3 Determinants of health

This chapter describes determinants of the health of Australians, providing a background for the great potential of prevention and health promotion. The conceptual framework of health for *Australia's health* (Figure 1.1 in Chapter 1) shows determinants as biomedical and genetic factors, health behaviours, socioeconomic factors and environmental factors. The determinants influence health and wellbeing, and can be influenced by interventions and by resources and systems.

The chapter's introduction presents a framework for determinants of health that illustrates how various determinants can relate to and influence other determinants as well as health and wellbeing. The chapter presents information on the main types of determinants of health in Australia and includes data, where available, on levels, patterns and trends.

3.1 What are health determinants?

The health of individuals and populations is influenced and determined by many factors acting in various combinations. The dominant view is that health is 'multicausal': healthiness, disease, disability and, ultimately, death are seen as the result of the interaction of human biology, lifestyle and environmental (including social) factors, modified by health interventions and other measures.

Health determinants can be described as those factors that raise or lower the level of health in a population or individual. Determinants help explain and predict trends in health and explain why some groups have better or worse health than others. They are the key to the prevention of disease, illness and injury.

Determinants may have positive or negative effects. Factors such as tobacco smoking or low socioeconomic status increase the risk of ill health and are commonly termed 'risk factors'. Positive influences such as a high intake of fruit and vegetables are known as 'protective factors'. Unlike behaviours, some determinants such as age, sex and genetics cannot be altered.

For almost all risk and protective factors the associated effect is not 'all or nothing'. For risk factors, rather than there being one point at which risk begins, there is an increasing effect as the exposure increases. For example, each increment in a person's body weight above their 'optimal' level is associated with an increase in the risk of ill health. Although the increasing risk often starts at relatively low levels, the usual practice is to monitor a risk factor by reporting the proportion at the riskier end of the spectrum.

Determinants can vary in the extent to which they represent 'relative risk' and 'absolute risk' of developing disease. Those that represent a high relative risk are associated with relatively high proportions of people exposed to the risk factor developing disease, although the prevalence of the risk factor may be low, and the absolute number of people that develop disease may be low. Those determinants that represent a high

absolute risk are usually associated with relatively high proportions of the population exposed to the risk factor, so that if levels of determinants change, even by small amounts, the result can be large changes in the absolute number of people who develop disease, even though the relative risk of developing disease may not be high. If, for example, a food product provided to a small group of people was contaminated with *Salmonella*, there would be a high relative risk of food poisoning among the group. However, as the product was only provided to the small group, there would be a relatively low absolute risk of poisoning from the food product in the population as a whole.

In addition to influencing the occurrence of new cases of disease or injury, determinants can affect the continuation and prognosis of chronic diseases and their complications. The use of health care interventions can also be regarded as a determinant in that context. They are described in Chapter 7 and are not covered here.

Determinants can also influence how individuals function, in terms of their activities and participation in society. Aspects of the physical environment can either facilitate functioning or act as a barrier to it, as can the availability of assistance from other people or aids and appliances (WHO 2001).

A framework for determinants

Determinants are in complex interplay and range from the 'upstream' background influences (such as culture and wealth), with many health and non-health effects that can be difficult to quantify, to immediate or direct influences with highly specific effects on particular aspects of health. They are often described as a web of causes, but they can also be thought of as part of broad causal 'pathways' or 'chains' that affect health. Figure 3.1 is a simple framework of determinants and their pathways, with the general direction of effects going from left to right.

General background factors and environmental factors can determine the nature of socioeconomic characteristics and both can influence people's health behaviours, their psychological state and factors relating to safety. These in turn can influence biomedical factors, such as blood pressure and body weight, which may have health effects through various further pathways. At all stages along the path these various factors interact with an individual's genetic composition. In addition, the factors within each group in Figure 3.1 often interact and are highly related to each other. (Despite the general direction of these influences they can occur in reverse. For example, an individual's health can also influence their physical activity levels, employment status and wealth.)

General background factors

General background factors affect virtually all people in society to some extent, although to varying degrees. These factors combine to influence the basic levels of security, safety, hygiene, nourishment, technology, information, freedom and morale of societies. It is difficult to put values and quantities on most of these broad factors, let alone measure them and assess their impact precisely. However, it is widely agreed that, at least up to a fair degree of societal development, they are a vital determinant of a population's health. They set the background level around which variations then occur between groups and individuals.

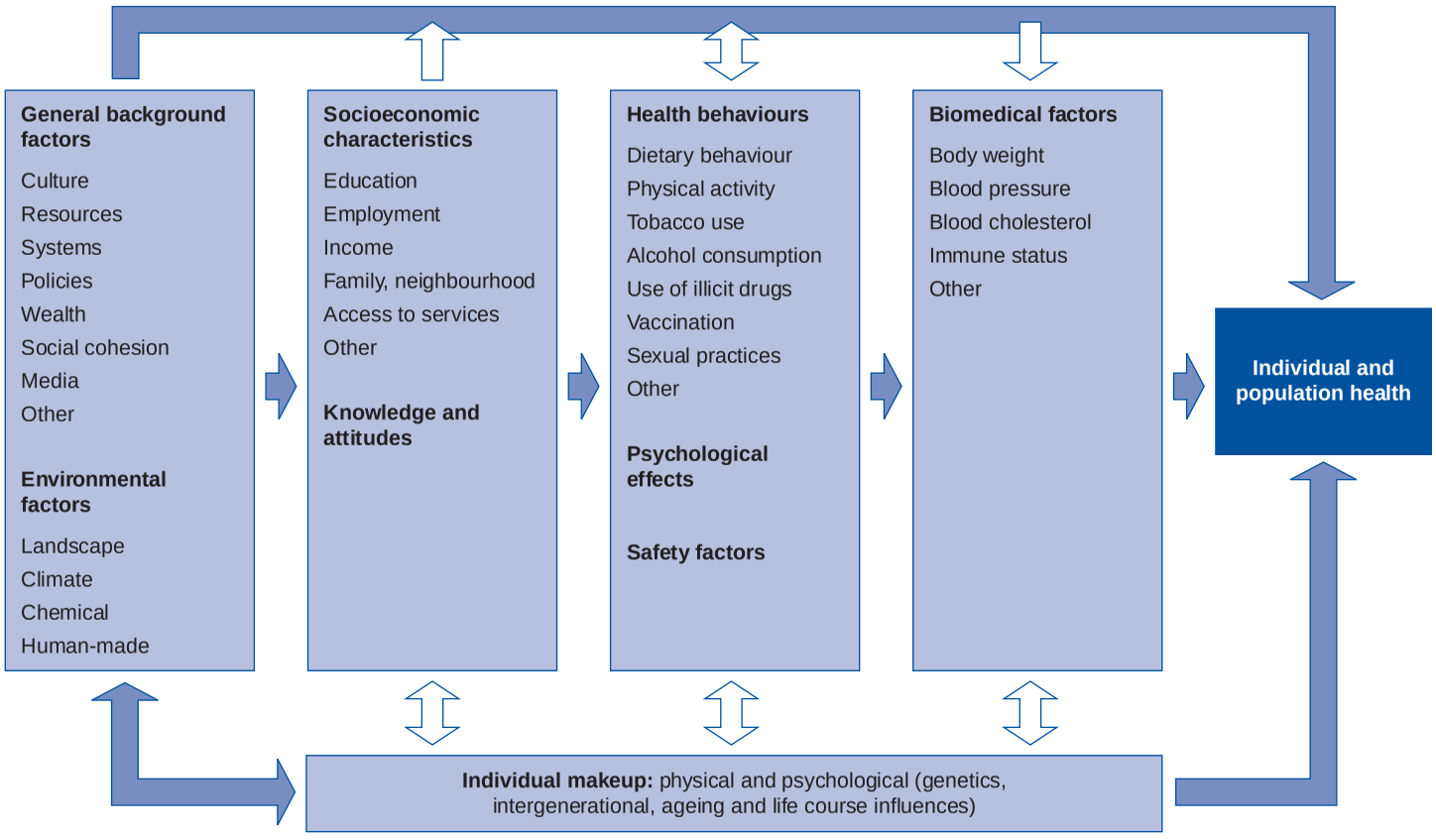


Figure 3.1: A conceptual framework for determinants of health

Included in these general background factors are wealth and social cohesion. Wealth or accumulated assets can buffer material living standards, for example in periods of low income (AIHW 2005a). The Household Income and Labour Dynamics in Australia survey showed that, in 2002, the least wealthy 50% of households owned less than 10% of total household wealth, while the wealthiest 10% owned 45% of total household wealth.

Social cohesion can be defined as the connections and relations between societal units, such as individuals, groups and associations, or the glue that holds communities together (AIHW 2005a), and links with aspects of socioeconomic characteristics in the framework. Levels of social cohesion are indicated by the fact that the majority of Australians are confident they can rely on their support network in times of crisis, and make contact with family and friends on a weekly basis. A third of Australians engage with the wider community, mostly as volunteers, and three-quarters donate money to charities and non-profit organisations. Markedly smaller percentages are civically engaged, in terms of being regularly involved in the activities of a political, advocacy or community organisation. However, less than half of Australians are socially trusting (that is, of less well-known acquaintances and strangers), domestic violence and child abuse remain very real for some Australian females and children, and rates of imprisonment increased markedly between 1994 and 2004 (AIHW 2005a).

Environmental factors

As described here, environmental factors include the physical environment, such as the climate, the land, plant and animal life, and human-made factors such as chemical pollution, the built environment and waste products. Among many things, these can affect a society's supply of water, and food and other primary products, and therefore its wealth, and they can influence where and how people live and spend their time. Large-scale environmental disruptions, such as human-induced climate change, can have major health implications in the longer term as well as in the short term. Environmental determinants are detailed further in Section 3.2.

Socioeconomic characteristics

Socioeconomic characteristics are influenced by society's policies, structures and history, and can be affected by environmental factors as well. Variations in socioeconomic characteristics can in turn lead to marked variations in health. Differences in people's levels of education and income, for example, can lead to strong differences in the opportunities and choices that affect their health. Socioeconomic characteristics that can influence health are described in Section 3.3.

Knowledge and attitudes

Knowledge, attitudes and beliefs are influenced by general background factors such as culture and resources, by education, and by families and social settings. They affect health through influencing lifestyle behaviours, help-seeking behaviours, and other health decisions. A selection is described in Section 3.4.

Health behaviours

General background factors, varying socioeconomic factors and knowledge and attitudes can influence health behaviours. A particular health behaviour such as an

individual's diet, for example, can result partly from the general availability and range of foods due to the system as a whole. It can also reflect a person's 'inherent' preferences modified by cultural and family influences and by knowledge of food values. Finally, it may further reflect the person's financial and political freedom to exercise those preferences. Some important behavioural determinants of health are detailed in Section 3.5.

Psychological effects

A person's psychological state and behaviour clearly affect each other and both can in turn lead to biomedical changes or disease. Diseases such as asthma, for example, are believed to be often influenced by psychological factors (AIHW: Australian Centre for Asthma Monitoring 2003). There is also evidence that depression, social isolation and a lack of quality social support can lead to problems such as heart disease, independent of any intermediary behavioural effects (Bunker et al. 2003).

Safety factors

Safety factors can be regarded as related to behaviour, policies and to the built or human-made environment; and they are influenced by education, knowledge and attitudes, and also by socioeconomic influences on choices. Safety factors influenced by combinations of behaviour, socioeconomic conditions and policies include seat belt-wearing, home smoke detectors, unsafe product recalls, levels of crime, car airbags and road improvements.

Direct experiences or perceptions of safety can greatly affect a person's physical and mental health and wellbeing. Most but not all people feel safe or very safe at home after dark, an estimated 8.9% of households experienced at least one household crime in the 12 months prior to the 2002 National Crime and Safety Survey, and an estimated 5.3% of people over 15 years were victims of at least one personal crime (ABS 2003a). In the 2002 ABS General Social Survey, 9.0% of persons aged 18 years or over reported being victims of physical or threatened violence (ABS 2003b). The burden of injury was estimated (provisionally, at the time of writing) to be 245,600 disability-adjusted life years (DALYs) in 2003 (Chapter 2).

