AIHW
AUSTRALIAN INSTITUTE OF HEALTH & WELFARE

8

bulletin

A growing problem

Trends and patterns in overweight and obesity among adults in Australia, 1980 to 2001

Highlights

The prevalence of obesity has risen so dramatically worldwide that the World Health Organization has called it a 'global epidemic'. Australia is no exception.

Trends based on self-reported data

- Self-reported data show that in 2001 an estimated 2.4 million Australian adults were obese—16% of men and 17% of women aged 18 years and over.
- A further 4.9 million Australian adults were estimated to be overweight but not obese—42% of men and 25% of women aged 18 years and over.
- The prevalence of obesity has increased significantly over time. Between 1989–90 and 2001, the prevalence of obesity increased from 9% to 16% in men and from 10% to 17% in women.

Trends based on measured data

Data based on measured height and weight show even higher proportions of adults are overweight:

- In 1999–2000, 17% of men and 20% of women aged 25–64 years were classified as obese.
- A further 49% of men and 27% of women aged 25–64 years were classified as overweight but not obese.
- Between 1980 and 1999–2000 the proportion of men aged 25–64 years who were obese rose from 9% to 17%. In the same period, the obesity rate among women of that age more than doubled, from 8% to 20%.

CONTENTS

A growing problem

Trends in waist circumference

- Just over one fifth (21%) of men and 28% of women aged 25–69 years were abdominally obese in 1999–2000.
- A further 28% of men and 21% of women aged 25–69 years were abdominally overweight but not obese.
- Between 1989 and 1999–2000 the prevalence of abdominal obesity increased from 14% to 21% in men and from 16% to 28% in women.

International comparisons

It is difficult to find directly comparable international data. The following can, however, be said:

- Self-reported data show that the prevalence of obesity among Australians aged 25–64 years (18%) is about 4 percentage points lower than that for adults of the same age in the United Kingdom and the United States.
- Self-reported data show that the prevalence of overweight but not obese among Australians aged 25–64 years (35%) is also around 3 to 4 percentage points behind the rates for the United Kingdom (39%) and the United States (38%).
- Measured data show that the prevalence of obesity is slightly higher among Australians aged 25–64 years (20%) than among people of the same age in New Zealand (18%) but twice as high as in Italy (9%).
- In contrast, New Zealand has a higher prevalence of overweight but not obese than Australia— 43% compared with 38%. The corresponding rate for Italy is substantially lower, at 33%.

Introduction

The World Health Organization (WHO) has called the worldwide rise in obesity a 'global epidemic' (WHO 2000). Current levels of obesity in Australia mean that we are not immune from this problem. Analysis of the Australian Bureau of Statistics (ABS) 2001 National Health Survey found that, on the basis of self-reported height and weight, around 16% of Australians aged 18 years and over were obese and a further 34% were overweight but not obese. In contrast, data from the 1989–90 National Health Survey showed that 9% of Australians aged 18 years and over were obese and 30% were overweight but not obese. Thus in only 13 years the proportion of obese Australian adults increased substantially—by almost 80%—and the proportion of overweight but not obese Australian adults increased by 14%.

This bulletin documents the evidence from national cross-sectional surveys of overweight and obesity among adults in Australia during the past two decades, puts the size of the problem in perspective, and compares the prevalence in Australia with the prevalence in other developed countries. Future bulletins will focus on trends by socio-demographic and economic factors and on the impact of overweight and obesity in Australia in terms of a number of health-related measures.

Background

The association between overweight and an increased risk of ill-health is well known. People who are overweight, particularly those who are obese, have higher rates of mortality and morbidity than people of healthy weight, both overall and from a range of specific conditions (WHO 2000). Among these conditions are coronary heart disease, Type 2 diabetes, gall bladder disease, ischaemic stroke, osteoporosis, sleep apnoea, and some cancers. Obesity can also have psychosocial and psychological consequences. Among people who are overweight, weight loss can reduce the incidence and severity of some of these conditions, as well as improving cholesterol levels, blood pressure and glycaemic control and decreasing the symptoms of osteoarthritis (WHO 2000).

Overweight is a matter of energy imbalance. Although many factors may influence an individual's weight, at a basic level weight gain results when, over a sufficient period, the energy intake from the diet exceeds the energy expended through physical activity (WHO 2000). In the long term even a slight imbalance can result in increased weight. Attention to diet and physical activity is therefore important, not only for preventing weight gain but also for weight loss and subsequent maintenance.

Apart from genetic factors, which are not modifiable, other influences on weight are social, economic and cultural factors and the nature of the physical environment. These tend to affect weight through their interaction with dietary behaviours and patterns of physical activity. The large-scale environmental and cultural changes inherent in the modernisation of society—particularly in the latter half of the 20th century—are considered to be the driving forces behind the global epidemic of obesity (WHO 2000). Although evidence on the specific behaviours and environmental conditions that are responsible for the epidemic is currently limited, a number of changes that have occurred might have had an impact. The increased use of cars has led not only to a decrease in transport-related activity but also to a reduction in access to and the construction of walking and cycling paths. Increased traffic and concerns about personal safety might also have limited walking, cycling and activities in public places, particularly among children. Further, increased use of labour-saving devices and greater engagement in passive forms of entertainment such as television, computers and video games have increased the amount of time spent in a sedentary or minimally active state (Cameron et al. 2003). These factors, combined with the availability of high-calorie 'fast foods' and drinks and larger portion sizes, have given rise to an environment and a culture conducive to the development of obesity. For this reason some experts argue that intervention and prevention strategies aimed at changing the environment to one that promotes healthy, active living will be more successful in addressing the obesity problem than strategies designed to work solely at the individual level.

A growing problem

Trends in body mass index

The most common measure used for classifying weight, the body mass index (BMI), is calculated as a person's weight in kilograms divided by the square of their height in metres. A classification defined by the WHO is generally used to group people aged 18 years and over into categories of overweight and obesity according to their BMI (WHO 2000) (Table 1). In this bulletin the WHO definitions for overweight (BMI ≥ 25) and obese (BMI ≥ 30) have been used, however, the WHO category of 'preobese' (25 ≤ BMI < 30) is referred to as 'overweight but not obese'.

