

3.5 High blood pressure

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

Description

Definition

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

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

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

Causal factors and determinants

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

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

Health outcomes

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

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

Box 3.5.1: Health problems associated with high blood pressure

Stroke

Coronary heart disease

Heart failure

Kidney disease

Dementia

Blindness

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

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

Patterns

Prevalence

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

People from socioeconomically disadvantaged groups are more likely to have high blood pressure than those from less disadvantaged

groups. This disparity has been noted in terms of education levels (those with low education levels having higher blood pressure) and socioeconomic status in Australia.

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

Trends

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

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

Impacts

Deaths

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

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

Use of health services

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

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

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

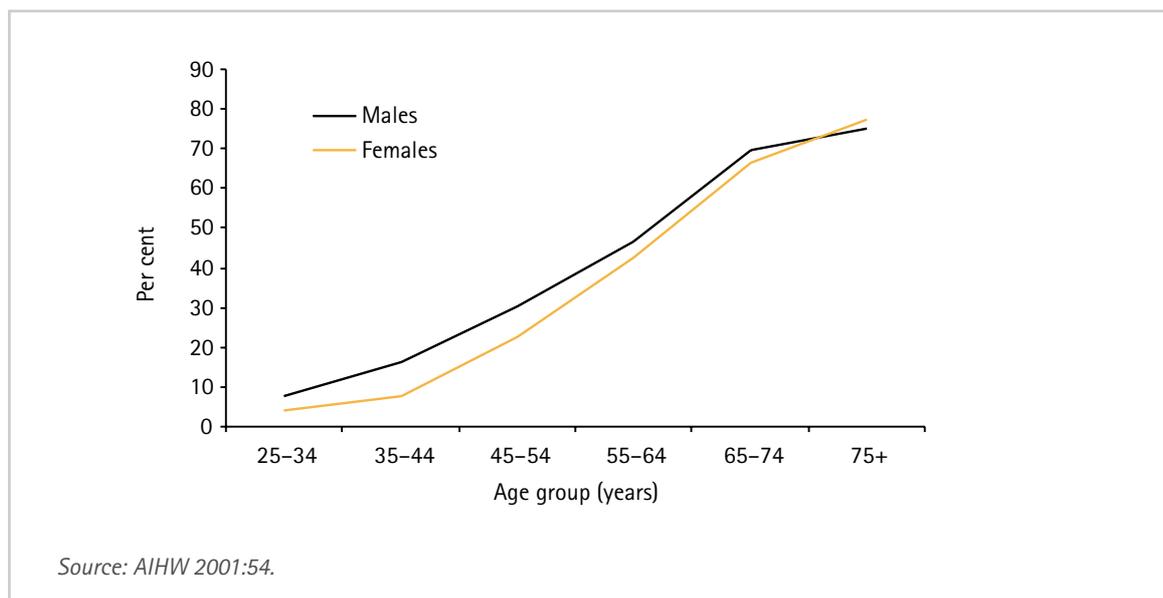
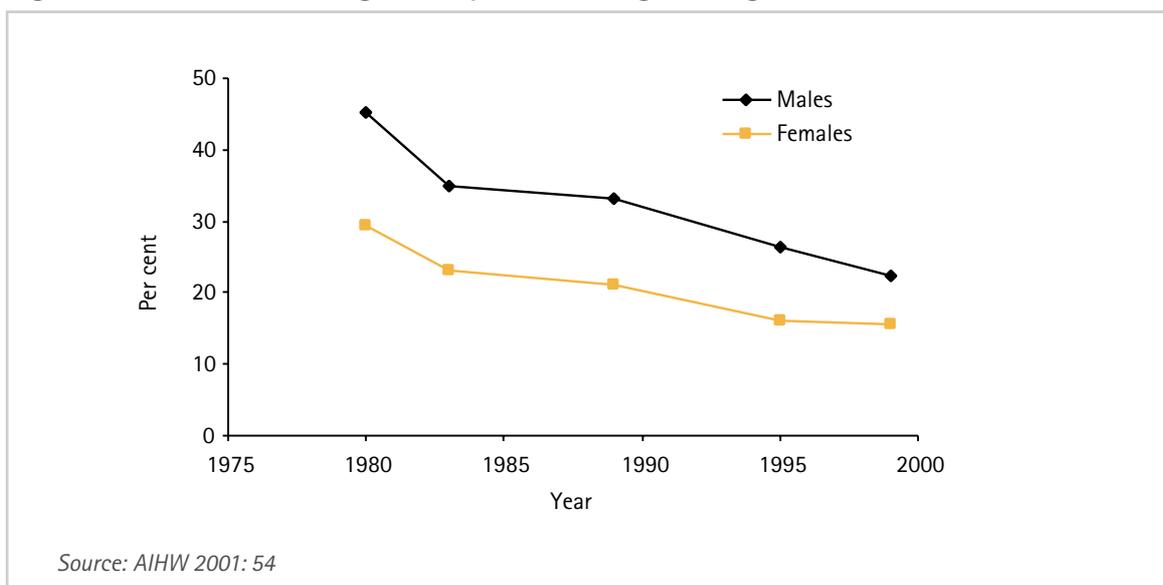


