (Type 1 and Type 2), 1999–2000



Note: The effect of any non-response bias on estimates from AusDiab is yet to be determined. Appoximately 50% of eligible households participated in the household interview, and 55.2% of eligible adults in these households took part in the physical examination.

Source: Dunstan et al. 2001:8.

category compared to the highest category. Diabetes is also more common among certain migrant groups, in particular those from Pacific Island nations, India, China and Southern Europe. However, differences in diabetes prevalence between metropolitan, rural and remote areas were not significant (AIHW 2001a:64).

Complications

Uncontrolled diabetes leads to a variety of complications, often resulting in limitation of activity, disability, illness and premature mortality. These complications can be broadly classified as microvascular (affecting the small blood vessels), macrovascular (affecting the large blood vessels) and those associated with pregnancy (Box 2.6.3).

Box 2.6.3: Major diabetes-related complications

Microvascular complications

Nephropathy (kidney disease)
Retinopathy (eye disease)
Neuropathy (nerve complications)

Macrovascular complications

Coronary heart disease
Stroke
Peripheral vascular disease

Pregnancy-related complications

Foetal malformation
Spontaneous abortion
Stillbirth
Neonatal hypoglycaemia (low blood sugar)

Source: DHAC & AIHW 1999:14.

There are no recent data in Australia on the extent of complications of diabetes. The 1995 ABS National Health Survey collected information on self-reported prevalence of diabetes and associated conditions. Compared to those without diabetes, people with diabetes were far more likely to report conditions such as high blood pressure, high blood cholesterol, heart disease, stroke, vision problems, kidney disease, and limb amputation (Figure 2.6.4).

While some of these are known complications of diabetes, conditions such as high blood pressure and high blood cholesterol, when superimposed on diabetes, raise the chances of complications.

Disability

According to the 1998 ABS Survey of Disability, Ageing and Carers, almost 64,000 Australians have a disability due to diabetes. The rate of disability in the population aged 45 and over due to diabetes was 863 per 100,000 persons. Some well known forms of disability resulting from diabetes are limb amputation and blindness.

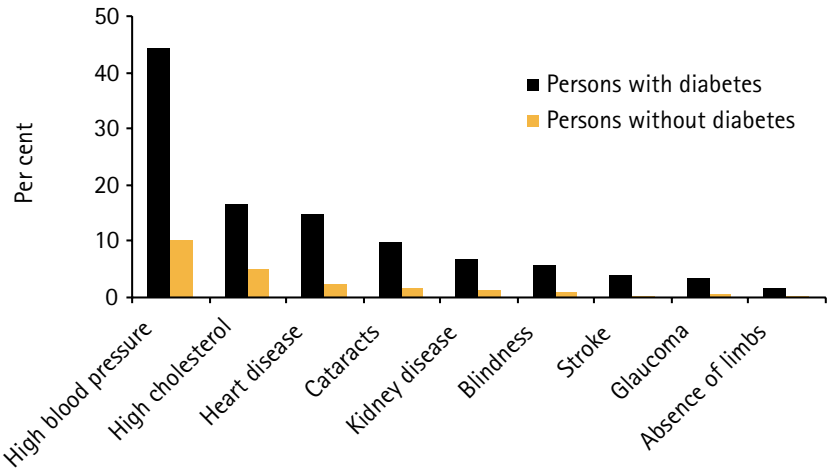
Use of health services

In 1999–00, there were 336,976 hospitalisations for diabetes as either a principal or an additional diagnosis, accounting for almost 6% of all hospitalisations. The average length of stay in hospital for diabetes treatment was over 7 days, which was twice as long as for non-diabetic conditions. Over 80% of hospitalisations where diabetes is either a principal or an additional diagnosis are due to Type 2 diabetes.

The 1999–00 survey of general practice activity found that diabetes was the eighth most common problem managed by general practitioners (GPs), up from twelfth place a decade earlier (AIHW: Britt et al. 2000:39). About 90% of GP visits for diabetes relate to Type 2 diabetes (AIHW: Senes & Britt 2001:xii–xiii).

The estimated health system costs of diabetes in 1993–94 were $372 million ($217 million for Type 2 compared with $155 million for Type 1 diabetes). An additional $309 million in costs were for complications of diabetes, but it is not possible to divide this amount between Type 1 and Type 2 diabetes (AIHW: Mathers & Penm 1999:17).

Figure 2.6.4: Persons with and without diabetes reporting other diseases and conditions, 1995



Source: ABS 1997.

Management

Diabetes requires lifelong care. Good management requires a team of professionals including a GP, a diabetes educator, a dietitian, and others, depending on individual complications. Following the initial evaluation of the person's condition, it is important to establish treatment goals, develop a management plan, and provide care for complications that may arise. Patient education and continuing support are central to diabetes management.

A major element of diabetes care is daily self-management. In addition to home testing to monitor blood glucose levels, it involves adherence to a dietary regime, often specific for the individual. Weight reduction is also important in the control of hyperglycaemia. Substantial benefits can also come from a physically active lifestyle. In many persons with Type 2 diabetes, achievement of these treatment goals will remove the need for medication (Bishop et al. 1998:437).

Prevention and screening

Type 2 diabetes is considered to be largely preventable through efforts similar to those for preventing CHD. These aim at reducing obesity and increasing the level of physical activity. However, recent trends in the prevalence of these risk factors have been unfavourable, with adverse consequences for the future incidence of diabetes (DHAC & AIHW 1999:38).

Another useful approach is to aim at high-risk populations, particularly Indigenous Australians, through community-based interventions. Programs that emphasise lifestyle changes including low-fat, high-fibre diets, cessation of tobacco smoking, and increased physical activity should be encouraged (Bishop et al. 1999:434).

GPs are well placed to screen patients at risk of diabetes and to link them with specialist services. There are a number of resources and programs aimed at assisting GPs in this task. A variety of guidelines have been developed on diabetes, but these have focused on clinical practice, with few guidelines outlining evidence-based best practice in prevention (DHAC & AIHW 1999:49–51).

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2.7 Asthma

Asthma (ICD-9 code 493; ICD-10-AM codes J45, J46) is a chronic inflammatory disorder of the lung's air passages that makes them narrow in response to various triggers, leading to episodes of shortness of breath and wheezing. Asthma can begin at all ages, including the very young. The disease can start as a mild chronic cough and lead to mild or severe wheezing and sometimes even to respiratory arrest. Many people with asthma experience reduced quality of life and require a range of health services, from general practitioner (GP) care to emergency ward visits or hospital in-patient care.

Description

Signs and symptoms

The symptoms of asthma can vary greatly in frequency and severity, ranging from intermittent mild symptoms to an incapacitating and life-threatening disorder. Some individuals have an occasional episode (episodic asthma) that is mild and brief, but are otherwise symptom-free. Others have chronic asthma with mild coughing and wheezing much of the time, and occasional severe attacks after exposure to known environmental irritants, viral infections, exercise or non-specific irritants.

Disease severity and survival

The prognosis of individual asthma attacks is generally good. Spontaneous remission is fairly common in episodic asthma, particularly in children, but rare in chronic asthma. Seasonal fluctuations can occur in both types of asthma. People who tend to be allergic and have episodic asthma usually have more symptoms in spring and summer when they are more heavily exposed to triggers. By contrast, chronic asthmatics are usually worse off in winter months because of more frequent viral infections. There is occasionally a fatal outcome, especially if treatment is inadequate or delayed.

Co-morbidities

Asthma often occurs with other respiratory conditions, whose presence can influence the management of the disease. In allergic children and adolescents, asthma often coexists with conditions such as eczema, sinusitis and hay fever. Chronic obstructive pulmonary disease (COPD) commonly coexists with asthma among older people.

Fatigue is a common side effect of asthma. It is a normal response to breathing distress, lack of sleep or physical exertion. Asthma is known to disturb sleep, and one form of sleep disturbance, obstructive sleep apnoea, can itself cause asthma-like symptoms such as wheezing.

Also, there can sometimes be side effects associated with the long-term use of steroid medications prescribed to reduce inflammation in the lung's air passages. Some of these include osteoporosis, bruising easily, risk of cataract, heartburn and indigestion, and mood swings (Brostoff & Gamlin 1999).

Risk factors

Risk factors for asthma fall into two categories—factors that predispose a person to being asthmatic, and factors that can precipitate attacks or worsen their severity (see Box 2.7.1).

Factors that may increase the risk of asthma include a family history of the disease and being 'allergic'. The relationship of parental history to

asthma among children has been documented by many studies; it is estimated that having a parent with asthma nearly doubles the risk of asthma in the child (Peat 1996:10). Further, the marked rise in childhood asthma in Western societies, including Australia, over the past quarter-century is thought to reflect a basic shift in early-life environmental conditions. These, in turn, affect the direction of maturation of the young person's immune system, thereby influencing their disposition to asthma and other allergy-based disorders.

Box 2.7.1: Risk factors for asthma

Predisposing factors

Family history of asthma
Age
Excess weight

Environmental factors

Allergens
Exercise
Emotion
Viral infections
Tobacco smoke
Food
Chemicals
Drugs

Source: Crompton et al. 1999.

The symptoms of asthma can be triggered by a wide variety of agents in the environment, either acting alone or in conjunction with other irritants. The triggers that cause episodes of air passages narrowing and other asthma symptoms are specific to each individual. Known triggers include allergens, exercise, emotion, viral infections, exposure to tobacco smoke, food chemicals, cold air and weather changes.

Allergen exposure is currently recognised as an important risk factor for asthma in children (Peat 1996:9). House dust mites, pollens and animal fur are known asthma allergens (Newton et al. 1998). Australian homes are reported to have some of the highest levels of house dust mite. This is due mainly to environmental factors, such as housing being located in temperate coastal climates, that provide ideal conditions for breeding mites.

Tobacco smoking (including passive smoking) is another 'trigger' for asthma attacks. There is strong evidence supporting the association of exposure to environmental tobacco smoke (ETS) and asthma in childhood (age under 15). Exposure to ETS has been found to cause exacerbations of symptoms in children who have asthma (i.e. cough, wheeze, breathlessness and sputum) (WHO 1999:7). The association of ETS with childhood asthma is most consistent at high exposures (i.e. where mothers smoke more than 10 cigarettes a day), and the evidence is supportive of a causal relationship (NHMRC 1997:43). However, it is less clear whether exposure to lower levels of ETS increases the risk of asthma in children.

There is speculation that changes in diet in recent years, especially the higher use of processed foods, salt and polyunsaturated oils, are contributing factors to the increasing rate of childhood asthma (Peat 1996:9).

Prescription or non-prescription drugs can also trigger asthmatic episodes. The medications that may cause or exacerbate asthma symptoms include aspirin and non-steroid anti-inflammatory drugs. Allergic reactions and exacerbation of asthma have also been reported with the use of herbs such as echinacea (Newton et al. 1998).

Exposure to sensitising agents in the workplace is also known to trigger asthma, often referred to as occupational asthma. Known agents include wood dust, flour, industrial chemicals (isocyanates and epoxy resins), metal salts and laboratory animals. Extended exposure to these agents may increase the severity of asthma symptoms (AIHW 2000:91).

Impacts

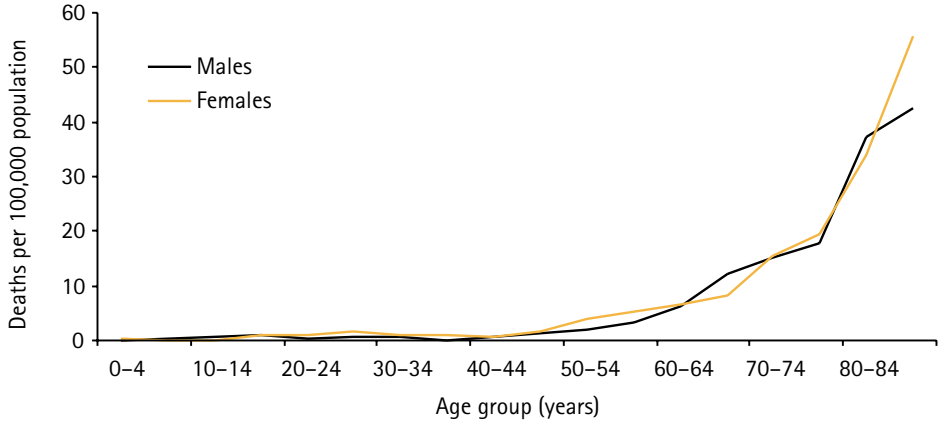
Deaths

In 1998, there were 701 deaths from asthma (or 0.5% of all deaths), with a death rate of 3.4 per 100,000. The female rate was higher than the male rate, 3.6 deaths per 100,000 females compared with 3.2 per 100,000 males.

Reported deaths from asthma generally increase with age in both males and females (Figure 2.7.1), although asthma mortality data are known to become less reliable among older people. Asthma is often difficult to distinguish from COPD in these age groups.

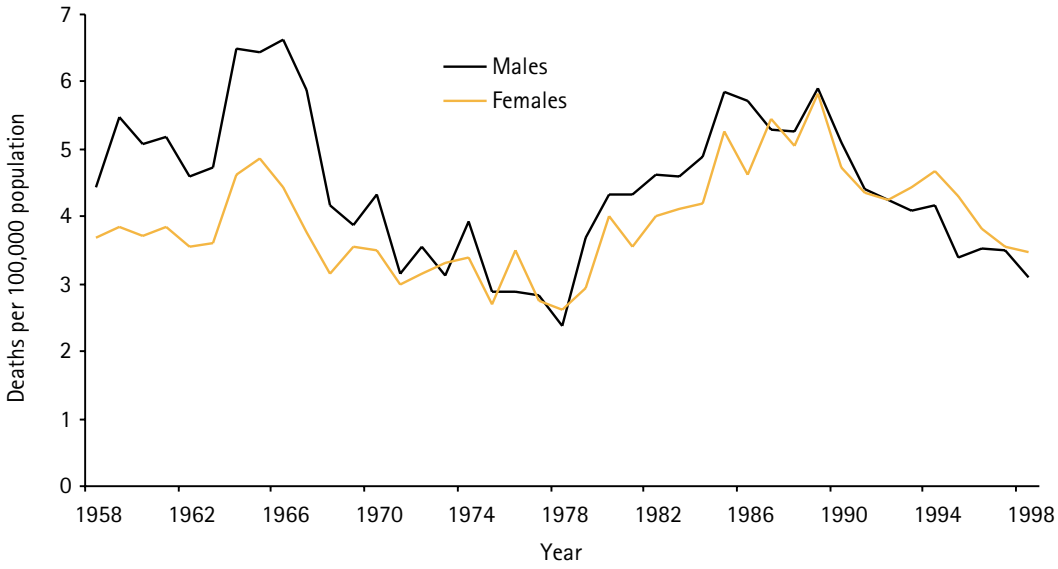
No clear trend has emerged in death rates for asthma over the last four decades. Following a decrease between 1968 and 1978, asthma death rates increased over the next decade. Since 1989, the death rates for asthma have been declining and have recently approached the rates of the 1970s (Figure 2.7.2).

Figure 2.7.1: Age-specific death rates for asthma, 1998



Source: AIHW National Mortality Database.

Figure 2.7.2: Death rates for asthma, 1958 to 1998



Source: AIHW National Mortality Database.

Table 2.7.1: Death rates for asthma in metropolitan, rural and remote areas, 1994–1998

Metropolitan		Rural			Remote		
Capital cities	Other	Large centres	Small centres	Other	Centres	Other	Australia
3.5	3.3	4.5*	3.5	4.6*	5.6*	4.3	3.8

** Significantly different from 'Capital cities' at the 5% level.*

Notes: 1. Rates are number of deaths per 100,000 persons, age-standardised to the Australian population at 30 June 1991.
2. Following RRMA (rural, remote and metropolitan area) classification.

Source: AIHW National Mortality Database.

Asthma mortality shows significant regional variation. Analysis of data for the period 1994–1998 reveals an association between death rates and increasing geographic remoteness (see Table 2.7.1). A major factor contributing to these differentials is the larger representation of the Indigenous population, with known higher death rates for asthma, in rural and remote areas. Other factors that contribute to these differentials are limited access to emergency and primary care and higher exposure to a variety of chemicals and pesticides.

Prevalence

The prevalence of asthma in Australia is one of the highest in the world, with more than two million Australians reporting the disease in 1995. Between 1989–90 and 1995, the self-reported prevalence of asthma increased from 85 per 1,000 to 113 per 1,000 (ABS 1997). Most of those reported asthma of mild to moderate severity, and were not at high risk of death from the disease.

Asthma is more prevalent in young people (aged under 25) than older age groups. In the 1995 ABS National Health Survey, it was most commonly reported as a recent or long-term condition by those aged 5–14 (192 per 1,000) and 15–24 (149 per 1,000). Among those aged 5–14, asthma was more common in males than in females, whereas it was more prevalent in females than males among those aged 15–24.

Also according to the 1995 ABS National Health Survey, smokers and ex-smokers both reported a higher prevalence of asthma (11%) than those who have never smoked (9%). Furthermore, young children living in households with one or more smokers reported a higher prevalence of asthma than children living in non-smoking households. Of children aged 0–4, 13% of those living with one or more smokers were reported to have asthma compared with 9% in non-smoking households. Similarly, asthma was reported to be more common in children aged 5–9 living with one or more smokers (22%) than in those from a non-smoking household (18%) (ABS 1997:8).

Asthma is more commonly reported among Indigenous than among non-Indigenous people across all age groups. It was the most commonly reported condition for Indigenous children and young adults: 17% of those aged 5 and under, 23% of those aged 5–14, and 20% of those aged 15–24. Although not the most common condition in older age groups, it was still reported by 16–17% of Indigenous adults aged 25 and over (ABS & AIHW 1999:92).

There is some geographic variation in the prevalence of asthma in Australia. The 1995 ABS National Health Survey found that Queensland had the highest (134 per 1,000) and Tasmania the lowest (103 per 1,000) prevalence of asthma (AIHW 2000:90).

Complications

Several different types of complications are associated with asthma attacks. An acute asthma attack may produce a pneumothorax, where air escapes from the lungs into the chest wall, compressing the lung. The symptoms are a

sudden worsening of breathing distress, accompanied by sharp chest pains and a rapid heart rate.

Air escaping out of the lungs and into the skin around the chest and neck is occasionally observed during an asthma attack (a condition known as subcutaneous emphysema). Collapse of part of the lung is a common complication of asthma, often leading to pneumonia.

Disability

Asthma can have a great impact on quality of life. People with asthma are reported to have lower scores than those without asthma when rated in relation to physical and social functioning, role limitations, bodily pain, vitality and general health, indicating a more negative health state. Episodes of asthma also lead to interruptions in schooling and work. According to the 1995 ABS National Health Survey, 12% of people with asthma reported taking days off work or school in the 2 weeks preceding the survey compared with 4% of the population without asthma (ABS 1997).

More than 171,000 persons in Australia reported asthma as a disabling condition in the 1998 ABS Survey of Disability, Ageing and Carers. The disability was mainly in the form of restriction of daily activities, including work and school participation. Another 131,000 persons reported experiencing specific activity limitations in regard to self-care, mobility and communication due to their asthma (AIHW 2000:93).

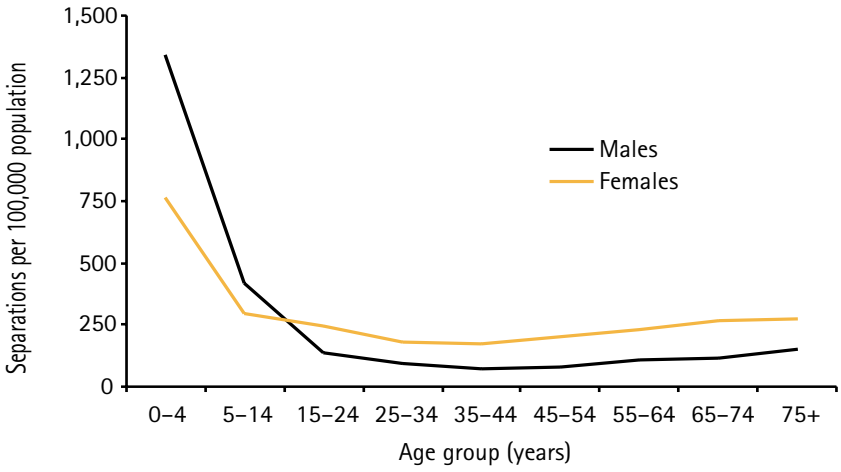
Use of health services

Asthma is the fifth most common problem managed in general practice. A survey of general practice activity in 1999–2000 reported that asthma was recorded on 3,363 occasions in the sample (at a rate of 32 per 1,000 encounters), accounting for 2.2% of all problems managed (AIHW: Britt et al. 2000:45). From 1998 to 2000, there were similar GP management rates for asthma in metropolitan and rural areas, with 31 problems per 1,000 encounters in metropolitan areas, 34 in large rural areas and 32 in small rural areas (AIHW: Britt et al. 2001).

In 1999–00, asthma was the fourth most common reason for admission to hospital. Asthma was the principal diagnosis in 47,008 hospital separations or 0.8% of all hospitalisations, with an average stay of 2.7 days. It accounted for 14% of all hospitalisations for diseases of the respiratory system.

Asthma is one of the most frequent reasons for hospitalisations among children. Males are hospitalised for asthma more often than females in the early years of life (Figure 2.7.3).

Figure 2.7.3: Age-specific hospital separation rates for asthma, 1999–00



Source: AIHW National Hospital Morbidity Database.

The hospital separation rate for asthma, like the death rate, shows regional variation, with rates increasing with geographic remoteness. Remote areas report the highest hospital separation rates, followed by the rural areas (Table 2.7.2).

Asthma is one of the most common reasons for visits to a casualty/emergency ward. Of respondents in the 1995 ABS National Health Survey reporting that they had visited a casualty/emergency ward, asthma was one of the most common reasons given, accounting for about 6% of all reasons.

In 1993–94, the health system costs for asthma were estimated to be $478 million. These include costs associated with the prevention, diagnosis and treatment of asthma (AIHW 2000). Pharmaceutical costs constituted a large proportion of the total cost for asthma ($199 million, approximately 42% of total costs). This is due to many asthma sufferers requiring prescription medication on a regular basis, which is evident with prescription medication accounting for four-fifths ($162 million) of the pharmaceutical costs for asthma.

Hospital services and pharmaceutical costs for asthma were concentrated in those aged 0–14 and 65 and over. The two groups accounted for 66% of the hospital services costs and 53% of the pharmaceutical costs for asthma.

The health system costs of females was higher than that of males, an overall difference of $27 million. The major source of the difference was hospital sector costs, where the cost for males was $42 million compared with $52 million for females.

Management

Asthma management may be divided into management of acute attacks and day-to-day long-term therapy. Drug therapy enables most patients to lead relatively normal lives with few adverse drug effects. Patients with mild asthma and infrequent episodes of wheezing may need therapy only intermittently when they have symptoms. Others, with more persistent symptoms, benefit from continuous treatment.

Two types of medications are used to treat asthma, quick relievers and long-term controllers. Quick relief medications prevent and help reduce the tightening of the muscles around the bronchial tubes. Since inflammation is a primary trigger factor of asthma, anti-inflammatory medications are often prescribed to maintain long-term control.

Asthma can be managed by effective education, regular self-use of devices that monitor lung function, identification of trigger factors, coordinating self-management with written

Table 2.7.2: Hospital separation rates for asthma in metropolitan, rural and remote areas 1996–1998

Metropolitan		Rural			Remote		
Capital cities	Other	Large centres	Small centres	Other	Centres	Other	Australia
3.0	2.3*	3.2*	3.7*	4.0*	5.4*	5.7*	3.2

**Significantly different from 'Capital cities' at the 5% level.*

Notes: 1. Rates are number of hospital separations per 100,000 persons, age-standardised to the Australian population at 30 June 1991.

2. Following RRMA (rural, remote and metropolitan area) classification.

Source: AIHW National Morbidity Database.

action plans and regular medical consultations. A healthy diet, regular exercise and not smoking are important in the successful management of asthma.

Prevention

There is a lack of knowledge currently on how to prevent people from becoming asthmatic, although control of environmental tobacco smoke and other air pollutants can reduce the frequency or severity of asthma attacks. Drug therapy can also do this for affected people, along with reducing exposure to other factors that trigger attacks.

Good prevention includes avoiding the well-known triggers. People with asthma are advised not to smoke tobacco or be exposed to tobacco smoke. Workplaces with excessive fine dusts of an organic nature (flour, sawdust, grain dust and proteins from animals), or with chemicals found in the manufacturing of plastics and resins, should also be avoided.

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2.8 Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) (ICD-9 codes 491, 492, 496; ICD-10-AM codes J41–J44), is a long-term disease that causes continual and increasing shortness of breath. It is a major cause of mortality, illness and disability in Australia—the third leading cause of burden of disease following coronary heart disease and stroke. The single most important cause of COPD is tobacco smoking. Therefore the avoidance and cessation of smoking will greatly reduce the risk of the disease.

Description

COPD is a serious and disabling lung disease marked by progressive shortness of breath. Chronic bronchitis and emphysema are the two prominent forms of COPD, although some other lung diseases can be included under the heading of COPD.

Chronic bronchitis is the inflammation and thickening of the walls of the bronchial tubes (bronchi), which narrows the tubes. It often induces coughing spells, and the glands of the bronchial tubes produce excess mucus that leads to the coughing up of sputum.

In emphysema, the alveoli (air sacs) in the lungs are gradually destroyed by inflammation making it difficult for the lungs to convey oxygen to the blood stream and hence to the rest of the body. Also the bronchi become floppy and narrow, making it increasingly difficult to breathe.

Each condition can occur on its own but chronic bronchitis and emphysema usually coexist in an individual.

Signs and symptoms

COPD develops gradually, with few symptoms in its early stages. The disease typically progresses over many years, from mild breathlessness on strenuous exertion to severe breathlessness on minimal exertion. The symptoms of the disease can vary among sufferers, but typical symptoms of COPD include breathlessness and a cough with sputum production and wheezing.

Because COPD and asthma share a number of symptoms and features, it is sometimes difficult to distinguish between the two diseases. This problem applies particularly in older people because COPD and asthma can both cause chest symptoms such as shortness of breath, coughing and wheezing. COPD sufferers are more likely than people with asthma to have a daily morning cough with sputum and persistent chest symptoms throughout the day.

Disease severity and survival

The progress of the disease and survival are most closely related to the progressive decline in lung function (Fletcher et al. 1976). In those with chronic bronchitis, the mild shortness of breath and wheezing in the early stages of the disease develops over time into a chronic cough with sputum. The cough then becomes more frequent and greater effort is required to move oxygen into and out of the lungs. Among those with emphysema the wheezing becomes more frequent and greater effort is needed to breathe sufficiently. In the advanced stages of the disease, the heart may be affected (NHLBI 1995).

COPD starts with a moderate decline in lung function before the age of 50 (Goldring et al. 1993:387). The progressive reduction in lung function caused by COPD is largely irreversible.

COPD has no cure and will usually shorten life. No drug therapies have been shown to improve survival by reducing the rate of decline in lung

function, although cessation of smoking does slow the progression of COPD.

Co-morbidities

People with COPD, particularly current or past tobacco smokers, often suffer from other related diseases and conditions. These may include concurrent conditions such as heart and blood vessel diseases, and various cancers.