The WHO classification for adults is not suitable for children and adolescents. Cole et al. (2000) have developed standard BMI cut-off points for children and adolescents aged 2 to 17 years. In addition, the WHO classification for adults may not be suitable for all ethnic groups, who may have equivalent levels of risk at a lower BMI (e.g. people from China or Japan) or higher BMI (e.g. people from Polynesia) (IDI 2000; WHO 2000).

Table 1: Classification of BMI for people aged 18 years and over

BMI (kg/m²)	Classification	Risk of co-morbidities
Less than 18.5	Underweight	Low (but increased risk of other clinical problems)
18.5 to less than 25	Normal weight range	Average
25 or more	Overweight	
25 to less than 30	Overweight but not obese	Increased
30 or more	Obese	
30 to less than 35	Obese class 1	Moderate
35 to less than 40	Obese class 2	Severe
40 or more	Obese class 3	Very severe

Source: WHO 2000

In Australia, national surveys have used both measured and self-reported information on height and weight in order to calculate BMI. Trends based on measured and self-reported data from several national (or quasi-national) cross-sectional surveys are presented separately in the sections that follow. When interpreting the data, note that rates based on self-reported data should not be compared with those based on measured data. This is because BMI obtained from self-reported data generally underestimates a person's true BMI (see the next section for more detail) and thus prevalence estimates based on such data will be lower than the actual values. Despite this, self-reported data are useful for monitoring trends. Box 1 summarises the data sources used in this bulletin and further details are provided in Appendix A.

Box 1: Data sources used in this bulletin

Survey	Responsible organisation	Year	Scope (in this bulletin)	Sample size (in this bulletin)	Measure of overweight
National Health Survey	Australian Bureau of Statistics	1989–90	National, 18+ years	37,638	Self-reported BMI
		1995	National, 18+ years	35,414	Self-reported BMI
		2001	National, 18+ years	16,355	Self-reported BMI
Risk Factor Prevalence Surveys	National Heart Foundation of Australia	1980	State capital cities, 25–64 years	5,550	Measured BMI
		1983	State capital cities, 25–64 years	7,562	Measured BMI
		1989	All capital cities, 25–64 years	7,667	Measured BMI
		1989	All capital cities, 25–69 years	8,321	Measured waist circumference
National Nutrition Survey	Australian Bureau of Statistics, the then Dept.of Health and Aged Care	1995	Urban areas, 25–64 years	4,792	Measured BMI
		1995	Urban areas, 25–69 years	5,244	Measured waist circumference
Australian Diabetes, Obesity and Lifestyle Study (AusDiab)	International Diabetes Institute	1999–2000	Urban areas (excluding ACT), 25–64 years	5,560	Measured BMI
			Urban areas (excluding ACT), 25–69 years	6,032	Measured waist circumference

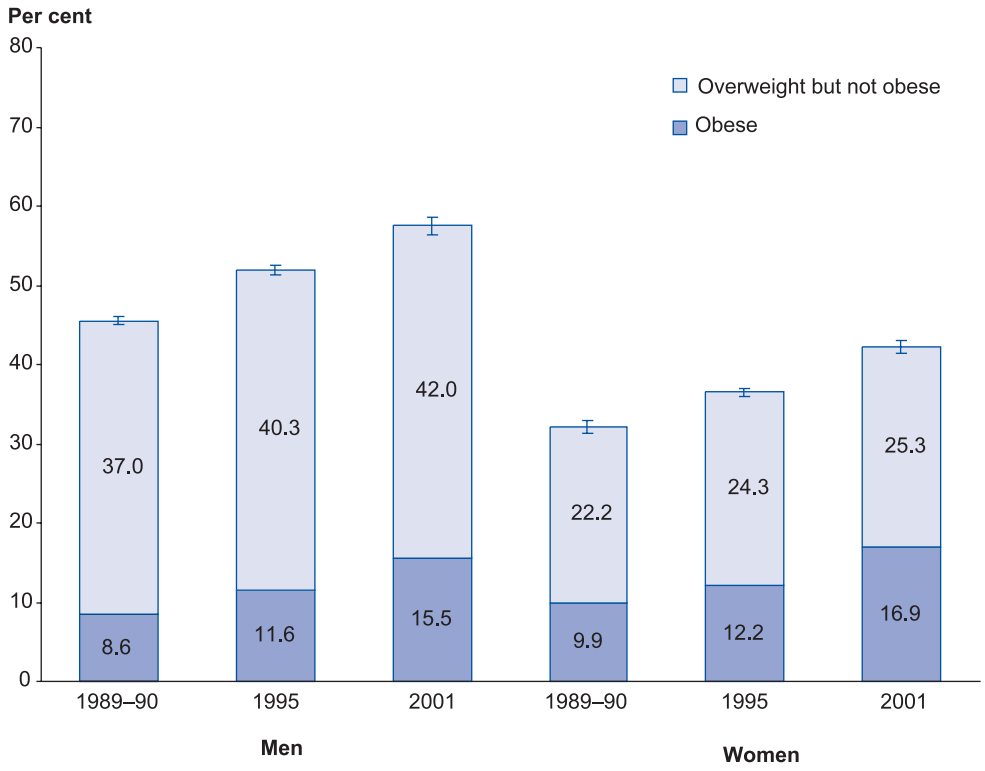
Trends based on self-reported data

Analysis of the ABS National Health Surveys conducted between 1989–90 and 2001 suggests a rapid rise in the prevalence of obesity among both men (an 80% increase) and women (a 71% increase) during the 13-year period, with a smaller increase in the prevalence of overweight but not obese (14% in both men and women) (Figure 1). On the basis of self-reported height and weight, in 2001 an estimated 16% of men and 17% of women aged 18 years and over were obese—a total of 2.4 million obese Australian adults. A further 4.9 million Australian adults (42% of men and 25% of women aged 18 years and over) were estimated to be overweight but not obese.