Figure 3.5.2: Prevalence of high blood pressure among those aged 25–64, 1980 to 1999



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

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

Prevention and management

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

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

Box 3.5.2: Lifestyle changes to reduce high blood pressure

Reduce excess weight

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

Limit alcohol intake to two standard drinks per day

Reduce salt in the diet

Source: AIHW 2001:55.

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3.6 High blood cholesterol

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

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

Description

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

Definition

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

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

Causal factors and determinants

For most people, the most important contributor to high blood cholesterol is a diet high in saturated fats, found most commonly in meat and dairy products and in many takeaway and processed foods (see Box 3.6.1).

Monounsaturated and polyunsaturated fats (from vegetable oils, nuts, seeds, and fish) do not increase blood cholesterol levels, and in some cases may lower them (NHFA 1995). Cholesterol in food can also raise blood cholesterol levels, but usually less than saturated fat does.

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

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

Box 3.6.1: Causes of high blood cholesterol

Diet high in saturated fats

Excess body weight

Genetic predisposition

Source: McBride & Anda 1998:282–4.



Patterns

Prevalence

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

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

Trends

No clear trend has emerged in the proportion of the population with high blood cholesterol level over the past two decades. The proportion of Australian males (aged 25–64 and living in capital

cities) with high blood cholesterol appears to have declined slightly between 1989 (51%) to 1999–2000 (47%). Among females, there was little or no change in the same period (Figure 3.6.2).

