



High blood pressure

Key points

- High blood pressure is a major risk factor for coronary heart disease, stroke, heart failure, peripheral vascular disease and kidney failure. The risk of disease increases as the level of blood pressure increases.
- In 1999–00, 3.69 million Australians aged 25 years and over (30% of that population) had high blood pressure.
- For people aged 25–64 years living in urban areas, the proportion of people with high blood pressure has halved since 1980.
- Based on self-reports from the 2001 National Health Survey, among Australians of all ages, 14% of Indigenous Australians had high blood pressure, compared with 10% of other Australians.

High blood pressure (also referred to as hypertension) is a major risk factor for coronary heart disease, stroke, heart failure, peripheral vascular disease and kidney failure. The risk of disease increases as the level of blood pressure increases. High blood pressure causes the heart to work harder than normal, causing it to enlarge and weaken over time. When high blood pressure is controlled by medication, the risk of heart, stroke and vascular diseases is reduced, but not necessarily to the levels of unaffected people.

Major causes of high blood pressure include poor diet (particularly a high salt intake), overweight, excessive alcohol consumption and insufficient physical activity.

What is high blood pressure?

Blood pressure represents the forces exerted by blood on the walls of the arteries and is written as systolic/diastolic (e.g. 120/80 mmHg, stated as '120 over 80').

There is a continuous relationship between blood pressure levels and the risk of heart, stroke and vascular diseases, making the definition of high blood pressure somewhat arbitrary.

In this report, high blood pressure is categorised using the WHO guidelines:

- systolic blood pressure (SBP) greater than or equal to 140 mmHg; or
- diastolic blood pressure (DBP) greater than or equal to 90 mmHg; or
- receiving medication for high blood pressure.

While SBP is a stronger predictor of risk of heart, stroke and vascular diseases than DBP, for population monitoring purposes SBP, DBP and medication use are measured.

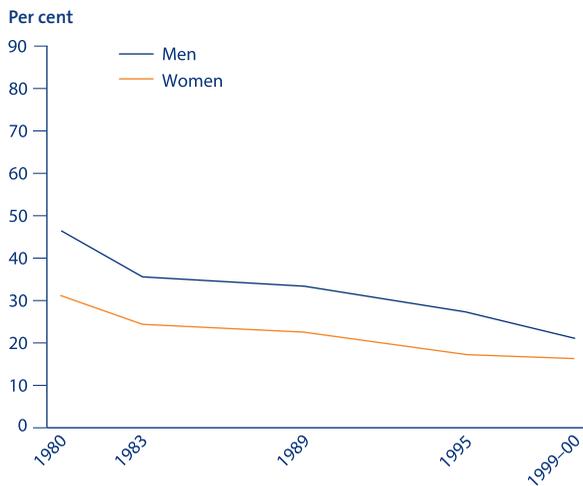
How many Australians have high blood pressure?

Based on measured data from the 1999–00 Australian Diabetes, Obesity and Lifestyle (AusDiab) Study, an estimated 30% of people aged 25 years or more had high blood pressure. This corresponds to 3.69 million Australians.

Trends

Trends in measured blood pressure are only available for people aged 25–64 years living in urban areas. Over the last two decades there have been large declines in the prevalence of high blood pressure. For men the prevalence has fallen steadily from 47% in 1980 to 21% in 1999–00. The rate for women has also halved, from 32% in 1980 to 16% in 1999–00.

People with high blood pressure, aged 25–64 years, 1980 to 1999–00



Notes

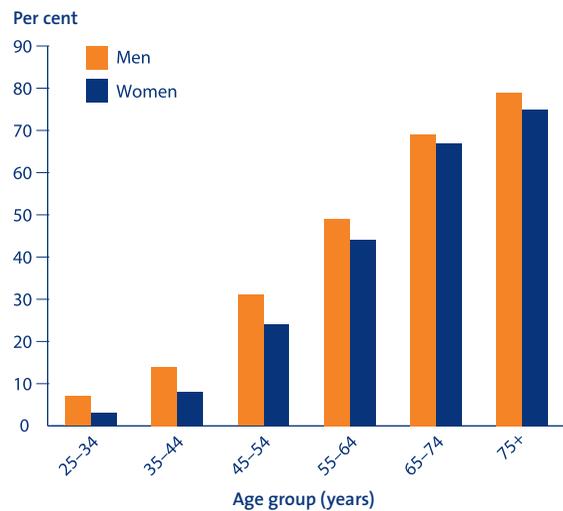
1. Based on measured data.
2. Age-standardised to the 2001 Australian population.
3. Urban areas only.
4. Trends for older Australians are not available.

Sources: AIHW analysis of the 1980, 1983, and 1989 Risk Factor Prevalence Studies; 1995 National Nutrition Survey; 1999–00 AusDiab Study.

Sex and age

In 1999–00, 32% of men and 27% of women aged 25 years and over had high blood pressure. The proportion of men and women with high blood pressure increases with age. Among people aged 65–74 years, around two-thirds had high blood pressure. This compares with around 5% for those aged 25–34 years.

People with high blood pressure, aged 25 years and over, 1999–00



Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, among adults aged 25 years and over in 1999–00, there were generally no significant differences in the prevalence of high blood pressure.

Aboriginal and Torres Strait Islander peoples

There are no national data on measured blood pressure to assess the prevalence among Indigenous Australians. However, based on self-reports from the 2001 National Health Survey, among people of all ages, 14% of Indigenous Australians reported high blood pressure, compared with 10% of other Australians. Indigenous Australians reported high blood pressure from a younger age than other Australians.



Region

The most recent data on measured blood pressure for regions of Australia come from the 1995 National Nutrition Survey. In 1995, among people aged 18 years and over, there were no significant differences in the prevalence of high blood pressure between urban, rural and remote areas.

State and territory

In 1999–00, the prevalence of high blood pressure among people aged 25 years and over ranged among the states and territories from 34% in Victoria to 25% in the Northern Territory. Note that data were not available for the Australian Capital Territory.

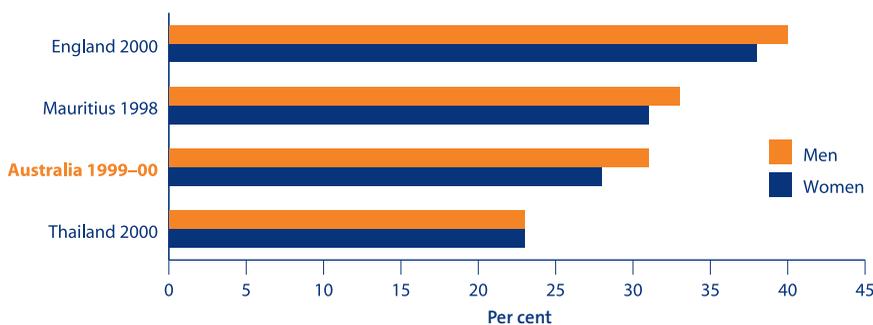
International comparisons

The WHO compiled data on a range of risk factors, including high blood pressure. Four countries presented comparable recent national data for adults.

From this, England showed the highest prevalence of high blood pressure (40% of men and 38% of women) for the four countries. Australia ranked third of the four countries compared, with 31% of men and 28% of women having high blood pressure in 1999–00. Men and women in Thailand had the lowest rate of the four countries compared: 23% of men and women in 2000 had high blood pressure.

Care should be taken when making comparisons based upon these data, as they may apply to different years, age ranges and have not been age-standardised.

People with high blood pressure, by selected countries, latest available year



Notes

1. Based on measured data.
2. High blood pressure is defined as systolic blood pressure of 140 mmHg or more; or diastolic blood pressure of 90 mmHg or more; or receiving medication for high blood pressure.
3. Data are for the following age groups: England 16 years and over; Mauritius 25–74 years; Australia 25 years and over; Thailand 35 years and over.
4. Crude rates are presented.

Source: Strong & Bonita 2003.