Biomedical factors

Biomedical risk factors are determinants derived from body measurements, such as overweight, high blood pressure and high blood cholesterol. Because they are 'within the body', biomedical risk factors can be regarded as 'downstream' in the causal process, and they can be shown to carry comparatively direct and specific risks for health. They are often influenced by behavioural factors which are in turn influenced by socioeconomic factors and other 'upstream' determinants. Health behaviours tend to interact with each other and to influence a variety of biomedical factors. Both physical activity and diet, for example, can affect body weight, blood pressure and blood cholesterol. They can do this alone or, with greater effect, together. Behavioural and biomedical risk factors tend to increase each other's effects when they occur together in an individual. Information on three important biomedical factors is presented in Section 3.6.

Individual makeup

Determinants act upon and are influenced by an individual's makeup, both physical and psychological. This makeup can greatly modify a person's response to other new or continuing determinants. It can be seen as the complex product of a person's genes, intergenerational effects, their ageing, and physical or social influences at various stages over their life course. These influences can become built into a person's makeup for various periods or for life. Some diseases, such as muscular dystrophy, result entirely from a person's genetic features, whereas most others reflect the interaction between those features and the many other influences mentioned here.

Determinants of the burden of disease

In most parts of this chapter, information is presented for specific determinants. The population health impact of individual risk factors varies, depending not only on their prevalence in the population, but also on their relative effects in contributing to disease and mortality. Table 3.1 aims to give a perspective on the impact of biomedical and behavioural determinants by providing an estimate (provisional at the time of writing) of their relative importance in 2003 measured in terms of their causal contribution to morbidity and mortality in Australia. From this, overweight was estimated to cause the most premature death and illness, followed by tobacco smoking and high blood pressure.

Table 3.1: Proportion of disease burden attributed to selected determinants of health (per cent)

Determinant	Males	Females	Persons
Overweight	8.8	8.3	8.6
Tobacco smoking	9.5	6.1	7.9
High blood pressure	7.5	7.0	7.3
Physical inactivity	6.5	6.8	6.7
High blood cholesterol	6.5	5.7	6.1
Alcohol harm	5.3	2.2	3.8
Alcohol benefit	–1.6	–2.1	–1.8
Occupational exposures	2.6	1.3	2.0
Illicit drugs	2.6	1.2	1.9
Lack of fruit/vegetables	1.9	1.0	1.4
Intimate partner violence	n.a.	2.1	1.0
Child sexual abuse	0.3	1.3	0.8
Unsafe sex	0.4	0.6	0.5

n.a. Not available.

Note: Attributable disability-adjusted life years (DALYs) as a proportion of total DALYs. One DALY equals one year of healthy life lost through premature death or living with disability due to illness or injury (see Chapter 2). Data are provisional at the time of writing.

Source: AIHW: Begg et al. in press.

3.2 Environmental factors

Environmental factors include many physical, chemical and biological conditions and agents that may affect human health, both positively and negatively. Clean air, water and food, and safe human-made environments benefit the health and wellbeing of individuals and communities. On the other hand, the natural environment and natural

disasters can be harmful, as can human-caused changes such as land degradation, freshwater depletion and climate change.

Environmental influences on health can be direct or indirect, obvious or subtle, straightforward or complex, and immediate or delayed. This makes it challenging to estimate the full range and size of the harmful health effects of the environment. These include communicable diseases due to microbial contamination of food or water, vector-borne diseases transmitted by insects such as mosquitoes, respiratory and heart diseases due to air pollution and chemicals in workplaces, other consequences of chemical toxicity, effects of noise and heat, and injuries due to poorly designed traffic systems and home or workplace environments. The increasing interest in global climate change has focused attention on how ecological systems influence disease occurrence.

According to the 2001 State of the Environment report (Australian State of the Environment Committee 2001), urban air quality has generally improved since 1996, streetscapes and parks in most urban areas are better, and there is greater energy efficiency in residences. However, over the same period the quality of water bodies deteriorated and invasive species have continued to pose a serious problem. Furthermore, many of the warmest years on record in Australia have occurred in the last two decades, with 2005 having been the warmest.

Food quality

Contamination of food anywhere on the food chain from 'paddock to plate' can lead to foodborne illness. An estimated 4–7 million cases of foodborne infection (gastroenteritis) occur annually in Australia (Hall et al. 2005) and foodborne infectious illnesses other than gastroenteritis can also occur. Various pesticides and other non-natural contaminants can also be found in some foods, but the estimated average dietary exposures to pesticides and other contaminants in Australia remain within acceptable health standards (FSANZ 2002).

Poor hygiene and temperature control in any part of the food production chain can potentially lead to illness. Preventing foodborne illness relies on a complex system of regulation, increasingly based on assessing risks associated with food businesses. The Hazard Analysis and Critical Control Point system relies on a food business identifying potential hazards and the control measures needed (NSW Health 2006). Food safety also depends on kitchen hygiene levels, including in households.

Foodborne infections

Foodborne pathogens that commonly cause gastroenteritis in Australia include the bacteria *Salmonella* and *Campylobacter* and viruses such as noroviruses (Sinclair et al. 2005). Sometimes the illness is part of a recognised 'outbreak' with a known food responsible for infecting a number of people. In 2004, 118 such outbreaks affected 2,076 people (OzFoodNet Working Group 2005).

Data from the OzFoodNet outbreak register indicate that high-risk foods include raw eggs, poultry, fish, oysters, and commercial foods like kebabs, bakery products and pizzas. Increasingly, fresh produce is being implicated as the cause of outbreaks, particularly salads, fruit juice and sprouts (Dalton et al. 2004).

In Australia, notification rates for potentially foodborne infections have increased over recent decades. This is partly because of more complete reporting and improved laboratory capacity to identify pathogens, but is probably also due to changed behaviours—people are eating more takeaway and pre-prepared meals, which may pose higher risks if not well prepared. Australia has well-regulated hygiene standards in the food production industry, but the increased scale of production, processing and distribution in recent decades has increased the potential for widespread outbreaks of foodborne infection (Kirk et al. 2004).

Water quality

Providing a safe drinking water supply is fundamental to maintaining good public health. This includes issues of both quantity and quality. In modern Australia, with escalating demands for fresh water, there are increasing concerns about the sufficiency of supplies for domestic consumption and hygiene in some regions.

Water quality depends on controlling the concentrations of potentially harmful chemical and microbial contaminants, which may originate from natural or human-made sources. In Australia, 93% of households are connected to mains water supplies, and over 80% use mains water as their primary source of drinking water. Other important sources of drinking water are rainwater tanks (11% of households), particularly in rural areas, and bottled water (7.6%) (ABS 2005a).

Fluoridation of tap water delivers public health benefits by reducing dental caries, and about two-thirds of Australians are currently supplied by fluoridated mains water (Box 3.1).

Box 3.1: Population exposure to fluoridated drinking water

The most effective public health measure for preventing dental decay is the adjustment of fluoride in drinking water to a range of 0.5 parts per million to 1.0 part per million (varying by climate to reflect differences in patterns of water consumption). Over two-thirds of Australians (69.1%) live in areas where the public water supply meets these requirements. High percentages in most states and territories reflect the fact that their capital cities are fluoridated. The exception is Queensland, where Brisbane and most regional centres are not fluoridated.

Exposure to fluoridated drinking water[(a)]

State/territory	% of population
NSW	89.8
Vic	75.3
Qld	4.7
WA	90.1
SA	90.2
Tas	94.7
ACT	100.0
NT	84.2

(a) Percentage of state/territory population living in areas with fluoride in public water supplies.

Fluoride from natural or engineering sources at concentrations of 0.7 parts per million or more (except SA and NT where concentration is 0.5 parts per million or more).

Source: AIHW Dental Statistics and Research Unit, unpublished data.

Microbiological risks from drinking water are mainly due to contamination by harmful micro-organisms from human or animal faeces. A broad range of viruses, bacteria and protozoa can be transmitted by contaminated water supplies. Disease outbreaks from public water supplies are rare in Australia, but they periodically occur from small private water supplies.

Chemical contaminants in water may arise from natural sources; for example, arsenic, nitrate or fluoride occurs in some groundwater supplies with particular geological characteristics. Other chemical contamination may result from human activities (for example, agricultural herbicides and pesticides in surface-water supplies). While national data are not available, results for New South Wales in 2003 indicate that almost 100% of drinking water samples met guidelines for permissible levels of inorganic chemicals and pesticides (Population Health Division 2004).

In some parts of Australia, drinking water quality may be affected by cyanobacterial (blue-green algae) blooms and their toxins, resulting from increased nutrient levels, warm water temperatures and reduced water flows. While odour and flavour are impaired, health risks remain uncertain.

Managing the quality of drinking water requires multiple barriers to reduce potentially harmful contaminants to acceptable levels before water is supplied to consumers. Barriers may include protection of source waters, prolonged storage to reduce contaminant levels, filtration and disinfection, and maintaining the physical integrity of the distribution system. This multi-barrier approach was strengthened by the adoption of a national risk assessment and risk management framework as the central focus of the Australian Drinking Water Guidelines in 2004 (NHMRC 2004).

Although most Australians have access to good quality drinking water, the 2001 Community Housing and Infrastructure Needs Survey found that 56 of the 169 Indigenous communities (about 17,000 people) that had been tested had drinking water supplies that failed testing at least once in the 12 months before the survey (ABS 2002a).

Water-based recreation promotes healthy physical activity and enhances wellbeing, but may also expose participants to microbial (such as blue-green algae) or chemical contaminants. The quality of natural recreational water bodies may be affected by discharges of sewage, stormwater and agricultural runoff, while risks to swimming pool water quality arise from microbial contaminants originating from bathers themselves. Public swimming pools have been the source of a number of outbreaks of cryptosporidiosis in recent years in Australia.

Animal vectors and reservoirs of disease

The occurrence of vectorborne and zoonotic diseases (diseases that can be transmitted from animals to humans) diseases fluctuates considerably with patterns of human mobility, trade, weather, and the ecology of vector species such as mosquitoes and of reservoir species such as birds. Changes in the environment, weather and climate, but also mosquito control activities, influence the prevalence and geographic range of some mosquito-borne diseases within Australia. These include dengue (188 cases notified in Australia in 2004–05), Ross River virus disease (1,858), Barmah Forest virus disease (1,256) and, sometimes with more serious consequences, diseases caused by Murray Valley encephalitis (2 cases in 2004–05), Kunjin virus (4 cases) and Japanese encephalitis virus (no cases in 2004–05) (CDNA 2005).

Other infectious diseases can be spread by ticks and flies. Flies are also responsible for the spread of the eye disease trachoma in remote Indigenous communities. Mammals and birds act as natural reservoirs for a variety of pathogens that cause infectious diseases in humans. Since 2003, birds have acted as a reservoir for avian influenza ('bird flu'), which had caused 177 laboratory-confirmed cases in humans (including 98 deaths) worldwide by March 2006, mainly in Asia (WHO 2006). No cases had been recorded for Australia.

Providing information relevant to the risk of acquiring mosquito-borne disease, sentinel chicken surveillance is undertaken in New South Wales, Victoria, Queensland, Western Australia and the Northern Territory, to detect and provide early warning of activity of Murray Valley encephalitis virus and Kunjin virus. In addition, sentinel pig surveillance is conducted in Queensland (Cape York and the Torres Strait) to monitor Japanese encephalitis virus activity. Media warnings are issued when virus activity is detected, advising local residents of the need to take added precautions to avoid mosquito bites.

The sentinel flocks of chickens are tested for evidence of new infections throughout the year in some sites, and during summer months in others. In the 2004–05 season (in which there was no surveillance in Queensland), Murray Valley encephalitis virus activity was detected in the Top End of the Northern Territory and in the Kimberley in Western Australia; and Kunjin virus activity was detected in the Northern Territory. The sentinel pig surveillance detected Japanese encephalitis virus in the Torres Strait (CDNA 2005).

