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*Better information and statistics
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Weight loss surgery in Australia

Australian Institute of Health and Welfare
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Australian Institute of Health and Welfare

Board Chair

Hon. Peter Collins, AM, QC

Director

Penny Allbon

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

George Bodilsen (Hospitals Data Unit)

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Phone: (02) 6244 1157

Email: hospitaldata@aihw.gov.au

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Foreword

Excess body weight has been clearly linked with increased risk of mortality and chronic diseases. While obesity is commonly regarded as a condition that individuals can modify through dietary interventions and exercise, the use of surgical interventions for morbid obesity has been increasing. I am pleased to present this publication which provides a comprehensive range of statistics about the provision of weight loss surgery in Australia, as well as information on the prevalence of obesity in Australia, and the provision of general practitioner services to people with excess body weight.

Penny Allbon

Director

October 2010

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Abbreviations

ABS	Australian Bureau of Statistics	n.e.c.	Not elsewhere classified
ACT	Australian Capital Territory	..	Not applicable
ACHI	Australian Classification of Health Interventions	NHCDC	National Hospital Cost Data Collection
AIHW	Australian Institute of Health and Welfare	NHMD	National Hospital Morbidity Database
ALOS	Average length of stay	NMDS	National minimum data set
AR-DRG	Australian Refined Diagnosis Related Group	NHS	National Health Survey
ave	Average	NHMRC	National Health and Medical Research Council
BEACH	Bettering the Evaluation and Care of Health	n.p.	Not published
BMI	Body mass index	NSW	New South Wales
Cat.	Catastrophic	NT	Northern Territory
CC	Complication and/or comorbidity	OECD	Organisation for Economic Co-operation and Development
DoHA	Department of Health and Ageing	Qld	Queensland
DRG	Diagnosis Related Group	RRMA	Rural, Remote and Metropolitan Area
GP	General Practitioner	SA	South Australia
ICD-10-AM	International statistical classification of diseases and related health problems, 10th revision, Australian modification	SES	Socioeconomic status
MDC	Major Diagnostic Category	SEIFA	Socio-Economic Indexes for Areas
n.a.	Not available	SLA	Statistical local area
NCCH	National Centre for Classification in Health	Tas	Tasmania
		Vic	Victoria
		VMO	Visiting medical officer
		WA	Western Australia

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The National Health and Medical Research Council (NHMRC) funded this report as part of a suite of activities relating to diet and obesity.

Summary

Overweight and obesity are risk factors for many chronic diseases including diabetes, cardiovascular disease, high blood pressure and osteoarthritis. The increasing prevalence of overweight and obesity in Australia is of considerable concern. While many overweight people will rely on improving diet and increasing exercise to lose weight, some will have surgery to reduce excess weight.

In 2007, Australia ranked the third highest of all Organisation for Economic Co-operation and Development (OECD) countries that reported measured body mass index (BMI). Australia's high ranking was reinforced in the 2007–08 National Health Survey, which found that 68% of adult males and 55% of adult females were overweight or obese according to their measured BMI. A recent time series study of Bettering the Evaluation and Care of Health (BEACH) program data showed that the proportion of general practice encounters for overweight and obese patients has been steadily increasing in the last 10 years.

Weight loss surgery

This report shows that there was a substantial increase in weight loss surgery in Australia, from approximately 500 separations in 1998–99 to 17,000 in 2007–08. Almost four in five separations were for women, and women having weight loss surgery tended to be younger than men who had these procedures.

In 2007–08, over 90% of separations for weight loss surgery were in private hospitals, with private health insurance funding 82% of separations.

Separation rates for weight loss surgery were lowest for people living in the most disadvantaged areas of Australia; people living in areas classified in the middle socioeconomic group had the highest separation rate for these procedures.

During 2007–08, the average length of stay for separations for weight loss surgery was 1.7 days, with 18% of separations being same-day separations.

Adverse events were reported in approximately 12% of separations for weight loss surgery in 2007–08. The proportion of weight loss surgery separations reporting an adverse event has declined over time. This decline may reflect changes in the types of procedures performed, including the introduction of laparoscopic weight loss procedures.

Costs

In 2007–08, the estimated cost of hospital care for weight loss procedures was \$108 million. In the public sector, the estimated cost of hospital care was approximately \$12.5 million for 1,230 separations. In the private sector, this was estimated at approximately \$96 million for 15,750 separations.

In 2007–08, approximately \$15.2 million in benefits was paid through the Medicare Benefits Schedule for weight loss surgery-related procedures.

1 Introduction

1.1 Context of the report

Excess body weight has been clearly linked with increased risk of mortality and morbidity from heart and vascular diseases, such as coronary heart disease, stroke, heart failure and peripheral vascular disease. There is also substantial evidence for a causal relationship between excess body weight and increased risk for diseases such as Type 2 diabetes, gestational diabetes and some cancers such as colorectal cancer, prostate cancer and post-menopausal breast cancer (AIHW 2008).

Obesity is commonly regarded as a condition that individuals can modify through dietary interventions and exercise. However, the use of surgical interventions for morbid obesity (referred to collectively as 'bariatric' or 'weight loss' surgery) has been increasing, and a number of researchers have noted this increase. Smith et al. (2008) found that a six-fold increase in weight loss surgery between 2000 to 2004 in Western Australia could not be ascribed to an increase in obesity. They argue that the increase in weight loss surgery was due to increased publicity about weight loss procedures, greater acceptability of laparoscopic adjustable gastric banding (LAGB) over surgical procedures, and increasing numbers of surgeons practising weight loss surgery. O'Brien et al. (2005) suggest that the rise in weight loss surgery is due to its efficacy in achieving weight loss where other interventions (such as lifestyle changes) are not shown to have durable effects, as well as the development of safer and less invasive procedures.

In May 2009, the findings of a government inquiry into obesity in Australia were released with recommendations for the prevention and management of the obesity epidemic (House of Representatives Standing Committee on Health and Ageing 2009). Recommendations for the management of obesity included:

- to ensure equity in access by publicly funding bariatric surgery, including multidisciplinary support teams, for those patients that meet appropriate clinical guidelines (Recommendation 5)
- to develop a national register of bariatric surgery with appropriate stakeholders. The purpose of the register would be to capture data on the number of patients, the success of surgeons, and any possible complications. The data would be used to track the long-term success and cost effectiveness of bariatric surgery (Recommendation 6).

In 2008, the National Health and Medical Research Council commissioned the AIHW to produce a report on weight loss surgery. The purpose of the report was to provide an overview of weight loss surgery based on:

- the prevalence of overweight and obesity using the National Health Survey
- the primary care of overweight and obesity using the AIHW BEACH survey of general practice activity
- national data from the National Hospital Morbidity Database held by the AIHW.

1.2 Structure of the report

This report has four chapters, of which this introduction is the first. Chapter 2 presents a population view of overweight and obesity, including estimated rates of overweight and obesity for selected population groups. Chapter 3 provides an overview of the provision of general practitioner (GP) services related to obesity. Chapter 4 presents an analysis of the provision of weight loss procedures in Australian hospitals over time, by hospital sector, various patient characteristics, and state and territory. Chapter 4 also presents the limited available information on adverse events and outcomes, and estimated costs of hospital care for weight loss surgery.

A technical appendix (Appendix 1) presents information on methods and related data issues relevant to this report, including data coverage, population estimates and age standardisation methods.

2 Overweight and obesity in Australia

This chapter presents information on the prevalence of overweight and obesity in Australia over time and across selected population groups.

As part of the 2007–08 National Health Survey (NHS), interviewers measured the height and weight of survey participants. The NHS defined adults as persons aged 18 years and over. The body mass index (BMI) is derived from either measured or self-reported height and weight which is used to record the prevalence of overweight and obesity (Box 2.1).

Box 2.1: Classifying body weight

Body mass index (BMI) and waist circumference measurement are the two main methods used for monitoring body weight. The most common measure used is the BMI (particularly in self-report surveys), as people are more likely to know their height and weight than their waist circumference. The BMI is calculated by dividing weight in kilograms by the square of height in metres (kg/m^2).

The standard recommended by the World Health Organization for adults aged 18 years and over is based on the association between BMI and illness and mortality (WHO 2000):

- underweight: $\text{BMI} < 18.5$
- healthy weight: $\text{BMI} \geq 18.5$ and $\text{BMI} < 25$
- overweight but not obese: $\text{BMI} \geq 25$ and $\text{BMI} < 30$
- obese $\text{BMI} \geq 30$.

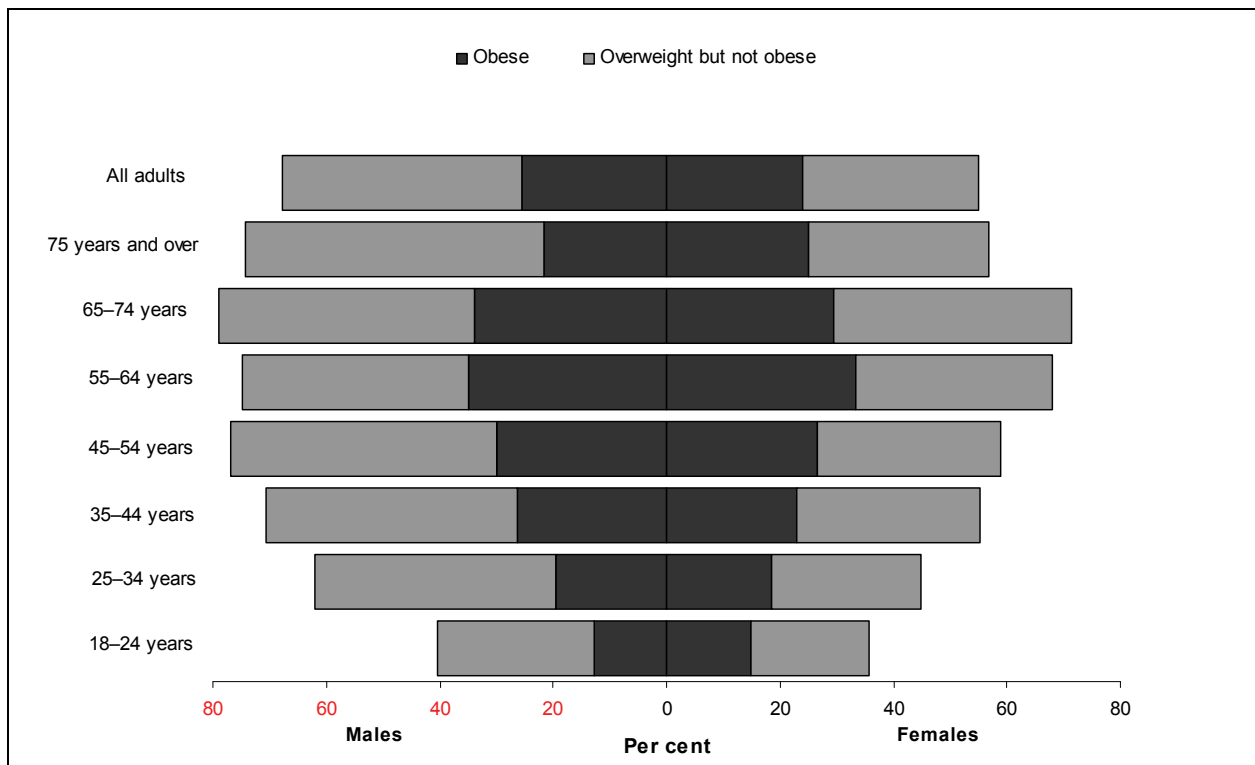
This classification may not be suitable for all ethnic groups and it is not suitable for children. Compared with the rest of the population, some groups may have equivalent levels of risk at lower BMI (for example, Asians) or higher BMI (for example, Polynesians). For children and adolescents aged 2–17 years, Cole et al. (2000) have developed a separate classification of overweight and obesity based on age and sex.

Source: AIHW 2010.

2.1 Prevalence

Age and sex-specific rates

In 2007–08, more than two-thirds (68%) of adult (aged 18 years and over) males and over half (55%) of adult females were overweight or obese. Males (26%) and females (24%) were equally likely to be obese, but men were more likely than women to be overweight but not obese – 42% of men and 31% of women fell into this category. For both men and women, obesity rates were highest in the age group 55–64 years, while people aged 65–74 were most likely to be classified as either overweight or obese (Figure 2.1).



