Australian Government

**Australian Institute of
Health and Welfare**

PREVENTION OF

cardiovascular disease,
diabetes and chronic kidney disease

TARGETING RISK FACTORS

December 2009

Australian Institute of Health And Welfare

Canberra

CONTENTS

A C K N O W L E D G M E N T S

S U M M A R Y

This is the first report to present a systematic approach to monitor prevention in Australia. Using a new conceptual framework, this report focuses on prevention of the modifiable risk factors for the three closely related conditions of cardiovascular disease, diabetes and chronic kidney disease. These diseases account for around a quarter of the burden of disease in Australia, and just under two-thirds of all deaths. The risk factors discussed include smoking, high blood pressure, high blood cholesterol, obesity and physical inactivity. Drawing on data from a wide range of sources, the report covers three aspects of prevention: the prevalence of the risk factors, initiatives aimed at the whole population and services provided to individuals.

Main findings

Risk factors (Chapter 2)

Most of the risk factors are common:

- physical inactivity, overweight and obesity, and high cholesterol affect over 50% of adults
- smoking and high blood pressure affect 20–35% of adults.

The prevalence of some risk factors is increasing, notably obesity, which rose from 11% of adults in 1995 to 24% in 2007–08. Indigenous Australians and people from lower socioeconomic groups are particularly affected more than others.

Population-level interventions (Chapter 3)

There are many population-level interventions aimed at these risk factors. The most commonly used are public awareness campaigns and community interventions such as school-based programs. Interventions are delivered by many groups, including the Australian, state and local governments, as well as by non-government organisations. However, there is currently a lack of systematic data available on these interventions.

Individual-level services (Chapter 4)

Almost half a million health checks, which can be used to identify these risk factors, were done through Medicare in 2007–08 and the rate is increasing. Medications also play an important role in managing the risk factors. Around a fifth of all medicines supplied in the community in 2007 were for lowering blood pressure, and another 8% were for lowering cholesterol.

Next steps

There is clearly a need for ongoing monitoring in the area of prevention. However, better data are needed, in particular those based on measurement rather than self-reported data, as well as systematic data on population-level initiatives.

1 INTRODUCTION

Background

Prevention of disease or ill health is a major aim of the health care system. Despite this, monitoring prevention has not previously occurred in a structured way in Australia. Some information relevant to prevention is contained in various documents (for example AIHW 2004, 2008c,d; Britt & Miller 2009; Queensland Health 2008) but a detailed assessment of prevention services and the related outcomes has not previously been undertaken. Internationally, the World Health Organization has focused on the importance of prevention (WHO 2005). Despite this, very few countries appear to be systematically tracking their progress in the area, particularly in the services aimed at prevention.

Expenditure on prevention is low compared with other health care activities. Some information on expenditure by the health system on 'public health' is available (AIHW 2008j), where public health covers communicable disease control, selected health promotion, organised immunisation, environmental health, food standards and hygiene, screening programs, prevention of hazardous and harmful drug use, and public health research. While this definition of public health does not include all aspects of prevention, such as preventive care in general practice, it does give an indication of the relative expenditure on prevention-type activities. The analysis shows that expenditure on public health accounted for 1.9% of total health expenditure in 2006–07, having increased by 5.6% per year between 1999–00 and 2006–07.

Increased focus on prevention

Prevention has been receiving increased attention in Australia in recent years. This attention has been in a number of areas, including policy discussions and health service planning. However, there has not been a great deal of attention on how Australia monitors its efforts in prevention. There have been calls for the development of performance indicators for prevention services and evaluation of programs (Oldenburg & Harper 2008; Russell et al. 2008), but less about monitoring more broadly, including analysis of prevention services.

The National Preventative Health Taskforce was established in 2008 to provide advice to governments and health providers on prevention, with a particular focus on tobacco, alcohol and obesity. The major discussion paper compiled by the taskforce (NPHT 2008) stressed the importance of monitoring and surveillance but did not include details about how this should be done. An options paper (Moodie et al. 2008) prepared for the National Health and Hospitals Reform Commission proposed a national prevention agency, whose role would include the 'development of national capacity in surveillance of chronic diseases', along with other functions. The commission's final report (NHHRC 2009) also proposed a national prevention agency. The recently released final report of the National Preventative Health Taskforce (NPHT 2009) outlines the National Preventative Health Strategy. The report reiterates the importance of ongoing data, surveillance and monitoring to support the proposed increased focus on prevention.

Importance of monitoring prevention

Monitoring in the sense it is used here relies on available data systems that can be analysed to assess the size of a problem, who is most affected and whether the situation is changing over time (CSDH 2008:178). It also includes using the information to assess future trends and to measure the costs and effects of a particular problem. This is closely related to surveillance. The main difference between the two is in the time period: surveillance usually refers to continuous assessment that is aimed at very quickly detecting events of concern requiring immediate attention (for example communicable disease outbreaks), whereas monitoring usually refers to longer term assessment that is usually intermittent or episodic, such as for chronic diseases (Last 2001).

Monitoring aims to provide information and evidence of interest to policy makers, service planners and providers, researchers and the wider community. As systematic monitoring of prevention activities has not been undertaken in detail before, there is a need for baseline information that can be used to help assess the changes that result from the increased policy focus on prevention. It is widely expected that other areas of the health care system are monitored, such as care in hospitals and by general practitioners (GPs). It is similarly important that prevention services and interventions are also monitored. With the increased focus on prevention in Australia, it is important that sound systems to independently monitor efforts in this area are established.

Cardiovascular disease, diabetes and chronic kidney disease

Cardiovascular disease (CVD) is any disease of the heart ('cardio') or blood vessels ('vascular'). The affected blood vessels may be in different parts of the body, including the periphery (manifesting as 'peripheral vascular disease') and the brain (manifesting as 'stroke'). Some forms of CVD are very common in Australia, including hypertension (high blood pressure), coronary heart disease, heart failure and cerebrovascular disease. CVD is one of the leading causes of disability and death in Australia (AIHW 2004). Combining the impact of both premature deaths and the extent of associated disability, CVD was estimated to account for 17% of the overall disease burden in Australia in 2003 (Begg et al. 2007). CVD is the most expensive disease group, in terms of direct health care expenditure, at over $5.9 billion, which represents 11% of Australia's total allocated health system expenditure in 2004–05 (AIHW 2008e).

Diabetes mellitus (in this report referred to as diabetes) is a chronic condition in which blood glucose levels become too high as a result of the body producing insufficient insulin or being unable to use insulin properly (WHO 1999). Diabetes can lead to a range of complications, including coronary heart disease and stroke, as well as kidney disease and retinopathy (loss of vision) (IDF 2006). Self-reported data in the 2004–05 National Health Survey (NHS) showed that about 699,600 Australians (3.5% of the population) had been diagnosed with diabetes (AIHW 2008d). Diabetes accounted for 5.8% of the overall disease burden in Australia in 2003 (Begg et al. 2007). In 2004, 11,735 deaths in Australia were associated with diabetes.

It is important to note that there are different types of diabetes, and that the role of prevention is quite different for each of these. Type 1 diabetes is thought to be caused by a combination of genetic and environmental factors, and at this stage there is no known way to prevent the disease (Daneman 2006; Devendra et al. 2004). The other main type of diabetes is Type 2, where the main modifiable risk factors

are being overweight and having low levels of physical activity (Shaw & Chisholm 2003). Thus, Type 2 diabetes is highly preventable. The temporary form of diabetes that can occur during pregnancy—gestational diabetes—also shares many of the risk factors for Type 2 diabetes. For all types of diabetes, prevention of complications is a key aim of clinical management.

Chronic kidney disease (CKD) is defined as the occurrence of kidney damage and/or reduced kidney function, lasting for at least 3 months. It is classified into five stages from stage 1 (least severe) to stage 5 (most severe), where patients may need to undergo kidney replacement therapy (dialysis or transplant) as kidney function is not sufficient to sustain life (AIHW 2009a). CKD is common—one in seven Australian adults over the age of 25 years had some degree of CKD in 1999–2000. CKD imposes a substantial burden of disease in Australia, contributing to nearly 10% of all deaths in 2006 and over 1.1 million hospitalisations in 2006–07.

These three diseases share many risk factors, and often coexist. The shared risk factors also promote co-occurrence of these diseases and strengthen the association between them. These risk factors do not just affect the onset of CVD, diabetes and CKD, but also affect their progression and increase the risk of complications. The risk factors include ageing, the person's sex, overweight or obesity, diet, physical activity and socioeconomic conditions.

These diseases are also risk factors for each other. Diabetes is a well-established risk factor for CVD. Diabetes can also lead to kidney damage—a complication known as 'diabetic nephropathy'. CKD has been found to independently increase the risk of hypertension and other cardiovascular diseases, including heart attack, angina, coronary artery disease, stroke and heart failure. CVD, especially hypertension, is one of the major causes of CKD.

Framework for monitoring prevention

What is prevention?

Due to the use of different definitions by various groups, there is some lack of clarity in various discussions about prevention as identified by Russell and colleagues (2008). There is particular confusion when the terms primary, secondary and tertiary prevention are used but given different meanings by different groups. For example, in public health and epidemiological work, secondary prevention usually refers to efforts to reduce the prevalence of the disease by shortening its duration, while tertiary prevention aims to reduce the number or impact of complications (Last 2001). In much of the clinical literature, however, secondary prevention is used to mean prevention of recurrences or complications (see for example Reid et al. 2002; Rodríguez-Artalejo & Banegas Banegas 2004; Wells et al. 2008). The Australian Institute of Health and Welfare's (AIHW) definition avoids these problems (AIHW 2008c) and is the one used here:

> **Prevention (of disease or ill health)** Action to reduce or eliminate the *onset, causes, complications or recurrence* of disease or ill health. [Italics added.]

The framework

A framework (Figure 1.1) has been developed to provide a conceptual picture of how this monitoring task could be approached. The framework is based on the definition of prevention given above, following the three main areas where prevention is important in the health care system: prevention of risk factors (causes), prevention of disease (onset), and prevention of progression, complications and recurrence in people with the disease. For each of these three components, there are two main aspects to monitor: the outcomes that are to be prevented, and the prevention services that are being provided.
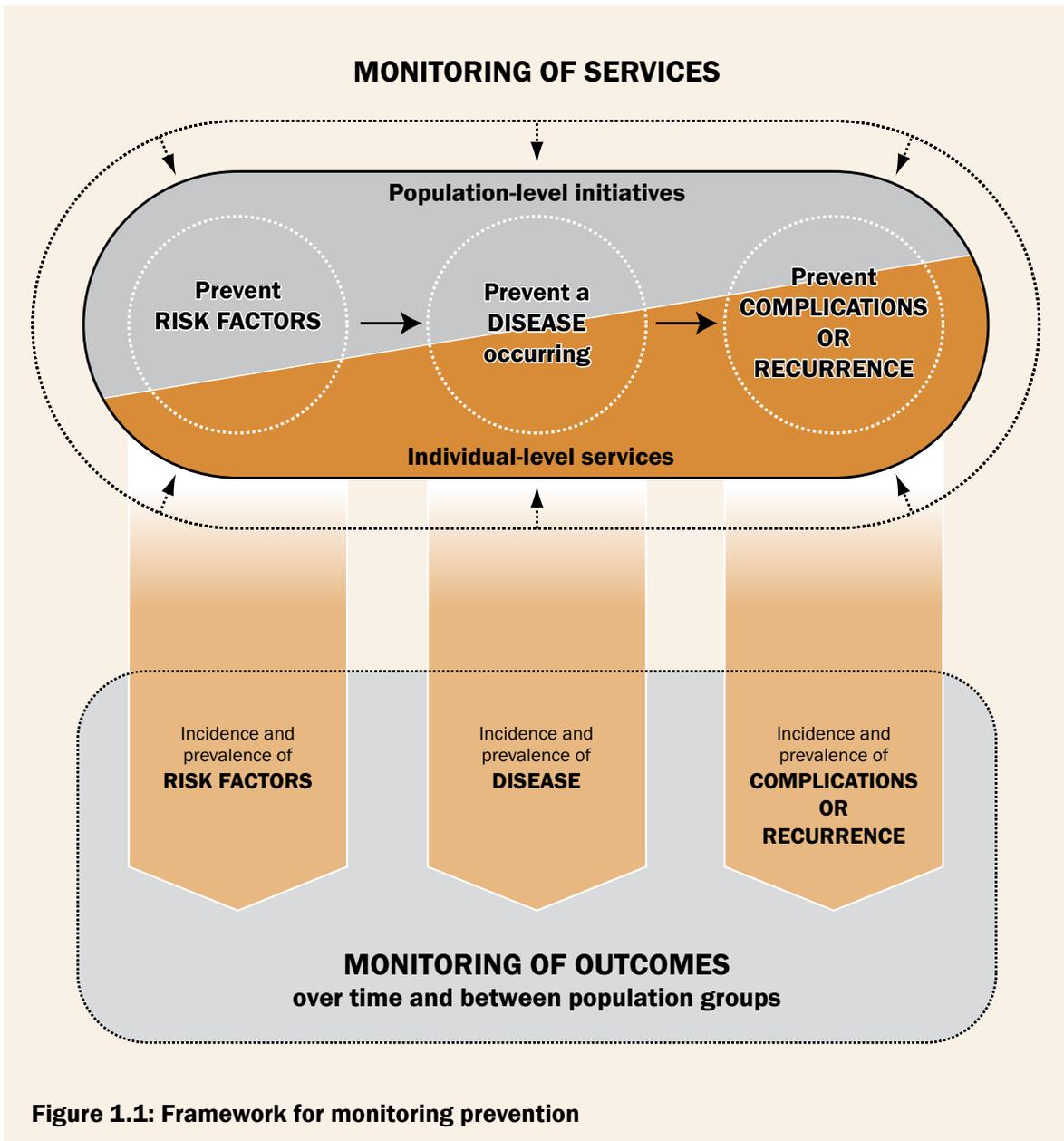
Figure 1.1: Framework for monitoring prevention

In terms of monitoring the outcomes, ideally both the incidence and the prevalence would be monitored for each of the three areas: risk factors, the actual diseases and their complications (including recurrence). These areas need to be monitored in order to assess the size of the problem, and to help in determining whether the prevention activities are having the desired effect. It is therefore important to monitor the results over time, in the population at large, and in high-risk population groups such as Aboriginal and Torres Strait Islander peoples and different socioeconomic groups. It is also useful to compare data from Australia with other comparable countries.

The range of prevention services broadly covers two types of activities. The first is health promotion, which aims to provide individuals and groups with the best chance of maintaining good health and preventing ill health. Health promotion emphasises working with people to enable them to make decisions about their needs and how best to meet them (Naidoo & Wills 2000). Health promotion is the process of enabling people to increase control over and improve their health, or the process of individuals and communities taking control over the determinants of their health (Keleher & Murphy 2004). Prominent targets of health promotion are people's dietary and physical activity patterns, as well as their use of tobacco or alcohol. Health promotion occurs in a variety of ways, such as regulation, public awareness campaigns and community-based programs. Health promotion aims to make healthy choices easier or even automatic or unconscious, to enable control over the determinants of health and to improve health and wellbeing (Keleher & Murphy 2004).

The second activity is the more traditional therapeutic-type health care usually provided under the supervision of a medical practitioner. This can include vaccinations, health checks and prescribing of medications. For risk factor prevention, there is likely to be a relatively large role for health promotion and a smaller, although important, one for health care. This balance then changes across the framework to more health care than health promotion for prevention of complications. Both of these types of activities need to be monitored so that comparisons can be made over time, across population groups and across geographical areas.

Monitoring of health services has most often been associated with individual-level care, that is, services provided directly to individuals. However, for prevention it is also important to monitor services and interventions provided at the population level: those provided to the whole population or population groups rather than to individuals on a one-to-one basis. For example, these can include television advertising campaigns, school-based interventions or taxes. Monitoring these population-level interventions is a relatively new challenge. When these types of interventions have been examined, it has tended to be in the context of evaluations of specific programs (such as tobacco control) rather than for the purpose of monitoring.

The framework is high-level, and thus does not attempt to include all the details that may be relevant to prevention. The simplicity of the framework is intentional, allowing the level of detail to be determined in the implementation of the framework as required. It has been developed to apply to the CVD, diabetes and CKD cluster of diseases. However, it is generic, and is likely to be applicable in other situations.

The framework does not include the causes of the causes in its scope: these factors such as the social, economic and environmental factors that often affect the traditional risk factors (see 'A conceptual framework for determinants of health' in AIHW 2008c:111). These 'up-stream' factors affect many aspects of health, not just particular diseases that may be examined. Thus they fall outside the scope of this framework. This is not to downgrade their importance. Instead, the decision was made to

concentrate on those factors closer in the causal pathway to the diseases—those behavioural and biomedical risk factors related to these specific diseases. There is a strong case for monitoring services and interventions aimed at these wider determinants, but this would be best done in a separate process.

However, there are parts of this framework that are related to these factors. 'Population groups' is an important part of this framework: the services and outcomes should be monitored for various groups of the population, including socioeconomic groups. Also, specific environmental aspects relevant to these diseases, such as transport and urban design, are included in the population-level part of the services section.

Application to cardiovascular disease, diabetes and chronic kidney disease

The cluster of closely related diseases, namely CVD, diabetes and CKD, account for around a quarter of the disease burden in Australia (Begg et al. 2007). Sixty-two per cent of deaths in 2004 and 25% of non-dialysis hospitalisations in 2004–05 involved at least one of these diseases (AIHW: Tong & Stevenson 2007). As discussed above, these diseases share many risk factors (including the three that are a focus of the National Preventative Health Taskforce) and some of the diseases are also risk factors for others, such as both diabetes and CKD being risk factors for CVD, and diabetes and CVD being risk factors for CKD. Thus it is preferable to monitor prevention for these diseases together, rather than separately.

This group of diseases is highly preventable, making them an ideal group of diseases to monitor in relation to prevention. For CVD, 70% of the total burden of disease (measured as the combined effect of years of life lost due to premature death and years lived with a disability) in 2003 was due to the 14 risk factors measured in the Australian Burden of Disease Study (Begg et al. 2007). High blood pressure accounted for the largest amount, followed by high blood cholesterol and physical inactivity. Similarly, for diabetes 60% of the total disease burden was due to the 14 measured risk factors, dominated by high body mass (essentially overweight and obesity). Clearly, these risk factors are highly preventable.

Table 1.1 outlines an approach to applying the broad framework to the monitoring of prevention for this cluster of diseases. The aim is to cover the important areas at a high level, rather than to comprehensively cover all possible factors in detail. The top half of the table covers the outcomes that are being targeted for prevention, and the second half covers the relevant services.

Table 1.1: Application of the prevention monitoring framework to cardiovascular disease, diabetes and chronic kidney disease

Outcomes of prevention

Risk factors	Diseases	Complications
Prevalence (and incidence where possible) of: • overweight and obesity • physical inactivity • poor diet • tobacco smoking • excessive alcohol • high blood pressure • impaired glucose regulation • abnormal blood lipids • depression • low birthweight. **Prevalence of multiple risk factors** **Prevalence of absolute risk**	**Prevalence (and incidence) of:** • overall CVD • coronary heart disease • cerebrovascular disease • diabetes (by type) • CKD. **A measure of severity where possible:** • CVD events (heart attacks and strokes) • HbA1c levels for diabetes • GFR levels for CKD. **Functioning for people with the diseases**	**Prevalence of comorbidities between CVD, diabetes and CKD** **Prevalence of diabetes complications:** • CVD • CKD • eye problems • foot problems • deaths. **Prevalence of CVD complications:** • CKD • case fatality of events • deaths. **Prevalence of CKD complications/ progression:** • end-stage kidney disease • deaths.

Services for prevention

Risk factors (prevent or improve risk factors)	Diseases (prevent disease or detect early)	Complications (prevent complications in people with disease)
Population level: • laws and regulations • tax and price interventions • public awareness campaigns • improving the built environment • community-based interventions. **Individual level:** • GP and health provider services (e.g. health advice, education, referral, risk assessment, opportunistic screening/ monitoring) • community-based programs (e.g. quit smoking, exercise) • medications for risk factor • surgery (e.g. gastric banding).	**Population level:** • screening programs • guidelines. **Individual level:** • health care provider services (monitoring for disease/ opportunistic screening) • medications to prevent disease • health care according to guidelines.	**Population level:** • guidelines. **Individual level:** • health care according to guidelines on preventing complications.

HbA1c = glycated haemoglobin; GFR = glomerular filtration rate (usually estimated using the eGFR).

Monitoring outcomes

In monitoring prevention, it is important to track the outcomes that are being targeted, to see how large the problem is, and to determine whether the situation is getting better or worse and whether there are particular problems for some population groups.

Table 1.1 (column 1) identifies three main types of information about risk factors that need to be monitored: individual risk factor frequency, prevalence of multiple risk factors and prevalence of absolute risk. Individual risk factor frequency includes measures of incidence (where available) and prevalence of the main risk factors for these three diseases, including behaviours such as physical inactivity and tobacco smoking, and biomedical ones such as obesity and high blood pressure. If possible, it is better to present information on the distribution of the population for a particular risk factor, rather than just the proportion of people above a particular cut-off point. An example of this is presenting the population distribution across body mass index (BMI) levels, rather than just the proportion of people who are overweight or the proportion who are obese. This concept is known as 'continuous risk'. Most of the risk factors in this list are associated with increased risk for at least two of the diseases of interest. Prevalence of multiple risk factors measures the number of people with two or more of these individual factors, and is included because it is associated with an even greater risk of the diseases. Finally, absolute risk provides a numerical measure of an individual's risk of these diseases, taking into account the actual level of each of the relevant risk factors. This information can then be compiled as a prevalence measure, such as the number of people with a particular risk level.

To monitor the actual disease level (column 2), three areas are outlined in the table. The first is measures of prevalence and incidence of the disease, including each of the three diseases plus some key subgroups such as coronary heart disease, cerebrovascular disease (including stroke and transient ischaemic attack) and type of diabetes. The second is measures of disease severity (or an indicator of it) such as event rates for CVD, HbA1c levels in people with diabetes and GFR levels for CKD. These are important to help determine whether any increases in incidence and prevalence are in the less or more severe stages of these diseases. For example, increases in the less severe cases could suggest improvements in early detection, and may not actually be an increase in underlying disease levels. The third area for monitoring population-level disease is to measure functioning, such as ability with activities of daily living or employment status, to see what effects the diseases are having.

The outcomes for complications of each of these diseases (column 3) would be measured within the population with the disease. That is, the denominator for each of the measures would be the number of people with the disease. The first complication to monitor is the presence of comorbidities between these diseases—the number of people with at least two complications. There are also specific complications for each of the three diseases. The measure of deaths is a case fatality rate, as it would be reported as the number of deaths among people with the disease. An important aspect is monitoring these complications in different age groups, as the aim is to prevent or at least delay the complications.

Monitoring services

There are two broad areas to monitor in prevention services: those delivered to whole populations and those delivered to individuals (second half of Table 1.1). Population-level services need to be counted and described at the population level, while individual-level services need to be counted according to their effect on individuals (such as the number of individuals receiving a particular service).

While there is overlap between these two categories in the programs and services covered, it is the counting approach that most distinguishes the two.

Population-level interventions and services are most relevant for risk factor prevention (column 1). The structure used here to organise the areas to monitor is based on the approach used by the World Health Organization (WHO 2005), and covers laws and regulations; taxation and price mechanisms; public awareness campaigns; approaches through the built environment; and community, school and workplace interventions. Population-level programs for prevention or early detection of the disease (column 2) could include organised screening or risk assessment programs, and clinical guidelines. Similarly, clinical guidelines for complication prevention (column 3) would be a population-level initiative. Monitoring population-level services has not been the focus of health service monitoring in the past. In general, services have been measured at the individual level—the tendency is to count the number of people receiving a service. As it is difficult in many cases to measure the number of individuals exposed to a particular population level program, these programs have not usually been included in more traditional monitoring. However, it is possible to monitor the presence of these initiatives, although some development of the required types of data collections may be needed.

Monitoring individual-level prevention services takes a more traditional health-service monitoring approach. Despite this, little monitoring in this area has been undertaken for prevention. Areas that need to be monitored for the prevention of risk factors (column 1) include GP and health provider services, community-based programs, medications and surgery. Similarly, for services that aim to prevent the disease or complications (columns 2 and 3), services provided by health care providers and medications need to be included. It is also important to monitor whether health care is being provided according to guidelines, for preventing both the disease and its complications.

This report

This report focuses on the prevention of *risk factors* for CVD, diabetes and CKD—the first component of the framework described above. The report is intended to be a baseline report, to assess where Australia is now in the prevention of these risk factors, to inform future monitoring of prevention for these conditions, and to track progress. The prime focus of the report is at the national level. There are some parts of the framework where data are not currently readily available. This is particularly the case for the population-level services. Information is included where possible, but in this first report gaps do remain.

Main questions

The analyses presented in this report focus on three main questions:

1. What is the national prevalence of the main risk factors for CVD, CKD and diabetes?

2. What population-level initiatives are in place that aim to prevent each of these risk factors in people without them and improve or remove them in people with them?

3. What individual-level services are being used to prevent each of these risk factors in people without them and improve or remove them in people with them?

Where possible, these three questions consider specific population groups, including Aboriginal and Torres Strait Islander peoples, people living in rural and remote locations, and people from different socioeconomic groups.

Structure

This report has three main chapters covering each of the questions outlined above. Chapter 2 presents new analysis using the available information on the risk factors. Chapter 3 covers population-level interventions, and Chapter 4 presents information on the individual-level services. Chapter 5 is a discussion of the main issues raised by these findings.

2   R I S K   F A C T O R S

Background

There are a number of determinants of CVD, Type 2 diabetes and CKD in terms of prevention, causation, disease progression and maintenance of the disease. Determinants that have a negative effect or increase the chance of a person developing a disease are often referred to as risk factors.

Some risk factors are not modifiable, such as age, sex and genetics, whereas others are associated with health-related behaviours or biomedical factors. The determinants of health, however, go beyond these to the underlying social, economic, psychological and cultural factors that can contribute to disease.

For almost all risk factors there is no known threshold at which risk begins. Rather, there is an increasing effect as the exposure increases. Although the increase in risk often starts at relatively low levels, the usual practice when monitoring is to focus on the riskier end of the spectrum. However, there is also value in monitoring moderate risk to assess trends in the wider population and to identify people who may benefit from preventive interventions that will help to reduce or maintain their risk profile.

CVD, Type 2 diabetes and CKD share many common risk factors. This chapter focuses on the modifiable risk factors for these diseases that can in some way be prevented. Table 2.1 lists the risk factors that will be discussed in this chapter and indicates the diseases with which they are associated. While each of the risk factors listed are directly associated with their corresponding diseases, there is a lot of overlap between the risk factors and, in some circumstances, one risk factor may lead to another risk factor, which will then lead to the disease. For example, overweight and obesity is a direct risk factor for CVD, Type 2 diabetes and CKD but it can also lead directly to high blood pressure, which in turn can lead to CVD, Type 2 diabetes and CKD. Where possible, information has been presented by different population groups including socioeconomic status, Indigenous status and geographical location. This is to identify particular groups that may have better or worse health than others.

Table 2.1: Relationships among cardiovascular disease, Type 2 diabetes and chronic kidney disease and risk factors

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Overweight and obesity	✖	✖	✖
Physical inactivity	✖	✖	✖
Poor diet	✖	✖	✖
Tobacco smoking	✖	✖	✖
Excessive alcohol	✖		
High blood pressure	✖		✖
High blood cholesterol	✖	✖	
Impaired glucose regulation		✖	
Depression	✖		
Low birthweight	✖	✖	✖

Absolute risk

The concept of 'absolute risk' is explored at the end of this chapter. 'Absolute risk' is the term used to define the chance of an individual developing a particular disease within a specified period. It takes into account an individual's comprehensive risk factor profile instead of only focusing on single risk factors.

Multiple risk factors

Each of the risk factors covered in this chapter are individually important. However, having more than one risk factor can magnify the risk of disease (Kannel 2000; Poulter 1999). For example, a person with mildly raised blood pressure and no other risk factors will be at a lower risk of a cardiovascular event than someone with mildly raised blood pressure and one or two other risk factors (WHO-ISH 1999).

In 2001, it was estimated that more than half of all adults had two or three of nine risk factors associated with CVD (53%), with nearly one person in six (16%) having four or more risk factors. Men and women were equally likely to have five or more risk factors (5%), while women were slightly more likely than men not to report any risk factors (10% compared with 6%). The risk factors analysed in this study included low vegetable consumption, low fruit consumption, physical inactivity, smoking, obesity, high blood pressure, risky alcohol consumption, high blood cholesterol and diabetes (AIHW: O'Brien 2005).

Burden of disease

Individual risk factors can contribute to the overall burden of a disease. *The burden of disease and injury in Australia 2003* (Begg et al. 2007*)* showed that twelve different risk factors were associated with CVD and together explained 70% of the burden from this group of causes. High blood pressure and high blood cholesterol were the largest contributors, followed by physical inactivity, high body mass, tobacco, and low fruit and vegetable consumption. Two risk factors were associated with Type 2 diabetes (including the proportion of CVD caused by diabetes) and together explained 60% of the burden from this cause. High body mass was by far the largest contributor to this disease (Begg et al. 2007). There is no information available on the burden of CKD in Australia.

Overweight and obesity

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Overweight and obesity	✖	✖	✖

Excess weight, particularly obesity, has been well established as a risk factor for CVD, diabetes and CKD (NHMRC 2003a; Wang et al. 2008). Overweight normally arises from a sustained energy imbalance due to the energy intake from the diet being greater than the energy expended through physical activity. Obesity is a severe form of overweight.

How do we measure overweight and obesity?

There are a number of methods used for measuring overweight and obesity including BMI, waist circumference and waist-to-hip ratio. BMI and waist circumference are the main methods used. BMI is most commonly used in population surveys and is calculated by dividing a person's weight in kilograms by the square of their height in metres (kg/m^2). Waist circumference is also useful because abdominal fat mass over certain thresholds indicates increased risk of chronic disease (Box 2.1; NHMRC 2003a). It may also be more strongly linked to disease than BMI (Seidell & Bouchard 1999).

Height and weight data may be collected in surveys as measured or self-reported data. When people self-report these measures, they tend to overestimate their height and underestimate their weight, leading to an underestimate of BMI. Thus, rates of overweight and obesity based on self-reported data are likely to be underestimates of the true rates, and should not be directly compared with rates based on measured data (Flood et al. 2000; Niedhammer et al. 2000).

Box 2.1: Measuring body weight

Body mass index

The standard recommended by the World Health Organization (WHO 2000) and included in the National Health Data Dictionary *(HDSC 2006) to measure BMI for adults aged 18 years and over is:*

- *underweight (BMI < 18.5)*

- *healthy weight (BMI ≥ 18.5 and BMI < 25)*

- *overweight (BMI ≥ 25; includes obese)*

- *overweight (but not obese) (BMI ≥ 25 and BMI < 30)*

- *obese (BMI ≥ 30).*

This classification may not be suitable for all ethnic groups. For children and adolescents aged 2–17 years, Cole and colleagues (2000) have developed a separate classification of overweight and obesity based on age and sex.

Waist circumference

The National Health Data Dictionary *defines waist circumference cut-offs for increased and substantially increased risk of ill health (NHDC 2003). Waist circumferences of 94 cm or more in men and 80 cm or more in women indicate increased risk (referred to here as abdominal overweight). Waist circumferences of 102 cm or more in men and 88 cm or more in women indicate substantially increased risk (referred to here as abdominal obesity). This classification is not suitable for use in people aged less than 18 years and the cut-off points may not be suitable for all ethnic groups.*

BMI can be categorised into groups of not overweight (including those who are in the healthy weight and underweight categories), overweight (but not obese) and obese to quantify prevalence. However, with such categorisation, valuable information about the overall picture can be lost. Therefore, the information is presented here as continuous, over the whole BMI range (Figure 2.1).

How many Australians are overweight or obese?

The most recent source of information that includes measured height, weight and waist circumference information is the 2007–08 NHS. According to this survey, 24% of people aged 15 years and over were classified as obese, 36% overweight (but not obese) and 40% not overweight.