Impacts

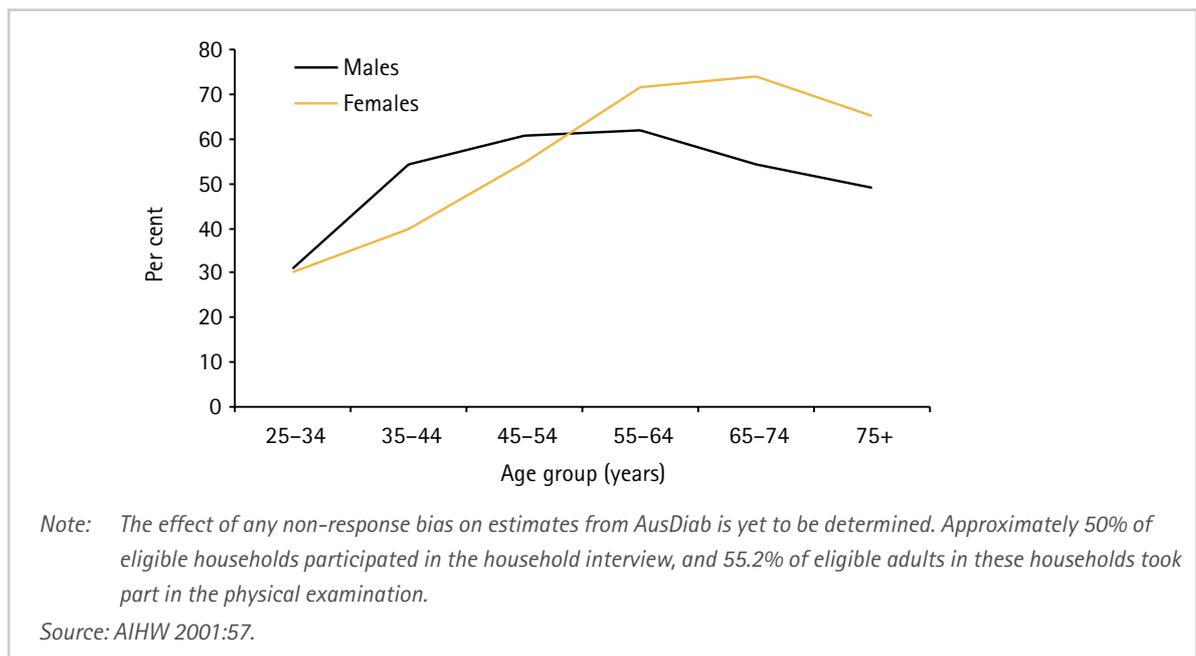
Deaths

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

Use of health services

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

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



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

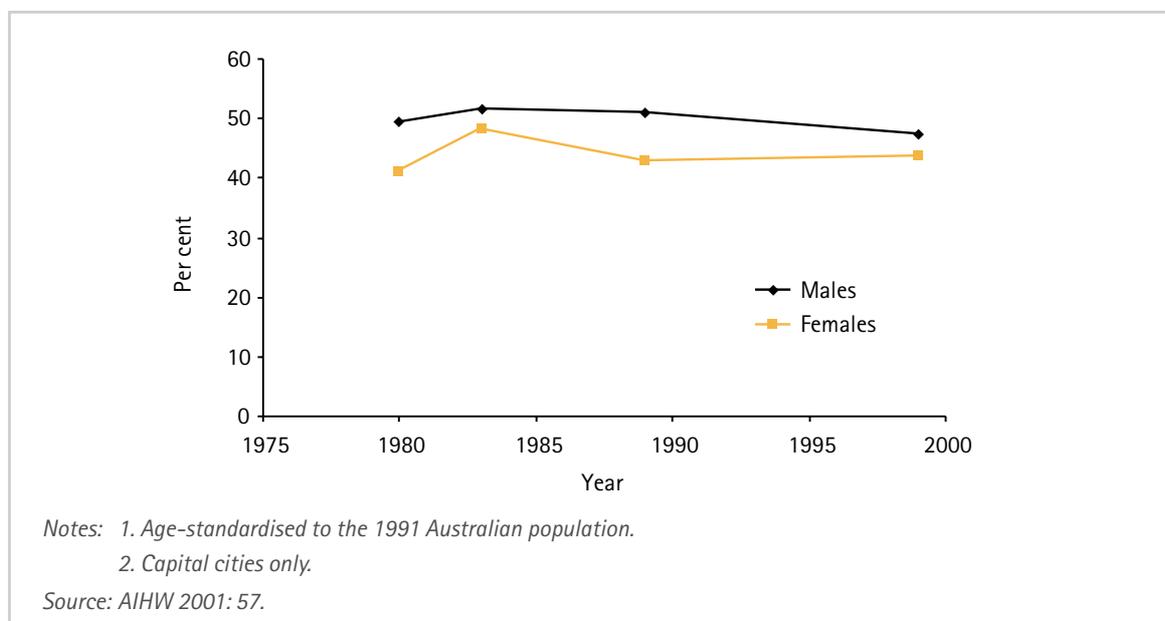
Prevention

High blood cholesterol is largely preventable by modifying diet and changing individual behaviour. Lifestyle changes that prevent or lower high blood cholesterol include eating a diet low in saturated fat and cholesterol, increasing physical activity and reducing excess body

weight. Current Australian guidelines for cholesterol reduction focus primarily on reducing the amount of saturated fat in the diet, to no more than 8% of total energy intake (NHFA 1999).

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

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



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3.7 Excess weight

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

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

Description

Definition

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

Measurement

The measurement of excess weight as a risk factor for chronic diseases is not simple as both overall fat and the regional distribution of fat contribute to chronic disease development and progression. Two common measures for excess weight (approximating body fat) are body mass index (BMI) and waist circumference (see Box 3.7.1).

BMI relates body weight to height, with a BMI between 18.5 and 25 taken as a good range for health (NHMRC 1997). However, the use of BMI as an indicator of fat accumulation is limited because it does not distinguish between weight associated with muscle and weight associated with fat.

