



Introduction

Risk factors are characteristics that are associated with an increased risk of developing a particular disease or condition. These can be demographic, behavioural, biomedical, genetic, environmental, social or other factors, which can act independently or in combination (Table 3.1). Increasing life expectancy, the reduction in communicable diseases, and the high prevalence of risk factors mean that chronic diseases are prominent in Australia.

Table 3.1: Risk factors and determinants for chronic diseases

Modifiable risk factors		Broad influences (may or may not be modifiable)	Non-modifiable factors
<i>Behavioural</i>	<i>Biomedical</i>		
Tobacco smoking	Excess weight	Socio-environmental factors	Age
Excess alcohol use	High blood pressure	Psychosocial factors	Gender
Physical inactivity	High blood cholesterol	Early life factors	Indigenous status
Poor diet	Other	Political factors	Ethnic background
Other			Family history
			Genetic makeup

The National Public Health Partnership's strategic framework for preventing chronic disease (NPHP 2001) places a strong emphasis on health promotion, acknowledging that the prevention and management of risk factors is a key aspect of preventing chronic disease. The framework takes a life course perspective on prevention, which highlights the importance of healthy behaviour and management of risk factors for primary prevention of chronic diseases, as well as throughout the course of established diseases.

The chronic diseases highlighted in this report are considered to be preventable, since many of the factors which influence them can be avoided or modified. For example, tobacco smoking is the single most important factor in the development of chronic obstructive pulmonary disease, and therefore controlling tobacco use is a major preventive strategy for reducing the burden of this disease (AIHW 2005c). Since most of the modifiable risk factors are associated with several different diseases (Table 3.2), prevention and management of these factors can have substantial benefits.

The various risk factors and determinants listed in Table 3.1 have different roles in the prevention of chronic diseases. Behavioural and biomedical risk factors are often able to be modified at the individual level by changes in behaviour or through medical intervention. For the broader influences on health, interventions at a community or population level may be required to produce change, such as strategies to promote immunisation of young children, or town planning policies incorporating more open spaces for recreational activity. Non-modifiable factors — that is, a person's individual characteristics such as their age or ethnicity — can help in identifying groups at risk. These characteristics are important factors to consider when developing prevention and management strategies, not only to highlight the differing risk factor profiles in different population groups, but also to ensure the strategies developed are culturally and linguistically appropriate.



Table 3.2: Relationships between selected chronic diseases/conditions and modifiable risk factors

Chronic disease/ condition	Behavioural risk factors				Biomedical risk factors		
	Poor diet	Physical inactivity	Tobacco smoking	Excess alcohol use	Excess weight	High blood pressure	High blood cholesterol
Coronary heart disease	✓	✓	✓	✓	✓	✓	✓
Cerebrovascular disease	✓	✓	✓	✓	✓	✓	✓
Lung cancer			✓				
Colorectal cancer	✓	✓		✓	✓		
Depression				✓	✓		
Diabetes	✓	✓			✓		
Asthma			✓		✓		
COPD ^(a)			✓				
Chronic kidney disease	✓		✓		✓	✓	
Oral diseases	✓		✓	✓			
Osteoarthritis		✓			✓		
Osteoporosis	✓	✓	✓	✓			

(a) Chronic obstructive pulmonary disease

Source: AIHW 2002a.

Trends in the prevalence of the main behavioural and biomedical risk factors for chronic diseases are not always consistent with the trends in these diseases most affected by them. Risk factors may be present for many years before a disease manifests, leading to lags between changes in risk factor prevalence and resulting changes in disease incidence or prevalence. Therefore it is necessary to continue identifying and monitoring the variety of risk factors affecting chronic diseases.

This chapter provides information on risk factors at different stages of life. The first section covers a selection of early life factors that can create a predisposition to chronic disease in later life. The second and third sections then deal in turn with prevalence and trends in risk factors among children and adolescents, and among adults. The focus in these sections is on behavioural and biomedical risk factors: smoking, physical inactivity, excessive alcohol use, poor diet (indicated by inadequate fruit and vegetable consumption), excess weight (also referred to as 'overweight and obesity'), high blood pressure and high cholesterol. The chapter concludes with some additional information on multiple risk factors in adults.

Early life factors

Risk factors encountered very early in life, including during gestation, may lead to increased risk of chronic diseases in later life. Although the person affected has little or no control over his or her exposure to these risks, action by parents, carers and the community can limit the exposure of infants and children to factors that could have a negative impact on their future health status, and promote practices that have a positive impact on health. This section describes the risk factors of low birthweight and breastfeeding.

Low birthweight

A baby born with a low birthweight has an increased risk of developing chronic diseases such as coronary heart disease, cerebrovascular disease, high blood pressure, Type 2 diabetes, kidney damage and obstructive lung disease (United Nations Sub-Committee on Nutrition 2000). A birthweight less than 2,500 grams is considered low. A very low birthweight is less than 1,500 grams, whereas an extremely low birthweight is less than 1,000 grams.

In 2002, the average birthweight in Australia was 3,371 grams (Laws & Sullivan 2004). Boys (3,431 grams) were, on average, heavier than girls (3,308 grams). Birthweights of under 2,500 grams represented 6.4% of live births. The vast majority of live births in 2002 (91.8%) were between 2,500 and 4,499 grams.

Low birthweight is associated with a number of factors, including the size and age of the mother and the number of previous births (Laws & Sullivan 2004). However, according to the United Nations Sub-Committee on Nutrition (2000), low birthweight in industrialised countries is mostly associated with prematurity, or preterm birth (birth before 37 weeks of gestation), which is commonly attributed to tobacco smoking during pregnancy (United States Department of Health and Human Services 2004). About 8% of births in Australia in 2002 were preterm (Laws & Sullivan 2004).

Intrauterine growth retardation can also be associated with low birthweight. It is largely attributed to pre-eclampsia (a complication of pregnancy characterised by high blood pressure and protein in the urine) and tobacco smoking during pregnancy, as well as alcohol intake during pregnancy (United Nations Sub-Committee on Nutrition 2000). There were 6,713 hospital separations for pre-eclampsia in 2002–03, with an average age at separation of 28.8 years.

In addition to preterm births and intrauterine growth retardation, smoking during pregnancy can lead to various complications, including placental problems, spontaneous abortion and stillbirth (United States Department of Health and Human Services 2004).