(a) Based on measured height and weight as collected in the National Health Survey.

Source: ABS 2009: AIHW analysis of 2007-08 National health Survey

Figure 2.1: Prevalence of overweight and obesity^(a) in adults by age and sex, 2007-08

The prevalence of overweight and obesity varied across states and territories. In 2007-08, obesity among women was most prevalent in Tasmania (30%), while New South Wales had the highest obesity rates for men (27%) (Table 2.1). Comparable estimates were not available for the Northern Territory.

Table 2.1: Overweight and obesity^(a) in adults, by sex, state and territory, 2007-08 (per cent)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total ^(b)
Males									
Overweight but not obese	42.1	41.3	42.7	43.9	42.0	42.0	39.9	n.p.	42.1
Obese	26.9	24.5	25.2	25.3	23.8	23.6	24.9	n.p.	25.6
Overweight or obese	69.0	65.8	67.9	69.2	65.8	65.6	64.8	n.p.	67.7
Females									
Overweight but not obese	31.9	30.7	29.6	30.5	32.1	32.7	27.3	n.p.	30.9
Obese	21.3	25.4	25.0	25.9	25.1	29.7	23.2	n.p.	24.0
Overweight or obese	53.2	56.1	54.6	56.4	57.2	62.4	50.5	n.p.	54.9
Total									
Overweight but not obese	37.1	36.1	35.9	37.2	37.2	37.2	33.7	n.p.	36.6
Obese	24.2	24.9	25.1	25.6	24.4	26.7	24.1	n.p.	24.8
Overweight or obese	61.3	61.0	61.0	62.8	61.6	63.9	57.8	n.p.	61.4

(a) Based on measured height and weight as collected in the National Health Survey.

(b) Total includes data from the NT.

n.p. Not published.

Source: ABS 2009: AIHW analysis of 2007-08 National Health Survey.

Trends in overweight and obesity

Analysis of the NHS shows that between 1995 and 2007–08, the proportion of adults with a healthy BMI declined from 44% to 39%. The proportion of adults who were overweight remained stable, while the proportion of obese adults increased from 19% to 25% (Table 2.2). The growth in obesity rates was greater for males (7 percentage points) than females (5 percentage points), and was observed for all age groups.

Table 2.2: Overweight and obesity^(a) in adults, by age and sex, 1995 and 2007–08 (per cent)

	Overweight but not obese		Obese	
	1995	2007–08	1995	2007–08
Males				
18–24 years	26.5	27.6	10.2	12.8
25–34 years	44.3	42.4	14.5	19.6
35–44 years	48.1	44.1	18.3	26.4
45–54 years	51.2	46.9	25.7	29.9
55–64 years	50.6	39.9	25.6	35.0
65–74 years	51.7	45.1	21.4	33.9
75 years and over	48.7	52.8	17.3	21.5
18 years and over	45.2	42.1	18.6	25.6
Females				
18–24 years	17.7	20.8	8.6	14.9
25–34 years	23.1	26.3	15.0	18.4
35–44 years	29.4	32.4	16.1	22.9
45–54 years	32.6	32.5	24.7	26.5
55–64 years	41.8	34.6	26.6	33.4
65–74 years	36.1	42.0	27.7	29.4
75 years and over	40.9	31.8	18.9	25.1
18 years and over	29.9	30.9	18.9	24.0
Persons				
18–24 years	22.2	24.2	9.4	13.9
25–34 years	34.2	34.7	14.7	19.0
35–44 years	38.8	38.2	17.2	24.6
45–54 years	42.1	39.8	25.5	28.2
55–64 years	46.3	37.3	26.1	34.2
65–74 years	43.3	43.5	24.8	31.6
75 years and over	43.9	41.4	18.3	23.5
18 years and over	37.6	36.6	18.7	24.8

(a) Based on measured height and weight as collected in the National Health Survey.

Source: ABS 2009; AIHW analysis of 1995 and 2007–08 National Health Surveys.

Aboriginal and Torres Strait Islander peoples

The 2004–05 National Aboriginal and Torres Strait Islander Health Survey collected self-reported information on BMI. The survey found that 23% of Indigenous Australians aged 15 years and over were overweight and a further 24% were obese (ABS 2006b). After adjusting for differences in the age structures of the Indigenous and

non-Indigenous populations, Indigenous Australians were 1.2 times as likely to be overweight or obese as other Australians.

Remoteness area of residence

The 2004–05 NHS determined BMI from self-reported (rather than measured) height and weight information. Therefore, the results of the 2004–05 NHS are not directly comparable with those of the 2007–08 NHS.

According to the 2004–05 National Health Survey:

- almost 60% of adults living in *Other areas* (which included outer regional, rural and remote areas of Australia) were overweight or obese (Table 2.3), compared to 56% of adults living in *Inner regional* areas and 52% in *Major cities*
- 23% of adults living in *Other areas* were obese, compared to 20% of adults in *Inner regional* areas and 17% in *Major cities*.

Table 2.3: Overweight and obesity^(a) in adults, by remoteness of residence, 2004–05

	Major cities	Inner regional	Other areas ^(b)	Australia	
	(%)	(%)	(%)	(%)	('000)
Males					
Overweight	42.5	43.5	44.0	42.9	2,987
Obese	17.7	20.1	24.6	19.0	1,324
<i>Overweight or obese</i>	<i>60.2</i>	<i>63.6</i>	<i>68.6</i>	<i>61.9</i>	<i>4,311</i>
Females					
Overweight	27.5	29.3	28.3	28.0	1,901
Obese	15.7	18.8	21.2	17.0	1,154
<i>Overweight or obese</i>	<i>43.3</i>	<i>48.2</i>	<i>49.6</i>	<i>45.0</i>	<i>3,055</i>
Total					
Overweight	35.1	36.5	36.5	35.5	4,888
Obese	16.7	19.5	23.0	18.0	2,478
Overweight or obese	51.8	55.9	59.5	53.5	7,366

(a) Based on self-reported height and weight as collected in the National Health Survey.

(b) Other areas include *Outer regional*, *Remote* and *Very remote* areas of Australia.

Source: ABS 2006a; AIHW analysis of 2004–05 National Health Survey.

Socioeconomic status

The socioeconomic status (SES) groups in this chapter are based on the Index of Relative Advantage from the Socio-Economic Indexes For Areas 2001 (SEIFA) for the area of usual residence (SLA) of the patient. This index has been categorised into five SES groups, each group containing approximately 20% of the Australian population. The lowest SES group represents the 20% of the population living in areas with the least socioeconomic advantage, and the highest fifth represents the 20% of the population living in areas with the most socioeconomic advantage (see Appendix 1).

The 2004–05 NHS showed that adults living in areas classified to the lowest SES group had slightly lower rates of overweight than adults in the highest SES group (Table 2.4). However,

the variation in rates of obesity showed a different pattern, with obesity rates rising with greater disadvantage from 22% in areas classified to the lowest SES group, to 13% for those living in areas classified to the highest SES group. The rise was particularly marked for females, with 22% of women being obese in the lowest SES group, compared to 11% in the highest SES group. The rate for extreme obesity also increased with disadvantage, particularly for women.

Table 2.4: Overweight and obesity^(a) in adults, by socioeconomic status group, 2004–05 (per cent)

	SES group					Australia
	1—Lowest	2	3	4	5—Highest	
Males						
Overweight	41.2	41.1	44.0	44.3	43.7	42.9
Obese	21.5	22.8	19.0	17.6	15.2	19.0
<i>Overweight or obese</i>	<i>62.6</i>	<i>63.9</i>	<i>63.0</i>	<i>61.8</i>	<i>58.9</i>	<i>61.9</i>
Females						
Overweight	27.7	28.9	29.0	28.6	25.6	28.0
Obese	22.3	20.2	18.9	13.6	10.9	17.0
<i>Overweight or obese</i>	<i>50.0</i>	<i>49.1</i>	<i>47.9</i>	<i>42.2</i>	<i>36.5</i>	<i>45.0</i>
Total						
Overweight	34.5	35.0	36.4	36.4	35.2	35.5
Obese	21.9	21.5	19.0	15.6	13.2	18.0
Overweight or obese	56.4	56.5	55.4	52.0	48.4	53.6

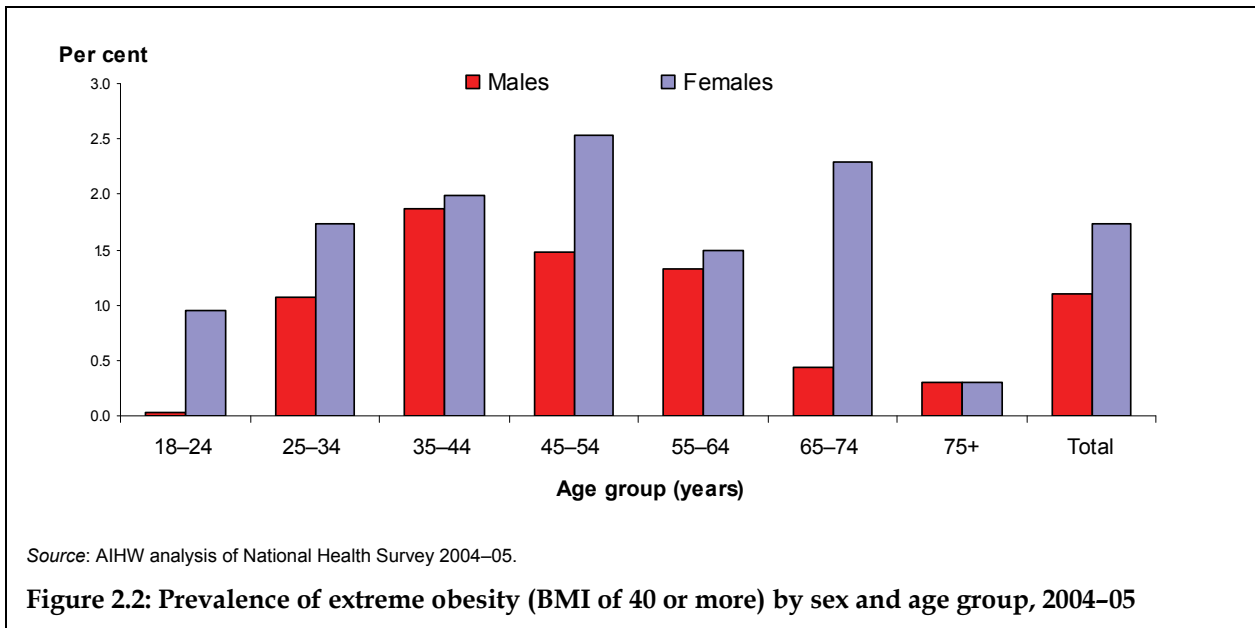
(a) Based on measured height and weight as collected in the National Health Survey.

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

Abbreviation: SES—Socioeconomic status.