Air pollution

Air quality in Australia is relatively good by international standards (Manins et al. 2001) but requires regulation and continual monitoring. The air can be contaminated by pollutants, micro-organisms and odours, all of which can be harmful. The health effects of air pollutants range from mild respiratory symptoms through to asthma, cardiovascular conditions and premature mortality. Whereas older people are most at risk, the very young are also at risk (BTRE 2005). Lead exposure damages nerve function and can be a particular concern in the mental development of children.

Recent studies based in Brisbane, Sydney and Melbourne have found an association between air pollution levels and mortality and/or hospital admissions (EPA Victoria 2000, 2001; Morgan et al. 1998a, 1998b; Petroeschevsky et al. 2001; Simpson et al. 2005a, 2005b). A recent report estimated that motor vehicle pollution accounted for between 900 and 2,500 cases of cardiovascular disease, respiratory disease and bronchitis in 2000, and between 900 and 2,000 early deaths (BTRE 2005).

Ambient (that is, outdoor) air pollution in Australia is mainly caused by emissions from motor vehicles, heavy industry and mining activities. Air may also contain emissions from the combustion of fossil fuels for electricity generation, smoke from home heating and bushfires, and wind-blown dust. Indoor air may contain pollutants such as nitrogen dioxide from unflued gas heaters, volatile organic compounds from surface coatings and adhesives, moulds from moist surfaces, and tobacco smoke.

Environmental regulation has markedly reduced the ambient levels of sulfur dioxide, nitrogen dioxide, lead and carbon monoxide (BTRE 2005), and the concentration of lead in urban air has decreased substantially since unleaded fuels were introduced in the

mid-1980s (Australian State of the Environment Committee 2001). However, levels of nitrogen oxides and of particulate matter with diameters of up to 10 microns (PM_{10}) are of ongoing policy concern, as are those with diameters less than 2.5 microns ($PM_{2.5}$), known to cause respiratory and cardiovascular illness.

Australia's National Environment Protection Council has established an Ambient Air Quality National Environment Protection Measure (NEPM), which includes air quality standards for nitrogen dioxide, PM_{10}, carbon monoxide, sulfur dioxide, photochemical oxidants (as ozone) and lead. Levels of these pollutants are regularly measured in a number of sites around Australia and reported in terms of the number of days per year when the average concentration exceeds the NEPM. Ozone is measured as an indicator of the amount of photochemical smog; it is not a directly emitted pollutant but is formed in a reaction between volatile organic compounds and nitrogen oxides under sunlight.

The number of days per year in which the concentration of PM_{10} exceeded the NEPM standard level of 50µg/m^3 was generally higher in Sydney and Melbourne than in the other major capital cities during the period 2000–04 (Table 3.2). Perth was the only city which did not exceed the maximum allowable days of PM_{10}. Ozone concentrations exceeding 0.10 ppm were more frequent in Sydney than in the other major capital cities. No obvious trend of increase or decrease in ozone levels occurred for any of the capital cities during this period.

The concentration of lead in urban air has decreased substantially in Australia since unleaded fuels were introduced in the mid-1980s (Australian State of the Environment Committee 2001). However, the historical and ongoing accumulation of lead in smelting

Table 3.2: Days per year when concentrations of PM_{10} and ozone exceeded the ambient air quality NEPM standard levels, major capital cities, 2000–04

	2000	2001	2002	2003	2004
Number of days when concentration of PM_{10} exceeded 50µg/m^3 (over 24 hours)[(a)]					
Sydney	2	5	17	10	2
Melbourne	0	2	6	13	11
Brisbane	0	1	7	2	2
Perth	0	1	2	1	1
Adelaide	n.a.	n.a.	1	6	4
Number of days when concentration of ozone exceeded 0.10 ppm (over 1 hour)[(b)]					
Sydney	4	9	2	4	7
Melbourne	1	0	0	2	1
Brisbane	0	0	2	0	0
Perth	0	0	0	0	1
Adelaide	n.a.	n.a.	0	0	0

(a) The maximum allowable number of days exceeding this level (50 micrograms per cubic metre) is five days per year, to be achieved by 2008.

(b) The maximum allowable number of days exceeding this level (0.1 parts per million) is one day per year, to be achieved by 2008.

n.a. Not available.

Sources: AIHW 2005a; NEPC 2005.

centres such as Port Pirie in South Australia and Broken Hill in New South Wales continues to pose health risks, particularly for children. These centres have been the focus of efforts to reduce childhood lead exposure and, over the past 20 years, there have been substantial exposure reductions, with recent exposures close to the exposure ranges observed in non-industrial settings before the removal of lead from petrol.

Built environments

The built environment consists of structures and spaces built or modified by people. These include houses, commercial and public buildings, parks and roads. Well-designed built environments can be beneficial to health and wellbeing by providing green spaces, shade and ventilation to reduce the urban 'heat island' effect in summer, safe roads, and bicycle and walking paths. Dwellings can be designed to minimise exposure to allergens, microbes, asbestos and physical hazards (including temperature extremes), and to reduce energy consumption.

Built environments may also contain physical hazards such as machinery and poor lighting in the workplace, and chemical hazards such as tobacco smoke and solvents. The use of gas cookers and unflued gas heaters can be a source of indoor air pollution, particularly in domestic dwellings.

Hazards may also be created by the design of the built environment. High-density living spaces, for example, create conditions favourable to the spread of infectious diseases. On the other hand, urban sprawl can encourage reliance on motor vehicle transport and deter physical activity. This contributes to traffic noise, air pollution and traffic accidents. Research from the United States has linked urban sprawl to obesity and high blood pressure (Ewing et al. 2003).

Environmental change, ecosystems and health

Environmental health research has traditionally focused on the health impacts of specific, usually localised, environmental exposures, such as those described above. In recent times, it has also developed a broader ecological approach that seeks to understand the population health effects of changes to the complex relationships between humans and their natural and social environments.

It is now widely recognised that human activities are having an increasing impact on many natural biophysical and ecological systems, including the global climate system (IPCC 2001; Millennium Ecosystem Assessment 2005). The resulting large-scale changes to the environment include:

- global warming
- extreme weather events
- depletion of stratospheric ozone
- deforestation
- land degradation
- loss of biodiversity
- rising sea levels
- depletion and contamination of fresh water.

In general, the effects on human health of these large-scale and complex environmental changes are difficult to measure or forecast. Meanwhile, there are growing concerns over this issue, especially in relation to climate change—and recognition that the accruing health risks extend into future decades. Although some effects may be beneficial (for example, land clearing can reduce habitats for disease-carrying animals and insects), most are expected to be harmful. More direct risks may include those from heatwaves, cyclones, floods and bushfires. Health may also be affected via less direct pathways, by changes in populations of pathogens, disease vectors, and non-human hosts and their interactions; by changes in aeroallergen production, and by changes in the agri-ecosystems that produce food. Disruption of social and economic conditions resulting from climate change could also have indirect consequences on health, both physical and mental (McMichael et al. 2006; Woodruff & McMichael 2004).

Australian temperatures have increased by about 0.9°C since 1910, consistent with global warming trends, and the trend is expected to continue over the decades ahead (Bureau of Meteorology 2006). It has been predicted that, between now and 2100, greenhouse gas accumulation will have increased the annual average temperature by between 1°C and 6°C over most of Australia, with significantly larger changes in some regions. One report has predicted that between 8,000 and 15,000 Australians could die every year from heat-related illnesses by 2100, compared with between 4,200 and 8,000 if global carbon dioxide emissions were reduced (Woodruff et al. 2005). That report also predicted that the geographical range of the mosquitoes that periodically transmit dengue in Queensland could extend from their current range in far northern Queensland, the Northern Territory and Western Australia to include coastal areas as far south as Sydney or Brisbane, depending on how much global emissions were reduced. This would place more of Australia's population at risk of dengue, and greater public health control efforts would be required to prevent transmission.

3.3 Socioeconomic characteristics

Health status is related to many socioeconomic factors, such as income and employment, and these factors are in turn associated with health. Because of the close associations and because the causal relationship can act in both directions, it is difficult to quantify the relationships. For example, those who are unemployed may be more likely to become ill because being without a job is bad for health, but at the same time those who become ill may be more likely to become unemployed or leave the labour force (the health selection effect). In such cases it is not always clear which came first, the illness or the unemployment. Also not clear is the extent to which it is the lower incomes resulting from unemployment that lead to poorer health and how much is it the unemployment itself.

This section describes some of the most important relationships and details the direction in which socioeconomic factors have been moving in the last decade or so. Further information about the association between health and socioeconomic status is in Chapter 4.

Socioeconomic characteristics that influence health include education, income, wealth, occupation, marital and family status, labour force participation, housing, ethnic origin and characteristics of the area of residence.

Education

Education is an important determinant of health, both in its own right and through its link to income and employment. Education provides knowledge and skills so that individuals can improve their own health and access appropriate health services (Adler & Newman 2002). Two important population-level measures of education are the Year 12 retention rate and educational attainment for the whole population (ABS 2003c).

Retention in education until Year 12 is becoming increasingly important for young people. Retention rates increased rapidly during the 1980s to a peak in 1992, with slight decreases in recent years. In 1980, 32% of males and 37% of females completed Year 12 (AIHW 2005a), compared with 73% and 82% in 1992 (ABS 2001). In 2004, 70% of males completed Year 12, as did 81% of females, and 40% of Indigenous young people (ABS 2006a).

Overall educational attainment continues to increase. In 2004, 21.9% of the population aged 25–64 had a bachelor degree or above, compared with 13.4% in 1994. Among this group, a diploma or other post-secondary educational qualification was held by 34.7% in 2004 compared with 30.8% in 1994. Overall, there was an increase in the proportion of people with post-secondary qualifications, from 44% in 1994 to 57% in 2004 (ABS 2006a).

Income

There is much debate about the relationship between income, wealth and health and, in particular, whether health status is associated with the inequality of income and wealth in a society or whether it is only the absolute level of income and wealth that is relevant.

Some research indicates that there is no strong evidence that countries or regions with higher levels of income inequality (disparity between high and low incomes) had worse health status than those with lower levels of income inequality (Lynch & Smith 2002; Mackenbach 2002; Mackenbach & Howden-Chapman 2003; Pearce & Davey Smith 2003). However, some still argue for a link between health status and income inequality, at least in the United States of America (Marmot 1999, 2002; Wilkinson & Marmot 2003).

Although the evidence for a link between income inequalities and health in high-income countries is not strong, income itself has been shown to relate strongly to health, especially in lower income countries. Higher incomes can enable the purchase of health-related goods and services such as better food, housing, recreation and health care, and may provide psychological benefits such as a greater sense of control.

In Australia, 19% of the mortality burden for males and 12% for females has been associated with socioeconomic disadvantage (AIHW: Mathers et al. 1999). That is, if all Australians had the same death rates as people living in the most socioeconomically advantaged fifth of areas and regions, then overall mortality rates would reduce by 19% for males and 12% for females.

Real national disposable income per person rose by 25% between 1996–97 and 2004–05 (ABS 2006b) and now stands at $35,106. The ABS Income and Housing Survey shows increases of 25% for the lowest income quintile (fifth) in real household equivalent income over the period 1994–95 to 2003–04, 19% for the highest income quintile, and 20% for households overall (ABS 2006c). Thus, inequality of income has reduced somewhat in this period.

Employment status and occupation

There is unquestionably a link between unemployment and health status. The unemployed have a higher chance of dying and more illnesses than those of similar age who are employed. For some, unemployment has been caused by illness but for many it is unemployment that causes the health problems.