Recurrent bouts of chest infections, pneumonia and allergies are usual among people with COPD, which complicate the symptoms and treatment of the disease.

It is common for COPD sufferers to experience depression and anxiety caused by the distressing symptoms of the disease, its prognosis and the limitations it imposes. Studies have shown that between 30% and 96% of people with COPD display anxiety, depression, panic, confusion or neurosis (ALF 2001:6).

Risk factors

Risk factors for COPD can be categorised first into predisposing factors, and second into environmental and behavioural factors (Box 2.8.1)

Heredity plays a role in predisposing some people to COPD. For example, the deficiency of the enzyme alpha-1-antitrypsin (a genetic trait) can lead to the development of emphysema. Airway hyper-responsiveness (over-reactive airways) is another genetically determined trait that contributes to the development of COPD.

Tobacco smoking is overwhelmingly the strongest risk factor for COPD. It has been estimated that about 77% of deaths from COPD are attributable to smoking (AIHW: Mathers et al. 1999). The majority of COPD sufferers have a long history of tobacco smoking. When inhaled, the smoke paralyses the microscopic hairs (cilia) lining the bronchial tubes. Irritants trapped in the mucus remain in the bronchial tubes and can inflame the bronchial membranes, eventually resulting in chronic obstruction.

Tobacco smoking also increases the severity of the disease. In smokers with COPD, lung function tends to deteriorate more rapidly than in non-smokers. If a smoker stops smoking before serious COPD develops, the rate at which the lung function declines from then on is equal to that for people without the disease. Unfortunately, because some lung damage cannot be reversed, lung function is unlikely to return completely to normal (NHLBI 1995).

Environmental agents, including air pollutants and occupational dusts and chemicals, may contribute to the risk of COPD, either independently or in addition to tobacco smoking (Goldring et al. 1993:389). There is some recent evidence that air pollution levels may be linked to hospital admissions for exacerbations of COPD, although the effect is small (Anderson et al. 1997). Several analyses from cities with high air pollution levels suggest that hospital admissions and mortality due to COPD can vary according to the level of certain pollutant chemicals (Bates & Sizto 1987).

COPD symptoms can be greatly aggravated by chest and viral infections such as the common cold, influenza and pneumonia.

Box 2.8.1: Risk factors for COPD

Predisposing factor

Heredity

Environmental and behavioural factors

Tobacco smoking

Pollution (in the workplace or elsewhere)

Chest and viral infections

Source: Crompton et al. 1999 .

Impacts

Deaths

There were 5,575 deaths in 1998 with COPD listed as the underlying cause of death. It was the fourth leading cause of death among males (40 per 100,000) and sixth most common cause of death among females (17 per 100,000).

COPD is not a significant contributor to mortality among young people. It affects mostly older people, reflecting largely the lifelong exposure to external risk factors, especially smoking. Death rates increase significantly among those aged 70 and over, in particular males (Figure 2.8.1).

In Australia, the death rate attributable to COPD increased steadily from the 1950s, peaking in the early 1970s. Since 1970 the male death rate for COPD has, in general, decreased, but the female death rate has increased steadily (Figure 2.8.2). The increase in the female rate could be the delayed outcome of an increase in the proportion of female smokers, from the late 1970s to mid-1980s (AIHW 2000:95).

Prevalence

The Australian Burden of Disease and Injury Study has estimated that in 1996 there were almost 300,000 people with COPD in Australia, with more than 20,000 new cases every year (AIHW: Mathers et al. 1999). The prevalence was higher in males compared with females: 1,940 per 100,000 males compared with 1,300 per 100,000 females in 1996.

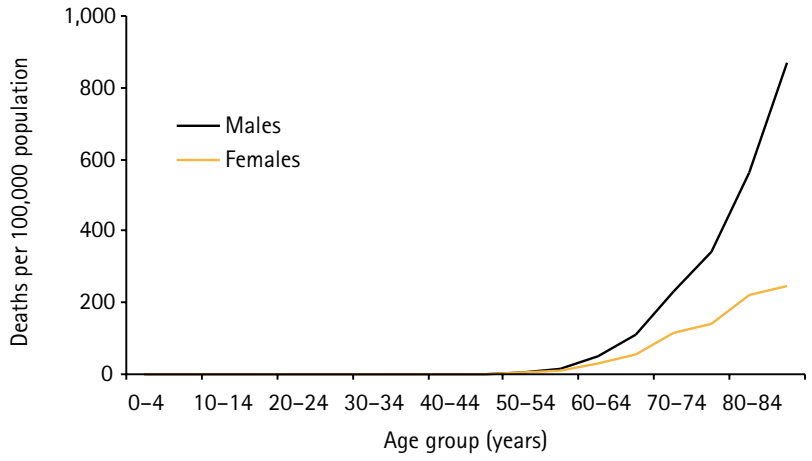
A different estimate put the prevalence much higher, estimating 474,000 cases of moderate to severe COPD (ALF 2001). This latter figure was derived by applying a population-based assessment model (used by the World Health Organization to estimate prevalence in developing countries) to Australian population data.

Obtaining comparable prevalence (and any other health-related data) for COPD is difficult. There are differences in the way the disease is defined, with the only consensus being to include chronic bronchitis and emphysema. Available data (often based on self-reports) are likely to underestimate the actual prevalence because COPD is often not diagnosed until it begins to impair a person's lifestyle and is moderately advanced.

Complications

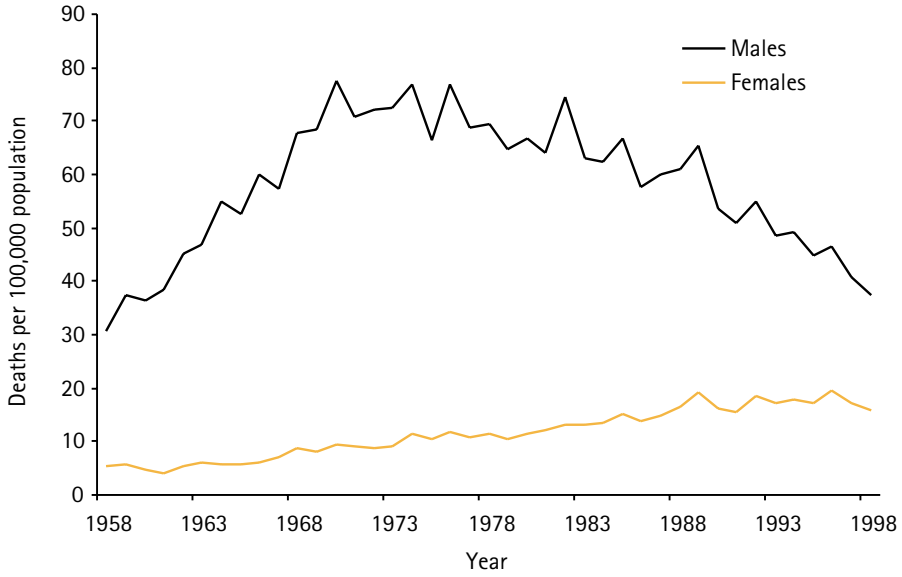
As COPD progressively inhibits normal lung function, other organ systems are threatened. Low blood oxygen (hypoxaemia) due to insufficient oxygen being absorbed into the

Figure 2.8.1: Age-specific death rates for COPD, 1998



Source: AIHW National Mortality Database.

Figure 2.8.2: Death rates for COPD, 1958 to 1998



Source: AIHW National Mortality Database.

blood, can lead to increased blood pressure in the lungs. This overtaxes the right side of the heart, which pumps blood to the lungs, leading to a form of heart failure known as cor pulmonale (NHLBI 1995).

When there is inadequate oxygen in the blood, the body increases production of oxygen-carrying red blood cells to compensate for the deficiency (secondary polycythemia). The excess number of red cells can thicken the blood so much that it clogs the small blood vessels, therefore restricting blood flow (NHLBI 1995).

Another complication of COPD is pneumothorax, which occurs when the lung develops air-filled 'blisters' (bullae) that puncture, allowing air to escape into the surrounding spaces (pleura). As the air accumulates in these spaces, it causes pressure on the lung and sudden severe pain on one side of the lung accompanied by shortness of breath (Crompton et al. 1999).

Osteoporosis may develop in some people with COPD, often caused by the long-term use of oral corticosteroids, a medication prescribed to reduce the inflammation of the air passages. Diabetes may also develop as a side effect of steroid use.

Disability

People with COPD typically experience increasing shortness of breath, which can be very disabling, for months or years before dying. As the disease advances, breathlessness may occur walking up stairs and eventually walking slowly along flat ground, and normal daily activities become more difficult. Often people have to sleep in a semi-sitting position because they are unable to breathe when they lie down. They often complain that they wake up during the night with a choking sensation, and need to sit up to cough (NHLBI 1995).

Most people with COPD are no longer capable of productive work within 7 to 8 years of initial diagnosis (Goldring et al. 1993).

Use of health services

In 1999–00, there were 48,583 hospital separations for COPD (0.8% of all separations). COPD accounted for 15% of all hospital

separations for diseases of the respiratory system. It contributed 377,407 bed days, with an average length of stay of 7.7 days.

The rate of hospital usage for COPD increases with age, particularly after the age of 45 reflecting largely the pattern noted in age-specific death rates. Males are hospitalised for COPD much more frequently than females, although the rates for the two sexes are very similar among those under 45 years of age (Figure 2.8.3).

The total health system costs of chronic bronchitis and emphysema (the two prominent COPD diseases) in 1993–94 were estimated to be $300 million (AIHW 2000), almost three times as much as for lung cancer ($107 million). The major costs were hospital services ($112 million or 37% of total costs), followed by pharmaceutical ($66 million, or 22%) and medical costs ($61 million, or 20%).

Management

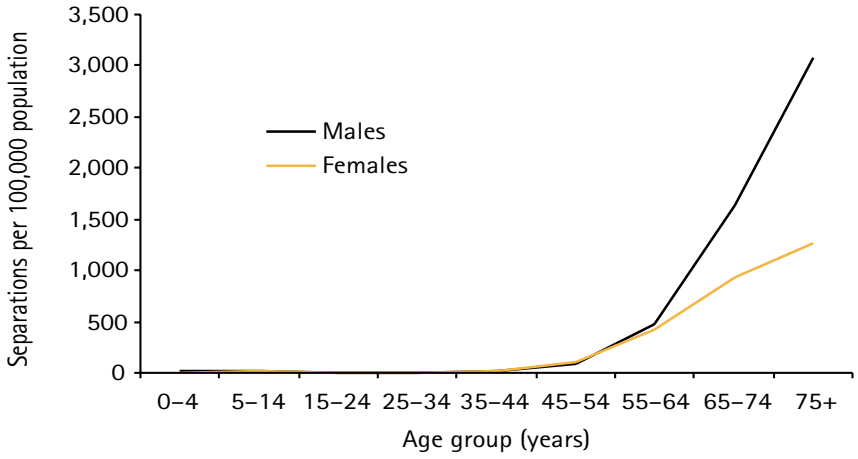
COPD cannot be cured, but therapy can often relieve symptoms and control potentially fatal exacerbations. It may also slow progression of the disease. Treatment must be directed at alleviating conditions that cause symptoms and excessive disability such as chest infections, asthmatic episodes and limitation of physical activity.

Depending on the severity of COPD, prescribed medications may include bronchodilators, which help open narrowed air passages; corticosteroids, which lessen inflammation of the air passage walls; and antibiotics, prescribed to fight infection. People with COPD may eventually require supplemental oxygen (NHLBI 1995).

For some people in the advanced stages of COPD, lung transplantation has been successful. In some sufferers it is beneficial to surgically remove the large air-filled 'blisters' (bullae) that form because of COPD (Crompton et al. 1999).

Since management of COPD is essentially about improving quality of life for the sufferer, the most effective intervention is for permanent cessation of smoking as this will slow the disease process (ALF 2001). The avoidance of work-related exposures to dusts and fumes, air pollution (including environmental tobacco

Figure 2.8.3: Age-specific hospital separation rates for COPD, 1999–00



Source: AIHW National Hospital Morbidity Database.

smoke), excessive heat and cold, and very high altitudes (such as flying, as this may cause hypoxaemia) is also recommended.

The control of complications caused by low blood oxygen, such as high blood pressure in the lungs (pulmonary hypertension) and cor pulmonale, is important in the management of COPD.

Respiratory infection in people with COPD should be treated immediately because it aggravates breathlessness and may lead to respiratory failure among advanced cases (Crompton et al. 1999). COPD sufferers should also refrain from intimate contact with those who have respiratory infections such as the common cold or influenza. Sufferers should consider vaccination against pneumonia and influenza (NHLBI 1995).

General exercise and maintenance of a healthy diet is considered necessary to successfully manage COPD. Also, consuming copious amounts of fluids will help keep the sputum loose so that it can be brought up by coughing.

Prevention

Since smoking has such an important role in the initiation and progression of COPD, smoking cessation is the central preventive strategy. Exposure to environmental tobacco smoke (ETS) should also be avoided whenever possible. Research suggests that exposure to ETS can contribute to COPD if combined with other risk factors such as past smoking (NHLBI 1995).

In addition to smoking as the most common cause of COPD, dust from grain, cotton, wood, mining and other sources or irritant chemical gases may contribute to COPD. Exposure to these factors should therefore be minimised, especially in those who already have COPD, and this may require a change of occupation.

For COPD, the risks from various factors appear to be additive. Therefore it is important to identify the risk factors that occur concurrently such as smoking, exposure to dust particles in the workplace or other irritants, to ensure that the disease is prevented successfully.

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2.9 Chronic renal disease

Chronic renal (kidney) disease is a debilitating and irreversible disorder in which kidney functions become progressively worse. The disease contributes substantially to mortality and disability in Australia and is especially prominent in Indigenous populations.

Chronic renal disease contrasts with acute renal disease which occurs when kidney function suddenly slows or stops altogether. Acute renal disease may progress to a chronic stage and permanent loss of kidney function, but typically is reversible.

Mortality reported here for chronic renal disease is defined by the following ICD-9 codes: 403, 581–583, 585–587, 590–592, 593.2, 593.8 and 593.9; hospital separations are covered by the ICD-10-AM code Z49 'care involving dialysis'.

Description

Kidneys play a vital role in regulating the balance of water and certain substances such as sodium and potassium in the blood. They do this by acting as a filter of the blood, with excess and unwanted water and other materials being allowed to pass into the bladder as urine. The kidneys also help regulate blood pressure and production of red blood cells.

Renal disease can be caused by many conditions that damage the kidneys. These include an inflammatory process known as glomerulonephritis, diabetes, long-term high blood pressure and kidney infections. Although many kidney disorders may be successfully treated and therefore have no long-term consequence, some remain unresolved and become chronic.

Commonly, the loss of kidney function follows a path from renal insufficiency to renal failure, and progresses eventually to end-stage renal disease (ESRD). Various stages of renal disease are described in Box 2.9.1.

Box 2.9.1: Stages of renal disease

Renal insufficiency: *The initial phase of renal disease is renal insufficiency. There are typically no symptoms and it may go undetected to renal failure within months or over an extended period. Renal insufficiency is typically detected by abnormal levels of albumin and creatinine.*

Renal failure: *In this phase, there is a gradual loss of kidney functions; problems may include anaemia, and salt and fluid retention. Renal failure can be detected by abnormal albumin and creatinine levels or by tests showing lowered filtering capacity of the kidneys.*

End-stage renal disease (ESRD): *In this stage, there is a severe reduction in kidney function such that dialysis or kidney transplantation is necessary to maintain life. ESRD is irreversible and incurable with attendant high morbidity and mortality.*

Signs and symptoms

Initial signs of renal disease may include unintentional weight loss, nausea, vomiting, general ill feeling, fatigue, headache, frequent hiccups and generalised itching (pruritus). Further symptoms can include anaemia (a deficiency of circulating red blood cells or

haemoglobin), high blood pressure, excessive urine passing, escape of certain proteins in the urine and a build up of certain substances in the blood, all of which may lead to other complications. For example, high blood potassium levels may lead to abnormal heart rhythms, high uric acid levels to gout, and retention of phosphate and abnormal calcium levels to bone disease.

Co-morbidities

Common co-morbidities for renal disease include heart disease, peripheral vascular disease, high blood pressure and diabetes (see Box 2.9.2). Many of these conditions, such as high blood pressure and diabetes, not only coexist or are found additional to renal disease, but are also common complications due to impaired renal function.

During 1996–99, almost 40% of persons beginning treatment for ESRD were confirmed or suspected to also have coronary artery disease, 28% had peripheral vascular disease, 17% had chronic lung disease and 16% had cerebrovascular disease. Diabetes was present in 26% of new cases (Disney et al. 2000).

Box 2.9.2: Common co-morbidities for renal disease

Heart and vascular diseases
Chronic lung disease
Diabetes
High blood pressure

Source: Disney et al. 2000.

Risk factors

A number of factors contribute to the development and progression of chronic renal disease including predisposing, biomedical and lifestyle factors (Box 2.9.3). Many of these risk factors may exist simultaneously.

Box 2.9.3: Risk factors for renal disease

Predisposing factors
Heredity

Biomedical factors
Glomerulonephritis
Diabetes
High blood pressure

Lifestyle factors
Excess weight
Infections
Injury
Long-term use of analgesic compounds and related agents

Sources: Briganti et al. 1999; Disney et al. 2000.

Some kidney disorders are inherited or are congenital conditions. Polycystic kidney disease for example is an inherited condition in which many cysts form in the kidneys, slowly replacing the mass of the kidneys, and thus leading to kidney failure.

Glomerulonephritis, a group of kidney diseases caused by inflammation and gradual, progressive destruction of the internal kidney structures, is the leading cause of renal failure in Australia. Glomerulonephritis may be triggered in some persons by exposure to stimuli such as streptococcal infections.

Diabetes is the second most common cause of deterioration of the kidneys. Diabetes damages both the small and large blood vessels in the body, thus affecting kidney functions. Good control of blood sugar levels in diabetics can delay or avoid damage to kidney functions (AKF 2000).

High blood pressure, a controllable and reversible risk factor, may also lead to kidney impairment. Increased pressure in the arteries and vessels of the kidneys may cause them to

become narrowed and thickened, impairing the filtering ability of the vessels. In persons with diabetes, high blood pressure further increases the risk of damage to the blood vessels of the kidney.

Excess body weight, especially when found in conjunction with both diabetes and/or high blood pressure, also increases the risk of renal disease, as do infections such as skin sores and scabies. Acute injury, such as extremely low blood pressure following trauma, complicated surgery, septic shock, haemorrhage, burns and associated dehydration, or other severe or complicated illness may lead to acute renal failure. In some cases this may not resolve, and therefore become chronic. Long-term use of various analgesic compounds and related agents are also causal to kidney harm and there is some evidence that smoking accelerates kidney disease.

Impacts

Information on the impact of chronic renal disease in Australia is currently limited, due primarily to lack of data. As noted earlier, kidney disease may go undetected for many years and therefore may not be fully reflected in incidence and prevalence data. Also, the high rate of complications associated with chronic renal disease may lead to deaths from kidney dysfunction to be coded to underlying causes of death other than the kidney impairment per se.

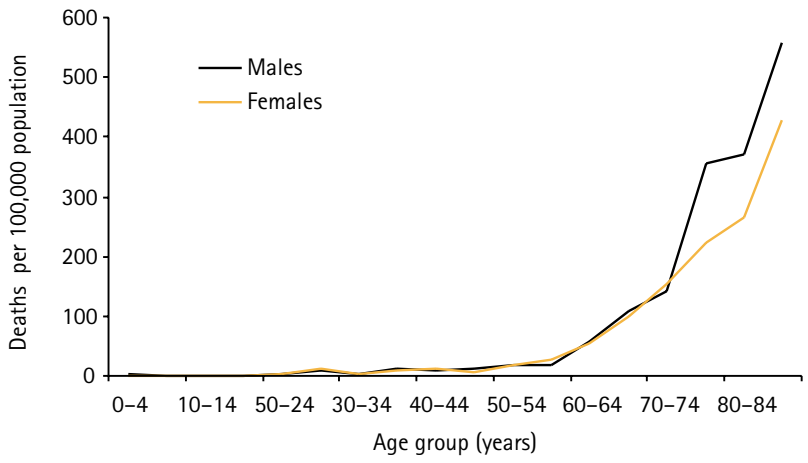
Deaths

Chronic renal disease is a significant contributor to mortality in Australia. In 1998, chronic renal disease accounted for 1,852 deaths (823 males and 1,029 females), with death rates of 9.7 and 7.6 per 100,000 males and females respectively.

The majority of deaths for chronic renal disease are in older age groups, with death rates for both sexes rising steeply after age 60. Although death rates for chronic renal disease are similar in both sexes until the age of 75, the male death rate begins to ascend above that of females at this point (Figure 2.9.1).

The greater burden of mortality in older age groups reflects both the long latency period of disease development and improvements in management. Persons treated by dialysis generally survive longer, albeit with disability.

Figure 2.9.1: Age-specific death rates for chronic renal disease, 1998



Source: AIHW National Mortality Database.

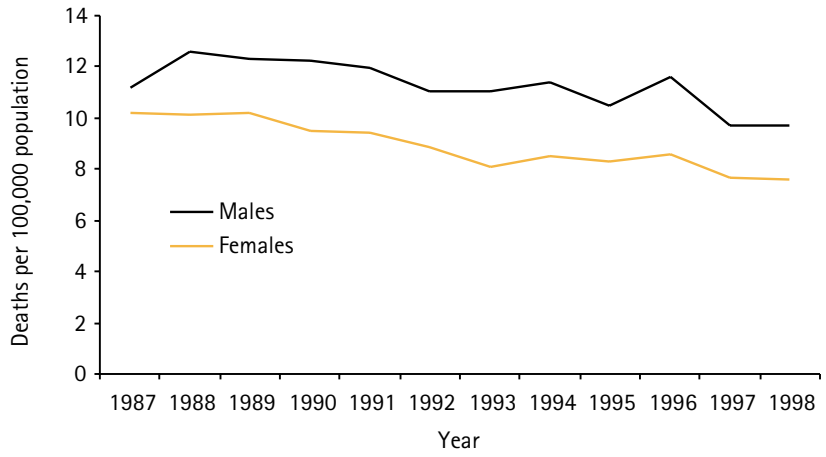
Deaths following chronic renal disease have decreased in both males and females in recent years (Figure 2.9.2). The decrease is most likely due to improved treatment and management extending the lifespan of persons with the disease.

Incidence

The incidence of chronic renal disease is difficult to determine. However, the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) provides a source of information to estimate incidence for ESRD through persons that begin dialysis or receive kidney transplants.

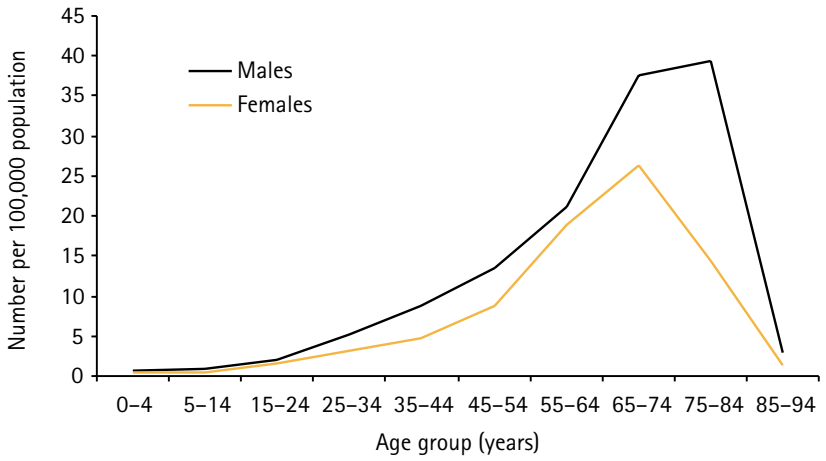
In 1998, a total of 1,589 persons began treatment for ESRD (Disney et al. 1999). Of these, 940 were males (59%) and 649 females (41%). The average age of new cases was 57 with the largest number in the 65–74 age group. Incidence peaked among males aged 75–84 (39 per 100,000) and among females aged 65–74 (26 per 100,000) (Figure 2.9.3).

Figure 2.9.2: Death rates for chronic renal disease, 1987 to 1998



Source: AIHW National Mortality Database.

Figure 2.9.3: Age-specific incidence of ESRD, 1998



Source: Disney et al. 1999.

The death rates for renal disease are decreasing, but the ESRD incidence is now on the rise. There has been a steady increase in new cases of ESRD in Australia, rising from 6.2 per 100,000 in 1992 to 8.5 per 100,000 in 1998.

Prevalence

By the end of 1998, a total of 10,403 persons were being treated for ESRD in Australia. These included 4,880 people with functioning transplants and 5,523 persons dependent on dialysis. The numbers, both of transplants and of persons dependent on dialysis, have increased steadily in the 10 years to 1998 (Figure 2.9.4).

The increase in the total number of people with functional transplants is due mainly to a marked improvement in the survival of kidney transplants. On the other hand, the increasing prevalence of persons reliant on dialysis is due in part to older patients beginning dialysis. In 1998, 38% of new patients were aged 65 and over, compared to 22% in 1989. A levelling off in the number of kidneys available for transplant in the 1990's has also contributed to the increase in persons undertaking dialysis (Disney et al. 2000).

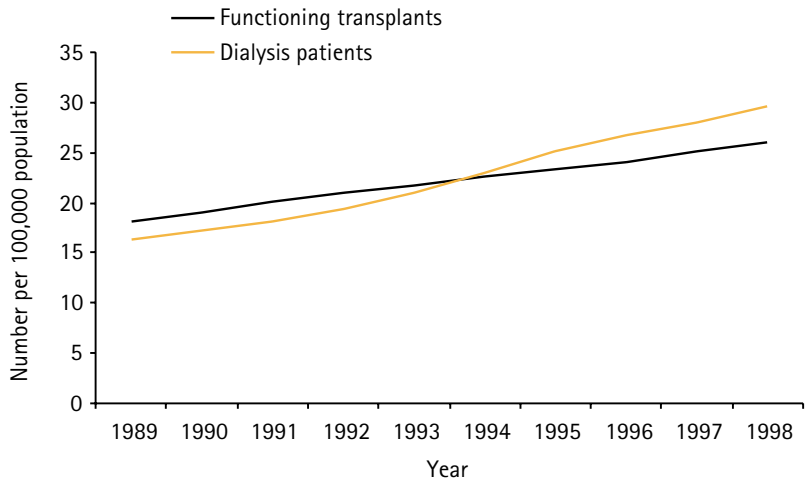
Chronic renal disease in Indigenous populations

There are large disparities in the burden of chronic renal disease between Indigenous and non-Indigenous Australians. In the Northern Territory, epidemic levels of renal failure are reported in the Indigenous population (Spencer et al. 1998).

In 1997–99, there were 78 deaths in Western Australia, South Australia and the Northern Territory of Indigenous persons, where renal failure was the underlying cause (identification of Indigenous persons in death records in other jurisdictions is not of sufficient quality for reporting). Indigenous persons whose deaths were due to renal failure are typically of relatively younger ages compared to non-Indigenous deaths (ABS 2001: 91).