Previous comparisons of measured and self-reported height and weight have shown that people tend to overestimate their height and underestimate their weight (Flood et al. 2000; Niedhammer et al. 2000; ABS 1998a; Waters 1993). Further, shorter people tend to overestimate their height to a greater extent than taller people, and lighter people tend to report their weight more accurately than heavier people. The result of this is that BMI is not accurately classified using self-reported information and such data may underestimate the true prevalence rates of overweight and obesity. Analysis of the 1995 National Health Survey (self-reported data) and the 1995 National Nutrition Survey (a subsample of the National Health Survey that recorded measured data) showed that self-reported data underestimated the true prevalence of obesity by an average of around 6 percentage points and the true prevalence of overweight but not obese by an average of around 5 percentage points. Crudely applying these adjustments to the estimates based on self-reported data in the 2001 National Health Survey suggests that there may have been as many as 3.3 million people aged 18 years and over who were obese in 2001 and 5.6 million who were overweight but not obese.

A growing problem

Figure 1: Prevalence of overweight and obesity by BMI: self-reported height and weight, Australian men and women aged 18 years and over, 1989–90 to 2001



Notes

1. Age-standardised to the 2001 Australian population.

2. Error bars indicate 95% confidence intervals for the prevalence of overweight (BMI ≥ 25).

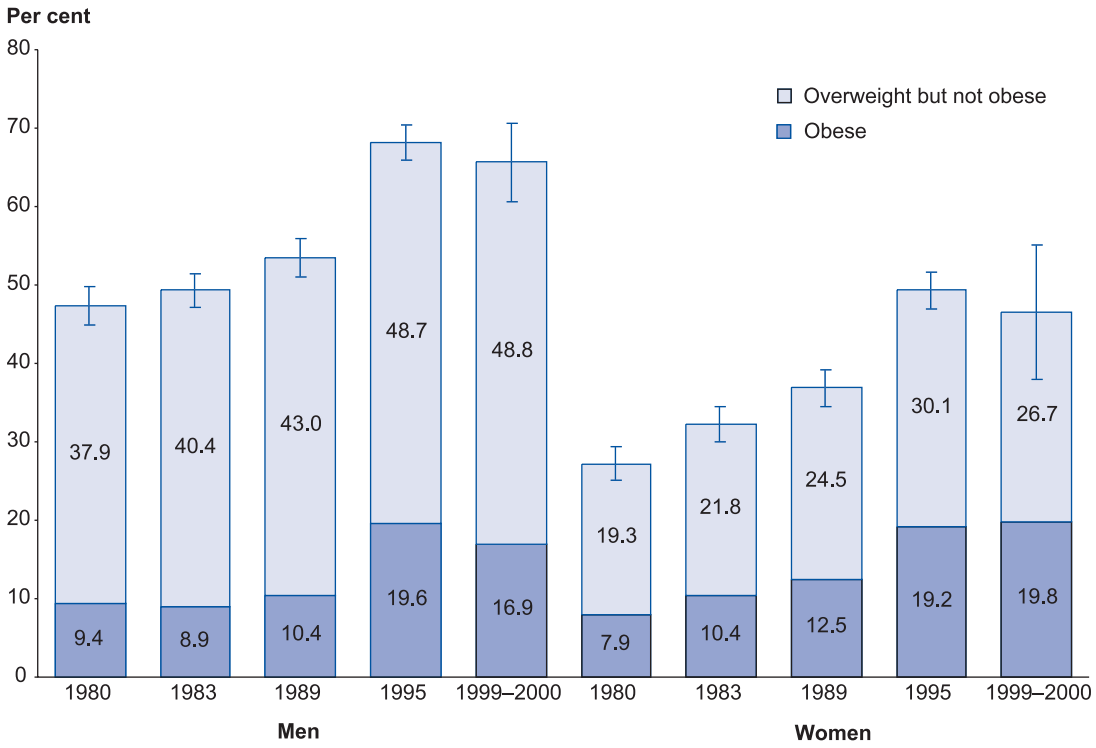
Sources: AIHW analysis of the 1989–90, 1995 and 2001 National Health Surveys.

Trends based on measured data

The rapid rise in the prevalence of obesity based on self-reported height and weight is supported by data derived from measured height and weight. Between 1980 and 1999–2000 the proportion of obese men aged 25–64 years and living in Australian capital cities and urban areas rose by almost 80%, from 9.4% to 16.9% (Figure 2). In the same period the obesity rate among women aged 25–64 years rose 2.5 times, from 7.9% to 19.8%.

Although the proportions of obese men and overweight but not obese women appear to have fallen slightly between 1995 and 1999–2000, the falls were not statistically significant. The 1999–2000 estimates are based on data collected in the Australian Diabetes, Obesity and Lifestyle Study (AusDiab). This study recorded a response rate of around 35%, and the impact of any non-response bias is yet to be determined. Further, the method used to collect the data may be a factor in the apparent decrease. The study involved participants coming to a central clinic, where anthropometric and other data were collected in person by the study investigators. It has been suggested that people who are overweight, particularly those who are obese, may be less likely to participate in surveys where their weight will be assessed, thus causing bias through self-selection and an underestimation of overweight prevalence in the population (Magnus et al. 1983).

Figure 2: Prevalence of overweight and obesity by BMI: measured height and weight, Australian men and women aged 25–64 years, 1980 to 1999–2000



Notes

1. Age-standardised to the 2001 Australian population.

2. Capital cities and urban areas only.

3. Error bars indicate 95% confidence intervals for the prevalence of overweight (BMI ≥ 25).

Sources: AIHW analysis of 1980, 1983, 1989 Risk Factor Prevalence Surveys; 1995 National Nutrition Survey; 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Trends in waist circumference

As the weight of Australians has increased so too have our waistlines. Excess weight accumulated in the abdominal region is a good indicator of increased risk of developing chronic disease, particularly Type 2 diabetes and coronary heart disease (NIH, National Heart Lung and Blood Institute 1998). Although the waist-to-hip ratio has traditionally been used to measure the prevalence of abdominal overweight, more recent evidence suggests that waist circumference alone may identify people at health risk both from being overweight and from having a central fat distribution (Lean et al. 1995; Han et al. 1995; Pouliot et al. 1994; Seidell et al. 1992).