Health inequalities

People with high blood pressure, 1999–00

Population subgroup	Men	Women	Persons
Per cent			
Age group (years)			
25–34	7.1	3.4	5.2
35–54	21.6*	14.9*	18.3*
55–74	58.5*	55.8*	57.1*
75 and over	78.8*	74.6*	76.3*
<i>Ages 25 and over (ASR)</i>	32.3	27.2	29.7
Socioeconomic status (highest level of education)			
Did not complete secondary school	35.0	29.9	31.8
Completed secondary school	29.4	28.3	28.8
TAFE/tertiary	31.8	25.3*	28.9
Aboriginal and Torres Strait Islander status			
	n.a.	n.a.	n.a.
Region			
	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than age-specific rates are age-standardised (ASR) to the 2001 Australian population.
4. High blood pressure is defined as systolic blood pressure of 140 mmHg or more; or diastolic blood pressure of 90 mmHg or more; or receiving medication for high blood pressure.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Further reading

ABS 2002. 2001 national health survey: Aboriginal and Torres Strait Islander results, Australia. ABS Cat. No. 4715.0. Canberra: ABS.

NHFA 2003. Hypertension management guide for doctors 2004. Viewed 4 February 2004, <<http://www.heartfoundation.com.au>>.

Strong K & Bonita R 2003. The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. Geneva: WHO.

WHO-ISH 1999. 1999 guidelines for the management of hypertension. CVD Prevention 2(2):76–111.



High blood cholesterol

Key points

- High blood cholesterol is a risk factor for coronary heart disease, ischaemic stroke and peripheral vascular disease. The risk of coronary heart disease increases with rising blood cholesterol levels.
- In 1999–00, 6.40 million Australians aged 25 years and over (51%) had cholesterol levels of 5.5 mmol/L or more.
- For people aged 25–64 years living in capital cities, there has been no marked fall in the prevalence of people with high blood cholesterol over 1980 to 1999–00.

High blood cholesterol is a risk factor for coronary heart disease, ischaemic stroke and peripheral vascular disease. It is the main cause of the process by which the blood vessels that supply the heart and other parts of the body become clogged. The risk of coronary heart disease increases with rising blood cholesterol levels.

For most people, a high level of saturated fat in the diet is the main factor that raises blood cholesterol levels. Cholesterol in foods can also raise blood cholesterol levels, but less so than saturated fat. Genetic factors also affect blood cholesterol levels and a few people have high cholesterol levels regardless of their dietary intake of saturated fat and cholesterol.

What is high blood cholesterol?

Total blood cholesterol levels of 5.5 mmol/L or more are an indication of an increased risk of developing coronary heart disease, and levels of 6.5 mmol/L or more are considered to indicate high risk. However, these values are somewhat arbitrary, as coronary heart disease risk increases continuously from cholesterol levels of 4.5 mmol/L or possibly lower.

While total blood cholesterol is measured for population-monitoring purposes, also of interest are the components of cholesterol, HDL and LDL cholesterol—so called ‘good’ and ‘bad’ cholesterol, respectively. HDL cholesterol provides protection against heart disease by helping to reduce atherosclerosis. Excess levels of LDL cholesterol can contribute to clogging of the arteries (atherosclerosis), increasing the risk of heart attack and stroke.

How many Australians have high blood cholesterol?

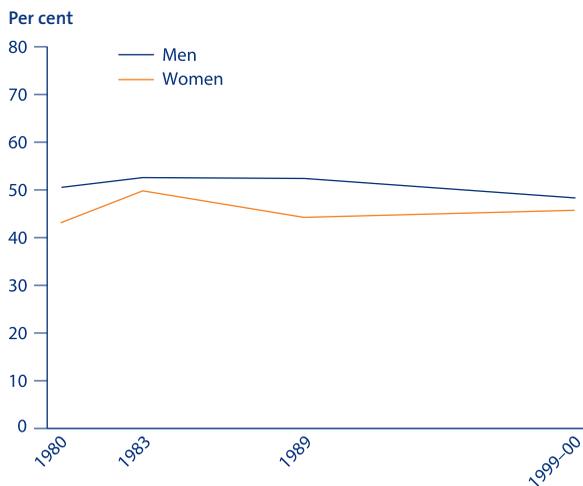
Based on measured data from the 1999–00 AusDiab Study, 52% of Australians aged 25 years and over had cholesterol levels of 5.5 mmol/L or more. This corresponds to 6.40 million Australians.

Trends

Trends in measured blood cholesterol are available only for people aged 25–64 years living in capital cities. These data show that average blood cholesterol levels have remained fairly constant over the period 1980 to 1999–00. In 1999–00, average blood cholesterol levels were 5.5 mmol/L for men and 5.4 mmol/L for women.

There has been no marked reduction in the prevalence of people with high blood cholesterol over the period 1980 to 1999–00. In 1980, 51% of men and 43% of women had high blood cholesterol, compared with 49% of men and 46% of women in 1999–00.

People with high blood cholesterol (5.5 mmol/L or more) aged 25–64 years, 1980 to 1999–00



Notes

1. Based on measured data.
2. Age-standardised to the 2001 Australian population.
3. Capital cities only.

Sources: AIHW analysis of the 1980, 1983, 1989 Risk Factor Prevalence Studies; 1999–00 AusDiab Study.

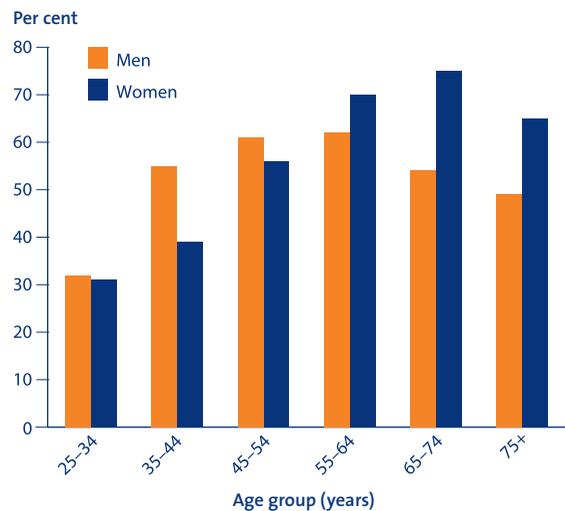
Sex and age

In 1999–00, 52% of men and 51% of women aged 25 years and over had blood cholesterol levels of 5.5 mmol/L or more. The prevalence of high blood cholesterol increased with age: for women, there was a steady increase to 65–74 years; for men, prevalence increased steadily with age until 55–64 years, after which it declined. From 55 years of age, a higher proportion of women than men had high blood cholesterol.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, among people aged 25 years and over in 1999–00, there were no significant differences in the prevalence of high blood cholesterol.

People with high blood cholesterol (5.5 mmol/L or more), aged 25 years and over, 1999–00



Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Aboriginal and Torres Strait Islander peoples

There are no national data on measured blood cholesterol levels for Indigenous Australians.

Region

There are no national data on measured blood cholesterol levels across regional areas of Australia.

State and territory

In 1999–00, among people aged 25 years and over, the prevalence of high blood cholesterol ranged among the states and territories from 56% in South Australia to 49% in New South Wales. Note that data were not available for the Australian Capital Territory.



International comparisons

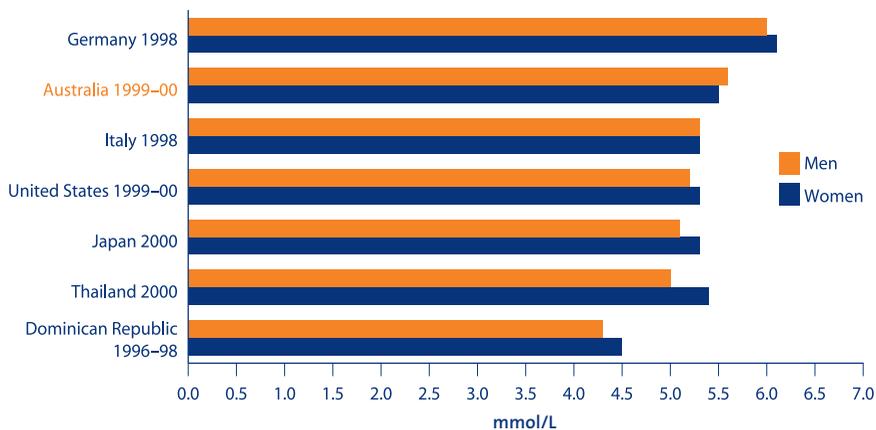
The WHO compiled data on a range of risk factors, including average blood cholesterol levels. Seven countries presented comparable recent national data for adults.