Currently, new cases of ESRD in Indigenous populations are reported to be doubling every 4 years (Spencer et al. 1998). In 1998, 131 Indigenous Australians began dialysis or

Figure 2.9.4: Trends in the numbers of functioning transplants and dialysis patients, 1989 to 1998



Source: Disney et al. 1999.

received kidney transplants, accounting for about 8% of all new cases (Disney et al. 1999). In the Northern Territory, Indigenous persons accounted for 74% of new ESRD cases, yet account for only 28% of the Territory's population.

As at December 1999, there were 535 Indigenous persons with ESRD, 5% of all those registered with ANZDATA. Of these, 434 were dependent on dialysis and a further 101 were living with functioning transplants.

A large proportion of cases of kidney disease in Indigenous persons have diabetes as the underlying cause. In 1998, diabetic nephropathy contributed 42% of the Indigenous dialysis group, compared with 22% in the total dialysis groups (Disney et al. 1999).

Complications

Persons with chronic renal disease are at increased risk for severe anaemia, which reduces the blood oxygen carrying capability. Another common complication is an increased susceptibility to infection. Bone disorders such as the serious condition of renal osteodystrophy can also occur as a result of renal failure.

Box 2.9.4: Common complications of renal disease

Anaemia
Infections
Bone disorders
Heart failure
High blood pressure
Transplantation-related complications

Source: Disney et al. 2000.

There are also a range of complications following dialysis and kidney transplantation. These include heart failure, high blood pressure, abnormal bleeding, and liver, blood and other problems associated with transplant rejection.

Use of health services

Chronic renal disease is a long-term, debilitating, costly and life-threatening disease that requires intensive management, and therefore places a disproportionately large burden on the health system. Persons with chronic renal disease, in particular those who have progressed to ESRD, account for a large proportion of the use of health services. For example, in 1999–00 'care involving dialysis' was the single greatest reason for hospital separations; there were 535,396 separations recorded for this particular diagnosis, almost 10% of all separations.

In 1993–94, the direct costs of kidney diseases in Australia were an estimated $81 million, 0.25% of total health system costs. This included approximately $46 million in hospital costs, $6.6 million in GP and specialist costs, and $1.5 million in pharmaceutical costs (AIHW: Mathers et al. 1998). A further $135 million was attributable to unspecified treatments and procedural costs, including the cost of dialysis.

Treatment and management

In the early stages of renal disease, treatment and management focus on delaying progression to ESRD and controlling complications. The most important interventions to slow progression are good blood pressure and ACE inhibitors. Other management involves controlling blood glucose levels, low-protein

diets and maintaining healthy levels of cholesterol in the blood, all in combination with medication. Management is aimed at reducing strain on the urinary system by minimising the volume of urine produced and preventing a large load of waste products.

Diet is important in delaying the progression of established renal disease. Recommended diets for persons with kidney disease are usually low in sodium, low in potassium and protein, and fluid controlled. This reduces the load on the kidneys, thus preventing toxic build up of waste products in the blood.

Once progression to ESRD has occurred, two major treatment options are available to sustain life, dialysis and kidney transplantation. Dialysis is a method of removing excess water and waste products from the blood when the kidneys no longer can. Dialysis is typically combined with a diet to reduce the wastes that build up in the blood and to maintain nutritious elements. Transplantation involves the surgical replacement of a patient's kidney with one from a donor.

Dialysis aids the survival of patients with ESRD but the greatest chance for long-term survival lies in transplantation. In recent years there have been improvements in the survival of persons with kidney transplants. Of people who had a kidney transplant in 1983, 58% had a functioning transplant 5 years later, increasing to 73% of those who had a transplant in 1993 (AIHW 2000:106).

Prevention

Prevention of renal disease may be facilitated by a number of lifestyle and medical choices. Lifestyle factors include weight and diet control; medical factors include control of biomedical risk factors for renal disease such as high blood pressure.

Some preventive factors aim to avoid the onset of primary kidney disease while others aim to slow the progression of renal damage. These include careful control of glucose and blood pressure levels in persons with diabetes, and blood pressure control in persons with high blood pressure. Diets high in fresh fruit and vegetables, and with adequate fluid intake ease the burden on the kidneys.

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2.10 Oral diseases

With over 19 million untreated decayed teeth, dental caries (tooth decay) is the most prevalent chronic condition affecting health reported in the Australian population. It is estimated that there were almost 11 million newly decayed teeth in 1996, making dental caries the second most commonly occurring condition after upper respiratory tract infections.

Other oral diseases are also very common. The most common clinical consequences of oral disease are infection and tooth loss. Oral diseases are also associated with pain and discomfort; eating difficulties; and problems with speech, communication and socialising.

Description

A number of disorders are included in oral diseases, and range from mouth ulcers, oral cancer, tooth impactions, misaligned teeth and jaws, to trauma to the teeth and mouth.

There are two main forms of oral diseases:

- dental caries (tooth decay), caused by acid-producing bacteria that live in the mouth. Types of caries include early childhood caries, coronal caries, root caries and secondary caries.
- periodontal (gum) diseases, a group of inflammatory diseases that affect the gums, deeper connective tissues and the jaw bone, all of which support and protect the teeth.

Disease severity

Tooth decay can progress from demineralisation of the tooth or its root (which can lead to cavities) to infection of the tooth pulp, abscess formation, fracture of the tooth, and tooth loss. Gum diseases involve inflammation of the periodontal tissues which can be associated with recession of the gums or formation of periodontal pockets in the gums. These pockets may lead to advanced destruction of tooth support resulting in tooth mobility, formation of gum abscesses, and tooth loss.

Risk factors

The risk of oral disease and disorder is shaped by the physical environment (e.g. water fluoridation); the social and economic environment including the home, school, work and neighbourhood; individual behaviour; and genetic endowment. Tooth decay can occur at any age after teeth erupt and is therefore a health issue for all age groups. Caries-causing bacteria infect the mouth and proliferate on a diet of very sweet or sticky foods. Medical conditions and medications that alter the flow of saliva can increase the risk of caries, especially in the elderly. The most common forms of gum diseases are associated with increased age, smoking, infrequent dental visits, low education and income levels, and some medical conditions (Page 1995), especially diabetes (Genco 1996) and osteoporosis (Jeffcoat & Chestnut 1993).

Impacts

Deaths

While most oral disease problems are not usually life-threatening, there are some deaths related to oral diseases, primarily oral cancers. Oral cancers (ICD-9 codes 140–146, 149) represent approximately 4.1% of new cancers in males and 2.2% in females. In 1998, 549 Australians died from oral cancers (AIHW & AACR 2001:42–3.).

Incidence/prevalence

Dental problems are very common in the population and are ranked as the fourth most frequent illness condition, behind headache, high blood pressure and colds (Spencer & Lewis 1988). In 1995, dental problems were the fourth most frequently reported condition among children from birth to age 14, affecting 6% of boys and 7% of girls (AIHW 1998:16).

The number of decayed, missing and filled teeth due to dental caries increases with age. By age 20, over 90% of the population in 1987–88 had experienced some dental caries (Barnard 1993). The average number of untreated decayed teeth was highest at 1.8 for those aged 25–29. Persons with teeth missing as a result of dental caries comprised 76% of those aged 35–44, and there were over 17 missing teeth per person aged 65 and above. Filled teeth increased to a high of 10 per person aged 30–34.

Most of the Australian population has some mild gum disease at any given time. Only a small proportion of Australians has severe gum disease affecting their teeth. Of the population aged 10 or more in 1987–88, the most recent year for which information is available, 22% had periodontally healthy mouths, while 15% had periodontal pockets 4–5mm, and 3% had periodontal pockets 6mm or more in depth (Table 2.10.1).

Losing all natural teeth (edentulism) increases as age increases, as shown in Figure 2.10.1. This reflects both the cumulative loss of teeth over time and previous patterns of dental treatment. In 1996, 49% of persons aged 74 years or more were edentulous.

In only 54% of Australians in 1987–88 was malocclusion (misaligned teeth and jaws) judged to be absent, while severe malocclusion was present in 12% of people (Barnard 1993). Some treatment for malocclusion was judged to be needed by 11%, and 6% were having or had completed treatment.

Table 2.10.1: Periodontal problems of persons aged 10 or more, 1987–88

Periodontal condition	Per cent
Calculus	34
Periodontal pockets, 4–5mm	15
Periodontal pockets, 6mm or more	3
Bleeding of gums on probing	11
Edentulous (no natural teeth)	13
No periodontal problem	22

Source: Barnard 1993.

In 1996, there were 178 babies born with either cleft lip, cleft palate or both. Over the period 1987 to 1996 there were approximately six cases of cleft palate and nine cases of cleft lip per 100,000 live births each year (Hurst et al. 1999).

A total of 2,625 new cases of oral cancers were diagnosed in 1997 (AIHW & AACR 2000). The lip (45%), tongue (17%) and floor of mouth/other mouth (15%) were the most common sites of these new cases of oral cancer. A comparison of the number of new cases with the number of deaths from oral cancers indicates that survival rates are high.

Oral diseases in population subgroups

There are some marked social and regional differentials in Australia in the levels of oral diseases. In 6-year-old children, those living in areas representing the most disadvantaged quarter of the population experience almost twice as much caries as children living in areas representing the least disadvantaged quarter. People with lower education status and in less skilled occupational groups experience higher rates of edentulism (complete tooth loss) and tooth extraction.

There is also a clear relationship between occupation and the social impact of oral diseases and disorders. When three occupational groups were compared, people in more highly skilled or highly paid occupational groups reported less social impact as measured by the Oral Health Impact Profile, and showed a clear gradient across the dimensions of physical, psychological and social disability, and handicap associated with dental problems (Yanga-Mabunga 1998).

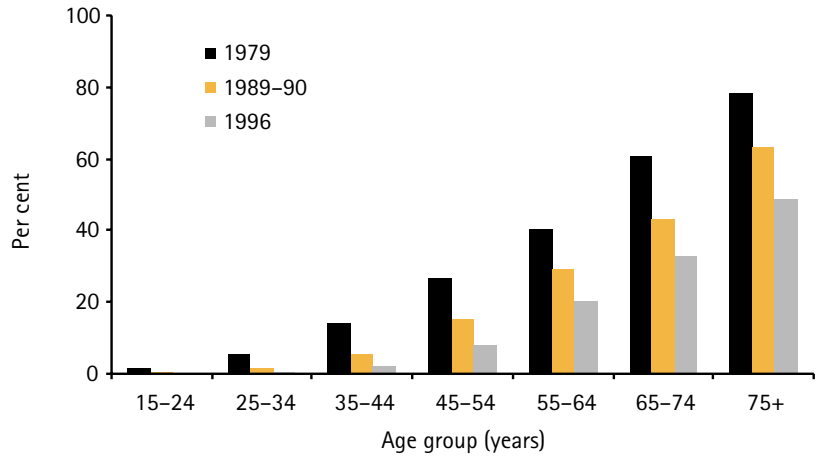
In 6-year-old children, caries experience increases from metropolitan to rural and remote locations. Twelve-year-old children living in rural areas fare worse than both urban-dwelling and remote-dwelling children, as shown in Figure 2.10.2. In addition, older Australians living in rural areas are more likely to be edentulous (have no natural teeth) and more likely to wear a denture than those living in urban areas.

Indigenous Australians are more likely than non-Indigenous Australians to have lost all their teeth, have gum diseases, and receive less caries treatment. High rates of tooth loss in Indigenous adults are associated with the high prevalence of mature onset diabetes in that community. Severe periodontal disease is more prevalent for Indigenous Australians for all ages above 35. The early stages of poorer periodontal health are evident in Indigenous Australians aged 18–24.

Quality of life

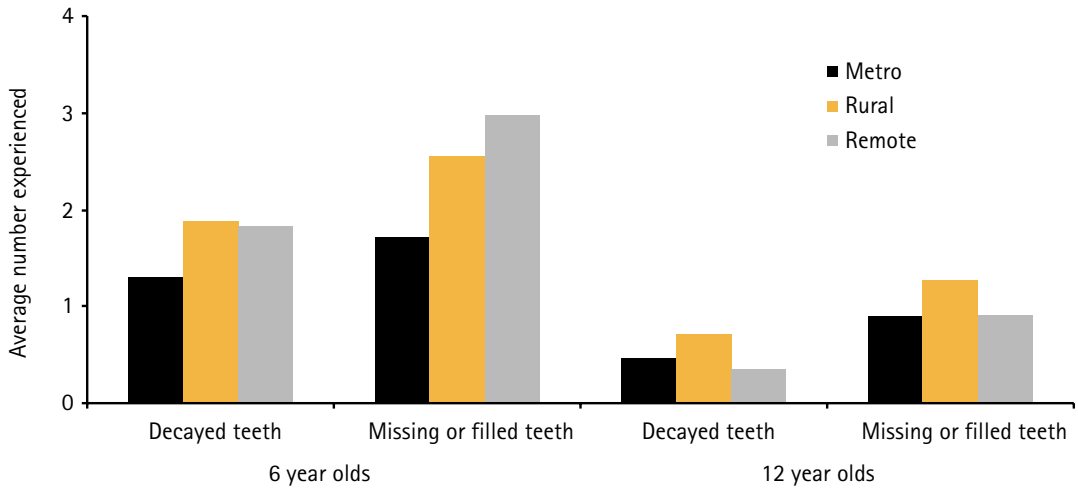
The social impact of oral diseases and disorders is widespread and significant across the Australian population, as shown in Figure 2.10.3. Nearly half of the adults with no natural teeth and 40% of those with some natural teeth reported experiencing discomfort, when eating, in the previous 12 months. Pain from teeth, gums or dentures was reported by approximately one-third of Australian adults. Self-consciousness related to oral health problems was reported by 20% of Australian adults. Approximately one in ten adult Australians who had their own natural teeth reported diminished taste, having to alter their

Figure 2.10.1: Edentulous persons, by age group, 1979 to 1996



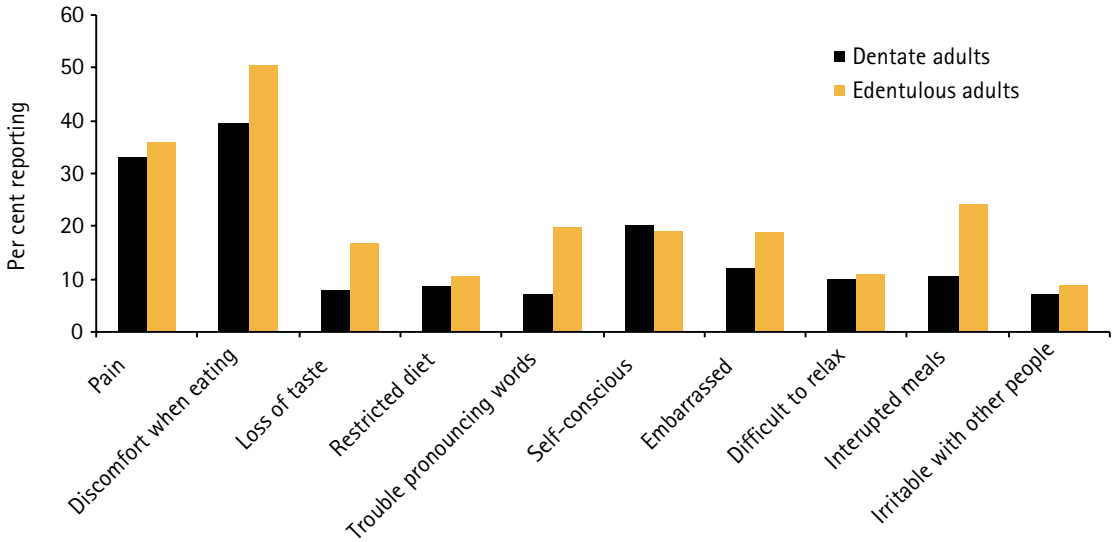
Sources: ABS 1979 Special Supplementary Survey 1; ABS 1989–90 National Health Survey; AIHW DSRU 1994–96 National Dental Telephone Interview Survey.

Figure 2.10.2: Children's experience of decayed, missing or filed teeth, by geographic location, 1996



Source: AIHW DSRU 1996 Child Dental Health Survey.

Figure 2.10.3: Social impact of oral diseases and disorders in last 12 months, 1999



Source: AIHW DSRU 1999 Dental Health and Lifestyle Factors Survey.

diet, difficulty pronouncing words, embarrassment, difficulty relaxing, having to interrupt meals and being irritable because of their teeth, gums or dentures in the previous 12 months (AIHW DSRU: unpublished data, 1999 Dental Health and Lifestyle Factors Survey).

Use of health services

Some oral diseases and conditions such as oral cancers and oral trauma may be treated in hospital settings. There are also dedicated public dental hospitals in some capital cities that provide public dental treatment to eligible patients. Most dental problems are treated by general dental practitioners in either private or public clinics.

Oral trauma resulted in Australians being admitted to hospital at a rate of 67 per 100,000 people (AIHW NISU, unpublished data). This includes only hospital admissions where oral injury was the principal diagnosis, not all admissions that include an oral injury. Oral trauma not resulting in hospitalisation is also substantial, with an estimated 24 cases of oral trauma per 1,000 children aged 6–12 years (Stockwell 1988).

The benefits of regular dental visits are shown in Figure 2.10.4. People whose most recent visit was for a dental problem were more likely to have a gap of over 5 years since their previous visit (17%), compared to those who came for a check-up (3%). Conversely, of those whose last visit was for a dental problem, only 41% had visited in the past year while 72% of those visiting for a check-up had visited in the last year.

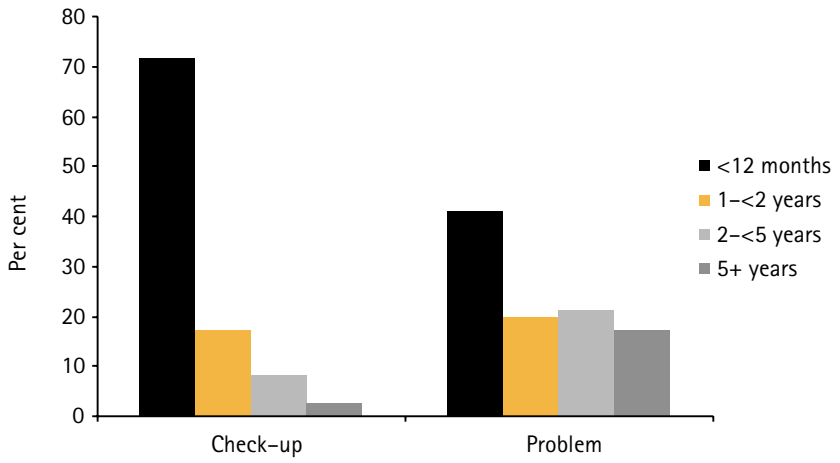
Differences in access are evident by age group. There is a sharp increase in visiting for a dental problem from adolescents (25% for ages 12–17) to young adults (over 40% for ages 18–24) after which the proportion of problem visiting remains fairly constant. In children, the greater use of dental services for check-up visits reflects the availability of services through the school dental services. In Australia as a whole, only 6% of those aged 6–12 had not made a dental visit in the previous 2 years. This increased to 10% for ages 13–16.

Costs

The high burden of illness from oral diseases and disorders is reflected in the costs of dental health care services. The direct costs to the health care system of oral disease in 1997–98 totalled more than $1.9 billion per year, or 4% of total health expenditure. Dental caries has been estimated to account for approximately 70% of this amount.

These costs do not include indirect costs of oral diseases and disorders to individuals, or the cost to society of lost work days, school days, or productivity (AIHW: Mathers & Penm 1998:2). For example, 21% of workers in 1996 reported taking time off work for a check-up, 16% reported taking time off for a problem, and 29% continued to work despite having a dental problem, but possibly with reduced productivity (Yanga-Mabunga 1998).

Figure 2.10.4: Time since last visit by dentate adults coming for a check-up or for a problem, 1994–96



Source: AIHW DSRU 1994–96 National Dental Telephone Interview Survey.

Management

Tooth and gum disease can be controlled, as evidenced by the use of fluoride, by tooth and gum brushing, by cessation of smoking, or by fillings and other treatments. The body's protective mechanisms, including saliva, play an important role in limiting tooth damage from caries-causing bacteria. Even if caries reaches an advanced stage, a tooth can be retained if infection is controlled, diseased tissue removed and replaced, and the form and function of the tooth restored (e.g. through root canal treatment).

Prevention

Oral diseases are largely preventable. When they occur, interventions are available to limit their progress, alleviate pain and suffering and restore function. The major types of oral disease are dental caries and periodontal disease. Both of these ultimately lead to tooth loss if not treated, but are largely preventable and reversible if detected and treated early. Currently about 90% of all tooth loss can be attributed to these two categories of diseases. Therefore, most tooth loss is avoidable.

Oral health needs in Australia are addressed implicitly in a number of ways, including nutrition and general health programs. Examples of primary prevention in oral health include water fluoridation, toothpaste fluoridation, education and awareness raising, and access to preventive dental services such as those offered by the school dental services provided by State and Territory health authorities. Secondary and tertiary prevention are generally offered by dental health care workers in clinical settings.

Water fluoridation

Considerable oral health gains from the prevention and control of dental caries, especially for children and adolescents, are associated with an increased exposure to fluoride, through both water fluoridation and toothpaste with fluoride (Spencer 1986a, 1986b; Spencer et al. 1994). Between 1964 and 1971, six of Australia's capital cities introduced water fluoridation. Melbourne was not fluoridated until 1977. In most Australian States and Territories, some three-quarters of the resident population now has access to fluoridated water supplies. Brisbane is the only non-fluoridated capital city.

School dental services

In the 1970s, the Commonwealth Government funded the development of infrastructure and the education of dental therapists as the workforce for school dental services. These services achieved high coverage of the target primary school population in all States and Territories other than New South Wales and Victoria. Most services were then extended through the secondary school population.

The range of care provided throughout Australia in the school dental services is similar, covering basic restorative and preventive care, and some limited orthodontic care. The school dental services have shown themselves to be effective in reaching a high percentage of children. The unit cost of the services is low and the health outcomes continue to improve, providing an excellent base on which the oral health of Australians can be built.

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2.11 Arthritis

Arthritis is a group of disorders in which there is inflammation of the joints, causing chronic pain, stiffness, disability and deformity. The two most common forms are osteoarthritis (ICD-9 code 715; ICD-10-AM codes M15–M19) and rheumatoid arthritis (ICD-9 codes 714.0–714.2, 714.31–714.33, 714.4–714.9; ICD-10-AM codes M05–M06). Arthritis imposes a heavy economic burden on the community, including in-patient and out-patient care, nursing home care, medications and lost productivity. Most of the arthritic conditions are of unknown cause and allow little opportunity for prevention. However, good management can address problems associated with some components of the disease.

Description

Arthritis (inflammation of the joints) can result from injury, infection, accumulated wear or auto-immunity. Most episodes of joint inflammation are resolved when healing has been completed, but in some cases the inflammation does not remit.

There are more than 100 known types of arthritis, of which osteoarthritis and rheumatoid arthritis account for the majority of cases. Other types include fibromyalgia, lupus, gout, spondylitis, bursitis, tendonitis and carpel tunnel syndrome.

Symptoms of arthritis include stiffness, pain and swelling of joints, most commonly in the fingers, toes, wrists, knees, elbows and ankles. The effects are usually symmetrical, affecting the same site on both sides of the body around the same time. Although it primarily affects the joints, rheumatoid arthritis can also affect the connective tissue throughout the body, particularly those related to the lungs, heart and eyes (Scott & Hochberg 1998:472).

Osteoarthritis is a degenerative joint disease affecting primarily the hands, spine and weight-bearing joints such as hips, knees and ankles. The disease begins in cartilage overlying the ends of joint bones, and is caused and accelerated by mechanical forces, disrupting the normal function of the joint. Pain is initially experienced in the joints during and after activity, but as degeneration progresses it may occur with only minimal movement or even during rest (AIHW 2000:100).

Rheumatoid arthritis is an auto-immune disease involving chronic inflammation of the joints, beginning with the membranes lining the joints and spreading to other joint tissues. The inflammation may damage the cartilage in the joint and erode adjacent bones. This damage and the reduced use of the joint can lead to deformities.

While most cases of arthritis occur at ages above 20 years, a form of rheumatoid arthritis, juvenile rheumatoid arthritis (ICD-9 code 714.30; ICD-10 code M08) occurs in children. The disease resembles adult rheumatoid arthritis in most respects, but may also have some distinctive patterns, including fever, rash and enlarged spleen, particularly in the systemic form (US NLM 2001).

Disease severity and complications

Most forms of arthritis are chronic in nature, although intermittent or episodic in presentation. Only a few forms can be completely cured. Juvenile rheumatoid arthritis often improves or remits at puberty, with approximately 75% of cases having minimal functional loss and deformity (US NLM 2001).

Pain is the most common outcome of most forms of arthritis. This can be compounded by destruction of the cartilage and underlying bone in the joint, often resulting in disability and

restrictions in normal activities. While such deformities are not usually life-threatening, mortality can occasionally result if the cervical spine becomes unstable (Katz 2000).

Rheumatoid arthritis often has additional features that do not involve the joints. Rheumatoid nodules (painless, hard, round or oval masses under the skin) are present in about 20% of cases. Occasionally these occur in the lungs, causing pleurisy (inflammation of the lining) and shortness of breath. Fibrosis (scarring) in the lung is reported to occur in 20% of persons with rheumatoid arthritis. Anaemia may occur due to failure of the bone marrow to produce enough new red cells to make up for the lost ones.

More serious complications of rheumatoid arthritis include vasculitis (inflammation of the blood vessels) which can lead to skin ulcerations or stomach ulcers. Vasculitis may also affect the brain, nerves and heart, causing stroke, heart attack or heart failure. Heart complications include pericarditis (inflammation of the outer lining) and myocarditis (inflammation of the heart muscle itself), both of which can lead to congestive heart failure (Katz 2000).

Risk factors

Genetic factors play an important role in a person's predisposition to arthritis. The precise genetic links vary for each type. Increasing age is a risk factor for both rheumatoid arthritis and osteoarthritis. The tendency to auto-immunity is also a risk factor for rheumatoid arthritis.

Females have a greater risk of rheumatoid arthritis. Females aged 54 and above are also at greater risk for osteoarthritis, but this is not necessarily the case at younger ages (March 1997:99; Scott & Hochberg 1998: 468–70, 473).

While there are no well-established behavioural risk factors for rheumatoid arthritis, a number of these have been identified for osteoarthritis (Box 2.11.1). The major modifiable risk factors are joint trauma, obesity and repetitive joint usage. A history of joint trauma is the strongest risk factor for osteoarthritis at either the knee or the hip. Obesity has been demonstrated to be a weight-bearing factor in osteoarthritis of the knee. Occupations requiring knee-bending have been associated with knee osteoarthritis, and farming has been associated with hip osteoarthritis. Recreational activities, including running and other sports, are not associated with the development of osteoarthritis among people who have not had prior joint injuries (Scott & Hochberg 1998:469–70).

Box 2.11.1: Risk factors for osteoarthritis

Predisposing factors

Genetic

Sex

Age

Environmental and behavioural factors

Joint trauma and injury

Obesity

Repetitive occupational joint use

Physical inactivity

Sources: March 1997:99; Scott & Hochberg 998:468–70.