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 (WHO 2000). BMI is more commonly used, however, particularly in self-report surveys, since people are much more likely to be able to report or estimate their height and weight than their waist circumference.

A growing problem

There are currently no standard cut-offs for waist circumferences to indicate increased risk of health problems. Current evidence, however, suggests that waist circumferences greater than or equal to 94 cm in men and greater than or equal to 80 cm in women indicate increased risk (WHO 2000 as described by Han et al. 1995). Waist circumferences greater than or equal to 102 cm in men and greater than or equal to 88 cm in women indicate substantially increased risk. As with BMI, this classification is not suitable for use in people aged less than 18 years; and again, the cut-off points may not be suitable for all ethnic groups. Table 2 shows the classification of waist circumference used to define abdominal overweight but not obese and abdominal obesity in this bulletin.

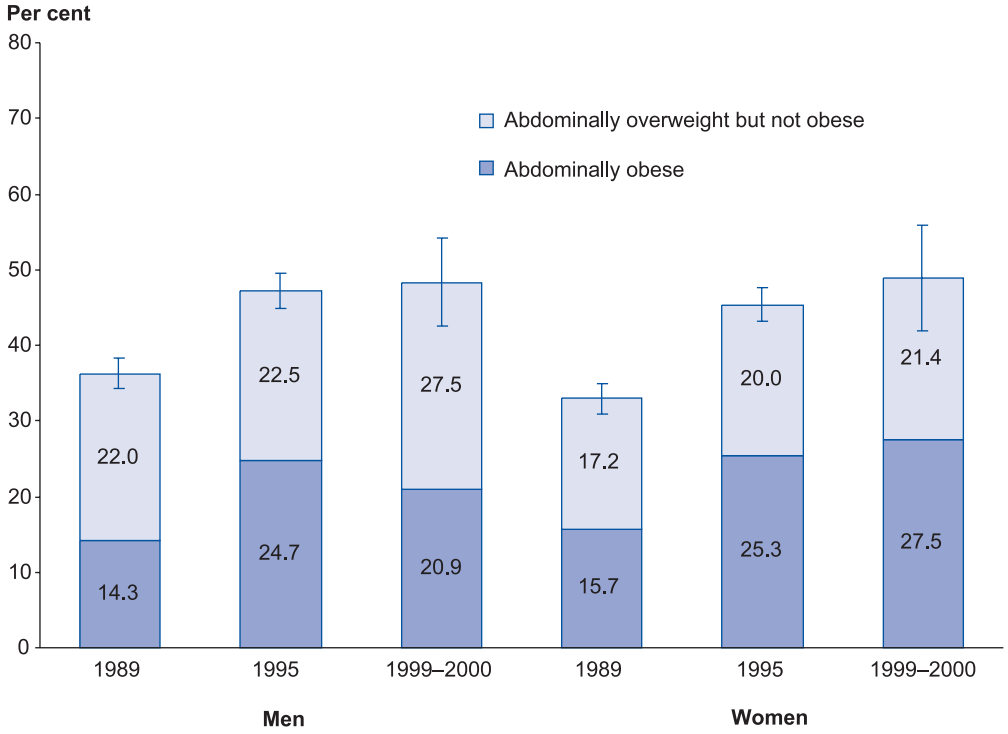
Table 2: Classification of waist circumference for people aged 18 years and over

	Waist circumference		
Classification (in this bulletin)	**Men**	**Women**	**Risk of metabolic complications**
Abdominally overweight but not obese	≥ 94 cm and < 102 cm	≥ 80 cm and < 88 cm	Increased
Abdominally obese	≥ 102 cm	≥ 88 cm	Substantially increased

In 1999–2000, 21% of men and 28% of women aged 25–69 years and living in Australian capital cities and urban areas were abdominally obese (Figure 3). A further 28% of men and 21% of women were abdominally overweight but not obese. Since 1989 the prevalence of abdominal obesity has increased by 46% in men and 75% in women aged 25–69 years, while the proportion of those who are abdominally overweight but not obese has increased by around 25% in both men and women of that age. It is noteworthy that the proportion of men who were abdominally obese fell between 1995 (24.7%) and 1999–2000 (20.9%), although the fall was not statistically significant. The fall might be a result of differences in the survey methodology as described in the preceding section.

It is interesting to compare the prevalence rates of overweight but not obese and obesity based on measured BMI with those based on waist circumference. It should, however, be remembered that BMI and waist circumference measure different aspects of obesity, so prevalence rates from the two methods should not really be directly compared. In 1999–2000 men were more likely to be classified as overweight on the basis of measured BMI (66%) than on the basis of waist circumference (48%) (Figures 2 and 3). This difference is mainly a result of the difference in the prevalence of overweight but not obese (49% based on BMI and 28% based on waist circumference), since the prevalence of obesity was fairly similar using both methods (17% based on BMI and 21% based on waist circumference). In contrast, women were slightly more likely to be classified as overweight on the basis of waist circumference (49%) than on the basis of measured BMI (47%).

Figure 3: Prevalence of abdominal overweight and obesity: measured waist circumference, Australian men and women aged 25–69 years, 1989 to 1999–2000



Notes

1. Age-standardised to the 2001 Australian population.

2. Capital cities and urban areas only.

3. Error bars indicate 95% confidence intervals for the prevalence of abdominal overweight.

Sources: AIHW analysis of 989 Risk Factor Prevalence Survey; 1995 National Nutrition Survey; 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

It is also noteworthy that the differentials between male and female prevalence rates for overweight but not obese differ according to which measure is used. Using measured BMI, the prevalence of overweight but not obese since 1989 has been around 70% higher on average for males than for females. In contrast, using measured waist circumference, the prevalence of overweight but not obese is about 23% higher on average for men compared with women. There is, however, little difference in the prevalence of obesity between men and women using either measure. There has been some criticism of BMI as an indicator of overweight and obesity because of its inability to account for the heavier weight of muscle mass (Gallagher et al. 1996; WHO 2000). This may have more impact on classification for males than for females.

