

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 causation, 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.

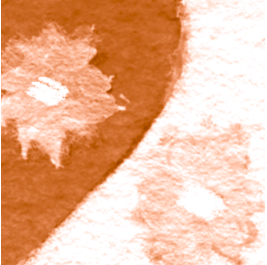
Premature mortality

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

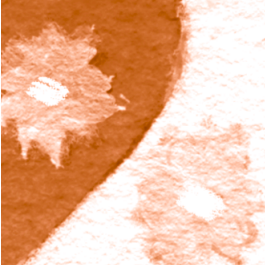
evidence that Australians are getting fatter (Dunstan et al. 2000; AIHW: de Looper & Bhatia 1998, 2001), a trend that may continue for some time, in view of shifts in the patterns of eating and physical activity. On the other hand, the levels of blood pressure have also declined lately in Australia (AIHW 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

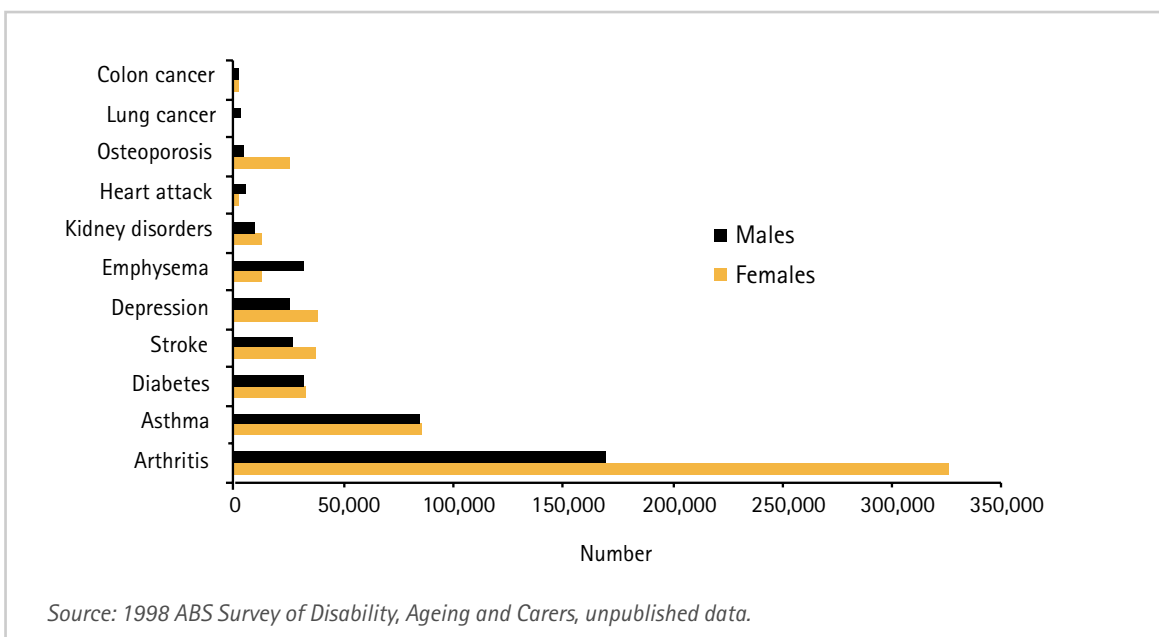
cause of death, accounting for 28,103 deaths, followed by stroke (Figure 1.0.2).

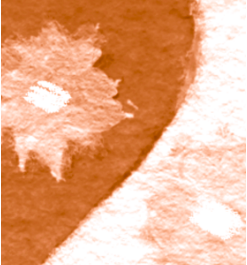
The relative contributions of various chronic diseases and conditions to the number of deaths may alter considerably if attributable fractions of mortality are also taken into consideration. Not only are some of the chronic diseases not listed as the underlying cause of death, but their input to premature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