Based on data from five states and territories, 17.3% of mothers who gave birth in 2003 reported to have smoked tobacco during pregnancy (Laws & Sullivan 2004). Mothers who smoked during pregnancy tended to be younger than those who did not, with 42.1% of teenage mothers smoking during pregnancy compared with 10.9% of mothers aged 35 years and over.

According to the 2004 National Drug Strategy Household Survey, 20% of women reported smoking tobacco and 47% reported consuming alcohol while pregnant and/or breastfeeding in the previous 12 months (AIHW 2005d). In contrast, 22% of all women aged 14–49 years reported that they smoked in the last 12 months, and 85% reported that they consumed alcohol.



Breastfeeding

Besides the psychological benefits derived from mother–infant bonding, breastfeeding contributes to the health and development of the infant, and may also influence adult health. Antibodies in breast milk protect the infant from bacterial and viral infections (NHMRC 2003). Breastfeeding lowers the risk of sudden infant death syndrome and may also lower the risk of some cancers, such as childhood leukaemia (NHMRC 2003; United States Breastfeeding Committee 2002).

Recent research has found that exclusive breastfeeding (infant consumes breast milk only) for 4–6 months protects the infant against the early development of wheezing (a symptom of asthma) and atopic dermatitis (often referred to as eczema). However, the evidence for long-term protective effects is not clear (Arshad 2005; Friedman & Zeiger 2005).

National data on exclusive breastfeeding are not available (AIHW 2005a). The National Health Survey, however, provides data on the proportion of infants ‘fully’ breastfed (receive only breast milk on a regular basis). Self-reported information from the 2001 National Health Survey revealed that:

- 83% of infants aged 0–3 years were breastfed when first taken home from hospital
- 48% of infants were receiving some breast milk by 6 months of age, but no infants at 6 months old were being fully breastfed
- 87% of infants had received some breast milk by 3 years of age
- 54% of infants aged 3 months or less were fully breastfed
- 32% of infants aged 6 months or less were fully breastfed
- problems in producing adequate milk was the most common reason for stopping breastfeeding (ABS 2003).

Risk factors in children and adolescents

Children’s health needs differ from those of adults, and therefore definitions of some risk factors in children and adolescents are different from those in adults. Although the risks associated with tobacco smoking and excessive alcohol consumption are similar in people of any age and can be measured in a similar fashion, this is not the case for other risk factors. As children grow and develop, their requirements for food and activity and their ‘healthy’ weight range change. For this reason, recommendations relating to health risk factors may be different for children and adolescents at different ages.

Data on risk factor trends in children are sparse. Although the regular national and jurisdictional health surveys gather data on risk factors in adults and health conditions at all ages, surveys that collect information about children’s health-related behaviours are irregular and often do not produce comparable data. This makes it difficult to monitor changes in the risk factor profile of Australia’s children and adolescents.

Australian recommendations and relevant data on risk factors in children and adolescents are outlined below along with available data on trends for smoking, risky alcohol consumption, fruit and vegetable consumption and body weight.

Childhood infections

In general, vaccine-preventable diseases in childhood, such as tetanus and meningococcal disease, are of an acute nature. However, some vaccine-preventable diseases can cause long-term consequences for the developing child. Diphtheria, for example, can damage the heart and kidneys. A number of chronic diseases may also arise from infections that are either not vaccine-preventable or for which population ('herd') immunity is poor. For example, kidney and heart damage can result from group A streptococcal infections (Cunningham 2000).

Programs exist in Australia for widespread immunisation against a large number of communicable diseases: whooping cough (pertussis), tetanus, diphtheria, polio, measles, mumps, rubella, *Haemophilus influenzae* type b (Hib), meningococcal C, invasive pneumococcal disease (IPD), hepatitis B and chicken pox (varicella). According to the National Immunisation Program, children born after 1 January 2005 should be immunised against these 12 diseases by 4 years of age.

The Australian Childhood Immunisation Register provides estimates of the coverage of vaccination of children under 7 years of age (Health Insurance Commission 2005). As at 31 December 2005, 90.2% of children aged 12 months to under 15 months, 92.1% of children aged 24 months to under 27 months, and 83.8% of children aged 72 months to under 75 months were fully immunised. According to Lister et al. (1999:156), vaccination coverage of at least 90% is required to 'achieve and maintain the levels of herd immunity needed to interrupt transmission of vaccine preventable diseases in Australia'.

For several of the vaccine-preventable diseases, there has been a dramatic reduction in the number of notified cases since the introduction of immunisation strategies in the 1990s (Table 3.3). Other diseases, such as diphtheria and poliomyelitis, have become rare in Australian children.

Table 3.3: Notifications of vaccine-preventable diseases, children 0–14 years, 1999 to 2004

Disease	1999 and 2000	2001 and 2002	2003 and 2004
Pertussis	3,936	5,913	3,956
Meningococcal disease	572	610	419
Measles	168	51	38
Mumps	145	58	30
Hib	40	33	25
Hepatitis B (acute)	11	15	16
Rubella	201	47	10
Tetanus	1	0	0
Diphtheria	0	0	0
Poliomyelitis	0	0	0

Note: Invasive pneumococcal disease was not notifiable before 2001, and chicken pox is not notifiable.

Source: Communicable Diseases Australia, National Notifiable Diseases Surveillance System.



Environmental tobacco smoke

Environmental tobacco smoke (ETS) is a combination of exhaled smoke and smoke from the burning end of a cigarette. It contains basically the same carcinogens and toxic agents that are inhaled directly by smokers. Although ETS can lead to serious health consequences for both adults and children, children are particularly susceptible. About 8% of childhood asthma has been attributed to ETS (NHMRC 1997). Exposure to ETS, 'or passive smoking', can also exacerbate existing asthma in children and increase the chance of developing other chronic respiratory diseases and impaired lung function (United States Environmental Protection Agency 1999). Some research suggests that people who have never smoked but who live with smokers are also more likely to develop lung cancer or coronary heart disease than if they lived with non-smokers (NHMRC 1997).

There has been a marked decline over the last decade in the proportion of children exposed to environmental tobacco smoke. This is reflected in the overall decline in tobacco smoking in the Australian population as well as a sharp decline in the proportion of households with dependent children in which someone smokes indoors (Table 3.4).