Co-morbidities

Arthritis coexists with a variety of diseases and conditions. While some of these may be no more than associated features of ageing, they are more likely to occur in arthritis sufferers because these diseases and conditions share common risk factors with arthritis, such as excess weight, previous joint injury and the tendency to auto-immunity.

Osteoarthritis is more likely to develop in people with prior inflammatory joint diseases such as gout or rheumatoid arthritis. Since osteoarthritis is in part a result of obesity and

lack of exercise, it may also occur together with heart and vascular diseases and Type 2 diabetes.

Diseases associated with rheumatoid arthritis include respiratory and infectious diseases, gastrointestinal disorders and non-Hodgkin's lymphoma (Scott & Hochberg 1998:473). Rheumatoid arthritis is also the most common cause of secondary amyloidosis, in which deposits of a waxy, starch-like protein (amyloid) can decrease the function of tissues, including those in the heart and brain (Wollheim 1993:648). Some of these co-morbidities are considered to reduce the life expectancy of people with rheumatoid arthritis.

Research in the USA has found that depression is much higher among adults with rheumatoid arthritis (between 14% and 27%) than in the general population (5%). This is probably because over half of those with rheumatoid arthritis are forced to make some changes in their work schedule, with resulting financial pressures, and over 70% are unable to participate in recreational activities. Another stress factor leading to depression is the uncertainty about the progression of the disease (Access Economics 2001:6).

Impacts

Deaths

Arthritis is listed as an underlying cause of relatively few deaths. In 1998, there were 86 deaths in Australia recorded as being due to osteoarthritis, and 135 due to rheumatoid arthritis. However, rheumatoid arthritis is believed to be associated with excess mortality. Causes of death that are more frequent in persons with rheumatoid arthritis include respiratory and infectious diseases and gastrointestinal disorders. Some of the mortality associated with gastrointestinal disorders may be due to the complications of therapy for arthritis (Scott & Hochberg 1998:473).

Prevalence

The ABS 1995 National Health Survey found that 2.7 million Australians (nearly 15% of the population) suffered from some form of arthritis, with about 60% of these being females. Of this total, 1.2 million had osteoarthritis and more than 476,000 had rheumatoid arthritis, with prevalence rates of 64 per 1,000 and 26 per 1,000 respectively. A recent projection of these figures to June 2000 indicates that an estimated 3.1 million Australians have arthritis, or 16.5% of the population. This estimate compares to 18% in the USA, 16% in Canada, and 14% in the UK and Europe (Access Economics 2001:6–7).

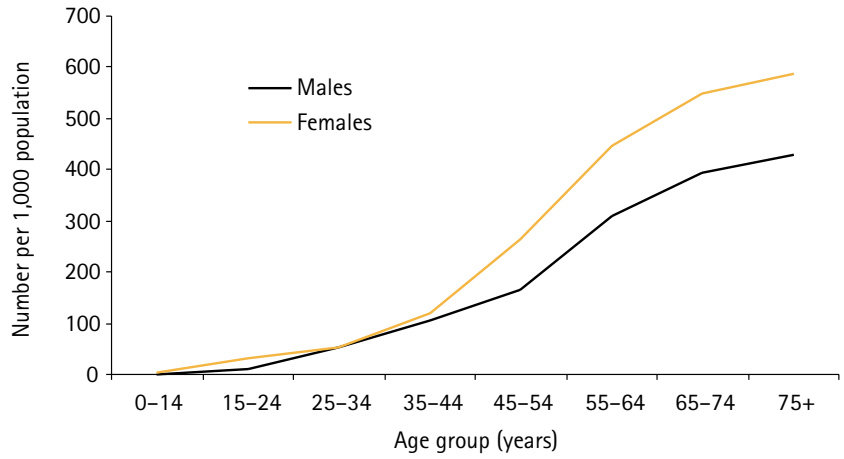
The strong relationship between arthritis and ageing is reflected in the increasing prevalence of the condition with age (Figure 2.11.1). Relatively few people at younger ages report having arthritis, but by age 65 over half of females and a third of males in Australia report having some form of arthritis.

The prevalence of both osteoarthritis and rheumatoid arthritis follows a similar pattern of increasing sharply with age (Figure 2.11.2). For both conditions, the prevalence is greater in females at nearly all ages.

Disability

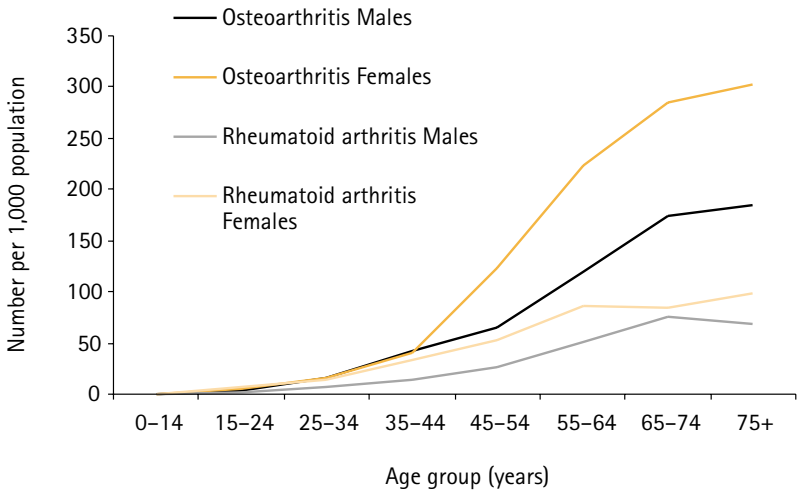
Arthritis can lead to disability due to restricted mobility from severe joint pain. The ABS 1998 Survey of Disability, Ageing and Carers found that nearly half a million Australians (497,000) had a disability due to arthritis, about 14% of all persons with a disability. Nearly two-thirds (66%) of these were females. Disability due to arthritis was particularly marked in the older age groups (Figure 2.11.3). At age 65 and above, 16% of females and 10% of males had a disability due to arthritis.

Figure 2.11.1: Age-specific prevalence of arthritis (any form), 1995



Source: AIHW analysis of ABS 1995 National Health Survey.

Figure 2.11.2: Age-specific prevalence of osteoarthritis and rheumatoid arthritis, 1995



Source: AIHW analysis of ABS 1995 National Health Survey.

Use of health services

Arthritic conditions are among the most frequently managed problems in general practice, representing 2.4% of all problems managed in 1999–00. Osteoarthritis alone represented 1.5% of all problems managed, ranking it as the tenth most frequently managed problem (AIHW: Britt et al. 2000:39). Osteoarthritis is also the third most common problem for which imaging is ordered by GPs, after back pain and fracture, being 4.1% of all imaging orders (AIHW: Britt et al. 2001:47, 92).

Hospital separations for osteoarthritis have increased by 42% over the past 7 years, from 39,186 in 1993–94 to 55,758 in 1999–00. There are far fewer separations for rheumatoid arthritis, and these have declined over the

same 7-year period, from 6,179 to 5,135. Average length of stay in hospital for both conditions in 1999–00 was over 6 days (6.5 days for rheumatoid arthritis and 6.4 days for osteoarthritis).

Health system costs in 1993–94 were estimated to be $624 million for osteoarthritis, nearly half (48%) of which was for hospital services. A further 19% was for nursing home care, 13% for medical care (mainly GPs), and 9% for pharmaceuticals. Costs for rheumatoid arthritis were $129 million, with 34% of this going to hospital services, 21% each to medical care and pharmaceuticals, and 14% to nursing home care (AIHW: Mathers & Penm 1999:19).

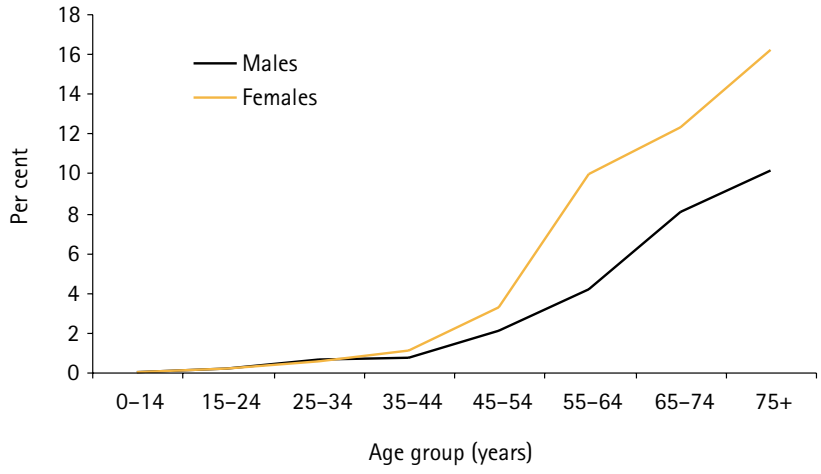
Management

Most types of arthritis cannot be fully cured, but it is possible to provide relief for many sufferers and delay progression of the condition. The goals of treatment for arthritis therefore are to provide pain relief, increase motion and improve strength.

For osteoarthritis, weight loss and exercise to strengthen bones and muscles are important. Anti-inflammatory drugs, such as COX-2 inhibitors, are preferable to pure analgesic agents in relieving pain in osteoarthritis because they have fewer gastrointestinal complications. Recent research suggests that glucosamine sulfate retards the progression of symptomatic knee osteoarthritis. In advanced cases not responding to treatment, surgical joint replacement is a cost-effective intervention (Brooks 2001:S91).

Early diagnosis and aggressive treatment with disease-modifying, anti-rheumatic drugs are important in treating rheumatoid arthritis. A range of new drugs, particularly the monoclonal antibodies, can significantly improve outcomes, at least in the short term. Surgical joint replacement also can be considered, but it does not appear to cure the disease (Brooks 2001:S91). An appropriate public health intervention, given the excess mortality from respiratory and infectious diseases among

Figure 2.11.3: Age-specific prevalence of disability due to arthritis, 1995



Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers.

patients with rheumatoid arthritis, is immunisation against pneumonia and influenza (Scott & Hochberg 1998:474).

Studies of self-management interventions have found that education programs provide significant improvements in outcomes for arthritis patients in comparison to anti-inflammatory drug treatment alone (Superio-Cabuslay et al. 1996).

Prevention

Due to the auto-immune nature of rheumatoid arthritis, prevention is not a major focus of efforts. Limited primary prevention measures have been identified for osteoarthritis. On the basis of current knowledge of risk factors, avoiding joint trauma, preventing obesity and modifying occupational-related joint stress through ergonomic approaches can all help prevent osteoarthritis (Scott & Hochberg 1998:470).

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2.12 Osteoporosis

Osteoporosis or 'porous bones' (ICD-9 code 733.0; ICD-10-AM codes M80–M82) is a condition characterised by the progressive loss of bone density, thinning of bone tissue and skeletal fragility. It is a major cause of morbidity, deformity, disability and poor quality of life among the elderly, particularly females, due mostly to fractures and related complications. Osteoporotic fractures can impair physical functions, often leading to dependency in older people. The cost to the community from osteoporosis, particularly in terms of health system expenditure, is high. Its impact is likely to increase further with the ageing of the population.

Description

Osteoporosis results when calcium dissolves from the bones, leaving them porous and weak. Reduction in bone tissue is accompanied by deterioration in the architecture and strength of the skeleton, increasing risk of fracture, and substantial pain and disability. It occurs more frequently in older persons as bone tissue is progressively lost with ageing, but the rate of deterioration varies widely between individuals.

Most experts define osteoporosis as skeletal bone mineral density of more than two standard deviation units below the average value for young adults (a t-score of –2.0; the WHO definition is a t-score of –2.5). Persons with this level of bone loss are at a high risk of fracture. Those with t-scores between –1.0 and –2.0, a condition known as osteopenia, are at an increased risk of fracture.

Fracture depends as much on injury as on bone density, but the loss of bone through osteoporosis increases the risk of fracture with minimal or no trauma. The risk of fracture increases by a factor of approximately two for each standard deviation unit below the mean (O'Neill 1997:1183). Fractures of the hip among older adults, especially when they occur in association with minimal or moderate trauma, are considered to be related to osteoporosis.

A major Australian study, using information obtained from radiology services, the Dubbo Osteoporosis Epidemiology Study, estimated that after age 60 about 56% of females and 29% of males suffer a fracture due to osteoporosis (Wark 1996:327). The proportion increases with age.

Disease severity and complications

The diagnosis of osteoporosis is made mostly following fractures of the spine, hip (especially the neck of the femur), wrist or other areas of the skeleton. Many epidemiological studies use fracture as a surrogate indicator of osteoporosis because of difficulties in measuring bone density (Scott & Hochberg 1998:476).

The various fracture sites have different sex ratios and incidence rates in different decades of life. Fracture-associated mortality also varies with age and site. For example, hip fractures result in considerable mortality, although this may reflect the greater presence of coexisting morbidity in older people.

Osteoporotic limb fractures are usually precipitated by falls, whereas the precipitating factor in vertebral fracture is often being lifted or lifting a heavy weight (Nuki et al. 1999:869). Back pain from compression fractures of the thoracic vertebrae is a common problem among the elderly.

Hip fractures are a particularly serious outcome of osteoporosis, as virtually all persons with a hip fracture are hospitalised for treatment. There were 14,600 hip fractures in 1994, mostly due to osteoporosis, and this number is expected to increase to 20,900 in 2010 (ANCC 1997:S5). Two-thirds of persons who fracture a hip do not return to their pre-fracture level of functioning,

with many of these requiring nursing home care. Studies in Australia and the USA suggest that mortality within a year of hip fracture is 24%, about five times higher than that in an age-matched group who did not suffer a hip fracture (ANCC 1997:S5; US CDCP 2001:4, 12–3).

Risk factors

There are many known risk factors for osteoporosis (Box 2.12.1). High in importance are those that affect bone mass development and loss over an individual's life span (Figure 2.12.1). Bone mass increases during growth years to reach a peak between the ages of 25 and 35 and falls thereafter in both sexes, with an accelerated phase in females mainly due to a deficiency of oestrogen (which has a central role in maintaining and balancing bone mass) following menopause.

Genetic factors also are important in the origin and development of osteoporosis; family studies suggest that genetic influences account for 70–85% of individual variation in bone mass (Nuki et al. 1999:868).

Box 2.12.1: Risk factors for osteoporosis

Predisposing factors

Being female
Family history
Low levels of oestrogen after menopause
Amenorrhoea lasting more than 6 months before the age of 45
Early menopause (before age 45)

Environmental and behavioural factors

Low body weight
Low calcium intake
Low vitamin D levels
Being immobile
Lack of exercise
Smoking
Alcoholism
Use of corticosteroids

Sources: O'Neill 1997:1188; Nuki et al. 1999:869.

Of the behavioural and environmental factors known to influence bone mass in normal individuals, the most important are lack of exercise and low calcium intake during growth and adolescence. Excessive exercise in females, in association with oestrogen loss, can also result in opposing effects of mechanical stress and hormone deficiency in the skeleton.

Calcium intake is also important in determining the rate of post-menopausal bone loss, along with vitamin D levels, which affect absorption of calcium. Low body weight is associated with low bone mineral density. Osteoporosis may also occur as a result of corticosteroid drug treatments, tobacco smoking and alcohol abuse (Nuki et al. 1999:868–9; Access Economics 2001:3).

Co-morbidities

Several medical conditions are associated with an increased risk of osteoporosis, including chronic liver disease, chronic renal disease and rheumatoid arthritis. Two metabolic disorders have also been identified in association with osteoporosis. One of these, known as hyperparathyroidism, involves excessive production of parathyroid hormone, which increases the blood calcium level by reabsorbing calcium from the bones. The other is a condition among males known as hypogonadism, wherein a decreased or absent secretion of hormones from the gonads causes increased loss of bone mass (O'Neill 1997:1188).

Impacts

Deaths

Only a small number of deaths (93 in 1998) are recorded as being caused by osteoporosis. However, the number of deaths due to falls among the elderly, many of which can be

attributed to osteoporosis, is large. The Burden of Disease and Injury Study, using attributable fractions by age and sex for six fracture sites, estimated that 523 deaths in 1996 were attributable to osteoporosis (AIHW: Mathers et al. 1999:74–5). In 1998, there were 1,014 deaths of persons aged 65 and over for which the external cause was an accidental fall, and in over half of these (551) hip fracture (fracture of neck of femur) was listed as the cause or one of the causes of death (AIHW: Cripps & Carman 2001:15).

Prevalence

There are several estimates available of the prevalence of osteoporosis in Australia. Based on self-reports in the 1995 ABS National Health Survey, an estimated 248,000 people had osteoporosis. Among females, the prevalence was 105 per 1,000 among those aged 65–74, and 123 per 1,000 among those aged 75 and above (Figure 2.12.2). Comparable rates among males were 12 and 15 per 1,000 respectively.

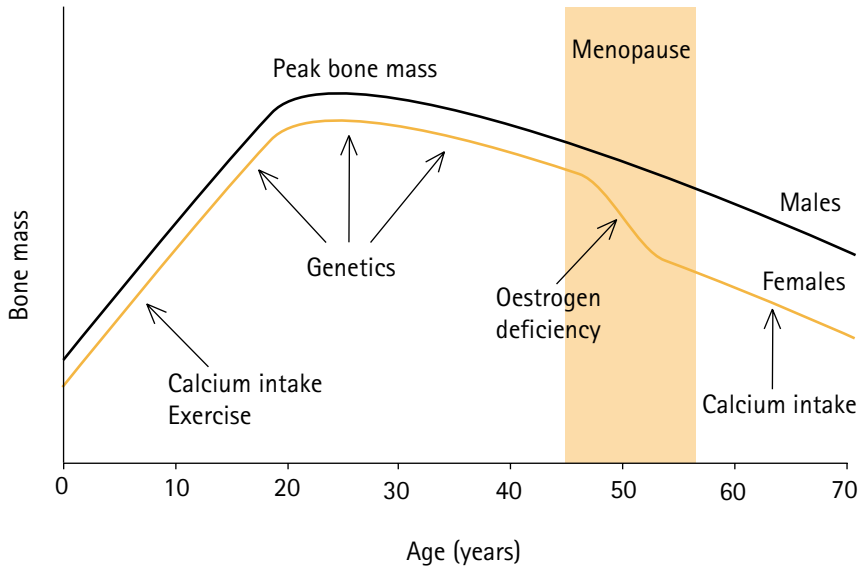
The Burden of Disease and Injury Study has estimated that in 1996 over 155,000 Australians suffered from osteoporosis. The prevalence of osteoporosis among females was estimated to be more than four times that among males: 13.7 per 1,000 females compared with 3.2 per 1,000 males (AIHW: Mathers et al. 1999:74, 209).

A much larger estimate of the prevalence of osteoporosis has been produced by Access Economics (2001:9), by including proportions of those reporting back problems, curvature of the spine, other musculoskeletal diseases, fractures from injuries, and osteoporosis from secondary sources. This method produces an estimate of 1.8 million people with osteoporosis in 1995.

Disability

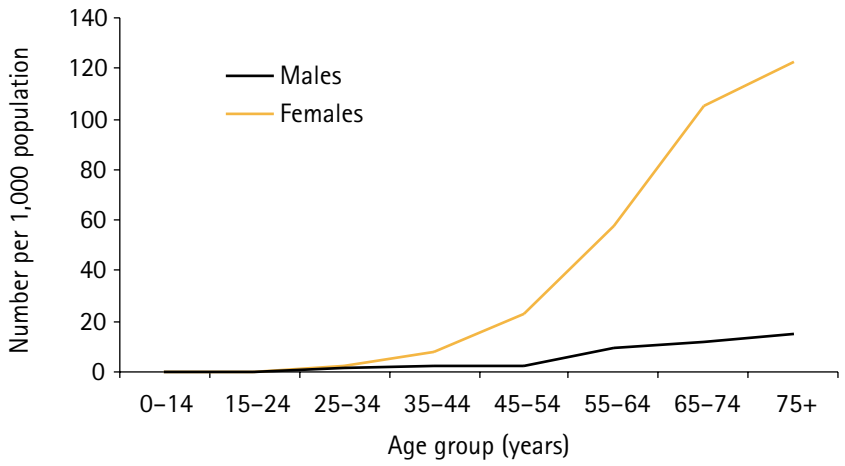
The 1998 ABS Survey of Disability, Ageing and Carers estimated that over 29,100 persons had a disability due to osteoporosis as the main cause, 85% of these being females. The rate of

Figure 2.12.1: Changes in bone mass with age



Source: Nuki et al. 1999:868. Reprinted from Davidson's Principles and Practices of Medicine, 18th edition. Nuke G, Ralston S & Luqmani R, Diseases of the Connective Tissues, Joints and Bones, pages 801–76 1999, by permission of the publisher Churchill Livingstone.

Figure 2.12.2: Age-specific prevalence of osteoporosis, 1995



Source: 1995 ABS National Health Survey.

disability due to osteoporosis in females aged 75 and over was estimated to be 13 per 1,000. The survey also estimated that a total of 96,100 persons with a disability had osteoporosis.

Use of health services

In 1999–00, there were 7,059 hospital separations for which the principal diagnosis was osteoporosis; 60% of these separations also listed fracture as reason for hospitalisation. The average length of stay for this latter group was over 12 days.

In the same period there were 27,260 separations for fractures that were likely to be the result of osteoporosis. These were closed fractures of the vertebrae, arm or hip (neck of femur) as a result of falls among people aged 50 and above (see Harris et al. 1998:44–5 for a detailed explanation and ICD-9 codes). Over three-quarters (78%) of these separations were of females.

There are several estimates of the costs of osteoporosis to the community. These estimates vary considerably, due to the different assumptions and methodologies used. The AIHW study of health system costs produced an estimate for osteoporosis in 1993–94 of $60 million. This estimate includes the costs of diagnosis and treatment of osteoporosis per se, while most of the costs for fractures resulting from osteoporosis are classified in the AIHW study as injury costs associated with fractures and falls (AIHW: Mathers & Penm 1999:9–10).

In addition to the $60 million costed for osteoporosis in the AIHW study, Access Economics (2001:13) estimated osteoporotic fractures in 1993–94 to cost $296 million. Another large category for osteoporosis-related health system costs, $950 million, included kyphosis (curvature of the spine), back problems and osteoporosis from secondary sources. The resulting total estimate by Access Economics of the health system costs for osteoporosis in 1993–94 was $1.3 billion.

The Dubbo Osteoporosis Epidemiology Study estimated the cost of treating osteoporotic fractures in persons aged 60 and over in Australia to be $779 million in 1992, with 54% of the total being attributable to hip fractures (Wark 1996:327). This estimate included rehabilitation and other community costs. In

contrast, an analysis by the Centre for Health Program Evaluation produced an estimate for 1994 of $227 million, much closer to the estimate generated by Access Economics. Almost two-thirds of this amount ($141 million) was for hospital in-patient care, and 85% of this care was for hip fractures (Harris et al. 1998:35–6).

Management

A number of lifestyle measures are advised for managing osteoporosis, including recommendations for lifestyle modification, pain relief and fall prevention measures that may prevent the progression of osteoporosis or fractures. However, at present there are no approved drug treatments to increase bone density once it is lost. A reasonable level of physical activity (30–60 minutes of moderate weight-bearing exercise on 3–4 days per week) can improve strength, stability and balance, thus reducing the risk of falls. Calcium intake should be at an adequate level (800 mg/day for pre-menopause females and 1,000 mg/day for post-menopause). Medications that predispose to bone loss (corticosteroids, thyroxine therapy, anticonvulsants) should be minimised, as should medications that predispose to falls (O'Neill 1997:1189).

Prevention

It is easier to prevent than to treat established osteoporosis. There are two main approaches to the prevention of osteoporosis. The first, optimising the attainment of peak bone mass, begins in childhood and includes maintaining a good diet with an adequate intake of calcium. An active lifestyle, with an emphasis on weight-bearing physical activities such as walking, is also important, as is discouraging smoking and excessive alcohol consumption (Scott & Hochberg 1998:481).

The second approach is to slow the rate of bone loss with ageing. A number of drug treatments, including hormone replacement therapy (HRT), are available. For females, oestrogen replacement started at the time of menopause seems to retard or prevent bone loss and reduce fracture risk for as long as the oestrogen is taken (Scott & Hochberg 1998:480). According to self-reported information in the 1995 ABS National Health Survey, 25% of females aged 45–54 and 30% of those aged 55–64 were using HRT (ABS 1997:60). Testosterone replacement is appropriate for males with osteoporosis caused by hypogonadism (O'Neill 1997:1190).

A 1996 national consensus conference on osteoporosis concluded that mass screening for low bone density is not required at present. The likelihood of poor attendance at screening programs, poor uptake and compliance with therapy, and the relatively low efficacy of available treatments (30–50%) suggest that the cost of a mass screening program would not be justified by any resulting change in the incidence of fractures in the whole community (ANCC 1997:S7–S8). Measurement of bone mass should, however, be considered for specific population groups: oestrogen deficient females, patients with vertebral fracture, patients receiving long-term glucocorticoid therapy, and patients with asymptomatic primary hyperparathyroidism (Scott & Hochberg 1998:482).

The risk factors for falling should also be addressed as part of an osteoporosis prevention program. An environmental assessment to help older persons 'fall-proof' their living areas is advisable. Typical actions from such assessments include installing optimal lighting; providing hand rails on stairs, toilet and bath areas; removing throw rugs and extension cords; placing soft corners on cabinets and furniture; and providing appropriate footwear to prevent tripping (Scott & Hochberg 1998:482).

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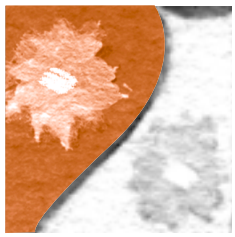


Risk factors

Poor diet and nutrition

Physical inactivity

Tobacco

Alcohol misuse

High blood pressure

High blood cholesterol

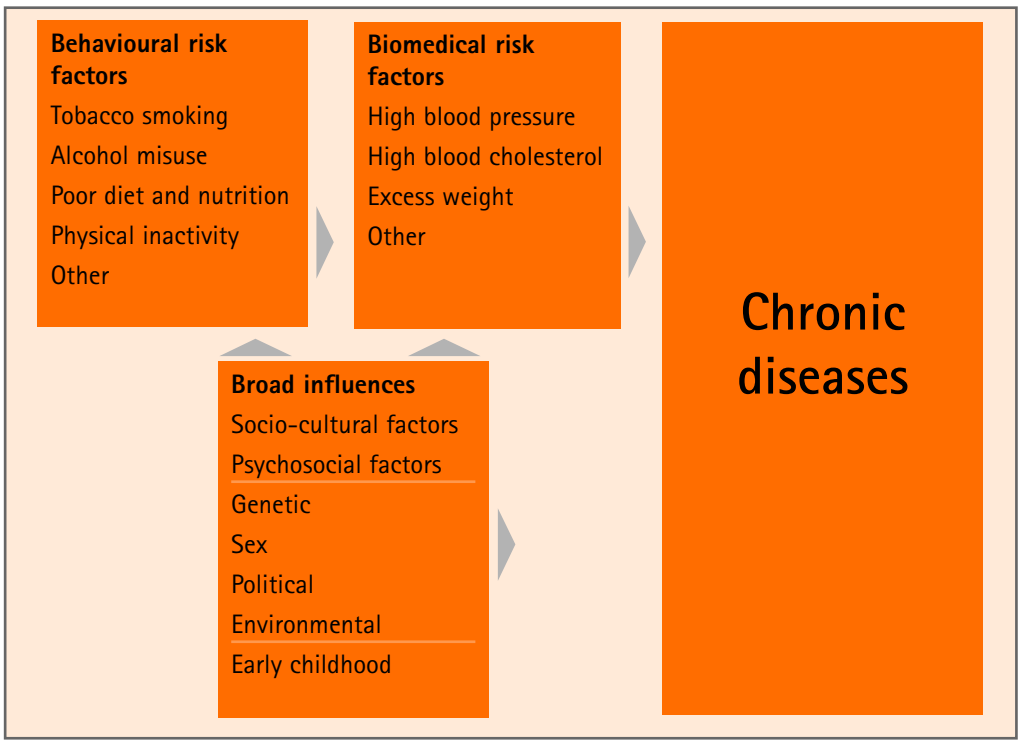
Excess weight

Chapter 3

3 Risk factors

This chapter shifts the focus from specific chronic diseases and conditions to risk factors that affect the onset, maintenance and prognosis of a variety of chronic diseases and their complications. The focus is on those risk factors that are avoidable or modifiable and for which there is potential for health gain through early prevention or appropriate management. Stand-alone information is presented on four common behavioural risk factors (tobacco smoking, alcohol misuse, physical inactivity, poor nutrition) and three biomedical risk factors (high blood pressure, high blood cholesterol, excess weight). All of these represent events along the causal pathways leading to the development of various chronic diseases and their complications (Figure 3.0.1).