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

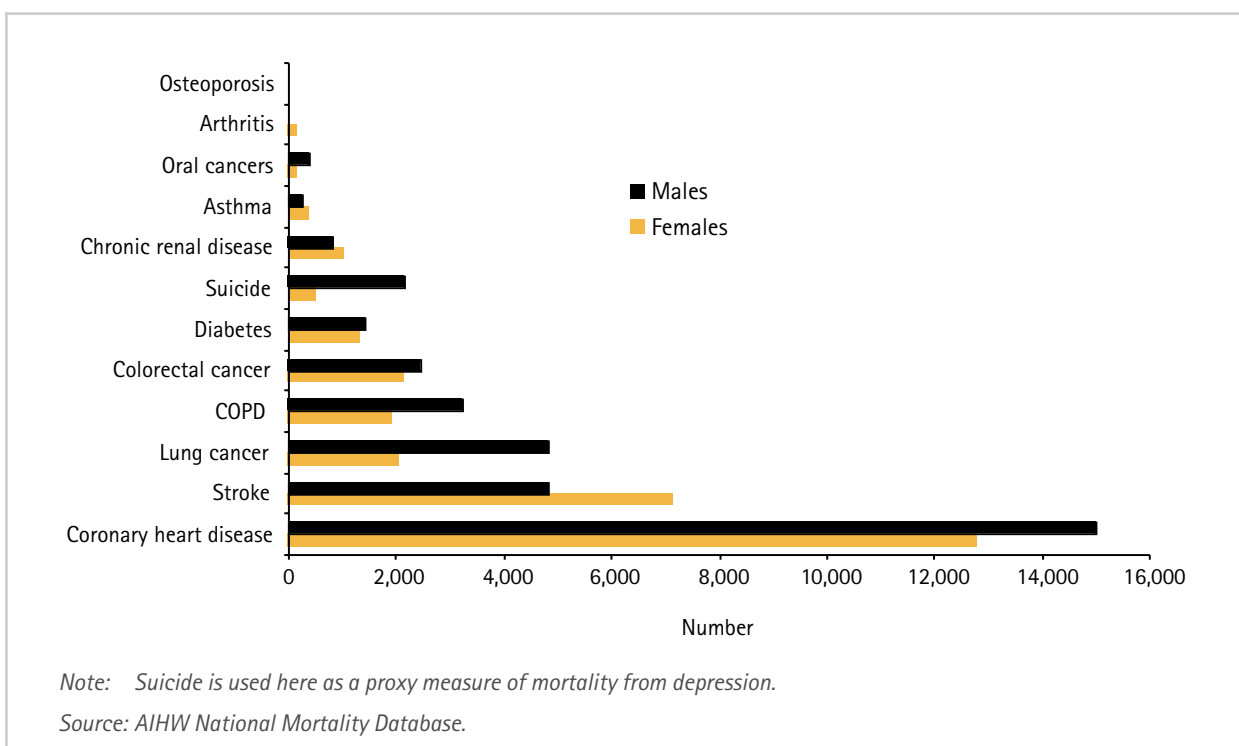
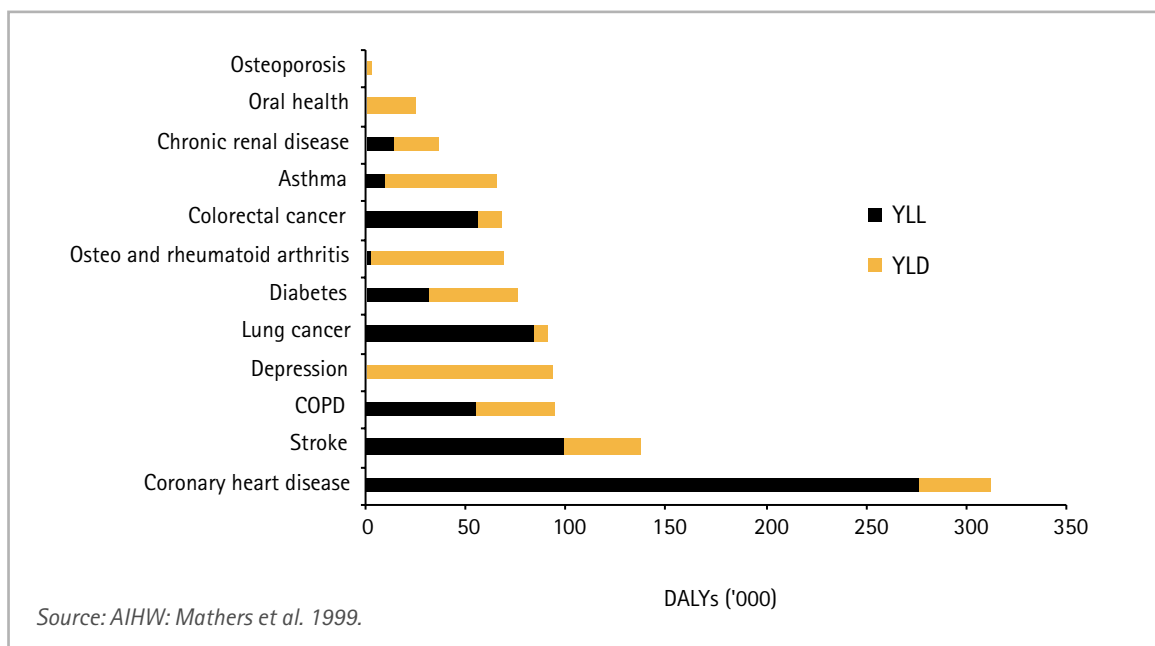


Figure 1.0.3: DALYs attributed to various chronic diseases and conditions, 1996



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.