A more useful measure of excess fat is waist circumference. Waist circumference measures fat located in the abdominal region (central obesity). A waist circumference of less than 94 cm in males and 80 cm in females is considered normal (see Box 3.7.1).

Box 3.7.1: Measurement of excess weight

The most easily calculated measure of excess weight is BMI. This is the ratio of weight (in kilograms) divided by height (in metres) squared. BMI classification consists of underweight, normal, overweight, and obese.

Body mass index (BMI):

Underweight	Less than 18.5
Normal weight	18.5 and less than 25
Overweight	25 and above, but less than 30
Obese	30 and above

Waist circumference measures levels of abdominal fat mass and indicates an increased risk of metabolic complications associated with obesity. Two categories, overweight and obese, are identified.

Waist circumference:

Males: overweight	94 to 101cm
obese	≥102cm
Females: overweight	80 to 87cm
obese	≥88cm

Sources: NHMRC 1997; WHO 2000.

Health outcomes

Excess weight is associated with an overall increase in premature mortality (WHO 2000). There is also substantial evidence for a causal relationship between excess weight and increased risk for a number of chronic diseases such as Type 2 diabetes, coronary heart disease and stroke. (Box 3.7.2). The risk of developing

more than one condition also increases with increasing levels of excess weight (Field et al. 2001).

The risk of Type 2 diabetes and its predecessor, impaired glucose tolerance, is associated with excess body weight (USDHHS 1996). The association is extreme in obese persons. The recent Australian Diabetes, Obesity and Lifestyle (AusDiab) Study, conducted in 1999–2000, found that almost half (44%) of those with diabetes in Australia are obese (Dunstan et al. 2001).

Box 3.7.2: Health problems associated with excess weight

Total mortality

Chronic diseases

Type 2 diabetes
Coronary heart disease
Stroke
Some cancers
Osteoarthritis
Kidney disease

Biomedical factors

High blood pressure
High blood cholesterol and triglycerides

Other conditions

Gall bladder disease
Respiratory difficulties
Musculoskeletal problems

Sources: WHO 2000; National Taskforce on the Prevention and Treatment of Obesity 2000; USDHHS 2000.

Excess weight has been clearly linked with increased risk of mortality and morbidity from heart and vascular diseases. The risk for several cancer types, such as colorectal, endometrial, post-menopausal breast cancer and prostate cancer is also increased in persons with excess weight.

With increasing levels of weight, the risk of both high blood pressure, and high blood cholesterol and triglycerides, is increased.

Weight loss improves blood pressure control and blood lipid levels. Excess weight also increases the risk of gallstones, respiratory disruption, sleep apnoea and musculoskeletal problems (WHO 2000).

In children and adolescents, excess weight may affect both short- and long-term health. Short term effects include increased cardiovascular disease risk factors, abnormal glucose metabolism, liver-gastrointestinal disturbances, sleep apnoea and orthopaedic complications. The most important long-term effect is the continuation of excess weight into adulthood. In the long term, excess weight in adolescence has also been shown to be significantly associated with both mortality and morbidity later in life (WHO 2000).

Patterns

Prevalence

The most recent estimates of levels of excess weight in the Australian population are from the AusDiab Study (Dunstan et al. 2001). The survey measured height, weight and waist circumference.

According to this survey, about 7 million (60%) of the adult population are either overweight or obese (as measured by BMI). Of these, approximately 5 million (40% of all adults) are overweight and over 2 million (20% of all adults) are obese.

Males are more likely than females to be overweight, with almost half (48%) of adult males estimated to be overweight compared to 30% of females (Table 3.7.1). The levels of obesity are higher in females, with 22% of females estimated to be obese compared to 19% of males.



In both males and females, overweight increases with age, peaking for both in the 65–74 age group. For both sexes, obesity is most common among those aged 55–64 (Table 3.7.1)

Also according to the AusDiab Study waist circumference measurements, an estimated 29% of adult males and 23% of adult females are classified as overweight. A further 27% and 34% of males and females respectively are obese (Table 3.7.2).

Population groups

Excess weight is more common in lower socioeconomic categories. Based on BMIs calculated from self-reported heights and weights, around 53% of females in the lowest socioeconomic category were overweight and 24% were obese, in comparison to 44% overweight and 14% obese females in the highest socioeconomic group in 1995 (AIHW 2001). No significant difference between males in the two socioeconomic categories was reported.