Figure 3.0.1: Relationships of risk factors and chronic diseases



Surveillance of risk factors is an integral part of chronic disease monitoring. Importantly, surveillance aids in forecasting levels and trends and provides an opportunity for early intervention.

Although this chapter profiles seven risk factors individually, it is important to note that the factors do not act alone or independently. They tend to coexist and to interact in their effects. As an individual factor they are almost always a contributory cause in a disease, not the sole cause. All diseases are to some extent multi-factorial in their causes.

It should also be noted that only a small proportion of risk factors associated with chronic diseases or conditions has been consistently found to meet the accepted epidemiological criteria of causation. In addition, the distinction between a disease (or a condition) and a risk factor is difficult to achieve, because several diseases act as risk factors for other diseases and conditions. Table 3.0.1 sets out some of the key linkages noted in this report between the risk factors and diseases covered.

A further point to remember is that there are important, broader influences on health and disease, such as many social and economic factors as shown in Figures 1.0.4 and 3.0.1. It is beyond the scope of this report to cover them here even though they make an important contribution to the risk factors discussed and also contribute to health and disease in a range of other ways.

It is difficult to be certain that a particular risk factor has contributed to a disease in any individual case, however good estimates can be made of its contribution to health and disease at a population level. A well-established approach is to calculate what is known as the attributable fraction. This is based on knowing the proportion of people who have the risk factor in question and the extra risk that the factor imposes on the individual who has it. For example, by knowing the percentage of smokers and ex-smokers, and the extra risk of lung cancer they have compared to non-smokers, it is estimated that over 80% (the attributable fraction) of lung cancer cases can be attributed to cigarette smoking. Some examples of attributable fractions are presented in the following sections.

Since risk factors often interact, it is much more difficult to establish their combined contribution to a particular disease. The individual attributable fractions cannot simply be added.

The following overviews include information on health outcomes associated with each risk factor, prevalence patterns, impacts in terms of associated mortality and use of health services, and potential for reducing the impact of the factor. Information is also presented on certain population groups because they have higher levels of some of the risk factors covered in this report and therefore are at greater risk of certain chronic diseases.

Table 3.0.1: Relationships between various chronic diseases, conditions and risk factors

	Risk factor							
	Behavioural				Biomedical			Other
Chronic disease/condition	Poor diet	Physical inactivity	Tobacco use	Alcohol misuse	Excess weight	High blood pressure	High blood cholesterol	Diabetes
Coronary heart disease	a	a	a	a	a	a	a	a
Stroke	a	a	a	a	a	a	a	a
Lung cancer			a					
Colorectal cancer	a	a			a			
Depression			a	a	a			
Diabetes	a	a			a			
Asthma			a		a			
Chronic obstructive pulmonary disease			a					
Chronic renal diseases	a				a	a		a
Oral diseases	a		a					a
Osteoarthritis		a			a			
Osteoporosis	a	a	a	a				
Excess weight	a	a						
High blood pressure	a	a		a	a			
High blood cholesterol	a	a			a			

3.1 Poor diet and nutrition

Consensus has developed about the role of diet in the aetiology and prevention of chronic diseases. A poor diet contributes to chronic diseases directly or indirectly through a range of health risk factors. It often results from over-consumption of food in general, or diets high in energy-rich components such as fat. A poor diet may also be low in dietary fibres or complex carbohydrates, and deficient in certain vitamins and minerals. In Westernised societies, the problem is typically one of excess food rather than deficiency.

Poor diet and nutrition is common and contributes substantially to the burden of chronic diseases in Australia.

Description

A key to achieving optimum health, is eating a balanced diet. In order to work efficiently, our bodies require a variety of nutrients on a daily basis and we can derive these from many different sources.

The importance of nutrition in disease prevention and health maintenance has been emphasised by the publication of dietary guidelines by the National Health and Medical Research Council (NHMRC). Three sets of guidelines have been developed—for adults, for children and adolescents, and for older Australians. The guidelines (summarised in Box 3.1.1) emphasise that we require a full set of nutrients—vitamins, minerals, carbohydrates, fibre, protein, and fats—to nourish and energise us.

Box 3.1.1: Summary of the dietary guidelines for Australians

Promote the consumption of:

- *a wide variety of foods including plenty of cereals, vegetables and fruits*
- *adequate amounts of water and other fluids*
- *foods high in iron (e.g. lean meats) and calcium (e.g. dairy foods)*

Limit intake of:

- *added sugars, salt and alcohol (alcohol is not recommended for children)*
- *fats, particularly saturated fat (low fat diets are not suitable for young children)*

Maintain a healthy body weight

Care for food and keep it safe to eat

Encourage and support breastfeeding

Source: NHMRC 1992, 1995, 1999a.

Health outcomes

Poor diet plays a key role in the development and progression of several chronic diseases such as coronary heart disease, stroke, some forms of cancer, Type 2 diabetes and dental caries. It also contributes to a variety of other health risk factors such as high blood pressure, excess weight, and high blood cholesterol (see Box 3.1.2). Alternatively, a healthy diet plays an important role in protecting against many chronic diseases and their risk factors.

There is strong evidence that poor diet and nutrition mostly leads to the development of chronic diseases through a range of intermediary risk factors. For example, high intake of saturated fat raises blood cholesterol levels, high overall fat intake contributes to overweight and obesity, and high salt use contributes to high blood pressure—all intermediate factors that increase the risk of coronary heart disease (AIHW 2001). There is strong evidence of the role of sugar in the development of dental caries (Stanton 2001).

Similarly, diets low in fruit and vegetables or high in dietary fat are known to increase the risk of colorectal cancer (NHMRC 1999b).

A high intake of plant foods (such as cereals, fruit, vegetables and legumes) on the other hand is considered to provide protection against coronary heart disease, some cancers and excess weight. There is good evidence that regular consumption of fish, particularly oily fish that are high in omega-3 polyunsaturated fats, reduces the risk of coronary heart disease (NHFA 1999). Similarly, omega-6 polyunsaturated fatty acids (found in large amounts in vegetable oils such as sunflower oil) are considered to protect against heart disease by lowering LDL cholesterol and probably by reducing the risk of an irregular heartbeat (NHMRC draft guidelines).

Breastfeeding, particularly exclusive breastfeeding, is thought to be protective of several chronic diseases later in life. These include Type 2 diabetes, inflammatory bowel disease, allergic diseases, obesity and atherosclerosis.

Box 3.1.2: Health problems associated with poor diet and nutrition

Coronary heart disease
Stroke
Type 2 diabetes
Some cancers
Bowel conditions
Dental caries
High blood pressure
High blood cholesterol
Excess weight
Atherosclerosis

Source: WCRF & AICR 1997; Law 1997.

Dietary patterns

Insights into the extent of poor diet and nutrition in the population can be gained by using several different approaches. One method is to compare dietary intake with the recommended levels. Another is to compare nutrient intakes to total energy intake (known as nutrient density), also based on the recommended dietary intakes. A third approach would be to compare trends in the apparent consumption of foodstuffs and nutrients standardised by dietary intake.

Information on dietary intake patterns in Australia as a whole is limited. National data are available mainly from the 1983 ABS Dietary Survey of Australian Adults, the 1985 ABS National Dietary Survey of School Children and the 1995 ABS National Nutrition Survey. Apparent consumption of foodstuffs and nutrients, information compiled by the ABS, can be used to track broad time trends.

Data from the 1995 ABS National Nutrition Survey indicate a 32.5% contribution of fats to energy intake for persons aged 19 and over (maximum recommended level, 30%), of which 12.5% is from saturated fats (maximum recommended level, 10%). Similarly, persons aged 19 and over are reported to consume 144g of fruit (minimum recommended level, 300g) and 259g of vegetables (minimum recommended level, 300g) per day. Put differently, 2 in 3 persons are not consuming the recommended level of vegetables, 4 in 5 are not consuming enough fruit, and 1 in 2 males and 2 in 3 females are not eating recommended levels of cereal foods (Table 3.1.1).

Trends

There have been significant changes in food and nutrient intake in Australia in the last two decades, both among children and adults, as revealed by the nutrition surveys. Intake of energy, dietary fibre, carbohydrate and iron all increased significantly during this period. By contrast, total fat consumption decreased (Table 3.1.2).

Among children, there were no changes in mean intake of dietary staples such as cereals, fruit, vegetables and meats but there were significant

Table 3.1.1: Comparison of food intake with recommended levels, 1995

Food group	Amount	Proportion of persons with inadequate intake	Recommended level
Vegetables	Too little	2 in 3	300g per day (minimum)
Fruit	Too little	4 in 5	300g per day (minimum)
Cereal foods	Too little	1 in 2 males 2 in 3 females	210g per day (minimum)
Fat (exceeding level)	Too much	2 in 3 males 1 in 2 females	30% of energy (maximum)
Saturated fat (exceeding level)	Too much	2 in 3	10% of energy (maximum)

Source: Cancer Council Australia 2001.

increases in the consumption of cereal-based foods (such as cakes, pastries and pizza), non-alcoholic beverages, and confectionary and sugar products (such as honey and jams).

Among adults, foods contributing to the increases (and which were consumed by at least 40% of the sample on the day of the surveys) were cereals (including breads, breakfast cereals, cakes and biscuits etc.) and non-alcoholic beverages.

Unexpected changes included increases in the consumption of plain drinking water among both adults and children and a decrease in vitamin C consumption, the latter largely attributable to a fall in fruit consumption among adults and fruit juices among children (Cook et al. 2001).

Disparities

Individual variation in dietary patterns is well recognised. Within any large population there also exist subgroups or pockets of population that are at a high risk of poor diet and nutrition. These people may be nutritionally vulnerable for several reasons—health status (chronically ill or handicapping conditions), socioeconomic disadvantage, education levels, Indigenous status and lack of easy access to a range of appropriate foods.

Socioeconomic disadvantage

According to the 1995 ABS National Nutrition Survey, adults in the socioeconomically most advantaged group have the highest average intake of energy. However, this group was also found to have the highest dietary fibre intake and the lowest cholesterol intake (ABS 1997). In comparison, people in the disadvantaged socioeconomic categories reported high levels of fat consumption. Interestingly, those in the most disadvantaged group reported a slightly higher intake of vegetables than all other socioeconomic groups (ABS & DHAC 1998).

Urban, rural and remote groups

Regional analysis of the 1995 ABS National Nutrition Survey indicated that people living in rural centres have the lowest median intakes for the majority of vitamins and minerals. Cholesterol intake is higher among males living in rural and remote areas but differences are less marked among females. Adults in rural and remote areas have reported eating half a serve more of vegetables daily than their metropolitan counterparts, although they still do not achieve the recommended minimum of five serves per day (ABS & DHAC 1998).

Table 3.1.2: Comparison of nutrient intake in Australia, 1980s and 1995

	Adults (aged 25–64 years)		Adolescents (aged 10–15 years)	
Nutrient/indicator	Direction[(a)]	Extent of change	Direction[(a)]	Extent of change
Energy	Increased	Males—3% Females—4%	Increased	Boys—15% Girls—11%
Protein	Unchanged		Increased	Boys—14% Girls—13%
Carbohydrate	Increased	Males—17% Females—16%	Increased	Boys—22% Girls—18%
Fat	Decreased	Males—6% Females—4%	Unchanged	
Cholesterol	Decreased	Males—14% Females—22%	Unchanged	
Fibre	Increased	Males—13% Females—10%	Increased	Boys—13% Girls—8%
Calcium	Increased	Males—18% Females—14%	Unchanged	
Iron	Increased	Males—11% Females—15%	Increased	Boys—16% Girls—11%
Vitamin C	Decreased	Males—8% Females—7%	Decreased	Boys—not significant Girls—10%

(a) Where there is a trend in mean intake it is significant at 1% level.

Source: Cook et al. 2001. Based on analysis of comparable samples from the 1983 National Dietary Survey of Adults, the 1985 National Dietary Survey of School Children and the 1995 National Nutrition Survey.

Indigenous and non-Indigenous groups

National data on the diet and nutrition of Indigenous peoples are limited (AIHW 2000). The Indigenous sample in the 1995 ABS National Nutrition Survey was too small to allow reliable analysis. The transition from a traditional hunter-gatherer lifestyle of varied, nutrient-rich diets to energy-rich diets high in fat and refined sugars has created changes in dietary patterns that do not appear to be conducive to good health.

Impacts

In Australia, as in other developed countries, mortality from poor diet and nutrition is almost always associated with diet-related diseases rather than from severe malnutrition or starvation. Two Australian studies have assessed the link between poor diet and mortality.

Gattorna et al. (1997) have attributed 16% of male and 20% of female deaths in Western Australia in 1994 to poor diet. The proportions declined slightly since 1983–85 when the corresponding estimates were 18% and 22% (Gattorna et al. 1997).

More specific estimates of the role of inadequate fruit and vegetable consumption in increasing the risk for mortality through a variety of chronic diseases were generated by the Australian Burden of Disease and Injury Study (AIHW: Mathers et al. 1999). According to this study, an estimated 2,541 (3.7%) male deaths and 1,516 female deaths (2.2%) in Australia in 1996 were attributable to inadequate fruit and vegetable consumption.

Prevention

Good nutrition, including childhood and prenatal nutrition, can play an integral part in the prevention of chronic diseases. Population initiatives to encourage nutritious diets can include education and training, mass media campaigns, government initiatives, economic incentives and regulatory measures.

Australia has used a variety of social marketing strategies to promote increased consumption of fruit and vegetables, e.g. 'Fruit 'n' Veg with Every Meal' (Western Australia 1989–93 and South Australia 1990–91); 'Two Fruit and Five Vegetables Every Day' (Western Australia 1989–93 and Victoria 1992–95) and 'Eat Well' (Tasmania 1997). In 1999, a national education campaign, comprising a partnership between Coles and the Dietitians' Association of Australia, was aimed at increasing fruit and vegetable consumption in the Australian population.

Recent government initiatives aimed at improving the health of Australians through better food and nutrition include the National Nutrition Strategy 2000–2010 (also known as 'Eat Well Australia'), the complementary Indigenous Nutrition Strategy, the National Breastfeeding Strategy, the National Action Plan on Vegetables and Fruit, and the National Cancer Strategy.

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3.2 Physical inactivity

People who are physically inactive, defined for this report as undertaking 'insufficient' physical activity to achieve measurable health outcomes, are at increased risk for all-cause mortality and for a range of chronic diseases. Physical inactivity is also associated with other chronic disease risk factors such as high blood cholesterol and high blood pressure.

Description

Levels of physical activity are categorised in this report as 'sufficient' or 'insufficient' activity (see Box 3.2.1). Although there is no clear level of physical activity that does not confer a health benefit, the definition of sufficient activity, and therefore insufficient activity, is based on emerging evidence on the health benefits of regular participation in physical activity (AIHW: Armstrong et al. 2000).

Box 3.2.1: Defining physical activity

'Sufficient' activity is defined as 150 minutes of activity per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).

'Insufficient' activity combines the constructs of no participation in physical activity and physical activity that is less than the amount required to meet the 'sufficient' category.

Source: AIHW: Armstrong et al. 2000:17.

Health outcomes

There is substantial literature outlining the relationship between physical inactivity and a range of health outcomes (see Box 3.2.2).

A lack of regular physical activity is associated with higher overall death rates for adults of any age (Blair et al. 1995). The strongest evidence is for an increased risk of mortality and morbidity from heart and vascular diseases, particularly coronary heart disease and acute myocardial infarction (heart attack) (USDHHS 1996).

Those who are physically inactive have a one-and-a-half to two-fold increase in risk for a fatal or non-fatal coronary event compared to those who are active (Kohl 2001). There is also some association between physical inactivity and an increase in risk of some types of stroke, although the evidence is less clear (Hu et al. 2000).

Insufficient physical activity increases the risk of Type 2 diabetes. Participation in sufficient physical activity reduces risk especially among people already at risk of Type 2 diabetes and influences the degree and severity of disability suffered from diabetes (Tuomilehto et al. 2001). It has been estimated that up to 50% of new cases of Type 2 diabetes could be prevented by participation in appropriate levels of physical activity (Manson & Spelsberg 1994).

Box 3.2.2: Health problems associated with physical inactivity

Chronic conditions

Heart and vascular diseases and conditions
Type 2 diabetes
Musculoskeletal disorders
Some cancers

Biomedical factors

High blood pressure
High blood cholesterol
Atherosclerosis
Excess weight

Sources: Bauman & Owen 1999; USDHHS 1996.

Physical inactivity is also associated with an increased risk for some cancers; in particular, an increased risk for post-menopausal breast cancer (Cancer Council Australia 2001) and colon cancer (Colditz et al. 1997).

These negative outcomes of physical inactivity contrast with the beneficial health outcomes associated with undertaking sufficient physical activity. In addition to reducing health risks for a variety of diseases and comorbidities, as outlined above, positive outcomes include weight control, increases in muscle and bone strength, reduction in risk for chronic conditions such as osteoporosis, lower back pain and arthritis, and protection against injury (specifically falls). Physical activity has also been associated with a reduction in risk for poor mental health, mainly through a reduction in the severity of depressive symptoms and anxiety (Bauman & Smith 2000; USDHHS 2000; Bauman & Owen 1999).

Patterns

Prevalence

In 1999, around 44% of the Australian adult population (aged 18–75) undertook insufficient physical activity (AIHW: Armstrong et al. 2000). Almost 15% reported undertaking no physical activity at all (Figure 3.2.1).

Levels of insufficient physical activity were higher in females (46%) than males (40%). Among males, the level of insufficient activity was highest among those aged 45–59 (50%) and lowest among those aged 18–29 (26%). Among females, levels of insufficient activity increased with increasing age, 36% in those aged 18–29 to 52% in those aged 60–75.

Trends

There was little change in physical activity patterns during the 1980s. But in the latter part of the 1990s there was a significant increase in the proportion of Australian adults categorised as insufficiently physically active.

In 1997, 38% of adult Australians were insufficiently physically active (doing no or little physical activity). Two years later, this proportion had grown to 43% (AIHW: Armstrong et al. 2000). The greatest increase in insufficient physical activity over that period was seen among those aged 30–44 (from 36% to 46%) (Figure 3.2.2). There was no change in the proportion of insufficiently physically active adults aged 60–75 (around 54%) between 1997 to 1999.

Impacts

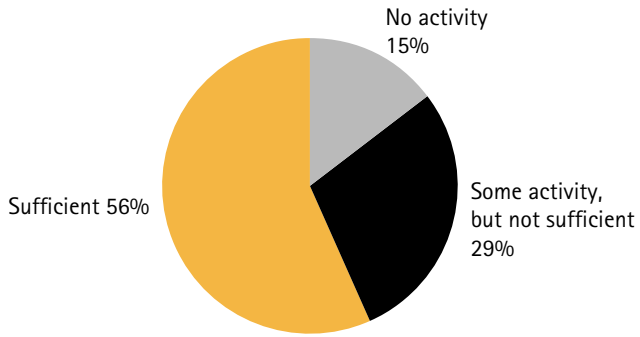
Deaths

Physical inactivity is not recorded as an underlying cause of death. However, the Australian Burden of Disease and Injury Study (AIHW: Mathers et al. 1999) estimated that 13,019 deaths in 1996 were attributable to physical inactivity. Of these, 53% were attributed to coronary heart disease, 22% to stroke and 12% to colorectal cancer.

Costs

In 1993–94, the estimated direct health care costs attributable to physical inactivity were about $377 million (Stephenson et al. 2000). This total consists of $161 million for coronary heart disease, $101 million for stroke, $28 million for Type 2 diabetes, $16 million for colon cancer, $16 million for breast cancer, and up to $56 million for depressive disorders.

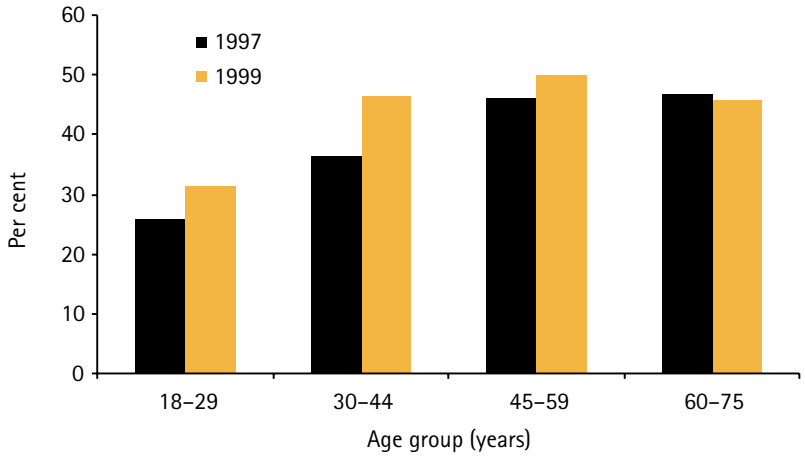
Figure 3.2.1: Levels of physical activity, adults aged 18–75, 1999



Note: 'Sufficient' activity is defined as 150 minutes of activity per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).

Source: AIHW: Armstrong et al. 2000.

Figure 3.2.2: Trends in insufficient levels of activity, 1997 and 1999



Source: AIHW: Armstrong et al. 2000.

Prevention

Promoting higher levels of participation in physical activity is a public health priority for most developed nations, including Australia. Increasing population levels of physical activity has significant potential to reduce chronic disease morbidity and mortality. Influences on increased population participation in physical activity may be in the form of government and community policies, projects, and campaigns.

Active Australia, launched in 1996, is an initiative that recognises the importance of physical activity and aims to increase participation in physical activity. It contains strategies that encompass education, the physical environment, infrastructure and

monitoring of physical activity patterns in Australia (DHFS 1998).

To make Australians more aware of the benefits of physical activity, National Physical Activity Guidelines for Australians were released in 1999 (DHAC 1999). These guidelines emphasise that people should become generally more active, along with recommending that Australians should accumulate at least 30 minutes of physical activity of at least moderate intensity on most, if not all, days of the week to obtain a health benefit. Moderate physical activities include, for example, brisk walking and cycling. The guidelines also mention the additional health benefits of participating in more vigorous activities, such as jogging and competition tennis. The National Heart Foundation of Australia and Cancer Council Australia, among others, are supportive and actively involved in campaigns to increase physical activity (NHFA 2001; Cancer Council Australia 2001).

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3.3 Tobacco

The use of tobacco, largely in the form of cigarette smoking, is a widespread behaviour with serious health consequences. It is the risk factor associated with the greatest burden of disease in Australia. In 1998, approximately 3.3 million adult Australians (22% of the adult population) were regular smokers and therefore at a significantly higher risk of heart disease, a range of serious cancers, and other major chronic conditions.

Cigarettes and other tobacco products (cigars, snuff, and chewing tobacco) contain carcinogens (cancer-causing agents), nicotine (an addictive agent) and numerous other poisonous substances. Tobacco smoke affects not only the individual user, but also others who may be exposed to it. Smoking during pregnancy carries risks of complications for the child and mother.

Health outcomes

People who use tobacco are at increased risk of vascular and heart diseases, cancers, and respiratory diseases (see Box 3.3.1). The risks increase with the number of cigarettes smoked daily, with the number of years of smoking, and especially when the habit is started at an early age.

Most of these risks are not apparent in people who have used tobacco for a short period, but due to the addictive nature of tobacco many users are unable to give up the habit and the health risks accumulate over their lifetimes. Long-term health consequences of smoking are reinforced by the fact that many young people who smoke regularly continue to smoke into and throughout adulthood.

Many of the health effects associated with active smoking have been noted for passive smoking (see Box 3.3.2). Environmental tobacco smoke has been shown to be associated particularly with childhood respiratory diseases including asthma, bronchitis, and pneumonia. The effects appear to be dose related—respiratory illnesses are more frequent in children with two smoking parents compared to children with only one parent who smokes (Fielding 1986:1015–6).

Box 3.3.1: Health problems associated with tobacco smoking

Heart and vascular diseases and conditions

Coronary heart disease
Stroke
Peripheral vascular disease

Cancers

Lung
Mouth
Oesophagus
Kidney
Pancreas
Bladder
Larynx
Stomach
Cervix

Respiratory diseases

Chronic obstructive pulmonary disease (COPD)
Asthma

Other

Oral diseases
Sexual dysfunction

Source: AIHW: Mathers et al. 1999:106.

Box 3.3.2: Health problems associated with passive smoking

Asthma in children

Lower respiratory tract infections

Lung cancer

Coronary heart disease

Source: NHMRC 1997.

Both direct and passive exposure to tobacco smoke pose special hazards to pregnant mothers, babies, and young children (see Box 3.3.3). Babies and children who are exposed to maternal tobacco smoking have more ear infections and asthma and have higher rates of sudden infant death syndrome (SIDS). Mothers who smoke during pregnancy are more likely to have low birthweight babies, with the attendant increased health risks.

Box 3.3.3: Health problems associated with smoking during pregnancy and childhood

Complications of pregnancy
Premature birth
Foetal death
Spontaneous abortion
Low birth weight
Sudden infant death syndrome (SIDS)
Asthma
Lower respiratory tract infections
Reduced lung function
Bronchial hyper-responsiveness
Middle ear disease

Source: NHMRC 1997.

Patterns

Prevalence

Tobacco smoking is highly prevalent in Australia. The 1998 National Drug Strategy Household Survey (NDSHS) measured tobacco consumption patterns among Australians aged 14 and above, and found that 25% of males and 20% of females were regular smokers (used tobacco daily or most days) at the time of the survey (Figure 3.3.1). A further 4% of both males and females reported that they were occasional smokers (smoked less often than daily or on most days), and a further 43% of males and 36% of females said that they were ex-smokers (AIHW: Adhikari & Summerill 2000).

Smoking was most prevalent in the 20–29 age group (33% males and 30% females), and lowest in the 60 and above age group (15% and 10% respectively). More than 16% of the youngest age group (ages 14–19) were smokers. The prevalence of regular smoking was higher among males at all ages.