From this, Australia ranked second highest after Germany, with the Dominican Republic reporting

the lowest average cholesterol levels of the seven countries compared.

Care should be taken when making comparisons based upon these data, as they may apply to different years and age ranges, and have not been age-standardised.

Average blood cholesterol levels, by selected countries, latest available year



Note: Data are for the following age groups: Germany 18–79 years; Australia 25 years and over; Italy 35 years and over; United States and Japan 20 years and over; Thailand 35 years and over; Dominican Republic 18–74 years.

Sources: AIHW analysis of the 1999–00 AusDiab Study; Strong & Bonita 2003.

Health inequalities

People with high blood cholesterol (5.5 mmol/L or more), 1999–00

Population subgroup	Men	Women	Persons
Per cent			
Age group (years)			
25–34	32.2	31.2	31.7
35–54	58.0*	46.5*	52.2*
55–74	58.3*	72.5*	65.7*
75 and over	49.3*	65.4*	58.8*
<i>Ages 25 and over (ASR)</i>	<i>51.5</i>	<i>51.0</i>	<i>51.5</i>
Socioeconomic status (highest level of education)			
Did not complete secondary school	54.1	53.0	53.2
Completed secondary school	50.1	52.5	52.9
TAFE/tertiary	51.5	49.6	50.4
Aboriginal and Torres Strait Islander status			
	n.a.	n.a.	n.a.
Region			
	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Further reading

ABS 2002. 2001 national health survey: Aboriginal and Torres Strait Islander results, Australia. ABS Cat. No. 4715.0. Canberra: ABS.

NHFA 1999. A review of the relationship between dietary fat and cardiovascular disease. *Aust J Nutr Diet* 56(Suppl 4):S5–S22.

NHFA & CSANZ (Cardiac Society of Australia and New Zealand) 2001. Lipid management guidelines. *Med J Aust* 175:S55–S90.

Strong K & Bonita R 2003. The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. Geneva: WHO.



Overweight

Key points

- Overweight, and in particular obesity, is associated with higher rates of death and illness.
- In 1999–00, 7.42 million adult Australians (60% of those aged 25 years and over) were overweight. Of these, about 2.5 million (21% of those aged 25 years and over) were obese.
- In 1995, 20% of boys and 21% of girls aged 2–18 years were overweight.
- For people aged 25–64 years in urban areas, between 1980 and 1999–00 the proportion who were obese rose from 9% to 17% for men and 8% to 20% for women. The proportion of men who were overweight but not obese also increased from 38% to 49%, and among women from 19% to 27%.
- Based on self-reports from the 2001 National Health Survey, men and women aged 20 years and over in the most disadvantaged areas were almost twice as likely to be obese than those in the least disadvantaged areas.
- Based on self-reports from the 2001 National Health Survey, among people aged 18 years and over, 64% of Indigenous Australians were overweight compared with 50% of other Australians. Indigenous Australians were nearly twice as likely to be obese than other Australians (31% compared with 16%).

Overweight, and in particular obesity, is associated with higher death and illness. Diseases and conditions including coronary heart disease, high blood pressure, high blood cholesterol, Type 2 diabetes, certain cancers and psychosocial problems are all more prevalent in overweight individuals.

Among those who are overweight, weight loss reduces the incidence and severity of high blood pressure, high blood cholesterol, Type 2 diabetes and osteoarthritis.

What is overweight?

Overweight is a condition of excess body fat that results from a sustained energy imbalance. This occurs when dietary energy intake exceeds energy expenditure over a period of time, resulting in weight gain. Obesity is a severe form of overweight.

There are two main methods for measuring levels of overweight and obesity at the population level: body mass index (BMI) and waist circumference.

BMI is the most commonly used of these two measures. It is calculated by dividing weight in kilograms by the square of height in metres (kg/m^2). A BMI of 25 or more indicates overweight, and 30 or more indicates obesity. In this report, unless stated otherwise, overweight refers to a BMI of 25 or more (i.e. the term includes obesity). Classifications of overweight and obesity are based primarily on the association between BMI and mortality, and are the standard recommended by the WHO and the *National Health Data Dictionary* (NHDD). This classification may not be suitable for all ethnic groups, who may have equivalent levels of risk at lower BMI (e.g. Asians) or higher BMI (e.g. Polynesians). For children and adolescents aged 2–17 years, a separate classification of body weight based on age and sex has been developed.

As a measure of overweight, waist circumference is a useful addition to BMI because abdominal fat mass can vary greatly within a narrow range of total body fat or BMI. The NHDD defines waist circumference cutoffs for increased and substantially increased risk of ill health. Waist circumferences of 94 cm or more in men and 80 cm or more in women indicate increased risk. Waist circumferences of 102 cm or more in men and 88 cm or more in women indicate substantially increased risk. As with BMI, this classification may not be suitable for use in people aged 18 years or below, and the cutoffs may not be suitable for all ethnic groups.

Unless otherwise stated, results presented in this section are based on BMI derived from measured height and weight.

How many Australians are overweight?

Based on measured data from the 1999–00 AusDiab Study, 60% of Australians aged 25 years and over were overweight (BMI of 25 or more). This corresponds to 7.42 million Australians. Of these, about 2.5 million (21% of the population aged 25 and over) were obese (BMI of 30 or more).

Trends

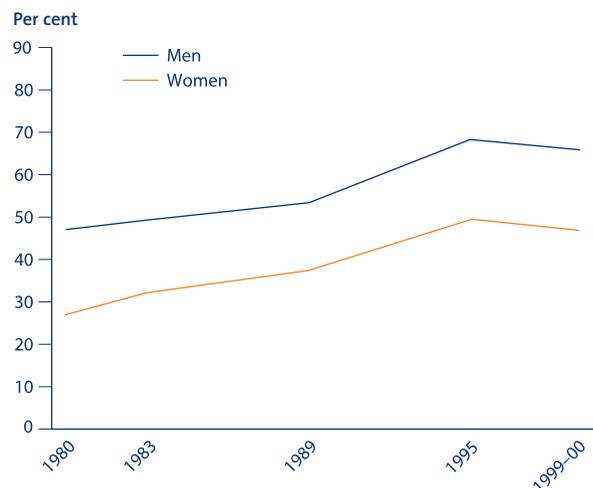
Trends in measured body weight are available only for people aged 25–64 years living in urban areas. These data show that there has been a considerable increase in the prevalence of overweight in Australia over the last 20 years. Trends for the urban population of Australia show that between 1980 and 1999–00 the proportion of men and women who were obese rose from 9% to 17% and 8% to 20% respectively. Similarly, the proportion of men aged 25–64 years who were overweight but not obese increased from 38% to 49%, and among women of the same age from 19% to 27%.

While trends for people aged 65 years and over are not available from measured data, based on self-reports from the National Health surveys, the prevalence of overweight has increased by 30% and obesity by 67% over the period 1989–90 to 2001.

Sex and age

In 1999–00, among Australians aged 25 years and over, men were more likely to be overweight than women (67% compared with 52%), although rates of obesity were similar (19% compared with 22%). The prevalence of overweight increased with age up to about 65 years. The highest rates were among 55–74-year-olds (71%) with the lowest rates in 25–34-year-olds (49%).