A growing problem

Putting the prevalence rates and trends into perspective

As discussed, the current rates of overweight and obesity based on self-reported height and weight show that 2.4 million Australians (around 16%) aged 18 years and over were obese and a further 4.9 million were overweight but not obese (around 34%) in 2001. Given that the prevalence of obesity based on self-reported data may be underestimated by around 6 percentage points, it can be said that as many as 3.3 million Australians might have been obese in 2001—slightly less than the total population of Melbourne (ABS 2003). Similarly, adjusting the prevalence of overweight but not obese by 5 percentage points suggests that as many as 5.6 million Australians—equivalent to the combined populations of Sydney and Perth—might have been overweight but not obese in 2001.

On the basis of self-reported data, 9% of men and 10% of women aged 18 years and over were obese in 1989–90. If these prevalence rates are applied to the 2001 estimated resident population, 1.4 million men and women (9% of the population aged 18 years and over) would be obese. But an estimated 2.4 million men and women were obese in 2001. This implies that there were 1.0 million more people—slightly less than the population of Adelaide—who were obese in 2001 than would have been the case had there been no increase in the prevalence of obesity between 1989–90 and 2001. Similarly, 0.6 million more Australians aged 18 years and over were overweight but not obese in 2001 than would have been the case had there been no increase in the prevalence between 1989–90 and 2001.

It should be noted that national cross-sectional population surveys are not the only source of data available for documenting the epidemic of obesity in Australia. For example, in their large, multi-ethnic community prospective study of Australian adults—the Melbourne Collaborative Cohort Study—Ball et al. (2003) found that over five years the participating men and women (aged 35–69 years at baseline) gained an average of 1.58 kilograms and 2.42 kilograms respectively.

International comparisons

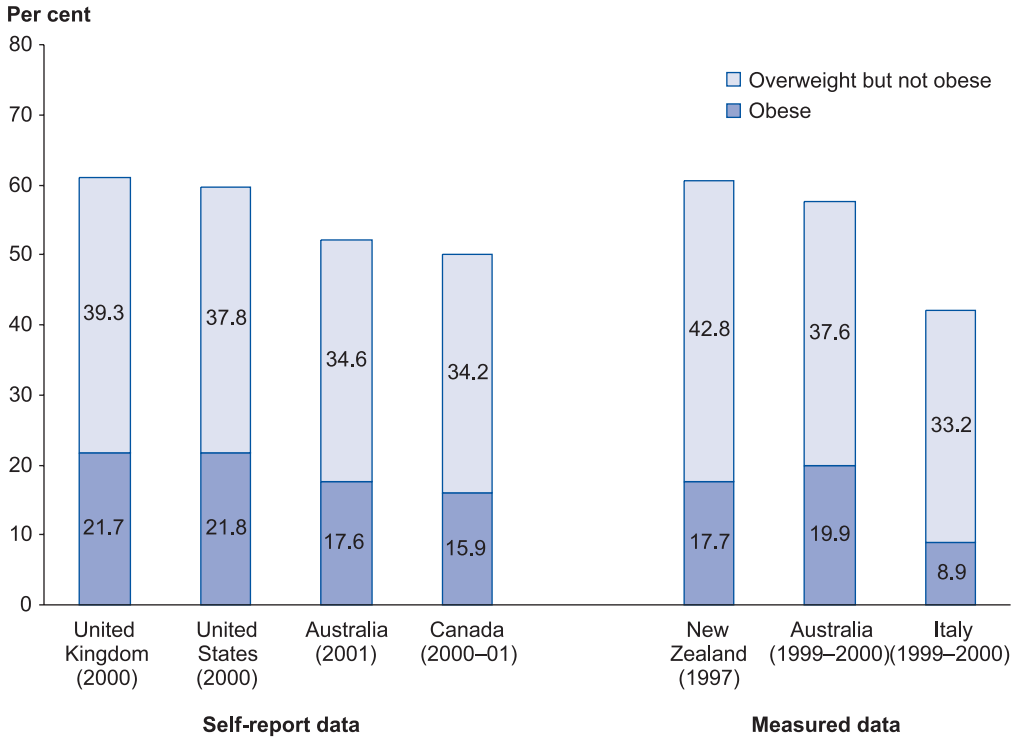
Results from the 2001 National Health Survey show that around 16% of Australian adults are obese and a further 34% are overweight but not obese, but how do we compare with the rest of the world? There are only limited international data that are directly comparable with Australian data in terms of the age groups included. Although there is a wealth of international data (e.g. see WHO 2000; WHO 2003), some countries collect and report data based on measured height and weight while others use self-reported height and weight. In addition, some countries use different BMI cut-off points to classify overweight and obesity. These variations mean it is impossible to make direct comparisons.

A comparison of results based on recent data for people aged 25–64 years from a number of developed nations shows that, while Australia is not the nation with the 'biggest' problem, we are not far behind (Figure 4).

International comparisons based on self-reported data show that the prevalence of obesity among Australian adults aged 25–64 years (at 17.6%) is only about 4 percentage points behind the rates for the United States (21.8%) and the United Kingdom (21.7%).

Comparisons based on measured data show that our closest neighbour, New Zealand, has a lower prevalence of obesity (17.7%) than Australia (19.9%) but has the highest rate of overweight but not obese (42.8%) among the three countries compared (the third one being Italy). In contrast, Italy has an obesity rate that is less than half that of Australia, with only 9% of people aged 25–64-years having a BMI of 30 or more.