Table 3.4: Smoking status of households with dependent children, 1995 to 2004

Household smoking status	1995	1998	2001	2004
	(per cent)			
Smokes inside the home	31.3	22.6	19.7	12.3
Only smokes outside the home	16.7	21.5	24.9	28.1
No one at home regularly smokes	52.0	55.9	55.4	59.6

Notes

1. Household smoking status as reported by respondents aged 14 years and over.

2. Households contain dependent children aged 14 years or under.

Sources: National Drug Strategy Household Surveys 1995, 1998, 2001, 2004.

Smoking and alcohol

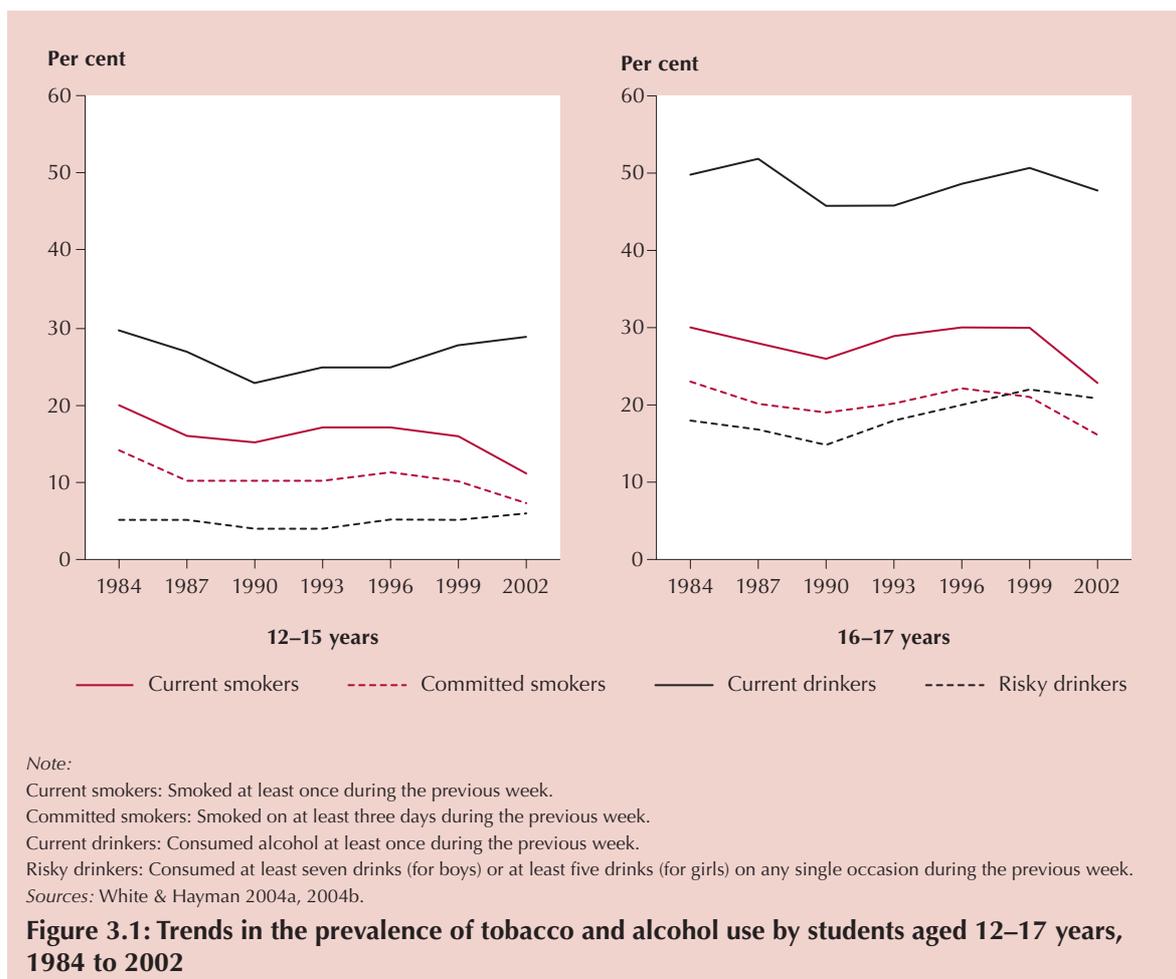
Data from the 2002 Australian Secondary Schools' Alcohol and Drug survey (ASSAD) show that around 14% of participants aged 12–17 years were 'current smokers' — that is, they reported smoking tobacco at least once during the previous week (White & Hayman 2004a). Around two-thirds of these young people (9%) were 'committed smokers' — that is, they smoked on at least three of the seven days before the survey. The proportion who were committed smokers increased with age, from 3% of 12-year-olds to 17% of 17-year-olds, and was higher in girls than boys at all ages.

Results from the ASSAD surveys also show that the proportion of those aged 12–17 years who were current or committed smokers declined between 1984 and 2002. Among those aged 12–15 years, the proportions of current and committed smokers halved, and reductions of around 20–30% were seen among those aged 16–17 years (Figure 3.1).

The ASSAD surveys also collect data on alcohol consumption among students aged 12–17 years. In 2002, 34% of students reported that they had consumed alcohol in the previous week, with a greater proportion among boys (37%) than girls (31%) (White & Hayman 2004b).

A particular concern relating to alcohol use in young people is 'binge drinking' — that is, drinking heavily over a short period of time, or drinking continuously over a number of days or weeks. This is associated with harm in the short term, such as injury, interpersonal violence, accidental death, self-harm and anti-social behaviour (NHMRC 2001). The Australian Alcohol Guidelines define short-term risky alcohol use in adults as consuming seven or more standard drinks (for males) or five or more drinks (for females) on any one day (NHMRC 2001). Of students participating in the 2002 ASSAD, 10% survey reported consuming alcohol at these levels at least once during the previous week, with this proportion increasing from 2% among 12-year-olds to 22% among 17-year-olds (White & Hayman 2004b).

The proportion of students aged 12–17 years who reported consuming alcohol during the week before the survey, and the proportion who drank at levels that could lead to short-term harm, were similar in ASSAD surveys of 2002 and 1984 (Figure 3.1) Levels of both current and risky drinking fell between 1984 and 1990 but then increased again up to 2002 (White & Hayman 2004b).