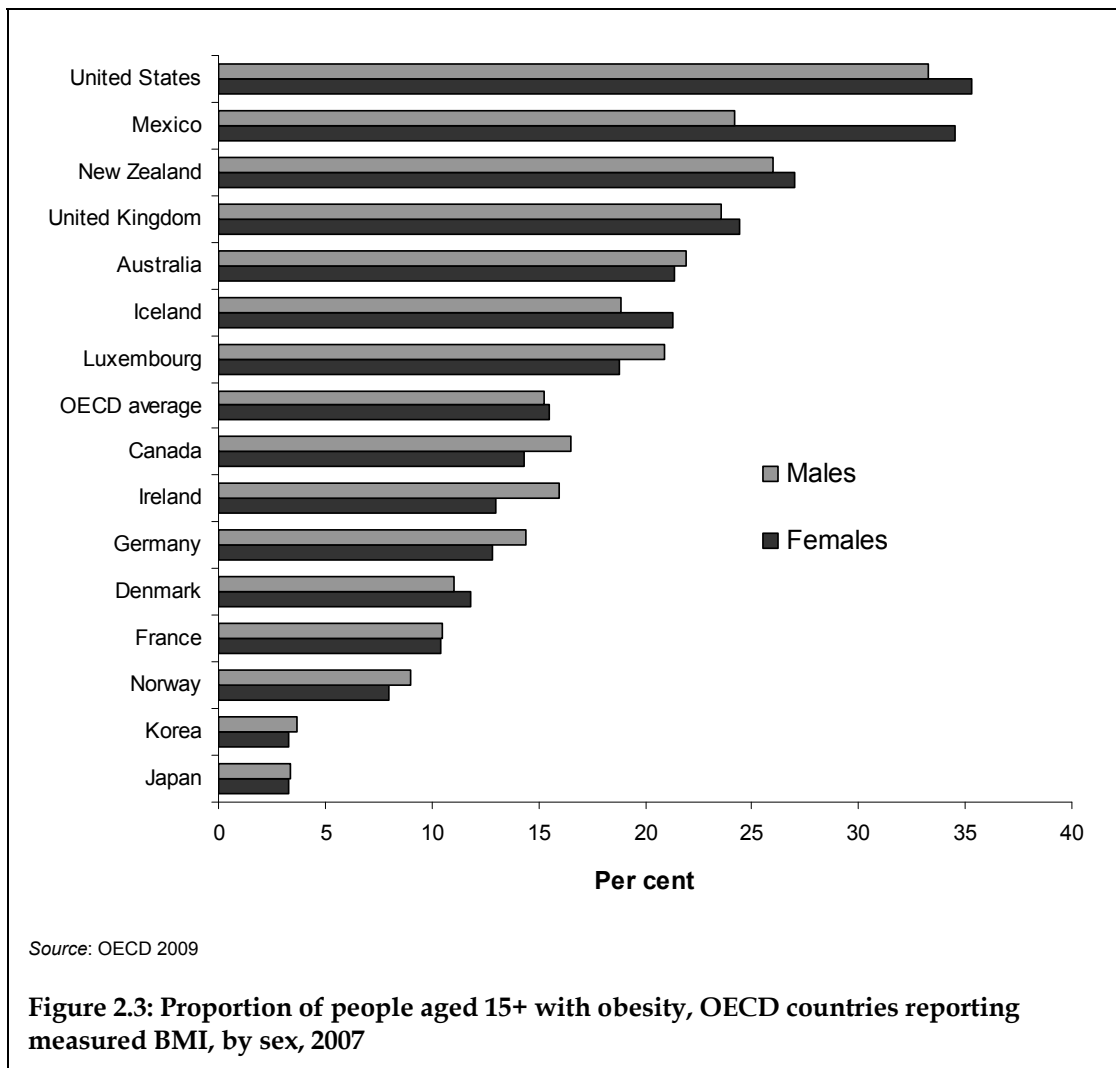
Extreme obesity

While the 2007–08 NHS indicated a higher prevalence of overweight and obesity in males, the 2004–05 survey suggested that extreme obesity (defined as a BMI in excess of 40) was more prevalent among females across all age groups. According to this survey, 1.4% of adult Australians (approximately 195,000 people) were extremely obese (Figure 2.2) – about 1.7% of women (118,000) and 1.1% of men (77,000). Females aged 45–54 years had the highest rates of extreme obesity (2.5%); among males it was most common in the 35–44 years age group.



International comparisons

Analysis by the Organisation of Economic Co-operation and Development (OECD 2007 and OECD 2009), showed that the prevalence of obesity among males and females aged 15 years and over in Australia was higher than the OECD average (Figure 2.3). The prevalence of obesity was lower than that in the United States of America, similar to that in the United Kingdom, but considerably higher than that in Japan.



2.2 The burden of excess body weight

Allocating health resources in the most effective way requires information about which conditions have the biggest impact on Australians and where the most gains in health can be made. To compare the impact of different diseases and injuries on an equal basis, a measure called the disability-adjusted life year (DALY) has been developed (AIHW 2008).

The DALY describes loss due to both fatal and non-fatal events, that is, years of life lost due to premature death coupled with years of healthy life lost due to disability (Begg et al. 2007). DALYs can be used to compare the burden of major disease groups (like cancer, cardiovascular disease and diabetes) between different population groups. DALYs can also be applied to risk factors for disease and death (like overweight and obesity).

Begg et al. found that 14 risk factors combined accounted for over 32% of the burden of disease in Australia in 2003. One of the determinants of health assessed was excess body weight. Approximately 7.5% of the total disease burden could be attributed to excess body weight, just behind high blood pressure and tobacco (Table 2.5). Excess body weight was the highest contributor to the burden of disease for those in the 35–44 age group (8.6%) and 45–54 age group (13%).

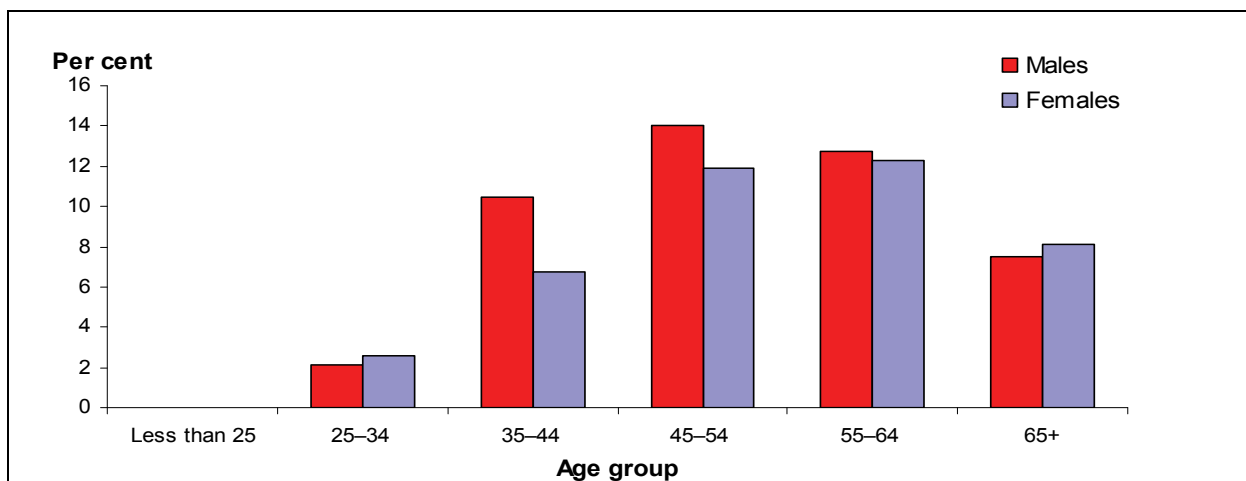
Table 2.5: Proportion of total disease burden attributed to 14 determinants of health, 2003 (per cent)

Determinant	Age group						Total
	Less than 25	25–34	35–44	45–54	55–64	65+	
Tobacco	1.0	0.1	3.6	9.5	14.2	10.0	7.8
High blood pressure	0.0	0.3	1.3	4.9	7.1	14.0	7.6
Overweight and/or obesity	0.0	2.4	8.6	13.0	12.5	7.8	7.5
Physical inactivity	0.1	1.8	5.1	8.2	9.2	9.0	6.6
High blood cholesterol	0.0	1.0	4.0	7.1	8.0	9.1	6.2
Alcohol	3.4	7.4	6.1	3.8	2.1	-0.2	2.3
Low fruit and vegetable intake	0.0	0.5	1.5	2.6	3.3	2.7	2.1
Illicit drugs	3.9	5.8	3.2	2.1	1.1	0.5	2.0
Occupational exposures	1.0	3.0	3.5	3.7	3.2	0.9	2.0
Intimate partner violence	1.3	3.4	3.0	2.0	0.6	0.1	1.1
Child sexual abuse	1.2	2.7	2.6	1.5	0.4	0.1	0.9
Air pollution—long term	0.0	0.1	0.4	0.6	0.9	1.2	0.7
Unsafe sex	0.2	1.5	1.5	0.8	0.5	0.3	0.6
Air pollution—short term	0.0	0.0	0.1	0.1	0.2	0.5	0.3
Osteoporosis	0.0	0.0	0.0	0.0	0.0	0.4	0.2
Joint effect ^(a)	11.6	26.4	32.5	39.1	39.5	36.5	32.2

(a) Estimate of the joint effect of all studied determinants, taking into account the overlapping effect among determinants on causal pathways.

Source: AIHW (2009a) sourced from Begg et al. 2007.

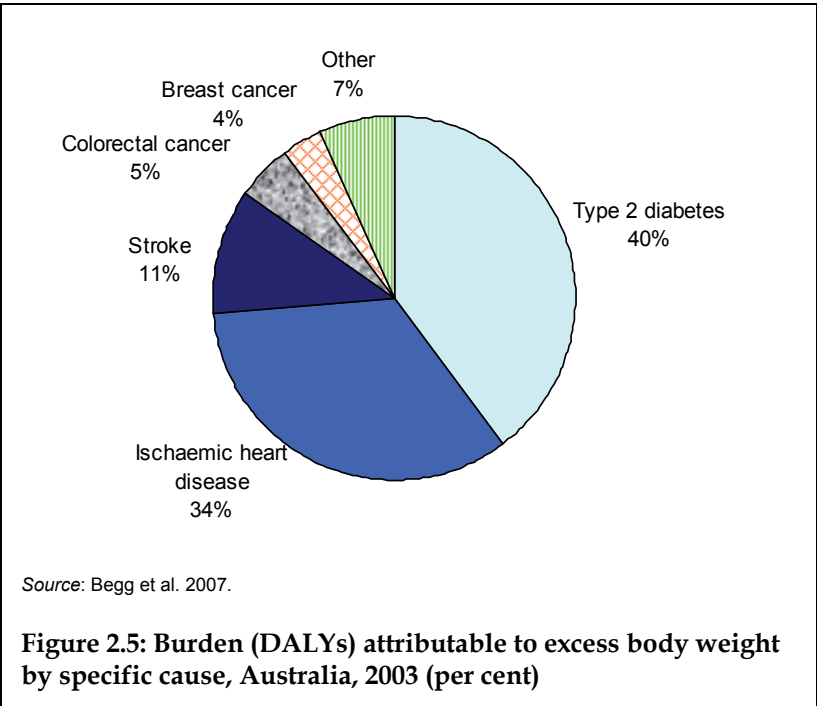
For most age groups, the burden from excess body weight was greater in males than females (Figure 2.4). The burden from excess weight increased with age, peaking for males in the 45–54 age group (14%) and the 55–64 age group for females (13%).



Source: AIHW (2009a) sourced from Begg et al. 2007.

Figure 2.4: Proportion of total disease burden attributed to excess body weight, by sex and age group, 2003 (per cent)

Overweight and obesity are risk factors for many chronic diseases. Of the total disease and injury burden attributable to excess body weight, Type 2 diabetes accounted for the highest proportion, followed by ischaemic heart disease and stroke (Figure 2.5).



3 General practice management of overweight and obesity

This chapter presents information on the management of overweight and obesity that general practitioners (GPs) in Australia undertake.