Table 3.7.1: Prevalence (%) of excess weight by BMI, adults (aged 25 and above), 1999–2000

Level of excess weight	Age group						All adults (25 and above)
	25–34	35–44	45–54	55–64	65–74	75+	
Overweight ^(a)							
Males	44	47	52	48	53	53	48
Females	24	25	32	36	40	39	30
Obese ^(b)							
Males	17	19	21	26	20	12	19
Females	12	21	26	32	31	17	22

(a) BMI 25 and above, but less than 30.

(b) BMI 30 and above.

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

Source: AIHW analysis of the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Table 3.7.2: Prevalence (%) of excess weight as measured by waist circumference, adults (aged 25 and above), 1999–2000

Level of excess weight	Age group						All adults (25 and above)
	25–34	35–44	45–54	55–64	65–74	75+	
Overweight ^(a)							
Males	27	27	31	31	30	28	29
Females	20	21	22	26	28	25	23
Obese ^(b)							
Males	14	25	27	36	41	37	27
Females	17	26	38	47	52	43	34

(a) Waist circumference: males 94–101cm; females 80–87cm.

(b) Waist circumference: males ≥ 102cm; females ≥ 88cm.

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

Source: Dunstan et al. 2001:14–5.

According to the 1994 ABS National Aboriginal and Torres Strait Islander Survey, Indigenous males are more likely than non-Indigenous males to be obese. Indigenous females are more likely to be both overweight and obese than non-Indigenous females (AIHW 2001).

Trends

In Australian adults, excess weight appears to have increased since the 1980s. The proportion of male adults who are overweight or obese increased from 47% in 1980 to 67% in 1995, before declining slightly to 65% in 1999–2000. The proportion increased from 26% to 48% for females from 1980 to 1995, with a decline to 45% in 1999–2000 (Figure 3.7.1). Looking

just at the population classified as obese (BMI \geq 30), the proportions increased from around 8% for both males and females in 1980 to 16% for males and 19% for females in 1999–2000.

The increasing levels of excess weight are not limited to adults. Recent analyses of the 1985 Australian Health and Fitness Survey and the 1995 ABS National Nutrition Survey, using new standard international definitions for childhood obesity, show substantial increases in the prevalence of both overweight and obesity in Australian children (Table 3.7.3). In 1985 approximately 10% of both boys and girls were overweight and 1% were obese. By 1995, these figures had increased to 15% and 5% respectively.

Figure 3.7.1: Proportion of adults (aged 25–64) overweight or obese, 1980 to 2000