The NDSHS also measured the amount of smoking by recent smokers (those classified above as 'regular' or 'occasional' smokers). The majority of recent smokers (60%) smoked 11 or more cigarettes a day, with more than a third of elderly smokers (37%) smoking in excess of 20 cigarettes a day. Among teenage smokers, nearly a third (32%) smoked 11 or more cigarettes a day (AIHW: Adhikari & Summerill 2000:7).

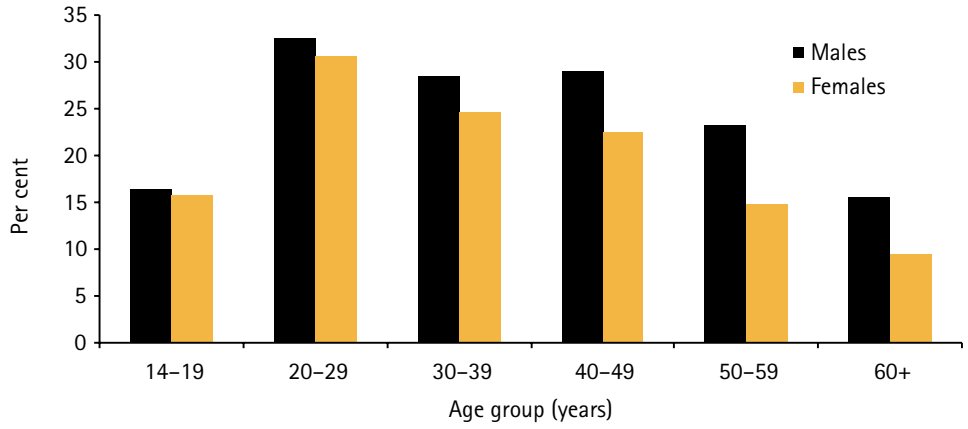
Smoking is highly associated with socioeconomic factors and is significantly more common among those in lower socioeconomic categories, the unemployed, those with lower levels of education, and those living in rural and remote areas (AIHW: Adhikari & Summerill 2000:11).

A high prevalence of smoking has also been found among Indigenous Australians. The 1995 ABS National Health Survey found that, among adults living in non-remote areas, 56% of Indigenous males and 46% of Indigenous females said they currently smoked, compared with 27% of non-Indigenous males and 20% of non-Indigenous females (ABS & AIHW 1999:52).

Trends

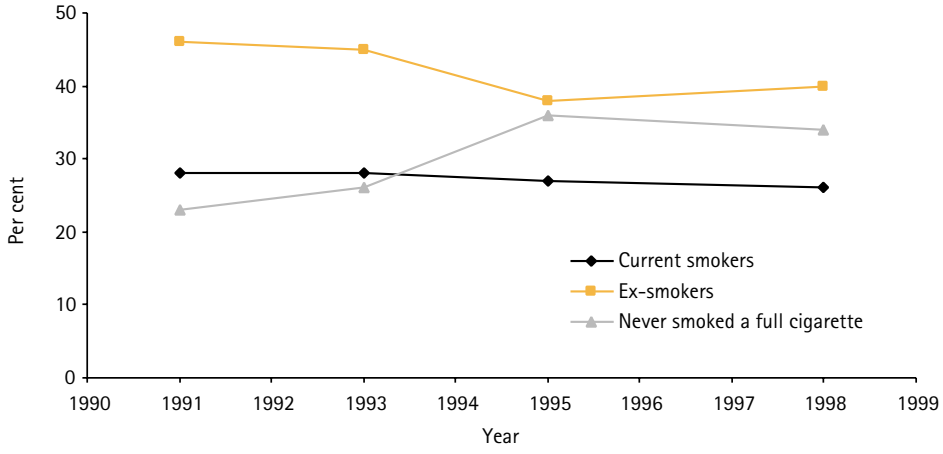
Smoking rates in Australia have declined since the early 1970s, but the rate of this decline slowed in the 1990s (AIHW: Mathers et al. 1999:104). Between 1991 and 1998, the prevalence of smoking declined only slightly. In 1991, 28% of Australians aged 14 and over were 'regular' or 'occasional' smokers, compared to 26% in 1998 (Figure 3.3.2). The proportion

Figure 3.3.1: Proportion of regular smokers, by age group, 1998



Source: AIHW: Adhikari & Summerill 2000:6.

Figure 3.3.2: Tobacco smoking, persons aged 14 and over, 1991 to 1998



Source: AIHW: Higgins et al. 2000:10.

of those who had never smoked, on the other hand, rose from 23% to 34% over the same period.

Based on a national survey of secondary students, it is estimated that more than 276,000 students aged 12–17 were current smokers (defined for students as at least one cigarette in the past week) in 1996. There was a decline in current smoking rates for students aged 12–17 from 1984 through to 1990, but this decline has since ceased. In 1996, the smoking rate for those aged 12–15 was 16% for both boys and girls, with the rate rising to 28% among boys aged 16–17 and 32% among girls aged 16–17 (Figure 3.3.3).

The level of cigarette consumption by smokers appears to have declined slightly. A national survey of smoking patterns in 1992 found that the average number of cigarettes smoked per day by smokers was 22.1 for males and 19.1 for females, compared to 19.7 for males and 18.1 for females in 1995 (Hill et al. 1998:210–3). These figures indicate that the average consumption by smokers has been about one 20-cigarette pack per day.

Overall consumption of tobacco in Australia has declined more markedly (Figure 3.3.4). Consumption of tobacco by Australians aged 15 years and over exceeded 3 kg each year from 1951 to 1978, peaking at 3.54 kg in 1961. Since then there has been a sustained decline in consumption, to 1.37 kg per person (age 15+) in 1998.

Impacts

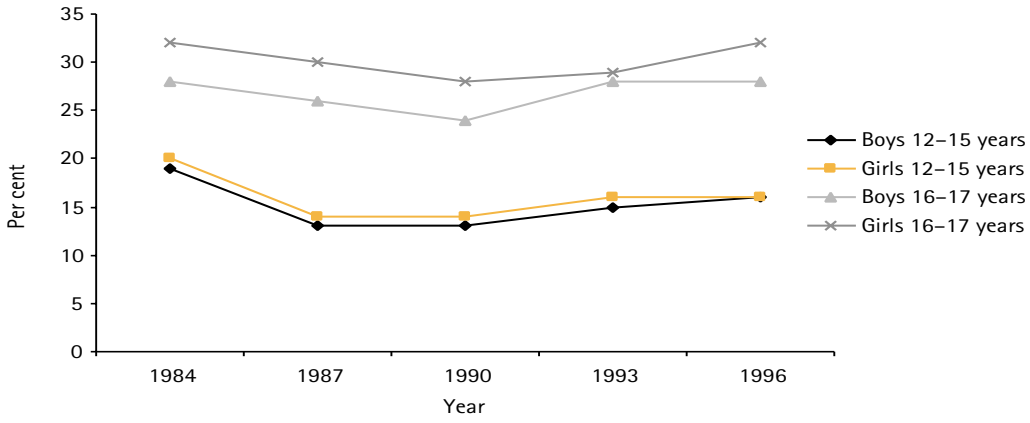
Deaths

The number of deaths attributable to tobacco in 1996 was estimated to be 16,875, 17% of male and 9% of female deaths. Of these deaths, 37% were attributed to lung cancer, 15% to coronary heart disease (CHD), and 28% to COPD (AIHW: Mathers et al. 1999:106).

Use of services

In 1997–98, over 142,500 hospital separations were attributed to tobacco use, representing 2.6% of all separations in that year. The largest single cause of these hospitalisations was CHD (26%), followed by COPD and cancers (about 20% each). In contrast to the deaths attributed to tobacco, only half (52%) of these separations were of people aged 65 and above. Another 42% of hospital separations were of people aged 35–64, due mainly to the high rate of

Figure 3.3.3: Proportion of adolescents (aged 12–17) who are smokers, 1984 to 1996



Source: Hill et al. 1999:256–7.

hospitalisation in this age group for CHD (AIHW: Ridolfo & Stevenson 2001:98).

Direct health care costs attributable to tobacco in 1992 have been estimated to be $833 million (Collins & Lapsley 1996, cited in AIHW: Higgins et al. 2000:12).

Prevention

As cigarette smoking is still the most important preventable cause of premature death and illness in Australia, reducing the prevalence of smoking remains a high priority on the public health agenda (AIHW 2000:306–9). This requires a wide range of educational, regulatory and other measures that must be sustained over the long term. The aim should be primarily to prevent the uptake of smoking by children and young adults, and also to encourage and support cessation by smokers and protection of non-smokers from environmental tobacco smoke.

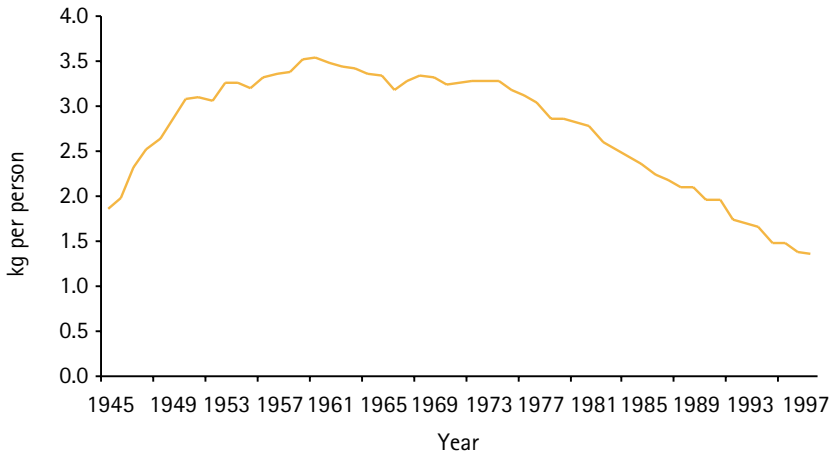
Measures to achieve these aims include:

- public and school-based education programs;
- progressive increases in the price of tobacco products;
- bans on smoking in buildings or other public enclosed spaces; and
- restrictions on tobacco advertising and promotion, including sponsorship of sport and the arts.

The National Tobacco Strategy (DHAC 2001) has as its goal the improvement of the health of all Australians by eliminating or reducing their exposure to tobacco. The four objectives of the strategy are to:

- prevent the uptake of tobacco use in non-smokers, especially children and young people;
- reduce the number of users of tobacco products;
- reduce the exposure of users to the harmful health consequences of tobacco products; and
- reduce exposure to tobacco smoke.

Figure 3.3.4: Tobacco consumption (kg per person aged 15 and over), 1945 to 1999



Source: ABS population, excise and customs data compiled by Michelle Scollo, VicHealth Centre for Tobacco Control, Anti-Cancer Council of Victoria.

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3.4 Alcohol misuse

Alcohol consumption by Australians is a topic of considerable public health importance. Although most people drink moderately and without ill-effect, excessive use of alcohol contributes to several chronic physical, psychological and behavioural health problems.

The negative health consequences of alcohol use include alcohol dependence ('alcoholism'), a number of chronic diseases, and acute conditions from large doses in a short time period, such as poisoning and injuries from motor vehicle accidents. Persons who suffer from alcohol dependence often sustain both the acute and chronic effects of alcohol.

Description

Definition

There are no standard definitions of terms such as alcohol misuse, alcohol dependence, or alcoholism. Statistics of alcohol misuse and its consequences have used a variety of techniques and definitions.

Several classifications have been used in Australia for measuring use of alcohol. One of these is based on the National Health and Medical Research Council's (NHMRC) guidelines for responsible drinking. The NHMRC distinguishes between males and females for amounts of alcohol intake considered to be 'hazardous' (more than four standard drinks per day for males, and more than two per day for females) or 'harmful' (more than six standard drinks per day for males, and more than four for females) (Table 3.4.1). These are collectively referred to as 'alcohol misuse' in this report.

Health outcomes

Some of the chronic health problems and conditions associated with hazardous or harmful use of alcohol are listed in Box 3.4.1. This list does not include all the neurological conditions resulting from alcohol dependence, nor does it cover all the behavioural problems and injuries that can result from the effects of alcohol. Alcohol use during pregnancy is also a known risk factor for the health of the foetus and newborn.

Hazardous consumption of alcohol is frequently found together with tobacco smoking, and the two combined are strongly associated with oral, throat and oesophageal cancers. Alcohol misuse is associated with increased risk of stroke and coronary heart disease (CHD) through its contribution to high blood pressure.

Table 3.4.1: Classification of alcohol intake levels

	Average number of standard drinks per day (1 standard drink = 10 g alcohol)	
Alcohol intake	**Males**	**Females**
Abstinence	0–0.25	0–0.25
Low	0.26–4.00	0.26–2.00
Hazardous	4.01–6.00	2.01–4.00
Harmful	>6	>4

Sources: AIHW: Mathers et al. 1999:108–9; NHMRC 1992.

Box 3.4.1: Health problems associated with hazardous or harmful alcohol use

Liver cirrhosis
Oral cancer
Cancer of the upper gastrointestinal tract
Liver cancer
Breast cancer
Colorectal cancer
Pancreatitis
Diabetes
Epilepsy
High blood pressure
Stroke
Coronary heart disease

Source: AIHW 2000:146, 355.

Low to moderate levels of alcohol consumption have been found to protect against some chronic diseases and risk factors, including high blood pressure, CHD, and stroke (AIHW 2000:147). While the benefits of moderate alcohol use are still being assessed, the important public health message remains that alcohol use, for some individuals even at moderate levels, increases the risk of many diseases and injuries.

Patterns

Prevalence

The 1998 National Drug Strategy Household Survey (NDSHS) produced two estimates of the level of hazardous or harmful alcohol use among Australians aged 14 and over. The 'conservative' estimate, based on the lower values of responses to questions using ranges such as 2–3 days per week or 3–4 drinks per day, showed that at least 7% of males and 4% of females were drinking at hazardous or harmful levels. The 'non-conservative' estimate (using the upper values of the ranges) was 16% for males and 10% for females. Comparable estimates based on the 1995 ABS National Health Survey, for respondents aged 15 and over, were 15% for males and 13% for females (AIHW: Mathers et al. 1999:109).

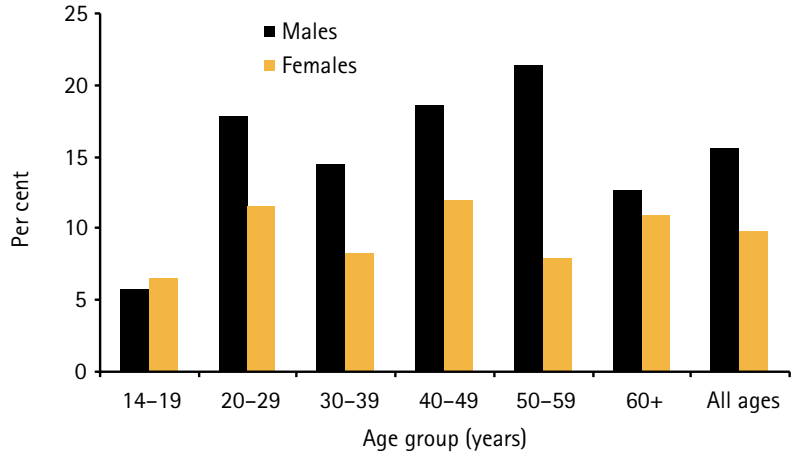
Using 'non-conservative' estimates from the 1998 survey, males are more likely than females to drink at hazardous or harmful levels at all ages except the 14–19 age group, where the levels of hazardous or harmful drinking were similar for both sexes at around 6%. Among males, hazardous or harmful drinking was highest (21%) in the 50–59 years group, while among females it was highest (12%) in the 40–49 years group (Figure 3.4.1).

In 1998, there were proportionately more regular drinkers (at least once per week) among the highest socioeconomic group compared to other socioeconomic groups, among those with tertiary education qualifications compared to those with no qualifications, and among employed persons compared to the unemployed and those not in the labour force (AIHW: Adhikari & Summerill 2000:21).

A number of studies have shown that Indigenous Australians are less likely than non-Indigenous Australians to be drinkers of alcohol. For example, in the 1995 ABS National Health Survey (NHS), among persons aged 18 and above and living in non-remote areas, 55% of Indigenous males were 'recent' drinkers (at least one drink in the last week) compared to 66% of non-Indigenous males. For females, the corresponding figures were 33% compared to 46% (ABS & AIHW 2001:156).

Despite the lower proportion of Indigenous adults who drink, alcohol continues to be of concern for Indigenous people because those who do drink alcohol are more likely to consume it at hazardous levels. In the 1995 NHS, 12% of Indigenous adult males were classified as drinking at hazardous levels (more

Figure 3.4.1: Hazardous or harmful drinking, 1998



Source: 1998 National Drug Strategy Household Survey.

than four standard drinks per day), compared to 5% of non-Indigenous males. Similarly, nearly 3% of Indigenous adult females used alcohol at hazardous levels (more than two standard drinks per day), compared to 1% of non-Indigenous adult females (ABS & AIHW 2001:156).

Trends

Alcohol consumption patterns have remained largely unchanged over the last decade (Figure 3.4.2), with around 50% of the population aged 14 and above drinking regularly (at least once per week). A further 30% drink on only a few occasions each month, and the remainder either no longer drink alcohol or have never consumed a full glass of alcohol (AIHW 2000:147).

Alcohol consumption in Australia has been relatively stable over the past 5 years, at around 7.6 litres of pure alcohol per person per year. The peak year for alcohol consumption was 1981, when Australians consumed on average 9.7 litres of pure alcohol per person. Part of the decline is attributable to a reduction in consumption of beer (AIHW: Higgins et al. 2000:14–5).

Impacts

Deaths

The Burden of Disease and Injury Study estimated that 4,492 deaths in 1996 were attributable to 'alcohol harm'. These deaths represented 4.7% of all male deaths and 2.1% of female deaths. The main underlying causes of death attributable to alcohol harm were liver cirrhosis (16% of all deaths due to alcohol harm), stroke (14%), road traffic accidents (11%), colorectal cancer (9%) and alcohol dependence (9%). The study also estimated that in the same year 7,157 deaths were averted due to the protective effects of low to moderate use of alcohol, mainly reduced deaths from CHD and stroke (AIHW: Mathers et al. 1999:111).

The study also found that the harmful effects of alcohol were distributed relatively evenly across all age groups, whereas almost all the benefits from alcohol were found in age groups over 45, and particularly in older people. The study concluded that moderate alcohol use was beneficial in middle and older ages, while alcohol misuse was harmful at all ages (AIHW: Mathers et al. 1999:109–10).

Use of services

In 1997–98, over 43,000 hospital separations were attributed to alcohol misuse. Sixty per cent of these were for alcoholism and alcoholic liver cirrhosis, 14% for cancer, and 14% for road injuries (AIHW: Ridolfo & Stevenson 2001:106).

Direct health care costs attributable to alcohol misuse in 1992 have been estimated to be $145 million, plus an additional $767 million in road accident costs (Collins & Lapsley 1996, cited in AIHW: Higgins et al. 2000:12).

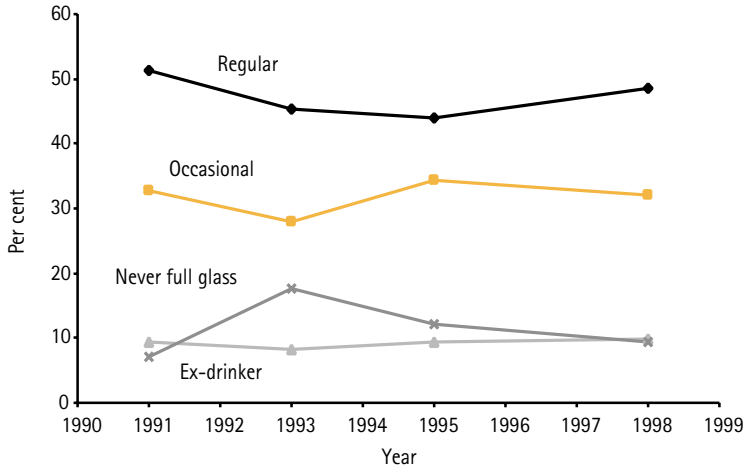
There are also social costs from the excessive use of alcohol. In 1998, over one-third of adult Australians reported being either verbally or physically abused by someone under the influence of alcohol. About one in ten persons reported being the victims of alcohol-related property damage or theft (AIHW 2000:147).

Prevention

A range of measures aim to prevent the misuse of alcohol. These include legislative and regulatory control on prices, sales outlets and the level of alcohol in various beverages. There are also public education programs aimed at special groups such as pregnant women, young people, the elderly, and Indigenous Australians. The National Alcohol Strategy for 2000–01 to 2002–03 provides national direction for minimising the consequences of alcohol-related harm (DHAC 2001). The strategy aims to:

- reduce mortality and morbidity caused by alcohol;
- reduce social disorder, family disruption and crime related to the misuse of alcohol; and
- reduce the level of economic loss due to alcohol misuse.

Figure 3.4.2: Alcohol use, persons aged 14 and over, 1991 to 1998



Source: AIHW 2000:147.

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3.5 High blood pressure

High blood pressure (hypertension) is a major risk factor for stroke, and a strong risk factor for coronary heart disease (CHD) and renal (kidney) disease. It is one of the most prevalent and chronic health risk factors in Australia, with approximately 3 million adults having the condition. The presence of high blood pressure is usually not apparent to the sufferer; hence, unless otherwise detected, an individual will be unaware of the risks faced. When superimposed upon other health diseases and conditions such as diabetes and high blood cholesterol, the health risk associated with high blood pressure is significantly enhanced.

Description

Definition

The term 'blood pressure' refers to the forces exerted by circulating blood on the walls of the arteries, with two recordings, systolic and diastolic. Systolic pressure is the peak blood pressure measured as the heart muscle contracts to pump blood from its main chamber, and diastolic pressure is the minimum blood pressure as the heart muscle relaxes to take more blood into its chambers. Although 'high' blood pressure is usually defined as being above a particular level, there is no threshold level of risk, and as pressure increases so does the risk of disease.

According to the World Health Organization, high blood pressure is defined as:

- systolic blood pressure greater than or equal to 140 mmHg, and/or
- diastolic blood pressure greater than or equal to 90 mmHg.

Causal factors and determinants

A variety of factors contribute to the onset and progression of high blood pressure. Many of these factors are lifestyle factors but the causal pathways reveal the role of genetic and other biomedical predispositions.

The level of blood pressure tends to increase with age, so that as people get older they are more at risk of developing high blood pressure. High blood pressure is also more common in populations with high levels of excess weight and high dietary salt intake (AIHW 2001:53). Other factors that can contribute to increased blood pressure are high alcohol consumption and lack of potassium in the diet, specifically, a high ratio of sodium to potassium (Labarthe & Roccella 1998:266).

Health outcomes

High blood pressure contributes to the two major forms of cardiovascular disease, CHD and stroke, as well as to other serious complications (Box 3.5.1). Stroke is the problem most strongly associated with high blood pressure. CHD forms a greater part of the burden attributed to high blood pressure because it is more common in the population than stroke.

High blood pressure can increase the risk of CHD and stroke by two to four times. Furthermore, these risks are age-associated: older persons with high blood pressure have a greater risk of CHD and stroke than do younger persons at the same level of blood pressure (AIHW 2001:55).

Box 3.5.1: Health problems associated with high blood pressure

Stroke
Coronary heart disease
Heart failure
Kidney disease
Dementia
Blindness

Sources: AIHW: Mathers et al. 1999:119; AIHW 2001:53; DHAC & AIHW 1999:65.

There are a number of mechanisms by which high blood pressure affects the vascular system. If the pressure in the blood vessels is too high, the heart is forced to pump harder to push blood through the body; over time this force can overtax the heart and lead to heart failure. High blood pressure in the vessel walls also contributes to atherosclerosis (the build-up of substances on the inner walls of the arteries) and therefore to its complications, such as heart attack. High blood pressure can also be both the cause and result of kidney disease.

Patterns

Prevalence

Approximately 3 million Australians aged 25 and above (28%) have high blood pressure; the number includes those on treatment (AIHW 2001:53). High blood pressure is more common among males (31% of those 25 and above) than females (26%). The prevalence of high blood pressure increases steadily with age, to over 70% for those aged 75 and above (Figure 3.5.1).

People from socioeconomically disadvantaged groups are more likely to have high blood pressure than those from less disadvantaged groups. This disparity has been noted in terms of education levels (those with low education levels having higher blood pressure) and socioeconomic status in Australia.

No national sample of the Indigenous population is available, but data from the Kimberley region in Western Australia suggest that high blood pressure is two to three times more common among Indigenous people than among other Australians (AIHW 2001:54).

Trends

The proportion of Australians with high blood pressure (including those on medication) has declined over the past 20 years (Figure 3.5.2). Among males aged 25–64 the proportion with high blood pressure and/or receiving medication has fallen steadily from 45% in 1980 to 22% in 1999–2000. Among females, the decline was from 29% to 16%.

Average levels of blood pressure have also declined over this same period. An analysis of this trend during the 1980s showed that the decline occurred equally among those on medication for high blood pressure and those not receiving treatment (Bennett & Magnus 1994:525).

Impacts

Deaths

As well as being an important risk factor for several major diseases, 'hypertensive disease' is also listed as an underlying cause of death (ICD-9 codes 401–405). In 1998, hypertensive disease was listed as the underlying cause of 1,140 deaths in Australia, with the great majority of these being persons aged 65 and above.

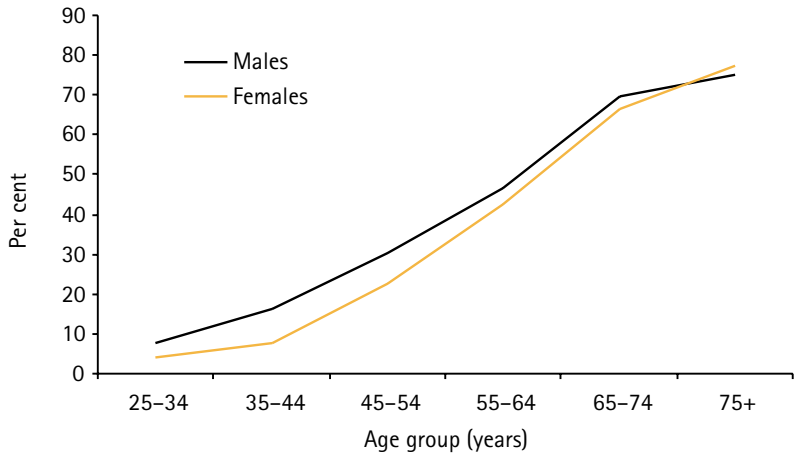
In addition, the Australian Burden of Disease and Injury Study estimated that 14,369 deaths in 1996 (11% of all deaths) were attributable to high blood pressure. Over half (55%) of these attributed deaths were due to CHD; another 30% of deaths are listed under stroke as the underlying cause of death (AIHW: Mathers et al. 1999:120–1).

Use of health services

High blood pressure is the single most common problem managed by general practitioners (GPs), comprising nearly 6% of all problems managed by GPs in Australia annually (AIHW: Britt et al. 2000:39).