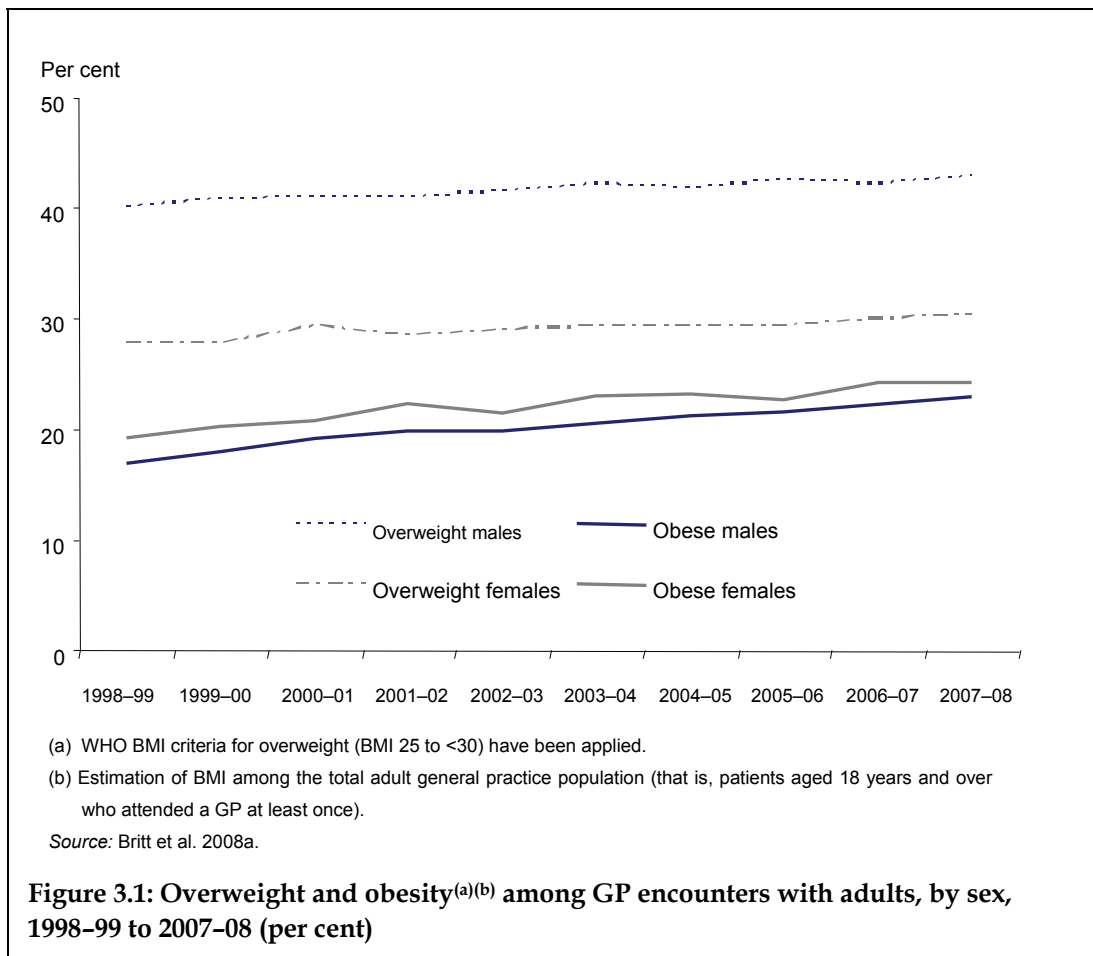
3.1 The BEACH survey

The Bettering the Evaluation and Care of Health (BEACH) program is a cross-sectional, continuous national study of general practice activity in Australia, undertaken by the General Practice Statistics and Classification Centre, University of Sydney, an AIHW collaborating unit. Each year, about 1,000 GPs from a random sample provided by the Department of Health and Ageing participate in the survey. These GPs use structured paper forms to provide details on the problems they managed and treatments recommended for 100 consecutive patient encounters. They also provide information about themselves and their practice. Patient risk factor data, including self-reported height and weight for calculation of BMI, are collected from a sub-sample of 40 patient encounters per GP. Adult BMI was classified using the World Health Organization cut-offs set out in Box 2.1.

3.2 Prevalence of overweight and obesity among GP encounters

Adults

Results from the BEACH program showed that between 1998–99 and 2007–08, there was a significant increase in the proportion of encounters with overweight and obese patients for both male and female Australian adults attending GPs (Figure 3.1). In 1998–99, overweight and obesity were reported for 32.8% and 18.3% of GP encounters respectively; the prevalence rose to 35.4% and 23.9% of encounters in 2007–08 (Britt et al. 2008a). The largest growth was in the 'obese' category, with overweight increasing to a lesser degree. Over the 10-year period, overweight was reported for a higher proportion of encounters for male patients than females, but obesity was reported for a higher proportion of encounters for female patients.



Children

Classification of BMI for children attending general practice used a method developed by Cole et al. (2000), which calculates the age-sex-specific BMI cut-off levels for overweight and obesity specific to children. There are three categories defined for childhood BMI: underweight/normal, overweight and obese. This method, based on international data from developed western cultures, is applicable in the Australian setting.

According to the BEACH substudy, the prevalence of overweight and obesity in Australian children aged 2-17 years who presented to GPs was static between 1998-99 to 2007-08 (Table 3.1). In 2007-08, children were obese in approximately 11% of encounters, and overweight in 17% of encounters (Britt et al. 2008b).

Table 3.1: Comparative BMI class for children aged 2-17 years, BEACH 1998-99 to 2007-08^(a) (per cent)

	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Children										
Overweight	17.1	17.4	17.8	17.9	18.3	19.2	17.7	17.9	18.6	17.1
Obese	11.0	10.4	11.4	10.9	11.9	11.8	10.8	10.9	10.6	11.2

(a) To apply a more precise method for calculating child BMI, children with height outside the ABS range based on age and sex were excluded. To incorporate this exclusion, child BMI has been re-calculated for 1998-99 to 2005-06 and data presented here will differ from data previously published.

Source: Britt et al. 2008a.

3.3 Patient weight loss methods

As part of the annual BEACH study, Supplementary Analysis of Nominated Data (SAND) sub-studies are undertaken on selected issues. In 2006–07, a SAND sub-study was conducted over a 5-week period on 2,164 encounters with patients aged 2 years or older, focusing on ‘weight loss attempts and methods’ (Britt et al. 2008c). The sub-study found that in 43% of encounters for overweight adults and 68% of encounters for obese adults, the patient had attempted to lose weight in the previous 12 months. Of these, about two-thirds indicated exercise as a weight loss method, 39% indicated a self-planned diet and 31% had indicated GP advice. Multiple response was allowed.

3.4 GP management of overweight and obesity

Analysis of BEACH data in 2005–07 on GP management of overweight or obesity in adults attending general practice found that GPs managed overweight or obesity in 2,243 out of 166,670 encounters with adults; a management rate of 1.35 per 100 encounters (Valenti 2008).

The management rate of overweight/obesity varied with age. For example, overweight or obesity was managed at 1.78 per 100 encounters with patients aged 25–44 years, compared with 1.18 per 100 encounters with 18–24 year olds and 0.33 per 100 encounters with patients aged 65 years or over.

The management rate was significantly higher for females (1.58 per 100 encounters) than males (0.98) but did not differ significantly by socioeconomic status (SEIFA Index of Disadvantage), Indigenous status, non-English speaking background status or remoteness area of patient residence. Approximately 1.7 per 100 encounters were referred to a medical specialist (compared to 5.9 per 100 encounters overall). Overweight and obese people were more likely to be referred to allied health services, particularly to a dietician or nutritionist. When recording referrals to medical specialists, the GPs did not specify the treatment requested, so the proportion referred for weight loss surgery could not be estimated.

4 Weight loss surgery in Australia

This chapter provides information on weight loss surgery undertaken in Australian hospitals. The information is sourced from the National Hospital Morbidity Database, a compilation of episode-level records from data collection systems in Australian hospitals. The database contains information on admitted patients in almost all hospitals, including public acute and private hospitals (see Box 4.1).

Weight loss surgery (also known as bariatric surgery) is defined here using selected *Procedures for morbid obesity* from Block number 889 of the *Australian Classification of Health Interventions* (ACHI).

The *Procedures for morbid obesity* block includes 30511-00 *Gastric reduction*, 30511-01 *Laparoscopic gastric reduction*, 30512-00 *Gastric bypass*, 30512-00 *Laparoscopic biliopancreatic diversion*, 30512-02 *Biliopancreatic diversion*, 90950-00 *Insertion of gastric bubble or balloon*, 14215-00 *Revision of gastric band* and 30514-00 *Surgical reversal of procedure for morbid obesity*. For this publication, weight loss surgery includes separations with any of these procedures, except for *Surgical reversal of procedure for morbid obesity*, unless another procedure for morbid obesity was also performed in that episode.

Box 4.1: Summary of data relating to admitted patients

Statistics on admitted patients are compiled when an admitted patient (a patient who undergoes a hospital's formal admission process) completes an episode of admitted patient care and 'separates' from the hospital. This is because most of the data on the use of hospitals by admitted patients are based on information provided at the end of the patients' episodes of care, rather than at the beginning. The length of stay and the procedures carried out are then known and the diagnostic information is more accurate.

Separation is the term used to refer to the episode of admitted patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care by being discharged, dying, transferring to another hospital or changing type of care.

For each separation, patients are assigned a principal diagnosis, which is the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted patient care. If applicable, procedures are also reported. These can be surgical or non-surgical, and therapeutic, diagnostic or of a patient-support nature (for example, anaesthesia).

'Patient day' means the occupancy of a hospital bed (or chair in the case of some same-day patients) by an admitted patient for all or part of a day.

The state and territory health authorities compile information on episodes of admitted patient care in public and private hospitals and supply it to the AIHW for collation into the National Hospital Morbidity Database.

The database provides information on patient diagnoses using the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10-AM). Patient procedures are recorded using the Australian Classification of Health Interventions (ACHI) (NCCH 2006).

(continued)

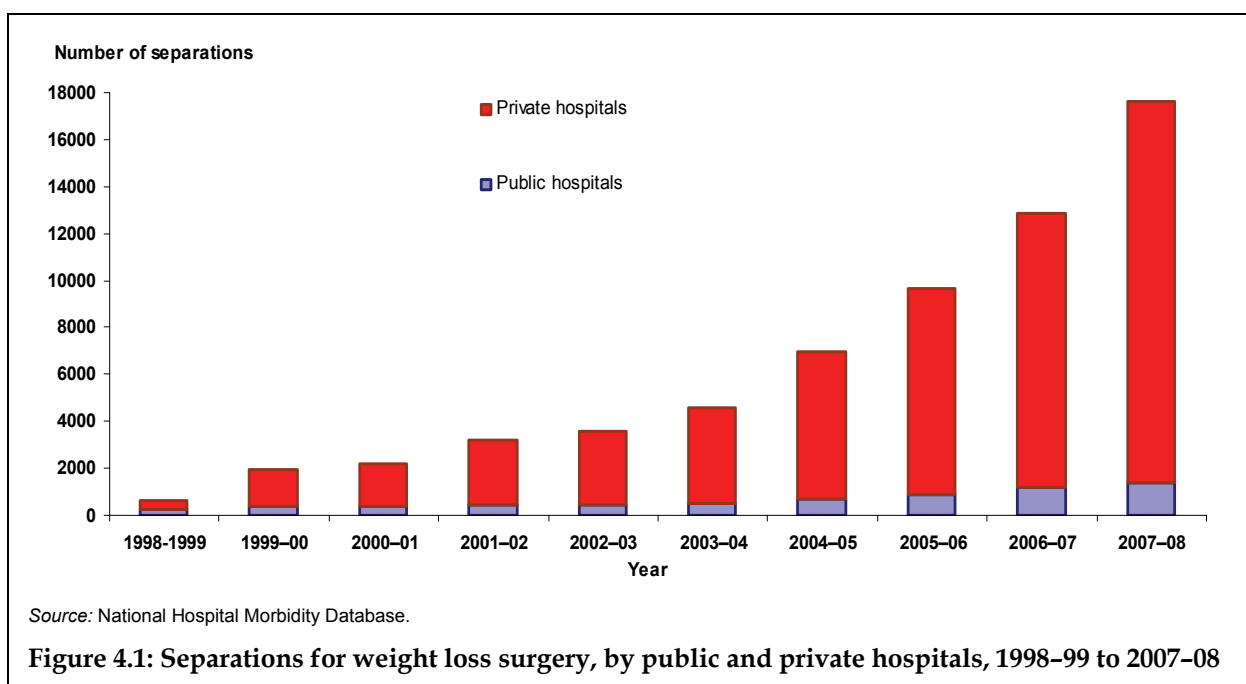
Box 4.1 (continued): Summary of data relating to admitted patients

Variation in data on hospital services

Although there are national standards for data on hospital services, there are some variations in how hospital services are defined and counted between public and private hospitals, among the states and territories, and over time. For example, there is variation in admission practices for some services, such as chemotherapy and endoscopy. As a result, people receiving the same type of service may be counted as same-day admitted patients in some hospitals, and as non-admitted patients in other hospitals. In addition, hospitals provide some services in some jurisdictions, and non-hospital health services provide them in other jurisdictions. The national data on hospital care does not include care supplied by non-hospital providers, such as community health centres.

4.1 Overview

Between 1998–99 and 2007–08, the number of hospital separations for weight loss surgery increased from 535 to around 17,000 (Figure 4.1). While the total number of hospital separations increased on average by less than 4% per year between 1998–99 and 2007–08 (AIHW 2009b), the number of separations for weight loss surgery increased by 54% per year on average over the same period. In 2007–08, 93% of separations for weight loss surgery were in private hospitals.