Data from the 2007–08 NHS displayed in Figure 2.1 represent the distribution of BMI for both males and females in the Australian population. BMI measurements ranged from 15 kg/m², which is very underweight, to 53 kg/m², which is severely obese; however, most of the population had a BMI well within this range. For both males and females a greater proportion of the Australian population are obese rather than underweight.

On average, males had a higher BMI than females. This can be seen in Figure 2.1, as the distribution of BMI measurements for males is shifted slightly to the right of the distribution for females. Interestingly, when BMI was rounded to the nearest whole number, the most frequently measured BMI for males was 27 kg/m², which is categorised as overweight. In females, it was substantially lower at 24 kg/m², which is categorised in the healthy weight range.

As the data from the 2007–08 NHS have been analysed in a continuous fashion, it is possible to see that a large proportion of people who were not overweight had a BMI of 24 and therefore could be at risk of moving to the overweight category. Also, 16% of the overweight (but not obese) people had a BMI of 29, therefore being very close to the obese category. However, a similar proportion (19% of obese) had a BMI of 30 and therefore were only just classified as obese.

Notes

1.   Based on measured data.

2.   Missing values were excluded from the numerator and the denominator.

Source: AIHW analysis of the ABS 2007–08 National Health Survey confidentialised unit record file (CURF).

Figure 2.1: Body mass index (measured), people aged 15 years and over, 2007–08
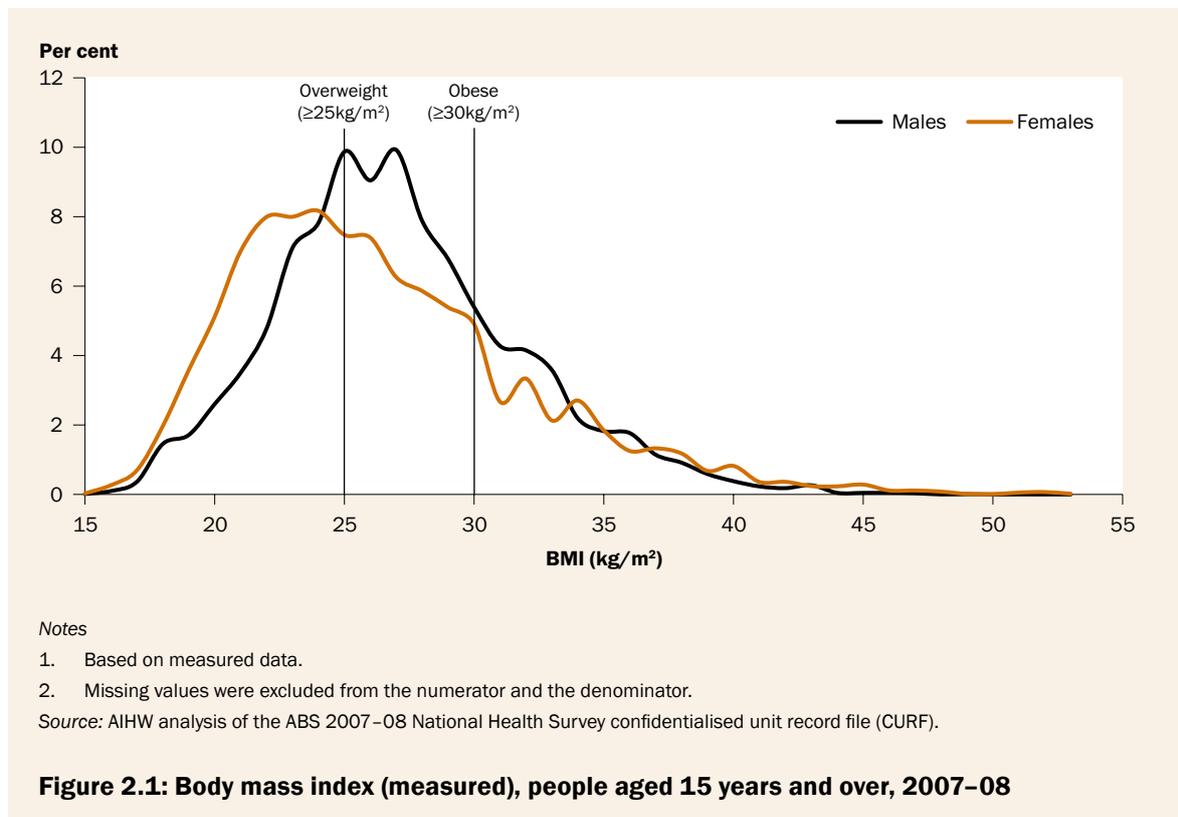
The World Health Organization further categorises obesity into three categories by risk of comorbidity (NHMRC 2003a). All people who are obese are at risk; however, people with a BMI of 30–34.9 kg/m^2 are considered to be at moderate risk of comorbidity, 35–39.9 kg/m^2 at severe risk and ≥ 40 kg/m^2 at very severe risk. When analysed, the 2007–08 NHS shows that 68% of all people who were obese were considered to be of moderate risk, 24% at severe risk and 8% at very severe risk.

Figure 2.2 shows the distribution of waist circumference measurements for the Australian population as measured in the 2007–08 NHS. Over half of those surveyed were at increased or substantially increased risk of ill health (≥ 94 cm in males and ≥ 80 cm in females). The figure also indicates that a greater proportion of females had a higher level of risk (substantial risk) than males.

Notes

1.   Based on measured data.

2.   Missing values were excluded from the numerator and the denominator.

3.   The increased and substantially increased risk indications are to be used as a guide only. Waist circumference measurements have been grouped into 10 cm groups and the proportion of people at each risk level can not therefore be accurately measured.

Source: AIHW analysis of the ABS 2007–08 National Health Survey CURF.

Figure 2.2: Waist circumference (measured), people aged 18 years and over, 2007–08

Population groups

Some population groups are at greater risk of overweight and obesity than others. Table 2.2 summarises the prevalence of overweight and obesity for different age groups, sex, socioeconomic status, Indigenous status and geographic location based on data from the 2007–08 NHS and the 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Middle-aged to older people (aged 55–74 years) were more likely to be obese than people in other age groups, and people aged 65–74 years had the highest rate of overweight (but not obesity). Males were more likely to be overweight or obese than females, with 66% of males aged 15 years and over overweight or obese compared with 53% of females.

Obesity increased with decreasing socioeconomic position and was highest among people living in outer regional, rural or remote areas. The prevalence of overweight (but not obesity), however, remained fairly constant among the different socioeconomic and geographic positions, with no obvious trend or pattern.

The crude prevalence of overweight and obesity in Indigenous Australians was 29% overweight and 31% obese. When Indigenous Australians were compared with non-Indigenous Australians, Indigenous males were slightly more likely (67%) to be overweight or obese than non-Indigenous males (64%). Also, Indigenous females were more likely (63%) to be overweight or obese than non-Indigenous females (46%).

Trends

The prevalence of overweight and obesity has increased steadily in recent years. Measured height and weight information from the 1995 and 2007–08 National Health Surveys indicates that the age-standardised rate of overweight and obesity in people aged 15 years and over has increased between 1995 and 2007–08, from 43% to 60%. The age-standardised rate of overweight (but not obesity) among Australian adults aged 15 years and over has increased from 32% in 1995 to 36% in 2007–08, and the proportion of Australian adults who were obese increased from 11% in 1995 to 24% in 2007–08.

An AIHW report titled *Obesity trends in older Australians* (AIHW: Bennett et al. 2004) analysed trend data using both self-reported and measured weight that had been obtained from various population surveys. This report showed that the average self-reported weight for every age group was higher in 2001 than for the same age group in 1995, which was in turn higher than its counterpart in 1989. Using measured weight data, the average measured weight increased during the 1980s and 1990s by around 6.5 kg for men and 7.1 kg for women. This increase in average measured weight occurred in each 5-year age group. The report also showed that men aged 30–34 years in 1980 gained over 8 kg as they aged to 50–54 years in 2000. Similarly, women aged 30–34 years in 1980 gained over 12 kg as they aged to 50–54 years. These findings have implications for future health services because not only are people heavier than previous generations at the same age, they are also likely to gain weight rather than lose weight as they become older, placing them at greater risk of being overweight or obese and therefore at increased risk of CVD, Type 2 diabetes and CKD.

Table 2.2: Prevalence of overweight (measured) based on body mass index[a] for people aged 15 years and over, 2007–08

Population subgroup	Per cent of population			
	Males		Females	
	Overweight (but not obese)	Obese	Overweight (but not obese)	Obese
Age group (years)				
15–24[b]	24.6	13.0	21.5	12.7
25–34	42.4	19.5	26.5	18.0
35–44	44.2	26.6	32.5	22.8
45–54	47.0	29.8	32.5	26.4
55–64	40.0	34.9	34.7	33.2
65–74	45.1	33.8	41.9	29.3
75 and over	52.8	21.5	32.5	24.2
15 and over ASR[c]	*41.2*	*24.7*	*30.5*	*22.7*
Socioeconomic status				
Group 1 (lowest socioeconomic position)	33.2	33.9	29.3	31.1
Group 2	38.6	26.0	30.5	25.5
Group 3	43.3	24.1	34.4	23.5
Group 4	45.0	22.4	30.9	20.7
Group 5 (highest socioeconomic position)	43.9	19.3	27.5	15.3
Aboriginal and Torres Strait Islander status[d]				
Indigenous	35.9	30.9	26.7	36.7
Non-Indigenous	44.8	19.6	29.0	17.3
Geographic location				
Major cities	41.5	22.7	29.3	20.9
Inner regional	42.7	26.2	34.5	25.7
Outer regional, rural and remote areas	37.5	32.3	30.7	27.0

(a) See Box 2.1 for classification of body mass index.

(b) For children aged 15–17 years, a separate classification of overweight and obesity developed by Cole et al. (2000) has been used.

(c) Age standardised to the 2001 Australian population.

(d) Data extracted from the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey (data are from non-remote areas only). Please note, in this survey height and weight were self-reported.

Notes

1. Based on measured data.

2. All rates other than age-specific rates are standardised to the 2001 Australian population.

3. Rows may not add to 100.0 due to rounding.

4. Pregnant women were excluded from participating in this section of the NHS.

5. Cases with missing values were excluded from the numerator and the denominator.

Source: AIHW analysis of the ABS 2007–08 National Health Survey CURF and the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Physical inactivity

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Physical inactivity	✘	✘	✘

Physical activity is important for maintaining good health. Regular participation in moderate to vigorous physical activity is protective against a range of diseases and conditions, including diabetes, heart disease and some forms of cancer (AIHW 2006). Participation in sufficient physical activity can modify or reduce the effects of some of the risk factors for CVD, Type 2 diabetes and CKD such as obesity, high blood pressure and high blood cholesterol. Participation in regular physical activity is one of the major recommendations of the evidence-based guidelines for the primary prevention of Type 2 diabetes (NHMRC 2001b). Physical inactivity has also been shown to increase the risk of CKD (Stengel et al. 2003; White et al. in press). Physical inactivity has been shown to be almost as important as tobacco smoking, and similar to high blood pressure and high blood cholesterol, in contributing to the prevalence of CVD in Australia (AIHW 2004).

What is physical activity?

Physical activity is any bodily movement produced by the muscles that results in energy expenditure. Exercise is a subset of physical activity; 'exercise' is defined as planned, structured and repetitive bodily movement done to improve or maintain one or more components of physical fitness. Recommended physical activity levels for both adults and children have been outlined in the National Physical Activity Guidelines for Australians (DHAC 1999).

These guidelines recommend 'at least 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week' to achieve health benefits. This is generally interpreted as 30 minutes on at least 5 days of the week, a total of at least 150 minutes of moderate-intensity activity per week. Examples of moderate-intensity activity include brisk walking, medium-paced swimming or cycling, mowing the lawn and digging in the garden. The guidelines also suggest including some regular, vigorous activity for extra health and fitness for those who are able. Examples of vigorous activity include aerobics, speed walking, jogging and fast cycling.

How many Australians are physically inactive?

The most recent source of national data for physical activity levels is the 2007–08 NHS, in which exercise was categorised into four levels—high, medium, low and sedentary. Box 2.2 shows the methodology used in the 2007–08 NHS to define each exercise level. The results presented here from the 2007–08 NHS cannot be directly assessed against the Australian National Physical Activity Guidelines but all people in the sedentary category and some people in the low category would be classified as having insufficient activity levels according to the guidelines.

Overall, according to this survey, the majority (about 70%) of Australians were sedentary or undertook low levels of physical activity (Table 2.3).

Box 2.2: Defining exercise levels in the 2007–08 National Health Survey

Information was recorded from each respondent aged 15 years and over about the frequency, duration and intensity of exercise undertaken for sport, recreation or fitness during the last 2 weeks and an exercise level was derived for each respondent.

The level is based on a score derived from:

No. of times activity undertaken (in last 2 weeks) × Average time per session (in minutes) × Intensity

Exercise level was derived using intensity values of:

3.5 for walking

5.0 for moderate exercise

7.5 for vigorous exercise.

Scores for each activity were summed and ranges were grouped and labelled as follows:

Sedentary	*scores less than 100 (includes no exercise)*
Low exercise level	*scores of 100 to less than 1,600*
Moderate exercise level	*scores of 1,600 to 3,200 but less than 2 hours vigorous exercise*
High exercise level	*scores greater than 3,200 and 2 hours or more of vigorous exercise (ABS 2009).*

Population groups

Physical inactivity varied with age. The proportion of people with sedentary physical activity levels increased with age. As can be seen in Table 2.3, the proportion of people who had a sedentary physical activity level was highest in those aged 75 years and over (57%) and lowest in those aged 15–24 years (27%).

People who were categorised into the lowest socioeconomic position (that is, Group 1) were more likely than those from other groups to have sedentary physical activity levels (45%). When sedentary activity is combined with the low level of activity, 79% of people in the lowest socioeconomic group were categorised into these physical activity levels. These rates then decrease with increasing socioeconomic position.

Overall, a large proportion of Indigenous Australians reported sedentary physical activity levels (47%). Compared to non-Indigenous Australians using age-standardised rates, Indigenous Australians were more likely to be sedentary (53%) than other Australians (33%).

When physical activity levels were analysed by geographical location, no major differences were observed although some slight variations were evident. People living in areas other than *Major cities* and *Inner regional* had a higher proportion of people with sedentary exercise levels (39%) compared with those living in *Major cities* and in *Inner regional* areas (both 35%).

Trends

Published trend information indicates that the proportion of people in the low and sedentary group remained fairly constant, at about 70%, during the period 1995 to 2004–05 (ABS 2006). Results presented here suggest that this trend has continued to 2007–08, with about 70% of Australians aged 15 years and over still having sedentary or low physical activity levels.

Table 2.3: Prevalence of physical activity among people aged 15 years and over, 2007–08

Population subgroup	Per cent of population			
	Sedentary	Low activity levels	Moderate activity levels	High activity levels
Age group (years)				
15–24	27.2	37.5	24.2	11.1
25–34	30.4	41.1	20.0	8.5
35–44	34.7	39.8	19.6	6.0
45–54	36.5	37.1	21.0	5.4
55–64	36.6	35.6	24.1	3.7
65–74	39.5	32.3	25.9	2.2
75 and over	57.2	26.3	16.0	0.4
15 and over ASR[a]	35.2	37.1	21.5	6.2
Socioeconomic status				
Group 1 (lowest socioeconomic position)	45.5	33.4	16.9	4.2
Group 2	38.8	37.3	19.1	4.8
Group 3	38.2	34.7	20.8	6.4
Group 4	30.9	39.7	22.6	6.9
Group 5 (highest socioeconomic position)	24.9	39.6	27.2	8.3
Aboriginal and Torres Strait Islander status[b]				
Indigenous	53.0	26.7	15.6	4.7
Non-Indigenous	33.3	36.1	23.7	6.9
Geographic location				
Major cities	34.5	37.3	21.8	6.4
Inner regional	34.8	37.8	20.8	6.5
Outer regional, rural and remote areas	39.3	34.9	21.3	4.5

(a)   Age standardised to the 2001 Australian population.

(b)   Data extracted from the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey. Due to the methodology used in this report, these results may differ to results published elsewhere.

Notes

1.   See Box 2.2 for a definition of exercise level.

2.   Based on self-reported data.

3.   All rates other than age-specific rates are standardised to the 2001 Australian population.

4.   Rows may not add to 100.0 due to rounding.

5.   Cases with missing values were excluded from the numerator and the denominator.

Source: AIHW analysis of the ABS 2007–08 National Health Survey CURF and the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Poor diet

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Poor diet	✘	✘	✘

Diet plays an important role in health and wellbeing. Poor diet is a risk factor for CVD, Type 2 diabetes and CKD largely through its adverse influence on body weight, particularly obesity (NHMRC 2001b; WHO 2003).

The promotion of good health and prevention of chronic diseases through dietary behaviour may be achieved, in the first instance, by following dietary guidelines such as those developed by the National Health and Medical Research Council (NHMRC). According to these guidelines, Australian adults and children should consume a wide variety of nutritious foods including a high intake of plant foods, and limit the intake of salt, saturated fat and alcohol (NHMRC 2003b).

Dietary fat intake

Recent evidence suggests that total fat intake does not appear to be an independent risk factor for coronary heart disease, but a diet high in fat may contribute to an increased risk of being overweight (AIHW 2004). There is also good evidence to support an association between a high consumption of saturated fatty acids and an increased risk of coronary heart disease by increasing total and low-density lipoprotein (LDL) cholesterol (the 'bad' cholesterol). For Type 2 diabetes, reducing saturated fat intake can decrease the risk of developing diabetes by increasing the body's ability to use insulin properly, promoting weight loss (in people who are overweight or obese) and reducing LDL cholesterol levels (NHMRC 2001b).

Dairy products are a main contributor to saturated fat intake, therefore the proportion of people consuming whole milk can be used as an indicator for higher total and saturated fat intake (Marks et al. 2001). Data from the 2007–08 NHS showed that 46% of the Australian population drank whole milk— 51% of males and 40% of females. Other types of milk (which include low or reduced fat and skim milk) were consumed by 49% of the Australian population, 5% did not drink milk at all and approximately 1% did not know what type of milk they consumed.

Dietary fibre intake

A high-fibre diet is recommended to reduce the risk of developing Type 2 diabetes and CVD (ADA 2002; Mann et al. 2004; NHMRC 2001b; WHO 2003). Fruit and vegetable consumption can be used as an indicator of dietary fibre intake. The most recent source of information on fruit and vegetable consumption in the Australian population is the 2007–08 NHS. This survey found that 56% of males and 46% of females did not meet the recommended daily intake of fruit, and 92% of males and 90% of females did not meet the recommended daily intake of vegetables.

Population groups

Inadequate fruit intake appeared to decrease as age increased and was therefore less prevalent in older people than younger people. A less distinct difference in vegetable intake by age was observed (Table 2.4).

Levels of fruit intake were related to socioeconomic position, with 54% of people in the lowest socioeconomic group having inadequate fruit intake compared with 47% of people in the highest group. There was not a lot of difference, however, in vegetable intake across different socioeconomic groups, with 90–92% of people having inadequate vegetable intake.

A large proportion of Indigenous Australians consumed inadequate amounts of fruit (71%) and vegetables (81%). When compared with non-Indigenous Australians, the age-standardised prevalence of inadequate fruit intake in Indigenous Australians was 58% compared with 48% in non-Indigenous Australians. The age-standardised prevalence of inadequate vegetable intake in Indigenous Australians was 89% compared with 85% of non-Indigenous Australians.

People living in *Major cities* were less likely to have inadequate fruit intake (50%) than those living in *Inner regional* (53%) or other areas (57%). For vegetable consumption the opposite was observed, with a higher proportion of people living in *Major cities* having inadequate vegetable intake.

Trends

In order to compare the proportions of people consuming sufficient fruit and vegetables over time, sufficient intake has been based on two or more serves of fruit and four or more serves of vegetables. The proportion of people usually eating sufficient serves of fruit remained stable between 2001 and 2004–05 at around 50% (AIHW 2008f). The proportion of people usually consuming enough vegetables rose slightly for both males and females, from 27% of males and 33% of females in 2001 to 30% and 35% respectively in 2004–05 (AIHW 2008f). Information from the most recent NHS suggests that in 2007–08 the proportion of people consuming both sufficient fruit and vegetables has declined since 2004–05 (ABS 2009).

Table 2.4: Inadequate fruit and vegetable intake among people aged 15 years and over, 2007–08

Population subgroup	Per cent of population	
	Inadequate fruit intake	Inadequate vegetable intake
Age group (years)		
15–24	65.7	90.5
25–34	55.9	94.4
35–44	54.5	92.7
45–54	48.8	90.7
55–64	40.9	87.9
65–74	34.9	86.3
75 and over	34.6	87.3
15 and over ASR[a]	*51.0*	*90.8*
Socioeconomic status		
Group 1 (lowest socioeconomic position)	54.2	92.1
Group 2	54.3	90.2
Group 3	50.3	91.5
Group 4	49.9	89.7
Group 5 (highest socioeconomic position)	47.2	90.7
Aboriginal and Torres Strait Islander status[b]		
Indigenous	58.4	88.5
Non-Indigenous	47.9	84.9
Geographic location		
Major cities	49.6	92.6
Inner regional	52.5	86.1
Other areas	56.7	89.2

(a)   Age-standardised to the 2001 Australian population.

(b)   Data extracted from the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey (data are from non-remote areas only).

Notes

1.   Inadequate fruit intake is defined as less than two serves of fruit per day for adults and less than three serves a day for children and adolescents aged 15–18 years.

2.   Inadequate vegetable intake is defined as less than five serves of vegetables per day for adults and less than four serves a day for children and adolescents aged 15–18 years.

3.   Based on self-reported data.

4.   All rates other than age-specific rates are standardised to the 2001 Australian population.

5.   Rows may not add to 100.0 due to rounding.

6.   Cases with missing values were excluded from the numerator and the denominator.

Source: AIHW analysis of the ABS 2007–08 National Health Survey CURF and the ABS 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Tobacco smoking

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Tobacco smoking	✘	✘	✘

Tobacco smoking is known to be a major contributor to sickness and deaths in Australia and has been confirmed as an independent risk factor for CVD (AIHW 2008c), Type 2 diabetes (AIHW 2008d) and CKD (AIHW 2009b).

What is tobacco smoking?

Tobacco smoking includes the smoking of tobacco products such as packet cigarettes, roll-your-own cigarettes, pipes and cigars. People who smoke inhale a range of chemicals. The addictive substance in cigarettes is nicotine, but a range of other noxious substances, such as carbon monoxide and cadmium, are also inhaled (Foy et al. 2005). There can also be harmful effects associated with inhaling environmental tobacco smoke, or passive smoking. Passive smoking has been associated with a number of health problems including coronary heart disease. Passive smoking has not been covered further in this report.

How many Australians smoke?

According to the 2007 National Drug Strategy Household Survey, 16.6% of people aged 14 years and over smoked tobacco daily in 2007, 1.3% smoked tobacco weekly and 1.5% smoked less than weekly. In total, just over 19% of Australians aged 14 years and over were current smokers in 2007 (AIHW 2008h).

Figure 2.3 shows the number of times tobacco was consumed per month by people who identified as smokers. Overall, for smokers, tobacco consumption ranged from 1 time per month to about 3,700 times per month. Smokers most frequently consumed tobacco 300 to 499 times per month, with 27% of male smokers and 34% of female smokers consuming this amount. This is equal to 10–17 times per day.

Population groups

Table 2.5 shows how smoking behaviour varied among different population groups. In 2007, of those aged 14 years or over, the proportion who smoked tobacco was inversely related to socioeconomic status—26% for the lowest socioeconomic group against 14% for the highest group. Smoking was also related to remoteness, with 25% of people living in *Remote and very remote* areas being smokers compared with 18% of people in *Major cities*.

In order to assess the prevalence of smoking in Indigenous Australians, two data sources can be used. According to the 2007 National Drug Strategy Household Survey, which surveyed people aged 14 years and over, Indigenous Australians were more likely than non-Indigenous Australians to be current smokers (34% versus 19%) (Table 2.5). In addition to this, the 2004–05 National Aboriginal and Torres Strait Islander Health Survey, which surveyed only people aged 18 years and over, found that 48% of Indigenous Australians and 23% of non-Indigenous Australians were current smokers (AIHW 2008a).

Trends

The proportion of Australians aged 14 years and over who reported smoking tobacco in the previous year fell from 29.1% in 1993 to 19.4% in 2007 (AIHW 2008i). The proportion of daily smokers also declined to 16.6% in 2007, compared with 25.9% in 1993 and 17.4% in 2004.

Table 2.5: Prevalence of smoking among people aged 14 years and over, 2007

	Number per 100 population		
Population subgroup	**Never smoked[a]**	**Ex-smoker[b]**	**Smokers[c]**
Age group (years)			
14–19	87.9	2.3	9.8
20–29	60.5	12.8	26.7
30–39	51.0	24.1	24.8
40–49	47.1	28.8	24.2
50–59	48.3	32.8	18.9
60 and over	52.2	37.2	10.6
14 and over	*55.4*	*25.1*	*19.4*
Socioeconomic status			
Group 1 (lowest socioeconomic position)	49.6	24.5	25.9
Group 2	53.4	25.1	21.5
Group 3	55.8	23.7	20.5
Group 4	56.9	25.2	17.8
Group 5 (highest socioeconomic position)	59.6	26.6	13.9
Aboriginal and Torres Strait Islander status			
Indigenous	47.6	18.3	34.1
Non-Indigenous	55.6	25.5	19.0
Geographic location			
Major cities	57.6	24.4	18.0
Inner regional	51.7	26.4	21.9
Outer regional	50.2	26.9	23.0
Remote and very remote	47.8	27.1	25.0

(a)   Never smoked more than 100 cigarettes or the equivalent tobacco in their life.

(b)   Smoked at least 100 cigarettes or the equivalent tobacco in their life, and no longer smoke.

(c)   At the time of the survey smoked daily, weekly or less than weekly.

Note: Estimates of tobacco use by younger people should be interpreted with caution due to the low smoking prevalence and smaller sample size of this population group.

Source: 2007 National Drug Strategy Household Survey.

Proportion of smokers (%)
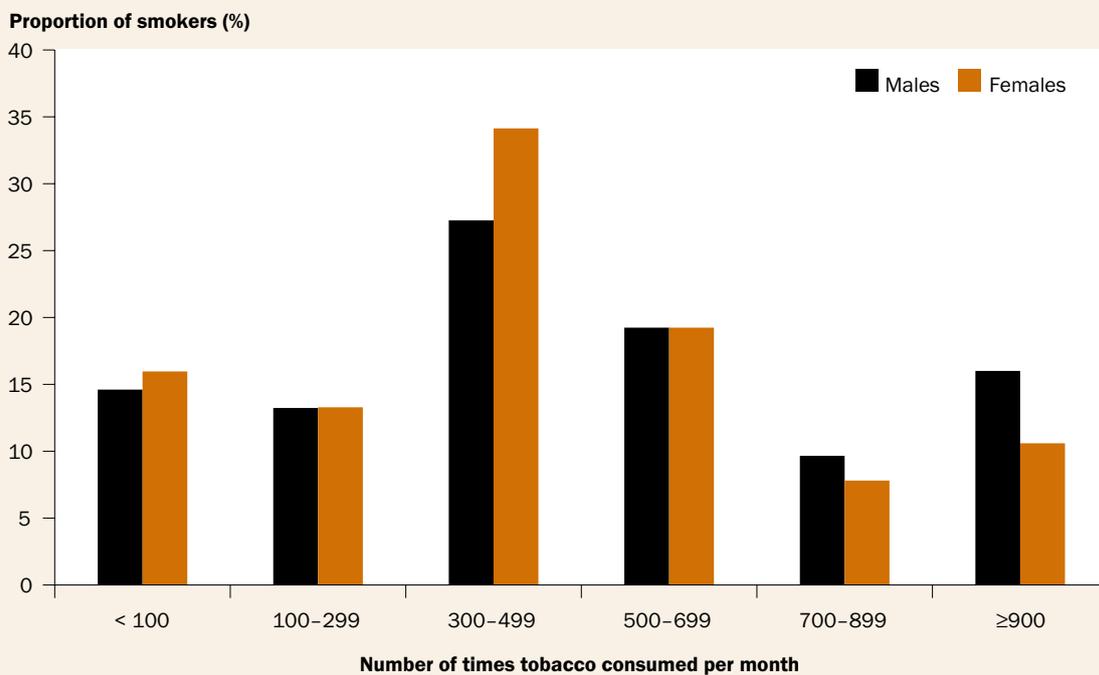
Source: 2007 National Drug Strategy Household Survey.

Figure 2.3: Number of times tobacco consumed per month, 2007

Excessive alcohol consumption

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Excessive alcohol	✖		

Excessive alcohol consumption is a major risk factor for disease and death in Australia. Long-term excessive consumption of alcohol contributes to CVD.

The effect of alcohol consumption on CVD varies with levels of consumption—low to moderate consumption of alcohol is potentially protective whereas high consumption is associated with a higher risk of CVD. High intake of alcohol (and particularly binge drinking, also known as 'short-term risk of harm') is associated with higher blood pressure and increased risk of death from stroke. Alcohol can also affect blood triglyceride levels, complicating the effects of high blood cholesterol where present (AIHW 2004).

What is excessive alcohol consumption?

In this report, alcohol consumption is presented according to the 2001 NHMRC alcohol guidelines (NHMRC 2001a), which were the current guidelines at the time the data were collected. These alcohol risk guidelines have recently been revised and updated (NHMRC 2009).

Risk of alcohol-related harm can be measured as either short-term or long-term risk of harm. Short-term risk of harm is associated with given levels of drinking on any drinking occasion whereas long-term risk of harm is associated with regular daily patterns of drinking. This report will focus on the long-term risk of alcohol-related harm because it is the regular daily pattern of drinking that contributes to CVD.

The 2001 alcohol guidelines describe three risk categories for alcohol-related harm in the long term. For adult males, the consumption of up to 28 standard drinks per week is considered 'low risk', 29 to 42 per week 'risky' and 43 or more per week 'high risk'. For females, the consumption of up to 14 standard drinks per week is considered 'low risk', 15 to 28 per week 'risky' and 29 or more per week 'high risk'.

How many Australians drink alcohol?

In terms of long-term alcohol-related harm and based on self-reported information from the 2007 National Drug Strategy Household Survey, it was estimated that the majority (73%) of Australians aged 14 years and over consumed alcohol in moderation ('low risk'). In contrast, 10% of those aged 14 years and over drank at levels considered to be harmful ('risky' and 'high risk') to their overall health—this corresponds to 2.1 million Australians. Around 17% of people aged 14 years and over abstained from alcohol in the previous 12 months.

The 2007 National Drug Strategy Household Survey asked all people who reported having had an alcoholic drink in the previous 12 months how many standard alcoholic drinks they consumed on the previous day. This ranged from 0 to 47 standard alcoholic drinks that day (Figure 2.4). The majority of the Australian population aged 14 years or over (53% of males and 66% of females) had consumed less than one alcoholic drink on the previous day. The proportion of people then decreased exponentially as the number of drinks increased.

Population groups

Alcohol consumption patterns varied among different population groups in 2007 (Table 2.6). When comparing different age groups, younger people (16% of those aged 20–29 years) were more likely than other age groups to consume high levels of alcohol. There were no significant differences by socioeconomic group in the consumption of alcohol at harmful levels ('risky' and 'high risk'). Indigenous Australians were slightly more likely to consume alcohol at 'high risk' levels than non-Indigenous Australians (12.5% compared with 10.2%). However, Indigenous Australians were also more likely to abstain from alcohol compared with non-Indigenous Australians (23% compared with 17%). Among people aged 14 years and over, a higher percentage of people living in *Remote and very remote* areas reported consuming alcohol at 'risky' and 'high risk' (15%) levels, compared with those living in *Major cities* (10%).

Trends

One in 10 people aged 14 years or over consumed alcohol once a month or more at levels considered harmful in the long term. This level of harmful consumption has been relatively stable since 2001 (AIHW 2008h).