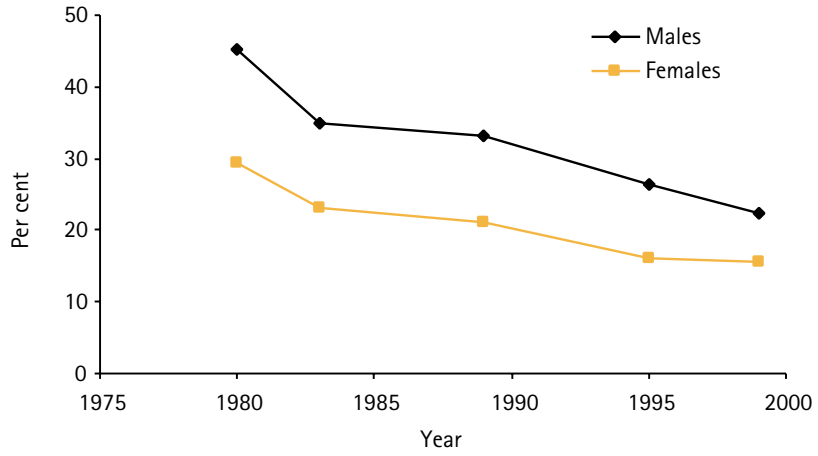
There were 7,807 hospitalisations in 1999–00 with high blood pressure (ICD-10-AM codes

Figure 3.5.1: Age-specific prevalence of high blood pressure, 1999–2000



Source: AIHW 2001:54.

Figure 3.5.2: Prevalence of high blood pressure among those aged 25–64, 1980 to 1999



Source: AIHW 2001: 54

I10-I15) listed as the principal diagnosis. It is also an additional diagnosis in a large number of hospital separations.

High blood pressure on its own accounted for $831 million in total health system costs in 1993–94 (2.4% of all costs), which was nearly as much as for CHD on its own. Over half (57%) of these costs were for pharmaceuticals, and one-quarter were for medical services, mainly GPs (AIHW: Mathers and Penm 1999:7).

Prevention and management

The natural history of blood pressure is reasonably well understood; it is highly preventable and modified by lifestyle and behavioural measures. Some of these measures are listed in Box 3.5.2.

Given the high health risk associated with high blood pressure, management of the condition is important. A variety of drug treatments including ACE inhibitors, diuretics, calcium channel blockers, and beta-blockers are available to manage the condition (AIHW 2001:70).

Box 3.5.2: Lifestyle changes to reduce high blood pressure

Reduce excess weight

Participate in at least 30 minutes of moderate-intensity physical activity each day

Limit alcohol intake to two standard drinks per day

Reduce salt in the diet

Source: AIHW 2001:55.

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3.6 High blood cholesterol

A high level of blood cholesterol (hypercholesterolemia) is a major risk factor for coronary heart disease (CHD), the single greatest cause of death and disability in Australia. It is also associated with an increased risk of ischaemic stroke.

Cholesterol is a fatty substance produced by the liver and carried by the blood to supply the rest of the body. It has several functions essential to life, including its use as part of cell walls and in producing steroid hormones. However, high blood cholesterol is a prime factor in the development of atherosclerosis, the process that blocks arteries through abnormal build-ups of substances on their inner walls.

Description

Cholesterol is transported in the blood as part of cholesterol–fat–protein particles known as lipoproteins. Two forms of these particles are high-density lipoprotein (HDL) and low-density lipoprotein (LDL). HDL is believed to be beneficial, but excess LDL is the component that contributes to atherosclerosis. While the ratio of LDL to HDL cholesterol is an indicator of health risk, the total blood cholesterol is still a useful guide to the level of LDL and is therefore commonly used as an indicator in population health monitoring.

Definition

A total blood cholesterol level above 5.5 mmol/L is considered to constitute an increased risk for developing coronary heart disease. Levels above 6.5 mmol/L involve high risk. These cut-off points are arbitrary and the health risk increases continuously from very low cholesterol levels.

Average adult values of blood cholesterol in Australian males and females in 1999–00 were 5.5 and 5.4 mmol/L respectively, and over 6 million Australians aged 25 and over are estimated to exceed the lower limit of 5.5 mmol/L (AIHW 2001:56).

Causal factors and determinants

For most people, the most important contributor to high blood cholesterol is a diet high in saturated fats, found most commonly in meat and dairy products and in many takeaway and processed foods (see Box 3.6.1). Monounsaturated and polyunsaturated fats (from vegetable oils, nuts, seeds, and fish) do not increase blood cholesterol levels, and in some cases may lower them (NHFA 1995). Cholesterol in food can also raise blood cholesterol levels, but usually less than saturated fat does.

Genetic determinants affect blood cholesterol levels and some people have a genetic predisposition for high cholesterol (AIHW 2001:56).

As with high blood pressure, it is rare for a person with high blood cholesterol to have warning signs.

Box 3.6.1: Causes of high blood cholesterol

Diet high in saturated fats
Excess body weight
Genetic predisposition

Source: McBride & Anda 1998:282–4.

Patterns

Prevalence

The 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab) has estimated that around 50% of adults of both sexes aged 25 and above have high (≥5.5 mmol/L) blood cholesterol levels (AIHW 2001:56). At age 30, around 30% have high blood cholesterol. The level peaks at 74% in females around age 70, and 62% in males around age 60 (Figure 3.6.1).

There are no known strong associations between blood cholesterol levels and the major demographic and socioeconomic factors. One study on blood cholesterol levels among Indigenous Australians found higher levels compared to the non-Indigenous population, but other studies have shown no differences between the two groups (AIHW 2001:57).

Trends

No clear trend has emerged in the proportion of the population with high blood cholesterol level over the past two decades. The proportion of Australian males (aged 25–64 and living in capital cities) with high blood cholesterol appears to have declined slightly between 1989 (51%) to 1999–2000 (47%). Among females, there was little or no change in the same period (Figure 3.6.2).

Impacts

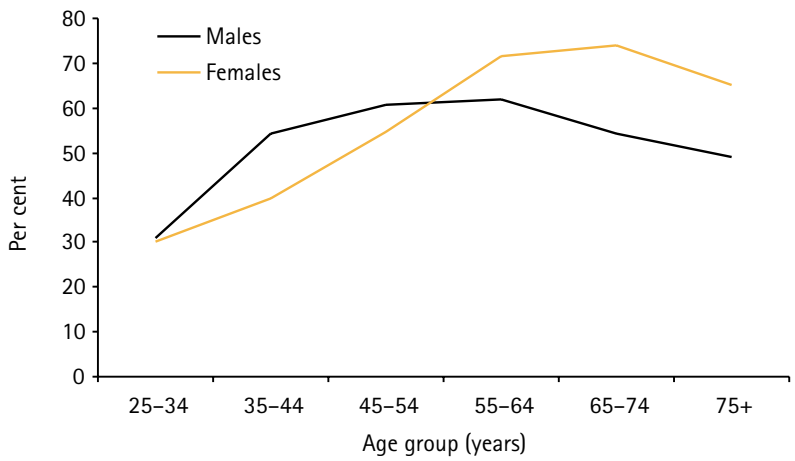
Deaths

Although high blood cholesterol (ICD-9 code 272.0) is occasionally listed as the underlying cause of death in Australia (142 deaths in 1998), many of these deaths are due to inherited disorders, such as familial hypercholesterolaemia. Such numbers are only a small fraction of the deaths attributable to high blood cholesterol. The Australian Burden of Disease and Injury Study estimated that 5% of all deaths in 1996 were attributable to high blood cholesterol, mostly through CHD (AIHW: Mathers et al. 1999:123).

Use of health services

Use of health services in relation to high blood cholesterol on its own accounted for $199 million in total health system costs in 1993–94 (6% of all

Figure 3.6.1: Age-specific prevalence of high blood cholesterol, 1999–2000



Note: *The effect of any non-response bias on estimates from AusDiab is yet to be determined. Approximately 50% of eligible households participated in the household interview, and 55.2% of eligible adults in these households took part in the physical examination.*

Source: AIHW 2001:57.

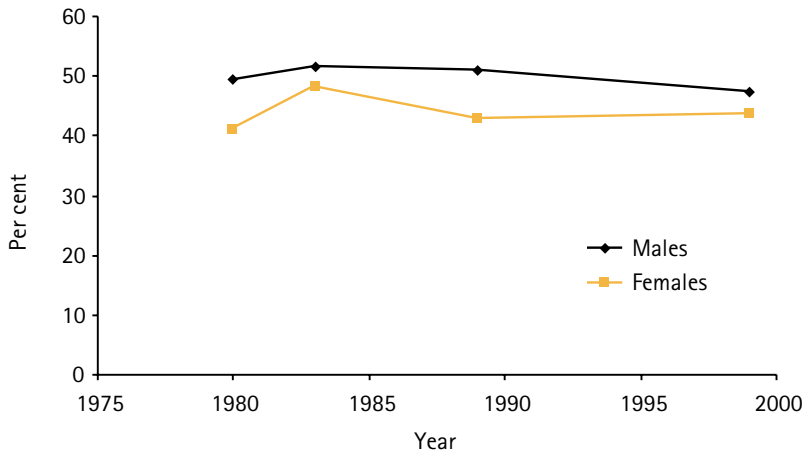
costs). Over two-thirds (69%) of these costs were for drugs, and 21% were for medical services, mainly general practitioners (AIHW: Mathers & Penm 1999:7).

Prevention

High blood cholesterol is largely preventable by modifying diet and changing individual behaviour. Lifestyle changes that prevent or lower high blood cholesterol include eating a diet low in saturated fat and cholesterol, increasing physical activity and reducing excess body weight. Current Australian guidelines for cholesterol reduction focus primarily on reducing the amount of saturated fat in the diet, to no more than 8% of total energy intake (NHFA 1999).

Drug therapies have also been shown to be beneficial in lowering blood cholesterol levels. Clinical trials have demonstrated that lowering cholesterol in people with and without cardiovascular disease reduces rates of death and illness. The statin group of drugs have been proven to be the most effective drug therapy for lowering blood cholesterol levels (AIHW 2001:56, 71).

Figure 3.6.2: High blood cholesterol among those aged 25–64, 1980–99



Notes: 1. Age-standardised to the 1991 Australian population.
2. Capital cities only.

Source: AIHW 2001: 57.

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3.7 Excess weight

Overweight and obesity, which together can be termed as excess weight, are major contributors to several chronic diseases and are associated with a range of other risk factors, such as high blood pressure, impaired glucose tolerance and high blood cholesterol.

Excess weight is an escalating health problem, reaching epidemic proportions in most Westernised countries. In Australia, levels of excess weight are currently increasing across most age groups.

Description

Definition

Excess weight is a condition of abnormal and excessive fat accumulation to the extent that a person's health and wellbeing may be adversely affected (WHO 2000). The primary cause of excess weight is an imbalance in the long-term energy equation, with energy intake exceeding energy expenditure (NHFA 1996).

Measurement

The measurement of excess weight as a risk factor for chronic diseases is not simple as both overall fat and the regional distribution of fat contribute to chronic disease development and progression. Two common measures for excess weight (approximating body fat) are body mass index (BMI) and waist circumference (see Box 3.7.1).

BMI relates body weight to height, with a BMI between 18.5 and 25 taken as a good range for health (NHMRC 1997). However, the use of BMI as an indicator of fat accumulation is limited because it does not distinguish between weight associated with muscle and weight associated with fat.

A more useful measure of excess fat is waist circumference. Waist circumference measures fat located in the abdominal region (central obesity). A waist circumference of less than 94 cm in males and 80 cm in females is considered normal (see Box 3.7.1).

Box 3.7.1: Measurement of excess weight

The most easily calculated measure of excess weight is BMI. This is the ratio of weight (in kilograms) divided by height (in metres) squared. BMI classification consists of underweight, normal, overweight, and obese.

Body mass index (BMI):

Underweight	*Less than 18.5*
Normal weight	*18.5 and less than 25*
Overweight	*25 and above, but less than 30*
Obese	*30 and above*

Waist circumference measures levels of abdominal fat mass and indicates an increased risk of metabolic complications associated with obesity. Two categories, overweight and obese, are identified.

Waist circumference:

Males:	*overweight*	*94 to 101cm*
	obese	*≥102cm*
Females:	*overweight*	*80 to 87cm*
	obese	*≥88cm*

Sources: NHMRC 1997; WHO 2000.

Health outcomes

Excess weight is associated with an overall increase in premature mortality (WHO 2000). There is also substantial evidence for a causal relationship between excess weight and increased risk for a number of chronic diseases such as Type 2 diabetes, coronary heart disease and stroke. (Box 3.7.2). The risk of developing

more than one condition also increases with increasing levels of excess weight (Field et al. 2001).

The risk of Type 2 diabetes and its predecessor, impaired glucose tolerance, is associated with excess body weight (USDHHS 1996). The association is extreme in obese persons. The recent Australian Diabetes, Obesity and Lifestyle (AusDiab) Study, conducted in 1999–2000, found that almost half (44%) of those with diabetes in Australia are obese (Dunstan et al. 2001).

Box 3.7.2: Health problems associated with excess weight

Total mortality

Chronic diseases

Type 2 diabetes
Coronary heart disease
Stroke
Some cancers
Osteoarthritis
Kidney disease

Biomedical factors

High blood pressure
High blood cholesterol and triglycerides

Other conditions

Gall bladder disease
Respiratory difficulties
Musculoskeletal problems

Sources: WHO 2000; National Taskforce on the Prevention and Treatment of Obesity 2000; USDHHS 2000.

Excess weight has been clearly linked with increased risk of mortality and morbidity from heart and vascular diseases. The risk for several cancer types, such as colorectal, endometrial, post-menopausal breast cancer and prostate cancer is also increased in persons with excess weight.

With increasing levels of weight, the risk of both high blood pressure, and high blood cholesterol and triglycerides, is increased. Weight loss improves blood pressure control and blood lipid levels. Excess weight also increases the risk of gallstones, respiratory disruption, sleep apnoea and musculoskeletal problems (WHO 2000).

In children and adolescents, excess weight may affect both short- and long-term health. Short term effects include increased cardiovascular disease risk factors, abnormal glucose metabolism, liver-gastrointestinal disturbances, sleep apnoea and orthopaedic complications. The most important long-term effect is the continuation of excess weight into adulthood. In the long term, excess weight in adolescence has also been shown to be significantly associated with both mortality and morbidity later in life (WHO 2000).

Patterns

Prevalence

The most recent estimates of levels of excess weight in the Australian population are from the AusDiab Study (Dunstan et al. 2001). The survey measured height, weight and waist circumference.

According to this survey, about 7 million (60%) of the adult population are either overweight or obese (as measured by BMI). Of these, approximately 5 million (40% of all adults) are overweight and over 2 million (20% of all adults) are obese.

Males are more likely than females to be overweight, with almost half (48%) of adult males estimated to be overweight compared to 30% of females (Table 3.7.1). The levels of obesity are higher in females, with 22% of females estimated to be obese compared to 19% of males.

In both males and females, overweight increases with age, peaking for both in the 65–74 age group. For both sexes, obesity is most common among those aged 55–64 (Table 3.7.1)

Also according to the AusDiab Study waist circumference measurements, an estimated 29% of adult males and 23% of adult females are classified as overweight. A further 27% and 34% of males and females respectively are obese (Table 3.7.2).

Population groups

Excess weight is more common in lower socioeconomic categories. Based on BMIs calculated from self-reported heights and weights, around 53% of females in the lowest socioeconomic category were overweight and 24% were obese, in comparison to 44% overweight and 14% obese females in the highest socioeconomic group in 1995 (AIHW 2001). No significant difference between males in the two socioeconomic categories was reported.

Table 3.7.1: Prevalence (%) of excess weight by BMI, adults (aged 25 and above), 1999–2000

Level of excess weight	Age group						All adults (25 and above)
	25–34	35–44	45–54	55–64	65–74	75+	
Overweight[a]							
Males	44	47	52	48	53	53	48
Females	24	25	32	36	40	39	30
Obese[b]							
Males	17	19	21	26	20	12	19
Females	12	21	26	32	31	17	22

(a) BMI 25 and above, but less than 30.
(b) BMI 30 and above.

Note: The effect of any non-response bias on estimates from AusDiab is yet to be determined. Approximately 50% of eligible households participated in the household interview, and 55.2% of eligible adults in these households took part in the physical examination.

Source: AIHW analysis of the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Table 3.7.2: Prevalence (%) of excess weight as measured by waist circumference, adults (aged 25 and above), 1999–2000

Level of excess weight	Age group						All adults (25 and above)
	25–34	35–44	45–54	55–64	65–74	75+	
Overweight[a]							
Males	27	27	31	31	30	28	29
Females	20	21	22	26	28	25	23
Obese[b]							
Males	14	25	27	36	41	37	27
Females	17	26	38	47	52	43	34

(a) Waist circumference: males 94–101cm; females 80–87cm.
(b) Waist circumference: males ≥ 102cm; females ≥ 88cm.

Note: The effect of any non-response bias on estimates from AusDiab is yet to be determined. Approximately 50% of eligible households participated in the household interview, and 55.2% of eligible adults in these households took part in the physical examination.

Source: Dunstan et al. 2001:14–5.

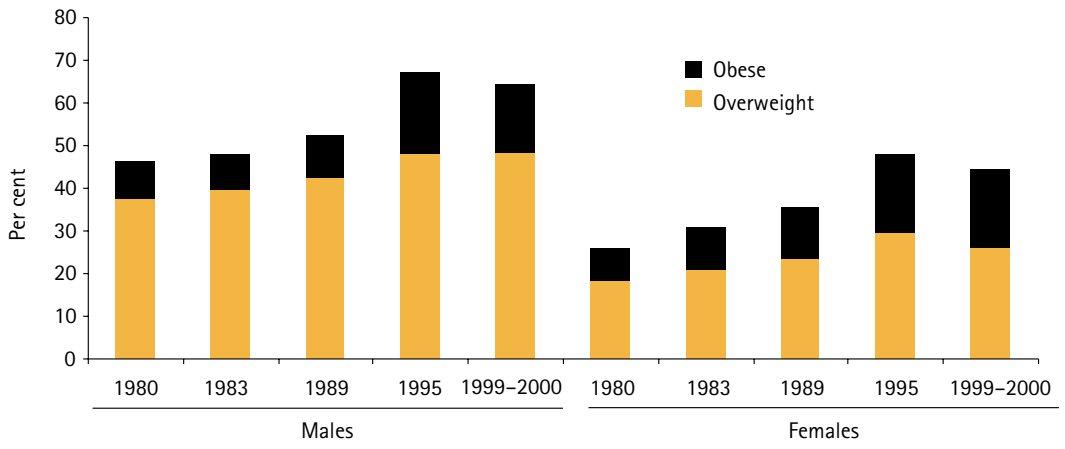
According to the 1994 ABS National Aboriginal and Torres Strait Islander Survey, Indigenous males are more likely than non-Indigenous males to be obese. Indigenous females are more likely to be both overweight and obese than non-Indigenous females (AIHW 2001).

Trends

In Australian adults, excess weight appears to have increased since the 1980s. The proportion of male adults who are overweight or obese increased from 47% in 1980 to 67% in 1995, before declining slightly to 65% in 1999–2000. The proportion increased from 26% to 48% for females from 1980 to 1995, with a decline to 45% in 1999–2000 (Figure 3.7.1). Looking just at the population classified as obese (BMI≥30), the proportions increased from around 8% for both males and females in 1980 to 16% for males and 19% for females in 1999–2000.

The increasing levels of excess weight are not limited to adults. Recent analyses of the 1985 Australian Health and Fitness Survey and the 1995 ABS National Nutrition Survey, using new standard international definitions for childhood obesity, show substantial increases in the prevalence of both overweight and obesity in Australian children (Table 3.7.3). In 1985 approximately 10% of both boys and girls were overweight and 1% were obese. By 1995, these figures had increased to 15% and 5% respectively.

Figure 3.7.1: Proportion of adults (aged 25–64) overweight or obese, 1980 to 2000



Notes:
1. *Overweight: BMI 25 and above, but less than 30.*
   Obese: BMI 30 and above.
2. *1980, 1983, 1985 data: NHFA Risk Factor Prevalence Survey (capital city participants).*
   1995 data: ABS National Nutrition Survey (includes urban participants).
   2000 data: AusDiab Survey (capital city participants).
3. *The effects of any non-response bias on estimates from AusDiab are yet to be determined. Approximately 50% of eligible households participated in the household interview and 55.2% of eligible adults in these households took part in the physical examination.*
4. *Age standardised to the Australian population as at 30 June 1991.*

Sources: AIHW analysis of the 1980, 1983, 1989 NHFA Risk Factor Prevalence Surveys; 1995 ABS National Nutrition Survey; 1999–2000 AusDiab Survey.

Table 3.7.3: Changes in the prevalence of overweight and obesity in children, aged 7–15, between 1985 and 1995

	Overweight (%)		Obese (%)	
Sex	1985	1995	1985	1995
Boys	9.3	15.3	1.4	4.7
Girls	10.6	16.0	1.2	5.5

Notes: 1. *1985 data: Australian Health and Fitness Survey 1985.*
2. *1995 data: National Nutrition Survey 1995.*

Source: Magarey et al. 2001.

Impacts

The health, economic and psychological burden of overweight and obesity is high, both at the population and the individual level (NHMRC 1997).

Deaths

In Australia, excess weight has been estimated to account for approximately 4.5% of all deaths in Australia (AIHW: Mathers et al. 1999). Many of the deaths attributable to excess weight are due to chronic diseases. In 1996 this included about 2,300 deaths from coronary heart disease, 1,400 deaths from Type 2 diabetes and 750 deaths from colorectal cancer (Table 3.7.4).

Costs

The direct costs of obesity in Australia in 1994 were estimated to be $464 million (Inuoe et al. 2000). Furthermore, in 1997 the National Health and Medical Research Council estimated that consumers spent $500 million on weight-control programs (NHMRC 1997).

Prevention

Although a widespread and increasing phenomenon, excess weight for most people is not inevitable. In principle there is immense scope to reduce the problem by modifying dietary intake and fostering greater physical activity. However, this would require major changes in life style.

The problem of excess weight in Australia has been recognised by peak prevention bodies including the Strategic Inter-governmental Nutrition Alliance (SIGNAL) and the Strategic Inter-governmental forum for Physical Activity and Health (SIGPAH). These groups are attempting to halt the increasing levels of excess weight among Australians by producing guidelines and strategies to promote healthy eating and increase levels of physical activity.

Table 3.7.4: Deaths attributable to overweight and obesity, 1996

Cause of death	Number of deaths
Coronary heart disease	2,302
Type 2 diabetes	1,388
Colorectal cancer	748
High blood pressure	500
Ischaemic stroke	427
Other[a]	369
Total	**5,734**

(a) 'Other' includes back problems, osteoarthritis, gall bladder disease and cancers of the uterus, breast and kidney.

Source: AIHW: Mathers et al. 1999.

References

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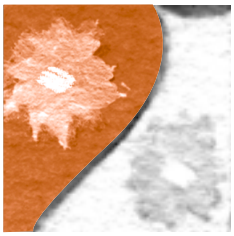

Appendixes

Methods, classifications and data sources ⌘

Glossary ⌘

Methods, classifications and data sources

This appendix describes the statistical methods and data classifications used to produce the estimates presented in this publication. The major data sources used to compile information given in this report are also described.

The large amount of material presented in the body of the report and the variety of data sources accessed for generating this information attest the presence of well-developed statistical systems in Australia. However, the information base has some limitations for monitoring certain aspects of chronic diseases, and this issue is also discussed.

Statistical methods

Estimated resident population

The estimated resident population (ERP) of Australia and its subdivisions, as produced by the Australian Bureau of Statistics (ABS), has been used in the calculation of various rates and ratios included in this report. ERPs are based on the 5-yearly ABS Census of Population and Housing to which several adjustments are made. ERPs are updated each year using indicators of population change such as births, deaths, net migration and overseas visitors.

Estimates at the statistical local area (SLA) level were aggregated to generate regional population estimates, such as those for the rural and remote parts of Australia. Estimating the size of the Indigenous population, however, has been problematic (ABS & AIHW 2001). In view of this, experimental population projections produced by the ABS were used.

Age-specific rates

Age-specific rates were calculated by dividing the number of events (such as deaths, disease cases or hospital separations) occurring in each specified age group by the estimated resident population (ERP) for the corresponding age group. The rates are expressed as events per 1,000 or per 100,000 population.

Age standardisation

To control for the effects of different age structures, direct age standardisation was applied to death, incidence, prevalence and hospitalisation rates. Unless otherwise specified, the 1991 Australian population was used as the standard (AIHW: de Looper & Bhatia 2001).

In interpreting age-standardised rates, it must be remembered that these rates are for comparison purposes only. The magnitude of an age-standardised rate has no intrinsic value since it is only an index measure. Therefore an age-standardised rate is not a substitute for age-specific rates.

Summary measures

Summary measures, such as disability-adjusted life years (DALY), years of life lost (YLL) and years of healthy life lost due to disability (YLD), have been quoted in this report to describe the burden of chronic diseases. The estimates are all from the AIHW's Australian Burden of Disease and Injury Study (AIHW: Mathers et al. 1999). The Australian study adapted the methods of Global Burden of Disease study (Murray & Lopez 1996) to the local context, drawing extensively on Australian sources of health data.

Aetiological fractions

To outline the contribution of various risk factors to the impact of chronic diseases,

aetiological fractions were used. An aetiological fraction—also known as an attributable proportion or attributable risk—is a form of indirect quantification of morbidity and mortality due to a specified risk factor. This involves the estimation of a probability measure of the likelihood of causation by the risk factor which is then applied to the total number of deaths or illnesses resulting from a specific cause. The fractions used in this report are those determined by AIHW: Mathers et al. (1999) and AIHW: Ridolfo and Stevenson (2001).

Data classification

Mortality classifications

The causes of death described in this report were classified following WHO's ninth revision of the International Classification of Diseases (ICD-9) (WHO 1977). Most of the mortality-related information is based on the underlying cause of death. The underlying cause is the disease or injury that initiated the sequence of events leading directly to death, or as the circumstances of the violence or accident that produced the fatal injury (WHO 1948). In order to facilitate comparisons with earlier periods, the numbers of deaths reported here for 1997 and 1998 have been adjusted to account for the change from manual to automatic ICD-9 coding, and thus they may differ from other published numbers. It is also important to note, when interpreting long-term mortality trends, that between 1967 and 1968 and between 1978 and 1979 there were coding changes from ICD-7 to ICD-8 and ICD-8 to ICD-9, respectively.

Since 1997, information on additional causes of death has also been made available by the ABS (Gaminiratne 2001). This additional information is useful in the context of chronic diseases, many of which are not immediately life-threatening or fatal but may contribute directly or indirectly to various processes leading up to death.

Morbidity classifications

Hospital statistics (i.e. separations) were classified using the International Statistical Classification of Diseases and Related Health Problems, tenth revision, Australian modification (ICD-10-AM) (NCCH 1998). Most of the hospital separation-related information is based on first-listed or principal diagnosis. This is the condition established to be chiefly responsible for occasioning the admission to the hospital. The principal diagnosis is not necessarily the underlying cause of disease; it may only be a manifestation of the disease (AIHW 2000a). Information on additional diagnoses, whether contributing to the reason of principal diagnosis or not, is also listed and is useful for seeking insight into the contribution of various chronic diseases to illness and morbidity.