The strong growth in weight loss surgery was evident across both public and private hospital sectors, although the increase was higher in private hospitals (61% per year) compared with public hospitals (27%) (Table 4.1). In 2007–08, 93% of separations for weight loss surgery were in private hospitals.

Between 1998–99 and 2007–08, there were some substantial changes in the mix of weight loss surgery procedures performed. These changes need to be considered in conjunction with

differences in codes between versions of the Australian Classification of Health Interventions (ACHI). In 2000-01, a new code was created for *Revision of gastric band*. In 2004-05, new codes were created for *Laparoscopic adjustable gastric banding*, *Laparoscopic biliopancreatic diversion* and *Biliopancreatic diversion*. As a result, from 2004-05 some procedures that were previously coded to *Gastric reduction* and *Gastric bypass* were coded to the new procedure codes. The drop in the number of separations for *Gastric reduction* between 2003-04 and 2004-05 is likely to be due to this change.

Between 2004-05 and 2007-08, there was a substantial relative increase in the number of separations for *Revision of gastric band* and *Laparoscopic adjustable gastric banding*.

Table 4.1: Separations for weight loss surgery, by procedure, public and private hospitals, 1998–99 to 2007–08

	1998–99											Change (per cent)	
	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	Avg since 1998–99	Avg since 2004–05	
Public hospitals													
Gastric reduction	158	228	194	238	278	300	128	131	130	95	-6.2	-9.5	
Laparoscopic adjustable gastric banding ^(a)	..	..	..	..	..	..	320	455	704	761	n.a.	33.5
Gastric bypass	11	61	69	50	43	53	44	53	34	31	13.8	-11.0	
Laparoscopic biliopancreatic diversion ^(a)	..	..	..	..	..	..	6	2	8	3	n.a.	-20.6
Biliopancreatic diversion ^(a)	..	..	..	..	..	..	16	15	10	6	n.a.	-27.9
Insertion of gastric bubble (balloon).	15	6	9	2	7	2	5	5	4	3	-18.2	-15.7	
Revision of gastric band ^(b)	..	..	49	66	91	95	122	160	236	347	n.a.	41.7
Total separations for weight loss^(c)	184	293	312	350	413	444	637	816	1,118	1,234	26.9	24.7	
Private hospitals													
Gastric reduction	307	1,373	1,335	2,113	2,334	3,124	667	357	372	471	5.5	-11.0	
Laparoscopic adjustable gastric banding ^(a)	..	..	..	..	..	..	4,067	5,782	7,481	11,472	n.a.	41.3
Gastric bypass ^(a)	9	87	132	199	180	163	148	179	228	201	47.4	10.7	
Laparoscopic biliopancreatic diversion ^(a)	..	..	..	..	..	..	10	1	9	8	n.a.	-7.2
Biliopancreatic diversion ^(a)	..	..	..	..	..	..	29	38	20	13	n.a.	-23.5
Insertion of gastric bubble (balloon).	35	4	12	13	28	21	11	64	245	176	22.4	152.0	
Revision of gastric band ^(b)	..	..	261	336	458	607	1,225	2,102	2,931	3,471	n.a.	41.5
Total separations for weight loss^(c)	351	1,463	1,727	2,612	2,951	3,868	6,107	8,482	11,246	15,748	60.9	37.1	
All hospitals													
Gastric reduction	465	1,601	1,529	2,351	2,612	3,424	795	488	502	566	2.5	-10.7	
Laparoscopic adjustable gastric banding ^(a)	..	..	..	..	..	..	4,387	6,237	8,185	12,233	n.a.	40.8
Gastric bypass ^(a)	20	148	201	249	223	216	192	232	262	232	35.8	6.5	
Laparoscopic biliopancreatic diversion ^(a)	..	..	..	..	..	..	16	3	17	11	n.a.	-11.7
Biliopancreatic diversion ^(a)	..	..	..	..	..	..	45	53	30	19	n.a.	-25.0
Insertion of gastric bubble (balloon).	50	10	21	15	35	23	16	69	249	179	17.3	123.7	
Revision of gastric band ^(b)	..	..	310	402	549	702	1,347	2,262	3,167	3,818	n.a.	41.5
Total separations for weight loss^(c)	535	1,756	2,039	2,962	3,364	4,312	6,744	9,298	12,364	16,982	54.1	36.0	

(a) Codes for Laparoscopic adjustable gastric banding, Laparoscopic biliopancreatic diversion and Biliopancreatic diversion did not exist before 2004–05.

(b) A code for Revision of gastric band did not exist before 2000–01.

(c) Total may be less than the sum of the components as patients may undergo more than one weight loss procedure in an episode.

.. Not applicable n.a. Not available.

Abbreviation: Avg—Average.

Source: National Hospital Morbidity Database.

In 2007–08, the most common weight loss procedure was *Laparoscopic adjustable gastric banding* (LAGB) accounting for over 72% of separations (Table 4.2). Another common weight loss procedure was *Revision of gastric band*, which was reported for over 22% of weight loss surgery separations.

While the three states with the largest populations (New South Wales, Victoria and Queensland) accounted for the majority of separations for weight loss surgery (72%) (Table 4.2), separation rates per 10,000 population varied markedly across Australia. Western Australia (11.51) and New South Wales (8.22) showed separation rates higher than the national average (7.95).

Table 4.2: Separations and separations per 10,000 population for weight loss surgery, by procedure, public and private hospitals, states and territories, 2007–08

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Public hospitals									
Gastric reduction	n.p.	62	6	7	14	n.p.	0	n.p.	95
Laparoscopic adjustable gastric banding	75	255	167	209	28	27	0	0	761
Gastric bypass	n.p.	n.p.	5	n.p.	13	0	0	0	31
Insertion of gastric bubble (balloon)	0	n.p.	0	n.p.	0	0	0	0	n.p.
Revision of gastric band	31	146	51	82	16	14	n.p.	5	347
<i>Total separations</i> ^(a)	116	467	231	300	69	43	n.p.	6	1,234
Private hospitals									
Gastric reduction	92	108	54	156	53	n.p.	n.p.	n.p.	471
Laparoscopic adjustable gastric banding	2,893	2,657	2,319	1,807	933	n.p.	n.p.	n.p.	11,472
Gastric bypass	121	n.p.	19	n.p.	37	n.p.	n.p.	n.p.	201
Insertion of gastric bubble (balloon)	112	n.p.	17	n.p.	6	n.p.	n.p.	n.p.	176
Revision of gastric band	2,387	367	273	235	88	n.p.	n.p.	n.p.	3,471
<i>Total separations</i> ^(a)	5,595	3,174	2,672	2,204	1,111	n.p.	n.p.	n.p.	15,748
All hospitals									
Gastric reduction	94	170	60	163	67	n.p.	n.p.	n.p.	566
Laparoscopic adjustable gastric banding	2,968	2,912	2,486	2,016	961	n.p.	n.p.	n.p.	12,233
Gastric bypass	125	19	24	11	50	n.p.	n.p.	n.p.	232
Insertion of gastric bubble (balloon)	112	35	17	8	6	n.p.	n.p.	n.p.	179
Revision of gastric band	2,418	513	324	317	104	n.p.	n.p.	n.p.	3,818
Total separations ^(a)	5,711	3,641	2,903	2,504	1,180	n.p.	n.p.	n.p.	16,982
All hospitals—separation rates per 10,000 population ^(b)									
Gastric reduction	0.13	0.32	0.14	0.75	0.43	n.p.	n.p.	n.p.	0.26
Laparoscopic adjustable gastric banding	4.27	5.49	5.84	9.28	5.99	n.p.	n.p.	n.p.	5.73
Gastric bypass	0.17	0.04	0.06	0.05	0.31	n.p.	n.p.	n.p.	0.11
Insertion of gastric bubble (balloon)	0.16	0.07	0.04	n.p.	n.p.	n.p.	n.p.	n.p.	0.08
Revision of gastric band	3.49	0.97	0.76	1.45	0.67	n.p.	n.p.	n.p.	1.79
Total ^(a)	8.22	6.87	6.81	11.51	7.37	n.p.	n.p.	n.p.	7.95

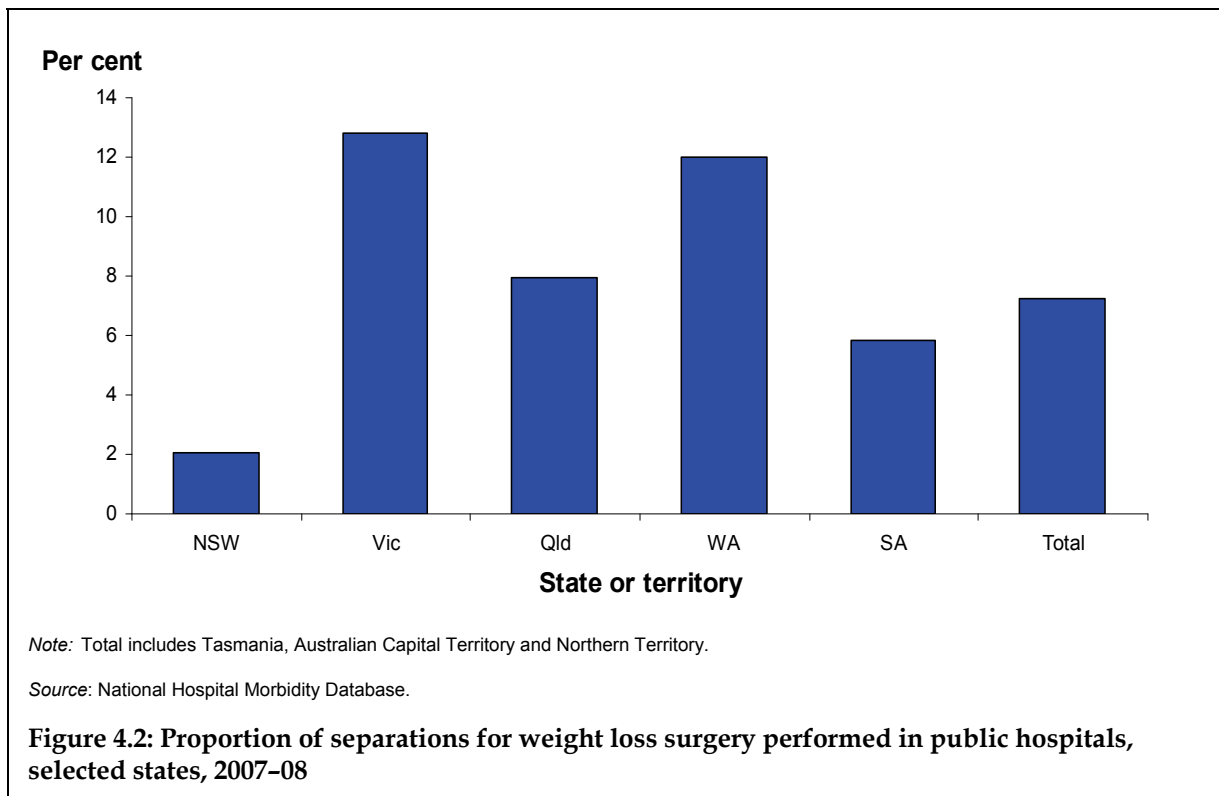
(a) Total may be less than the sum of the components as patients may undergo more than one weight loss procedure in an episode.

(b) Figures are directly age-standardised to the June 2007 Australian population.

n.p. Not published.

Source: National Hospital Morbidity Database.

In 2007–08, about 7% of separations for weight loss surgery nationally were from public hospitals. However, there was variation in the proportion of weight loss surgery performed in public hospitals across the states and territories (Figure 4.2). Public hospitals accounted for a higher proportion of weight loss surgery in Victoria (12.8%) and Western Australia (12.0%), while in New South Wales public hospitals accounted for 2.0% of weight loss surgery.



While most patients having weight loss surgery had one procedure, some patients had more than one procedure during their stay in hospital. For example, a patient may have a gastric bubble or balloon removed, and an adjustable gastric band inserted as part of the same hospital stay. During 2007-08, almost 3% of separations for weight loss surgery involved multiple weight-loss-related procedures (Table 4.3). The majority of these cases involved *Reversal of procedure for morbid obesity* combined with *Laparoscopic adjustable gastric banding* (LAGB).