In the late 1980s, mortality was estimated to be 50% higher in the unemployed than in the employed in Australia (Mathers 1994). In the New Zealand Census mortality study, males 25–64 years who were unemployed in 1991 had a 44% higher chance of dying within three years than males who were in full-time employment. Rates of suicide, lung cancer and cardiovascular disease were particularly elevated for those who were unemployed (Blakely 2002). The UK linked census study also shows a strong relationship between unemployment and the chance of dying. Those unemployed at any census between 1971 and 1991 had a 22% higher chance of dying in the period 1995 to 2001 (White et al. 2005). Because this study followed people over time, it was able to partly answer the question of the direction of cause. It concluded that unemployment directly increased the chance of dying, and it was not just that unemployed people were sicker in the first place.

There is also extensive evidence of an association between occupation and mortality both overseas and in Australia (Draper et al. 2004). This evidence typically shows that persons employed in manual occupations have higher mortality rates for most causes of death than those employed in clerical or managerial/professional occupations. These differences may relate both to the lower socioeconomic status of manual workers, as a group, and their increased risk of exposure to injury and other occupational hazards.

At the end of 2005, 61.0% of the Australian adult civilian population were employed. A further 3.0% were unemployed (giving an unemployment rate of 4.7%) and 36.0% were not in the labour force (Table 3.3). Of employed females, just over half were in full-time employment, compared with 85% of employed males.

Table 3.3: Labour force status of persons aged 15 years and over, November 2005 (per cent)

Labour force status	Males	Females	Persons
In the labour force			
Employed			
Full time	58.2	29.2	43.5
Part time	9.8	25.0	17.5
Total employed	*68.1*	*54.2*	*61.0*
Unemployed			
Looking for full-time work	2.8	1.6	2.2
Other	0.6	1.0	0.8
Total unemployed	*3.4*	*2.6*	*3.0*
Total in the labour force	71.5	56.8	64.0
Not in the labour force	28.5	43.2	36.0
Total population ('000)[(a)]	8,080.0	8,334.8	16,414.8

(a) Total civilian population aged 15 years or over.

Source: ABS 2005b.

The occupation of employed persons is recorded in the population Census (last conducted in 2001) and also in the ABS monthly labour force survey. In Australia, occupation is classified by the Australian Standard Classification of Occupations, which at its highest level has nine broad groups. These are traditionally further grouped into three categories: professional, 'white-collar' and 'blue-collar' (Table 3.4).

In the total employed population in late 2005, professional occupations comprised the largest group (39.7%), and there was very little difference in this proportion between males and females. Although for all persons the white-collar and blue-collar groups were of similar size, females accounted for the bulk of white-collar occupations, with the opposite the case for blue-collar occupations. Analysis of the Census data indicates that with increasing age there is generally a shift in the profile towards the professional occupation groups.

Table 3.4: Occupation of employed persons aged 15 years and over, November 2005 (per cent)

Occupation group	Males	Females	Persons
Professional			
Managers and administrators	10.6	5.3	8.2
Professionals	17.2	21.5	19.1
Associate professionals	12.6	12.0	12.3
Total professional	*40.4*	*38.8*	*39.7*
White-collar			
Advanced clerical and service workers	0.9	8.0	4.1
Intermediate clerical, sales and service workers	8.4	26.4	16.6
Elementary clerical, sales and service workers	6.2	14.9	10.2
Total white-collar	*15.6*	*49.3*	*30.8*
Blue-collar			
Tradespersons and related workers	20.8	2.8	12.7
Intermediate production and transport workers	13.0	2.3	8.2
Labourers and related workers	10.3	6.8	8.7
Total blue-collar	*44.1*	*11.9*	*29.5*
Total employed persons ('000)	5,499.4	4,517.6	10,017.0

Source: ABS 2005c.

Marital and family status

Children in single-parent families have poorer health than children in two-parent families (Mathers 1995). However, this seems to be due to single-parent families having lower average income and more unemployment than two-parent families, not to the family structure in itself (Mathers 1995; National Health Strategy 1992). The proportion of families with dependent children that are one-parent families has increased fairly consistently between 1976 and 2001: from 12% to 22% (AIHW 2005a).

3.4 Knowledge, attitudes and beliefs

Among the many factors that influence an individual's health are their knowledge, attitudes and beliefs about lifestyle behaviours, help-seeking behaviours, and other health decisions. A range of theories aim to explain the relationship between cognitive states and behaviour (or behaviour change), which can be distilled to a handful of key factors, including:

- an individual's behaviour intention
- environmental constraints
- skill or ability
- anticipated outcome of a given behaviour
- other supporting factors such as self-standards and self-efficacy.

Many Australian studies have documented attitudes and perceptions on diet, use of tobacco, alcohol and illicit substances, physical activity, childhood immunisation, and various other issues. Selected recent findings are summarised here to illustrate the various information available.

Respondents to the 2004 National Drug Strategy Household Survey (NDSHS) were asked for their thoughts on the health effects of tobacco smoke on non-smokers. Around 9 in 10 non-smokers thought that living with or working/socialising with smokers would affect a non-smoker's health, compared with 7 in 10 smokers (Table 3.5).

Table 3.5: Smokers' and non-smokers' perceptions of the effects of tobacco smoke on non-smokers, 2004 (per cent)

Situation/perception	Non-smokers[(a)]	Smokers[(b)]	All
Live with smokers			
Yes, might be affected	92.2	72.9	88.2
No, might not be affected	3.7	14.4	5.9
Don't know	4.1	12.7	5.9
Work or socialise with smokers			
Yes, might be affected	89.5	66.9	84.8
No, might not be affected	5.0	18.6	7.8
Don't know	5.5	14.5	7.4

(a) Never or ex-smoker.

(b) Daily, weekly or less-than-weekly smoker.

Source: AIHW 2005b.

The Australian Study of Health and Relationships showed that knowledge of the transmission routes and health consequences of the most common sexually transmitted infections (in particular gonorrhoea, genital warts and chlamydia) was poor. Individuals with the best knowledge were those who identified as homosexual or bisexual and those with a history of a sexually transmitted infection. Females were found to have significantly more knowledge about sexually transmitted infections than

men. Higher educational and occupational status among both males and females were associated with better knowledge (Grulich et al. 2003a).

In the area of physical activity, Gill & Taylor (2004) reported on the impact of perceived body image on being more physically active: around 15% of respondents said that the way they felt about their body shape prevented them from being more physically active, with the majority (82%) saying that their body image perception did not affect their physical activity behaviours.

As an example of the role of knowledge, attitudes and beliefs in health behaviours, Rickwood and others (2005) studied the factors that affect help-seeking for mental health problems among young people. The researchers found that negative attitudes towards professional help were a major barrier in help-seeking. Other barriers included fear of stigma relating to mental health problems, and fear about the confidentiality of professional services. On the other hand, positive attitudes towards professionals (engendered by previous positive experiences) promoted help-seeking behaviour. Another positive impact was mental health 'literacy', including knowledge of symptoms and when to get help, knowledge of available services, and knowledge of what to expect from different types of services.

3.5 Health behaviours

Behavioural determinants of health that accounted for the greatest burden of disease in Australia in 2003 included tobacco smoking, physical activity, alcohol consumption, use of illicit drugs, lack of fruit and vegetables, and unsafe sex. This section provides information on the prevalence of these determinants, as well as of other determinants such as adult vaccination.

Tobacco smoking

Impact and prevalence

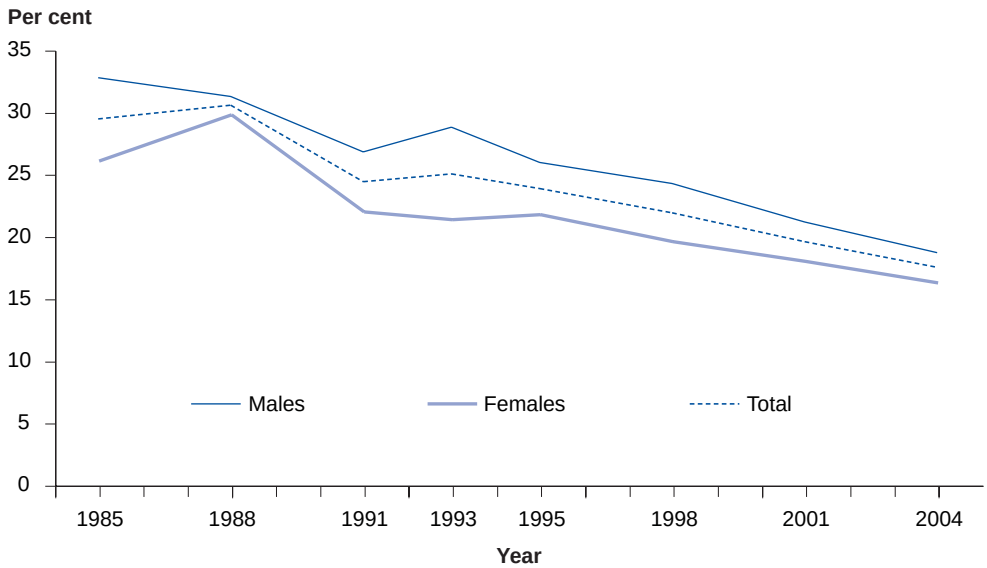
Tobacco smoking contributes to more drug-related hospitalisations and deaths than alcohol and illicit drug use combined. It is a major risk factor for coronary heart disease, stroke, peripheral vascular disease, cancer and a variety of other diseases and conditions.

Tobacco smoking is responsible for 7.9% of the burden on the health of Australians: around 9.5% of the total burden of disease in males and 6% in females (provisional estimate at the time of writing) (see Table 3.1). Globally, the World Health Organization (WHO) estimates that tobacco causes 8.8% of deaths (4.9 million) and 4.1% of the total burden of disease (WHO 2002).

The tangible social costs of tobacco use in Australia were estimated to be $7.6 billion in 1998–99, or about 2.3% of gross domestic product (Collins & Lapsley 2002).

Estimates from the 2004 NDSHS indicate that around 2.9 million Australians (17.4% of people aged 14 years and over) smoked tobacco daily. Males were more likely to be daily smokers (18.6%) than females (16.3%). Former smokers comprised 26.4% of the population (29.2% of males and 23.6% of females) and 52.9% had never smoked (48.2% of males and 57.5% of females).

In Australia, smoking rates have been declining since the 1950s, when it was estimated that around 70% of males and 30% of females smoked. Between 1995 and 2004, the prevalence of smoking for males and females declined by 7.3 and 5.5 percentage points, respectively (Figure 3.2).



Source: AIHW 2005b.

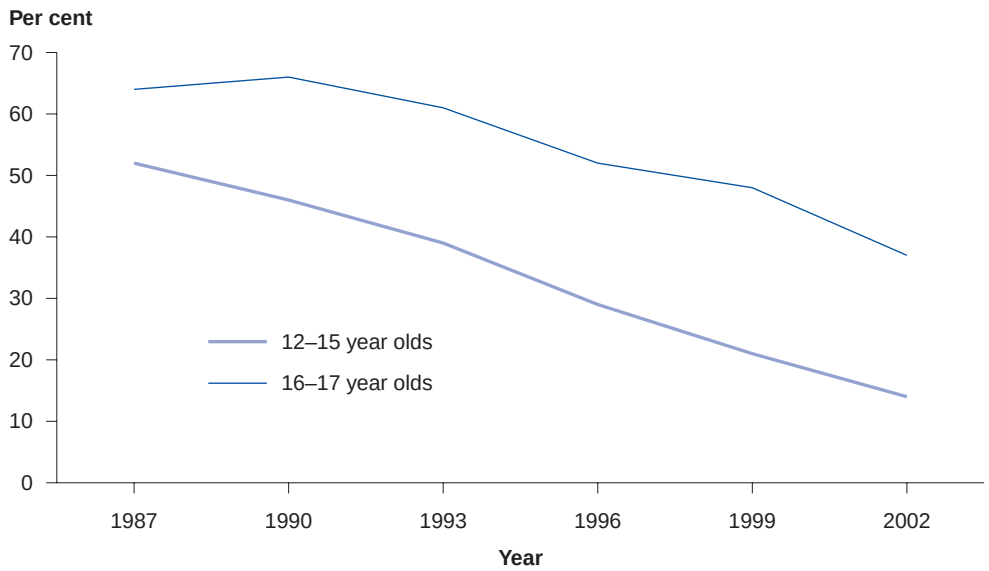
Figure 3.2: Daily smokers, population aged 14 years or over, 1985–2004

Smoking among young people

The ability of teenagers to purchase cigarettes increases the likelihood of smoking. In response, all states and territories in Australia have enacted legislation that prohibits the supply of cigarettes to people under the age of 18 years.