Table 2.6: Prevalence of alcohol consumption behaviour based on long-term risk[a] of harm among people aged 14 years and over, 2007

	Number per 100 population		
Population subgroup	**Abstainer/ex-drinker**	**Low risk[b]**	**Risky or high risk[c]**
Age group (years)			
14–19	29.0	62.2	8.8
20–29	12.9	71.1	16.0
30–39	12.2	77.5	10.3
40–49	12.4	76.8	10.8
50–59	14.0	75.6	10.4
60 and over	24.7	68.9	6.4
14 and over	*17.1*	*72.6*	*10.3*
Socioeconomic status			
Group 1 (lowest socioeconomic position)	22.5	66.7	10.8
Group 2	19.5	70.5	9.9
Group 3	17.9	71.9	10.2
Group 4	16.5	74.4	9.1
Group 5 (highest socioeconomic position)	11.5	77.1	11.5
Aboriginal and Torres Strait Islander status			
Indigenous	23.4	64.2	12.5
Non-Indigenous	16.8	73.0	10.2
Geographic location			
Major cities	17.3	72.9	9.8
Inner regional	17.2	72.0	10.9
Outer regional	16.5	71.5	12.0
Remote and very remote	12.6	72.1	15.3

(a)   Long-term risk of harm is associated with regular daily patterns of drinking. The model used is that outlined in the 2001 Australian Alcohol Guidelines (NHMRC 2001b).

(b)   For males the consumption of up to 28 standard drinks per week and for females up to 14 standard drinks per week is considered 'Low risk'.

(c)   For males 29 or more standard drinks per week and for females 15 or more standard drinks per week is considered 'Risky or high risk'.

Source: 2007 National Drug Strategy Household Survey.

Proportion of drinkers (%)
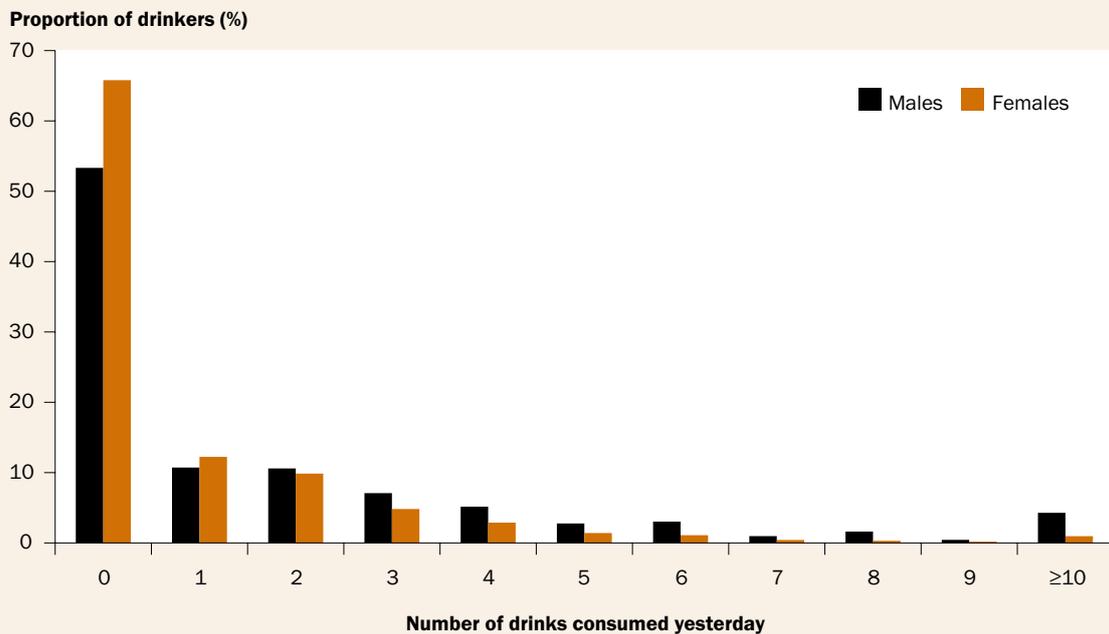
Note: Number of drinks reported has been rounded to the nearest whole standard drink.
Source: 2007 National Drug Strategy Household Survey.

Figure 2.4: Number of standard drinks consumed on the previous day, 2007

High blood pressure

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
High blood pressure	✘		✘

Elevated blood pressure is a major risk factor for CVD and CKD (Barri 2008; NHFA 2008). It is more likely to occur if a number of other risk factors are present including obesity, physical inactivity and poor diet (NHMRC 2004). Controlling or reducing the chance of the onset of high blood pressure reduces the risk of CVD and overall deaths (NHFA 2008).

How do we measure blood pressure?

Blood pressure measures the forces exerted on the artery walls as the heart pumps blood around the body. It is written as systolic/diastolic (for example 120/80 mm Hg, stated as '120 over 80'). Systolic blood pressure reflects the maximum pressure in the arteries when the heart muscle contracts to pump blood. Diastolic blood pressure reflects the minimum pressure in the arteries when the heart muscle relaxes before its next contraction.

There is a continuous relationship between blood pressure levels and CVD risk. This makes the definition of high blood pressure somewhat arbitrary. Clinically, individuals may have different blood pressure targets based on a number of different factors. However, for population-level monitoring, the World Health Organization (Whitworth 2003) defines high blood pressure as:

- systolic blood pressure of 140 mm Hg or more, or
- diastolic blood pressure of 90 mm Hg or more, or
- receiving medication for high blood pressure.

How many Australians have high blood pressure?

The Australian Diabetes, Obesity and Lifestyle (AusDiab) study conducted in 1999–2000 is the most recent source of national data available. The study measured the blood pressure of each participant. The data show that, overall, 30% of adults aged 25 years and over had high blood pressure, and males were more likely to have high blood pressure (33%) than females (27%).

Although the point at which an individual is considered to have high blood pressure is well defined, there is actually no clear threshold at which the risk of disease begins. For example, each increment in a person's blood pressure above their optimal level is associated with an increase in the risk of stroke. It is therefore useful to examine the total range of blood pressures in the Australian population, and to assess both the proportion of people that is on the border of high blood pressure and the severity of blood pressure levels within the group of people that is classified as having high blood pressure.

Figure 2.5 represents the distribution of systolic blood pressure for males and females in the Australian population. The most common systolic blood pressure measurement for both males and females was 120 mm Hg. Figure 2.6 represents the distribution of diastolic blood pressure for males and females in the Australian population. The most common diastolic blood pressure measurement for males was 75 mm Hg and for females 65 mm Hg. Figures 2.5 and 2.6 show that, on average, males had higher systolic and diastolic blood pressure than females. A greater proportion of males were also more likely to be categorised as having high systolic or diastolic blood pressure than females.

Figures 2.5 and 2.6 also indicate the proportions of males and females that were receiving medication to lower blood pressure. They show that a larger proportion of females were receiving medication to lower blood pressure (15%) than males (12%). Interestingly, both figures also show that a larger proportion of males than females with high blood pressure levels were not receiving medication. This could suggest that males are more likely to have undetected or untreated high blood pressure.

Theoretically, all people receiving medication to lower blood pressure should not have a systolic blood pressure that is greater than or equal to 140 mm Hg or a diastolic blood pressure that is greater than or equal to 90 mm Hg. This is because blood-pressure–lowering medications should successfully lower an individual's blood pressure to the target levels. There may be circumstances in which an individual's blood pressure does not respond to pharmacological treatment (NHFA 2008); however, with further review and adjustments to the treatment strategy, most high blood pressure should eventually be controlled. Figures 2.5 and 2.6 show that substantial proportions of males and females were receiving medication to lower blood pressure, but continued to have blood pressure levels that are considered high.

This could suggest that a substantial proportion of the population has detected and treated high blood pressure that remains uncontrolled. These people remain at an unacceptable risk of CVD and CKD unless their treatment is reviewed and their blood pressure reduced to the target levels.

Population groups

The prevalence of high blood pressure varies among different population groups in Australia (Table 2.7). In 1999–2000, the prevalence of high blood pressure increased with age and was higher in males than females. People who did not complete secondary school were more likely than people who completed secondary school or a higher level of education to have high blood pressure. The proportions of people with high blood pressure were similar in urban and rural areas.

There are no data sources available that contain measured blood pressure information for Indigenous Australians. However, based on self-reported blood pressure data in the 2004–05 National Aboriginal and Torres Strait Islander Health Survey, about 14% of Indigenous males and 16% of Indigenous females reported high blood pressure, compared with 10% of non-Indigenous males and females (AIHW 2008a).

Trends

The prevalence of high blood pressure among people aged 25 years and over in 1995 (31%) was similar to that in 1999–2000 (30%) (AIHW 2008c). Longer term trends are available only for the urban population aged 25 to 64 years. They indicate that between 1980 and 1999–2000 the prevalence of high blood pressure more than halved for males aged 25 to 64 years (from 47% in 1980 to 21% in 1999–2000) and halved for females of the same age (from 32% in 1980 to 16% in 1999–2000) (AIHW 2008c).
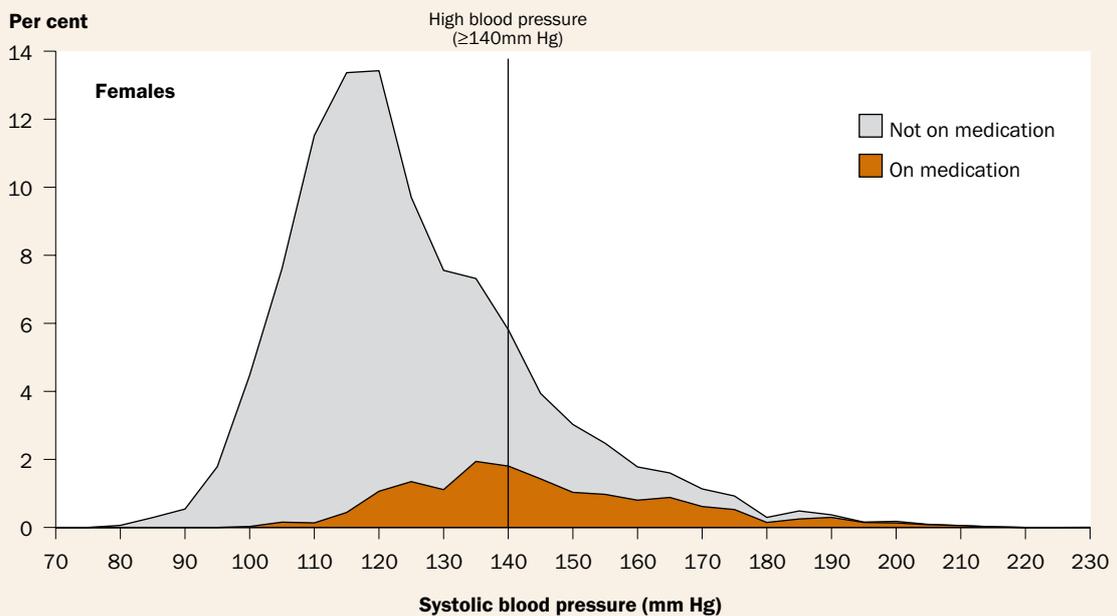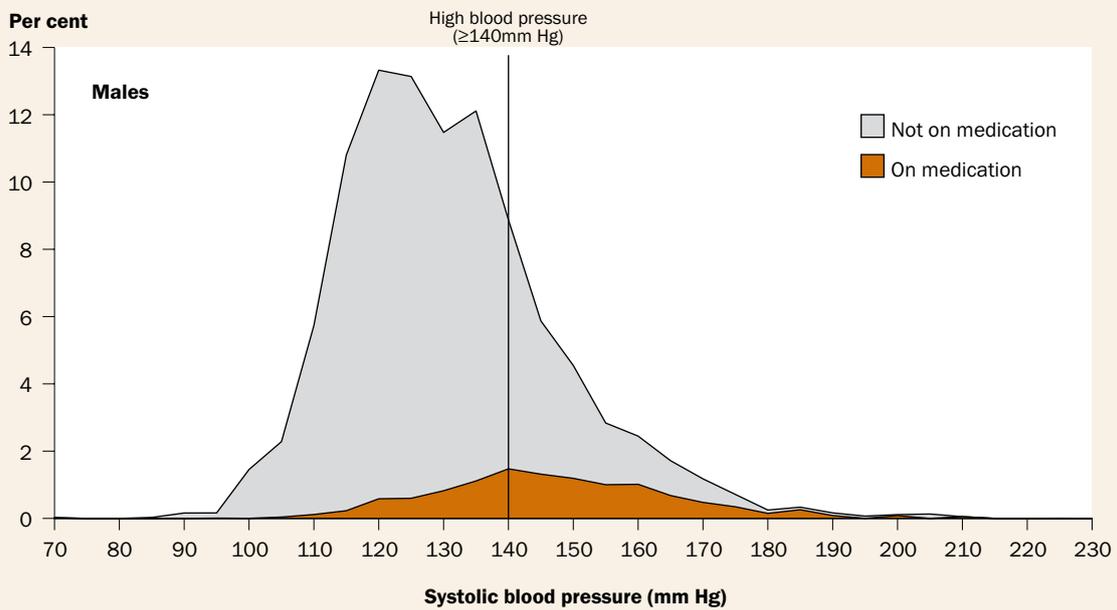
Per cent

Males

High blood pressure
(≥140mm Hg)

☐ Not on medication
◼ On medication

Systolic blood pressure (mm Hg)

Per cent

Females

High blood pressure
(≥140mm Hg)

☐ Not on medication
◼ On medication

Systolic blood pressure (mm Hg)

Notes
1. Based on measured data.
2. Blood pressure measurements have been rounded to the nearest multiple of 5.
3. Missing values were excluded from the numerator and the denominator.
4. Excludes people who self-reported taking medications for high blood pressure

Source: AIHW analysis of the 1999–2000 AusDiab study.

Figure 2.5: Systolic blood pressure (measured), people aged 25 years and over, 1999–2000
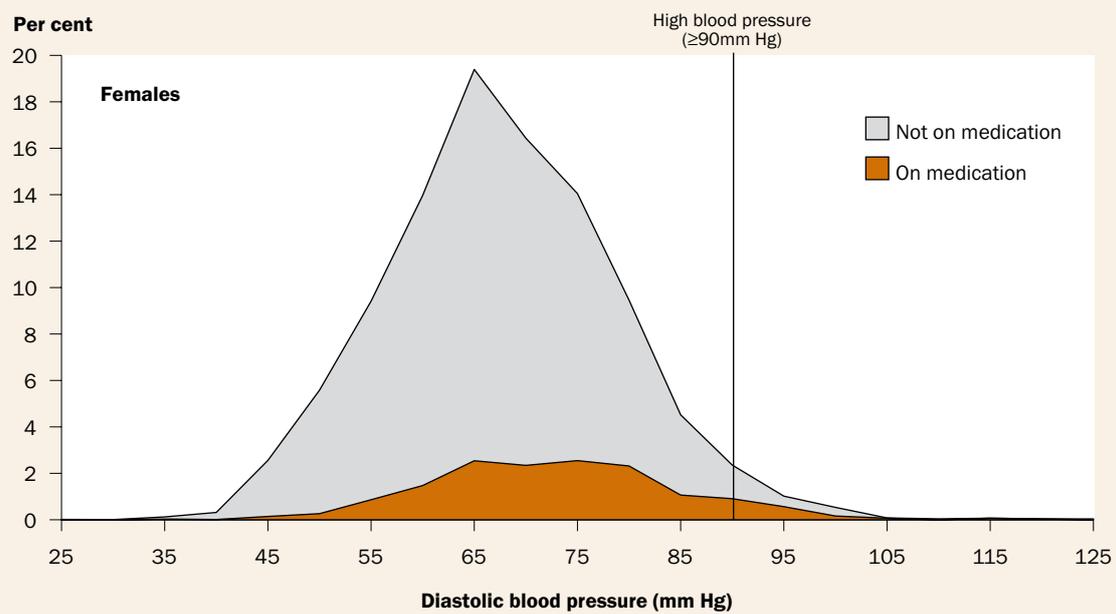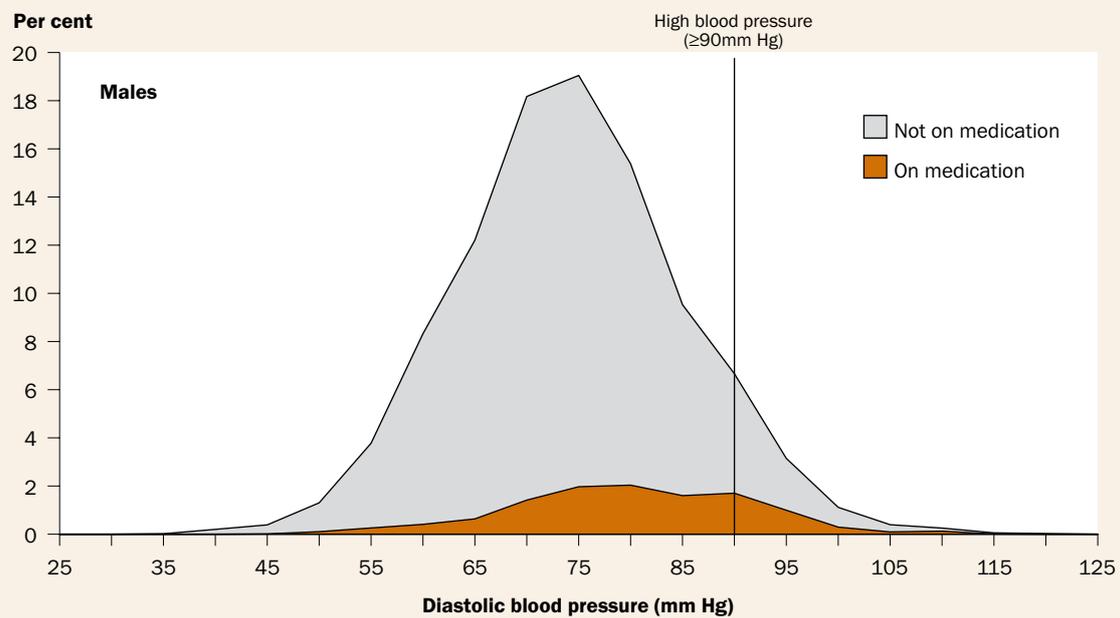
Per cent

Males

High blood pressure
(≥90mm Hg)

- Not on medication
- On medication

Diastolic blood pressure (mm Hg)

Per cent

Females

High blood pressure
(≥90mm Hg)

- Not on medication
- On medication

Diastolic blood pressure (mm Hg)

Notes

1. Based on measured data.
2. Blood pressure measurements have been rounded to the nearest multiple of 5.
3. Missing values were excluded from the numerator and the denominator.
4. Excludes people who self-reported taking medications for high blood pressure

Source: AIHW analysis of the 1999–2000 AusDiab study.

Figure 2.6: Diastolic blood pressure (measured), people aged 25 years and over, 1999–2000

Table 2.7: Prevalence of high blood pressure[a] (measured) among people aged 25 years and over, 1999–2000

Population subgroup	Per cent of population		
	Males	Females	Persons
Age group (years)			
25–34	7.1	3.3	5.2
35–44	14.1	7.6	10.8
45–54	30.6	23.6	27.1
55–64	49.4	44.6	47.0
65–74	69.7	67.4	68.5
75 and over	80.0	75.9	77.6
25 and over ASR[b]	*32.5*	*27.4*	*29.9*
Socioeconomic status (highest level of education)			
Did not complete secondary school	35.3	30.4	32.6
Completed secondary school	31.6	23.4	27.2
Tertiary/technical and further education	30.6	25.8	28.5
Aboriginal and Torres Strait Islander status			
Indigenous	n.a.	n.a.	n.a.
Non-Indigenous	n.a.	n.a.	n.a.
Geographic location			
Urban	32.2	26.8	29.5
Rural	33.0	28.1	30.5

n.a. Not available.

(a)   High blood pressure defined as systolic blood pressure of 140 mm Hg or more or diastolic blood pressure of 90 mm Hg or more or receiving medication for high blood pressure.

(b)   Age-standardised to the 2001 Australian population.

Notes

1.   Based on measured data.

2.   Column totals may not sum to 100.0 due to rounding.

3.   Missing values were excluded from the numerator and the denominator.

4.   Excludes people who self-reported taking medications for high blood pressure

Source: AIHW analysis of the 1999–2000 AusDiab study.

High blood cholesterol

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
High blood cholesterol	✘	✘	

High blood cholesterol is a major risk factor for coronary heart disease and ischaemic stroke, two highly prevalent forms of CVD (AIHW 2008c). It is a basic cause of plaque, the process by which the blood vessels that supply the heart and certain other parts of the body become clogged.

For most people, saturated fat in the diet is the main factor that raises blood cholesterol levels. Genetic factors can also affect blood cholesterol levels, severely in some individuals. Attention to factors such as physical activity and diet plays an important role in maintaining a healthy blood cholesterol level.

What is cholesterol?

Cholesterol (see Box 2.3) is a fatty substance produced by the liver and carried by the blood to the rest of the body. Its natural function is to provide material for cell walls and for steroid hormones. If levels in the blood are too high, this can lead to an artery-clogging process known as atherosclerosis that can trigger heart attacks, angina or stroke.

As with most risk factors, there is not a single point at which the risk of disease from cholesterol begins. Rather, as total blood cholesterol increases, so does the risk of CVD and Type 2 diabetes. In general, a total cholesterol level of 5.5 mmol/L or more is considered high, but it is important to remember that this is an arbitrary definition.

Box 2.3: Blood cholesterol

Two important parts of blood cholesterol are:

- *low-density lipoprotein (LDL) cholesterol, often known as 'bad' cholesterol. Excess levels of LDL cholesterol are the main way that cholesterol contributes to plaque*
- *high-density lipoprotein (HDL) cholesterol, often known as 'good' cholesterol. High levels have a protective effect against heart disease by helping to reduce plaque.*

Triglyceride is another form of fat that is made by the body. Its levels can fluctuate widely according to dietary fat intake and under some conditions levels that are too high may contribute to plaque.

In this report, 'high blood cholesterol' is based on a total cholesterol level of 5.5 mmol/L or more.

How many Australians have high total blood cholesterol?

The AusDiab study conducted in 1999–2000 is the most recent source of national data available in which total cholesterol was measured in study participants. Figure 2.7 displays the distribution of total cholesterol levels for the Australian population. The average total cholesterol levels for both males and females were 5.5–5.6 mmol/L. The data show that roughly half of all Australian adults aged 25 years and over had a total cholesterol level that was considered high (Figure 2.7).

Population groups

High total cholesterol was more common in older people; however, the rate was highest in people aged 55–64 years. Males had a higher rate of high total cholesterol than females up until age 55 years, but above that age females were more likely than males to have high total cholesterol (Table 2.8).

People living in rural communities had a slightly higher rate of high total cholesterol (50%) than people living in urban areas (47%). And, interestingly, people who did not complete secondary school were also slightly more likely to have high total cholesterol than those who did complete secondary school (Table 2.8).

The 1999–2000 AusDiab study cannot be used to report the prevalence of high total cholesterol in Aboriginal and Torres Strait Islander people. However, the 2004–05 National Aboriginal and Torres Strait Islander Health Survey estimates that 60% of Indigenous Australians had high cholesterol, compared with 45% of non-Indigenous Australians, based on self-reported information.

Trends

Trends in the prevalence of high blood cholesterol are only available to the year 2000 for people aged 25–64 years living in capital cities, and show no apparent change in the prevalence of high blood cholesterol since 1980 (AIHW 2008c).
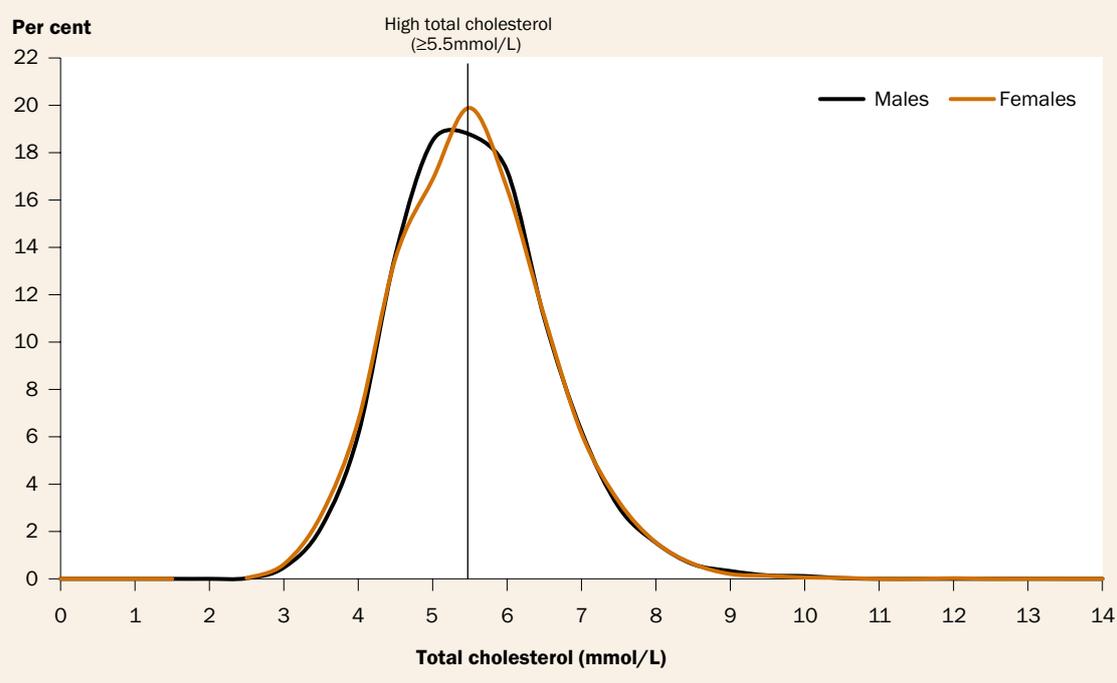
Per cent

High total cholesterol
(≥5.5mmol/L)

Males Females

Total cholesterol (mmol/L)

Notes

1.   Based on measured data.

2.   Missing values were excluded from the numerator and the denominator.

Source: AIHW analysis of the 1999–2000 AusDiab study.

Figure 2.7: Total cholesterol (measured), people aged 25 years and over, 1999–2000

Table 2.8: Prevalence of high total cholesterol (measured) among people aged 25 years and over, 1999–2000

Population subgroup	Per cent of population		
	Males	Females	Persons
Age group (years)			
25–34	28.8	28.4	28.6
35–44	51.4	34.3	42.8
45–54	56.8	53.4	55.1
55–64	56.9	67.5	62.2
65–74	48.9	70.3	60.6
75 and over	47.7	61.4	55.8
25 and over ASR[a]	*47.6*	*47.8*	*47.9*
Socioeconomic status (highest level of education)			
Did not complete secondary school	50.1	48.6	49.5
Completed secondary school	46.9	48.2	47.9
Tertiary/technical and further education	46.8	45.9	46.1
Aboriginal and Torres Strait Islander status			
Indigenous	n.a.	n.a.	n.a.
Non-Indigenous	n.a.	n.a.	n.a.
Geographic location			
Urban	45.4	47.5	46.6
Rural	50.5	48.2	49.6

n.a. Not available.

Notes

1.   Based on measured data.

2.   Column totals may not sum to 100.0 due to rounding.

3.   Missing values were excluded from the numerator and the denominator.

Source: AIHW analysis of the 1999–2000 AusDiab study.

Impaired glucose regulation

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Impaired glucose regulation		✖	

Impaired glucose regulation is the metabolic state between normal glucose regulation and diabetes (WHO 1999). There are two categories of impaired glucose regulation: impaired fasting glucose (IFG) and impaired glucose tolerance (IGT). IFG and IGT are not considered to be clinical entities in their own right but rather risk factors for the future development of diabetes (NHMRC 2001b; Twigg et al. 2007).

Early treatment and improved management of impaired glucose regulation may reduce the incidence of Type 2 diabetes (Bennett 1999; Shaw & Chisholm 2003). In a review of six studies exploring IFG and IGT as predictors of future diabetes, it was found that, in the majority of the populations studied, 60% of

people who developed diabetes had either IGT or IFG 5 years before they were diagnosed with diabetes (Unwin et al. 2002).

There is some evidence that lifestyle changes incorporating increased physical activity and healthy eating could reduce or stop the progression of IFG and IGT to diabetes. For example, results from a large longitudinal study by Tuomilehto and colleagues (2001) showed that lifestyle interventions, such as counselling aimed at reducing weight and total fat intake, and increasing fibre intake and physical activity among obese adults with IGT reduced the rate of progression to diabetes by 40–60% over a 3–6-year period.

How is impaired glucose regulation defined?

IFG and IGT are measured using the oral glucose tolerance test—the same test used to diagnose diabetes. In this test a blood glucose measurement is taken after about 8 hours of fasting. Another measurement is taken 2 hours after consuming 75 g of glucose, often in the form of a high-sugar drink. IFG represents abnormalities of glucose regulation immediately after an overnight fast while IGT represents abnormalities of glucose regulation 2 hours after consuming glucose. Table 2.9 summarises how the categories of impaired glucose regulation are diagnosed and defined.

Table 2.9: Defining impaired glucose regulation

Impaired fasting glucose (IFG)	
Fasting blood glucose	6.1–6.9 mmol/L and, if measured,
2-hour blood glucose level[a]	< 7.8 mmol/L
Impaired glucose tolerance (IGT)	
Fasting blood glucose	< 7.0 mmol/L and
2-hour blood glucose level[a]	≥ 7.8 mmol/L and < 11.1 mmol/L
Type 2 diabetes	
Fasting blood glucose	≥ 7.0 mmol/L or
2-hour blood glucose level[a]	≥ 11.1 mmol/L

(a)   Blood glucose 2 hours after ingestion of 75 g oral glucose load.

Source: National Evidence Based Guideline for Case Detection and Diagnosis of Type 2 Diabetes (Colagiuri et al. 2009).

How many Australians have impaired glucose regulation?

Based on measured data from the 1999–2000 AusDiab study, it was estimated that about one in six Australians aged 25 years and over had impaired glucose regulation, with IGT more prevalent than IFG (11% and 6% respectively) (Table 2.10).

The prevalence of impaired glucose regulation (which is made up of the prevalence of IFG and IGT) varies with sex and age. For example, in the 1999–2000 AusDiab study the overall prevalence of impaired glucose regulation was higher in males (17%) than females (15%) (Table 2.10). The age distribution indicates that the prevalence peaked in females aged 75 years and over, and in males aged 65–74 years (Figure 2.8). In almost all age groups, the prevalence of impaired glucose regulation was higher in males than females.

Trends

A comparison of results from the 1981 Busselton Study and 1999–2000 AusDiab study suggests a substantial increase in the age-standardised prevalence of IGT for both males (3–10%) and females (3–12%) between the two study periods (Dunstan et al. 2001).

Table 2.10: Prevalence of impaired glucose regulation among adults aged 25 years and over, 1999–2000

	Per cent of population		
	Males	**Females**	**Persons**
Impaired glucose tolerance	9.2	11.9	10.6
Impaired fasting glucose	8.1	3.4	5.8
Impaired glucose regulation	**17.4**	**15.4**	**16.4**

Source: AIHW analysis of the 1999–2000 AusDiab study.

Source: AIHW analysis of the 1999–2000 AusDiab study.