Table 4.3: Separations for weight loss surgery, single and multiple procedures, 2007-08

	Public hospitals	Private hospitals	Total
Separations with one weight loss procedure			
Gastric reduction	83	420	503
Laparoscopic adjustable gastric banding (LAGB)	736	11,102	11,838
Gastric bypass	29	172	201
Laparoscopic biliopancreatic diversion	3	5	8
Biliopancreatic diversion	5	7	12
Insertion of gastric bubble (balloon)	3	176	179
Revision of gastric band	334	3,406	3,740
<i>Total with one procedure</i>	<i>1,193</i>	<i>15,288</i>	<i>16,481</i>
Separations with more than one weight loss related procedure			
LAGB and Reversal of procedure for morbid obesity	19	317	336
Other weight loss procedure and Reversal of procedure for morbid obesity	22	143	165
<i>Total with more than one procedure</i>	<i>41</i>	<i>460</i>	<i>501</i>
Total	1,234	15,748	16,982

Source: National Hospital Morbidity Database.

Principal diagnoses

The principal diagnosis is the diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care. In 2007–08, two in three separations for weight loss surgery had a principal diagnosis of *Obesity* (Table 4.4). Other principal diagnoses included *Adjustment and management of implanted device* (13%) and *Complications of other internal prosthetic devices, implants and grafts* (8%). A small proportion of patients (<0.1%) had a principal diagnosis of a malignancy of the digestive organs.

Table 4.4: Separations for weight loss surgery, by selected principal diagnoses, by public and private hospitals, 2007–08 (per cent)

		Public hospitals	Private hospitals	Total
E66	Obesity	58.6	69.0	68.3
Z45	Adjustment and management of implanted device	0.5	14.0	13.1
T85	Complications of other internal prosthetic devices, implants and grafts	19.6	7.4	8.3
E11	Type 2 diabetes mellitus	10.1	6.3	6.5
K91	Post-procedural disorders of digestive system, n.e.c.	3.0	0.4	0.6
C78	Secondary malignant neoplasm of respiratory and digestive organs	0.1	0.0	0.0
	Other diagnoses	8.2	2.8	3.2
	Total	100.0	100.0	100.0

Abbreviation: n.e.c.—Not elsewhere classified

Source: National Hospital Morbidity Database

Note: Refer to section 4.2 for further information on T85 and K91.

Same-day and overnight separations

A same-day separation occurs when a patient is admitted and separates on the same date. In 2007–08, over 18% of separations for weight loss surgery were same-day episodes (Table 4.5). Almost three in four separations for *Revision of gastric band* and *Insertion of gastric bubble* were same-day episodes. Overall, a higher proportion of separations were same-day in private hospitals than in public hospitals (19% and 11% respectively).

Table 4.5: Proportion of weight loss surgery separations that were same-day, by public and private hospitals, 2007–08

	Same-day separations (per cent)		
	Public hospitals	Private hospitals	Total
Gastric reduction	2.1	3.2	3.0
Laparoscopic adjustable gastric banding	1.2	0.9	1.0
Gastric bypass	0.0	0.0	0.0
Laparoscopic biliopancreatic diversion	0.0	0.0	0.0
Biliopancreatic diversion	0.0	0.0	0.0
Insertion of gastric bubble (balloon)	33.3	73.3	72.6
Revision of gastric band	36.6	77.5	73.8
Total	11.3	18.7	18.1

Source: National Hospital Morbidity Database.

Patient days and average length of stay

During 2007–08, patients having weight loss surgery stayed in Australian hospitals for approximately 28,100 days overall, with overnight separations accounting for almost 25,000 patient days. The average length of stay, excluding same-day separations, was 1.8 days (Table 4.6). Some types of surgery had markedly lengthier stays. For example, the average length of stay for *Biliopancreatic diversion* was 14.9 days and for *Gastric bypass* the average was 7.0 days. Neither of these procedures was reported for same-day separations.

Table 4.6: Patient days and average length of stay for weight loss surgery separations, by public and private hospitals, 2007–08

	Public hospitals	Private hospitals	Total
Total patient days			
Gastric reduction	411	1,238	1,649
Laparoscopic adjustable gastric banding	1,403	17,582	18,985
Gastric bypass	426	1,200	1,626
Laparoscopic biliopancreatic diversion	15	40	55
Biliopancreatic diversion	164	120	284
Insertion of gastric bubble (balloon)	4	243	247
Revision of gastric band	920	4,677	5,597
<i>Total^(a)</i>	<i>3,278</i>	<i>24,791</i>	<i>28,069</i>
Patient days for overnight separations			
Gastric reduction	409	1,223	1,632
Laparoscopic adjustable gastric banding	1,394	17,474	18,868
Gastric bypass	426	1,200	1,626
Laparoscopic biliopancreatic diversion	15	40	55
Biliopancreatic diversion	164	120	284
Insertion of gastric bubble (balloon)	3	114	117
Revision of gastric band	793	1,987	2,780
<i>Total^(a)</i>	<i>3,139</i>	<i>21,851</i>	<i>24,990</i>
Average length of stay, excluding same-day separations (days)			
Gastric reduction	4.4	2.7	3.0
Laparoscopic adjustable gastric banding	1.9	1.5	1.6
Gastric bypass	13.7	6.0	7.0
Laparoscopic biliopancreatic diversion	5.0	5.0	5.0
Biliopancreatic diversion	27.3	9.2	14.9
Insertion of gastric bubble (balloon)	1.5	2.4	2.4
Revision of gastric band	3.6	2.5	2.8
Total	2.9	1.7	1.8

(a) Total may be less than the sum of the components as patients may undergo more than one weight loss procedure in an episode.

Source: National Hospital Morbidity Database.

Funding source

In 2007–08, 82% of separations for weight loss surgery were for patients with a principal funding source of *Private health insurance* (Table 4.7). Approximately 11% of separations were *Self-funded* and 6% of separations were for *Public patients*.

Table 4.7: Separations for weight loss surgery^(a) by principal source of funds, public and private hospitals, states and territories, 2007-08

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Public hospitals									
Public patients ^(a)	49	405	95	295	64	42	n.p.	n.p.	957
Private health insurance	n.p.	n.p.	n.p.	n.p.	5	n.p.	0	n.p.	72
Self-funded ^(b)	45	25	126	0	0	0	0	0	196
Other ^(c)	n.p.	n.p.	n.p.	n.p.	0	0	0	0	9
Total	116	467	231	300	69	43	n.p.	6	1,234
Private hospitals									
Public patients ^(a)	n.p.	0	0	0	0	n.p.	n.p.	n.p.	n.p.
Private health insurance	4,856	2,881	2,253	n.p.	1,059	n.p.	n.p.	n.p.	13,902
Self-funded ^(b)	704	271	370	159	36	n.p.	n.p.	n.p.	1,627
Other ^(c)	n.p.	22	49	n.p.	16	n.p.	n.p.	n.p.	218
Total	5,595	3,174	2,672	2,204	1,111	n.p.	n.p.	n.p.	15,748
All hospitals									
Public patients ^(a)	50	405	95	295	64	n.p.	n.p.	n.p.	958
Private health insurance	n.p.	n.p.	n.p.	2,028	1,064	n.p.	n.p.	n.p.	13,974
Self-funded ^(b)	749	296	496	159	36	n.p.	n.p.	n.p.	1,823
Other ^(c)	35	n.p.	n.p.	22	16	n.p.	n.p.	n.p.	227
Total	5,711	3,641	2,903	2,504	1,180	n.p.	n.p.	n.p.	16,982

(a) 'Public patients' includes separations with a funding source of Australian Health Care Agreements, Reciprocal health care agreements, Other hospital or public authority (with a Public Patient election status) and No charge raised (in public hospitals).

(b) Tasmania was unable to identify all patients whose funding source may have been Self-funded, therefore the number of separations in this category may be underestimated and others may be overestimated.

(c) 'Other' includes separations with a funding source of Other compensation, Department of Defence, Correctional facilities, Other hospital or public authority (without a public patient election status), Other, No charge raised (in private hospitals), Workers compensation, Motor vehicle third party personal claim, Department of Veterans' Affairs and Not reported.

n.p. Not published.

Source: National Hospital Morbidity Database.

Age and sex profile

In 2007-08, there were almost 13,300 separations for weight loss surgery for females compared to 3,700 separations for males (Table 4.8). The age groups from 35 to 54 years had the highest number of separations for weight loss surgery for both males and females. Between 1998-99 and 2007-08, the average relative increase in separations for weight loss surgery was higher for males (61%) than females (53%) (Table 4.8). The average growth in separations for weight loss surgery was higher for older age groups compared with younger age groups.

Table 4.8: Separations for weight loss surgery by sex and age group, 1998-99 to 2007-08

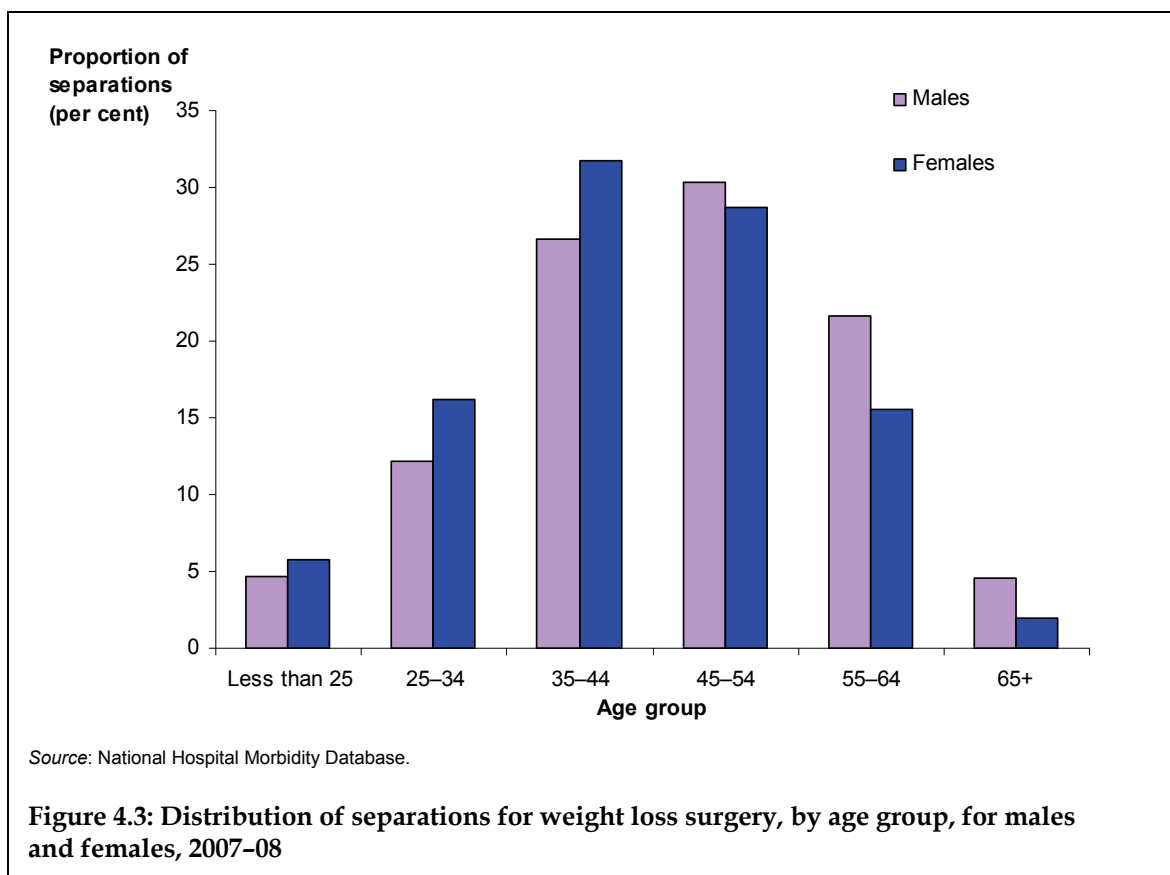
	Avg change (Per cent)											
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	Since 1998-99	Since 2004-05
Males												
Less than 25	5	14	16	16	26	39	54	80	112	174	55.8	47.7
25-34	10	42	59	79	82	108	179	208	318	453	61.1	36.3
35-44	33	92	85	149	197	237	380	521	729	994	53.1	37.8
45-54	24	90	85	136	187	265	421	598	752	1,127	61.8	38.9
55-64	9	31	53	68	110	136	288	382	554	794	75.1	40.2
65+	2	5	15	15	16	30	50	64	107	168	74.0	49.8
Total	83	274	313	463	618	815	1,372	1,853	2,572	3,710	60.8	39.3
Females												
Less than 25	37	75	95	95	138	153	295	471	605	767	46.1	37.5
25-34	133	372	427	564	573	666	987	1,294	1,689	2,178	41.8	30.2
35-44	158	536	616	916	931	1,222	1,771	2,425	2,923	4,205	50.7	33.4
45-54	95	359	442	695	776	1,034	1,560	2,138	2,898	3,804	58.6	34.6
55-64	26	129	131	211	294	371	672	991	1,456	2,060	72.7	45.3
65+	3	11	15	18	34	51	87	125	220	255	74.3	43.1
Total	452	1,482	1,726	2,499	2,746	3,497	5,372	7,444	9,791	13,269	52.6	35.2
Persons^(a)												
Less than 25	42	89	111	111	164	192	349	551	717	941	47.5	39.2
25-34	143	414	486	643	655	774	1,166	1,502	2,007	2,631	43.9	31.2
35-44	191	628	701	1,065	1,128	1,459	2,151	2,946	3,652	5,201	51.1	34.2
45-54	119	449	527	831	963	1,299	1,981	2,737	3,651	4,931	59.3	35.5
55-64	35	160	184	279	404	507	960	1,373	2,010	2,855	73.4	43.8
65+	5	16	30	33	50	81	137	189	327	423	74.1	45.6
Total	535	1,756	2,039	2,962	3,364	4,312	6,744	9,298	12,364	16,982	54.1	36.0

(a) Includes separations for which sex was Not reported.