Physical inactivity

National physical activity recommendations for Australian children and adolescents recommend at least 1 hour of moderate to vigorous physical activity each day, with no more than 2 hours each day using electronic media (for example, TV/video, computer games, internet) for entertainment, particularly during daylight hours (DoHA 2004a, 2004b).

Although there are no recent national data on the physical activity patterns of Australian children and adolescents, a recent survey conducted in New South Wales found that three-quarters of children and adolescents reported meeting the physical activity recommendations. Boys reported more activity than girls, but for both sexes participation decreased with age (Booth et al. 2006).

The 2003 Western Australian Child and Adolescent Physical Activity and Nutrition Survey (CAPANS) found that less than one in seven primary school children (aged 7–12 years) reported no participation in sport, exercise or dance activities (Hands et al. 2004). Among secondary school students (aged 13–16 years), one in four males and one in three females reported undertaking no physical activity outside of school. Two-thirds of secondary students and over half of all primary students reported watching television for more than 2 hours each week day. In addition, boys reported an average of 15–17 hours each week using a computer or video game machine in their leisure time, with girls reporting an average of 11–15 hours per week (Hands et al. 2004). This suggests that a large proportion of children and adolescents may spend more than the recommended 2 hours each day using electronic media for entertainment.

Fruit and vegetable consumption

The *Australian guide to healthy eating* (DHFS 1998) recommends that adolescents aged 12–18 years eat a minimum of 300 grams of fruit and 300 grams of vegetables (including legumes and potatoes) each day, with a daily minimum of 300 grams of fruit and 225 grams of vegetables recommended for children aged 8–11 years. The size of an average apple or a small salad is 100g. Younger children should eat 150 grams of fruit and 150 grams of vegetables each day (DHFS 1998).

The 1995 National Nutrition Survey provides the most recent national data on fruit and vegetable consumption in children and adolescents. This survey showed that average consumption of fruit and vegetables among people aged 2–18 years was well below recommended levels in most age groups (Table 3.5). Notably, consumption of vegetables and legumes in those aged 12–18 years was much higher among boys than girls.

More recently, information from CAPANS in Western Australia revealed that almost half of participants aged 8–15 years usually ate less than the recommended amount of fruit, and two-thirds of those aged 8–11 years and almost all aged 12–15 years usually ate less than the recommended amount of vegetables (Hands et al. 2004).

Comparable data on fruit and vegetable consumption are available for children and adolescents aged 10–15 years from the 1985 National Dietary Survey of Schoolchildren and the 1995 National Nutrition Survey. Cook et al. (2001) report that the proportion

of boys and girls consuming fruit products and dishes decreased over the period, but the average amount consumed per day increased slightly. The proportion of boys consuming vegetable products and dishes decreased between 1985 and 1995; the proportion of girls consuming these foods was constant. The average amount of vegetables consumed per day by those aged 10–15 years showed a slight but non-significant increase over the period (Cook et al. 2001).

Table 3.5: Average daily intake of fruit, vegetables and legumes in children and adolescents, by age group, 1995

Age group	Fruit products and dishes		Vegetable products and dishes		Legumes and pulse products and dishes	
	Boys	Girls	Boys	Girls	Boys	Girls
	(grams per person)					
2–3 years	153.8	137.0	92.6	88.8	7.1	6.7
4–7 years	146.1	141.3	102.2	114.2	8.9	5.6
8–11 years	131.4	115.5	157.5	156.7	5.3	2.8
12–15 years	122.0	130.6	219.9	185.7	13.6	6.7
16–18 years	97.1	118.0	282.6	192.8	16.2	9.0

Source: ABS 1999.

Body weight

As children develop, their body size and shape can change rapidly, meaning that a single BMI value indicating excess weight (as used in adults) is not appropriate for girls and boys at different ages. The International Obesity Task Force (IOTF) has developed specific BMI cut-off points that are appropriate for use in people aged 2–17 years (Cole et al. 2000).

There is a lack of recent national data regarding overweight and obesity among children and adolescents. The most recent national data come from the 1995 National Nutrition Survey, in which the height and weight of all participants over the age of 2 years were measured. Using the cut-off points developed by the IOTF, 15–24% of boys and 15–23% of girls were found to have excess weight (Figure 3.2). Depending on age, 2–6% of boys and 3–7% of girls were found to be obese.

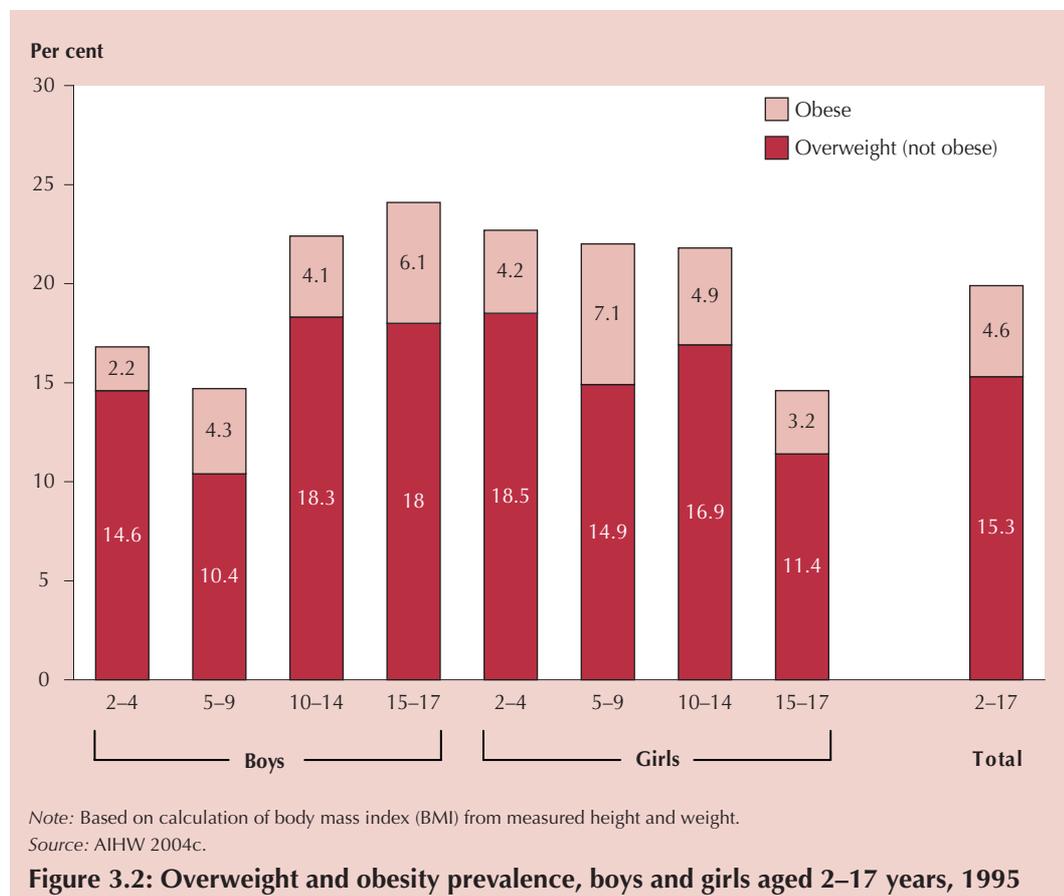
More recently, the NSW Schools Physical Activity and Nutrition Survey found that the measured prevalence of overweight and obesity combined among young people in New South Wales (in Kindergarten to Year 10) has risen from 20% in 1997 to 25% in 2004. Overall the prevalence of obesity among boys was 7.7% and among girls was 6.1% (Booth et al. 2006).