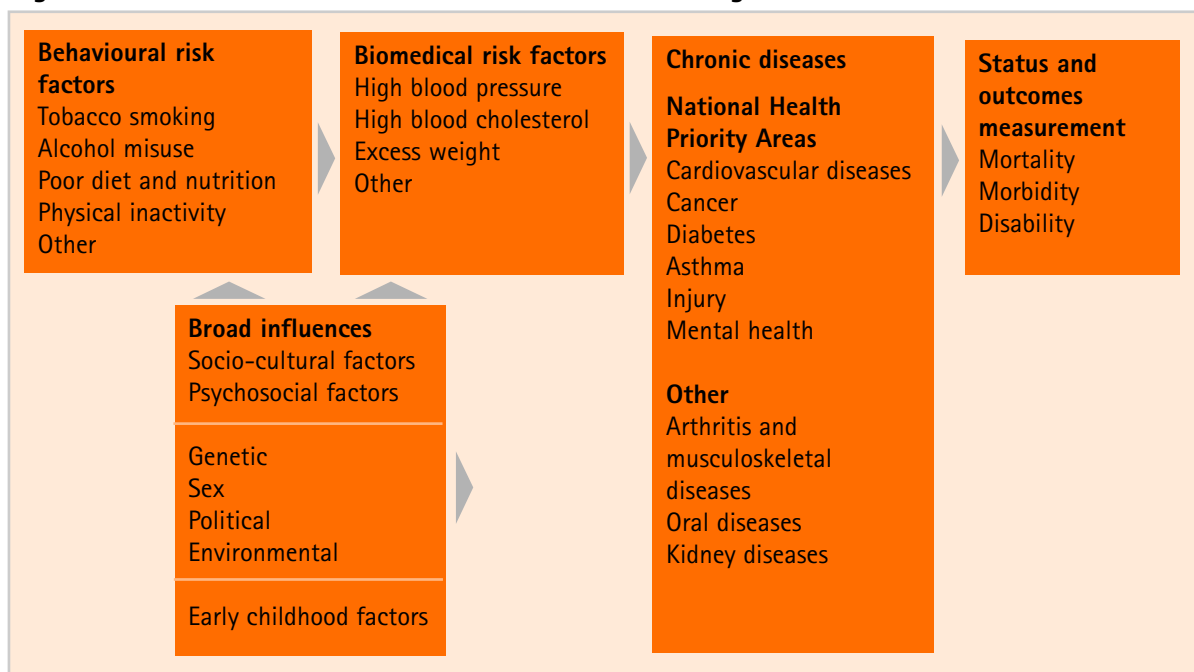
It is now possible to detect certain chronic conditions early in their progression, when treatment is most effective. Regular screening can detect several types of cancer and can also be critical in preventing some complications of diabetes. Regular measures of blood pressure and blood cholesterol and 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

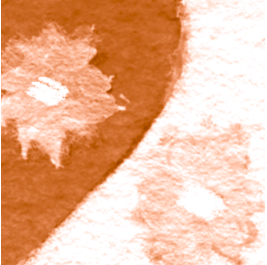


In addition to information derived from mortality, morbidity and disability data, surveillance of risk factors is required to generate critical information for the planning and evaluation of preventive programs for chronic diseases (Bonita et al. 2001). There is also the need to integrate information 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.

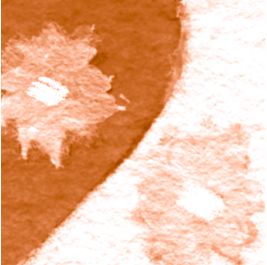
Risk factors selected for inclusion are those that have a high likelihood of causality associated with at least one of the diseases detailed in the report, are large contributors to the burden of chronic diseases in general, and are potentially modifiable (Chapter 3). All these risk factors can be identified 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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