Estimates from the Australian Secondary Schools Alcohol and Drug surveys show that the proportion of those aged 12–15 years who were current smokers and had purchased their most recent cigarette (instead of acquiring it in some other way) declined from 52% in 1987 to 14% in 2002, while for those aged 16–17 the decline was from 64% to 37% (Figure 3.3).

In the 2004 NDSHS, about one in 12 persons aged 12–19 years reported smoking daily in 2004. Rates were under 3% for those aged 12–15 years and markedly higher for those aged 16 years and over, particularly for females aged 16–17 years (Table 3.6). About 96% of the 12–15 years age group reported having never smoked a full cigarette; about the same for both males and females. Estimates of tobacco use by younger people should be interpreted with caution because of the low prevalence and relatively smaller sample sizes compared with those for adults.



Source: White & Hayman 2004.

Figure 3.3: Teenage smokers who purchased their most recent cigarette, 1987–2002

Table 3.6: Daily smokers: proportions among those aged 12–19 years, 2004 (per cent)

	Age group			
Sex	**12–15**	**16–17**	**18–19**	**12–19**
Males	2.0	7.5	17.5	7.3
Females	2.6	14.5	16.3	9.1
Persons	**2.3**	**10.9**	**16.9**	**8.1**

Source: AIHW 2005c.

Children exposed to tobacco smoke in the home

Children are particularly susceptible to the effects of environmental tobacco smoke. Passive smoking causes lower respiratory infections, middle ear infections, onset and worsening of asthma, decreased lung function, eye and nose irritation, low birthweight and sudden infant death syndrome in children (National Drug Strategy 2002; NHMRC 1997).

The benefits of reducing children's exposure to environmental tobacco smoke at home also include reduced school absenteeism, increased school performance, reduced uptake of smoking and lower consumption of tobacco among children who smoke (National Drug Strategy 2002).

Over the period 1995–2004, around one-third of all households included dependent children (that is, children aged 14 years and under). In 1995, around 31% of these households included someone who smoked inside the home (Table 3.7). With the general decline in smoking prevalence, this figure fell to less than 12.3% of households in 2004, or just over 600,000 dependent children exposed to tobacco smoke inside the home.

Table 3.7: Household smoking status[(a)], by dependent children status[(b)], 1995–2004 (per cent)

	Dependent children				No dependent children[(c)]			
Household smoking status	**1995**	**1998**	**2001**	**2004**	**1995**	**1998**	**2001**	**2004**
Smokes inside the home	31.3	22.6	19.7	12.3	32.2	26.6	21.3	17.4
Only smokes outside the home	16.7	21.5	24.9	28.1	13.7	18.0	19.8	17.6
No-one at home regularly smokes	52.0	55.9	55.4	59.6	54.1	55.4	58.9	65.0

(a) Household smoking status as reported by respondents aged 14 years or over.

(b) Households including dependent children aged 14 years or under.

(c) Includes dependents aged 15 years and over.

Source: AIHW analysis of National Drug Strategy Household Surveys 1995–2004.

International comparisons

The prevalence of daily smoking varies considerably among OECD countries, ranging from about one in three of the adult population in the Netherlands and Hungary, to less than one in five in the United States of America, Canada, Sweden and Australia (Table 3.8).

Table 3.8: Prevalence of daily smoking, population aged 15 years or over, selected OECD countries, 1974–2004[(a)]

Country	1974	1984	1994	2004
Netherlands	53.0	39.0	37.0	34.0
Hungary	n.a.	35.2	35.5	33.8
Luxembourg	n.a.	33.0	33.0	33.0
Korea	n.a.	n.a.	34.7	30.4
Japan	47.8	39.8	36.9	30.3
France	n.a.	30.0	28.0	28.6
Denmark	55.0	47.0	37.0	28.0
Ireland	45.6	34.5	28.0	27.0
Belgium	n.a.	36.0	26.0	27.0
Norway	42.0	38.0	33.0	26.0
United Kingdom	45.0	34.0	27.0	26.0
New Zealand	36.0	32.0	27.0	25.0
Germany	n.a.	n.a.	22.9	24.3
Italy	n.a.	31.7	25.4	24.2
Czech Republic	n.a.	n.a.	26.1	24.1
Finland	n.a.	24.6	22.7	22.2
Iceland	n.a.	33.0	26.9	20.2
Australia	**37.8**	**35.4**	**24.1**	**17.7**
Sweden	n.a.	30.5	22.7	17.5
United States	37.1	32.1	21.0	17.5
Canada	39.0	31.2	25.5	17.0

(a) Data are for the year specified, or one to three years earlier or later.

n.a. Not available.

Sources: OECD Health Data 2005; National Drug Strategy Household Survey 2004.

With few exceptions, the countries included in Table 3.8 saw a decline in the prevalence of daily smoking between 1974 and 2004, with major reductions in the early part of this period and a slowing of the decline in the last decade. The decline in smoking rates in Australia over the past three decades has resulted in Australia having the fourth lowest daily smoking prevalence (17.7%) of the OECD countries in Table 3.9, behind Canada (17.0%), the United States (17.5%), and Sweden (17.5%).

Physical activity

Physical activity is important in maintaining good health. Regular physical activity reduces cardiovascular risk in its own right and also improves levels of cardiovascular risk factors such as overweight, high blood pressure, low levels of HDL (the 'good' cholesterol) and Type 2 diabetes. It helps protect against some forms of cancer, and strengthens the musculoskeletal system, helping to reduce the likelihood of osteoporosis (low bone-mineral density) and the risk of falls and fractures. In addition, taking part in physical activity improves mental wellbeing (in both the short term and longer term) by reducing feelings of stress, anxiety and depression (Dunn et al. 2001).

National guidelines have set out the amount of physical activity that Australians should take if they are to gain health benefits (Box 3.2). Compared against these guidelines, a significant majority of Australians are not physically active enough. People who have lower-than-recommended levels of physical activity have an increased risk of mortality and morbidity from a range of diseases and conditions. Low levels of physical activity have been estimated (provisionally, at the time of writing) to have accounted for 6.7% of the burden of disease and injury in Australia in 2003 (see Table 3.1).

Box 3.2: What is sufficient physical activity for health?

The National Physical Activity Guidelines for Australians (AIHW 2003; DHAC 1999; DoHA 2004a, 2004b) recommend at least 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week to obtain health benefits. This is generally interpreted as 30 minutes on at least five days of the week, a total of at least 150 minutes of moderate activity per week. The guidelines for children and adolescents recommend at least 60 minutes of moderate to vigorous physical activity every day.

Examples of moderate-intensity activity are brisk walking, swimming, doubles tennis and medium-paced cycling. More vigorous physical activity includes jogging and active sports like football and basketball.

There are two ways of calculating 'sufficient' activity for health based on the Australian Guidelines. These are: 'sufficient time' (at least 150 minutes per week of moderate-intensity physical activity, with each minute of vigorous activity counted as two minutes of moderate activity) and 'sufficient time and sessions' (at least 150 minutes of moderate-intensity physical activity accrued over at least five sessions per week, with vigorous activity counted double). For population-monitoring purposes, sufficient time and sessions is the preferred measure of sufficient activity for health as it takes into account the frequency as well as duration of physical activity. Research suggests that even shorter sessions (down to 10 minutes) can be beneficial as well, provided they add up to the required total over the week.

Individuals' reductions in physical activity in recent decades may be partly due to the increased time spent in sedentary or minimally active states, perhaps as a result of labour-saving devices and passive forms of entertainment (such as computers, television, video games and the Internet). Low physical activity levels may also be related to apparent reductions in 'active transport' among adults and children associated with increased car ownership and use, along with safety concerns leading to less walking, cycling and transport-related physical activity. Research also indicates that people perceive that they have less discretionary time available for exercise or sporting activities (Bauman et al. 2002).

Prevalence and trends

Various methods are available to measure physical activity, so results from different surveys can provide different estimates of the proportion of people who are sufficiently active for health. Most of the information presented here is based on data obtained from the 1997, 1999 and 2000 National Physical Activity Surveys (NPASs). This series examined self-reported participation in walking (including walking for transport), other moderate activity and vigorous activity during leisure time, using the Active Australia Survey instrument. More recent data are available from state and territory surveys, conducted using computer-assisted telephone interviewing (CATI).

Non-leisure time physical activity, such as activity at work or domestic activity, also contributes to overall physical activity. However, this component of physical activity is difficult to measure, and the instruments used to measure it are not generally practical for use in population surveys.

Here, 'sufficient time and sessions' (see Box 3.2) is used as the measure of 'sufficient' physical activity for health. 'Insufficient physical activity' is the completion of some physical activity but either not enough in total or not in sufficient sessions to meet the 'sufficient time and sessions' recommendations.

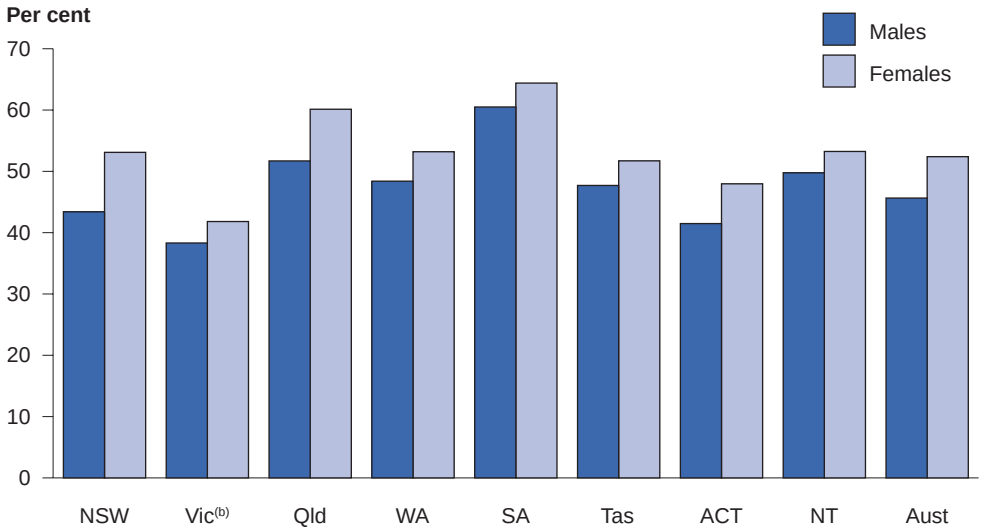
Estimates from the 2004 state and territory CATI surveys suggest that around 50% of adults are not undertaking sufficient physical activity (Figure 3.4). Females reported higher levels of inactivity than males in all states and territories.

Data from the 2000 NPAS showed that rates of insufficient physical activity were highest among those aged 30–59 years and lowest among those aged 18–29 years, for both males and females (Figure 3.5). The proportion in the survey reporting no physical activity over the previous week increased with age, from about 11% of males and 9% of females aged 18–29 years to 20% of males and 17% of females aged 45 years or over.

Available data suggest little change in physical activity patterns during the 1980s and much of the 1990s in Australia. However, between 1997 and 2000 the estimated proportion of Australians with lower-than-recommended levels of physical activity rose from 49% to 54%. During this period, the prevalence of insufficient levels of physical activity increased among males and females and for all age groups under 60 years. The proportion of males in the NPAS reporting no physical activity also increased, from 14% in 1997 to 18% in 2000.