Abbreviation: Avg—Average.

Source: National Hospital Morbidity Database.

In 2007–08, almost 54% of females undergoing weight loss surgery were less than 45 years of age, compared to 43% of males in the same age bracket (Figure 4.3).



In 2007–08, a higher proportion of separations for females had a *Revision of gastric band* (23% for females and 19% for males) (Table 4.9). A higher proportion of separations for males had a *Laparoscopic adjustable gastric banding* procedure (75% for males and 71% for females).

Table 4.9: Separations for weight loss surgery, by sex, 2007–08

	Males	Females	Total ^(a)
Gastric reduction	120	446	566
Laparoscopic adjustable gastric banding	2,766	9,456	12,233
Gastric bypass	69	163	232
Laparoscopic biliopancreatic diversion	3	8	11
Biliopancreatic diversion	10	9	19
Insertion of gastric bubble	50	129	179
Revision of gastric band	718	3,099	3,817
Total^(b)	3,710	13,269	16,982

(a) Includes separations for which sex was *Not reported*.

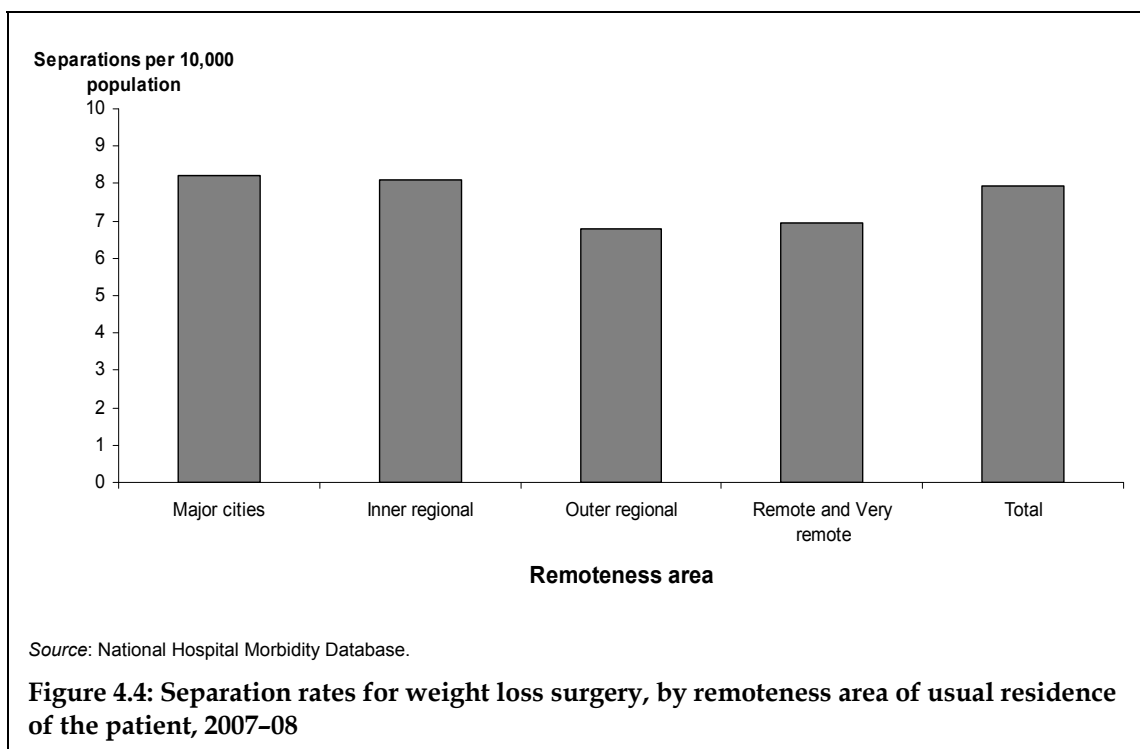
(b) Total may be less than the sum of the components as patients may undergo more than one weight loss procedure in an episode.

Source: National Hospital Morbidity Database.

Area of usual residence

In 2007–08, the number of separations and the separation rate for weight loss surgery varied considerably by remoteness area of usual residence of the patient (Figure 4.4). The separation

rate was highest for residents of *Major cities* (8.2 separations per 10,000 people) and lowest for residents of *Outer regional* areas (6.9 separations per 10,000 people).



In 2007-08, 71% of all separations for weight loss surgery were for patients who resided in the *Major cities*, while 2% were for residents of *Remote* or *Very remote* regions. Separation rates for individual weight loss procedures also varied across remoteness areas (Table 4.10).

Table 4.10: Separations for weight loss surgery, by remoteness area of usual residence, 2007–08

	Major cities	Inner regional	Outer regional	Remote and Very remote	Total
Separations					
Gastric reduction	379	97	68	20	566
Laparoscopic adjustable gastric banding	8,278	2,606	1,001	258	12,233
Gastric bypass	191	24	12	3	232
Insertion of gastric bubble (balloon)	159	6	12	1	179
Revision of gastric band	3,043	545	173	41	3,818
Total^(a)	12,012	3,276	1,341	341	16,982
Separations per 10,000 population^(b)					
Gastric reduction	0.26	0.23	0.33	0.41	0.27
Laparoscopic adjustable gastric banding	5.66	6.44	5.07	5.25	5.77
Gastric bypass	0.13	0.06	0.06	n.p.	0.11
Insertion of gastric bubble (balloon)	0.11	n.p.	0.05	n.p.	0.08
Revision of gastric band	2.08	1.36	0.88	0.85	1.80
Total^(a)	8.21	8.10	6.78	6.94	7.95

(a) Total may be less than the sum of the components as patients may undergo more than one weight loss procedure in an episode. Total includes separations for Laparoscopic biliopancreatic diversion and Biliopancreatic diversion.

(b) Figures are directly age-standardised to the June 2007 Australian population.

n.p. Not published.

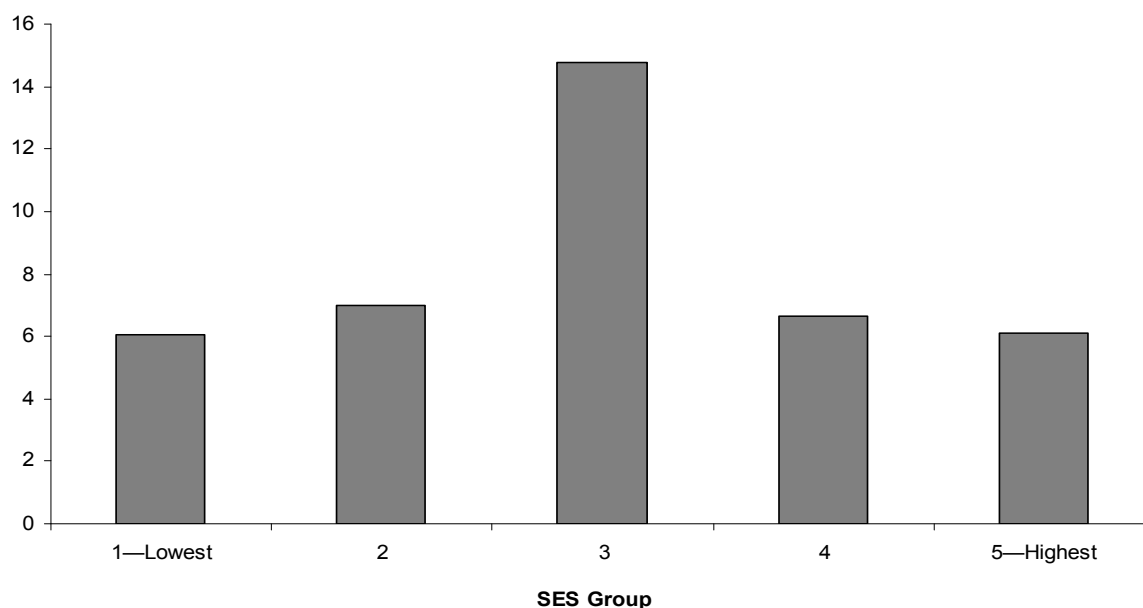
Source: National Hospital Morbidity Database.

Socioeconomic status

The socioeconomic status (SES) groups in this chapter are based on the Index of Relative Advantage/Disadvantage (from SEIFA 2006, see Appendix) for the area of usual residence (SLA) of the patient. This index is categorised into five SES groups, each group containing approximately 20% of the Australian population. The lowest SES group represents the 20% of the population living in areas with the least socioeconomic advantage/most disadvantage, and the highest fifth represents the 20% of the population living in areas with the most socioeconomic advantage/least disadvantage (see Appendix 1).

In 2007–08, people living in areas classified to the middle SES group had a separation rate for weight loss procedures of 14.8 per 10,000 population – more than double the separation rate of any other SES group (Figure 4.5).

Separations per 10,000 population



Source: National Hospital Morbidity Database.

Abbreviation: SES—Socioeconomic status.

Figure 4.5: Separation rates for weight loss surgery by socioeconomic status group, 2007-08

The much higher rate of separations for weight loss surgery in the middle SES group was also evident across most categories of weight loss procedures in 2007-08 (Table 4.11).

Table 4.11: Separation statistics for weight loss surgery, by socioeconomic status group, 2007-08

	1—Lowest	2	3	4	5—Highest	Total
Separations						
Gastric reduction	72	90	288	72	44	566
Laparoscopic adjustable gastric banding	1,723	1,964	4,907	1,965	1,674	12,233
Gastric bypass	32	32	93	17	58	232
Insertion of gastric bubble (balloon)	20	23	41	45	50	179
Revision of gastric band	574	687	996	716	845	3,818
<i>Total^(a)</i>	<i>2,420</i>	<i>2,789</i>	<i>6,297</i>	<i>2,813</i>	<i>2,663</i>	<i>16,982</i>
Separations per 10,000 population^(b)						
Gastric reduction	0.18	0.22	0.67	0.17	0.10	0.27
Laparoscopic adjustable gastric banding	4.29	4.91	11.50	4.64	3.84	5.77
Gastric bypass	0.08	0.08	0.22	0.04	0.13	0.11
Insertion of gastric bubble (balloon)	0.05	0.05	0.10	0.11	0.11	0.08
Revision of gastric band	1.44	1.73	2.34	1.69	1.93	1.80
<i>Total^(a)</i>	<i>6.04</i>	<i>6.97</i>	<i>14.76</i>	<i>6.64</i>	<i>6.10</i>	<i>7.95</i>

(a) Total may be less than the sum of the components as patients may undergo more than one weight loss procedure in an episode. Total includes separations for *Laparoscopic biliopancreatic diversion* and *Biliopancreatic diversion*.