The general practice data follow the International Classification of Primary Care, second edition (ICPC-2) (WICC 1997). The ICPC classification has a bi-axial structure, with 17 chapters based on body systems along one axis and seven components covering signs, symptoms, process of care and diagnoses along the other. The processes of care, including referrals, non-pharmacological treatments and orders (pathology and imaging), were classified by the process components of the ICPC-2 (AIHW: Britt et al. 2001).

Disability characterisation

The loss of healthy life due to non-fatal conditions can be categorised using a variety of classifications. The International Classification of Functioning (ICF), a core member of the WHO family of health-related classifications,

conceptualises disability as multidimensional, relating to the body functions and structures of people, the activities they do, the life areas in which they participate and the factors in the environment which affect these experiences (WHO 2001). The ABS Survey of Disability, Ageing and Carers (ABS 1999) operationalises these concepts into 17 different types of limitations, restrictions or impairments. These characteristics can be further related to specific diseases and conditions.

The extent of disability associated with various diseases and conditions can also be categorised using disability weights, or health state preferences (Murray & Lopez 1996). However, no Australia-specific disability weights have been generated. Another numerical categorisation of disability is based on the years of healthy life lost due to time lived in states other than the reference state of good health, or YLD (AIHW: Mathers et al. 1999). Both disability weights and the YLD categorisation give a broader interpretation of morbidity or ill health, concepts that are not fully picked up by the ABS survey instrument.

Socioeconomic indexing

The ABS has constructed a number of socioeconomic indexes to classify geographic areas on the basis of social and economic information (ABS 1998a). The Index of Relative Socioeconomic Disadvantage (IRSD), used in this report, is one such index. The IRSD is derived from social and economic characteristics of an SLA, such as income, educational attainment, levels of public sector housing, unemployment and jobs in various occupations.

Individual records were classified into quintiles of socioeconomic disadvantage, based on the IRSD value for the SLA of usual residence. Quintile 1 includes the least disadvantaged households, while Quintile 5 covers the most disadvantaged households. It is important to note that the IRSD relates to the average disadvantage of all people living in an SLA and does not necessarily reflect an individual's socioeconomic status.

Geographical classification

Regional areas were mapped using the Rural, Remote and Metropolitan Areas (RRMA) classification, developed by the Department of Primary Industry and Energy and the then Department of Human Services and Health (DPIE & DHSH 1994). The RRMA classification assigns each SLA to one of seven regional categories: capital cities, other metropolitan, large rural centres, small rural centres, other rural areas, remote centres, and other remote areas. These categories can be regrouped into three larger zones: metropolitan, rural and remote.

The RRMA classification is based primarily on population estimates and an index of remoteness. Other related classifications, such as the Accessibility and Remoteness Index of Australia (DHAC & GISCA 1999), have also become available lately but were not used in this report in order to maintain continuity with the historical data reported earlier (AIHW: Strong et al. 1998).

Data sources

Information has been combined from a variety of data sources to generate profiles of various chronic diseases and their risk factors. The data sources interrogated include administrative collections, population surveys, registries, social indexes and maps (AIHW 2000b; Glover et al. 1999).

The description has been organised around the impact components of chronic diseases, their risk factors and their management, specifically the data sources for reporting on mortality,

morbidity (incidence/prevalence, professional encounters), disability, risk factors, health service use, and other measures of health and quality of life.

Mortality

The cause of death statistics were extracted from the National Mortality Database, maintained at the AIHW. The database contains a time series beginning in 1907 on the underlying causes of death, as supplied by the medical practitioner certifying the death or by the coroner.

Registration of deaths in Australia is the responsibility of State and Territory Registrars of Births, Deaths and Marriages. Registrars provide the information to the ABS for coding the cause of death (AIHW 2000b).

On 1 January 1997, the ABS introduced new, automatic coding software that identifies multiple causes of death. This information is useful for monitoring co-morbid conditions and complications that are a hallmark of chronic diseases. In this report, the death data relate mostly to the underlying cause of death.

Morbidity

Information on the extent of illness and morbidity was derived from a variety of data sources. The capacity to combine various, sometimes disparate, pieces of information into an ensemble is limited by a general lack of incidence/prevalence data, incomplete case ascertainment and limited identification of the clinical stage of the disease. Information on the duration of illness or morbidity is also sketchy.

Incidence/prevalence

Two major sources of incidence/prevalence data for chronic diseases are population surveys and disease registries.

A variety of health surveys are conducted in Australia to generate information on the prevalence of various chronic diseases, their risk factors and complications, and professional encounters. Most of these (the National Nutrition Survey, the Survey of Mental Health and Wellbeing, and the National Aboriginal and Torres Strait Islander Survey) were one-off, providing baselines for the 1990s. Other surveys such as the National Health Survey (NHS) have been conducted periodically, are ongoing and form the basis for a reasonable time series. Some disease-related information is also available from surveys planned with another objective in mind, e.g. the Survey of Disability, Ageing and Carers.

National registries have been established in Australia to identify and ascertain disease cases through a variety of sources. Data from three national registries, one each for cancer (National Cancer Statistics Clearing House, or NCSCH), insulin-treated diabetes mellitus (National Diabetes Register, or NDR) and end-stage renal disease (Australia and New Zealand Dialysis and Transplantation Registry, or ANZDATA), have been utilised in this report.

For the purpose of this report, disease prevalence and other related information was extracted from the surveys and registries described below.

National Health Survey (NHS)

The NHS, conducted by the ABS, is designed to collect information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. Historical information is available from four NHS surveys, conducted in 1977, 1983, 1989–1990 and 1995. The 1995 survey collected information from a sample of 57,600 people over a 12-month period (ABS 1997). The latest NHS was conducted in 2001, information from which has not yet become available.

Survey of Mental Health and Wellbeing

The Survey of Mental Health and Wellbeing, conducted by the ABS in 1997–1998, has three components: the adult component, the child and adolescent component, and the low prevalence component (Jablensky et al. 1999). The adult component sampled 10,600 Australians aged 18 years and over (ABS 1998b). The survey was designed to obtain information on the prevalence of a range of mental disorders including information on the level of disability associated with mental disorders, health services used, and help needed as a consequence of a mental health problem. The child and adolescent component sampled 4,700 persons aged between 4 and 17 years (Sawyer et al. 2000).

Australian Diabetes, Obesity and Lifestyle Study (AusDiab)

The AusDiab, conducted by the International Diabetes Institute, is a comprehensive survey of the prevalence and impact of diabetes and its risk factors (Dunstan et al. 2001). The survey collected self-reported information on diabetes as well as cardiovascular risk factors, features of the metabolic syndrome, health knowledge, attitudes, and health services utilisation and practices from approximately 10,000 adults aged 25 years and over throughout Australia (excluding the Australian Capital Territory).

Dental health surveys

National data on oral diseases and conditions, based on clinical dental examinations are available for children from the Child Dental Health Survey (CDHS), and for both children and adults from the National Oral Health Survey of Australia (NOHSA). The National Dental Telephone Interview Survey (NDTIS) provides information on self-reported oral health status and dental behaviour.

The CDHS has been collected annually by the AIHW Dental Statistics and Research Unit (DSRU) in conjunction with State and Territory health authorities since 1989, and forms part of a series of annual surveys beginning in 1977. The CDHS monitors the dental health of children enrolled in school dental services operated by State and Territory health authorities. Data are collected on oral health status, demographics and service provision at the time of routine clinical examinations by dental therapists and dentists. In 1996, information was collected from a total of 80,559 children aged between 4 and 15 years.

The NDTIS has been conducted by DSRU in 1994, 1995, 1996 and 1999. The NDTIS collects information on the basic features of oral health and dental care within the Australian population, providing information on issues such as access to care, social inequalities and dental behaviours. The survey is based on samples of Australians aged 5 years and over from all States and Territories, and conducted using computer-assisted telephone interviewing (CATI) techniques.

The NOHSA was carried out in 1987–1988 by health departments in each State and the Australian Capital Territory. Information on oral health status and treatment needs, and dental behaviour was collected. Over 6,800 households participated in the survey. Of the 16,897 individuals (aged 5 years and over) interviewed, 14,432 received a clinical dental examination in their home.

National Cancer Statistics Clearing House (NCSCH)

The NCSCH, located at the AIHW, receives records from individual State and Territory cancer registries on new cases of cancer diagnosed in residents of Australia (AIHW & AACR 1999). This commenced with cases first diagnosed in 1982. The data items provided to the NCSCH by the State and Territory cancer registries enable analysis of cancer by site and behaviour.

The NCSCH produces annual reports of national incidence and mortality data. Periodically, analyses of specific cancer sites, cancer histology, differentials in cancer rates by country of birth, geographical variation, trends over time and survival are undertaken on an accumulation of data which permits examination of these issues in greater detail.

The registry currently maintains data for cancer incidence to 1998 and for mortality to 2000.

National Diabetes Register (NDR)

The NDR collects information about people who began using insulin as part of their treatment for diabetes from 1 January 1999 onwards (AIHW 2001a). This includes persons with Type 1, gestational, Type 2 or any other form of diabetes. Current objectives of the NDR are to monitor and report on the incidence of insulin-treated diabetes mellitus (ITDM) and Type 1 diabetes, and to provide a research database for epidemiological studies of ITDM and Type 1 diabetes.

The NDR obtains information from two different data sources, the National Diabetic Services Scheme (administered by Diabetes Australia) and the Australasian Paediatric Endocrine Group (State-based registers which collect information about young people, aged less than 15, with diabetes).

Australia and New Zealand Dialysis and Transplantation Registry (ANZDATA)

ANZDATA is the source of national data on the incidence, prevalence and outcome of dialysis and transplant treatment for patients with end-stage renal failure (Disney et al. 2000). The registry collects and records data from all dialysis and transplant units in Australia and New Zealand. Data for patients is collected twice a year, at 31 March and 30 September.

Professional encounters

General practitioners (GP) are usually the first point of call for medical services in Australia. Information on GP–patient encounters is collected through the Bettering the Evaluation and Care of Health (BEACH) Survey, an ongoing national data collection looking at the clinical activities of general practitioners (AIHW: Britt et al. 2001). The General Practice Statistics and Classification Unit (an AIHW collaborating unit within the Family Medicine Research Centre, University of Sydney) conducts the survey.

BEACH began in April 1998 and involves a random sample of approximately 1,000 general practitioners per year, each collecting data on 100 consecutive patient encounters. The information available includes problems managed, medications, referrals, tests and investigations, and patients' reasons for professional encounters.

Hospital administration data

The National Hospital Morbidity Database, maintained at the AIHW, contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital (AIHW 2000b). The data items are supplied to the AIHW by the State and Territory health authorities, and by the Department of Veterans' Affairs. In this report, disease data relate to the principal diagnosis of hospitalisations except for hospital statistics for end-stage renal disease, which is attributed to diagnosis code 'care involving dialysis'. Information on other diagnoses is also provided, where necessary.

Disability

The disability-related information was extracted from the Surveys of Disability, Ageing and

Carers, conducted by the ABS. The surveys collect national information on disability levels of Australians, their current and future care needs, and the role of carers. The last survey, conducted in 1998, was based on a sample of about 42,100 people (ABS 1999).

The disability surveys contain information about the role of various diseases and health conditions as disabling conditions. A disease condition may be defined as the main disabling condition—a long-term condition identified by a person as the one causing the most problems—or as another disabling condition. Multiple conditions are listed.

The disability information may be further grouped into categories, such as intellectual disability and physical disability. This grouping not only takes into consideration the underlying health condition but also impairment, activity limitations, participation restrictions and related environmental factors (AIHW 2001b).

Health risk factors

Information on health risk factors, both behavioural and biomedical, in Australia is sketchy and irregular. This makes recognition of any underlying trends in chronic disease susceptibility and outcomes difficult; no comprehensive picture of the extent of the problem emerges. Most of the information is based on self-reports and is often piecemeal. In addition to the sources described below, health risk factor information is also collected through the NHS.

Behavioural risk factors

Physical activity

Baseline information on physical activity patterns and knowledge of the benefits of physical activity among adult Australians is collected in the Active Australia Baseline Survey. The survey, conducted in 1997, obtained information from a national sample of 4,821 persons (Bauman & Owen 1999).

Another source of physical activity data was the National Physical Activity Survey, which sampled 3,841 persons to assess current patterns of physical activity and the impact of the Active Australia campaign in 1999 (AIHW: Armstrong et al. 2000).

Drug use

Information on drug use in Australia, both tobacco smoking and alcohol misuse, was extracted from the National Drug Strategy and Household Surveys (NDSHS), conducted by the Commonwealth Department of Health and Ageing (AIHW: Adhikari & Summerill 2000). These surveys began in 1985, and have been carried out every 2 or 3 years since. The sixth in the series was conducted between June and September 1998, with 10,030 Australians aged 14 years and over participating. The survey respondents were asked about their knowledge of drugs, their attitudes towards drugs, their drug consumption histories and related behaviours. The most recent survey was undertaken in 2001, but information from it has not yet become available.

Another regular survey from which information about tobacco smoking was extracted is conducted by the Anti-Cancer Council of Victoria. These surveys form a time series on smoking patterns since 1984 (Hill et al. 1998).

Diet and nutrition

The largest and most comprehensive Australian survey of food and nutrient intake, dietary habits and body measurements, the National Nutrition Survey (NNS), was a joint project between the ABS and the then Commonwealth Department of Health and Aged Care (DHAC). The one-off 1995 NNS collected information from a sub-sample of respondents to the 1995 NHS, approximately 13,800 people from urban and rural areas of Australia (ABS & DHFS 1997).

Biomedical risk factors

Information on biomedical risk factors in Australia is limited in scope and dated. Piecemeal information is available on a small set of markers.

Three surveys were conducted by the National Heart Foundation of Australia in the 1980s to generate a national time series on biomedical (and behavioural) risk factors (AIHW 2001c). Although the data are somewhat dated now, in the absence of other suitable data they remain an important source of national information for biomedical risk factors. The surveys collected information from a sample of around 22,000 adults living in capital cities of Australia (Canberra and Darwin were not included in the 1980 and 1983 surveys) between May/June and December of 1980, 1983 and 1989.

As described earlier, the AusDiab study also collected information on a variety of biomedical risk factors, including blood pressure, cholesterol levels and measured body mass index, from approximately 10,000 adults aged 25 years and over throughout Australia (excluding the Australian Capital Territory).

Health service use

In addition to throughput information provided by the National Hospital Morbidity Database and BEACH on GP visits, information on health service use is available from emergency department admissions, Medicare statistics and National Health Surveys. Limited information from these sources has been included in the report.

Health expenditure

The impact of chronic diseases is also presented in economic terms, i.e. health system costs of various diseases. The information is based on a Disease Costs and Impact Study conducted by the AIHW in collaboration with the National Centre for Health Program Evaluation. The study ascribed 92% of recurrent health expenditure in 1993–94 to disease-age-sex groups, using available casemix and cost weight information for hospital inpatients, non-inpatients, medical services, pharmaceutical drugs, nursing homes and dental and allied health services (AIHW: Mathers and Penm 1998). This information is now dated but has been included in the report to complete the picture.

Overall burden of disease

The report also provides baseline information on the overall burden of disease associated with each disease and some of their risk factors using DALY statistics. The information is based on an AIHW study, undertaken using methods developed for the Global Burden of Disease Study but adapted to the Australian context (AIHW: Mathers et al. 1999). The study provides estimates of the extent of ill-health and disability in Australia in 1996. The study also provides estimates of the burden associated with a range of risk factors.

Data quality issues

This attempt to develop national baseline information has raised the awareness of the gaps in information to effectively monitor chronic diseases in Australia. This section outlines some data quality issues that should be taken into consideration when interpreting the statistics presented in this report.

A particular problem with the use of a variety of data sources for generating profiles of individual diseases is that the available data vary greatly by disease. Diseases such as lung cancer can be reasonably well described, using information, for example, from the NCSCH, in conjunction with mortality, hospitalisation and disability information. Some insight into

underlying trends and risk factors is also possible from the existing collections and surveys. In contrast, there is a paucity of information for diseases such as osteoporosis.

Another issue that requires careful attention in the context of chronic diseases is the limitations of the administrative collections such as the National Mortality Database and National Hospital Morbidity Database in relation to multiple causes of death or diagnoses. Additional causes of death or secondary diagnoses are recorded with variable accuracy depending on the nature of the disease or underlying cause of death. Conditions such as diabetes and cancer tend to be relatively well recorded as additional causes of death or secondary diagnoses. On the other hand, conditions such as depression and arthritis are poorly recorded. There is a need to validate additional causes of death or diagnoses (secondary) in interpreting the role of chronic diseases in mortality and morbidity.

Data quality issues exist in the identification of Indigenous Australians across a range of population surveys and administrative data collections (ABS & AIHW 2001). Deficiencies in health data for Indigenous Australians occur in both mortality and hospitalisation databases. Mortality data for Western Australia, South Australia, the Northern Territory and the Australian Capital Territory only are considered to have more than 90% coverage of Indigenous Australian deaths. Indigenous mortality data for the Australian Capital Territory are not included in this report due to small numbers.

Another concern in using currently available datasets such as AusDiab, is the response rate. In the AusDiab study, approximately 50% of eligible households participated in the household interview, and 55% of eligible adults in these households took part in the physical examination. The effect of any non-response bias on estimates from AusDiab is yet to be determined.

Some of the information included in this report is dated, but has been included for the sake of completeness, given the lack of more suitable or more recent data. These data sources, however, can not be used for marking baselines. The most prominent of such data sorces is the information on biomedical risk factors, which is seriously out of date.

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Glossary

angina: Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs, as in exercise.

associated causes of death: All morbid conditions, diseases and injuries (separate from the *underlying cause of death* recorded on the death certificate) contributing to death. See *cause of death*.

asthma: An inflammatory disease of the air passages that makes them prone to narrow too easily and too much in response to 'triggers', causing episodes of shortness of breath and wheezing or coughing. The triggers include exercise, pollen, dust mite, cold weather, throat and chest infections, tobacco smoke and other factors.

atherosclerosis: A process that gradually clogs arteries, through fatty and fibre-like deposits building up on the inner walls of the arteries and can lead to *cardiovascular disease*.

atopy: A genetic tendency to develop allergic reactions.

atrial fibrillation: A disorder of heart rate and rhythm in which the upper heart chambers (atria) are stimulated to contract in a very rapid and/or disorganised manner.

blood cholesterol: Fatty substance produced by the liver and carried by the blood to supply the rest of the body. Its normal function is to provide material for cell walls and for steroid hormones, but if levels in the blood are too high it can lead to *atherosclerosis*.

blood pressure: It is the force exerted by blood against the walls of the arteries. The force is created by the pumping action of the heart, at contraction (systolic) and at relaxation (diastolic).

body mass index (BMI): The most commonly used method of assessing whether a person is normal weight, underweight, overweight or obese. Calculated by dividing the person's weight (in kilograms) by their height (in metres) squared, i.e. kg/m2.

bronchiectasis: An abnormal dilation (expansion) of the main air passages (bronchi) of the lungs.

bronchitis: A respiratory disease in which the membranes of the bronchi (main air passages in the lungs) are irritated and inflamed. This causes the tiny airways in the lungs to narrow or shut off, resulting in coughing spells accompanied by thick phlegm and breathlessness.

cardiovascular disease: Any disease of the heart or blood vessels, including *heart attack, angina, stroke* and *peripheral vascular disease*.

cause of death: The disease or factor contributing to the death. When used technically, this term is usually applied to the 'underlying cause' listed on the medical certificate issued at death. The *underlying cause of death* is defined as the main disease that initiated the train of events leading directly to death, distinct from *associated causes of death* which are conditions, diseases or injuries that contributed to the death, directly or indirectly.

cerebrovascular: Of or relating to blood vessels and the supply of blood to the brain. See *stroke*.

co-morbidity: When a person has two or more health problems at the same time.

chronic bronchitis: Long-term condition with inflammation of the bronchi, the main air passages of the lungs, causing frequent coughing attacks and coughing up of mucus.

chronic disease: A disease persisting for a long period (at least 3 to 6 months).

chronic obstructive pulmonary disease (COPD): A collection of disorders, predominantly *chronic bronchitis* and *emphysema*, which commonly result from smoking. The condition is characterised by difficulty in breathing, wheezing and a chronic cough.

complications: Conditions and illness resulting directly or indirectly from another disease or condition.

congestive heart failure: A condition where there is inadequate pumping of the heart leading to an accumulation of fluid in the lungs. Typical symptoms include shortness of breath with exertion, difficulty in breathing when lying flat and leg or ankle swelling.

coronary heart disease (CHD): *Heart attack* and *angina* (chest pain). Also known as *ischaemic heart disease*.

cor pulmonale: *Heart failure*, caused by chronic lung conditions.

corticosteroid: A steroid hormone produced by the cortex (outer layer) of the adrenal gland, such as cortisol.

dental caries: Tooth decay.

depression: A mood disorder with prolonged feelings of hopelessness and being sad, low and inadequate, with a loss of interest or pleasure in activities and often with suicidal thoughts or self-blame.

dialysis: A method of removing excess waste substances from the blood when the kidneys are unable to work effectively.

disability: When used technically, disability refers to the presence of one or more of a defined set of limitations, restrictions or impairments.

disability-adjusted life year (DALY): A summary statistic to describe years of healthy life lost through disability and/or premature mortality.

eczema: A common, typically long-term, skin condition marked by an itchy rash and often found among people with allergies.

edentulous: Loss of all natural teeth.

emphysema: A long-term lung disease where over-expansion or destruction of the lung tissue blocks oxygen intake, leading to shortness of breath and other problems.

encounter (general practitioner): Any professional interchange between a patient and a general practitioner.

glomerulonephritis: Inflammation in the primary filtration units of the kidney (the glomeruli); frequently follows infections, especially those of the skin and upper respiratory tract caused by particular strains of bacteria.

glucose: The main sugar that the body uses for energy. Glucose comes from the breakdown of carbohydrates in the diet as well as from the breakdown of glycogen (the storage form of glucose) in the liver.

HDL cholesterol: Cholesterol packaged in high-density lipoprotein particles. The HDLs are good acceptors of membrane-free cholesterol and transport it back from tissues to the liver.

health risk factor: Any factor that represents a greater risk of a health disorder or other unwanted condition. Some risk factors are regarded as causes of disease, others are regarded as mere contributors.

heart attack: Life threatening emergency that occurs when a vessel supplying blood to the heart muscle is suddenly blocked completely. The event may lead to the death of a part of the heart muscle. The medical term commonly used for a heart attack is *myocardial infarction*.

heart failure: When the heart cannot pump strongly enough to keep the blood circulating around the body at an adequate rate.

hospital separation: The formal process by which a hospital records the completion of treatment and/or care for an admitted patient. The episode of care may be completed by an admitted patient's discharge, death, transfer to another hospital, or change in the type of care.

hypercholesterolaemia: This refers to high or elevated levels of cholesterol in the blood stream.

hyperglycaemia: High blood *glucose* levels.

hyperinsulinemia: The presence of excess *insulin* in the blood.

hypertensive disease: Long-term high blood pressure; may damage the vessels of the heart, brain or kidneys.

hypertriglyceridaemia: High levels (1.0 mmol/L or above) of *triglycerides*; a marker of lipid abnormalities.

hypoglycaemia: A low blood *glucose* level (i.e. 3.5 mmol/L or less).

impaired glucose tolerance: Slower metabolism of *glucose* due to *insulin resistance* or deficiency. Classified as fasting plasma glucose less than 7.0 mmol/L and 2-hour plasma glucose 7.8–11.0 mmol/L after oral glucose tolerance testing (OGTT).

incidence: The number of new cases (of a disease, condition or event) occurring during a given period. Compare with *prevalence*.

insulin: A hormone produced in the *pancreas* that helps *glucose* to enter body cells for energy metabolism.

insulin resistance: A condition in which *insulin* works inefficiently and the body compensates by producing an excess supply.

International Classification of Diseases (ICD): The World Health Organization's internationally accepted statistical classification of disease and injury.

ischaemia: Reduced or blocked blood supply. See *ischaemic heart disease*.

ischaemic heart disease: See *coronary heart disease*.

LDL cholesterol: Cholesterol packaged in low-density lipoprotein particles. LDLs carry cholesterol to the various tissues for use.

malocclusion: Faulty closing or meeting of opposing teeth in the upper and lower jaws.

metabolic syndrome: Also called Syndrome X, is a symptom cluster associated with a high risk of coronary heart disease and stroke. Central to metabolic syndrome is *insulin resistance*. Other common signs are: impaired glucose tolerance, excessively high blood insulin levels, high blood pressure, abnormal blood cholesterol levels (specifically high levels of triglycerides and low levels of HDL cholesterol), increased uric acid, and central obesity.

morbidity: Refers to ill-health in an individual and to levels of ill-health in a population or group.

myocardial infarction: See *heart attack*.

obesity: Increased adiposity or fat mass, associated with several chronic diseases and their risk factors. Usually defined as *body mass index* ≥ 30, or waist circumference ≥ 102 cm for males or ≥ 88 cm for females.

Organisation for Economic Co-operation and Development (OECD): An organisation of 30 developed countries, including Australia.

osteoarthritis: The most common form of arthritis; it is associated with a breakdown of cartilage in joints and commonly occurs in the hips, knees and spine.

osteoporosis: Reduction in bone mass caused by the loss of calcium from the bones, making them weaker and thus more prone to fractures.

pancreas: An organ that produces digestive substances and hormones, including *insulin*.

patient-days: The number of full or partial days of stay for patients who were admitted for an episode of care and who underwent separation during the reporting period. A patient who is admitted and separated on the same day is allocated 1 patient-day.

periodontal: Refers to the supporting structures of the teeth; including the gums, connective tissue and bone.

peripheral vascular disease: Pain in the legs due to an inadequate blood supply to them.

polyps: Projecting growths from a mucous surface such as the inside of the bowel; may be benign (non-cancerous) or able to develop into a cancerous growth.

prevalence: The number or proportion (of cases, instances, etc.) present in a population at a given time. Compare with *incidence*.

principal diagnosis: The diagnosis established after study to be chiefly responsible for occasioning the patient's episode of care in hospital (or attendance at the health care facility).

rheumatoid arthritis: A chronic inflammatory disease where the person's immune system attacks his or her own body tissues (an auto-immune condition) causing destruction of the joints.

risk factor: See *health risk factor*.

Rural, Remote and Metropolitan Areas classification: A classification that assigns geographic areas into one of seven categories: capital cities, other metropolitan centres, large rural centres, small rural centres, other rural areas, remote centres and other remote areas.

saturated fats: Fats that are solid and are found in the diet, mostly from animal sources. In excess, they tend to raise blood cholesterol.

separation: See *hospital separation*.

sinusitis: Inflammation of a sinus (cavity or space in the skull bone).

sleep apnoea: Cessation or prolonged break in breathing during sleep.

stent: A metal mesh tube placed permanently in a narrowed artery to hold the vessel open.

stroke: When an artery supplying blood to the brain suddenly becomes blocked or bleeds, often causing paralysis of parts of the body or speech problems.

subcutaneous: Under the skin.

triglycerides: A hydrophobic (non-water soluble), neutral lipid, packaged with proteins and cholesterol in various lipoprotein particles.

underlying cause of death: The main disease or injury initiating the sequence of events leading directly to death. See *cause of death*.

uric acid: A substance present in small amounts in human urine, and also found in the joints in gout.