People who were overweight (BMI of 25 or more), aged 25–64 years, 1980 to 1999–00

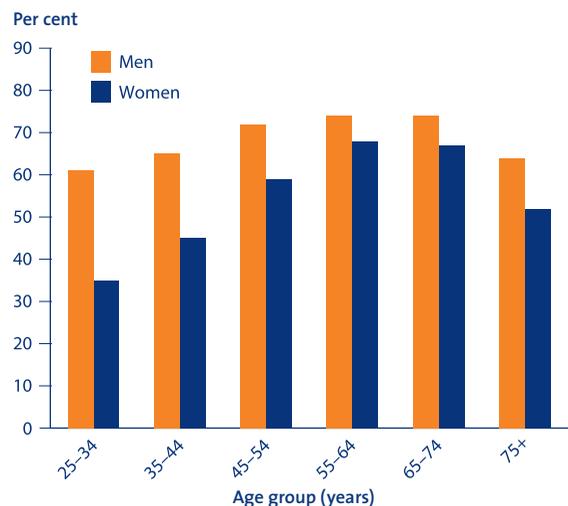


Notes

1. Based on measured data.
2. Age-standardised to the 2001 Australian population.
3. Urban areas only.

Sources: AIHW analysis of the 1980, 1983, 1989 Risk Factor Prevalence Studies; 1995 National Nutrition Survey; 1999–00 AusDiab Study.

People who were overweight (BMI of 25 or more), aged 25 years and over, 1999–00



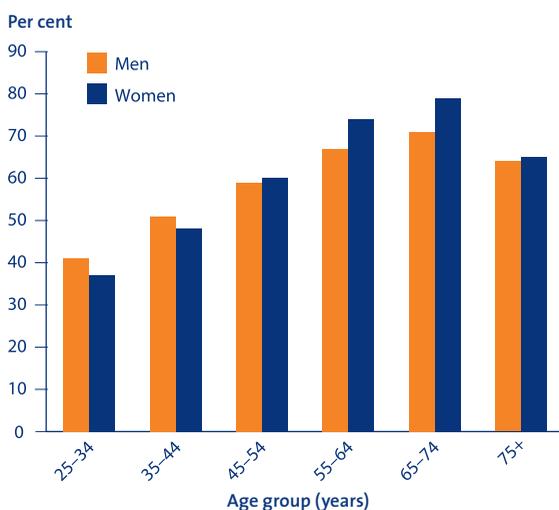
Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.



In 1999–00, 55% of men had a waist circumference greater than 94 cm and 56% of women had a waist circumference greater than 80 cm. Around 27% of men had a waist circumference greater than 102 cm and 34% of women had a waist circumference greater than 88 cm, indicating substantially increased risk of health problems. For both men and women, the prevalence of overweight based on waist circumference increased with age to 65–74 years and then declined.

People who were overweight (waist circumference of 94 cm or more for men and 80 cm or more for women), aged 25 years and over, 1999–00



Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, there were no significant differences in the prevalence of overweight based on educational attainment in 1999–00 (using measured data).

Based on self-reports from the 2001 National Health Survey, among people aged 20 years and over, men and women from the most disadvantaged areas were almost twice as likely to be obese than those in the least disadvantaged areas.

Aboriginal and Torres Strait Islander people

Available data show that Indigenous Australians are more likely than other Australians to be overweight. Based on self-reports from the 2001 National Health Survey, among people aged 18 years and over living in non-remote areas, 64% of Indigenous Australians were overweight compared with 50% of other Australians. The disparity in obesity rates in non-remote areas is even stronger—Indigenous Australians were nearly twice as likely to be obese than other Australians (31% compared with 16%).

Region

The most recent data on overweight derived from measured data for regions of Australia come from the 1995 National Nutrition Survey. From these data there were no significant differences in the prevalence of overweight for people aged 18 years and over living in urban, rural and remote areas in 1995.

State and territory

In 1999–00, among people aged 25 years and over, the rate of overweight ranged from 65% in South Australia to 59% in New South Wales, Queensland and Western Australia. Note that data were not available for the Australian Capital Territory.

Children and adolescents

Children and adolescents who are overweight or obese also have an increased risk of adverse health conditions, including risk factors for heart, stroke and vascular diseases. They have a greater likelihood of becoming overweight or obese adults, and have a greater risk of developing conditions such as Type 2 diabetes.

In 1995, the prevalence of overweight among children and adolescents aged 2–18 years was 19.5% for boys and 21.1% for girls. These results are based on age- and sex-specific BMI cutoffs.

International comparisons

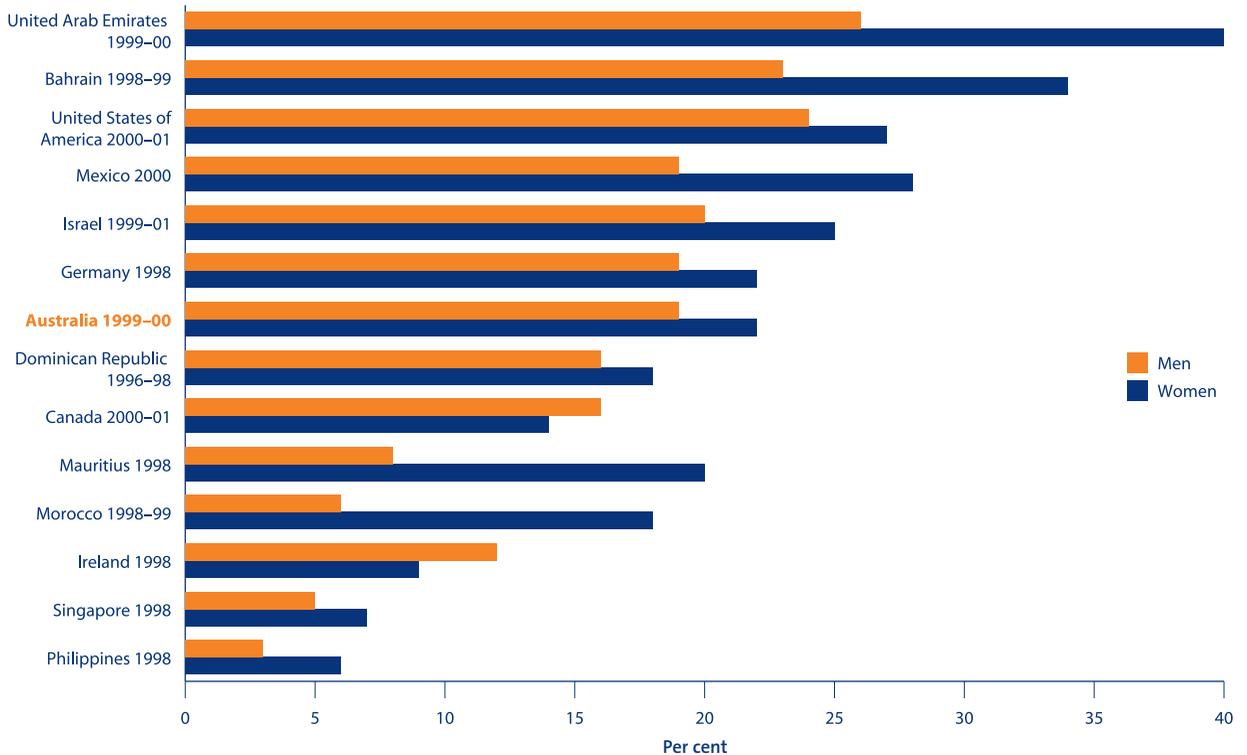
In a comparison based on measured data for people aged 25–64 years among three countries (there are only limited international data that are directly comparable with Australian data in terms of the age groups included) results showed that New Zealand and Australia had similar rates of overweight (61% compared with 58%), while Italy's overweight rate was around one-quarter lower than that of Australia's at 42%. These rates were age-standardised to the WHO standard population.

The WHO compiled data on a range of risk factors, including obesity, which provides more extensive comparisons. Fourteen countries presented comparable recent national data for adults.

From this, obesity rates ranged from as low as 3% for men and 6% for women in the Philippines in 1998, to as high as 26% of men and 40% of women in the United Arab Emirates in 1999–00 of the 14 countries compared. Australian rates were at the higher end of the scale for the 14 countries compared, with 19% of men and 22% of women classed as obese in 1999–00.