Figure 4: Prevalence of overweight and obesity: selected countries, people aged 25–64 years, 1997 to 2001



Notes

1. Age-standardised to the WHO World Standard population.

2. For New Zealand Maori and Pacific peoples, a BMI of 26 to less than 32 indicates overweight but not obese while a BMI of 32 or more indicates obesity.

Sources

Self-reported data: Health Survey for England 2000; US Behavioural Risk Factor Surveillance System 2000; 2001 National Health Survey (Australia); Canadian Community Health Survey 2000–01.

Measured data: 1997 National Nutrition Survey (New Zealand); 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab); 1999–2000 Survey on Health Conditions of the Population and Recourse to Health Services (Italy).

A growing problem

What of the future?

Although the future cannot be predicted with any certainty, it is interesting to speculate about what the prevalence of overweight might be in Australia in 2010 and 2020. One scenario would be to look simply at the effect of the ageing of the population on the future prevalence of overweight by assuming that the current rates remain stable. For example, applying the current (2001) rates of obesity based on self-reported data to the projected populations for 2010 and 2020 suggests that 2.7 million Australians aged 18 years and over will be obese by 2010 and 3.0 million by 2020. That is, applying the current obesity rates to the projected population in 2010 suggests that by 2010 there would be a further 300,000 obese Australians aged 18 years and over beyond the number in 2001 (2.4 million) simply as a result of the ageing of the population. By 2020 there would be a further 600,000 obese Australians aged 18 years and over compared with 2001. Similarly, in 2010 there would be 5.6 million overweight but not obese Australians aged 18 years and over (700,000 more than in 2001) and the number would rise to 6.3 million by 2020 (1.4 million more than in 2001).

Another scenario would be to assume that the future trend in Australia will mirror the trend in the United States, where rates of overweight but not obese and obesity have been consistently higher than in Australia over time. For example, 21% of people aged 18 years and over in the United States in 2001 were obese on the basis of self-reported height and weight (BRFSS 2003). The corresponding prevalence rate for Australia in 2001 was 16%, which corresponds to the rate observed in the United States in 1995. Thus, if it is assumed that in six years' time the prevalence of obesity in Australia will reach 21%, then 3.3 million Australians aged 18 years and over will be obese in 2007 (900,000 more than in 2001).

It should be noted, however, that there are many other possible scenarios for the future: the numbers just shown are only examples of what might happen.

Conclusion

The prevalence of obesity in Australia has been, and may still be, increasing at an alarming rate. Self-reported data show that at present about 16% of the population aged 18 years and over is obese, following an increase in the prevalence of almost 80% since 1989. Measured data suggest that the current obesity rate is even higher, at 17% for men and 20% for women aged 25–64 years. If the proportion of people who are overweight but not obese is also taken into account then, at present, two-thirds of men and nearly half of women aged 25–64 years are overweight (i.e. BMI ≥ 25) on the basis of measured height and weight.

Overweight, in particular obesity, has significant health, social and economic impacts. The rise in overweight and obesity has many potential health effects, such as an increased incidence of Type 2 diabetes, respiratory diseases, coronary heart disease, cancers, hypertension, high cholesterol and stroke. There are also the more practical considerations—the sizing of clothing; the sizes of chairs and seats in the home, at work and in public places such as cinemas and restaurants; the dimensions of cars and public transport vehicles; and so on. Given that overweight and obesity are largely preventable, and that weight loss in people who are obese or overweight offers significant health benefits (NIH, National Heart Lung and Blood Institute 1998; WHO 2000), there is enormous scope for improving the health of Australians by promoting environmental and lifestyle changes, such as increased physical activity and dietary modification, to reverse the trend.

References

ABS (Australian Bureau of Statistics) 1996. National Health Survey Users' Guide, Australia 1995. ABS Cat. No. 4363.0. Canberra: ABS.

ABS (Australian Bureau of Statistics) 1998a. How Australians measure up. ABS Cat. No. 4359.0. Canberra: ABS.

ABS (Australian Bureau of Statistics) 1998b. National Nutrition Survey Users' Guide, Australia 1995. ABS Cat. No. 4801.0. Canberra: ABS.

ABS (Australian Bureau of Statistics) 2000. Population projections, Australia, 1999–2101. ABS Cat. No. 3222.0. Canberra: ABS.

ABS (Australian Bureau of Statistics) 2002. National Health Survey 2001: summary of results, Australia. ABS Cat. No. 4364.0. Canberra: ABS.

ABS (Australian Bureau of Statistics) 2003. Year Book Australia 2003. ABS Cat. No. 1301.0. Canberra: ABS.

Ball K, Crawford D, Ireland P & Hodge A 2003. Patterns and demographic predictors of 5-year weight change in a multi-ethnic cohort of men and women in Australia. Public Health Nutrition 6(3):269–81.

BRFSS (Behavioral Risk Factor Surveillance System) 2003. Trends tables. National Center for Chronic Disease Prevention and Health Promotion, Atlanta GA. Viewed 29 July 2003, <http://www.cdc.gov/brfss>.

Cameron AJ, Welborn TA, Zimmet PZ, Dunstan DW, Owen N, Salmon J et al. 2003. Overweight and obesity in Australia: the 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab). Medical Journal of Australia 178(9):427–32.

Cole TJ, Bellizzi MC, Flegal KM & Dietz WH 2000. Establishing a standard definition for child overweight and obesity worldwide: international survey. British Medical Journal 320:1–6.

Dunstan D, Zimmet P, Welborn T, Sicree R, Armstrong T, Atkins R et al. (AusDiab Steering Committee) 2001. Diabesity and associated disorders in Australia—2000: the accelerating epidemic. The Australian Diabetes, Obesity and Lifestyle Study (AusDiab). Melbourne: International Diabetes Institute.

Flood V, Webb K, Lazarus R & Pang G 2000. Use of self-report to monitor over-weight and obesity in populations: some issues for consideration. Australian and New Zealand Journal of Public Health 24:96–9.

Gallagher D, Visser M, Sepulveda D, Harris T & Heymsfield SB 1996. How useful is body mass index for comparison of body fatness across age, sex, and ethnic groups? American Journal of Epidemiology 143(3):228–39.