Figure 2.8: Age-specific prevalence of impaired glucose regulation in adults, 1999–2000
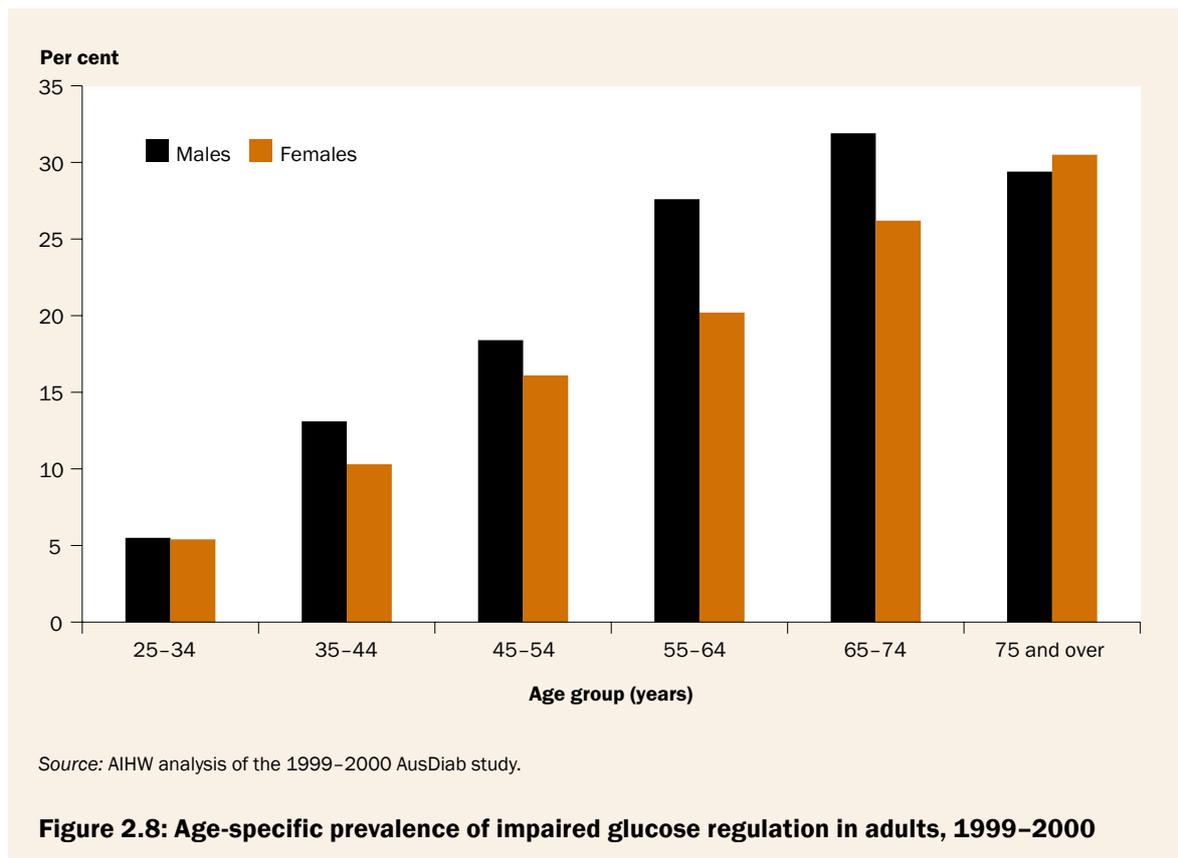
Depression

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Depression	✘		

There is evidence suggesting that depression can directly lead to problems such as heart disease, independent of any intermediary behavioural effects such as increased rates of smoking or poor diet (Bunker et al. 2003). The strength of the association is similar to that of other standard risk factors such as high cholesterol (Bunker et al. 2003).

The relationship between depression and CVD is complex. CVD is a strong risk factor for depression, while depression is a risk factor for CVD (Clarke & Currie 2009). Depression can also affect other risk factors for CVD, and often co-exists with other risk factors. For example, people with depression are more likely to smoke and be physically inactive (Bunker et al. 2003), and depression is a major barrier to the adoption of healthy lifestyle behaviours (Hayes 2006).

What is depression?

Depression is a mental illness that affects many Australians. It is a mood disorder with prolonged feelings of being sad, hopeless, low and inadequate. It may include a loss of interest or pleasure in activities, often with suicidal thoughts or self-blame (AIHW 2008c). In 2006–07, depression was the fifth most common problem managed by GPs in Australia (AIHW 2008c). Other types of mental illness include anxiety, bipolar disorder and schizophrenia (AIHW 2008c). In total, mental illness was estimated to be responsible for 13% of the total burden of disease in Australia in 2003, placing it third as a broad disease group after cancers and CVD (Begg et al. 2007).

Box 2.4: Measuring mental health in the 2007 National Survey of Mental Health and Wellbeing

To estimate the prevalence of specific mental disorders, the 2007 National Survey of Mental Health and Wellbeing used the World Mental Health Survey Initiative's version of the World Health Organization's Composite International Diagnostic Interview, version 3.0 (WMH–CIDI 3.0). The WMH–CIDI 3.0 was chosen because it:

- *provides a fully structured diagnostic interview*
- *can be administered by lay interviewers*
- *is widely used in epidemiological surveys*
- *is supported by the World Health Organization*
- *provides comparability with similar surveys conducted worldwide.*

Source: National Survey of Mental Health and Wellbeing: summary of results 2007 (ABS 2008).

How many Australians have depression?

The 2007 National Survey of Mental Health and Wellbeing found that, of all people aged 16–85 years in Australia (16 million), almost 1.9 million people (11.6%) had experienced a depressive episode at some stage in their lives and 650,000 people (4.1%) had experienced a depressive episode in the previous 12 months (Table 2.11). These results equate to just over 1 in 25 Australians having experienced a depressive episode in the preceding 12 months.

Females had a higher prevalence of depressive episodes than males. Overall, 15% of women (equating to 1,150,700 females) and 9% of men (equating to 694,000 males) aged 18–85 years had experienced a depressive episode at some point in their lives. Females were also more likely than males to have experienced a depressive episode in the previous 12 months (5% of females compared with 3% males) (ABS 2008).

The prevalence of lifetime depressive episodes appeared to be higher among younger males and females. Figure 2.9 shows that females aged 18–64 years (16%) had a higher prevalence of lifetime depressive episodes than females aged 65–85 years (8%). Similarly, males aged 18–64 years (10%) had a higher prevalence of lifetime depressive episodes than males aged 65–85 years (6%).

Table 2.11: 12-month and lifetime prevalence of depressive episodes in the Australian population, 2007

	12-month depressive episode[a]		Lifetime depressive episode[b]	
	Number ('000)	Per cent	Number ('000)	Per cent
Males	245.0	3.1	697.0	8.8
Females	407.4	5.1	1,168.1	14.5
Persons	**652.4**	**4.1**	**1,865.1**	**11.6**

(a)   12-month depressive episode is based on lifetime diagnosis and the presence of symptoms of a mild, moderate or severe depressive episode in the 12 months before the survey interview.

(b)   Persons who met the criteria for a mild, moderate or severe depressive episode at some stage in their lifetime.

Source: National Survey of Mental Health and Wellbeing: summary of results 2007 (ABS 2008).

Per cent
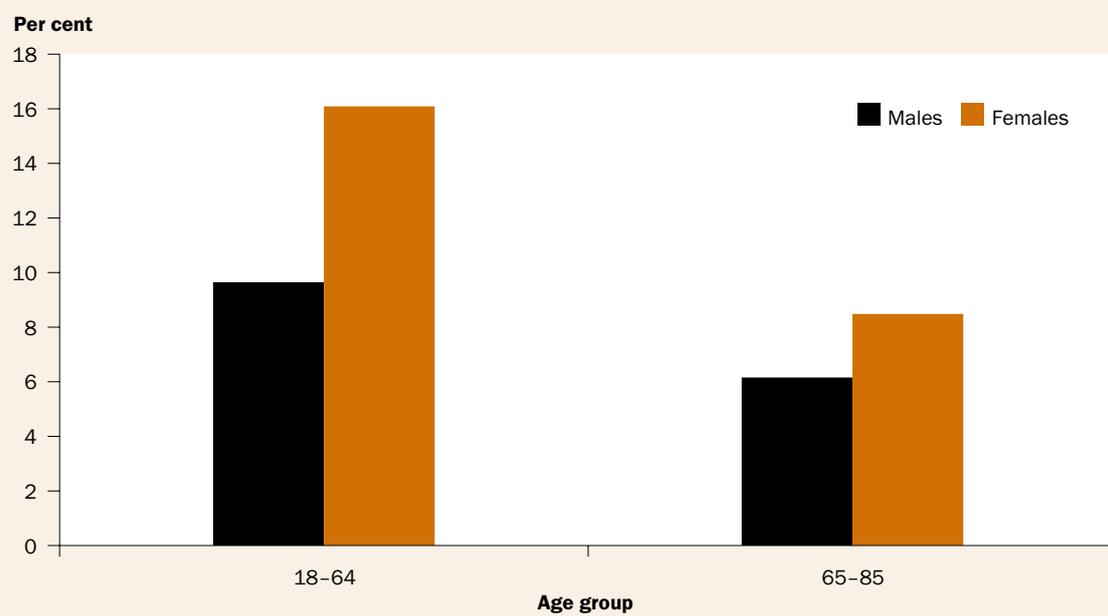
(a)   Persons who met the criteria for mild, moderate or severe depressive episode at some stage in their lifetime.

Source: National Survey of Mental Health and Wellbeing: summary of results 2007 (ABS 2008).

Figure 2.9: Proportion of males and females with lifetime(a) depressive episode, 2007

Low birthweight

Risk factor	Cardiovascular disease	Type 2 diabetes	Chronic kidney disease
Low birthweight	✘	✘	✘

It is hypothesised that low birthweight babies have cardiovascular, metabolic and endocrine adaptations that permanently change the structure and function of the body (Barker 1999). It is theorised that these changes may to lead to CVD and Type 2 diabetes in adult life (Barker 1999). Low birthweight may also result in a number of factors associated with CKD (White et al. 2009). In particular, low birthweight is often associated with intrauterine malnutrition, which can impair nephron development in the kidneys. Nephrons are the functional and structural unit of the kidney and are responsible for the purification and filtration of the blood (Hughson et al. 2003).

A baby may be small due to being born early, or may be small for its gestational age. Some factors contributing to low birthweight include the mother's socioeconomic position, age of the mother, number of previously born siblings, mother's nutritional status, mother's smoking and alcohol intake, and illness during pregnancy (Ashdown-Lambert 2005; Mohsin et al. 2003).

What is low birthweight?

Babies are defined as having low birthweight if their weight at birth is less than 2,500 g. Within this category, babies weighing less than 1,500 g are defined as very low birthweight and babies less than 1,000 g as extremely low birthweight (WHO 1992).

How many babies are born with a low birthweight in Australia?

Data from the National Perinatal Data Collection show that the average birthweight of live born babies in Australia in 2006 was 3,370 g. The average birthweight ranged from 3,262 g in the Northern Territory to 3,407 g in Tasmania (Laws & Hilder 2008).

In 2006, there were almost 18,000 live born babies (6.4% of all births) with low birthweight in Australia (Laws & Hilder 2008). A further 3,000 babies were of very low birthweight, constituting a further 1.1% of live births, and 1,300 of these were extremely low birthweight (Figure 2.10 and Table 2.12). The data suggest that male live born babies were less likely to be of low birthweight (5.9%) than female babies (6.9%) in 2006. Since 2000, the proportion of live born babies with low birthweight has remained stable at around 6–7%.

Population groups

The proportion of low birthweight babies varied between different population groups (Table 2.12). In 2006, there was a higher proportion of low birthweight in live born babies of mothers living in the lower socioeconomic position (the most disadvantaged group) (7.3%) compared with babies born to mothers living in the highest socioeconomic position (5.5%).

The average birthweight of live born babies of Aboriginal and Torres Strait Islander mothers was about 3,169 g. This was just over 200 g lighter than the average of 3,378 g for live born babies of non-Indigenous mothers (Laws & Hilder 2008). The proportion of low birthweight live born babies of Aboriginal and Torres Strait Islander mothers was 12.4%, twice that of babies of non-Indigenous mothers (6.2%) (Laws & Hilder 2008).

The proportion of low birthweight babies also varied according to mother's geographical location of usual residence. In 2006, live born babies of mothers living in very remote locations were more likely to be of low birthweight (10.2%) than those born in other areas (Table 2.12).


Source: Australia's mothers and babies 2006 (Laws & Hilder 2008).

Figure 2.10: Birthweight of live born babies in grams, 2006
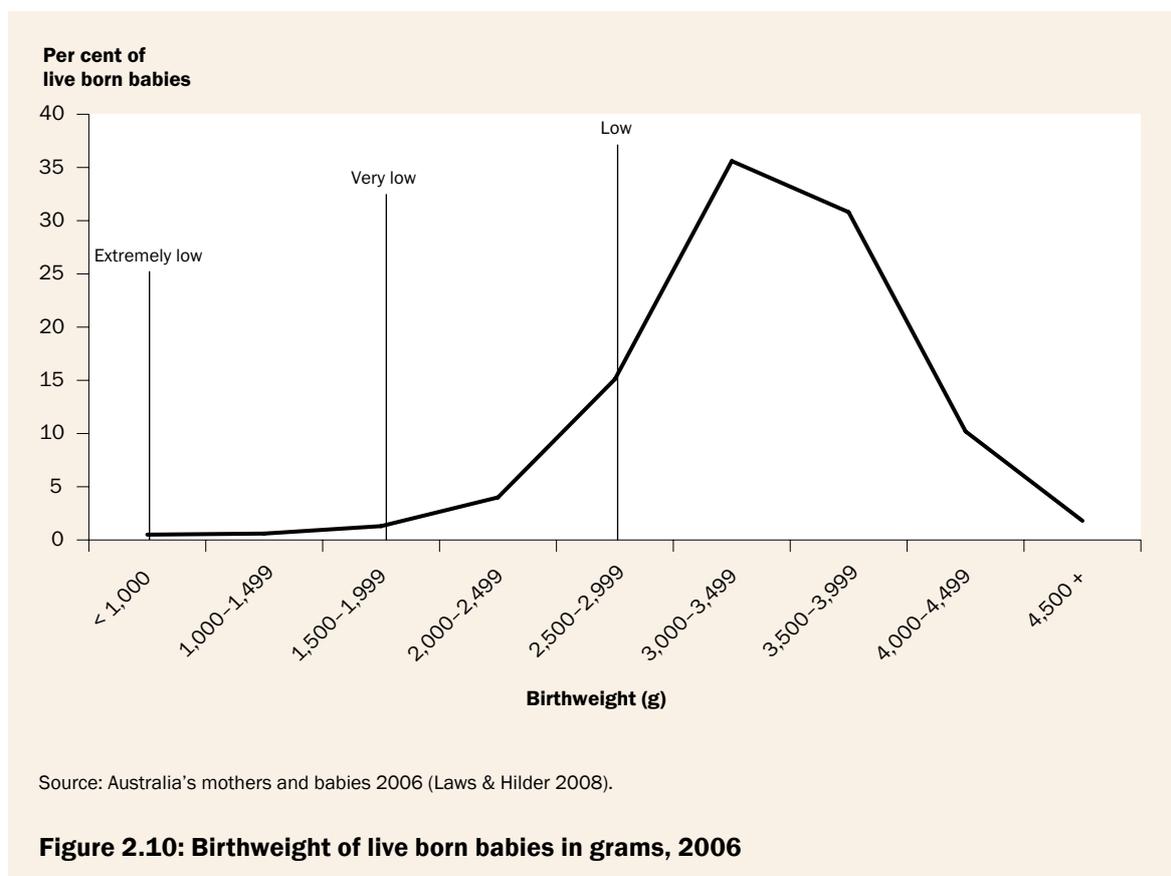
Table 2.12: Birthweight proportions for live born babies of mothers of different population groups, 2006

Population subgroup	Per cent of live born babies		
	Extremely low[a]	Very low[b]	Low[c]
Overall	0.5	1.1	6.4
Socioeconomic status			
Group 1 (lowest socioeconomic position)	0.6	1.3	7.3
Group 2	0.5	1.1	6.8
Group 3	0.4	1.0	6.3
Group 4	0.4	1.1	6.0
Group 5 (highest socioeconomic position)	0.4	0.9	5.5
Aboriginal and Torres Strait Islander status			
Indigenous	1.1	2.3	12.4
Non-Indigenous	0.4	1.0	6.2
Not stated	0.2	1.1	6.6
Geographic location			
Major cities	0.5	1.0	6.2
Inner regional	0.4	1.0	6.4
Outer regional	0.6	1.3	7.1
Remote	0.6	1.2	8.3
Very remote	0.9	2.1	10.2

(a)   Extremely low birthweight = birthweight of less than 1,000 g.

(b)   Very low birthweight = birthweight of less than 1,500 g.

(c)   Low birthweight = birthweight of less than 2,500 g.

Note: In this table, very low is a subset of low birthweight and extremely low is a subset of very low birthweight.

Sources: Australia's mothers and babies 2006 (Laws & Hilder 2008); National Perinatal Statistics Unit additional analysis of the National Perinatal data collection.

Absolute risk

Up until now, preventive treatment decisions for CVD, Type 2 diabetes and CKD have been focused on individual risk factors. However, the relationship between risk factors and disease is integrated and continuous (Chen et al. 2008). Individuals are more likely to develop clusters of risk factors and the assessment of disease risk based on the combined effect of multiple risk factors is more accurate than that based on individual risk factors (NVDPA 2009).

'Absolute risk' is a term used to define the probability of an event occurring, for example a CVD event such as stroke, within a specified period, and takes into account an individual's entire risk factor profile instead of focusing on single risk factors. Tools for health professionals have recently been developed to assess the risk of CVD and Type 2 diabetes in people without known disease. There are no tools available yet to assess the absolute risk of CKD.

For absolute CVD risk, tools have been developed in both electronic and paper-based formats. These are usually based on the Framingham Risk Equation (Anderson et al. 1991). This equation has been adapted for the Australian population and considers an individual's age, sex, systolic blood pressure, total and HDL cholesterol, smoking status and left ventricular hypertrophy (enlargement of the lower left chamber of the heart). The result reflects the individual's risk of developing CVD and is designed to help Australian primary care health professionals to make informed decisions about the individual's clinical care to manage their risk (NVDPA 2009). Guidelines have been developed by the National Vascular Disease Prevention Alliance to help Australian health professionals to use this tool effectively. These guidelines have also been approved by the NHMRC.

In a recent study, Chen and colleagues (2007) used the Framingham Risk Equation to compute 5- and 10-year risks of developing first-time CVD for the AusDiab survey population. The results were weighted to the total Australian population and are shown in Table 2.13.

Table 2.13: Proportion of Australian population aged 25 years and over at CVD risk

	Per cent of Australian population	
	Men	Women
5-year CVD risk		
High[a]	5.4	0.6
Intermediate[b]	13.0	3.0
10-year CVD risk		
High[a]	5.4	0.6
Intermediate[b]	14.7	3.9

(a)   High risk was defined as 5-year CVD risk > 15% or 10-year CVD risk > 30%.

(b)   Intermediate risk was defined as 5-year CVD risk of 10–15% or 10-year CVD risk of 20–30%.

Source: Adapted from Chen et al. 2007.

To assess the risk of Type 2 diabetes in people without known disease, the Australian Type 2 Diabetes Risk Assessment Tool, commonly known as 'AUSDRISK'. has been developed (DOHA 2009d). This tool is based on the Finnish Type 2 Diabetes Risk Score, known as 'FINRISC' (Lindstrom & Tuomilehto 2003), but has been adapted for the Australian population. It is used to assess an individual's risk of developing Type 2 diabetes in the next 5 years. In this assessment tool, an individual's age, sex, ethnicity, family history of diabetes, blood glucose level, blood pressure, smoking status, fruit and vegetable intake, level of exercise and waist measurement are used to assign an overall level of risk of the individual developing Type 2 diabetes. It has been designed to be completed by the patient who may then, based on the result, be asked to consult their GP (DoHA 2009d).

3 POPULATION-LEVEL PREVENTION INITIATIVES AND INTERVENTIONS

Background

Interventions to prevent risk factors for chronic disease, aimed at a population, are essential to prevent future disease and potential epidemics. Reduction in risk factors can lead to large health gains in the population and reduced mortality (WHO 2005).

The risk factors for CVD, diabetes and CKD described so far are part of a wider conceptual framework of determinants of health (Figure 3.1). They generally fit into two categories in the framework: health behaviours and biomedical factors.

Most population-level initiatives are aimed at health behaviours such as smoking, alcohol overuse, poor diet and physical inactivity. By reducing these risk factors, improvements can in turn be seen in biomedical risk factors such as high blood pressure, obesity, impaired glucose tolerance, abnormal blood lipids, low birthweight and depression. Although an initiative may initially target a health behaviour, modification of this behaviour will most likely lead to favourable results for the biomedical risk factors. Targeting health behaviours at a population level usually relies on changing the background determinants of health such as knowledge, attitudes and beliefs, and environmental factors.

Interventions at a population level in Australia can be initiated at all levels of government (Australian, state and territory, and local) and by non-government organisations. Hence the scope of interventions is wide. They are often guided by overarching strategies or policies. Although these strategies may come from all levels of government and non-government organisations, they are often established at a national level, with input from other government and non-government organisations. For example, the National Alcohol Strategy 2006–2009 was developed through collaboration between Australian governments, non-government and industry partners, and the broader community (DoHA 2009l; MCDS 2006).

Monitoring population-level initiatives

Population-level initiatives are very relevant for risk factor prevention. Population-level services have not been the focus of health service monitoring in the past, as this monitoring has usually been focused on individual-level services. In many cases it is difficult to systematically measure the number of individuals receiving a particular population program. However, it is possible to monitor the presence and focus of these initiatives, although ideally this would be based on a standard data collection that currently does not exist.

Institutions such as the NHMRC produce guidelines on clinical management or prevention of risk factors at an individual level, but there is a lack of direct guidance on best practice for population-level initiatives in Australia. In the United Kingdom, the National Institute for Health and Clinical Excellence produces guidelines for public health initiatives at a population level. These guidelines and materials can help define the scope of population-level initiatives that should be monitored.

Scope and purpose of this chapter

This report focuses on information on interventions by the Australian government, state and territory governments, and peak non-government organisations. Even within this scope, it is not possible in a report such as this to comprehensively describe all initiatives that are in place, largely due to the lack of a standardised data collection. This chapter therefore aims to paint a picture of the population-level initiatives set up to prevent risk factors in people who do not have them, and/or improve or remove the risk factors in people who already have them. This is done through the use of examples from Australian governments and peak non-government organisations.

Types of population-level initiatives

Population-level initiatives aimed at preventing risk factors can use a variety of methods. For this report, initiatives have been grouped into five categories, based on the approach used by the World Health Organization (WHO 2005), which include:

- laws and regulations
- tax and price interventions
- improving the built environment
- public awareness campaigns
- community-based interventions.

These categories can overlap, for example laws can be introduced to mandate taxation on a product, or a community-based program may improve the built environment.

Laws and regulations

Laws and regulations are a broad feature of society and have historically been used worldwide to great advantage in health promotion activities. Perhaps the best known of these in Australia are tobacco control laws that have regulated businesses to provide smoke-free environments as well as enforced advertising restrictions, warning labels and point-of-sale controls (Magnusson & Colagiuri 2008).

There are several ways in which laws and regulations may help prevent or improve risk factors. The law can be used to mandate informing or disclosing information to the public, for example through food labelling laws (Gostin 2007). Laws can be used to help improve the built environment and provide taxation and price incentives, and can also be used to regulate the marketing of products, as with tobacco, that may affect risk factors (Gostin 2007).

Tax and price interventions

Taxation and price policies can provide disincentives for people to start or continue unhealthy habits that affect risk factors, as well as provide incentives for the uptake of healthy habits. Taxation and price policies, like laws, can be classed as a broad feature of society. Tax increases as part of the wider tobacco control laws have been shown to contribute to the reduction of tobacco use while subsidies on fruit and vegetables in schools and workplaces have been shown to increase consumption (WHO 2005).
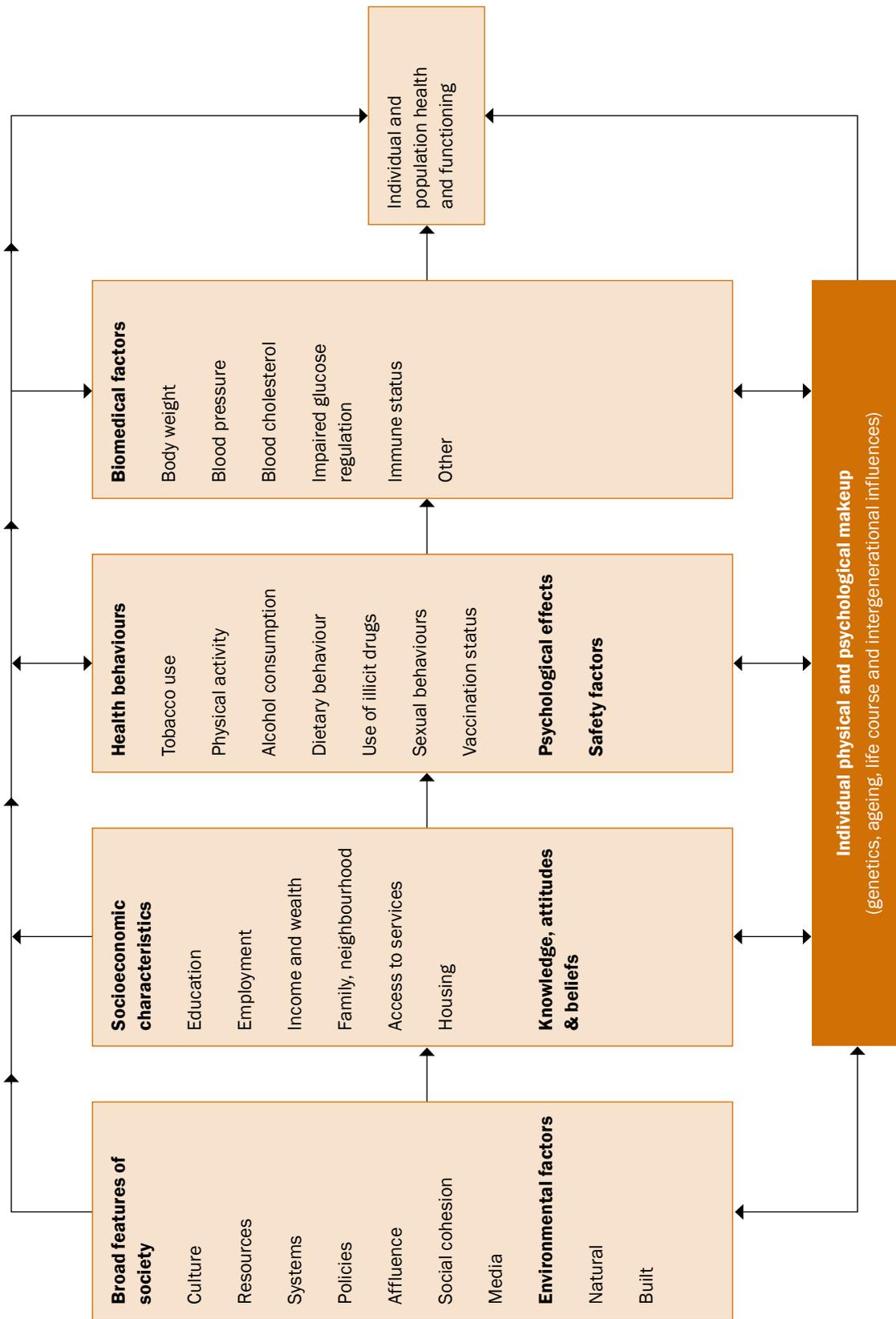
Figure 3.1: A conceptual framework for determinants of health

Broad features of society

Culture

Resources

Systems

Policies

Affluence

Social cohesion

Media

Environmental factors

Natural

Built

Socioeconomic characteristics

Education

Employment

Income and wealth

Family, neighbourhood

Access to services

Housing

Knowledge, attitudes & beliefs

Health behaviours

Tobacco use

Physical activity

Alcohol consumption

Dietary behaviour

Use of illicit drugs

Sexual behaviours

Vaccination status

Psychological effects

Safety factors

Biomedical factors

Body weight

Blood pressure

Blood cholesterol

Impaired glucose regulation

Immune status

Other

Individual and population health and functioning

Individual physical and psychological makeup

(genetics, ageing, life course and intergenerational influences)

Tax and price interventions are useful tools that can reach an entire community in several different ways. The revenue raised can also be used to fund disease prevention programs. Taxation or price incentives can be targeted at individuals, as in the cost of tobacco and the cost of fruit and vegetables, or at businesses and workplaces, as in tax relief for employers who invest in disease prevention programs (Magnusson & Colagiuri 2008).

Improving the built environment

The environment that people live in can affect their health and influence the uptake of behaviours that could be of health benefit. The effect of the built environment (areas made for human use and recreation) on health, and intervention to ensure acceptable conditions, has been a part of public health policy since the mid-1800s, when the *Public Health Act 1848* was passed in the United Kingdom. Subsequent Australian legislation based on this Act focused on the prevention of communicable diseases and diseases caused by hazardous substances through better sanitation, tenancy and zoning laws (Corbett 2008).

The built environment can affect the nutritional and physical activity habits of the population. For example, it has been shown that walking and cycling rates are higher in some neighbourhoods in the United States where there is higher population density, mixed land use and interconnected footpaths (WHO 2005).

It has also been hypothesised and shown that a high density of fast-food outlets in an area increases the risk of obesity (Li et al. 2009). The increasing availability and convenience of fast foods, lack of access to fresh fruits and vegetables, and larger portion sizes, also contribute to the obesity problem. People living in neighbourhoods with access to both safe places that facilitate physical activity and walking tracks, and have fresh food markets are likely to eat healthy food, be physically active and avoid obesity (Sallis & Glanz 2006).

Public awareness campaigns

Public awareness campaigns to prevent or reduce risk factors provide a target audience with information that can influence their behaviour. Such campaigns are often defined as 'health education' or 'social marketing', and can add to or change knowledge, attitudes and beliefs (Andreasen 1995; Glanz et al. 2008; Gordon et al. 2006).

Campaigns may be aimed at individuals, but also at professionals, organisations and policy makers (Gordon et al. 2006). Campaigns have been extensively used in many areas of health promotion, particularly for risk factors for chronic disease. Public awareness campaigns have the potential to inform, encourage and motivate to enhance health (NPHT 2008) through media such as television, radio and print. As media campaigns may not be effective in isolation, they are often complemented by support services, education resources, smaller community-run programs and government support.

In the case of risk factors for CVD, diabetes and CKD, campaigns usually target behavioural risk factors such as alcohol, smoking and nutrition. For example, the current Measure Up social marketing campaign is a national campaign that promotes healthy eating and physical activity, and primarily targets 25–50 year olds with children (ABHI 2007).

The aim of Western Australia's Go for 2&5 multi-strategy marketing campaign (2002–2005) was to increase adults' awareness of the benefits of eating more fruit and vegetables. By improving nutrition knowledge, attitudes and consumption behaviour, the campaign resulted in an observed increase of one serving of fruit and vegetables over 3 years (Pollard et al. 2007).

In 2006, graphic warnings and the Quitline telephone number were printed on cigarette packets in Australia. As well, the media warned Australians about the effects of smoking. To evaluate the campaign, the number of calls to the Quitline was monitored. There was a sharp increase in the number of calls shortly after the campaign began, indicating that Australians were seeking support to quit (Miller et al. 2009).

Public awareness campaigns that target a wide population often have a greater effect on some population groups than others, and some groups may have different levels of uptake of campaign messages. This means that campaigns should be culturally sensitive and appropriate (O'Donoghue 1999), to ensure that the message reaches the most at-risk populations.

Community-based interventions

Community-based interventions can be used to encourage and support healthy lifestyle choices. They are usually aimed at changing the knowledge, attitudes or beliefs of specific population groups and focus on preventing or reducing risk factors while working to help local communities to support the desired behaviour change (Altman 1995; Brenner 2002). These interventions can occur in a number of settings, including schools and workplaces, where the existing infrastructure and management support may also be key elements in enabling behaviour change.

Behaviours such as physical activity, diet and alcohol misuse are commonly targeted. For example, school-based programs in the United States focusing on physical activity and diet (among other things) have led to a decrease in total fat consumption and an increase in physical activity in children in the intervention schools (WHO 2005). Integrated community approaches have been implemented in France, Spain and Belgium through the EPODE program (Together Let's Prevent Childhood Obesity), which involves entire communities (EPHA 2008). The Australian Heart Foundation Walking Group is a free community-run network, where anyone can participate. The program relies on local government, leisure services and workplaces to run walking groups. The aim is to increase participation and enjoy physical activity, and create social connections (NHFA 2009).

Population-level interventions currently in place

For this section of the report, the AIHW collected information from states and territories, the Australian Government Department of Health and Ageing, and peak non-government organisations on population-level interventions currently in place. This resulted in the collection of a large amount of information that showed a great deal of activity across Australia.

Through this collection, two things that affect the monitoring of risk factors have become clear.