Similarly, CAPANS in Western Australia found that the prevalence of overweight and obesity in students aged 7–15 years increased from 9.3% of males and 10.6% of females in 1985 to 21.7% of males and 27.8% of females in 2003 (Hands et al. 2004).

As in adults, rates of overweight and obesity in children and adolescents have increased substantially in recent years. Comparison of data from the 1985 Australian Health and Fitness Survey and the 1995 National Nutrition Survey shows increases in the prevalence



of obesity, from 1.4% to 4.5% among boys aged 7–15 years and from 1.2% to 5.3% among girls aged 7–15 years (Magarey et al. 2001). The proportion of children of this age who were overweight but not obese also rose, from 9.3% to 15.3% among boys and from 10.6% to 16% among girls



Risk factors in adults

Information on the prevalence of risk factors in adults is available from a variety of sources. This section presents data from the National Health Survey series and state computer-assisted telephone interviewing (CATI) surveys, using the definitions presented in Table 3.6. These surveys are conducted regularly and collect self-reported data on health risk factors, health conditions, use of medications and health service use. More information on these data sources can be found in Appendix 2.

Results from the 2004–05 National Health Survey (NHS) indicate that the most common risk factors were those relating to diet and weight, with 86% of adults having inadequate vegetable consumption, almost half (46%) having inadequate fruit consumption, and more than half being overweight or obese (54%) (Table 3.7). The other behavioural risk factors were also common — nearly 5.1 million people (34% of people aged 18 years and over) were found to be undertaking very low levels of physical activity, and approximately 3.2 million people were daily smokers. Overall, nearly 97% of adults had at least one of the risk factors reported.

Comparing the 2004–05 NHS with the previous two surveys conducted in 2001 and 1995 shows that although some behavioural risk factors have remained relatively stable in those aged 18 years and over, others have increased over time. The proportion of people who were current smokers increased slightly between 1995 and 2001, and then decreased slightly in 2004–05 back to those levels observed in 1995 (23%). The proportion of people who were physically inactive decreased from 35% in 1995 to 32% in 2001 and then increased to 34% in 2004–05. There has been a steady increase in the proportion of risky alcohol consumption and obesity over the period 1995 to 2004–05. Risky alcohol consumption has increased significantly, with 8% of people drinking at risky levels in 1995 compared with 13% in 2004–05. The proportion of people aged 18 years and over who carry excess weight (based on their self-reported height and weight) has increased from 35% in 1995 to 54% in 2004–05. The proportion of adults falling within the obese category has also increased over this period from 11% to 16%.

Table 3.6: Risk factor definitions for adults (for self-reported data)

Risk factor	Definition
Smoking	Current daily smoking of tobacco products
Risky alcohol consumption ^(a)	Average daily consumption of more than four standard drinks for men and more than two standard drinks for women
Physical inactivity	Very low levels of leisure-time exercise (less than 100 minutes over the past 2 weeks)
Poor diet	Inadequate fruit consumption: usual daily intake of one serve or less Inadequate vegetable consumption: usual daily intake of four serves or less
Excess weight	Body mass index ^(b) (BMI) of 25.0 kg/m ² or more, calculated from self-reported height and weight (Note: 'obese' refers to people with a BMI of 30.0 or more)
High blood pressure	People who have been told by a doctor or nurse that they have high blood pressure, and who currently have this condition or whose current normal blood pressure is a result of medication
High blood cholesterol	People who have been told by a doctor or nurse that they have high cholesterol, and who currently have this condition

(a) See Appendix 3 for a complete set of the Australian Alcohol Guidelines.

(b) BMI is calculated as a person's weight (in kilograms) divided by the square of their height (in metres).

Table 3.7: Prevalence of risk factors, Australians aged 18 years and over, 2004–05

Risk factor	Number			Per cent		
	Males	Females	Persons	Males	Females	Persons
Smoking	1,782,500	1,397,600	3,180,100	24.2	18.4	21.3
Risky alcohol consumption	1,134,600	886,200	2,020,900	15.4	11.7	13.5
Physical inactivity	2,461,000	2,633,500	5,094,500	33.4	34.6	34.0
Inadequate fruit consumption	3,855,000	3,034,800	6,889,800	52.4	39.9	46.0
Inadequate vegetable consumption	6,448,400	6,365,300	12,813,600	87.6	83.7	85.6
Excess weight	4,555,400	3,418,100	8,009,700	61.9	45.0	53.5
High blood pressure	993,300	1,097,200	2,090,500	13.5	14.4	14.0
High blood cholesterol	684,000	649,100	1,333,100	9.3	8.5	8.9
<i>At least one of the above</i>	<i>7,190,100</i>	<i>7,260,600</i>	<i>14,450,700</i>	<i>97.7</i>	<i>95.5</i>	<i>96.6</i>
Total population 18 years and over	7,359,400	7,603,700	14,963,100	100.0	100.0	100.0