Han TS, van Leer EM, Seidell JC, & Lean MEJ 1995. Waist circumference action levels in the identification of cardiovascular risk factors: prevalence study in a random sample. British Medical Journal 311:1401-05.

IDI (International Diabetes Institute) 2000. The Asia–Pacific perspective: redefining obesity and its treatment. Viewed 25 July 2003, <http: www.obesityasiapacific.com/default.htm>.

A growing problem

Lean MEJ, Han TS & Morrison CE 1995. Waist circumference as a measure for indicating need for weight management. British Medical Journal 311:158–61.

Magnus P, Armstrong B & McCall M 1983. A comparison of populations self-selected and randomly selected for coronary risk factor screening. Preventive Medicine 12:340–50.

NIH (National Institutes of Health), National Heart, Lung and Blood Institute 1998. Clinical guidelines on the identification, evaluation and treatment of overweight and obesity in adults: the evidence report. NIH publication no. 98-4083. Bethesda MD: National Institutes of Health.

Neidhammer I, Bugel I, Bonenfant S, Goldberg M & Leclerc A 2000. Validity of self-reported weight and height in the French GAZEL cohort. International Journal of Obesity and Related Metabolic Disorders 24(9):1111–8.

Pouliot M-C, Despres J-P, Lemieux S, Moorjani S, Bouchard C, Tremblay A et al. 1994. Waist circumference and abdominal sagittal diameter: Best simple anthropometric indexes of abdominal visceral adipose tissue accumulation and related cardiovascular risk in men and women. American Journal of Cardiology 73:460–8.

Risk Factor Prevalence Study Management Committee 1981. Risk Factor Prevalence Study: No. 1—1980. Canberra: National Heart Foundation of Australia.

Risk Factor Prevalence Study Management Committee 1984. Risk Factor Prevalence Study: No. 2—1983. Canberra: National Heart Foundation of Australia.

Risk Factor Prevalence Study Management Committee 1990. Risk Factor Prevalence Study: No. 3—1989. Canberra: National Heart Foundation of Australia & Australian Institute of Health.

Seidell JC, Cigolini M, Charzewska J, Ellsinger B-M, Deslypere JP & Cruz A 1992. Fat distribution in European men: a comparison of anthropometric measurements in relation to cardiovascular risk factors. International Journal of Obesity 16:17–22.

Waters AM 1993. Assessment of self-reported height and weight and their use in the determination of body mass index. Canberra: Australian Institute of Health and Welfare.

WHO (World Health Organization) 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. Technical report series 894. Geneva: WHO.

WHO (World Health Organization) 2003. The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. Geneva: WHO.

Appendix A: Methods and data sources

Rates

Age-standardised rates are used to remove the influence of age when comparing populations with different age structures. The 2001 Australian population has been used as the standard population in all Australian comparisons. For international comparisons, the WHO World Standard population has been used.

Confidence intervals (error bars)

Confidence intervals are an indication of the amount of variation associated with an estimate. The graphs in this bulletin show 95% confidence intervals as error bars on each column. These indicate that, if the process that led to the estimated value were repeated many times, in 95% of cases the true population value would fall within that confidence interval.

Data sources

The Risk Factor Prevalence Studies were conducted by the National Heart Foundation of Australia in 1980, 1983 and 1989. They were designed to provide national measurements for blood pressure, blood lipids, height and weight, and waist and hip circumference, as well as self-reported information on smoking, alcohol consumption, physical activity, dietary behaviour and use of oral contraceptives (Risk Factor Prevalence Study Management Committee 1981; 1984; 1990). The three studies combined collected information from a sample of around 22,000 adults living in Australian capital cities (Canberra and Darwin were not included in the 1980 and 1983 studies) between May–June and December of the study year.

In all three studies participants were weighed and had their height measured by a trained nurse. In the 1989 study, participants also had their waist circumference measured; and information on self-reported height and weight was also collected.

The National Health Surveys, conducted in 1989–90, 1995 and 2001 by the Australian Bureau of Statistics, were designed to obtain national information on the health status of Australians, their use of health services and facilities, and health-related aspects of their lifestyle. In each survey, information on self-reported height and weight was collected from respondents aged 15 years and over. The 1989–90 survey collected information from a sample of 54,600 respondents (of whom 41,500 were aged 15 years and over) between October 1989 and September 1990. The 1995 survey collected information from a sample of 57,600 respondents (of whom 41,440 were aged 15 years and over) between January 1995 and January 1996 (ABS 1996). The 2001 survey collected information from approximately 26,900 respondents between February and November 2001 (ABS 2002).

A growing problem

The 1995 National Nutrition Survey, a joint project between the Australian Bureau of Statistics and the then Commonwealth Department of Health and Aged Care, is the largest and most comprehensive Australian survey of food and nutrient intakes, dietary habits and body measurements. The survey collected information from a subsample of respondents to the 1995 National Health Survey—approximately 13,800 people from urban and rural Australia. The National Nutrition Survey was conducted between January 1995 and January 1996 (ABS 1998b).

The Australian Diabetes, Obesity and Lifestyle Study (AusDiab), a survey conducted in 1999–2000 by the International Diabetes Institute, was designed to provide estimates of the prevalence of diagnosed and undiagnosed Type 2 diabetes and self-reported chronic conditions such as heart disease and hypertension (Dunstan et al. 2001). It also provided national measurements of blood pressure, blood lipids, blood glucose, body fat, height and weight, and waist and hip circumference; as well as self-reported information on diet, smoking, alcohol consumption, physical activity, and general health and wellbeing. The study collected information in urban and non-urban areas in all states and the Northern Territory and sampled over 20,000 people aged 25 years and over, of whom more than 11,000 underwent a physical examination.