Care should be taken when making comparisons based upon these data, as they may apply to different years and age ranges, and have not been age-standardised.

People who were obese (BMI of 30 or more) by selected countries, latest available year



Note: Crude rates are presented and are for different age groups.

Source: Strong & Bonita 2003.



Health inequalities

People who were overweight (BMI of 25 or more), 1999–00

Population subgroup	Men	Women	Persons
	Per cent		
Age group (years)			
25–34	61.1	35.0	48.5
35–54	68.1	51.5*	59.9*
55–74	74.1*	67.8*	70.8*
75 and over	63.6	52.0*	56.8
<i>Ages 25 and over (ASR)</i>	67.4	51.9	59.6
Socioeconomic status (highest level of education)			
Did not complete secondary school	70.5	56.7	62.1
Completed secondary school	67.9	54.7	61.1
TAFE/tertiary	66.2	50.0*	58.8
Aboriginal and Torres Strait Islander status			
	n.a.	n.a.	n.a.
Region			
	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than the age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Further reading

AIHW: Bennett SA, Magnus P & Gibson D 2004. Obesity trends in older Australians. AIHW Cat. No. AUS 42. Canberra: AIHW (Bulletin No. 12).

AIHW: Dixon T & Waters A-M 2003. A growing problem: trends and patterns in overweight and obesity among Australian adults, 1980 to 2001. AIHW Cat. No. AUS 36. Canberra: AIHW (Bulletin No. 8).

AIHW: O'Brien K & Webbie K 2004. Health, wellbeing and body weight: characteristics of overweight and obesity in Australia, 2001. AIHW Cat. No. AUS 43. Canberra: AIHW (Bulletin No. 13).

AIHW: O'Brien K & Webbie K 2003. Are all Australians gaining weight? Differentials in overweight and obesity among adults, 1989–90 to 2001. AIHW Cat. No. AUS 39. Canberra: AIHW (Bulletin No. 11).

Magarey A, Daniel L & Boulton TJ 2001. Prevalence of overweight and obesity in Australian children and adolescents: reassessment of 1985 and 1995 data against new standard international definitions. *Med J Aust* 174:561–4.

NHDC (National Health Data Committee) 2003. National health data dictionary. Version 12. AIHW Cat. No. HWI 43. Canberra: AIHW.

NHMRC 1997. Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity. Canberra: NHMRC.

Strong K & Bonita R 2003. The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. Geneva: WHO.

WHO 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series 894. Geneva: WHO.



Diabetes

Key points

- People with diabetes are at increased risk of developing coronary heart disease, stroke and peripheral vascular disease. It claimed 3,329 lives in 2002 (2.5% of all deaths).
- Based on measured blood glucose levels, about 945,600 Australians aged 25 years and over (7.6% of the population) had diabetes in 1999–00. About half these people were not aware that they had it. Based on self-reports from the 2001 National Health Survey, an estimated 554,200 Australians had diabetes.
- Based on comparison of the 1981 Busselton Study and the 1999–00 AusDiab Study, which both used blood glucose measurements to determine prevalence, there was a significant increase (from 3% to 7%) in the age-standardised prevalence of diabetes in Australia over that 20-year period. The 2001 National Health Survey also showed a large increase in self-reported diabetes compared with the 1989–90 survey (unadjusted prevalence of 1% and 3%, respectively).
- In 2001, the prevalence of self-reported diabetes was almost twice as high in the most disadvantaged areas than in the least disadvantaged.
- Aboriginal and Torres Strait Islander peoples have one of the highest rates of diabetes in the world. In 2001, the age-standardised prevalence of self-reported diabetes among Indigenous Australians (11%) was almost four times as high as for other Australians (3%). In 2000–02, death rates from diabetes among Indigenous Australians were almost 15 times as high as for other Australians.

Diabetes (also known as diabetes mellitus) has a significant impact on the health of Australians, both as a disease in its own right and as a risk factor for heart, stroke and vascular diseases. People with diabetes are at increased risk of developing coronary heart disease, stroke and peripheral vascular disease. Diabetes is the sixth leading cause of death in Australia, and contributes to significant illness, disability, poor quality of life and premature death. However, death rates from diabetes have fallen substantially over the last half-century, particularly among females.

Diabetes is presented here as a risk factor for heart, stroke and vascular diseases and also as an associated condition. This reflects the importance of diabetes in the development of heart, stroke and vascular diseases, and the emerging public health issue that diabetes itself presents.

Determining the prevalence of diabetes in the population is difficult. Most population surveys simply ask people whether they have ever been told by a health professional that they have diabetes. This method is limited, as people may not know that they have diabetes and the criteria used by health professionals in making diagnoses vary.

What is diabetes?

Diabetes represents a collection of closely related metabolic conditions characterised by high blood glucose levels resulting from defects in secretion of the hormone insulin, the physiological actions of insulin, or both. Insulin is a hormone produced in the pancreas that helps glucose to enter body cells for energy metabolism. The chronic high blood glucose levels (hyperglycaemia) of poorly controlled diabetes are associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels.

There are three main types of diabetes: Type 1, Type 2 and gestational diabetes.

- **Type 1 diabetes** results from an autoimmune destruction of the cells in the pancreas which produce insulin. People with Type 1 diabetes must have daily injections of insulin for survival.
- **Type 2 diabetes**, which accounts for about 85–90% of all diabetes, is characterised by insulin resistance and/or abnormal insulin secretion. In many cases the actual metabolic causes for this condition are not yet understood. In rare cases it arises from specific genetic mutations. In most cases, Type 2 diabetes can be prevented or at least delayed through the modification of its major risk factors including overweight and obesity, and physical inactivity.
- **Gestational diabetes** occurs during pregnancy in about 3–8% of females not previously diagnosed with diabetes and is a marker of greater risk of developing Type 2 diabetes later in life.

Risk factors for diabetes

Both genetic and environmental factors contribute to the onset of diabetes. Diabetes shares several risk factors with, and is itself a risk factor for, heart, stroke and vascular diseases. Type 1 diabetes is believed to be caused by exposure to environmental triggers, possibly certain viruses or food toxins. The development of Type 2 diabetes is influenced largely by the presence of behavioural and biomedical risk factors including obesity, physical inactivity, and possibly poor nutrition in foetal and early infant life. The risk factors for gestational diabetes are similar to those for Type 2 diabetes.

The existence of diabetes is also known to magnify the effect of conventional risk factors for heart, stroke and vascular diseases such as elevated cholesterol levels, central obesity, high blood pressure and smoking. Further, people with diabetes are more likely to have a clustering of these risk factors—sometimes known as the metabolic syndrome.

How many Australians have diabetes?

Prevalence

Based on measured blood glucose levels from the 1999–00 AusDiab Study, 7.6% of Australians aged 25 years and over had diabetes. This corresponds to an estimated 945,600 Australians. About half these people were not aware that they had diabetes.

Based on self-reports from the 2001 National Health Survey, an estimated 554,200 Australians had diabetes as a current, long-term condition.

Trends

There are no national data to compare trends of diabetes prevalence in Australia. However, both the 1981 Busselton Study in Western Australia and the 1999–00 AusDiab Study used blood glucose measurements to measure diabetes prevalence. A comparison of results indicated that there was a significant increase (from 3% to 7%) in the age-standardised prevalence of diabetes in Australia over that 20-year period.