First, most population-level initiatives are aimed at preventing behavioural risk factors (such as increasing people's fruit and vegetable intake, or physical activity levels). Dealing with behavioural risk factors can help prevent the biomedical risk factors (such as high blood pressure, high blood lipids or impaired glucose regulation). Biomedical risk factors are not normally specifically targeted though population-level initiatives in Australia. Therefore the picture presented here focuses on the behavioural risk factors currently tackled by specific programs.

Second, a systematic data collection is needed in order to effectively monitor these initiatives. Although AIHW staff attempted to collect information in a systematic fashion by approaching population health experts in different states and territories, many of the initiatives in this area are across sectors and levels of government, or occur outside government. The information collected was to some extent opportunistic and providers varied in the amount of detail they could readily provide. Therefore the list of interventions is not comprehensive—for this reason only examples are presented. It is clear, however, that the prevention of risk factors is being recognised and supported by all stakeholders as pivotal to improving and maintaining the health of Australians.

Overweight and obesity, physical inactivity and poor nutrition

Overweight and obesity, physical inactivity and poor nutrition are three risk factors that are commonly targeted together at the population level. The National Obesity Taskforce, a group established by Australian Health Ministers in 2003, reviewed the evidence for interventions to deal with overweight and obesity in adults and older Australians. They found convincing evidence that weight gain occurs from continued periods of energy imbalance, during which energy intake exceeds energy expenditure (NSW Centre for Overweight and Obesity 2005). In other words, people gain weight if they eat more food, particularly energy-dense foods, than they need according to their activity levels. Therefore it makes sense to focus on these two health behaviours (diet and physical activity) together when aiming to influence overweight and obesity levels.

Participation in physical activity reduces cardiovascular risk in its own right, and helps prevent Type 2 diabetes. It improves other risk factors such as high blood pressure and levels of HDL ('good') cholesterol, and improves mental wellbeing, including depression (AIHW 2008c).

A healthy diet is closely related to good health. It has been argued that poor nutrition during fetal development affects the growth and development of the child, and also increases the risk of abdominal obesity, Type 2 diabetes, CVD and CKD as an adult (SIGNAL 2001). Therefore, current priorities include the promotion of fruit and vegetable consumption, healthy weight and good nutrition to mothers, babies, school-aged children and Indigenous Australians (AIHW 2008c). As Indigenous Australians have poorer nutrition-related health, the priorities apply especially to them (AIHW 2008a).

Strategies and guidelines

National efforts to improve physical activity and nutrition, and combat overweight and obesity are based on a number of strategies and evidence-based guidelines (Box 3.1).

One of these strategies, Healthy Weight for Adults and Older Australians: the National Action Agenda to Address Overweight and Obesity in Adults and Older Australians 2006–2010, has three main goals: to prevent weight gain at the population level, to achieve better management of early risk and to improve

weight management. The strategy identifies prevention as the most important goal, and complements strategies that are already in place at other levels of government.

The strategy recognises that a multi-layered, intensive, widespread and sustained approach is required across the community and health sectors to deal with overweight and obesity in Australian adults over the years 2006–2010. It identifies actions at a population level, such as social marketing campaigns, collaborations on environmental change to promote physical activity, education, changes in primary health care, monitoring and surveillance, and a collaborative approach across sectors to support healthy food choices. It also identifies specific actions for different population groups such as Aboriginal and Torres Strait Islander peoples. Similarly, Healthy Weight 2008: the National Action Agenda for Children and Young People and their Families identifies actions for combating childhood overweight and obesity. Both these strategies identify population-level actions that can be grouped into the five categories used in this chapter.

Box 3.1: Strategies and guidelines for the prevention of overweight and obesity, physical inactivity and poor nutrition

- *Healthy Weight for Adults and Older Australians: the National Action Agenda to Address Overweight and Obesity in Adults and Older Australians 2006–2010 (DoHA 2008f)*

- *Healthy Weight 2008, Australia's Future: the National Action Agenda for Children and Young People and their Families (DoHA 2003)*

- *Be Active Australia: a Framework for Health Sector Action for Physical Activity 2005–2010 (NPHP 2005)*

- *National physical activity guidelines for adults 2005 (DoHA 2005)*

- *Australian physical activity recommendations for 5–12 year olds 2009 (DoHA 2004a)*

- *Australian physical activity recommendations for 12–18 year olds 2009 (DoHA 2004b)*

- *Recommendations on physical activity for health for older Australians 2009 (DoHA 2009k)*

- *Eat Well Australia: an Agenda for Action for Public Health Nutrition 2000–2010 (SIGNAL 2001)*

- *The Australian guide to healthy eating 1998 (DoHA 1998)*

- *Food for health: dietary guidelines for Australians 2003 (NHMRC 2003b)*

- *National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000–2010 (NATSINWP 2001b)*

- *Healthy Eating Healthy Weight 2008 (DAA 2008)*

- *National Heart Foundation of Australia physical activity recommendations for people with cardiovascular disease (Briffa et al. 2006).*

Laws and regulations

Food labelling

The development of standards to regulate food is done at a national level in Australia, with state and territory health departments being responsible for enforcing the standards. Labelling ingredients in food can help consumers make better choices if they are aware of what these ingredients mean for their health. In Australia, most packaged foods for retail sale must have a nutrition information panel (FSANZ 2002). The information is presented in a standard format that shows the amount per serve and per 100 g (or 100 ml if liquid) of the food. Panels contain average amounts per serve of energy in kilojoules; average protein, fat (total and saturated) and carbohydrate (total and sugars) in grams; average sodium in milligrams and any other nutrients when a nutritional claim is made in an appropriate unit. This regulation does not occur for food bought in restaurants and takeaways. The revised *Food Standards Code 1.2.8 Nutrition Information Requirements* was introduced in 2000, making it compulsory to declare the amount of saturated fat content as well as the total fat content (FSANZ 2002). Saturated fat is regarded as the most harmful type of fat, and can contribute to CVD by increasing blood cholesterol. Consumers can make an informed choice about foods containing saturated fat, and can in theory purchase a product with low saturated fat content (FSANZ 2009). The National Preventative Health Taskforce has recommended a new national labelling system to apply for all foods, not just packaged foods (NPHT 2008). The taskforce has also recommended regulation of the amount of trans fats, saturated fat, salt and sugar content in foods.

Urban planning

Laws and regulation for urban planning that can influence physical activity and healthy eating are made by state and territory governments, and local governments. Laws and recommendations such as those established for transport can affect physical activity levels. For example, the fourth objective of the Transport Coordination Plan for Queensland 2008–2018 is to encourage the use of public transport, walking and cycling, and reduce reliance on private vehicle use. In regards to urban planning and nutrition, the use of agricultural land for urban development, or inclusion of spaces for community gardens, has the potential to influence the availability of local food resources (Dixon et al. 2009).

Tax and price incentives

Potential tax and price incentives to facilitate good nutrition and physical activity include subsidising healthy foods, taxing unhealthy foods and providing tax incentives for active living. In Australia, most fresh foods for retail are exempt from the goods and services tax (GST). Foods that are taxed include prepared food, confectionery, savoury snacks, bakery products, ice cream and similar food, and biscuit goods. The National Preventative Health Taskforce has suggested that a review of the tax system may be needed to facilitate access to healthier foods and active recreation (NPHT 2008). Besides the exemption of fresh food from the GST, there are relatively few tax or price incentives at a population level to improve poor nutrition, physical inactivity or obesity. There are some interventions in small communities, such as subsidised gym memberships for employees in workplaces.

Improving the built environment

Urban planning occurs at the state and territory and local government levels in Australia, with some exceptions such as Commonwealth land. In recent years, it has become increasingly recognised that urban environments can affect physical activity levels and nutritional behaviours. The built environment can promote or inhibit energy consumption and expenditure (Hill et al. 2003).

Efforts to improve the built environment to help foster increased physical activity levels and better nutrition usually require the involvement of non-health sectors. Most of the focus in this area has been on influencing the people who affect policy or plan environments. For example, in 2004 the National Heart Foundation of Australia released the publication *Healthy by design: a planner's guide to environments for active living (*NHFA (Victorian Division) 2004). The report helps planners to incorporate designs that positively affect health into daily planning decisions. The report has specific advice on planning walking and cycling routes; streets; local destinations; open space; public transport; seating, signage, lighting, fencing and walls; and fostering community spirit. See also 'Urban planning' in the 'Laws and regulations' section above. Other examples are shown in Box 3.2.

Box 3.2: Examples of initiatives to improve the built environment

Specific programs in Victoria under the Go for Your Life initiative include improving access to public land to be underpinned by a uniform walking trail classification standard for Victoria; facilitating locally relevant public land projects; building on existing programs such as Conservation Volunteers Australia to focus on projects with a physical activity component; and recruitment strategies to engage those not currently involved in regular physical activity.

South Australia Health and the Department of Planning and Local Government are working together to improve the health and wellbeing of South Australians. The purpose of this collaboration is to increase knowledge of planning to incorporate health principles, concepts and strategies. There is a strong focus on healthy eating and physical activity, and assistance is given for planning and health matters within local government.

At a national level, the Healthy Spaces and Places project has developed an Internet-based national planning guide with practical tools, case studies and guidelines to help planning and design practitioners to incorporate active living into the built environment. The project also aims to raise awareness of this cross-disciplinary area and to contribute to national policy setting. The project is a collaboration by the Australian Local Government Association, the Heart Foundation of Australia and the Planning Institute of Australia.

In the Australian Capital Territory (ACT), the Active Living Project is a collaboration of the Heart Foundation and ACT Health, which aims to improve the health and wellbeing of people living in the ACT through a cross-sectoral approach to active living. An Active Living coordinator works with stakeholders from the health, transport, sport, recreation and planning sectors, and community representatives, to create support environments for active living in the ACT.

Public awareness campaigns

Public awareness campaigns are perhaps one of the most commonly used tools to target prevention of these risk factors. In Australia, public awareness campaigns are run at all levels of government and by non-government organisations. In the case of obesity, physical inactivity and poor nutrition, most campaigns are part of a wider strategy. See Box 3.3 for examples of current campaigns.

Box 3.3: Examples of public awareness campaigns

The national Australian Better Health Initiative social marketing campaign, Measure Up, was implemented in 2008. The campaign links waist circumference to risks of chronic disease and lower quality of life to raise awareness and motivation to change behaviours. The campaign's components include television, radio, print, outdoor, website and community education resources. The primary target group is 25–50 year old adults who have children, with a secondary target group of 45–60 year olds.

In Victoria the Go for Your Life campaign aims to promote healthy eating and increase physical activity in the general population and population subgroups. This occurs through whole-of-community and targeted settings, including sports and music events, and using a range of approaches including sponsorships, TV programs and commercials, ambassadors and program-specific marketing.

Kidney Health Australia's Make a Noise about the Silent Killer campaign is designed to create awareness about the risk of CKD. The campaign's television commercial shows animated jelly beans changing their lifestyles by taking up healthy activities.

Diabetes Australia's National Diabetes Action Program aims to raise awareness and promote prevention initiatives. A specific focus is to promote awareness that people are at increased risk of Type 2 diabetes if they have a family history and large waist circumference. It is a national campaign linked with programs run by the state and territory member organisations of Diabetes Australia.

The Australian Government's Get Set 4 Life—Habits for Healthy Kids program is a resource for parents, carers and teachers to help in developing healthy habits in young children (targeted at 4 year olds), such as healthy eating and physical activity.

The Healthy Weight website is an Australian Government resource. It provides information on maintaining a healthy weight, being active and healthy eating at different life stages.

In South Australia, the Obesity Prevention and Lifestyle Project aims to increase the proportion of 0–18 year olds in the healthy weight range by increasing healthy eating and physical activity through families and communities. The project tackles the problems of chronic disease in the community by starting with children and young people. The project is community-based, and involves social marketing and the wider community for support, especially families.

Community interventions

Community interventions are also regularly used to target the prevention of risk factors. Interventions set in schools are common. Corcoran and Bone (2007) list some of the advantages of using settings such as schools and workplaces for health promotion as providing a framework to use in practice, allowing ownership of health, enabling relationship exploration, recognising existing initiatives, encouraging an awareness of health at all levels and 'normalising' aspects of health.

State and territory governments fund or contribute to many community interventions through a range of schemes. See Box 3.4 for examples of current community interventions. Numerous similar interventions are in place across the country.

Box 3.4: Examples of community interventions

The Family Food PATCH program in Tasmania provides training to parents of children aged 0–12 years in practical food, nutrition and physical activity skills in different communities throughout the state. Volunteers (Family Food Educators) are then supported and encouraged to promote healthy lifestyles to other families in their local community through a range of activities, both formal and informal. Volunteers have access to a range of resources and professional support. The Family Food PATCH project is a joint initiative between the Child Health Association, Playgroup Tasmania, the Community Nutrition Unit of the Tasmanian Department of Health and Human Services and Eat Well Tasmania, and began in 2000.

Munch and Move, a joint initiative between the NSW Department of Health and the NSW Department of Community Services, is a program that supports the healthy development of young children by promoting physical activity, healthy eating and reduced small-screen time (TV, DVD and computers). The program focuses on the early childhood sector and includes face-to-face training and practical resources, information and ideas, as well as contact with local health professionals.

The South Australian Breastfeeding Program Strategic and Action Plan 2007–2012 has as one of its objectives to increase community acceptance of breastfeeding as the cultural norm. The Australian Better Health Initiative's Healthy Weight Coordinators have been implementing the action plan in the health regions. This includes working with the Australian Breastfeeding Association to enable health services to become 'Breastfeeding welcome' sites and support breastfeeding in community settings. The Baby Friendly Health Services program for community settings will commence at the first pilot site in 2009. This will inform the national accreditation process.

Smart Choices—Healthy Food and Drink Supply for Queensland schools is a strategy that helps determine which food and drinks can be supplied to schools, based on healthy eating principles as determined by the Australian Guide to Healthy Eating.

(continued)

Western Australia's Healthy Schools Project aims to promote and facilitate the implementation of best practice nutrition and physical activity initiatives in schools. Healthy School Coordinators are employed to facilitate physical activity and nutrition initiatives in schools with disadvantaged populations. They work with targeted schools to incorporate healthy eating and physical activity into school policies, facilitate community- and school-based activities, establish and strengthen existing partnerships and support the development of healthy school environments that contribute to the prevention of obesity and chronic disease.

The Tasmanian Government provides the Get Moving at Work, a resource kit for workplace health and wellbeing programs. The resource is designed to help organisations and employers to implement health and wellbeing programs in the workplace. It outlines the effects of the programs on employee health and wellbeing, workplace productivity levels and the economy as a whole.

The Go for Your Life campaign is a Victorian Government initiative to improve Victorians' health and wellbeing by developing healthy and active communities. The campaign encourages and raises awareness about healthy eating, physical activity and maintaining a healthy weight. Some of the Go for Your Life programs include A physical activity guide for senior Victorians, Active Families, Fad Diets Won't Work, and the Get Active Challenge.

The Australian Capital Territory's Kids at Play—Active Play and Eating Well project is an ACT Government initiative delivered in partnership by ACT Health, the Department of Territory and Municipal Services (Sport and Recreation) and the Heart Foundation ACT. The project responds to the rising levels of childhood obesity by promoting healthy eating and encouraging physical activity. The project targets children aged 0–5 years, their families and carers, early childhood sector staff and teachers.

The Heart Foundation's Jump Rope for Heart is one of the longest running physical activity programs run in schools. The aim is to teach Australian school children about the importance of physical activity, by jumping rope. This program is also a fundraiser for the Heart Foundation, giving the children more incentive to participate.

National Walk to Work Day, organised by the Pedestrian Council of Australia, is an annual event to promote regular walking and physical activity. The focus is on increasing physical activity and promotes the use of public transport, by reducing private vehicle use. The campaign also highlights the health and environmental benefits of walking to work.

The New South Wales Department of Health provides a free telephone coaching service called Get Healthy Information and Coaching Service. This initiative aims to help adults to eat healthy food, become physically active and maintain a healthy weight.

Tobacco

Tobacco smoking has moved from being a part of everyday Australian life to becoming increasingly socially frowned upon. Since the late 1980s, prevention and awareness campaigns have helped in the reduction of smoking (Keleher & Murphy 2004). As outlined in Chapter 2, tobacco smoking remains an area where significant gains in population health can be achieved with further reductions in smoking rates. Reducing smoking prevalence requires effecting positive change in the social, economic and cultural determinants of health (Queensland Health 2008). Tobacco control is a focus of the National Preventative Health Taskforce.

Tobacco smoking is the single most preventable cause of ill health and death in Australia, and therefore offers the greatest scope for prevention (AIHW 2008c). Population-level prevention efforts aim to stop the uptake of smoking and help smokers quit. The reduction in tobacco use in Australia is most likely due to comprehensive tobacco control strategies, including the increased price of tobacco products and the restriction of sales to people under 18 years of age, and changes to social attitudes towards smoking through legislation and hard-hitting public awareness campaigns (Queensland Health 2008; Sargent & DiFranza 2003).

Strategies and guidelines

National efforts to control tobacco smoking are outlined in the National Tobacco Strategy 2004–2009 (MCDS 2004). The four objectives of the strategy are to prevent the uptake of smoking, encourage smokers to quit, eliminate the harmful exposure of tobacco smoke to non-smokers ('passive smoking') and reduce the harm associated with continued smoking.

Australia has also ratified and works within the World Health Organization's Framework Convention on Tobacco Control (WHO 2009). In particular, this includes guidelines in four key areas: protecting public health policies from the commercial interests of the tobacco industry; protection from exposure to tobacco smoke; packaging and labelling of tobacco products; and tobacco advertising, promotion and sponsorship. The main types of initiatives under each of the relevant population-level categories are outlined below, along with some specific examples currently underway in Australia. Strategies and guidelines are summarised in Box 3.5.

Box 3.5: Strategies and guidelines for the prevention of smoking

- *National Tobacco Strategy 2004–2009*
- *World Health Organization's Framework Convention on Tobacco Control*
- *National Tobacco Youth Campaign (DoHA 2009i)*
- *National Partnership Agreement on Preventative Health*
- *Reinvigorating the National Tobacco Strategy (Indigenous Tobacco Control Initiative)*
- *Indigenous Tobacco Control Initiative*
- *Council of Australian Governments' (COAG) Action to Reduce Indigenous Smoking*
- *New South Wales: NSW Tobacco Action Plan 2005–2009*

(continued)

- *Queensland: Queensland Drug Strategy 2006–2010*
- *South Australia: SA Tobacco Control Strategy 2005–2010*
- *Tasmania: Tasmanian Tobacco Action Plan 2006–2010 (Tas. DHHS 2006)*
- *Victoria: Victorian Tobacco Control Strategy 2008–2013*
- *Western Australia: Western Australian Tobacco Action Plan 2007–2011.*

Laws and regulations

The National Tobacco Strategy 2004–09 outlines changes to laws and regulations to combat smoking. They include eliminating tobacco advertising and promotion, reducing the visibility of tobacco products and the accessibility to young people, making tobacco products less affordable, eliminating exposure to environmental tobacco smoke, and developing a system to reduce overall harm associated with dependence on tobacco-delivered nicotine. Many of these approaches are not new: Australian governments have been regulating tobacco for many years.

At a national level, the Australian Government is responsible for a range of national strategies (Talbot & Verrinder 2005); states and territories also have their own strategies and legislation. Key recommendations from the National Preventative Health Taskforce, many of which are underway in some form, include:

- mandating plain packaging of cigarettes
- ensuring regulations regarding advertising apply to modern forms of media, and banning point-of-sale displays
- establishing a national system to review more regularly mandated warnings and warn smokers about new health effects in a timely manner
- establishing a new regulatory body for tobacco
- strengthening state and territory legislation to ensure cigarettes are not sold to children
- establishing changes to laws that protect against second-hand smoke (NPHT 2009).

Tobacco advertising

Longitudinal studies consistently provide evidence that exposure to tobacco advertising and promotion is associated with the likelihood that adolescents will start to smoke (Lovato et al. 2003). Bans on tobacco advertising are recognised as being an essential component of a comprehensive tobacco control strategy (Cancer Council Victoria 2008).

Tobacco advertising and promotion have almost vanished from the mainstream media in Australia, as a result of federal and state laws (Quit Victoria 2008). Under the *Tobacco Advertising Prohibition Act 1992*, it is an offence to publish or broadcast a tobacco advertisement unless one of the few limited exceptions under the Act can be applied to the advertisement (DoHA 2009h). The purpose of the Act is to establish a national prohibition on tobacco advertising, expanding bans already in existence in some states and territories. The Act defines a tobacco advertisement as any writing, sign, symbol or image that gives publicity to or is intended to promote smoking or the purchase or use of tobacco products (Quit Victoria 2008).

In Australia, tobacco cannot be advertised in electronic or print media such as newspapers and magazines. Exemptions on advertising include imported magazines, point-of-sale advertising and product placement. Product placement occurs when a tobacco product or brand is shown in a film or photograph, or even in an advertisement for something else. The exposure of the product or brand is random, making legislation to ban it difficult (Quit Victoria 2008).

Sponsorship by tobacco companies is also banned or strictly limited in most Australian states (Quit Victoria 2008). Sponsorship is the provision of financial support in return for receiving publicity. In the past, Australian tobacco companies have been major sponsors of sports and cultural events. Linking a cigarette brand with an exciting, popular and highly skilled sport improves the image of the product in people's minds. It also undermines health messages by linking smoking with physical fitness and excellence.

Health warnings

Health warnings are mandatory on all tobacco products sold in Australia, providing information to smokers on the health effects of smoking. The warnings now occupy 30% of the front and 90% of the back of each pack, with a graphic appearing on the front and back. These warnings build on earlier systems of health warnings on tobacco products, and were implemented on 1 March 2006. The health warnings and accompanying information aim to increase smokers' knowledge of the health effects of smoking, encourage cessation and discourage uptake or relapse.

Smoking in public

The first public area smoking bans were implemented in cinemas and public transport, not to support health concerns but to reduce the risk of fire. Now, the increasing recognition of the health effects of second-hand smoke and a growing public dislike of cigarette smoke have contributed to smoke-free policies and legislation (Scollo & Winstanley 2008).

Smoking in public places and workplaces comes under the jurisdiction of the states and territories. The Australian Government controls the ban of smoking on domestic and international flights, and in airport buildings. In all states and territories except the Northern Territory, smoking is prohibited in enclosed dining areas, enclosed public places and almost all enclosed workplaces (Box 3.6). Public places such as pubs, clubs, casinos (exemptions apply for 'high roller rooms' in some states), shopping centres, cafes and workplaces became smoke-free Australia-wide on 31 October 2007. Most states and territories have legislated for smoke-free outdoor dining and other areas, and have laws, either in place or starting soon, prohibiting smoking in a vehicle carrying children.

Restrictions on smoking in public places can lead to reductions in smoking by limiting the opportunity to smoke and influencing the perceived social acceptability of smoking (Clark et al. 2008; US DHHS 2006). Restrictions also influence the health and wellbeing of people who do not smoke (Scollo & Winstanley 2008; US DHHS 2006). When people cannot smoke for long periods of time because of bans on smoking in their workplace, public transport and other public locations, they may be stimulated to attempt to quit. Some smokers may smoke less because they have fewer hours available in which they can smoke (Chapman et al. 1999; Farkas et al. 1999; Fichtenberg & Glantz 2002; IARC 2009).

Box 3.6: Legislation on smoking in public places

- *Australian Capital Territory:* Smoking (Prohibition in Enclosed Public Places) Amendment Act 2005
- *New South Wales:* Smoke-free Environment Act 2000
- *Northern Territory:* Tobacco control Act 2005
- *Queensland:* Tobacco and Other Smoking Products Act 1998
- *South Australia:* Tobacco Products Regulation Act 1997
- *Tasmania:* Public Health Act 1997
- *Victoria:* Tobacco Act 1987
- *Western Australia:* Tobacco Products Control Act 2006.

Source: *Scollo & Winstanley 2008.*

Legal tobacco purchasing age

The ability of teenagers to purchase cigarettes increases the initiation and likelihood of smoking (AIHW 2008c; Scollo & Winstanley 2008). Accordingly, all states and territories in Australia have legislation prohibiting the supply of cigarettes to people under the age of 18 years (Box 3.7). The legal age for purchasing tobacco products in all states and territories of Australia is 18 years of age (NPHT 2009; Scollo & Winstanley 2008). Since the introduction of a legal purchasing age, along with many other initiatives, Australia has seen significant reductions in smoking rates in young people that have been sustained over many years (Scollo & Winstanley 2008).

Box 3.7: Legislation on supplying tobacco to minors

- *Australian Capital Territory:* The Tobacco (Amendment) Act 1990 *prohibits the sale of tobacco to a person under the age of 18.*
- *New South Wales:* The Public Health (Tobacco) Act 2008 *prohibits the sale of tobacco and non-tobacco smoking products to minors (a person under the age of 18), and also prohibits the purchase of tobacco or non-tobacco smoking products on behalf of minors.*
- *Northern Territory:* The Tobacco Act 1992 *prohibits the sale of cigarettes to a child under the age of 18.*
- *Queensland:* The Tobacco and Other Smoking Products Amendment Act 2004 *prohibits the sale of tobacco to a person under 18.*
- *South Australia:* The Tobacco Products Regulation Act 1997 *prohibits the supply of tobacco to a child under the age of 18.*
- *Tasmania:* The Public Health Act 1997 *prohibits the supply of tobacco to those under the age of 18.*
- *Victoria: from 1 January 1994 it was illegal to sell tobacco to children under the age of 18, under the* Tobacco Act 1987.
- *Western Australia:* The Tobacco Products Control Act 2006 *prohibits the supply or sale of tobacco to children under the age of 18.*

Source: *Quit 2006.*

Tax and price interventions

Increases in tobacco tax are considered to be one of the most effective tools for decreasing smoking rates, especially among children (Lewit et al. 1997; World Bank 1999). In Australia, tax and price interventions for reducing tobacco smoking are the responsibility of the Australian Government. Because taxes make up a substantial percentage of the price, and because consumers are moderately (but not dramatically) responsive to price changes, increasing the rate of tax on tobacco products allows governments to both reduce the consumption of tobacco and increase government revenue (Cancer Council Victoria 2008).

There has been a tax on tobacco products in Australia since 1901. The current tax applied to tobacco products is through excise duty tax, customs duty tax and the GST (VicHealth Centre for Tobacco Control 2008).

The levels of taxation were increased between 1993 and 1995, and have been increased in line with the consumer price index since then. Changes to the method of taxing tobacco products in 1999—to a 'per stick' system for most cigarettes sold—resulted in some price increases. The introduction of the economy-wide GST in 2000 also led to a further real price increase (Box 3.8). The National Preventative Health Taskforce has recommended further increases on excise and customs duty on tobacco (NPHT 2009).

Box 3.8: Types of tax applied to tobacco in Australia

Goods and services tax

The GST is a broad, indirect tax levied at a rate of 10% on most goods and services consumed in Australia. The GST is estimated to be levied on around 60% of total household consumption, excluding basic food items, health care, child care, rent and education. Exports are not consumed in Australia and are therefore exempt from the GST. The Australian Government administers the GST on behalf of the states and territories, which receive GST revenues.

Customs duty tax

Custom duty is imposed on tobacco products imported into Australia, under the Customs Tariff Act 1995. *The current rate of customs duty, which applies per stick, is the same as the rate of excise duty imposed on tobacco products manufactured in Australia, and is set out in section IV of Schedule 3 to the Act.*

Excise duty tax

A single rate 'per stick' excise applies to all cigarettes with a tobacco content up to and including 0.8 g per cigarette. An excise per kilogram of tobacco applies to all other tobacco products, including cigarettes heavier than 0.8 g tobacco per cigarette, loose tobacco and cigars. As at 1 August 2009, the excise paid per stick on a cigarette containing up to 0.8 g tobacco is 25.833 cents per stick. Tobacco products containing more than 0.8 g tobacco are charged excise at the weight-based rate of $322.93 per kilogram. These rates are subject to an increase in line with the consumer price index, occurring in August and February each year.

Sources: *ATO 2009; DoHA 2008l; Treasury 2009; VicHealth Centre for Tobacco Control 2008.*

Improving the built environment

The socioeconomic and physical environment of neighbourhoods is associated with individual levels of smoking (Chuang et al. 2005). Interventions relevant to the built environment include restrictions on smoking in public places (see laws and regulations), the density of tobacco outlets, and point-of-sale displays of tobacco.

The higher the density of tobacco retail outlets, the higher the rate of smoking in that area. Lowering the effort and cost of accessing cigarettes is likely to increase consumption (Novak et al. 2006; Pokorny et al. 2003; Schneider et al. 2005).

Related to this, a major area of concern is the availability of tobacco outlets near schools as the density of cigarette outlets is associated with student smoking behaviours (Leatherdale & Strath 2007). Improving the built environment to reduce the uptake of smoking in young people includes preventing the number and proximity of tobacco retailers in school neighbourhoods (Henriksen et al. 2008; Leatherdale & Strath 2007; Schneider et al. 2005).

Point-of-sale tobacco displays have been shown to influence the impulse buying of cigarettes (Wakefield et al. 2007). See Box 3.9.

Box 3.9: Examples of interventions in the built environment

The New South Wales Public Health (Tobacco) Act 2008, *which came into effect in July 2009, bans the display of tobacco products, non-tobacco smoking products and smoking accessories in shops. The implementation will be phased in. The Act also restricts the sale of tobacco products and non-tobacco smoking products to a single point of sale on premises.*

The Tasmanian Government has amended the Public Health Act 2007 *to ban point-of-sale displays of tobacco. The Act will come into effect in February 2011.*

Victoria has amended the Tobacco Act 1987 *to ban point-of-sale displays of tobacco (exemptions apply for special tobacconists). This will come into effect on 1 January 2011. In March 2006, amendments to the* Tobacco Act 1987 *banned all tobacco-vending machines in public places except for permitted nightspots, casinos and bottle shops. This reduces the availability of tobacco, especially to underage people (as people must be aged 18 years or over to enter these premises).*

Refer to the section 'Smoking in public', and Box 3.6 for laws and regulations on smoking in public places.

Public awareness campaigns

Anti-smoking mass media advertising has played a major role in reducing the incidence and prevalence of smoking and is viewed as important for reducing the prevalence of smoking (Wakefield et al. 2008). Advertising raises public awareness about smoking and health, and has been shown to be cost-effective (Keleher & Murphy 2004).

In Australia's national tobacco strategies, social marketing campaigns play a major role in raising awareness of smoking-related health risks. This has resulted in large changes in attitudes toward smoking, including increased quitting attempts, and significant downward trends in smoking prevalence (Cancer Council Victoria 2008). The National Preventative Health Taskforce had recommended that funding be provided for several years to continue a social marketing campaign. This was agreed and has been funded through the National Partnership Agreement on Preventative Health. See Box 3.10 for examples of campaigns.

Box 3.10: Examples of public awareness campaigns

The Australian Government, state and territory governments, and non-government organisations (including Quit) run media campaigns to encourage quitting and prevent uptake of smoking. Quit encourages and supports the community and individuals to quit, and promotes awareness of the serious health effects of smoking (Quit Victoria 2009).

The Cancer Council Western Australia launched the Make Smoking History campaign focusing on 'who will you leave behind?' in May 2009. The campaign explores the experiences, thoughts and emotions of family members left behind by those who have died from smoking-related diseases (Cancer Council Western Australia 2009).

The current public awareness campaign Smarter than Smoking, What's the Point of Smoking When All it Does is Cost You? implemented by the Heart Foundation in Western Australia, targets young people to reinforce the short-term effects of smoking, and the impact it has on health, finances, performance, appearance and social opportunities. It uses television, radio, print and cinema to promote the message (Smarter than Smoking 2008).

National Youth Tobacco Free Day is an annual event aimed at educating young people about the health effects, environmental effects and the law. By raising the awareness of the dangers of smoking, the day seeks to create a tobacco-free generation. Each year, the event has a theme. In 2009 it supported the plain packaging of cigarettes (OxyGen 2009).

Community-based interventions

Community-based smoking interventions aim to reduce the number of people taking up smoking, and help those who already smoke to quit. Community-based interventions exist in schools, workplaces and the wider community, and are usually aimed at particular population groups such as young people).