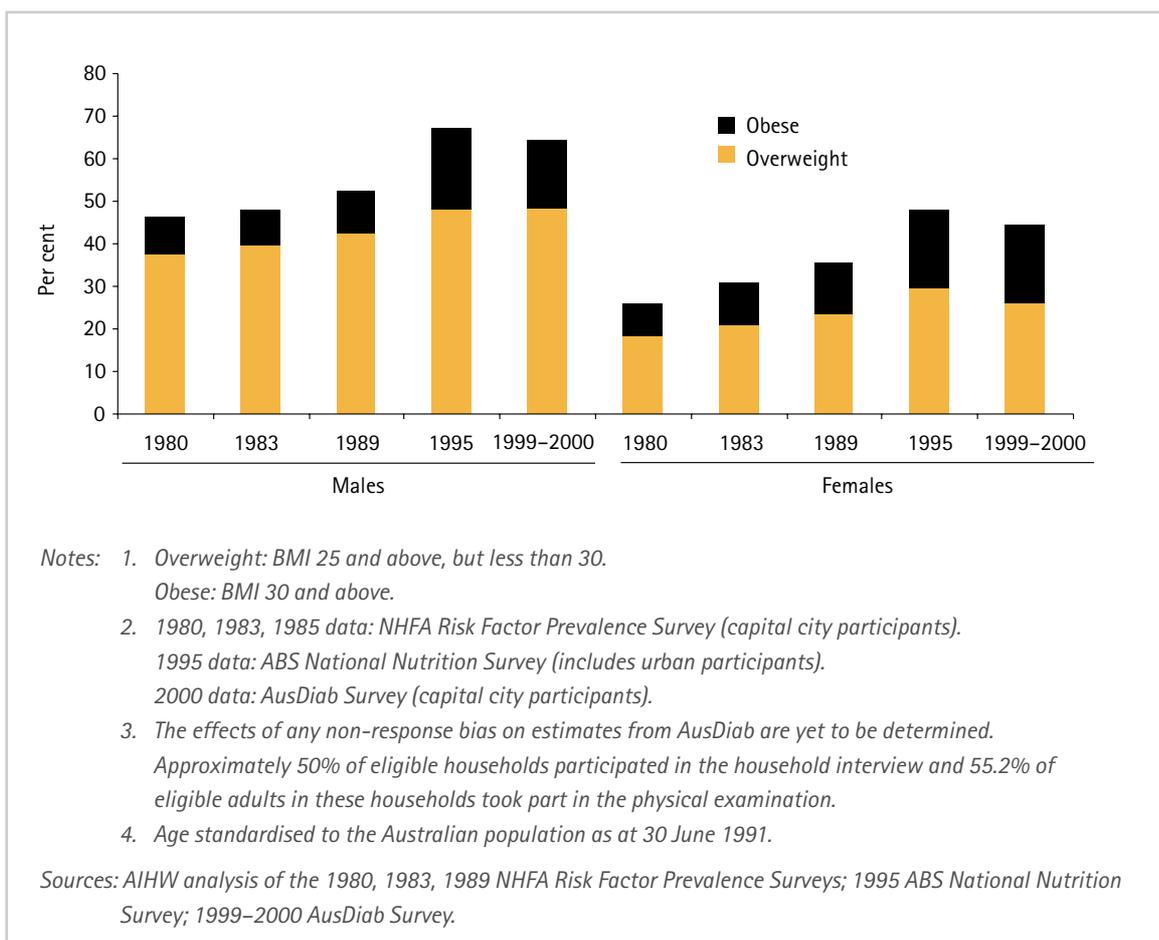


Table 3.7.3: Changes in the prevalence of overweight and obesity in children, aged 7–15, between 1985 and 1995

Sex	Overweight (%)		Obese (%)	
	1985	1995	1985	1995
Boys	9.3	15.3	1.4	4.7
Girls	10.6	16.0	1.2	5.5

Notes: 1. 1985 data: Australian Health and Fitness Survey 1985.

2. 1995 data: National Nutrition Survey 1995.

Source: Magarey et al. 2001.

Impacts

The health, economic and psychological burden of overweight and obesity is high, both at the population and the individual level (NHMRC 1997).

Deaths

In Australia, excess weight has been estimated to account for approximately 4.5% of all deaths in Australia (AIHW: Mathers et al. 1999). Many of the deaths attributable to excess weight are due to chronic diseases. In 1996 this included about 2,300 deaths from coronary heart disease, 1,400 deaths from Type 2 diabetes and 750 deaths from colorectal cancer (Table 3.7.4).

Costs

The direct costs of obesity in Australia in 1994 were estimated to be \$464 million (Inuo et al. 2000). Furthermore, in 1997 the National Health and Medical Research Council estimated that consumers spent \$500 million on weight-control programs (NHMRC 1997).

Prevention

Although a widespread and increasing phenomenon, excess weight for most people is not inevitable. In principle there is immense scope to reduce the problem by modifying dietary intake and fostering greater physical activity. However, this would require major changes in life style.

The problem of excess weight in Australia has been recognised by peak prevention bodies including the Strategic Inter-governmental Nutrition Alliance (SIGNAL) and the Strategic Inter-governmental forum for Physical Activity and Health (SIGPAH). These groups are attempting to halt the increasing levels of excess weight among Australians by producing guidelines and strategies to promote healthy eating and increase levels of physical activity.

Table 3.7.4: Deaths attributable to overweight and obesity, 1996

Cause of death	Number of deaths
Coronary heart disease	2,302
Type 2 diabetes	1,388
Colorectal cancer	748
High blood pressure	500
Ischaemic stroke	427
Other ^(a)	369
Total	5,734

(a) 'Other' includes back problems, osteoarthritis, gall bladder disease and cancers of the uterus, breast and kidney.

Source: AIHW: Mathers et al. 1999.

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