The 2001 National Health Survey also showed a large increase in self-reported diabetes compared with the equivalent 1989–90 survey (unadjusted prevalence of 1% and 3%, respectively).²²

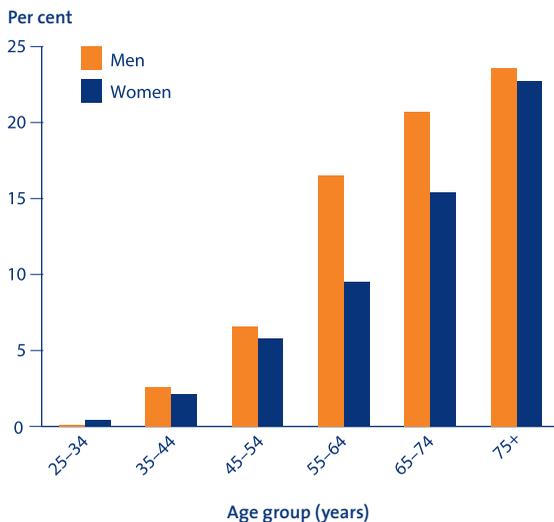
Sex and age

In 1999–00, the prevalence of diabetes was similar for men and women, 8% and 7% respectively. The proportion of Australians with diabetes increased with age, from 0.3% for those aged 25–34 years to 23% for those aged 75 years or over. A similar pattern was observed from the 2001 National Health Survey data, although the age-specific rates were about half the size of those observed in the 1999–00 AusDiab Study, reflecting the fact that estimates based on self-report underestimate the true prevalence of diabetes.

22 Changes in survey methodology and classification may reduce direct comparability between the National Health surveys.



People with diabetes, aged 25 years and over, 1999–00



Note: Based on measured data.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Socioeconomic status

Using educational attainment as an indicator of socioeconomic status, among people aged 25 years and over, there were no significant differences in the prevalence of diabetes based on educational attainment in 1999–00 (based on measured data).

Based on self-reports from the 2001 National Health Survey, the prevalence of diabetes was almost twice as high in the most disadvantaged areas as in the least disadvantaged areas.

Aboriginal and Torres Strait Islander peoples

Indigenous Australians have one of the highest rates of diabetes, especially Type 2, in the world. There are no national data on measured prevalence of diabetes among Indigenous Australians. However, based on self-reports from the 2001 National Health Survey, the age-standardised prevalence of diabetes among Indigenous Australians was almost four times as high as among other Australians (11% compared with 3%). Indigenous Australians from remote areas were almost twice as likely as those from non-remote areas to report having diabetes (16% compared with 9%).

Indigenous females were more likely to report diabetes than Indigenous males (12% compared with 9%).

While in both Indigenous and non-Indigenous populations the prevalence of diabetes is higher in older age groups, the prevalence among Indigenous Australians aged 35–44 years is almost as high as among other Australians aged 55 years and over.

Region

Based on self-reports from the 2001 National Health Survey, there were no significant differences in the prevalence of diabetes between major cities and rural/remote areas of Australia.

State and territory

The prevalence of self-reported diabetes was lowest in Tasmania (2%), with rates in the other states and territories around 3%.

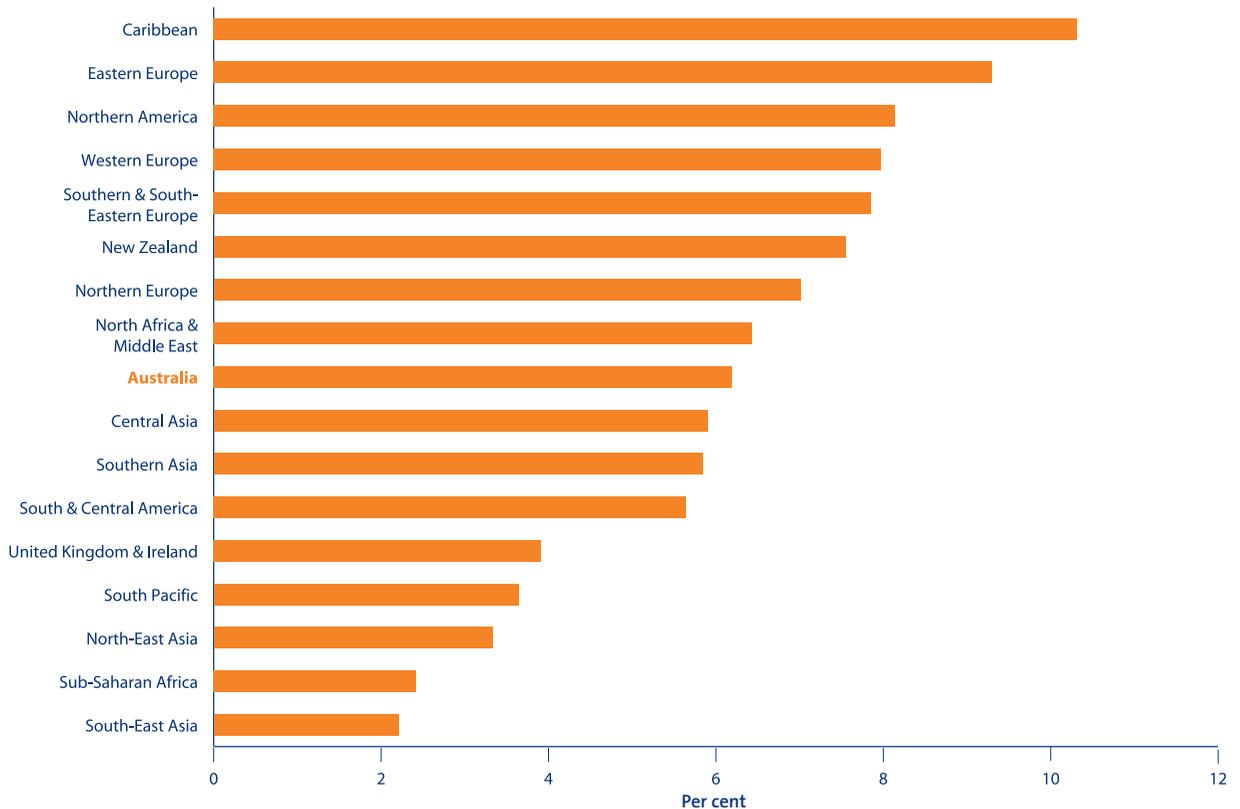
Non-English-speaking backgrounds

Certain overseas-born Australians have a higher prevalence of diabetes than people born in Australia. In 2001, the prevalence of self-reported diabetes was highest among men born in the Middle East and North Africa, and in South-East Asia and Southern Asia, and among women born in Southern and Eastern Europe, and Central Asia.

International comparisons

Data collated by the International Diabetes Federation (IDF) indicate that diabetes prevalence rates are higher in the Caribbean (10.3%), Eastern Europe (9.3%), Northern America (8.1%), Western Europe (8.0%), Southern and South-Eastern Europe (7.8%), New Zealand (7.6%), Northern Europe (7.0%), and North Africa and the Middle East (6.4%) compared with Australia (6.2%). All other regions had lower prevalence rates than Australia. These comparisons should be interpreted with caution, as the IDF data were derived from a variety of measured and self-reported data, with preference given to measured data, and varying methodologies and data sources were used to compile and extrapolate the IDF data into the regions.

People with diabetes, aged 20–79 years, by selected regions, 2003



Notes

1. Crude rates are presented.
2. South Pacific includes Melanesia, Micronesia & Polynesia (excludes Hawaii).

Source: IDF 2003.

Incidence

Between 1999–02, around 32,600 people were registered on the National Diabetes Register as new cases of insulin-treated diabetes. Around 60% were found to have Type 2 diabetes, 28% Type 1 diabetes and 9% gestational diabetes. At diagnosis 48% were aged 45 years and over, and less than 11% were aged 0–14 years.

Over 2000–02, just over 2,430 new cases of Type 1 diabetes in children aged under 15 years were recorded, equating to an average annual incidence rate of 20 new cases per 100,000 population in this age group.

Information on the incidence of non-insulin-treated diabetes is unavailable.

Trends

In Australia, previous survey estimates of the incidence of Type 1 diabetes in the 0–14-year-old age group have ranged from 12 per 100,000 in 1983 to 18 per 100,000 from 1990–96. Thus the latest incidence data from the National Diabetes Register supports recent reports suggesting that the incidence of Type 1 diabetes is increasing among children aged 0–14 years in Australia.