In 1986, the first smoke-free policy was implemented in all Australian Government workplaces. Further, most enclosed workplaces in Australia implemented a smoke-free policy between 1986 and 1995 (University of Sydney 2007). It is a legal obligation of employers to provide safe workplaces, including eliminating tobacco smoke. Most states and territories support and encourage the development and implementation of workplace tobacco control policies (Scollo & Winstanley 2008).

States and territories work in collaboration with their departments of education to ensure that there is appropriate education about smoking in their school curricula and environments (Queensland Health 2008). The Smarter than Smoking SA Project introduced learning activities on tobacco into their curriculum for senior secondary years in Australian studies, mathematics and English (Quit South Australia 2008; Smarter than Smoking SA & Quit SA 2009). See Box 3.11.

Box 3.11: Community intervention examples

In South Australia, the Riverland Youth Anti-Tobacco Project was set up to reduce the uptake of smoking among 12–17 year olds and increase smoking cessation among 18–29 year olds. The project is funded by Drug and Alcohol Services South Australia.

In 2008, Western Australia implemented the Smoke Free WA Health System policy at all 42 Department of Health sites. The Smoke Free WA Health System Working Party was established, and is responsible for facilitating, implementing, evaluating and monitoring the state-wide policy.

In the Northern Territory, the Department of Health and Families has implemented a smoke-free policy in all grounds and vehicles of all facilities.

From 1 May 2009, all ACT Health facilities and vehicles became smoke-free. Smoking is not permitted at any ACT Health facility, except in a designated outdoor smoking area. ACT Health staff who wish to quit smoking are supported through the provision of free nicotine replacement therapy and smoking cessation courses. Patients admitted to Canberra Hospital who smoke are helped to manage their nicotine dependence while at the hospital through nicotine replacement therapy.

Queensland has had a smoke-free health facilities policy, the Queensland Health Smoking Management Policy, in place since 2006, with free nicotine replacement therapy offered to smokers admitted to hospital (Queensland Health 2009a).

Alcohol

Reducing the misuse of alcohol and its effects requires a reduction in the incidence of risky drinking. Risky drinking is often referred to as 'binge drinking'. There is much debate over the definition of the term, and is difficult to scientifically define it. However, the term generally refers to drinking heavily over a short period of time with the intention of becoming intoxicated, resulting in immediate and severe intoxication (DrugInfo Clearinghouse 2009). Initiatives to help in reducing risky drinking focus on increasing public safety where alcohol is consumed, increasing the number of alcohol-free events, setting up workplace policies that support responsible drinking, providing equitable access to prevention and treatment services for alcohol misuse, and regulating alcohol availability—all of which are addressed in the National Alcohol Strategy 2006–09 (DoHA 2009b,l). The Australian Government has commissioned advice on preventing alcohol-related harm from the National Preventative Health Taskforce (NPHT 2009).

Strategies and guidelines

The National Alcohol Strategy 2006–2009 is a government initiative to minimise the harmful effects of alcohol use in Australia (DoHA 2009b,l). The strategy was developed in response to the Australian culture of high-risk alcohol consumption (DoHA 2009a). The strategy was developed through collaboration among the Australian Government, non-government organisations, industry and the community (DoHA 2009b). It outlines priority areas for coordinated action to develop drinking cultures that support a reduction in alcohol-related harm. The priority areas include intoxication, public safety and amenity, health effects, cultural considerations and alcohol availability (DoHA 2009l). The strategy identifies prevention as the most important goal.

In March 2008, the Australian Government announced the National Binge Drinking Strategy, which includes a range of measures to help tackle binge drinking among young Australians. These include a social marketing campaign, grants-based programs to support community partnerships with sporting and other non-governmental organisations, and innovative early intervention and diversion programs to identify young people who have been involved in an alcohol-related incident (DoHA 2009a).

Most state and territory governments have their own alcohol action plans and strategies (see Box 3.12) to tackle alcohol misuse. These action plans are similar in their priorities, approach, implementation, and evaluation and monitoring. For example, the Queensland Drug Strategy 2006–2010 aims to improve people's health, social and economic outcomes by preventing and reducing the harmful effects of alcohol and other drugs used in Queensland (Queensland Government 2006).

The NHMRC has produced the *Australian guidelines to reduce health risks from drinking alcohol*, specifically to prevent alcohol-related disease. The guidelines are based on the lifetime risk of alcohol-related harm, and recommend that both women and men drink no more than two standard drinks a day if they want to reduce their risk of being harmed by an alcohol-related injury or disease (NHMRC 2009).

Box 3.12: Strategies for preventing excess alcohol consumption

- *Australia-wide: The National Alcohol Strategy 2006–2009 (DoHA 2009l)*

- *Australian Capital Territory: The ACT Alcohol, Tobacco and other Drug Strategy 2004–2008 (ACT Government 2004).*

- *New South Wales: The Drug and Alcohol Plan 2006–2010 (NSW Health 2007).*

- *Queensland: The Queensland Drug Strategy 2006–2010*

- *Western Australia: The WA Drug and Alcohol Strategy 2005–2009 (Drug and Alcohol Office 2005)*

- *Tasmania: The Tasmanian Alcohol Action Plan 2009–14*

- *Victoria: Victoria's Alcohol Action Plan 2008–2013 (Vic. DH 2008).*

Laws and regulations

At the state and territory level, alcohol policies and program responsibilities include law enforcement, licensing regulation, treatment services and drug education in schools (NPHT 2009).

In Australia, alcohol is a legal drug; however, there are laws restricting its manufacture, supply, promotion and consumption (DASSA 2009). Over the past 25 years, changes to licensing laws have allowed more convenience and competition in the supply of alcohol, making alcohol more available than ever (Vic. DH 2008).

Liquor licensing

Regulating the physical availability of alcohol is important in reducing alcohol misuse (NPHT 2009). Liquor licensing laws cover aspects of regulation such as restrictions on the hours during which licensed premises can trade, the type of locations where alcohol can or cannot be sold (for example not in petrol stations or supermarkets in some states and territories) and limiting the number of sellers in the alcohol retail market (Donnelly et al. 2006).

Each state and territory has separate laws regarding the selling, buying and consumption of alcohol (Box 3.13). Some of these have recently changed to allow the police more control over licensed premises and harsher penalties Vic. DH 2007).

Restricting the hours and days of sale of alcohol is a standard component of alcohol policy and regulation (NPHT 2009). For example, some states have restricted trading hours by not allowing alcohol sales before a certain time of day, and by reducing hours on Sundays. Studies on the effects of increased restriction of opening hours of liquor outlets have reported decreases in alcohol consumption, incidence of crime and injury requiring hospitalisation (Chikritzhs et al. 2007b; Douglas 1998). Such interventions are more successful with high community involvement and support (Chikritzhs et al. 2007b).

Box 3.13: State and territories liquor and licensing acts

- Australian Capital Territory: Liquor Act 1975
- New South Wales: Liquor Act 2007
- Northern Territory: Liquor Act 1978–79
- Queensland: Liquor Act 1992
- South Australia: Liquor Licensing Act 1997
- Tasmania: Liquor Licensing Act 1990
- Victoria: Liquor Control Reform Act 1998
- Western Australia: Liquor Control Act 1988.

Legal drinking age and legal purchase age

The benefits of a legal minimum drinking age are reduced alcohol use and the associated issues and problems in young people. There are several regulations in each of the state and territory liquor licensing Acts which protect minors from alcohol. Laws regarding age and alcohol purchasing can influence drinking behaviours.

In all states and territories, the legal drinking age is 18 years (NPHT 2009). This is the earliest age that anyone in Australia is legally allowed to drink, purchase or possess alcohol in licensed premises. Consistent enforcement of purchase age laws is seen as critical in reducing alcohol consumption and related harm (Babor et al. 2003). States and territories vary in allowing drinking or possessing alcohol on private premises for people under the age of 18, but most allow some alcohol drinking under the supervision of at least one adult (such as a parent).

Alcohol labelling and the law

All bottles, cans and casks containing alcoholic beverages for sale in Australia are required by law to state on the label the approximate number of standard drinks that they contain (NHMRC 2009). The consumption limits in the Australian Alcohol Guidelines are based on the 'standard drink' concept.

The Australia New Zealand Food Standards Code provides specific requirements for alcoholic beverages and food containing alcohol. The labelling under this standard covers the declaration of alcohol by volume, standard drink and representation of low alcohol; representations on non-intoxicating beverages and food containing alcohol should not be presented as non-alcoholic. Beer, wine, wine products and spirits are also defined in the Code (FSANZ 2003).

By clearly displaying how many standard drinks the bottle or can contains, the label allows the consumer to monitor and calculate their consumption, and recognise that different types of alcoholic drinks can have different effects. When used in conjunction with the Australian Alcohol Guidelines (no more than two drinks per day for both men and women), it can help in preventing alcohol misuse and overconsumption. Where drinks are served in a glass, as in a bar, restaurant or pub, the staff are obliged to tell the consumer how many standard drinks each glass contains.

Alcohol advertising and the law

Australia has a quasi-regulatory system for alcohol advertising. Instead, there are guidelines in place called the *Alcohol Beverages Advertising Code*. The code is designed to:

> ensure that alcohol advertising will be conducted in a manner which neither conflicts with nor detracts from the need for responsibility and moderation in liquor merchandising and consumption, and which does not encourage consumption by underage persons (Management Committee of the ABAC Scheme 2009).

Alcohol advertising is assessed for the effects it will have on the public and on particular types of individuals, and who the advertisement is directed and communicated to as a whole (Management Committee of the ABAC Scheme 2009). Advertisements must present mature, balanced and responsible approaches to consumption. They must not have a strong or obvious appeal to children or adolescents; suggest that consumption will contribute to a significant change in mood or environment; associate the operation of vehicles, sport or dangerous activity with alcohol use; challenge or dare people to drink; or induce people to prefer a beverage of higher alcohol content (AFA 2009).

Alcohol diversion programs offer the opportunity for offenders to attend education sessions or counselling about the harms of alcohol use and responsible drinking skills (AMA 2009). These programs run in most states and territories and some local governments, often for specific at-risk population groups. For example the Queensland Indigenous Alcohol Diversion Program, provided by Legal Aid Queensland, is a treatment and support program for Aboriginal or Torres Strait Islanders who are charged with alcohol-related offences, or have been referred by the Department of Child Safety.

Tax and price interventions

Making alcohol more expensive is a cost-effective strategy to reduce the misuse of alcohol (Wagenaar et al. 2009). In Australia, there are four different taxes that are applied to alcohol (Box 3.14).

Box 3.14: Taxes applied to alcohol in Australia

Goods and services tax

The GST is a broad, indirect tax levied at a rate of 10% on most goods and services consumed in Australia. The Australian Government administers the GST on behalf of the states and territories, which receive GST revenues.

Custom duties tax

Duties apply only to imported alcohol. It is generally imposed as a percentage of the imported good but on a volumetric basis for excise-equivalent products.

Wine equalisation tax (WET)

All wines, meads, perries, ciders and sakes are subject to the wine equalisation tax. Unlike alcohol excises, the wine equalisation tax is an 'according to value' tax. It is calculated at a rate of 29% of the final wholesale price or, in certain other permitted circumstances, of a nominal wholesale value calculated as 50% of the retail price, or alternatively at the average wholesale price for identical wine.

Excise duties tax

For beer, spirits and other alcoholic beverages, excise is imposed on the alcohol content. Excise duties are levied per litre of alcohol content, with the rates varying according to the following categories: draught beer, other beer, non-commercial beer, other beverages not exceeding 10% of alcohol and potable spirits. The excise rate on commercial beer in containers greater than 48 litres (draught beer) is lower than for other commercial beer. The excise on 'other excisable beverages' is the same rate as for full-strength spirits. Other excisable beverages are those not exceeding 10% by volume of alcohol and include most ready-to-drink alcoholic mixed beverages. (DoHA 2009b; Treasury 2009).

Recently, tax has been increased on drinks known as 'alcopops'. The alcopop tax falls under the excise duties tax category and was increased from $39.36 to $66.67 per litre of alcohol in April 2008, as part of the Australian Government's 5-year plan to reduce teenage excessive alcohol consumption (DoHA 2009j; Vic. DPCD 2009a).

Improving the built environment

In recent years, there has been a relaxation of liquor licensing laws in Australia, and a marked increase in liquor outlets (NPHT 2009). The literature suggests that there is a relationship between the density of liquor outlets and alcohol-related harms, increased consumption, adverse health effects and violent crime (Chikritzhs et al. 2007a; Donnelly et al. 2006; Jackson 2003; Rabow & Watts 1983; Stevenson et al. 1999; Stockwell 1997).

Laws and policies that limit where alcohol can be consumed are common throughout the world. Partial or complete liquor bans in public places operate in Australian state and territory capitals, and regional towns and cities (Webb et al. 2004). The places affected are usually streets and paths, parks and public transport stations. Control over consuming alcohol in public places comes from the knowledge that poorly controlled drinking environments can influence alcohol-related harm (Babor et al. 2003; Plant & Thornton 2002).

Researchers believe that some urban environments promote the use of alcohol through outdoor advertising (Collins Perdue et al. 2003). In Australia, the second-greatest expenditure and exposure to alcohol is outdoor advertising (NPHT 2009). A study by Kelly and colleagues (2008) found that soft drinks and alcoholic beverages were the most commonly advertised products found outdoors around schools in Australia. The Outdoor Media Association Inc. introduced a policy in March 2009, limiting the advertising of alcohol products on fixed signs that are located within 150 metres of a primary or secondary school (OMA 2009).

Box 3.15: Examples of initiatives to improve the built environment

The Safer Venues Program run by the Queensland Government aims to reduce excessive alcohol consumption that is linked to injury, violence and street crime by working with the liquor industry to improve safety in and around licensed premises (Queensland Health 2008). This program indirectly benefits the community's risk of chronic disease by attempting to reduce alcohol consumption.

The City of Sydney Council's Street Drinking Strategy 2006–2011 aims to reduce the social effects of street drinking and improve the health of individuals as well as increase public safety and amenity (City of Sydney 2007).

Public awareness campaigns

Public awareness campaigns are perhaps one of the most commonly used tools to target risky alcohol behaviour. In Australia, public awareness campaigns are run at all levels of government and by non-government organisations. In the case of excess alcohol consumption, most campaigns are part of wider drug strategies. See Box 3.16 for examples of current campaigns.

Box 3.16: Examples of public awareness campaigns

The National Binge Drinking Campaign was introduced by the Australian Government in March 2008 to tackle the high levels of binge drinking in young Australians. The campaign's primary audience is teenagers aged 15–17 years and young adults aged 18–25 years. The secondary audience is parents of 13–17 year olds, as they are a major influence on their child's drinking behaviours. The campaign focuses on acute harms, as they are most relevant to episodes of intoxicated drinking. The main message of the campaign is 'Don't turn a night out into a nightmare'. The campaign includes television, radio, online and print advertising. The strategies involve raising awareness of the harms and costs associated with drinking to intoxication and delivering personally relevant messages to encourage, motivate and support (DoHA 2008b, 2009a).

The Community Pharmacy Alcohol Standard Drink Awareness Campaign provides alcohol information with a consumer's prescriptions. The information aims to increase awareness of the concept of a standard drink, how to reduce health risks from drinking alcohol and the interaction between some medications and alcohol (May 2009).

In South Australia, the alcohol intoxication campaign Drink Too Much, It Gets Ugly is a state-wide campaign that targets the group identified as most likely to binge drink (men aged 18–39 years). The objective is to reduce the acceptance of public drunkenness and encourage the target audience to re-think how much they drink.

The Victorian Government has produced a number of social marketing campaigns, most recently the alcohol and violence community awareness campaign Will You Handle Your Alcohol? Or Will Alcohol Handle You?. This campaign promotes the need for personal responsibility in alcohol consumption and associated behaviours, and highlights the potential consequences for those whose violent behaviour affects others (Vic. DHS 2009).

The Queensland Young Women and Alcohol Campaign aims to empower and support young Queensland women in reducing harmful alcohol consumption. Women aged 18–22 years are the primary target, as they are seen as the most at-risk population group. The campaign encourages young women to make their own decisions about drinking and promotes the idea that it is okay to say 'no' (Queensland Health 2009b).

Community-based interventions

Community settings are ideal for health promotion interventions as they allow the community to have ownership of their health, develop an awareness of all levels of health and develop a sense of involvement (Corcoran & Bone 2007). In the case of alcohol, the relevant aspects are community culture, geography and local regulations. See Box 3.17 for examples.

> ### Box 3.17: Examples of community-based interventions
>
> *The Good Sports program is an initiative of the Australian Drug Foundation to develop safer and healthier communities. Alcohol and sports in Australia have been closely linked for many years. Most major sporting competitions and teams promote and advertise alcohol consumption, and many sports clubs have a tradition of heavy drinking. A large number of clubs depend on revenue from alcohol to finance club activities. The program helps sporting clubs manage alcohol responsibly and reduce alcohol-related problems such as binge and underage drinking. It challenges community and club culture around excessive alcohol consumption, underage drinking and drink driving. It currently operates in every state and territory except for the Australian Capital Territory (ADF 2008).*
>
> *Rethinking Drinking is an Australian government-funded initiative that seeks to provide practical assistance to students, teachers and parents on how to minimise the harms associated with alcohol misuse. The project aims to encourage families to discuss alcohol issues by providing information to students, parents and other caregivers at alcohol information nights (Rethinking Drinking 2009). These information nights are usually held at schools, and respected members of the public, such as GPs, police officers and other role models, are invited.*
>
> *FReeZA, a Victorian Government initiative, is a program that provides young people in Victoria with the opportunity to enjoy local drug- and alcohol-free music, sport and other events. Young people are involved in the planning and running of the events, with the help of community organisations (Vic. DPCD 2009b).*
>
> *The Aboriginal Drug and Alcohol Council (SA) Inc. regularly run camps through the Makin' Tracks program to help Indigenous men realise that they do not need alcohol or drugs to have a good time (ADAC 2009).*

Depression

Depression has had increased attention for the last 10 years with a national strategy to combat depression in place since October 2000—Beyond Blue. Prevention of depression has focused firstly on developing recognition in the community that depression is a real disease, enhancing protective factors and preventing its risk factors. Protective factors for depression include social connectedness and activities that promote health and wellbeing, such as physical activity. Risk factors for depression include alcohol consumption, illicit drug use, partner violence and childhood sexual abuse.

Due to the huge amount of effort currently being made to combat depression, it is not possible to describe all population-level interventions. Most Beyond Blue interventions occur across states and territories and there are numerous other initiatives (see Box 3.18 for examples). In the context of the framework used in this report, there are no interventions that specifically target depression in the tax and price incentives or laws and regulations categories, although some interventions may indirectly help prevent depression. Initiatives currently in place to improve the built environment described in the sections on overweight and obesity, physical inactivity and poor nutrition are also likely to help prevent depression as poor built environments and a lack of physical activity are associated with an increased likelihood of depression (Galea et al. 2005).

Box 3.18: Mental health campaigns and community interventions

Beyond Blue includes a national advertising campaign to promote awareness of a variety of mental health illnesses including depression. A range of media is used, including television, radio, print, billboards, public transport and public amenities. The advertising covers postnatal depression, depression in later life, depression or anxiety and alcohol use, depression in men, depression in rural areas, and depression in the workplace.

The Australian Men's Shed Association has 'sheds' all over Australia. Many of these sheds are located in rural and outer areas, and are usually run by the local heath centre. Men from all backgrounds and ages are encouraged to join a shed, where they have the opportunity to get together in their own space, and spend time and work with other men (AMSA 2009).

Headspace, or Australia's National Youth Mental Health Foundation, provides mental health and wellbeing support, information and services to young people aged 12–25 years and their families. The young people can seek help from health professionals from one of their many locations across Australia. These professionals provide services for general health, mental health and counselling, education and employment, and alcohol and other drugs (NYMHF 2009).

The aim of Multicultural and Mental Health Australia is to build awareness of the mental health of Australians from culturally and linguistically diverse backgrounds, through campaigns, projects, information fact sheets, and resources and training for mental health professionals (MMHA 2009).

Flanno Weekend, supported by the Black Dog Institute, is a 3-day campaign to help raise awareness and de-stigmatise mental illness in the Hunter region of New South Wales. Workplaces, school and the community are encouraged to wear a flannelette shirt, as it represents 'working-class, endurance and comfort', and to donate a gold coin (Black Dog Institute 2009).

Mental health and wellbeing strategies, policies and plans recognise the importance of mental health and wellbeing to Australians. Improving mental health and wellbeing is achieved by increasing the allocations of money, implementing frameworks, improving the delivery of health care and services, collaborations, and facilitating community involvement.

Most Australians would be familiar with their workplace or school harassment and bullying policies, in place to protect the mental health and wellbeing of employees or students. These policies usually stem from the state or territory mental health and wellbeing strategy. Suicide prevention action plans are vital in some areas, and have indirect benefits on mental health and wellbeing. See Box 3.19.

Box 3.19: Mental health and wellbeing strategies and policies

Australia-wide: COAG National Action Plan on Mental Health 2006–2011

Australian Capital Territory: Action Plan for Mental Health Promotion, Prevention and Early Intervention, 2006–2008

New South Wales: Community Mental Health Strategy 2007–2012

Northern Territory: Northern Territory Suicide Prevention Action Plan 2009–2011

Queensland: Health Plan for Mental Health 2007–2017

South Australia: South Australia's Mental Health and Wellbeing Policy 2009–2014

Tasmania: Tasmania Mental Health Strategic Plan 2006–2011

Victoria: Because Mental Health Matters—Victoria's Mental Health Reform Strategy 2009–2019 (Vic. DH 2009)

Western Australia: State Mental Health Policy and Strategic Plan 2010–20 for Western Australia.

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4   INDIVIDUAL-LEVEL PREVENTION SERVICES

Background

As the term suggests, individual-level prevention services and interventions are designed to result in changes to risk behaviour or biomedical risk factors directly in individuals. This is usually accomplished by the more traditional health service (that is, patient–doctor) approach rather than the policy and/or legislative approaches used for population-level prevention services. Individual-level prevention services can be monitored by counting the number of individuals receiving a particular service. However, there has been little direct monitoring of the prevention services that people have received.

Services that need to be monitored for individual-level prevention include GP services, community-based programs, medications and surgery. To determine in detail what requires monitoring in this area, relevant services were classified against two dimensions: the *service or setting* and the *method* (Table 4.1). The relevant services and settings are general practices, allied health (including pharmacies), private health insurance funds and hospitals. An 'other' category is included as there may also be other settings where prevention activities occur, such as in specialist practices and outpatient departments in hospitals; these are likely to be less relevant to the prevention of risk factors, but will be important for prevention of diseases and their complications. The main methods identified as important for individual-level services aimed at preventing risk factors are opportunistic screening ('case-finding') and health checks, lifestyle advice and education, referral, medications and surgery.

The main areas where information would have been useful for this report are detailed in the table. However, there are no readily available data sources for some of these, and limitations with some of the data sources that were available. The shaded sections are areas where some information has been able to be included in this chapter. There are also many other individual-level services for which data could not be included, mainly because no data were readily available, such as quit smoking, weight loss and healthy living programs. The two specialised treatment areas relevant to the risk factors in this report are for depression and excess alcohol use. As these are 'diseases' in their own right, most of the relevant services have not been included in this report. It is important to note, however, that there are a significant number of services in these areas. These are detailed in *Mental health services in Australia 2005–06* (AIHW 2008g) and *Alcohol and other drug treatment services in Australia 2006–07* (AIHW 2008b).

Table 4.1: Classification of individual-level services where monitoring is required

Methods	Service/setting				
	GP/primary care practices	Allied health	Private health insurance funds	Hospitals: admitted patients	Other
Opportunistic screening, health checks	For risk factors (section 1)				Community/ health checks e.g. in workplaces
Lifestyle advice, education	For risk factors (section 2)	From dietitians, pharmacies etc.	To members		Through formal programs e.g. QUIT
	To pregnant women (re. low birthweight)				
Referral	To specialists and others (section 2)				
Treatment methods					
• medications	Prescribed to treat risk factors (section 3)	Dispensed (section 3)		Prescribed and dispensed	
• surgery				For obesity (section 4)	
• specialised services	For depression For alcohol dependence	For depression		For depression For alcohol dependence	For depression For alcohol dependence

Source: Categories adapted from Jorm et al. 2009.

This chapter provides national-level information about services provided to individuals in health care settings that are aimed at preventing risk factors for CVD, diabetes and CKD in people who do not have them, and improving or removing them in people who do have them. There are also current initiatives to encourage GPs and other health professionals to increase their focus on identifying and treating risk factors. These include programs and audits run by the National Prescribing Service (National Prescribing Service 2009) and the Australian Primary Care Collaboratives (Australian Primary Care Collaboratives 2009).

Health checks in primary care

Through Medicare, the Australian Government subsidises a range of health assessments that include components aimed at, either specifically or broadly, the prevention of risk factors associated with CVD, diabetes and CKD. This section provides information and statistics about these Medicare Benefits Schedule (MBS) health assessments (items 700, 702, 704, 706, 708, 709, 710, 711, 712, 713, 714, 716, 717, 718 and 719). Where possible, the MBS items are described in order of the life stage to which they relate. In total, there were 576,139 of these MBS health assessments provided in 2008–09.

Medicare Benefits Schedule health checks

Aboriginal and Torres Strait Islander Child Health Check

The Aboriginal and Torres Strait Islander Child Health Check (MBS Item 708) was introduced in May 2006 and is available annually to Aboriginal and Torres Strait Islander children aged 0–14 years. The check is aimed at prevention, early detection, diagnosis and intervention for common and treatable conditions that cause considerable morbidity and early mortality (DoHA 2009e). It includes measurement of height and weight, nutritional status, history of physical activity, exposure to environmental factors such as tobacco smoke, history of depression and history of substance abuse.

Almost 33,000 services were claimed for the Aboriginal and Torres Strait Islander Child Health Check between July 2006 and June 2008, with the rate of uptake doubling over the 3-year period, from 3.4 services per 100 Indigenous children aged 0–14 years in 2006–07 to 7.7 in 2008–09 (Table 4.2). Just over 14,000 services were claimed in 2008–09, with roughly equal numbers and rates of services claimed for boys and girls, but with a higher rate of claims among 0–4 year olds (9.4 per 100 population) than 5–14 year olds (6.7 per 100 population).

Table 4.2: Number of services claimed for the Aboriginal and Torres Strait Islander Child Health Check (MBS Item 708) by sex and age, July 2006 to June 2009

Sex/age group (years)	Number of services				Number per 100 population[a]			
	2006–07	2007–08	2008–09	Total	2006–07	2007–08	2008–09	Total
Boys								
0–4	1,498	2,626	3,071	7,195	4.7	8.2	9.4	7.5
5–14	1,684	3,667	4,110	9,461	2.7	5.9	6.6	5.1
Total (0–14)	*3,182*	*6,293*	*7,181*	*16,656*	*3.4*	*6.7*	*7.6*	*5.9*
Girls								
0–4	1,512	2,464	2,929	6,905	5.0	8.1	9.4	7.5
5–14	1,621	3,640	4,050	9,311	2.7	6.1	6.8	5.2
Total (0–14)	*3,133*	*6,104*	*6,979*	*16,216*	*3.5*	*6.8*	*7.7*	*6.0*
Children								
0–4	3,010	5,090	6,000	14,100	4.9	8.1	9.4	7.5
5–14	3,305	7,307	8,160	18,772	2.7	6.0	6.7	5.2
Total (0–14)	**6,315**	**12,397**	**14,160**	**32,872**	**3.4**	**6.7**	**7.7**	**6.0**

(a) Estimated Indigenous population for children aged 0–14 years as at 31 December of each year derived by averaging the relevant 30 June populations based on the experimental Indigenous population projections (based on the 2001 Census).

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp)

Healthy Kids Check

The Healthy Kids Check (MBS items 709 and 711) was introduced on 1 July 2008. It aims to ensure that all 4-year old children in Australia have a basic health check before they start school; promote the early detection of lifestyle risk factors, delayed development and illness; and introduce guidance for healthy lifestyles and early intervention strategies (DoHA 2008e).

Children aged 3–5 years who are permanent residents of Australia or who are covered by a Reciprocal Health Care Agreement are eligible for the Healthy Kids Check. The health assessment includes the following components:

- the collection of information about family and environmental factors, medical and social history, and lifestyle risk factors
- an assessment of the patient's health, based on the patient's history, examinations and the results of any investigations
- referral or follow-up of any problems where appropriate
- provision of health advice and information to the patient's parent or guardian, using the Department of Health and Ageing's *Get set 4 life—habits for healthy kids* (DoHA 2008d) and other relevant information such as a parent-held child health record.

Between July 2008 and June 2009, there were just over 40,000 services claimed for the Healthy Kids Check, at a rate of 5.0 services per 100 children aged 3–5 years (Table 4.3). Since the Healthy Kids Check was introduced, the number of claims increased from just over 1,000 in July 2008 to peak at 4,937 claims in February 2009 (possibly due to checks occurring before starting school), but has since fallen to around 4,000 claims since April 2009 (Figure 4.1).

Table 4.3: Number of services claimed for the Healthy Kids Check (MBS items 709 and 711) by sex and age, July 2008 to June 2009

Age group (years)	Number of services			Number per 100 population[a]		
	Boys	Girls	Children	Boys	Girls	Children
3–5	20,330	19,701	40,031	4.9	5.0	5.0

(a)   Australian population aged 3–5 years as at 31 December 2008.

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Aboriginal and Torres Strait Islander Adult Health Check

The Aboriginal and Torres Strait Islander Adult Health Check (MBS Item 710) was introduced in May 2004 and is available to Aboriginal and Torres Strait Islander persons aged 15–54 years once every 18 months to 2 years. The check covers history of medication use, physical activity, nutrition and alcohol, tobacco or other substance use, and depression, and includes measurement of blood pressure, height and weight, and waist circumference, and urinalysis for proteinurea (DoHA 2009f). If required blood glucose and lipids may also be tested. Patients who have this health check and are found to be at high risk of developing Type 2 diabetes based on their score from the Australian Type 2 diabetes risk assessment tool (AUSDRISK) (DoHA 2009d) can be referred by their GP to an accredited, subsidised lifestyle modification program. These programs, which usually consist of six group sessions of one and a half

hours each with a maximum of 15 people in each session, provide information designed to help patients to undertake sustained lifestyle and behaviour change to reduce their risk of developing Type 2 diabetes (DoHA 2008j).

The AUSDRISK (DoHA 2009d) consists of a short list of questions that, when completed, provide a guide to a patient's current level of risk of developing Type 2 diabetes over the next five 5 years (Box 4.1). Risk categories based on the AUSDRISK score are low risk (≤ 5)), intermediate risk (6–14) and high risk (≥ 15). More detail on the AUSDRISK is contained in the following section.

Box 4.1: Risk factors covered by the AUSDRISK assessment tool

- *Age*
- *Gender*
- *Ethnicity and country of birth*
- *Family history of diabetes (Type 1 or Type 2)*
- *History of high blood glucose*
- *Current use of medication for high blood pressure*
- *Current daily smoker status (cigarettes or other tobacco products)*
- *Daily consumption of fruit and vegetables*
- *Average amount of physical activity undertaken each week*
- *Waist circumference.*

Source: *DoHA 2009d.*

Over 18,000 services were claimed for the Aboriginal and Torres Strait Islander Adult Health Check between July 2008 and June 2009, at a rate of 6.1 services per 100 Indigenous adults aged 15–54 years (Table 4.4). Overall, more services for the check were claimed for women (55%) than men (45%), and this difference occurred in each age group. The rate of claims per 100 population increased with age from 4.7 services for 15–24 year olds to 8.8 for 45–54 year olds, and this was pattern was observed for both men and women.

Overall, the rate of claims for the Aboriginal and Torres Strait Islander Adult Health Check in 2008–09 (6.1 services per 100 population) was twice as high as that in 2004–05 (2.9). This doubling in the rate of claims over the 5-year period occurred for both males and females (Figure 4.2).