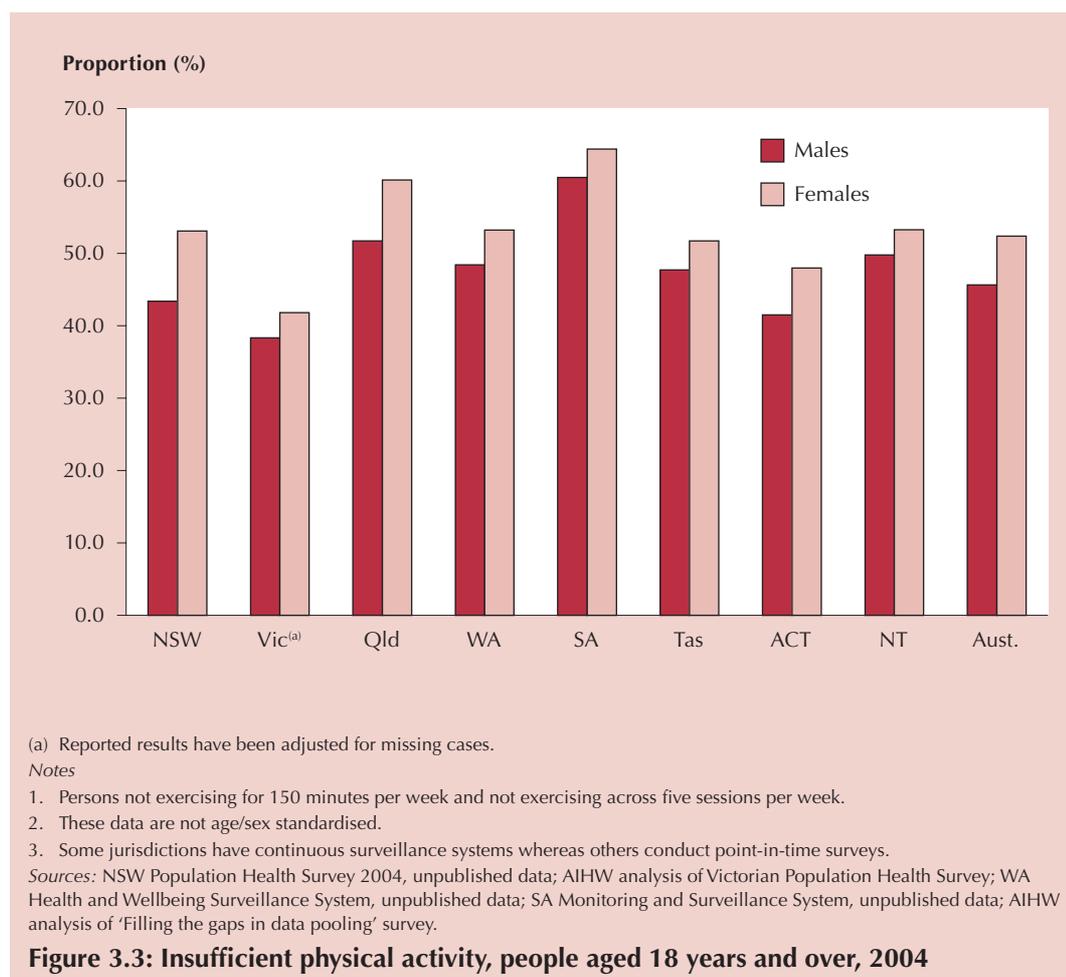
Note: Estimates are based on self-reported data.

Source: AIHW analysis of 2004–05 National Health Survey.



State CATI surveys are another source of data available on the prevalence of risk factors in Australia. Small differences in these results compared with the NHS may be due to differences in methods of data collection; for example, the CATI surveys are conducted by telephone, whereas the NHS is conducted using face-to-face interviews.

Estimates from the 2004 state and territory CATI surveys — which use a different measure of physical activity — suggest that around 50% of adults are not undertaking sufficient physical activity (Figure 3.3). Females consistently reported higher levels of inactivity.



Self-reported height and weight are also collected as part of state and territory CATI surveys, with results relatively consistent with those obtained from the NHS (Table 3.8).

Results from the state and territory CATI surveys also confirm the high proportion of the population who do not consume adequate amounts of fruit and vegetables, with estimates indicating that 91% of the adult population consume inadequate amounts of vegetables and 51% consume inadequate amounts of fruit (Table 3.9).

Table 3.8: Self-reported prevalence of overweight and obesity, people aged 18 years and over, 2004–05

Measure	NSW	Vic ^(a)	Qld	WA	SA	Tas	ACT	NT	Aust ^(b)
	(per cent)								
From 2004 state surveys	Males								
Overweight but not obese ^(c)	41.0	42.9	40.5	46.0	44.1	43.0	39.5	42.6	42.1
Obese ^(d)	16.3	14.7	20.0	14.1	18.5	15.1	14.8	18.3	16.5
Overweight or obese	57.3	57.6	60.5	60.1	62.6	58.1	54.2	60.9	58.6
	Females								
Overweight but not obese	26.0	25.3	26.5	27.2	28.9	25.8	26.2	24.0	26.3
Obese	15.4	16.0	16.5	17.0	19.4	17.5	15.9	15.9	16.3
Overweight or obese	41.4	41.3	43.1	44.2	48.3	43.3	42.1	39.9	42.5
	Persons								
Overweight but not obese	33.7	34.1	33.6	36.3	36.4	34.2	32.9	34.3	34.2
Obese	15.8	15.3	18.3	15.5	18.9	16.3	15.3	17.2	16.4
Overweight or obese	49.5	49.4	51.8	51.8	55.3	50.6	48.2	51.5	50.6
	From 2004–05 NHS^(a)								
	Persons								
Overweight but not obese	35.8	36.3	34.2	35.4	35.8	36.2	34.6	n.a.	35.5
Obese	18.0	17.0	18.7	17.3	19.6	19.5	18.2	n.a.	18.0
Overweight or obese	53.8	53.3	52.9	52.8	55.4	55.7	52.8	n.a.	53.6

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

(b) Derived from a weighted average of the state and territory estimates; for NHS result, as reported (incorporates the Northern Territory result) and adjusted for missing cases.