Appendix B: Statistical tables

Table B1: Prevalence of overweight and obesity: self-reported height and weight, Australian men and women aged 18 years and over, 1989 to 2001 (per cent with 95% confidence interval)

Sex	Year	Overweight but not obese	Obese	Overweight
Men	1989–90	37.0 (36.1–37.8)	8.6 (8.1–9.0)	45.5 (45.0–46.1)
	1995	40.3 (39.8–40.8)	11.6 (11.3–11.9)	51.9 (51.4–52.5)
	2001	42.0 (40.9–43.1)	15.5 (14.8–16.3)	57.6 (56.4–58.7)
Women	1989–90	22.2 (21.5–22.9)	9.9 (9.4–10.4)	32.1 (31.3–32.9)
	1995	24.3 (23.9–24.7)	12.2 (11.9–12.5)	36.5 (36.0–36.9)
	2001	25.3 (24.4–26.2)	16.9 (16.2–17.6)	42.2 (41.3–43.1)

Note: Age-standardised to the 2001 Australian population.

Sources: AIHW analysis of 1989–90, 1995 and 2001 National Health Surveys.

Table B2: Prevalence of overweight and obesity: measured height and weight, Australian men and women aged 25–64 years, 1980 to 1999–2000 (per cent with 95% confidence interval)

Sex	Year	Overweight but not obese	Obese	Overweight
Men	1980	37.9 (35.6–40.3)	9.4 (8.0–10.8)	47.4 (45.0–49.8)
	1983	40.4 (38.3–42.4)	8.9 (7.8–10.1)	49.3 (47.2–51.4)
	1989	43.0 (40.7–45.3)	10.4 (9.1–11.8)	53.4 (51.1–55.8)
	1995	48.7 (46.2–51.1)	19.6 (17.7–21.4)	68.2 (66.0–70.5)
	1999–2000	48.8 (45.4–52.2)	16.9 (14.1–19.7)	65.7 (60.7–70.7)
Women	1980	19.3 (17.4–21.1)	7.9 (6.6–9.2)	27.2 (25.1–29.3)
	1983	21.8 (19.7–23.9)	10.4 (9.2–11.7)	32.2 (30.0–34.4)
	1989	24.5 (22.4–26.5)	12.5 (11.0–14.0)	36.9 (34.6–39.3)
	1995	30.1 (27.9–32.2)	19.2 (17.4–21.1)	49.3 (47.0–51.6)
	1999–2000	26.7 (21.4–32.0)	19.8 (15.4–24.2)	46.5 (37.9–55.1)

Notes

1. Capital cities and urban areas only.
2. Age-standardised to the 2001 Australian population.

Sources: AIHW analysis of 1980, 1983 and 1989 Risk Factor Prevalence Surveys; 1995 National Nutrition Survey; 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

A growing problem

Table B3: Prevalence of abdominal overweight and obesity: Australian men and women aged 25–69 years, 1989 to 1999–2000 (per cent with 95% confidence interval)

Sex	Year	Overweight but not obese	Obese	Overweight
Men	1989	22.0 (20.2–23.7)	14.3 (12.8–15.7)	36.3 (34.2–38.3)
	1995	22.5 (20.6–24.3)	24.7 (22.8–26.6)	47.2 (44.9–49.5)
	1999–2000	27.5 (23.9–31.0)	20.9 (17.5–24.2)	48.3 (42.5–54.2)
Women	1989	17.2 (15.7–18.7)	15.7 (14.2–17.3)	32.9 (30.9–35.0)
	1995	20.0 (18.3–21.8)	25.3 (23.4–27.2)	45.4 (43.2–47.6)
	1999–2000	21.4 (19.1–23.7)	27.5 (21.4–33.5)	48.9 (41.9–55.8)

Notes

1. Capital cities and urban areas only.
2. Age-standardised to the 2001 Australian population.

Sources: AIHW analysis of 1989 Risk Factor Prevalence Survey; 1995 National Nutrition Survey; 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab).

Table A4: Prevalence of overweight and obesity: selected countries, people aged 25–64 years, 1997 to 2001 (per cent)

Country	Year	Overweight but not obese	Obese	Overweight
Self-reported data				
Australia	2001	34.6	17.6	52.2
United States	2000	37.8	21.8	59.6
United Kingdom	2000	39.3	21.7	61.0
Canada	2000–01	34.2	15.9	50.1
Measured data				
Australia	1999–2000	37.6	19.9	57.5
New Zealand	1997	42.8	17.7	60.5
Italy	1999–2000	33.2	8.9	42.1

Notes

1. Age-standardised to the WHO World Standard population.
2. For New Zealand Maori and Pacific peoples, a BMI of 26 to less than 32 indicates overweight but not obese while a BMI of 32 or more indicates obesity.

Sources

Self-reported data: 2001 National Health Survey (Australia); US Behavioral Risk Factor Surveillance System 2000; Health Survey for England 2000; Canadian Community Health Survey 2000–01.

Measured data: 1999–2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab); 1997 National Nutrition Survey (New Zealand); 1999–2000 Survey of Health Conditions of the Population and Recourse to Health Services (Italy).

Acknowledgments

Funding from the Commonwealth Department of Health and Ageing contributed to the production of this bulletin.

Kylie Ball and Paul Magnus refereed the bulletin. Their valuable comments are gratefully acknowledged. Kathleen O'Brien and Lynelle Moon also provided valued input to this bulletin.

This publication is part of the Australian Institute of Health and Welfare's Bulletin series. A complete list of the Institute's publications is available from the Media and Publishing Unit, Australian Institute of Health and Welfare, GPO Box 570, Canberra ACT 2601, or via the Institute's web site (http://www.aihw.gov.au).

AIHW Cat. No. AUS 36

ISSN 1446-9820

ISBN 1 74024 308 0

Suggested citation

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

Australian Institute of Health and Welfare

Any enquiries about or comments on this publication should be directed to:

Anne-Marie Waters
Australian Institute of Health and Welfare
GPO Box 570
Canberra ACT 2601
Phone: (02) 6244 1102
Email: anne-marie.waters@aihw.gov.au

Published by the Australian Institute of Health and Welfare

Printed by Union Offset Printers