Number of claims

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).
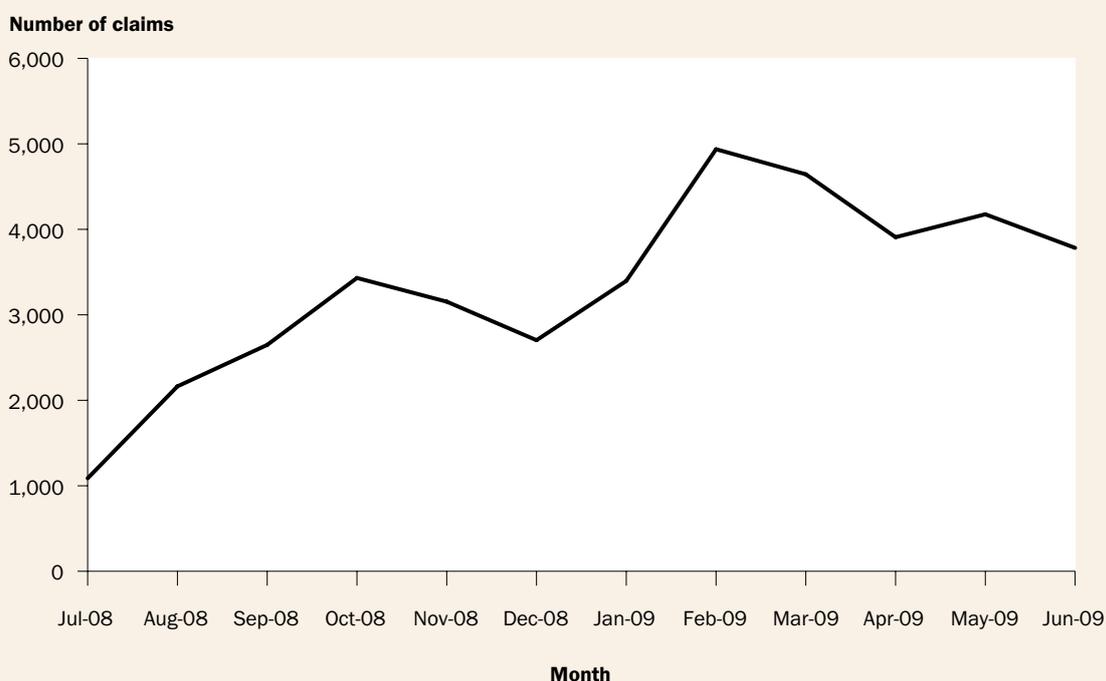
Figure 4.1: Number of services claimed for the Healthy Kids Check (MBS items 709 and 711) by month, July 2008 to June 2009

Table 4.4: Number of services claimed for the Aboriginal and Torres Strait Islander Adult Health Check (MBS Item 710) by sex and age, July 2008 to June 2009

Age group (years)	Number of services			Number per 100 population[a]		
	Males	**Females**	**Persons**	**Males**	**Females**	**Persons**
15–24	2,301	2,911	5,212	4.1	5.4	4.7
25–34	1,924	2,318	4,242	5.2	6.0	5.6
35–44	2,193	2,637	4,830	7.0	7.5	7.3
45–54	1,850	2,236	4,086	8.4	9.1	8.8
Total	**8,268**	**10,102**	**18,370**	**5.6**	**6.6**	**6.1**

(a)   Estimated Indigenous population for adults aged 15–54 years as at 31 December 2008 derived by averaging the 30 June 2008 and 2009 populations based on the experimental Indigenous population projections (based on the 2001 Census).

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Number per 100 population[a]
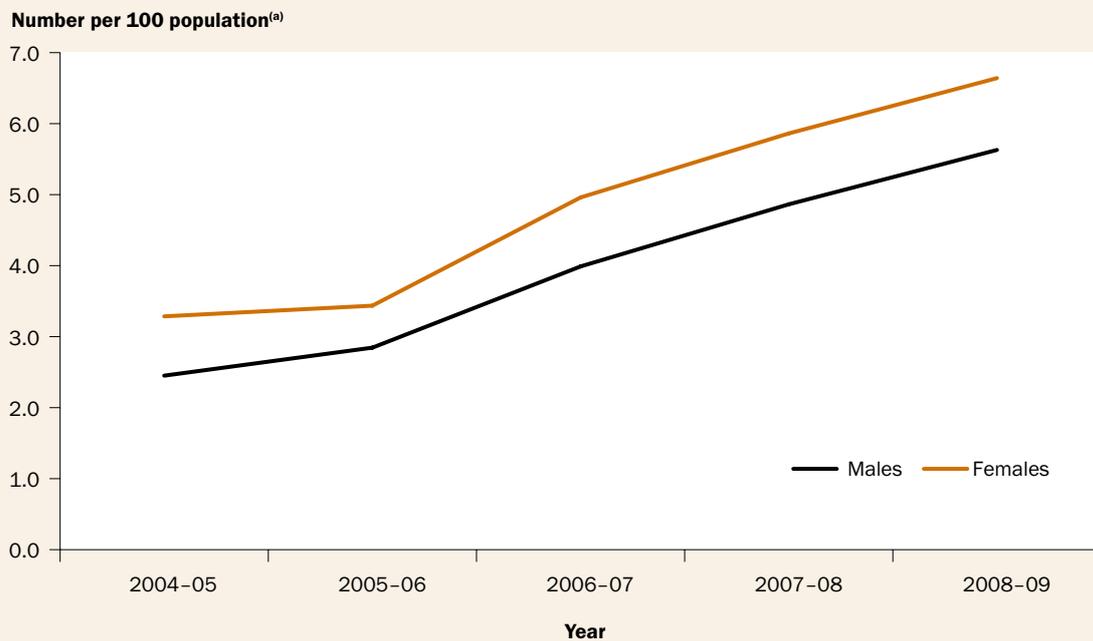
(a) Estimated Indigenous population for adults aged 15–54 years as at 31 December of each year based on the experimental Indigenous population projections (based on the 2001 Census).

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Figure 4.2: Services claimed for the Aboriginal and Torres Strait Islander Adult Health Check (MBS Item 710) by sex and year, July 2004 to June 2009

Type 2 Diabetes Risk Evaluation

The Type 2 Diabetes Risk Evaluation (MBS Item 713) was introduced from 1 July 2008 and is aimed at the prevention of Type 2 diabetes among patients aged 40–49 years (inclusive) who are at high risk of developing Type 2 diabetes based on their AUSDRISK score (DoHA 2008m).

A patient must complete the AUSDRISK to access the Type 2 Diabetes Risk Evaluation item. Patients with high AUSDRISK score results (that is, ≥ 15) are eligible to attend a Type 2 Diabetes Risk Evaluation by their GP. The evaluation is available to eligible patients once every 3 years, or where more than 3 years has elapsed since the Medicare 45 Year Old Health Check (MBS Item 717; see the next section for more information) has been claimed by that patient (DoHA 2009g). The evaluation includes:

- an overall assessment of the patient's risk factors, relevant examinations and the results of any investigations
- initiation of interventions where appropriate, including referrals and follow-up relating to the management of any risk factors identified
- the provision of advice and information (such as Lifescripts resources) to the patient including strategies to achieve lifestyle and behaviour changes where appropriate.

If appropriate, patients who have the Type 2 Diabetes Risk Evaluation may also be referred by their GP to an accredited, subsidised lifestyle modification program.

Patients with newly diagnosed or existing diabetes are not eligible to access the Type 2 Diabetes Risk Evaluation item.

Between July 2008 and June 2009, there were over 11,000 claims for Type 2 Diabetes Risk Evaluation, at a rate of 0.4 per 100 population aged 40–49 years (Table 4.5). Over 60% of these services were for 40–44 year olds and just over half (53%) were for women.

Table 4.5: Number of services claimed for the Type 2 Diabetes Risk Evaluation (MBS Item 713) by sex and age, July 2008 to June 2009

Age group (years)	Number of services			Number per 100 population[a]		
	Males	**Females**	**Persons**	**Males**	**Females**	**Persons**
40–44	3,343	3,649	6,992	0.4	0.5	0.5
45–49	1,968	2,297	4,265	0.3	0.3	0.3
Total	**5,311**	**5,946**	**11,257**	**0.3**	**0.4**	**0.4**

(a)   Australian population aged 40–49 years as at 31 December 2008.

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Medicare 45 Year Old Health Check

The Medicare 45 Year Old Health Check (MBS Item 717) was introduced from 1 November 2006 and is aimed at preventing, or delaying, the onset of chronic disease (DoHA 2008g). The health check can only be claimed once for each person and, to be eligible, a patient must be aged 45–49 years (inclusive), must be judged clinically by their GP to be at risk of developing a chronic disease and must have at least one risk factor. Risk factors that the GP may consider include, but are not limited to:

- lifestyle risk factors such as smoking, physical inactivity, poor nutrition or alcohol misuse
- biomedical risk factors such as high cholesterol, high blood pressure, impaired glucose metabolism or excess weight
- a family history of a chronic disease.

Patients who have the 45 Year Old Health Check and are found to be at high risk of developing Type 2 diabetes can also be referred by their GP to an accredited, subsidised lifestyle modification program.

Between 1 July 2007 and 30 June 2009, there were over 200,000 services claimed for the 45 Year Old Health Check, at a rate of 6.7 per 100 population aged 45–49 years (Table 4.6). There was little difference in the number and rate of services claimed per 100 population between males and females. However, the rate of services claimed was lower in 2008–09 (6.1 per 100 population aged 45–49 years) than in 2007–08 (7.3).

Table 4.6: Number of services claimed for the 45 Year Old Health Check (MBS Item 717) by sex and year, 45–49 year olds, July 2007 to June 2009

Year	Number of services			Number per 100 population[a]		
	Males	Females	Persons	Males	Females	Persons
2007–08	56,163	55,421	111,584	7.4	7.1	7.3
2008–09	48,161	47,668	95,829	6.2	6.1	6.1
Total	**104,324**	**103,089**	**207,413**	**6.8**	**6.6**	**6.7**

(a)   Australian population aged 45–49 years as at 31 December 2008.

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Comprehensive Medical Assessment for Aged Care Residents

The Comprehensive Medical Assessment for Aged Care Residents (MBS Item 712) was introduced in July 2004 and is available to permanent residents of a residential aged care facility, regardless of age (DoHA 2008a). The assessments may include assessment of nutritional status, smoking and alcohol use, and cardiovascular risk factors. A Medicare rebate for this item can only be claimed once a year.

Between July 2008 and June 2009, more than 68,000 services were claimed for comprehensive medical assessments for aged care residents, at a rate of 43 per 100 aged care residents (Table 4.7). Most (49%) of the services were claimed for people aged 85 years and over. While females had more than twice as many services as males, the rate per 100 aged care residents was slightly higher for males (45) than females (43). The rate of services claimed has more than doubled over the 5-year period since the assessment was introduced, from 16.4 per 100 population in 2004–05 to 43.5 in 2008–09 (Figure 4.3).

Table 4.7: Number of services claimed for the Comprehensive Medical Assessment for Aged Care Residents (MBS Item 712) by sex and age, July 2008 to June 2009

Age group (years)	Number of services			Number per 100 aged care residents[a]		
	Males	Females	Persons	Males	Females	Persons
0–64	2,135	1,764	3,899	60.0	57.9	59.0
65–74	3,568	3,578	7,146	54.2	51.1	52.6
75–84	8,343	15,368	23,711	49.5	45.0	46.5
85+	6,612	26,944	33,556	35.7	40.0	39.1
Total	**20,658**	**47,654**	**68,312**	**45.4**	**42.7**	**43.5**

(a)   Permanent aged care residents as at 30 June 2008 (AIHW 2009c).

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Number per 100 population[a]
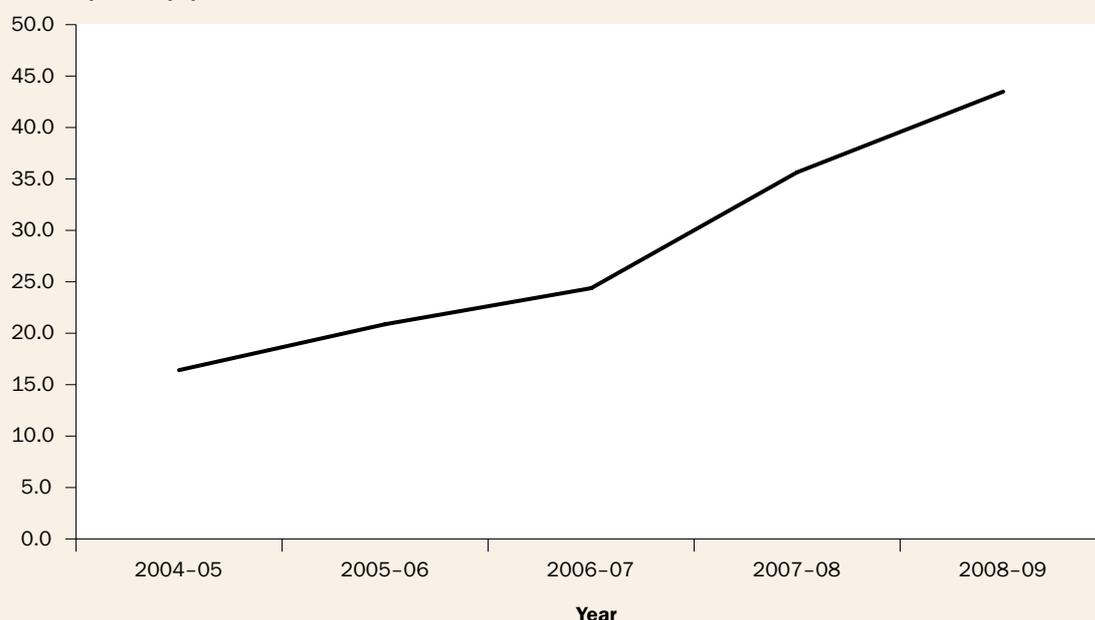
(a)   Permanent aged care residents as at 30 June of year (June 2008 population used to estimate June 2009 population) (AIHW 2009c).

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Figure 4.3: Services claimed for the Comprehensive Medical Assessments for Aged Care Residents (MBS Item 712) by sex and year, July 2004 to June 2009

Older Persons Health Assessment

The Older Person's Health Assessment was introduced in November 1999 and is an annual voluntary health assessment for people aged 75 years and over (MBS items 700 and 702) and Aboriginal and Torres Strait Islander people aged 55 years of age and over (MBS items 704 and 706) (DoHA 2008i). The comprehensive health assessment includes measurement of blood pressure and nutritional status.

Between July 2008 and June 2009, there were almost 310,000 services claimed for the Older Persons Health Assessment among the general population (Table 4.8), and over 5,200 services claimed for the Aboriginal and Torres Strait Islander Older Persons Health Assessment (Table 4.9).

People aged 75–84 years had a higher rate of claims per 100 population (25.4) for the Older Persons Health Assessment than those aged 85 years and over (16.5) (Table 4.8). While there was no difference in the rate of claims for men and women aged 75–84 years, the Older Persons Health Assessment was more likely to be claimed for women aged 85 years and over (17.4 per 100 population) than men of the same age (14.7).

For the Aboriginal and Torres Strait Islander Older Persons Health Assessment, females had higher claim rates per 100 population than males in each age group (Table 4.9). In stark contrast to the rate of claims for the Older Persons Health Assessment (22.9 per 100 population) (Table 4.8), the rate for the Aboriginal and Torres Strait Islander Older Persons Health Assessment was only 13.7 per 100 population (Table 4.9).

The rate of claims for both the Older Persons Health Assessment and the Aboriginal and Torres Strait Islander Older Persons Health Assessment has increased since they were introduced (Figure 4.4).

Table 4.8: Number of services claimed for the Older Persons Health Assessment[a] (MBS items 700 and 702) by sex and age, July 2008 to June 2009

Age group (years)	Number of services			Number per 100 population[b]		
	Males	Females	Persons	Males	Females	Persons
75–84	109,396	138,315	247,711	25.2	25.6	25.4
85 and over	18,672	42,668	61,340	14.7	17.4	16.5
Total	**128,068**	**180,983**	**309,051**	**22.8**	**23.0**	**22.9**

(a)   People aged 75 years of age and over are eligible.

(b)   Australian population aged 75 years and over as at 31 December 2008.

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Table 4.9: Number of services claimed for the Aboriginal and Torres Strait Islander Older Persons Health Assessment[a] (MBS items 704 and 706) by sex and age, July 2008 to June 2009

Age group (years)	Number of services			Number per 100 population[b]		
	Males	Females	Persons	Males	Females	Persons
55–64	1,367	1,756	3,123	11.3	13.2	12.3
65–74	650	907	1,557	13.5	15.7	14.7
75 and over	214	359	573	12.7	14.4	13.7
Total	**2,231**	**3,022**	**5,253**	**12.0**	**14.0**	**13.1**

(a)   Aboriginal and Torres Strait Islander people aged 55 years of age and over are eligible.

(b)   Estimated Indigenous population for adults aged 55 years and over as at 31 December 2008 derived by averaging the 30 June 2008 and 2009 populations based on the experimental Indigenous population projections (based on the 2001 Census).

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Health assessments for refugees and other humanitarian entrants to Australia

The health assessments for refugees and other humanitarian entrants to Australia (MBS items 714 and 716) were introduced in May 2006, and are a comprehensive one-off health check provided by GPs to refugees and other humanitarian entrants within 12 months of arrival or residency in Australia (DoHA 2008d). The assessment must include measurement of height, weight and blood pressure; assessment of psychological history (including depression); and an assessment of nutritional status. It may also include measurement of lipids and glucose. From 1 July 2006 to 30 June 2009, there were 16,778 services claimed for health assessments for refugees and other humanitarian entrants to Australia (4,752 services claimed in 2006–07, 5,282 in 2007–08 and 6,744 in 2008–09).

Number per 100 population(a)

Legend:
— Older Persons Health Assessment (MBS Items 700 & 702)
— Aboriginal and Torres Strait Islander Older Persons Health Assessment (MBS Items 704 & 706)
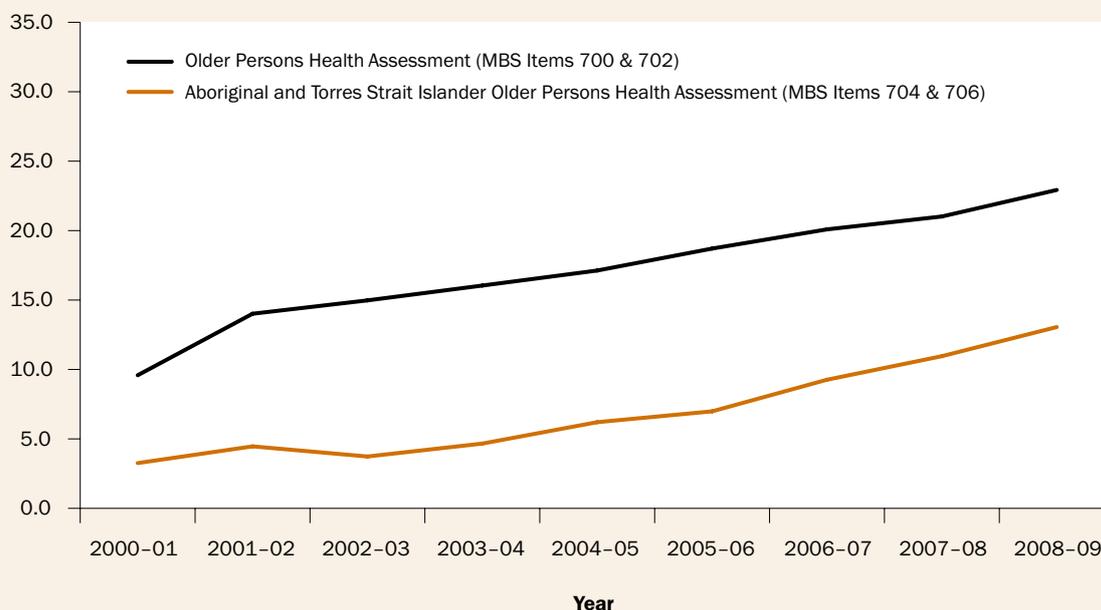
Year

(a) Australian population aged 75 years and over as at 31 December of each year and estimated Indigenous population for adults aged 55 years and over as at 31 December of each year derived by averaging the relevant 30 June populations based on the experimental Indigenous population projections (based on the 2001 Census).

(b) People aged 75 years of age and over are eligible for the Older Persons Health Assessment.

(c) Aboriginal and Torres Strait Islander people aged 55 years of age and over are eligible for the Aboriginal and Torres Strait Islander Older Persons Health Assessment.

Source: Australian Government Medicare Benefits Schedule statistics (http://www.medicareaustralia.gov.au/provider/medicare/mbs.jsp).

Figure 4.4: Services claimed for the Older Persons Health Assessment(b) (MBS items 700 and 702) and the Aboriginal and Torres Strait Islander Older Persons Health Assessment(c) (MBS items 704 and 706) by year, July 2000 to June 2009

Intellectual Disability Health Assessment

The Medicare health assessment for people with an intellectual disability (MBS items 718 and 719) was introduced in July 2007 to enable GPs to provide a preventive health check for people with an intellectual disability and to identify any medical intervention and preventive health care required (DoHA 2008h). The assessment can be undertaken annually and must include an assessment of nutritional status, measurement of height and weight, and checking opportunities for physical activity with the aim of moderate exercise for at least 30 minutes a day. It may also include lipid measurement. From 1 July 2007 to 30 June 2009, there were 12,689 services claimed for the Intellectual Disability Health Assessment (5,557 and 7,132 services claimed in 2007–08 and 2008–09 respectively).

Health advice and referrals

Health advice

Data on clinical treatments provided by GPs to individuals for cardiovascular disease, diabetes, chronic kidney disease and their risk factors are available from the Bettering the Evaluation and Care of Health (BEACH) study. BEACH is a GP-based survey of patient encounters that collects information about the patient's reasons for seeking care, the problems managed at the encounter, and treatments provided for each problem, including health advice and referrals, and medications prescribed (see Appendix for more information). The data reported here are for the period April 2007 to March 2008.

In addition to medications provided or prescribed at general practice encounters, the BEACH study allows GPs to record up to two other clinical or procedural treatments for each problem managed at an encounter. In 2007–08, there were 33,121 clinical treatments recorded, at a rate of 34.5 per 100 encounters. These treatments include general and specific advice, counselling or education, family planning and administrative processes (Britt et al. 2008a). Counselling about nutrition and weight was the most common preventive activity, accounting for 12.2% of all clinical treatments and provided at a rate of 4.2 per 100 encounters (Britt et al. 2008a). Counselling or advice for exercise, smoking, prevention, lifestyle and alcohol made up another 9.4% of all clinical treatments and, collectively, were provided at a rate of 3.2 per 100 encounters.

Referrals by general practitioners

In the BEACH survey, GPs are also able to record up to two new referrals per encounter to specialists, allied health professionals, hospitals for admission, emergency departments or other medical services such as hospital outpatient clinics and other GPs. In 2007–08, there were 12,008 referrals recorded, at a rate of 12.5 per 100 encounters (Britt et al. 2008a). Depression was the most common problem referred to an allied health service (12.1% of referrals to allied health services) and the seventh most common problem referred to a medical specialist (1.5% of referrals to a medical specialist). Obesity was the 10th most common problem referred to an allied health service, accounting for 1.7% of such referrals.

Medications in the community

Supply of prescription medicines in the community

Information on the supply of prescription medicines in the community is available from the Australian Government Department of Health and Ageing (DoHA). The information is derived from prescriptions submitted for subsidy payment under the Pharmaceutical Benefits Scheme (PBS) or the Repatriation Pharmaceutical Benefits Scheme (RPBS), and from estimates of the use of non-subsidised prescription medicines, calculated from data collected by the Pharmacy Guild of Australia's ongoing survey of community pharmacies (Box 4.2). Data are not available on the use of prescription medicines in public

hospitals and most private hospitals. Note that as a medicine may be used to treat more than one disease, and the condition for which the medicine is prescribed is not recorded, it is not possible to determine from these data sources the actual medicine use for specific conditions or purposes. The data does not include pharmaceuticals supplied under Section 100 of the National Health Act, which provides prescription medicines to Indigenous people living in remote areas.

Box 4.2: The Pharmaceutical Benefits Scheme, the Repatriation Pharmaceutical Benefits Scheme and the Pharmacy Guild Survey

Pharmaceutical Benefits Scheme

The PBS subsidises the cost of a wide range of prescription medicines, providing Australians with access to necessary and cost-effective medicines at an affordable price.

Australian residents and visitors from countries with reciprocal health care agreements are eligible for PBS benefits.

Patients are grouped into two classes: general and concessional. As at 1 January 2009, general patients paid the first $32.90 for each PBS prescription item. For concessional patients (people with low incomes and sickness beneficiaries who hold a health-care card), the payment was $5.30 per prescription item. These copayments are increased on 1 January each year, generally in line with increases in the consumer price index.

Individuals and families are protected from large overall expense for PBS-listed medicines by safety nets. For the calendar year beginning 1 January 2009, once a general patient and/or their immediate family has spent $1,264.90, the patient copayment decreases to the concessional rate of $5.30. Concessional patients are no longer required to pay the $5.30 copayment once their expenditure on PBS items exceeds $318.

Patients may be required to pay more than the standard copayment if a doctor prescribes a more expensive brand of an item, when there are cheaper, equivalent brands of that item listed on the PBS. These additional payments do not count towards the safety net.

Repatriation Pharmaceutical Benefits Scheme

The RPBS provides assistance to eligible war veterans and dependants. It is generally similar to the PBS for concessional beneficiaries, but covers a broader range of pharmaceuticals.

Pharmacy Guild Survey

This is an annual survey commissioned by the Drug Utilisation Sub-Committee of DoHA. The survey is conducted by the Pharmacy Guild of Australia to estimate the prescription volumes for drugs not subsidised by the PBS or the RPBS, that is, private prescriptions and PBS prescriptions priced under the general patient copayment. In 2007, total dispensing information was collected each month from 370 pharmacies that were members of the Pharmacy Guild.

Sources: *AIHW 2008c; DoHA 2009c.*

Box 4.3: Defined daily dose per 1,000 population per day

Medicine use can be expressed as defined daily dose per 1,000 population per day (DDD/1,000/ day). This is based on the assumed average dose per day of a medicine used for its main indication in adults. It gives an estimate of how many people per 1,000 population are taking the standard dose of the medicine each day, on average. The DDD enables valid comparisons between medicines, independent of differences in price, preparation and quantity per prescription. However, it has several limitations. As the DDD is based on international experience, it does not necessarily reflect the recommended or average prescribed dose in Australia. This measure assumes that the amount of medicine supplied is the same as the amount used, but this is not always the case. Note also that the DDD is calculated for the whole population, while medicine use may be concentrated in certain age groups or a particular sex.

Sources: *AIHW: Senes & Penm 2007; DoHA 2009c.*

In 2007, almost 251 million community prescriptions were dispensed in Australia and, of these, 74 million (30%) were for medicines classified under the Anatomical Therapeutic Chemical (ATC) classification system as 'cardiovascular system' medicines (that is, ATC code C) (DoHA 2008a).

High blood pressure

In 2007, the 49 million blood-pressure–lowering medications dispensed accounted for 20% of all medications (nearly 251 million prescriptions) and 67% of the 'cardiovascular system' medicines (just over 74 million prescriptions) supplied in the community (Table 4.10). Further, four generic blood-pressure–lowering medications—Ramipril, Perindopril, Irbesartan and Frusemide—were among the top 10 most commonly supplied medications in 2007 by the DDD/1,000/day measure (Box 4.3) (DoHA 2009c).

Table 4.10: Supply of blood-pressure–lowering medicines in the community, 2007

Pharmacological/therapeutic subgroup	Defined daily dose per 1,000 population per day			Number of prescriptions
	PBS/RPBS[a]	Other[b]	Total	
Agents acting on renin-angiotensin system	136.495	49.370	185.865	28,100,963
Calcium channel blockers	43.845	8.213	52.058	9,605,495
Diuretics	37.002	8.373	45.375	2,933,006
Beta-blocking agents	21.365	5.460	26.825	7,802,523
Antihypertensives	4.307	0.794	5.101	976,416
Peripheral vasodilators	0.012	0.006	0.018	4,906
Total	**243.026**	**72.216**	**315.242**	**49,423,309**

(a)   PBS—Pharmaceutical Benefits Scheme; RPBS—Repatriation Pharmaceutical Benefits Scheme.

(b)   Prescriptions not subsidised by the PBS or RPBS because they were private prescriptions or the cost to the patient was not more than the copayment.

Source: DoHA 2009c.

Over the period 1995–2005, agents acting on the renin-angiotensin system were the most commonly used blood-pressure-lowering medications dispensed in the community, with their use increasing by 121% from 52 to 115 DDD/1,000/day over the 10-year period (AIHW: Senes & Penm 2007). The use of calcium channel blockers and beta-blockers also increased over this period by 21% each, while the use of diuretics fell by 28%, antihypertensives fell by 37% and peripheral vasodilators, which were dispensed infrequently, fell by 90% (Figure 4.2).

Source: AIHW: Senes & Penm 2007 based on data from the Drug Utilisation Sub-Committee database, DoHA.

Figure 4.5: Supply of medicines with blood-pressure–lowering effect in the community, 1995–2005
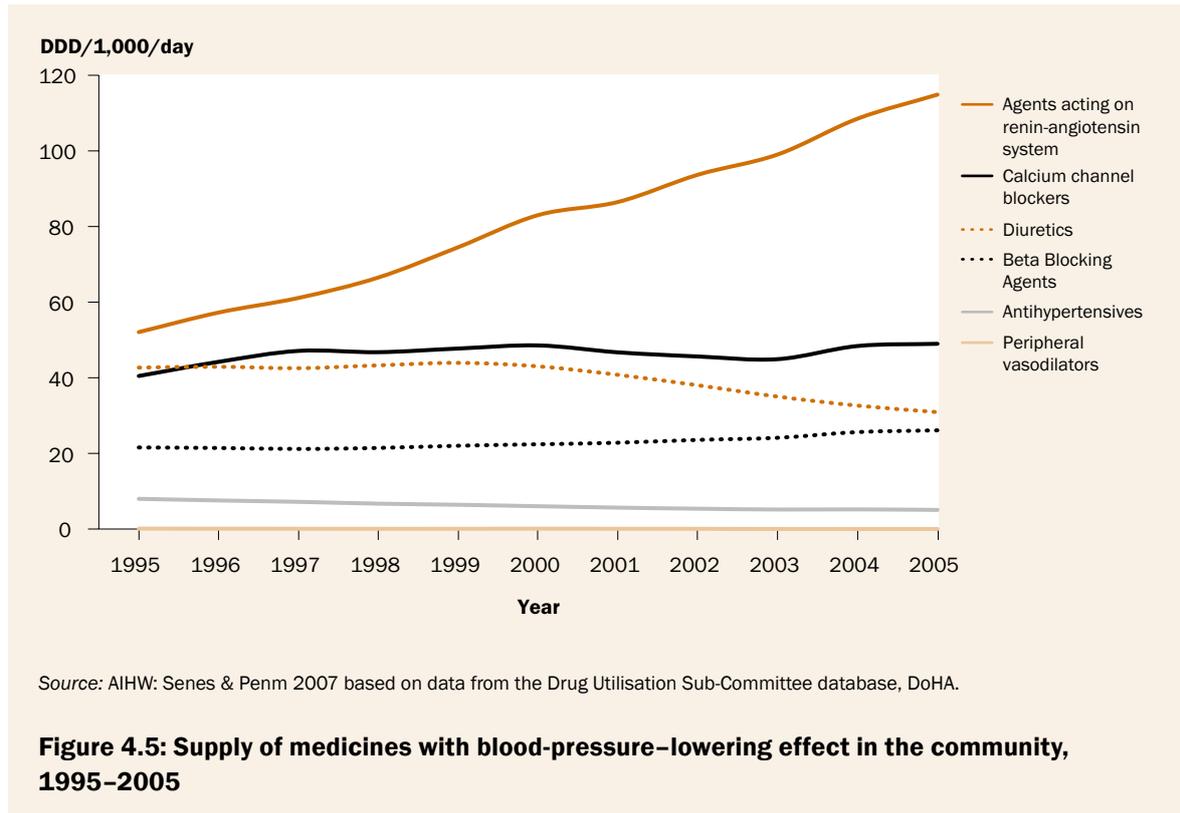
Abnormal blood lipids

There were over 21 million community prescriptions for lipid-modifying agents in 2007 (8% of all medications supplied in the community), of which 91% (19 million prescriptions) were for statins (Table 4.11). In fact, the statins atorvastatin and simvastatin were among the top 10 most commonly prescribed of all community medications in 2007, as measured by both DDD/1,000/day as well as by number of prescriptions (DoHA 2009c). Between 1995 and 2005, there was a 13-fold increase in the use of statins from 13.5 to 178.5 DDD/1,000/day (AIHW: Senes & Penm 2007) (Figure 4.3).