Data from the 1995, 2001 and 2004–05 National Health Surveys (NHSs) also suggest little change in physical activity patterns, with the proportion of people aged 18 years or

more reporting sedentary levels of physical activity (that is, less than 100 minutes of exercise over two weeks) remaining around 30–35% (ABS 2006d).



(a) Persons not exercising for 150 minutes per week and not exercising for five sessions per week.

(b) Reported results have been adjusted for missing values.

Sources: NSW Population Health Survey, unpublished data; AIHW analysis of Vic Population Health Survey (DHS 2004); WA Health and Wellbeing Surveillance System, unpublished data; SA Monitoring and Surveillance System, unpublished data; AIHW analysis of 'Filling the gaps in data pooling' survey (December 2004).

Figure 3.4: Insufficient physical activity [(a)], persons aged 18 years and over, 2004

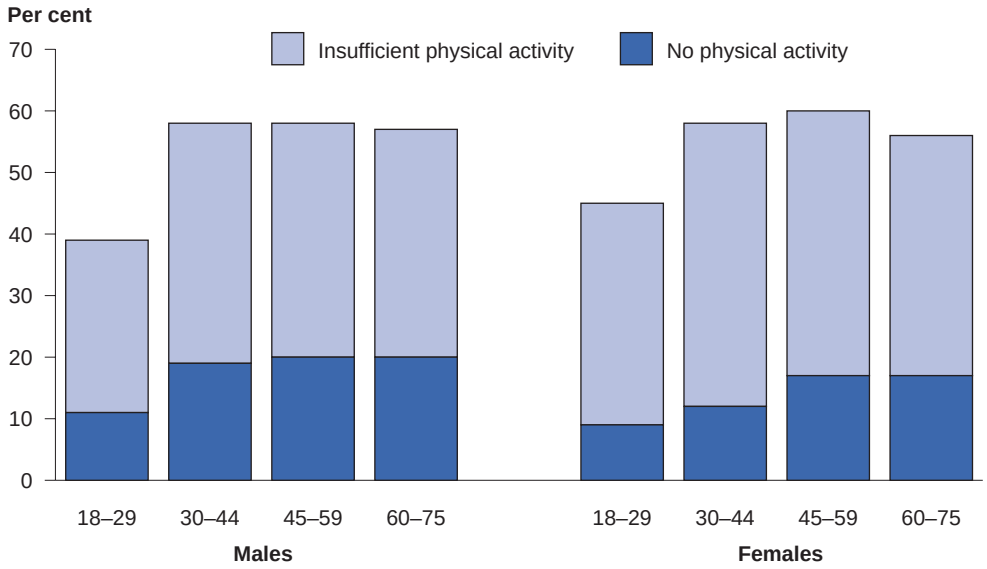
Older Australians

Physical activity is very important in maintaining and improving health and wellbeing in older age groups, particularly for preventing falls and broken bones. Inactivity in elderly people is associated with a loss of both balance and bone mass.

The NPAS findings indicate that the level of physical activity reported by older Australians (those aged 60–74 years) is remaining stable. The findings for 2000 suggest that about 21% and 14% of older Australian males and females, respectively, had sedentary levels of activity, and a further 33% and 44% had some activity but it was not 'sufficient' (AIHW analysis of the 2000 NPAS).

Children and adolescents

There are no recent national data on the physical activity levels of Australian children and adolescents. In a survey conducted recently in New South Wales, three-quarters of the students in Years 6, 8 and 10 reported levels of physical activity that met the recommendations (see Box 3.2). Boys reported more activity than girls, but for both sexes participation decreased with age (Booth et al. 2006). An earlier survey conducted in Western Australia (Hands et al. 2004) found that one-quarter of high school males surveyed, one-third of high school females and one out of seven primary school students reported doing no sport, exercise or dance activities in a typical week.



Notes

1. Age-standardised to the Australian population as at 30 June 2001.
2. People aged 18–75 years.
3. Insufficient physical activity is less than 150 minutes and/or less than five sessions in the previous week.

Source: AIHW analysis of the 2000 National Physical Activity Survey.

Figure 3.5: Proportion of adults undertaking insufficient or no physical activity, 2000

Alcohol consumption

Excessive alcohol consumption is a major risk factor for morbidity and mortality. The WHO estimates that, worldwide in 2002, alcohol caused 3.2% of deaths (1.8 million) and 4.0% of the burden of disease (WHO 2002). In Australia, it has been estimated (provisionally, at the time of writing) that harm from alcohol was the cause of 5.3% of the burden of disease for males and 2.2% for females (see Table 3.1).

There are also social costs to the consumption of alcohol. In Australia in 1998–99, the total tangible cost attributed to alcohol consumption (which includes lost productivity, health care costs, road accident-related costs and crime-related costs) was estimated at $5.5 billion (Collins & Lapsley 2002).

Nevertheless, some benefits are thought to arise in the longer term from low to moderate alcohol consumption, largely through reduced risk of stroke and ischaemic heart disease. The net harm associated with alcohol consumption, after taking into account these benefits, was around 2.0% of the total burden of disease in Australia in 2003.

Alcohol consumption patterns

Analysis of the NDSHS from 1993 to 2004 shows that four in five Australians drank alcohol, and one in ten did so daily (Table 3.9). In 2004, 83.6% of Australians aged 14 years or over were current drinkers. These rates have been fairly stable since 1993.

Table 3.9: Alcohol drinking status, population aged 14 years and over, 1993–2004 (per cent)

Drinking status	1993	1995	1998	2001	2004
Daily	8.5	8.8	8.5	8.3	8.9
Weekly	39.9	35.2	40.1	39.5	41.2
Less than weekly	29.5	34.3	31.9	34.6	33.5
Ex-drinker[(a)]	9.0	9.5	10.0	8.0	7.1
Never a full serve of alcohol	13.0	12.2	9.4	9.6	9.3

(a) Ex-drinkers are those who consumed at least a full serve of alcohol in their lives, but not in the last 12 months.

Source: AIHW 2005c.

International comparisons

The pattern of change over time in per person alcohol consumption varied among the OECD countries (Table 3.10). For the majority, including Australia, there appears to have been a peak of consumption in the 1970s and 1980s with a tapering off in the 1990s and early 21st century. A few countries, notably Ireland and the United Kingdom, had an increase in consumption over the past 40 years, while Portugal and Italy had a considerable decrease throughout the period.

Table 3.10: Alcohol consumption, population aged 15 years and over, selected OECD countries, 1963–2003[(a)] (litres of pure alcohol per person per year)

Country	1963	1973	1983	1993	2003
Luxembourg	10.4	12.7	12.4	15.3	14.9
Ireland	5.2	8.2	8.0	11.2	14.3
Hungary	8.6	11.9	14.5	13.1	13.4
Portugal	19.6	16.8	17.8	15.0	13.0
Czech Republic	n.a.	n.a.	12.2	11.5	11.9
Spain	14.5	19.0	17.0	12.0	11.7
Austria	12.0	16.1	12.6	12.3	11.3
Denmark	5.9	10.9	12.8	11.7	11.2
United Kingdom	6.1	8.7	9.1	9.3	11.1
Switzerland	13.1	15.0	13.6	12.1	10.8
France	n.a.	17.2	15.1	11.5	10.5
Germany	10.2	14.8	14.3	11.2	10.4
Belgium	9.6	13.3	13.8	11.7	10.2
Australia	9.8	13.0	12.3	10.0	9.8
Finland	3.1	7.4	7.9	8.4	9.2
New Zealand	5.8	11.3	10.6	9.6	9.2
Italy	16.6	15.3	12.6	10.2	8.7
United States	8.1	9.9	10.2	8.4	8.3
Japan	5.9	7.6	8.6	8.8	8.2
Canada	7.4	10.3	10.9	7.5	7.8
Sweden	5.1	7.0	6.1	6.2	7.0
Turkey	0.8	1.6	1.6	1.6	1.5

(a) Data are for the year specified, or one to three years earlier or later.

Sources: ABS 2004; OECD Health Data 2004.

Risk of harm from alcohol consumption

In 2001 the National Health and Medical Research Council (NHMRC) published alcohol consumption guidelines for males and females. They are expressed in terms of short-term and long-term risk of injury, ill health and death. An overview of the principal guidelines is in Box 3.3.

Box 3.3: Australian alcohol guidelines for short-term and long-term patterns of drinking—summary

Males who consume no more than four standard drinks a day on average or no more than 28 drinks in a week avoid the long-term risk of ill health and death related to alcohol and maximise the potential long-term health benefits.

The equivalent amounts for females are two standard drinks per day on average and 14 over a week (because of their lower average body mass and the different way their bodies process alcohol).

Males who consume more than six standard drinks in any one day significantly increase the short-term risk of health and social problems, including (but not only) risk of injury or death from accident, assault and self-harm.

For females the equivalent limit is four standard drinks.

Source: NHMRC 2001.

In 2004, one in six (16.4%) Australians aged 14 years or over had not consumed alcohol in the previous 12 months. Three in five (61.4%) Australians had drunk at levels considered low risk for harm in the short and long term, and one in twelve (8.3%) had drunk at levels considered risky or high risk for both short-term and long-term harm (Table 3.11).

Alcohol use and psychological distress

The Kessler 10 scale (K10) was developed for screening populations for psychological distress. The scale consists of 10 questions on non-specific psychological distress and relates to the level of anxiety and depressive symptoms a person may have experienced in the preceding four-week period. Analysis of psychological distress by alcohol use patterns for persons aged 18 years or over in Australia in 2004 shows that high-risk (15.6%) and risky (11.4%) drinkers were more likely than low-risk drinkers (8.6%) or abstainers (9.9%) to experience high or very high levels of psychological distress (AIHW 2005c). The psychological distress may have preceded the alcohol use for some and, for others, alcohol use may have preceded the psychological distress.

Use of illicit drugs

Illicit drug use refers to the use of drugs such as marijuana, heroin, ecstasy and cocaine (which are illegal to possess); the use of volatile substances such as glue, solvent and petrol as inhalants; or the non-medical use of prescribed drugs.

Illicit drug use is a major risk factor for ill health and death, being associated with HIV/AIDS, hepatitis C virus (HCV), low birthweight, malnutrition, infective endocarditis

Table 3.11: Risk of harm from alcohol, population aged 14 years or over, 2004 (per cent)

		Short-term risk[(a)]		
Long-term risk	**Abstainer**	**Low risk**	**Risky or high risk**	**Total**
Males				
Abstainer	12.9	. .	. .	12.9
Low risk	. .	61.5	15.5	77.0
Risky or high risk	. .	1.5	8.7	10.1
Total	*12.9*	*63.0*	*24.2*	*100.0*
Females				
Abstainer	19.8	. .	. .	19.8
Low risk	. .	61.2	9.4	70.6
Risky or high risk	. .	1.7	7.9	9.6
Total	*19.8*	*62.9*	*17.3*	*100.0*
Persons				
Abstainer	16.4	. .	. .	16.4
Low risk	. .	61.4	12.4	73.7
Risky or high risk	. .	1.6	8.3	9.9
Total	**16.4**	**62.9**	**20.7**	**100.0**

(a) Monthly basis.

Note: For description of long- and short-term risk see Box 3.3.

Source: AIHW 2005d.

(inflammation of the lining of the heart), poisoning, mental illness, suicide, self-inflicted injury and overdose. Globally, the WHO estimates that 0.4% of deaths (0.2 million) and 0.8% of the total burden of disease are attributable to illicit drug use (WHO 2002). In Australia in 2003, it is estimated (provisionally, at the time of writing) that 1.9% of the burden of disease was attributable to use of illicit drugs (see Table 3.1).

Trends in recent illicit drug use

From the NDSHS, around 15% of the Australian population aged 14 years or over used illicit drugs in 2004 (Table 3.12); there were decreases for each type of drug with few exceptions (AIHW 2005c). Marijuana/cannabis, at 11.3%, was the recently used illicit drug most commonly reported by this population—a decline from rates of around 13% in most survey years between 1993 and 2001. Ecstasy was the second most common, with use by an estimated 3.4%, for the first time being more prevalent than amphetamines (mainly methamphetamines) at 3.2%.