Hospitalisation

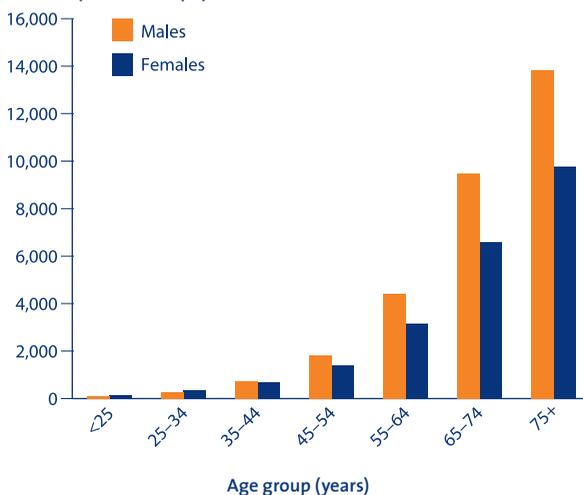
In 2001–02, there were 53,232 hospitalisations where diabetes was the principal diagnosis (0.8% of all hospitalisations). Diabetes is more often reported as an additional diagnosis, particularly when coronary heart disease, stroke and kidney disease are listed as the principal diagnosis. When hospitalisations for diabetes as the principal and additional diagnoses are combined, the total number was 391,912, or 6% of all hospitalisations.

Trends

Recent changes in the way hospital data for diabetes are recorded has made it difficult to compare counts over time. One consequence of the changes in recording procedure is an apparent, but not real, large increase in the number of hospitalisations where diabetes was recorded as the principal diagnosis compared with previous years.

Hospitalisations for diabetes, 2001–02

Number per 100,000 population



Source: AIHW National Hospital Morbidity Database.

Sex and age

In 2001–02, Australian males were more likely to be hospitalised for diabetes than females. This is true for both principal or additional diagnoses, and for most age groups.

Hospitalisations for diabetes increase steadily with age. Around 70% of hospitalisations for diabetes occur among those aged 60 years and over.

Length of stay in hospital

In 2001–02, the average length of stay in hospital (of those hospitalised for at least one night) for people with diabetes as the principal diagnosis was 10 days. In comparison, the average length of stay for all other principal diagnoses was 9 days. Diabetes also contributes to extended hospital stays for other conditions. When hospitalisations for diabetes as an additional diagnosis were taken into account, the average length of hospital stay (for those hospitalised for at least one night) for diabetes increased to 11 days compared with 9 days for persons without diabetes.

Deaths in hospital

In 2001–02, 3% of hospitalisations for diabetes (as a principal or additional diagnosis) ended in death.

Deaths

Diabetes was the sixth leading underlying cause of death among Australians in 2002, accounting for 3,329 deaths (2.5% of all deaths). However, when the number of deaths from diabetes as an associated cause as well as the underlying cause of death were combined, the number of deaths increased to 11,467 deaths (9% of all deaths). In other words, diabetes was three times as likely to be listed as an associated cause rather than the underlying cause of death.

Causes of death commonly listed with diabetes

Before 1998, deaths from diabetes were underestimated in Australian death reports, as diabetes was rarely listed alone as the underlying cause of death. However, since 1998, information on both underlying and associated causes of death has become available. When listed as an associated cause of death, diabetes predominantly occurs with heart, stroke and vascular diseases and, to a lesser extent, diseases of the genito-urinary system.

Of the deaths where diabetes was recorded as the underlying cause, coronary heart disease was listed as an associated cause in 50% of deaths in 2002. When diabetes was listed as an associated cause of death, coronary heart disease was the underlying cause in 24% of these deaths.

Trends

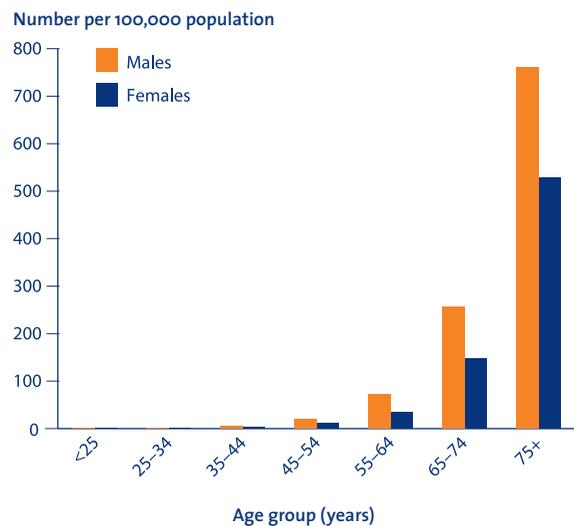
Death rates from diabetes (as an underlying cause) fell substantially over the second half of last century, particularly among females where there was a 66% decline since the early 1940s, when death rates for Australian females peaked. For Australian males, the diabetes death rate peaked in the late 1960s and has since declined by 17%. Between 1991–02, the death rate from diabetes (as the underlying cause of death) increased by around 9% among males, while the female death rate declined by about 6%.

Sex and age

In 2002, Australian males were more than one-and-a-half times as likely to die from diabetes (as the underlying cause of death) as Australian females.

Diabetes death rates increase dramatically with age, with 86% of all deaths occurring among those aged 65 years and over.

Deaths from diabetes, 2002



Source: AIHW National Mortality Database.

Aboriginal and Torres Strait Islander peoples

In 2000–02, Aboriginal and Torres Strait Islander peoples²³ died from diabetes (as the underlying cause of death) at almost 15 times the rate of other Australians.

²³ Includes data for only Queensland, Western Australia, South Australia and the Northern Territory as these states and territory are considered to have sufficient coverage of Indigenous Australian deaths.



Health inequalities

People with diabetes, 1999–00

Population subgroup	Men	Women	Persons
Per cent			
Age group (years)			
25–34	0.1	0.4	0.3
35–54	4.5*	3.8*	4.1*
55–74	18.4*	12.5*	15.4*
75 and over	23.6*	22.7*	23.0*
<i>Ages 25 and over (ASR)</i>	8.7	6.7	7.6
Socioeconomic status (highest level of education)			
Did not complete secondary school	10.5	6.8	8.1
Completed secondary school	9.5	5.1	6.8
TAFE/tertiary	7.8	7.4	7.7
Aboriginal and Torres Strait Islander status			
	n.a.	n.a.	n.a.
Region			
	n.a.	n.a.	n.a.

* Statistically significant difference when compared with the first row in the population subgroup.

n.a. Not available from this data source.

Notes

1. Based on measured data.
2. Data for ages 25 years and over.
3. All rates other than the age-specific rates are age-standardised (ASR) to the 2001 Australian population.

Source: AIHW analysis of the 1999–00 AusDiab Study.

Further reading

ABS 2003a. Causes of death, Australia, 2002. ABS Cat. No. 3303.o. Canberra: ABS.

ABS 2003b. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples. ABS Cat. No. 4704.o. Canberra: ABS.

AIHW 2003. National diabetes register: statistical profile, December 2001. AIHW Cat. No. CVD 24. Canberra: AIHW (Diabetes Series No. 4).

AIHW: Phillips G 2003. The impact of ICD coding changes for diabetes hospital morbidity data. AIHW Cat. No. CVD 26. Canberra: AIHW.

AIHW 2002. Diabetes: Australian facts 2002. AIHW Cat. No. CVD 20. Canberra: AIHW (Diabetes Series No. 3).

Craig M, Howard N, Silink M et al. 2000. The rising incidence of childhood Type 1 diabetes in New South Wales, Australia. *J Pediatr Endocrinol Metab* 13:363–72.

Dunstan D, Zimmet P, Welborn T et al. 2002. The rising prevalence of diabetes and impaired glucose tolerance: the Australian diabetes, obesity and lifestyle study. *Diabetes Care* 25(5):1–6.

IDF 2003. Diabetes atlas. 2nd ed. Brussels: IDF.