Table 4.11: Supply of lipid-modifying agents in the community, 2007

Generic name	Defined daily dose per 1,000 population per day			Number of prescriptions
	PBS/RPBS[a]	Other[b]	Total	
Statins				
Atorvastatin	67.564	0.177	67.741	10,327,133
Simvastatin	29.247	0.128	29.375	6,085,906
Pravastatin	8.180	0.040	8.220	1,784,306
Rosuvastatin	5.470	0.015	5.485	1,036,024
Fluvastatin	0.164	0.029	0.193	89,522
Fibrates				
Gemfibrozil	1.090	0.003	1.093	278,294
Fenofibrate	0.830	0.011	0.841	302,298
Bile acid sequestrants				
Cholestyramine	0.131	0.003	0.134	36,249
Colestipol hydrochloride	0.005	0.000	0.005	1,304
Other				
Ezetimibe	4.085	0.026	4.111	730,486
Nicotinic acid	0.000	0.000	0.000	6,438
Simvastatin and ezetimibe	n.a.	n.a.	n.a.	316,586
Atorvastatin and amlodipine	n.a.	n.a.	n.a.	250,709
Total	**116.766**	**0.432**	**117.198**	**21,245,255**

n.a. Not available.

(a)   PBS—Pharmaceutical Benefits Scheme; RPBS—Repatriation Pharmaceutical Benefits Scheme.

(b)   Prescriptions not subsidised by the PBS or RPBS because they were private prescriptions or the cost to the patient was not more than the copayment.

Source: DoHA 2009c.

DDD/1,000/day

Legend:
- Statins
- Fibrates
- Bile acid sequestrants
- Other
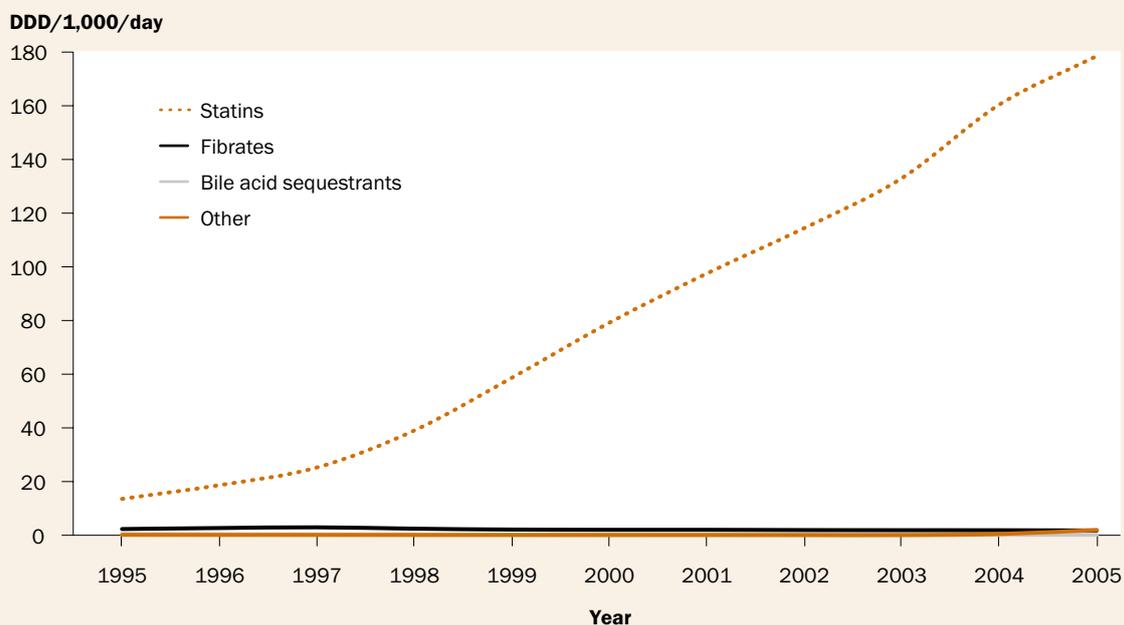
Source: AIHW: Senes & Penm 2007 based on data from the Drug Utilisation Sub-Committee database, DoHA.

Figure 4.6: Supply of serum-lipid–reducing agents in the community, 1995–2005

Nicotine and alcohol dependence

In 2007, bupropion, which is only available on prescription, accounted for 94% of prescription drugs used for nicotine dependence in the community (Table 4.12). While nicotine only accounted for 6% of prescriptions, most nicotine replacement therapy (such as gum, patches, inhalers and lozenges) is available over the counter and therefore is not captured by the data presented here. Varenicline, a prescription-only treatment, is a relatively new product that is also available for the treatment of nicotine dependence but it has only been subsidised by the PBS since January 2008.

Acamprosate and naltrexone, both of which are subsidised by the PBS or RPBS, were the most commonly prescribed medications for alcohol dependence in 2007 (Table 4.12). Disulfiram, which is not subsidised by the PBS, accounted for 8% of community prescriptions in 2007.

Table 4.12: Supply of drugs used in nicotine and alcohol dependence in the community, 2007

	Defined daily dose per 1,000 population			
Generic name	PBS/RPBS[a]	Other[b]	Total	Prescriptions
Drugs used in nicotine dependence				
Bupropion (only available on prescription)	0.296	0.025	0.321	93,671
Nicotine	0.006	0.004	0.010	5,812
Total	**0.302**	**0.029**	**0.331**	**99,483**
Drugs used in alcohol dependence				
Acamprosate	0.107	0.002	0.109	27,760
Naltrexone	0.076	0.001	0.077	19,789
Disulfiram	n.a.	n.a.	n.a.	3,909
Total	**0.183**	**0.003**	**0.186**	**51,458**

n.a. Not available.

(a)   PBS—Pharmaceutical Benefits Scheme; RPBS—Repatriation Pharmaceutical Benefits Scheme.

(b)   Prescriptions not subsidised by the PBS or RPBS because they were private prescriptions or the cost to the patient was not more than the copayment.

Source: DoHA 2009c.

Depression

Just over 15 million prescriptions were dispensed for antidepressants in 2007 (Table 4.13), accounting for 6% of all medications supplied in the community in that year. Sertraline was the most commonly prescribed antidepressant, with 2.8 million prescriptions in 2007, and was also the seventh most commonly prescribed of all community medications as measured by DDD/1,000/day (DoHA 2009c). It is important to note that many of the antidepressant medications listed below are not solely used for the treatment of depression but can also be used for the treatment of anxiety-related disorders.

Table 4.13: Supply of antidepressant medications in the community, 2007

| Generic name | Defined daily dose per 1,000 population | | | Prescriptions |
	PBS/RPBS[a]	Other[b]	Total	
Non-selective monoamine reuptake inhibitors				
Amitriptyline hydrochloride	2.734	0.847	3.581	1,311,520
Dothiepin hydrochloride	0.914	0.361	1.275	621,767
Doxepin hydrochloride	0.797	0.146	0.943	385,921
Imipramine hydrochloride	0.269	0.077	0.346	175,209
Clomipramine hydrochloride	0.208	0.047	0.255	65,631
Nortriptyline hydrochloride	0.165	0.079	0.244	82,827
Trimipramine maleate	0.000	0.027	0.027	13,405
Selective serotonin reuptake inhibitors				
Sertraline	12.706	7.402	20.108	2,840,969
Citalopram	5.986	2.440	8.426	1,677,793
Escitalopram	5.191	2.550	7.741	1,319,102
Fluoxetine hydrochloride	4.189	2.106	6.295	1,108,780
Paroxetine	4.031	1.983	6.014	1,127,052
Fluvoxamine	1.876	0.122	1.998	461,251
Monoamine oxidase inhibitors, non-selective				
Tranylcypromine sulphate	0.241	0.028	0.269	17,682
Phenelzine sulphate	0.029	0.000	0.029	7,082
Monoamine oxidase Type A inhibitors				
Moclobemide	*1.298*	0.058	1.356	185,745
Other antidepressants				
Venlafaxine	12.316	0.174	12.490	2,569,792
Mirtazapine	4.785	0.073	4.858	1,060,099
Reboxetine	0.407	0.005	0.412	97,094
Bupropion	0.296	0.025	0.321	93,671
Mianserin hydrochloride	0.160	0.020	0.180	68,063
Total	**58.598**	**18.570**	**77.168**	**15,290,455**

(a) PBS—Pharmaceutical Benefits Scheme; RPBS—Repatriation Pharmaceutical Benefits Scheme.

(b) Prescriptions not subsidised by the PBS or RPBS because they were private prescriptions or the cost to the patient was not more than the copayment.

Source: DoHA 2009c.

Medicines prescribed by general practitioners

Data on medicines that GPs prescribe or supply to treat risk factors for CVD, diabetes and CKD were sourced from the BEACH study for the period April 2007 to March 2008.

The scope of the information presented below overlaps with the previous section on medications supplied in the community. However, some prescribed medication may not be supplied (if the individual does not fill the prescription). Also note that the medications in the previous section will not all be prescribed by GPs—some will be prescribed by specialists, and some will be prescribed in hospital.

In 2007–08, high blood pressure was the problem most frequently managed by GPs, at a rate of 9.9 per 100 encounters and accounting for 6.5% of all problems managed (Britt et al. 2008a). The most commonly prescribed blood pressure medications in 2007–08 were agents acting on the renin-angiotensin system, which were prescribed at a rate of 6.6 prescriptions per 100 encounters and accounted for 8.1% of all prescriptions. The rate of prescribing of these medicines in general practice has increased significantly since 1998–99 (4.0 per 100 encounters). Calcium channel blockers were the second most commonly prescribed blood pressure medications in 2007–08 (2.1 per 100 encounters), although the rate of prescribing of calcium channel blockers has declined significantly since 1998–99 (2.7 per 100 encounters). Beta-blocking agents were prescribed at 1.7 per 100 encounters and diuretics at 1.3 per 100 encounters in 2007–08 (Britt et al. 2008a,b).

Depression was managed at a rate of 4.0 per 100 encounters in 2007–08 and accounted for 2.6% of all problems managed, making it the fifth most frequently managed problem in that year. Just over 4% of all prescriptions in 2007–08 were for antidepressants, which were prescribed at a rate of 3.4 prescriptions per 100 encounters. The most commonly prescribed antidepressant was sertraline (0.7% of all prescriptions; 18% of prescriptions for antidepressants; 0.6 prescriptions per 100 encounters) (Britt et al. 2008a).

Lipid disorders were the seventh most frequently managed problem in 2007–08 (2.4% of all problems managed; managed at a rate of 3.7 per 100 encounters). Serum-lipid–reducing agents were prescribed at 3.7 per 100 encounters in 2007–08, which represents a significant increase over the prescribing rate of 1.9 per 100 encounters for these medications in 1998–99 (Britt et al. 2008b). Atorvastatin and simvastatin were the most commonly prescribed serum-lipid–reducing agents in 2007–08 (3.2% of all prescriptions; 75% of all plain lipid-modifying agents) and were prescribed at a rate of 1.7 and 0.9 per 100 encounters respectively.

As an addition to the main BEACH survey, a substudy of 3,160 respondents from 112 GPs was conducted in 2007–08 and examined the management of high blood pressure and high blood cholesterol among general practice patients. Of the patients in the study, 35% had high blood pressure, high blood cholesterol or both conditions. Of the patients who provided information about current treatment, 86.1% were currently taking at least one medication for high blood pressure and/or high blood cholesterol, while 13.9% were not currently taking medication for either condition. Perindopril was the most commonly prescribed medication for high blood pressure, and atorvastatin was the most commonly prescribed medication for high blood cholesterol. Almost 86% of patients were being managed with medication alone, while another 8.7% of patients were managed with diet or exercise alone, and 5.1% were not being managed with either medication, or diet or exercise (SAND abstract number 113; Britt et al. 2008a) (see Appendix for more information about SAND).

Surgery for obesity

Over 17,000 hospital procedures for morbid obesity (excluding surgical reversal of procedure for morbid obesity) were performed in 2007–08 (Table 4.14). The most commonly performed procedure was laparascopic gastric reduction, which accounted for 72% of all hospital procedures for morbid obesity.

Table 4.14: Procedures for morbid obesity by sex, 2007–08

Procedure (ICD–10–AM code)	Number of procedures			Per cent of total		
	Males	Females	Persons	Males	Females	Persons
Revision of gastric band (14215-00)	719	3,101	3,821	19.2	23.3	22.4
Gastric reduction (30511-00)	120	446	566	3.2	3.3	3.3
Laparoscopic gastric reduction (30511-01)	2,775	9,470	12,247	74.1	71.1	71.7
Gastric bypass (30512-00)	69	163	232	1.8	1.2	1.4
Laparoscopic biliopancreatic diversion (30512-01)	3	8	11	0.1	0.1	0.1
Biliopancreatic diversion (30512-02)	10	9	19	0.3	0.1	0.1
Insertion of gastric bubble [balloon] (90950-00)	51	129	180	1.4	1.0	1.1
Total procedures[a]	**3,747**	**13,326**	**17,076**	**100.0**	**100.0**	**100.0**

(a)   Components may not add to totals due to sex not having been reported for some persons.

Source: AIHW National Hospital Morbidity Database (www.aihw.gov.au/hospitals/datacubes/datacube_proc.cfm).

The rate of procedures for morbid obesity among women in 2007–08 was 124.8 per 100,000 population (that is, 1 in every 1,000 women), which was 3.5 times the rate for men (35.5) (Table 4.15). Eighty per cent of procedures were performed among 30–59 year olds, with the procedure rate peaking at 280.5 per 100,000 in women 40–44 years of age and 78.6 per 100,000 in men aged 50–54 years.

The number of procedures for morbid obesity has been increasing substantially in recent years—by 35% per year between 2000–01 (2,072 procedures) and 2007–08 (17,076 procedures).

Table 4.15: Number of procedures for morbid obesity by sex and age, 2007–08

Age group (years)	Number of procedures			Number per 100,000 population[a]		
	Males	Females	Persons	Males	Females	Persons
0–14	1	4	5	0.0	0.2	0.1
15–19	49	168	217	6.5	23.7	14.9
20–24	124	597	721	16.0	80.6	47.6
25–29	152	809	961	20.3	110.4	64.9
30–34	305	1,380	1,685	41.5	187.1	114.4
35–39	459	2,083	2,543	58.4	261.4	160.6
40–44	543	2,143	2,687	72.0	280.5	177.0
45–49	595	2,032	2,627	78.2	261.8	170.9
50–54	545	1,788	2,333	78.6	253.7	166.9
55–59	476	1,353	1,830	74.9	210.8	143.3
60–64	329	713	1,042	60.0	130.2	95.0
65–69	134	187	321	33.0	45.2	39.1
70–74	31	63	94	9.8	18.6	14.4
75–79	2	4	6	0.8	1.3	1.1
80–84	2	1	3	1.1	0.4	0.7
85 and over	0	1	1	0.0	0.4	0.3
Total	**3,747**	**13,326**	**17,076**	**35.5**	**124.8**	**80.4**

(a)   Australian population as at 31 December 2007.

Source: AIHW National Hospital Morbidity Database (www.aihw.gov.au/hospitals/datacubes/datacube_proc.cfm).

5   D I S C U S S I O N

This report outlines the framework developed to guide the monitoring of prevention. The analytical parts of the report then use the framework to monitor prevention in relation to the key risk factors for CVD, diabetes and CKD. Consequently, this report aims to answer three questions:

1. What is the national prevalence of the main risk factors for CVD, diabetes and CKD?

2. What population-level initiatives are in place that aim to prevent or improve each of these risk factors?

3. What individual-level services are being used to prevent or improve each of these risk factors?

Answering the questions

In answer to the first question on risk factors, it was found that almost 70% of the population aged 15 years and over do not do enough physical exercise, and more than half (60%) are overweight or obese. The prevalence of overweight and obesity is of particular concern as it is continuing to increase. The latest available information shows that, among people aged 25 years and over, a little under a third had high blood pressure and around a half had high cholesterol in 1999–2000. While the proportion of people smoking continues to fall, there was still 20% of the population aged 14 years and over who smoked tobacco in 2007. Preventive treatment decisions are moving towards the assessment of multiple risk factors as well as each risk factor individually—particularly for CVD—as the concept of 'absolute risk' is a more accurate method of assessing the risk of developing various diseases. Based on the AusDiab survey, an estimated 5% of men aged 25 years and over were at high risk of a CVD event in the next 5 years, as were around 1% of women.

For the second question, it was not possible to present detailed data on population-level initiatives as there is currently very little routine collection of data on population-level prevention activities in Australia. However, descriptions of the types of current activities have been included, along with specific examples where information was available. From this, public awareness campaigns and community interventions appear to be commonly used across the risk factors examined. Although it is difficult to compare the amount of services delivered under the different categories of population inventions, some broad observations can be made. Legislation, and tax and price incentives, are less commonly used, although for some risk factors such as smoking they are integral to the initiatives. And when they are used, they can have a substantial impact, such as legislation for tobacco advertising, sales and permitted areas for smoking. There is a general awareness that the built environment can affect the prevalence of risk factors and some measures are being taken in this area. Most population-level initiatives focus on particular health behaviours as part of broader strategies.

Considerable new information on prevention activities provided to individuals has been presented (question 3), particularly on the health assessments that form part of the MBS. In 2007–08, there were almost half a million MBS health assessments provided to individuals in Australia. Health check data with trend information available for a number of years show that there have been increases in the rates of use, although in many cases only a relatively small proportion of the relevant population had used

these services. The other main area with available information is medication use in the community. The information presented shows that blood-pressure-lowering medications—among the most commonly supplied medications in Australia—accounted for 20% of all medicines supplied in the community in 2006. Lipid-lowering medications and antidepressants were also very commonly used, making up 8% and 6% respectively of all medicines supplied in the community. Counselling is another important component of general practice for prevention. In 2007–08, counselling about nutrition and weight was the most common preventive activity provided at GP encounters, accounting for 12.2% of all clinical treatments. The most intensive treatment examined here is hospital procedures for morbid obesity. In 2006–07, more than 13,000 of these procedures were performed in Australia, and the number is increasing sharply.

These results demonstrate that there is considerable activity in preventing or treating the risk factors for CVD, diabetes and CKD. This is the first time prevention across a number of risk factors has been systematically monitored in Australia. As the first such report, it is intended to provide a baseline so that the effects of the increased focus on prevention can be assessed in the future.

As a baseline report, there is not a great deal of trend information included. However, information on trends in the risk factors has been included, which is important to understand the context in which the prevention activities are taking place. In addition, trends in individual-level services have been included where possible. Future reporting should aim to include trends in the prevention services. However, it is important to note that any effect of the increased focus on prevention may take many years before it would have a discernable effect on the prevalence of the risk factors.

Information gaps

It is clear that there are a number of data gaps that restricted the amount of information that could be included in this report. Some of these gaps were due to the scope and timing of this report, while in other cases the data are not collected at present.

The largest gap was in the area of population-level prevention activities, for which there is currently no agreed and implemented standard data collection. Further challenges arise because of the large number of government and non-government organisations involved in these activities. This report provided information that could be readily compiled in this area; however, a detailed collection could not be undertaken. A potential structure for such a data collection has been provided, a process that would be very valuable if potentially challenging.

Gaps also exist in the area of individual-level prevention activities, notably medications used in the hospital setting and services provided in community settings (such as Quit programs, and advice provided by private health insurance funds to members).

As has been the case for many years, the report has not been able to include recent information on a number of risk factors due to the lack of a national blood measurement population survey in Australia in the last 10 years. It is, however, notable that measurements related to overweight and obesity were available from the latest NHS, and a new risk factor measurement survey is currently in the planning stages. Also in relation to risk factors, this report only presents prevalence estimates. Incidence estimates would also be valuable information, but currently there is only limited incidence data available in this area, mostly from studies such as the cohort component of the AusDiab study.

It is not currently possible to link service delivery with outcomes at the individual level, that is, to examine risk factors and health problems in individuals who have received particular services. This would be very valuable, and could be achieved with relevant data being linked across data sources.

Issues raised by the framework and analysis

It would be very useful to determine whether Australia's current efforts in prevention are adequate. While this is not an aim of this report, nor is it possible to assess this with the data presented here, there are various developments that provide some insight into this question. There have been a number of calls for more to be done in the area of prevention (Oldenburg & Harper 2008; Russell et al. 2008). And, very importantly, prevention is now a major policy focus at both the Australian Government and the state and territory levels (COAG 2008; NPHT 2008). Further, the recent report of the National Health and Hospitals Reform Commission listed 'embedding prevention and early intervention' as the first priority in the area of redesigning the health system (NHHRC 2009). Finally, the large number of people with the relevant risk factors also points to the need for more prevention. Taken together, these all suggest that the consensus is that there is considerable scope for increasing the health system efforts in the area of prevention. International comparisons could shed light on this, if comparable data were available.

One area that could be investigated further is to compare the services currently provided with those specified in relevant guidelines. In Australia, there are some relevant clinical guidelines, such as the prevention of diabetes and the assessment of absolute risk of cardiovascular events (NHMRC 2005; NVDPA 2009). These could be used to assess whether preventive care does follow these guidelines, although extra data collection would be needed. Australia does not currently have any guidelines for population-level prevention activities. Some of these do exist in other countries (see, for example, those produced by the National Institute for Health and Clinical Excellence in the United Kingdom).

This report does not attempt to assess the effectiveness of the various interventions, both population- and individual-level. In general, if these inventions are evidence-based services—they have been shown to be effective in research studies—then it is assumed that they are effective in practice. However, this may of course not always be the case, such as when interventions are used in populations or settings that were not covered by the relevant research study. There is scope for further research to be done in assessing the effectiveness of these interventions in practice. But the attribution of cause and effect in relation to prevention services is very challenging, largely due to the long duration between the intervention and the outcome.

There is an important role for self-management in the prevention of risk factors. While this report has focused on the health system's role in prevention activities, the successful prevention of (or improvement in) risk factors is also very dependent on the choices made by individuals in relation to their health behaviours—prevention of chronic disease is the shared responsibility of individuals and the overall environment (Roger 2009). The health system does have an important role in influencing these choices, but there are also many other influences outside the health system. These other influences can be positive or negative in terms of health, and can come from sources including the media, advertising and word-of-mouth.

In the analysis of risk factor levels, the report does provide information on differences across population groups where data were available. The general pattern is that there are higher levels of risk in the lower socioeconomic groups than the higher ones, and substantially higher risk for Indigenous Australians than other Australians. There are also higher levels of risk in the more regional and remote areas than in cities, but the difference is much smaller than for the other two categories mentioned above. There is evidence that these population groups are less likely to access preventive services than other groups, which has the potential to widen the gap in risk factors across population groups (Lorant et al. 2002). However, it was not possible to do detailed analyses of the individual-level services for different population groups. While some of this information is collected on the various databases used, detailed data take a significant amount of time to provide, limiting what could be included in this report. Nevertheless, this level of analysis could be included in future reporting. And if further data collation was done for population-level initiatives, it would also be important to include information on specific population groups targeted.

As outlined in the introduction to this report, the risk factors covered here are the behavioural and biomedical ones that are most relevant to CVD, diabetes and CKD. However, it is very important that more upstream determinants such as social and environmental factors are included in prevention activities, along with a focus on the risk factors covered here. These upstream factors of course have important effects on the risk factors within the scope of this report as well as for many other diseases and aspects of health and wellbeing.

Conclusions

It is clear that there is a strong need for increased monitoring of prevention activities in Australia, particularly with the increased policy focus in this area. Much of this monitoring can be done with existing data such as those included in this report. But there is considerable scope to extend this further, such as through more in-depth analysis of the currently available data (for example population groups), and also through data development to extend the information currently available in the existing collections (for example medication use in hospital). As well, there are many other areas where new data collections may be needed, such as in population-level prevention services. It is clear that there needs to be extension of the analysis that was possible for this report, and that monitoring continues systematically and independently of, but in partnership with, the organisations implementing the services.

There remains considerable scope for more prevention to occur in relation to the risk factors for CVD, diabetes and CKD. The shared risk factors for these diseases makes them a key area to focus on, particularly as these diseases account for a substantial proportion of the burden of disease in Australia (around a quarter), as well as a high proportion of deaths (a little less than two-thirds). The relevant risk factors continue to be very common, and in fact this is worsening in some cases, notably obesity. The increased policy focus on prevention is expected to result in an increased number of interventions in this area, thus making continued monitoring an important and relevant national activity.

A P P E N D I X

Data sources

Risk factors

Australian Diabetes, Obesity and Lifestyle study (1999–2000)

The 1999–2000 AusDiab study conducted by the International Diabetes Institute was designed to provide national estimates of the prevalence of diagnosed and undiagnosed diabetes. It also provided national measurements of blood pressure, blood lipids, blood glucose, body fat, height and weight, and waist and hip circumference, as well as self-reported information on CVD, anti-hypertensive and lipid-lowering medication use, diet, smoking, alcohol consumption, physical activity, and general health and wellbeing. The study collected information in urban and non-urban areas in all states and the Northern Territory for more than 11,000 people aged 25 years and over who underwent a physical examination. This represents a response rate of 37% (Dunstan et al. 2002).

Analysis of this data by the AIHW included only those people for whom all relevant data were available. In this report, measured prevalence data on high blood pressure, high blood cholesterol and overweight was obtained from this source.

National Aboriginal and Torres Strait Islander Health Survey 2004–05

This survey collected information relating to Indigenous health including health status, health action taken and lifestyle factors that may influence health. Information was collected from 10,439 Indigenous persons living in both remote and non-remote areas of Australia. This survey covered information similar to the NHS, including health status, health risk factors, long-term conditions, health service use, social and emotional wellbeing, and basic demographic information.

Information from this survey is mainly presented in Chapter 2 on risk factors by population groups.

National Drug Strategy Household Survey 2007

These surveys are the leading surveys of licit and illicit drug use in Australia. The 2007 survey was the ninth conducted under the auspices of the National Drug Strategy. Previous surveys were conducted in 1985, 1988, 1991, 1993, 1995, 1998, 2001 and 2004.

More than 23,000 people aged 12 years and over provided information on their drug use patterns, attitudes and behaviours. The sample was based on households, therefore homeless and institutionalised people were not included in the survey. The 2007 survey used the drop-and-collect method and the computer-assisted telephone interview (CATI) method to collect information from household respondents.

National Health Survey 2007–08

The National Health Surveys, a series of surveys conducted by the Australian Bureau of Statistics, were designed to obtain national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. The 2007–08 survey included 20,788 people from 15,792 private dwellings in all geographical areas except very remote areas.

National Perinatal Data Collection

The 2006 national data on births are based on notifications to the perinatal data collection in each state and territory. Midwives and other staff, using information obtained from mothers and from hospital or other records, complete notification forms for each birth in each jurisdiction. Information is included in the National Perinatal Data Collection for all live births and stillbirths of at least 400 g birthweight or at least 20 weeks gestation.

National Survey of Mental Health and Wellbeing 2007

This survey was conducted by the Australian Bureau of Statistics from August to December 2007. The survey collected information from about 8,800 Australians aged 16–85 years.

The survey provides information on the prevalence of selected lifetime and 12-month mental disorders by three major disorder groups: anxiety disorders (such as social phobia), affective disorders (such as depression) and substance use disorders (such as the harmful use of alcohol). It also provides information on the level of impairment, the health services used for mental health problems, physical conditions, social networks and caregiving, as well as demographic and socioeconomic characteristics.

Individual-level services aimed at prevention

Medicare Benefits Schedule statistics

Medicare Australia provides statistics on the claims submitted to and paid by the MBS. These include items claimed by GPs, doctors and specialists in the community.

Data from Medicare Australia were obtained for the following MBS health assessments:

- Older Persons Health Assessment (MBS items 700 and 702)
- Aboriginal and Torres Strait Islander Older Persons Health Assessment (MBS items 704 and 706)
- Aboriginal and Torres Strait Islander Child Health Check (MBS Item 708)
- Healthy Kids Check (MBS items 709 and 711)
- Aboriginal and Torres Strait Islander Adult Health Check (MBS Item 710)
- Comprehensive Medical Assessments for Aged Care Residents (MBS Item 712)
- Type 2 Diabetes Risk Evaluation (MBS Item 713)
- Health assessments for refugees and other humanitarian entrants to Australia (MBS items 714 and 716)
- Medicare 45 Year Old Health Check (MBS Item 717)
- Intellectual Disability Health Assessment (MBS items 718 and 719).

Online interactive data reports were accessed at <https://www. medicareaustralia.gov.au/statistics/ mbs_item.shtml> and collated by time period.

Bettering the Evaluation and Care of Health

The BEACH data are collected through a continuous survey of general practice activity in Australia, which began in April 1998. BEACH is an activity of the Australian General Practice Statistics and Classification Centre (formerly the General Practice Classification and Statistics Unit), a collaborating unit of the Family Research Centre of the University of Sydney and the AIHW. A rolling random sample of GPs is selected from the Medicare Australia database (AIHW: Britt et al. 2008a). To be eligible to participate, GPs must have claimed at least 375 general practice Medicare items in the previous 3 months. About 1,000 GPs participate annually, with about 20 GPs recording each week. Data are collected for 50 weeks each year and each GP collects information on 100 consecutive patient encounters.

The BEACH collection includes information about the following:

The encounter

- date and type of consultation
- up to four diagnoses or problems managed
- Medicare/Veterans' Affairs item number.

The patient

- age and sex
- postcode of residence
- health-care card status/Veterans' Affairs card status
- non-English-speaking background status
- whether the patient identifies as Aboriginal and/or Torres Strait Islander
- up to three reasons for the encounter.

The management of each problem

- medications prescribed, supplied or advised including brand, form, strength, dosage and drug status ('new' or 'continuing')
- non-pharmacological management including counselling, referrals, procedures, pathology and imaging ordered.

The characteristics of the GP

- age and sex
- years working in general practice
- number of sessions worked per week
- postcode of main practice, etc. (AIHW: Britt et al. 2008a).

For further information on BEACH, see <www.fmrc.org.au/beach.htm>.

Supplementary Analysis of Nominated Data

The SAND data are collected as a supplementary data set of the BEACH study (AIHW: Britt et al. 2008a). Organisations sponsoring blocks of SAND data collection ask questions on topics of their choice and have access to the detailed reports. GPs participating in SAND ask and record responses to specific questions in targeted patient groups.

A B B R E V I A T I O N S

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ASR	age-standardised rate
ATC	Anatomical Therapeutic Chemical
AusDiab	Australian Diabetes, Obesity and Lifestyle (study)
AUSDRISK	Australian Type 2 Diabetes Risk Assessment Tool
BEACH	Bettering the Evaluation and Care of Health
BMI	body mass index
CKD	chronic kidney disease
COAG	Council of Australian Governments
CURF	confidentialised unit record file
CVD	cardiovascular disease
DDD	defined daily dose
DoHA	Australian Government Department of Health and Ageing
GP	general practitioner
GST	goods and services tax
HDL	high-density lipoprotein
IFG	impaired fasting glucose
IGT	impaired glucose tolerance
LDL	low-density lipoprotein
MBS	Medicare Benefits Schedule
NDSHS	National Drug Strategy Household Survey
NHFA	National Heart Foundation of Australia
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
PBS	Pharmaceutical Benefits Scheme
RPBS	Repatriation Pharmaceutical Benefits Scheme
SAND	Supplementary Analysis of Nominated Data
WMH–CIDI 3.0	World Mental Health–Composite International Diagnostic Interview version 3.0

States and territories

ACT	Australian Capital Territory
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
Tas.	Tasmania
Vic.	Victoria
WA	Western Australia

Symbols

%	per cent
DDD/1,000/day	defined daily dose per 1,000 population per day
g	gram
kg	kilogram
kg/m^2	kilograms divided by metres squared
'000	thousands
mm Hg	millimetres of mercury
mmol/L	millimoles per litre
>	more than
<	less than
≥	more than or equal to
≤	less than or equal to

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