Young people's use of illicit drugs

The 2004 NDSHS was expanded from previous surveys so it covered persons aged 12 years and over, revealing that 7.6% of the population aged 12–15 years had used an illicit drug in the previous year. Illicit drug use was more common for young people aged 16–17 years (20.9%), and even more common for those aged 18–19 years (30.8%).

Most illicit drug use in the 12–15 years age group was of marijuana/cannabis (5.2%), followed by the non-medical use of pain-killers (2.0%). For all other substances surveyed the prevalence in this age group was less than 1%.

Table 3.12: Summary of recent[(a)] illicit drug use; population aged 14 years and over, 1993–2004 (per cent)

Substance/behaviour	1993	1995	1998	2001	2004
Marijuana/cannabis	12.7	13.1	17.9	12.9	11.3
Pain-killers/analgesics[(b)]	1.7	3.5	5.2	3.1	3.1
Tranquillisers/sleeping pills[(b)]	0.9	0.6	3.0	1.1	1.0
Steroids[(b)]	0.3	0.2	0.2	0.2	0
Barbiturates[(b)]	0.4	0.2	0.3	0.2	0.2
Inhalants	0.6	0.6	0.9	0.4	0.4
Heroin	0.2	0.4	0.8	0.2	0.2
Methadone[(c)]	n.a.	n.a.	0.2	0.1	0.1
Other opiates/opioids[(b)]	n.a.	n.a.	n.a.	0.3	0.2
Meth/amphetamine (speed)[(b)]	2.0	2.1	3.7	3.4	3.2
Cocaine	0.5	1.0	1.4	1.3	1.0
Hallucinogens	1.3	1.8	3.0	1.1	0.7
Ecstasy[(d)]	1.2	0.9	2.4	2.9	3.4
Ketamine	n.a.	n.a.	n.a.	n.a.	0.3
GHB[(e)]	n.a.	n.a.	n.a.	n.a.	0.1
Injected drugs	0.5	0.6	0.8	0.6	0.4
Any illicit drug	14.0	17.0	22.0	16.9	15.3
None of the above	86.0	83.0	78.0	83.1	84.7

(a) Used in last 12 months.

(b) For non-medical purposes.

(c) For non-maintenance purposes.

(d) This category included substances known as 'designer drugs' prior to 2004.

(e) Gamma-hydroxybutyrate.

Source: AIHW 2005c.

Illicit drug use and psychological distress

Illicit drug use can be associated with a range of mental illnesses, and there has been some recent debate about the relationship between heavy cannabis use and psychosis.

The 2004 NDSHS included the K10 scale of psychological distress, a module that measures non-specific psychological distress and relates to the level of anxiety and depressive symptoms a person may have had over the previous four weeks.

Among the general community (aged 18 years or over), less than one in 10 experienced high or very high levels of distress (Table 3.13). However, when this group is split into those who had used and those who had not used selected drugs in the last month, there was at least a twofold difference in that experience, with an almost sevenfold difference between users and non-users of heroin. The psychological distress may have preceded the drug use for some and, for others, the drug use may have preceded the psychological distress.

Table 3.13: Psychological distress,[(a)] by use of selected illicit drugs, persons aged 18 years or over, 2004 (per cent)

	Level of psychological distress		
Substance/behaviour	**Low**	**Moderate**	**High and very high**
All persons (18+)	68.4	21.8	9.8
Any illicit drug			
Used in the last month	50.1	30.4	19.6
Not used in the last month	70.4	20.9	8.8
Marijuana/cannabis			
Used in the last month	49.8	31.0	19.2
Not used in the last month	69.8	21.1	9.1
Heroin			
Used in the last month	9.9	25.2	64.9
Not used in the last month	68.5	21.7	9.8
Meth/amphetamines			
Used in the last month	36.1	32.8	31.1
Not used in the last month	68.8	21.6	9.5
Ecstasy			
Used in the last month	44.5	33.9	21.6
Not used in the last month	68.8	21.6	9.7

(a) Using the Kessler 10 scale of psychological distress.

Source: 2004 National Drug Strategy Household Survey.

Injecting drug use

As noted above, injecting drug use is a significant risk factor for transmitting bloodborne viruses such as HIV and HCV: in 2004 around 4% of new HIV infections and 70% of hepatitis C infections were attributed to injecting drug use (NCHECR 2005a).

Further, there is a strong association between the length of injecting and the prevalence of HCV. A 2004 survey of injecting drug users showed that 73% of people with a history of injecting drug use for 10 years or more tested positive to HCV antibody, compared with 25% of people with a history of injecting drug use of less than three years (Table 3.14). Such a relationship does not appear for HIV; however, only 1% of the injecting drug users assessed tested positive for HIV antibody.

The proportion of injecting drug users at needle and syringe programs reporting re-use of someone else's used needle and syringe in the previous month, in the national annual Needle and Syringe Program cross-sectional survey, decreased nationally from 17% in 2000 to 13% in 2003, then increased to 18% in 2004 (NCHECR 2005b). From 2000 to 2002, survey respondents aged less than 20 years were more likely than older age groups to report sharing needles and syringes in the previous month, but this difference was not observed in 2003 and 2004.

Re-use of someone else's needle and syringe was generally reported as after use by only one person (9% to 13% of all participants), typically a regular sex partner (7–9%) or close

friend (4–5%). Re-use of someone else's used equipment other than needles and syringes in the previous month remained stable in the period 2000–04, except for the proportion of survey respondents reporting re-use of someone else's spoon (down from 33% in 2000 to 27% in 2004).

Table 3.14: Prevalence of HIV or HCV antibodies among injecting drug users aged 14 years or over, by history of injecting drug use, 2004 (per cent)

	Tested positive to HIV antibody			Tested positive to HCV antibody		
History of injecting drug use	**Males**	**Females**	**Persons[(a)]**	**Males**	**Females**	**Persons[(a)]**
Less than 3 years	2.4	0	1.5	27	22	25
3–5 years	1.5	0	0.9	31	38	33
6–10 years	1.0	0	0.6	53	60	56
10 or more years	1.4	1.0	1.3	71	77	73
History not reported	3.9	0	2.3	54	67	53
Total	**1.4**	**0.5**	**1.1**	**58**	**62**	**60**

(a) Includes people whose sex was reported as transgender or whose sex was not reported.

Source: NCHECR 2005a.

Dietary behaviour

Diet plays a major role in health and in recent decades much evidence has shown that diet can either reduce or increase the risk of various diseases (NHMRC 2003). Dietary guidelines for children, adults and older Australians from the NHMRC recommend consuming a wide variety of nutritious foods, including a high intake of plant foods such as cereals, fruit, vegetables, legumes and nuts. They also recommend moderating sugar and fat intake, limiting saturated fat intake, choosing foods low in salt and limiting alcohol intake. In addition, the guidelines highlight the need to encourage and support breastfeeding and to prepare and store food safely.

Current priorities for action on nutrition include promoting fruit and vegetable consumption, healthy weight, and good nutrition for mothers, babies and school-aged children, as well as improving nutrition for vulnerable groups and reducing structural barriers to safe and healthy food (SIGNAL 2001). For Indigenous peoples, the focus is on diet-related diseases, access to healthy food, promotion of breastfeeding, nutrition for mothers and babies, children's nutrition, renal disease and dental health (NATSINWP 2001).

There have been few national nutrition-related data collected in recent years in Australia, with information about food and nutrient intakes last collected in 1995. However, the regular NHS collects limited information on nutrition-related behaviours, and there are also recent data available from state and territory CATI surveys.

Fruit and vegetable consumption

Fruit and vegetable consumption is strongly linked to the prevention of chronic disease and to better health, and the NHMRC dietary guidelines recommend that adults consume two to four serves of fruit and four to eight serves of vegetables per day (NHMRC 2003). However, despite concerns about overconsumption of food in

Australia and its contribution to the rising prevalence of overweight and obesity, large sections of the population are not consuming adequate amounts of fruit and vegetables. Analysis of self-reported data from the 2004–05 NHS shows that 85.7% of people aged 18 years or over did not usually consume five serves of vegetables per day, while 46.0% did not consume two serves of fruit (Table 3.15).

Proportions of people reporting inadequate fruit and vegetable consumption were similar for each state and territory. For vegetable consumption, rates ranged from 80.2% in Western Australia to 89.8% in the Australian Capital Territory. For fruit consumption, rates ranged from 44.0% in Victoria to 50.0% in South Australia.

Data collected through state and territory CATI surveys similarly indicate that a substantial proportion of the population do not consume adequate amounts of fruit and vegetables. The combined CATI data show inadequate vegetable consumption rates of 93.0% for males and 88.8% for females, and inadequate fruit consumption rates of 58.1% for males and 44.0% for females. Inadequate vegetable consumption rates were similar for each state and territory, ranging from 84.3% of persons in Tasmania to 93.0% in Victoria.

Table 3.15: Inadequate consumption of vegetables/fruit, persons aged 18 years or over, 2004–05 (per cent)

	NSW	Vic[(a)]	Qld	WA	SA	Tas	ACT	NT	Aust[(b)]
From 2004 CATI surveys					**Males**				
Inadequate vegetables[(c)]	93.9	96.4	91.3	87.3	93.0	84.6	90.6	91.5	93.0
Inadequate fruit[(d)]	59.7	57.0	56.1	52.0	67.5	58.1	55.3	64.8	58.1
					Females				
Inadequate vegetables	89.7	89.9	88.6	83.0	90.1	84.1	89.0	90.5	88.8
Inadequate fruit	46.7	39.6	42.2	41.4	52.9	47.9	43.1	52.7	44.0
					Persons				
Inadequate vegetables	91.8	93.0	90.1	85.1	91.5	84.3	89.7	91.1	90.9
Inadequate fruit	53.1	48.0	49.0	46.9	60.0	52.8	49.1	59.3	50.9
From 2004–05 NHS					**Persons**				
Inadequate vegetables	88.0	84.6	84.7	80.2	87.9	79.4	89.8	n.a.	85.7
Inadequate fruit	46.0	44.0	47.3	44.6	50.0	46.3	46.5	n.a.	46.0

(a) Reported results have been adjusted for missing values.

(b) Derived from a weighted average of the state and territory estimates for CATI data.

(c) Consumption of four or fewer serves of vegetables.

(d) Consumption of one or no serves of fruit.

Sources: ABS 2006d; AIHW analysis of 'Filling the gaps in data pooling' survey (December 2004); AIHW analysis of Vic Population Health Survey (DHS 2004); NSW Population Health Survey, unpublished data; SA Monitoring and Surveillance System, unpublished data; WA Health and Wellbeing Surveillance System, unpublished data; .

It has been estimated (provisionally, at the time of writing) that, in 2003, inadequate fruit and vegetable consumption was responsible for 1.4% of the total burden of disease in Australia (see Table 3.1). Lock and others (2005) estimate that 1.8% of the global burden of disease may be attributed to inadequate consumption of fruit and vegetables.

This compares with 1.3% for physical activity, 2.3% for overweight and obesity and 4.1% for tobacco.

Folate intake

The impact of good nutrition on health begins early in life. In particular, insufficient folate (a B vitamin also known as folic acid) in the diet of females of child-bearing age increases the risk of having a fetus affected with spina bifida or other neural tube defects. The NHMRC (1994) recommends that females capable of becoming pregnant consume 400 micrograms per day of folate. In 1995, the National Nutrition Survey found that only 1% of females aged 15–49 years consumed the recommended amount in their diet (excluding supplements) (Abraham & Webb 2001). Data from the 2001 NHS show that 11% of females aged 18–49 years were deliberately increasing their intake of folate, with 7% of females deliberately taking vitamin or mineral supplements because they contained folate, and 6.5% and 2.1% (respectively) deliberately consuming food or drinks fortified with folate (ABS 2003d).