Kidney (renal) failure

Key points

- Kidney failure is both a risk factor for and a condition associated with heart, stroke and vascular diseases.
- Kidney failure was recorded as underlying or associated cause in 13,361 deaths in 2002 (10% of all deaths).
- There are no national figures on the prevalence of kidney failure. Data on those on treatment for end-stage renal disease (ESRD), the severe end of kidney failure, provide an approximation. There were 12,945 people (66 per 100,000 population) with ESRD receiving kidney replacement treatment (dialysis or kidney transplantation) at the end of 2002.
- In 2002, 1,855 people (9 per 100,000 population) with ESRD started kidney replacement treatment in Australia.
- Kidney failure is more common among Aboriginal and Torres Strait Islander peoples than among other Australians. During 2000–02, the age-standardised Indigenous death rate from kidney failure was around five times that of other Australians.

Kidney failure is a condition where much or all of the kidney function is lost. The kidney fails to adequately do its job of removing waste products from the blood and regulating the body water and chemical balance. Acute kidney failure is usually reversible. However, chronic kidney failure is a long-term condition where kidney function is lost progressively and irreversibly. ESRD is the final stage in the progressive deterioration of kidney function. In this situation, a person needs dialysis or a kidney transplant to remain alive. This section deals with kidney failure in relation to heart and blood vessel disease, and its risk factors.

Heart, stroke and vascular causes, risk factors and complications

Acute kidney failure may result, among other causes, from heart or blood vessel disease that limits blood flow to the kidneys. This can happen in heart failure, heart attack or heart valve disease, where the blood flow to the kidney from the heart is reduced.

It can also be due to a blockage (clot or embolus) in the vessels that supply blood to the kidneys (renal arteries). Patients undergoing major heart, stroke and vascular surgery may also have less blood reaching the kidneys. Complications of acute kidney failure include abnormal heart rhythms, heart attack and inflammation of the outer layer of the heart (pericarditis).

Chronic kidney failure may be caused by any condition that damages the normal structure and function of the kidney. Infections, diabetes and high blood pressure are the main causes—26%, 26% and 16%, respectively, according to the ANZDATA (Australia and New Zealand Dialysis and Transplant Registry) (see **Methods and data sources**). Other vascular causes include narrowing or blockages of the kidney vessels, or following interventions to the aorta, renal arteries or coronary arteries in people with atherosclerosis. People with kidney failure are at high risk of heart, stroke and vascular diseases.

Heart, stroke and vascular diseases are the most frequent cause of death in people with ESRD. Lifestyle changes and treatments to reduce the risk of heart, stroke and vascular events are especially important in this group.

Risk factors for kidney failure include certain kinds of infections, diabetes, high blood pressure, heredity, injury, overweight and obesity, tobacco smoking and use of certain pain killers.



How many Australians have kidney failure?

There are no national figures on the prevalence of kidney failure. The 1999–00 AusDiab Study (ages 25 years and over) provided some information on indicators of kidney disease: 1.1% of those surveyed had elevated blood creatinine, 2.5% had protein in their urine and 6.4% had blood in the urine. ANZDATA collects data on those on treatment for ESRD, the severe end of kidney failure, and thus provides a proxy measure of the prevalence and incidence of ESRD.

Prevalence

There were 12,945 people (66 per 100,000 population) with ESRD receiving kidney replacement treatment (dialysis or kidney transplantation) at the end of 2002. Of these, 5,740 (29 per 100,000 population) had had a kidney transplant and just over 7,200 (37 per 100,000 population) were on dialysis. These figures represent a 5% increase in the number of dialysis-dependent people and a 5% increase in the number of people living with kidney transplants compared with the previous year.

These increases are likely to have been due to a combination of increased incidence, better management and new technologies, and kidney replacement therapy being provided to older people.

Incidence

In 2002, 1,855 people (9 per 100,000 population) with ESRD started kidney replacement treatment in Australia. The average age of new patients was 59 years.

Associated heart, stroke and vascular conditions and risk factors

Among the people who started treatment for ESRD in 2002, 32% had coronary heart disease, 19% had peripheral vascular disease, 10% had had a stroke, 37% had diabetes, 12% were current tobacco smokers and 41% were former tobacco smokers.

Trends

In the last decade, the proportion of people starting treatment for ESRD who have heart, stroke and vascular diseases has remained steady but the proportion with Type 2 diabetes has increased.

Hospitalisations

In 2001–02, there were 11,594 hospitalisations for which kidney failure was the principal diagnosis (0.2% of all hospitalisations). In 47% of these, heart, stroke and vascular diseases were recorded as an additional diagnosis. However, kidney failure was more likely to be recorded as an additional diagnosis, with a principal diagnosis of dialysis in 78% of such cases. There were 636,026 hospitalisations for dialysis (10% of all hospitalisations). This represents multiple admissions for a smaller number of patients as each receives dialysis two to three times each week. In addition, there were 111 hospitalisations with a principal diagnosis of thrombosis/occlusion of the renal artery and 632 for hypertensive kidney disease or high blood pressure secondary to other kidney disorders.

Procedures

In 2001–02 there were 570 kidney transplant operations. There were also 640,202 dialysis procedures, 22 procedures for renal bypass surgery, 29 for renal artery endarterectomy, and nine for embolectomy or thrombectomy of renal arteries.

Deaths

Kidney failure was the underlying cause of death for 1,925 Australians in 2002 (1.4% of all deaths). However, kidney failure is seven times as likely to be listed as an associated cause of death, bringing the total number of deaths where this condition was involved to 13,361 (10% of all deaths).

Kidney failure is rarely listed as the only cause of death, without any associated causes. Where kidney failure was the underlying cause of death in 2002, heart failure was listed as an associated cause in 29% of cases, coronary heart disease in 26% and stroke in 8%. When kidney failure was listed as an associated cause, heart, stroke and vascular diseases were the underlying cause of death in 41% of cases.

Cardiac events are the most common cause of death in people with ESRD. Of the 1,185 deaths among people on kidney replacement treatment for ESRD in 2002, 37% were due to heart disease (mainly cardiac arrest and heart attack) and 5% to stroke.

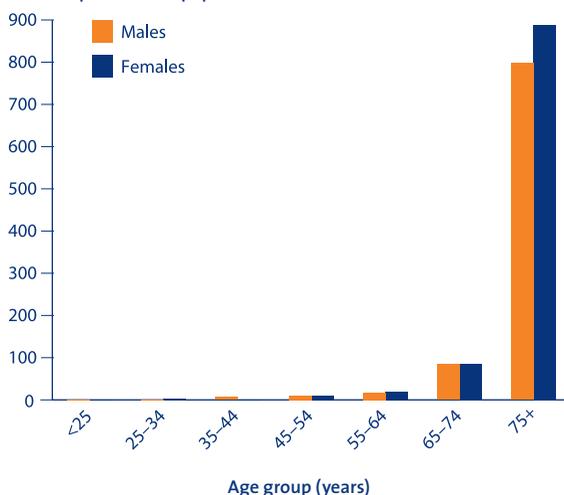
Sex and age

In 2002, males were one-and-a-half times as likely to die from kidney failure (as the underlying cause of death) as females.

Death rates from kidney failure increase markedly with age, with 88% of deaths occurring among those aged 75 years and over.

Deaths from kidney failure, 2002

Number per 100,000 population



Source: AIHW National Mortality Database.

Aboriginal and Torres Strait Islander peoples

Deaths from kidney failure occur at much higher rates among Indigenous Australians compared with other Australians. During 2000–02, in Queensland, Western Australia, South Australia and the Northern Territory, there were 63 Indigenous deaths due to kidney failure. This corresponds to an age-standardised Indigenous death rate of around five times that of other Australians.

Further reading

Braunwald E & Harrison TR 2001. *Harrison's principles of internal medicine*. 15th ed. New York: McGraw-Hill.

Russ GR & McDonald SP (eds) 2003. *ANZDATA registry 26th report. Australia and New Zealand dialysis and transplant registry*. Adelaide: ANZDATA.

Cass A, Cunningham J, Wang Z et al. 2001. Regional variation in the incidence of end-stage renal disease in Indigenous Australians. *Med J Aus* 175:24–7.