(c) Body mass index greater than or equal to 25.0 and less than 30.0.

(d) Body mass index greater than or equal to 30.0.

Notes

1. These data are not age/sex-standardised.

2. Some jurisdictions have continuous surveillance systems whereas others conduct point-in-time surveys.

Sources: AIHW analysis of 2004–05 National Health Survey; NSW Population Health Survey 2004, unpublished data; AIHW analysis of Victorian Population Health Survey; 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.

Table 3.9: Inadequate consumption of vegetables/fruit, people aged 18 years and over, 2004–05

Measure	NSW	Vic ^(a)	Qld	WA	SA	Tas	ACT	NT	Aust ^(b)
	(per cent)								
From 2004 state 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 cases.

(b) Derived from a weighted average of the state and territory estimates; for NHS result, as reported (incorporates the Northern Territory result) and adjusted for missing cases.

(c) Consumption of less than 5 serves of vegetables.

(d) Consumption of less than 2 serves of fruit.

Notes

1. These data are not age/sex standardised.

2. Some jurisdictions have continuous surveillance systems while others conduct point in time surveys.

Sources: AIHW analysis of 2004–05 National Health Survey; NSW Population Health Survey 2004, unpublished data; AIHW analysis of Victorian Population Health Survey; 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.



Variations by age and sex

Most risk factors are not evenly distributed throughout the population, with substantial variation existing across the ages. Some, such as high blood pressure, high cholesterol and overweight/obesity, are more likely to be reported by older people, whereas others, such as smoking and inadequate fruit and vegetable consumption, are more common in younger people (Table 3.10). In most cases risk factor prevalence is higher among males than females; however, high blood pressure is more common in females in the older age groups.

Table 3.10: Prevalence of risk factors by age and sex, people aged 18 years and over, 2004–05

Risk factor		Age group					All ages 18+
		18–24	25–44	45–64	65–84	85+	
		(per cent)					
Smoking	Males	30.3	29.6	22.5	9.4	2.0	24.2
	Females	23.4	23.3	17.3	5.7	7.2	18.4
	Persons	26.9	26.4	19.9	7.4	5.0	21.3
Risky alcohol consumption	Males	15.4	15.8	18.0	9.3	2.7	15.4
	Females	12.5	12.0	13.2	7.7	5.4	11.7
	Persons	14.0	13.9	15.6	8.4	4.3	13.5
Physical inactivity	Males	24.9	30.4	37.4	38.4	58.1	33.4
	Females	32.3	30.8	32.3	46.7	75.5	34.6
	Persons	28.6	30.6	34.8	42.9	68.0	34.0
Inadequate fruit consumption	Males	61.4	59.0	47.3	39.2	34.4	52.4
	Females	49.9	45.2	34.7	30.6	35.4	39.9
	Persons	55.7	52.0	40.9	34.6	35.0	46.0
Inadequate vegetable consumption	Males	92.1	90.3	85.3	81.4	88.2	87.6
	Females	90.8	86.0	79.2	81.6	87.8	83.7
	Persons	91.4	88.1	82.2	81.5	88.0	85.6
Excess weight	Males	36.0	64.8	70.9	57.9	38.1	61.9
	Females	27.7	40.9	53.9	51.3	33.2	45.0
	Persons	31.9	53.0	62.6	54.5	35.5	53.5
High blood pressure	Males	0.5	3.9	19.4	36.6	35.6	13.5
	Females	0.6	2.8	18.8	42.2	37.0	14.4
	Persons	0.6	3.3	19.1	39.6	36.4	14.0
High blood cholesterol	Males	0.6	3.1	13.4	24.6	14.2	9.3
	Females	0.3	1.9	12.2	23.3	11.4	8.5
	Persons	0.5	2.5	12.8	23.9	12.6	8.9

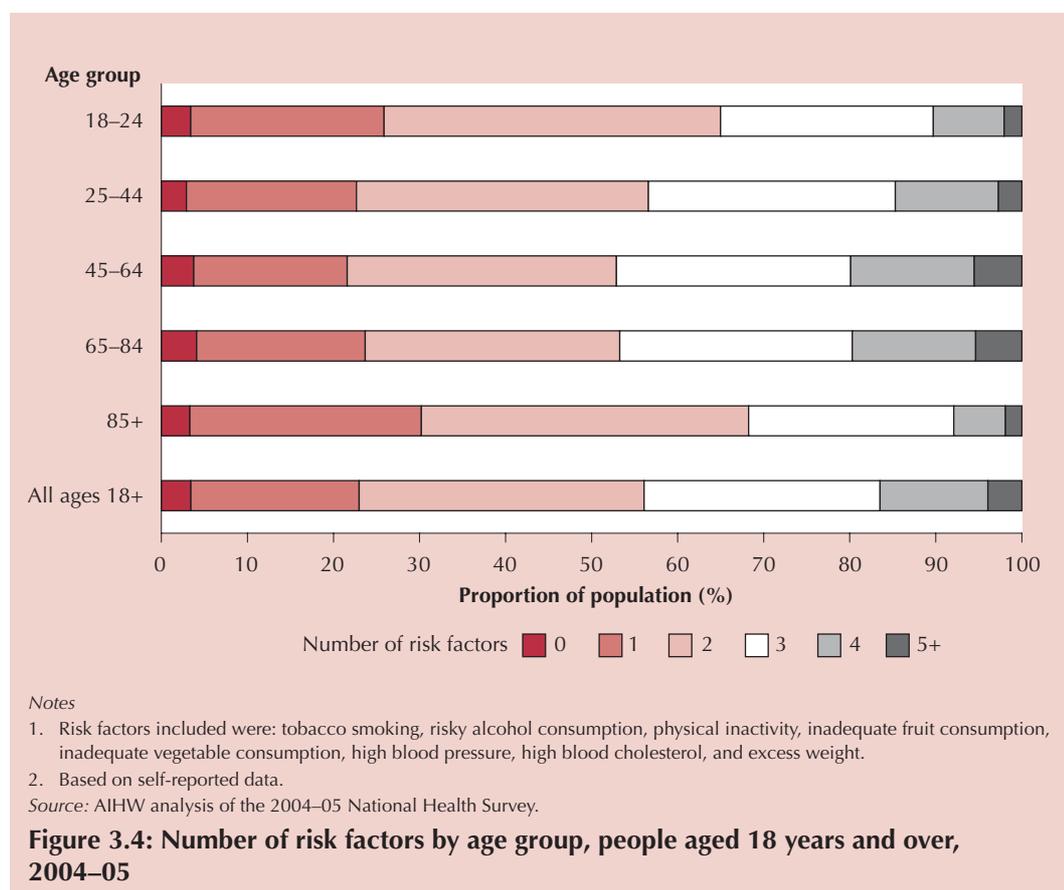
Note: Estimates are based on self-reported data.