Breastfeeding

Breastfeeding has nutritional, health, social and economic benefits. Evidence is accumulating of the protective role breastfeeding may have in several chronic diseases including Type 1 diabetes, inflammatory bowel disease and allergic diseases (NHMRC 2003). Breastfeeding has also been seen to play an important role in preventing obesity in children, attributed to physiological factors in human milk as well as feeding and parenting patterns associated with breastfeeding.

Australian recommendations for breastfeeding reflect the international recommendation of exclusive breastfeeding for six months, with introduction of complementary foods and continued breastfeeding from six months of age.

In 2001, it was reported that 87% of infants had ever been breastfed and at 6 months of age, 48% of infants were still being breastfed. These data also indicate that 32% of infants aged 6 months or less were fully breastfed (ABS 2003e). These proportions are similar to those reported in 1995.

Food security

The term 'food security' refers to the availability of healthy, affordable foods and the capacity of individuals and communities to access them. Food insecurity can affect nutritional status. In the 2001 NHS, 4.7% of the male respondents aged 19 years or over and 5.6% of the females indicated that there had been times in the previous 12 months when they had run out of food and could not afford to buy more (AIHW unpublished analysis of NHS data). These results were similar to those obtained in the 1995 National Nutrition Survey.

Food insecurity can be of particular concern for some population groups. Data from the 2001 NHS show that people with no post-school qualifications were significantly more likely to report running out of food and being unable to buy more (6.5%), compared to those with higher degrees (2.6%).

Older people of all backgrounds may be particularly vulnerable to food insecurity. This can result from problems with mobility or transport that lead to difficulty in accessing shops (Russell et al. 1998). People living in rural and remote areas of Australia are also

vulnerable as they typically pay more for healthy foods, and perishable items such as dairy foods, fruit and vegetables are frequently in short supply and of poorer quality (NHMRC 2003a). Many Aboriginal and Torres Strait Islander people live in these areas and poor nutrition contributes to their poor health (NHMRC 2000). Others at risk are the poor, people with a disability, the homeless, and those who suffer from substance abuse, alcoholism and some chronic diseases.

Overconsumption of food

While it is important to encourage the population to consume more fruit and vegetables and to address issues surrounding food insecurity, overconsumption of foods, particularly those high in energy and low in nutrients, is a serious problem for the Australian population. Overconsumption, or the consumption of more kilojoules than are required to meet energy needs, is contributing to Australia's increase in obesity, itself a significant risk factor for diseases such as cardiovascular disease and Type 2 diabetes (see the section on body weight later in this chapter).

Data from the National Dietary Survey of School Children and the National Nutrition Survey, respectively, indicate that average energy intake rose by nearly 15% and 12%, respectively, for boys and girls aged 10–15 years between 1985 and 1995. Data from the National Dietary Survey of Adults and the National Nutrition Survey, respectively, indicated that energy intake increased by around 350 kilojoules per day for adults aged 25–64 years living in state capital cities between 1983 and 1995 (Cook et al. 2001).

Saturated fat intake

A diet high in saturated fat increases the risk of coronary heart disease through its effect on raising the blood cholesterol level, notably its LDL component (see Box 3.5). In 1995, saturated fat accounted for around 13% of total energy intake by Australian adults, higher than the recommended maximum level of 10% (AIHW 2004a). The major sources of saturated fats in the adult diet are milk, cheese, butter, pastries, potato chips and meat (ABS & DHAC 1998).

As dairy products contribute significantly to saturated fat intake, the proportion of people who usually consume whole milk may be a useful indicator of saturated fat intakes. From the 2004–05 NHS, 52% of males and 39% of females usually consumed whole cow's milk (ABS 2006d).

Sexual practices

Sexual activity can be associated with health risks and is estimated (provisionally, at the time of writing) to have been the cause of 0.5% of the burden of disease in Australia in 2003 (see Table 3.1). Unprotected sexual intercourse can transmit infections such as chlamydia, gonorrhoea, HIV and syphilis. Sexual activity has also been associated with an increased risk for specific cancers such as cervical cancer and anal cancer.

The Australian Study of Health and Relationships used a CATI between May 2001 and June 2002, with a population-based sample of males and females aged 16–59. It indicated that 5.0% of the males and 5.7% of the females had had some homosexual experience in their lifetime, excluding non-genital sexual experience (Grulich et al. 2003b; Smith et al. 2003). Males and females who identified themselves as homosexual

reported an average of 79.1 and 7.8 same-sex sexual partners respectively over their lifetime, whereas males and females who identified themselves as heterosexual reported an average lifetime number of opposite sex sexual partners of 16.7 and 6.5, respectively (de Visser et al. 2003a; Grulich et al. 2003b).

Condom use by males and females for heterosexual encounters in the year before the study interview was associated with younger age, higher levels of education, living in major cities, lower incomes and having more than one sexual partner in the past year (Table 3.16). At their most recent heterosexual encounter, 24.7% of the males and 17.6% of the females reported condom use for vaginal intercourse. At their most recent homosexual encounter, 46.1% and 50.6% of males reported condom use for insertive and receptive anal intercourse, respectively. Although a higher proportion of males reported condom use at their most recent homosexual encounter, compared to corresponding reports by males and females about heterosexual encounters, the higher number of same-sex sexual partners indicates a higher risk of sexually transmissible infections among homosexually active males (Grulich et al. 2003a).

Table 3.16: Sociodemographic correlates of having used a condom for heterosexual activity in the past year, 2001–02 (per cent)

	Males	Females		Males	Females
Age			**Language at home**		
16–19	90.4	84.9	English	41.2	33.9
20–29	67.3	56.8	Other	62.2	40.0
30–39	46.4	37.8	**Education**		
40–49	28.5	18.8	Lower secondary	37.0	24.0
50–59	14.8	6.2	Secondary	44.1	39.7
Sexual identity			Post-secondary	44.6	39.6
Heterosexual	42.5	33.7	**Household income**		
Homosexual	55.4	15.6	Low (<$20,000)	54.1	44.1
Bisexual	35.9	67.5	Middle ($20,000–$52,000)	43.8	32.9
Region of residence			High (>$52,000)	39.1	32.0
Major city	46.5	36.9	**Occupational category**		
Regional	37.4	30.9	Blue collar	43.0	28.8
Remote	36.2	30.9	White collar	46.6	35.9
Excessive alcohol consumption			Manager/professional	37.8	32.5
No	57.3	46.3	**Partners in last year**		
Yes	49.3	43.5	1	36.1	30.0
Total	42.5	34.2	2 or more	78.4	80.5

Source: Australian Study of Health and Relationships (de Visser et al. 2003b).

Among homosexually active males in Sydney, the proportion who reported unprotected anal intercourse with casual partners gradually increased from 14.0% in 1996 to 25.7% in 2001, then declined to 22.4% in 2004; a similar trend was observed among homosexually active males in other capital cities in Australia (NCHECR 2005a). Trends in rectal isolates of gonorrhoea among males support the reports of unprotected anal

intercourse. The rate of these isolates among males in New South Wales increased to 4.1 per 100,000 population in 2002 and then declined to 3.0 per 100,000 population in 2004.

While the overall Australian rate of diagnosis of new cases of syphilis remained relatively stable in the period from 2000 to 2004, the rate almost doubled in New South Wales and increased ninefold in Victoria, and these increases were almost completely confined to homosexually active males (NCHECR 2005a).

In the period 2000 to 2004, chlamydia was the most frequently reported acute sexually transmissible infection in Australia. The population rate of diagnosis of chlamydia more than doubled, from 91.4 per 100,000 population in 2000 to 186.1 per 100,000 population in 2004 (NCHECR 2005a). Chlamydia was the only acute sexually transmissible infection under national surveillance for which the female-to-male ratio was above 1.0 in the years 2000 to 2004, indicating continuing unsafe heterosexual behaviour.

Vaccination

Vaccination is the administration of a vaccine to children and adults in order to stimulate the immune system and protect against a specific infectious disease. It has two main purposes. First, it is an effective way of providing individual protection against specific infectious diseases. Second, if enough people in a population are vaccinated, the spread of infection is limited and the disease can be controlled or, in some cases, eliminated. For example, smallpox has been eliminated worldwide, and poliomyelitis has been eradicated in most parts of the world including the Western Pacific region of the WHO. This has allowed routine smallpox vaccination to be discontinued. Vaccination against poliomyelitis must be continued because of the potential for reintroduction from areas where infection persists.

In the late 1800s, vaccines were developed against smallpox, plague and typhoid, and were used extensively throughout Australia. Over time, new vaccines have been developed for many infectious diseases and large-scale vaccination programs have been implemented for both children and adults.

Information on childhood vaccination is presented in Chapter 5.

Influenza and pneumococcal vaccination for adults

Vaccination against influenza and pneumococcal infection (which causes pneumonia) is available in Australia and is free to those aged 65 years or over, for Indigenous Australians aged 50 years or over, and for Indigenous Australians aged 15–49 years in high-risk groups.

The most recent national telephone survey estimated that 79.1% of Australians aged 65 years or over were vaccinated against influenza in 2004 (AIHW 2005e), a marked increase from 61% in 1998. When the vaccination status of aged care residents was taken into account, the estimated coverage for 2004 lifted slightly to 79.5%.

For pneumococcal disease, the estimated vaccination coverage of Australians aged 65 years or over in 2004 was 51.1%. More of this target group may have been vaccinated, but the currency of their vaccination could not be fully determined from the survey.

Other health behaviours

A wide range of other behaviours influence the health of Australians. These include use of sun protection measures; use of seat belts and helmets; avoidance of mosquito bites, tattooing and body piercing; and hygiene measures such as hand washing. Information that is both recent and national is not available for many of these behaviours. However, some information is available for some of them.

The 2001 NHS (ABS 2002b) showed that sun protection measures had not been used for 6.4% of children aged 0–6 years in the month before interview and, across all ages under 18, the figure was 8.6%. In 2002, the most common sun protection measures reported by female secondary school students in New South Wales were wearing sunscreen (46.3%), wearing a hat (29.5%), and staying mainly in the shade (29.4%). For male students, the most commonly reported measures were wearing a hat (51.8%), wearing sunscreen (35.0%) and staying mainly in the shade (26.8%). Rates of wearing hats and use of maximum protection sunscreen had fallen compared with 1993, but rates of mainly staying in the shade had risen (Population Health Division 2004).

The 2003 New South Wales adult health survey asked respondents about food handling practices in the home. Overall, 60.8% of people aged 16 years or over (64.4% for females, 56.3% for males) reported that they washed their hands with soap after preparing raw meat. Others wiped or rinsed their hands without using soap, or continued cooking without cleaning their hands (Centre for Epidemiology and Research 2004).

3.6 Biomedical factors

As noted in the introduction to this chapter, biomedical risk factors are determinants expressed as a body measurement. Three important risk factors are overweight, high blood pressure and high blood cholesterol. These factors are often highly interrelated. Excess body weight, high blood pressure and high blood cholesterol can all contribute to the risk of heart disease and amplify each other's effects if they occur together. In addition, obesity can in itself lead to high blood pressure and high blood cholesterol.

Blood pressure

High blood pressure (often referred to as hypertension; see Box 3.4) is a major risk factor for coronary heart disease, stroke, heart failure and kidney failure. The risk of disease increases as the level of blood pressure increases. When high blood pressure is controlled, the risk of cardiovascular disease and overall mortality is reduced, but not necessarily to the levels of unaffected people (WHO–ISH 1999).

Major causes of high blood pressure include diet (particularly a high salt intake), obesity, excessive alcohol consumption and insufficient physical activity. Whether sustained psychological stress has an effect on a person's average blood pressure level is subject to further research, but stress is likely to have indirect effects by influencing harmful health behaviours associated with high blood pressure (WHO 2002). Attention to health determinants such as body weight, physical activity and nutrition play an important role in maintaining healthy blood pressure.