Source: AIHW analysis of the 2004–05 National Health Survey.

Multiple risk factors

Generally, as the number of risk factors a person has for a particular condition increases, so does his or her risk of developing that condition. Monitoring multiple risk factors can help establish people at greater risk and thereby indicate those who might benefit most from early intervention. Some Australian guidelines and consensus statements relating to chronic disease detection refer to combinations of risk factors as ways of identifying high-risk groups for screening purposes (ANZSN & KHA 2004; Diabetes Australia Guideline Development Consortium 2001).

Results of the 2004–05 NHS show that 44% of Australians aged 18 years and over (6.6 million people) have at least three of the eight modifiable risk factors described above (Figure 3.4). The proportion of people with no risk factors was fairly consistent across the age groups, whereas the proportion with five or more risk factors was highest in the 45–64 and 65–84 years age groups.



Metabolic syndrome

Sets of risk factors which are often found together are sometimes referred to as a cluster. Because of the complex interactions between risk factors, sometimes the increased risk from a cluster of risk factors might be greater than the sum of the risks of the individual factors. Metabolic syndrome is one such cluster, and is a marker of increased risk of cardiovascular disease, Type 2 diabetes and kidney disease.

Metabolic syndrome is typically characterised by excess abdominal weight, insulin resistance, and blood pressure and/or lipid abnormalities. People who have metabolic syndrome are two to three times as likely to have a heart attack or stroke and five times as likely to develop Type 2 diabetes compared with those who do not (Dekker et al. 2005; Stern et al. 2004). People with Type 2 diabetes who also have metabolic syndrome are more likely to develop complications such as cardiovascular disease and kidney problems (Isomaa et al. 2001).



The definition of metabolic syndrome has been much debated. Several definitions have been proposed, two of which are most commonly used in practice (ATP III 2001; WHO 1999). The definitions are similar in the risk factors included but differ in the central component and the levels at which a person is considered to have each of the factors. The most recent definition — published by the International Diabetes Federation (IDF) in 2005 — builds on the previous definitions, and is intended to be easily applicable in clinical practice (Box 3.1).

Box 3.1: Metabolic syndrome

For people to be defined as having metabolic syndrome they must have:

- *excess abdominal weight (waist circumference ≥ 94 cm for Caucasian men and ≥ 80 cm for Caucasian women — ethnicity-specific values apply for other groups)*
- *plus any two of the following:*
 - *raised triglyceride level (≥ 1.7 mmol/L) or receiving treatment for raised triglycerides*
 - *reduced HDL cholesterol (< 1.03 mmol/L in males and < 1.29 mmol/L in females) or receiving treatment for reduced HDL cholesterol*
 - *raised blood pressure (systolic blood pressure ≥ 130 mmHg or diastolic blood pressure ≥ 85 mmHg) or receiving treatment for previously diagnosed high blood pressure*
 - *raised fasting plasma glucose (≥ 5.6 mmol/L) or previously diagnosed Type 2 diabetes.*

Source: Adapted from IDF 2005.

Results from the 1999–00 Australian Diabetes, Obesity and Lifestyle (AusDiab) study suggest that 29.1% of Australians aged 25 years and over have metabolic syndrome (based on the IDF definition) (Zimmet et al. 2005). In comparison, using the ATP III criteria in the AusDiab sample results in a prevalence estimate of 19% (Zimmet et al. 2005). International estimates of metabolic syndrome prevalence vary depending on which definition is used, but worldwide around 20–25% of adults are believed to be affected (IDF 2005).

Highlights: risk factors across the life course

Early life risk factors for chronic disease

- In 2002, low birthweights represented 6.4% of live births.
- In 2004, 20% of women reported smoking tobacco and 47% reported drinking alcohol during pregnancy or breastfeeding in the past 12 months.
- In 2001, 83% of infants aged 0–3 years were breastfed when first taken home.
- In 2001, 48% of infants were receiving some breastmilk by 6 months of age, but no infants at age six months were being fully breastfed.

Chronic disease risk factors in children and adolescents

- The proportion of children exposed to environmental tobacco smoke decreased over the last decade: 12.3% of households with dependent children included someone who smoked inside the home in 2004, compared with 31.3% in 1995.
- Survey findings from 2002 suggest that 14% of those aged 12–17 years had used tobacco over the past week and 34% had consumed alcohol.
- There are no national data available on physical activity for children and adolescents; however, approximately three-quarters of the children and adolescents in New South Wales reported meeting the physical activity requirements in 2005.
- In 1995 the average consumption of fruit and vegetables among people aged 2–18 years was well below recommended levels for most age groups.
- There is a lack of recent national data on the prevalence of obesity and overweight in children and adolescents. However, recent findings in New South Wales indicate the prevalence of overweight and obesity has increased from 20% in 1997 to 25% in 2004 among those in Kindergarten to Year 10.

Chronic disease risk factors in adults

- More than nine in ten adults had at least one chronic disease risk factor in 2004–05, with 44% having at least three modifiable risk factors.
- In 2004–05, 86% of adults reported inadequate vegetable consumption, almost 46% reported inadequate fruit consumption, 54% reported being overweight or obese, 34% were sedentary, 21% reported they were daily smokers and 13% that they drank alcohol at risky levels.
- The proportion of adults who carry excess weight increased from 35% in 1995 to 54% in 2004–05, and the proportion of adults falling into the obese category increased from 11% in 1995 to 16% in 2004–05.
- Risky alcohol consumption increased from 8% in 1995 to 13% in 2004–05.