(b) Figures are directly age-standardised to the June 2007 Australian population.

Source: National Hospital Morbidity Database.

4.2 Adverse events

Information on outcomes of weight loss surgery is limited. Outcome information available through the National Hospital Morbidity Database includes information on adverse events and mode of separation.

Information on outcomes after the patient leaves the hospital is also unavailable from the AIHW. Hence, information is not available on weight loss achieved, side-effects and follow-up care required (such as the number of adjustments required where *Laparoscopic adjustable gastric banding* was performed).

Adverse events are defined as incidents involving harm to a person receiving health care. They include infections, falls resulting in injuries, and medication and medical device problems.

Hospital separations data include ICD-10-AM diagnoses, places of occurrence, and external causes of injury and poisoning codes, which indicate that an adverse event was treated and/or occurred during the hospitalisation. However, other ICD-10-AM codes may also suggest that an adverse event has occurred, while some adverse events are not identifiable using these codes.

In 2007–08, there were over 2,000 weight loss surgery separations (or 12% of separations) with an ICD-10-AM code for an adverse event, comprising 383 separations in the public sector (31 per 100 separations) and 1,656 separations in the private sector (10 per 100 separations) (Table 4.12). The data for public hospitals are not comparable with those for private hospitals because their casemixes and recording practices may differ.

In 2007–08, *Procedures causing abnormal reactions/complications* were reported for over 1,900 (11.4 per 100) separations, a rate of 29 per 100 separations in public hospitals and 10 per 100 for private hospitals. In the public and private sectors, almost all separations that had an adverse event recorded also had a place of occurrence of *Health service area* (which includes hospitals) reported.

The adverse event rate associated with weight loss surgery in 2007–08 was 12 per 100 separations, markedly higher than the adverse event rate for all hospital separations (4.8 per 100 separations) (AIHW 2009b).

For three in four separations with an adverse event, the adverse event was recorded as the principal diagnosis (see below), indicating that it was associated with a previous admission.

Table 4.12: Separations with an adverse event for weight loss surgery separations, public and private hospitals, 2007–08

	Separations with adverse events			Adverse event separations per 100 separations (total bariatric)		
	Public	Private	Total	Public	Private	Total
External cause codes						
Y40–Y59 Adverse effects of drugs, medicaments and biological substances	13	32	45	1.1	0.2	0.3
Y60–Y82 Misadventures to patients during surgical and medical care	24	68	92	1.9	0.4	0.5
Y83–Y84 Procedures causing abnormal reactions/complications	357	1,574	1,931	28.9	10.0	11.4
Y88 & Y95 Other external causes of adverse events	3	1	4	n.p.	n.p.	n.p.
Place of occurrence codes						
Y92.22 Health service area	383	1,633	2,016	31.0	10.4	11.9
Diagnosis codes						
E89, G97, H59, H95, I97, J95, K91, M96, N99 Selected post-procedural disorders	71	166	237	5.8	1.1	1.4
T81.0 Haemorrhage and haematoma complicating a procedure, n.e.c.	12	59	71	1.0	0.4	0.4
T81.4 Infection following a procedure, n.e.c.	11	38	49	0.9	0.2	0.3
T82–T85 Complications of internal prosthetic devices, implants and grafts	268	1,317	1,585	21.7	8.4	9.3
Other diagnoses of complications of medical and surgical care (T80 to T88 and T98.3, not including above)	36	159	195	2.9	1.0	1.1
Total^(b)	383	1,656	2,039	31.0	10.5	12.0

(a) Categories do not sum to the totals because multiple diagnoses and external causes can be recorded for each separation and external cause codes and diagnosis codes can be used together to describe an adverse event.

n.p. Not published.

Abbreviation: n.e.c.—Not elsewhere classified.

Source: National Hospital Morbidity Database.

In 2007–08, adverse event rates associated with weight loss procedures varied considerably according to the type of procedure performed (Table 4.13). Adverse events were reported in 5.2 separations per 100 separations for *Laparoscopic adjustable gastric banding* compared to 35.2 per 100 separations for *Revision of gastric band*. Over half of all weight loss surgery separations with an adverse event were for patients having a revision of their gastric band (1,315 separations). *Procedures causing abnormal reactions/complications* were reported for almost all of these separations.

Table 4.13: Separations with an adverse event^(a) associated with bariatric procedures, public and private hospitals, 2007-08

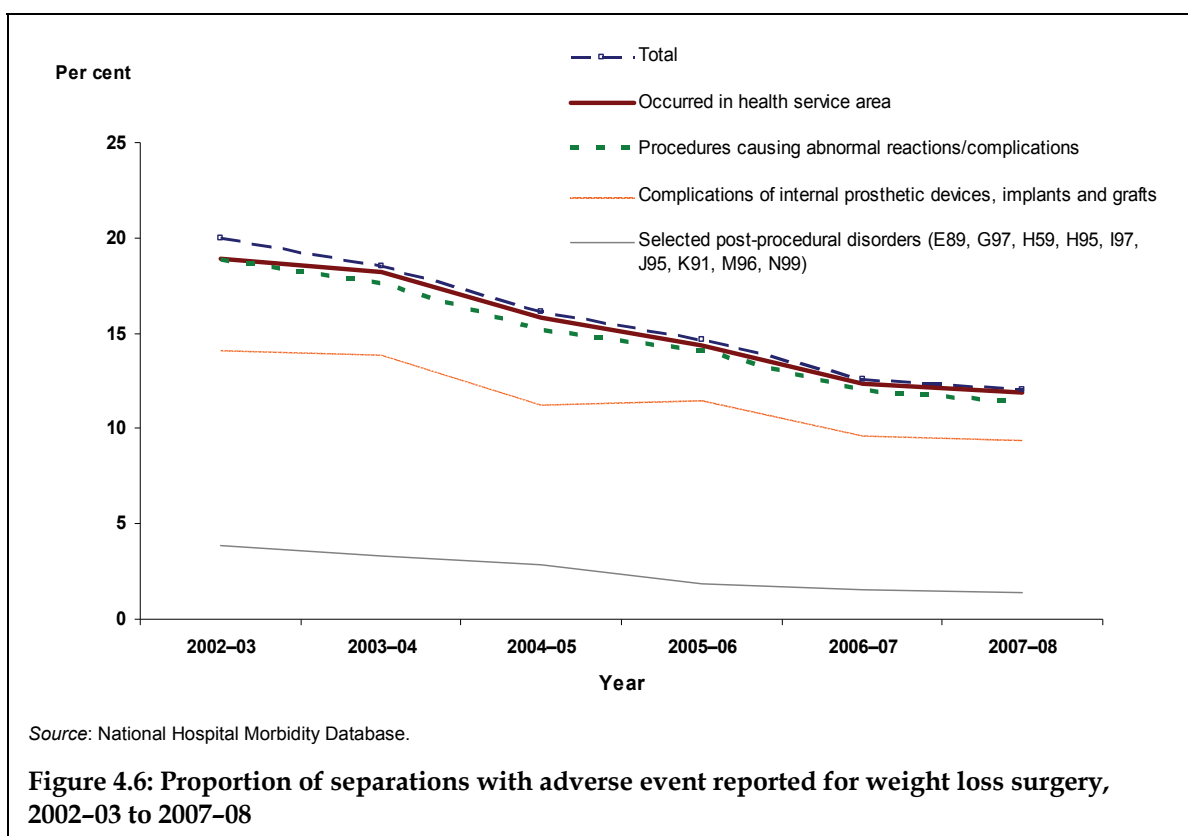
Procedure	Separations with adverse events			Adverse event separations per 100 separations (total for each procedure)		
	Public	Private	Total	Public	Private	Total
	Gastric reduction	28	66	94	33.7	15.7	18.7
Laparoscopic adjustable gastric banding	62	558	620	8.4	5.0	5.2
Gastric bypass	11	39	50	37.9	22.7	24.9
Revision of gastric band	288	1,027	1,315	86.2	30.2	35.2
Total^(b)	383	1,656	2,039	31.8	10.8	12.3

(a) Includes External cause codes Y40–Y59, Y60–Y82, Y83–Y8, Y88 and Y95; Place of occurrence codes Y92.22 and diagnosis codes E89, G97, H59, H95, I97, J95, K91, M96, N99, T81.0, T81.4, T82–T85 and other diagnoses of complications of medical and surgical care.

(b) Total includes *Laparoscopic biliopancreatic diversion*, *Biliopancreatic diversion* and *Insertion of gastric bubble (balloon)* procedures. n.p. Not published.

Source: National Hospital Morbidity Database.

Between 2002-03 and 2007-08, the proportion of separations for weight loss surgery for which an adverse event was reported declined across all adverse event categories (Figure 4.6).



The overall decline in the total adverse event rate for weight loss surgery was, in part, driven by the large rise in *Laparoscopic adjustable gastric banding*, which had the lowest adverse event rate for any weight loss surgery (Table 4.14). *Laparoscopic adjustable gastric banding* recorded a

decline from 6.9 adverse events per 100 separations in 2004–05 to 4.7 per 100 separations in 2007–08, while *Revision of gastric band* showed a decline from 44 adverse events per 100 separations in 2004–05 to 34 per 100 separations in 2007–08.

Table 4.14: Separations with an adverse event per 100 separations for weight loss surgery, 2004–05 to 2007–08

	2004–05	2005–06	2006–07	2007–08
Laparoscopic adjustable gastric banding	6.9	5.7	5.2	4.7
Revision of gastric band	44.1	38.4	30.9	33.7
Other weight loss procedure ^(a)	17.3	15.3	12.8	14.9
More than one procedure	61.1	67.4	58.3	69.7
<i>Total</i>	<i>16.1</i>	<i>14.7</i>	<i>12.6</i>	<i>12.0</i>
Adverse events for all hospital separations (including bariatric surgery)	4.7	4.8	5.1	4.8

(a) Includes *Gastric reduction*, *Gastric bypass*, *Laparoscopic biliopancreatic diversion*, *Biliopancreatic diversion*, and *Insertion of gastric bubble (balloon)*.

Source: National Hospital Morbidity Database.

Adverse events as a reason for admission

Adverse events can occur during an episode or be a reason for admission. If the adverse event is a reason for admission, the event can be reported as the principal diagnosis. When the principal diagnosis is an adverse event, it is probable that the adverse event was associated with a previous admission.

Table 4.13 presents separations for an adverse events reported as a principal diagnosis, or an external cause associated with a principal diagnosis. Overall, there were over 1,500 weight loss surgery separations (or 9 per 100 separations) with an ICD-10-AM code for an adverse event as a principal diagnosis (Table 4.15). For both public and private hospitals, approximately three in four separations reporting an adverse event had the adverse event reported as the principal diagnosis.

In 2007–08, *Procedures causing abnormal reactions/complications* were reported for over 1,500 (9.0 per 100) separations with a principal diagnosis of an adverse event, a rate of 22.4 per 100 separations in public hospitals and 7.9 per 100 for private hospitals.

Table 4.15: Principal diagnosis reported adverse events for weight loss surgery separations, public and private hospitals, 2007–08

	Separations with adverse events			Adverse event separations per 100 separations		
	Public	Private	Total	Public	Private	Total
External cause codes						
Y40–Y59 Adverse effects of drugs, medicaments and biological substances	3	3	6	n.p.	0.0	0.0
Y60–Y82 Misadventures to patients during surgical and medical care	8	12	20	0.6	0.1	0.1
Y83–Y84 Procedures causing abnormal reactions/complications	277	1,243	1,520	22.4	7.9	9.0
Y88 & Y95 Other external causes of adverse events	0	0	0	n.p.	n.p.	n.p.
Place of occurrence codes						
Y92.22 Health service area	287	1,245	1,532	23.3	7.9	9.0
Diagnosis codes						
E89, G97, H59, H95, I97, J95, K91, M96, N99 Selected post-procedural disorders	38	65	103	3.1	0.4	0.6
T81.0 Haemorrhage and haematoma complicating a procedure, n.e.c.	0	2	2	0.0	0.0	0.0
T81.4 Infection following a procedure, n.e.c.	3	15	18	0.2	0.1	0.1
T82–T85 Complications of internal prosthetic devices, implants and grafts	242	1,173	1,415	19.6	7.4	8.3
Other diagnoses of complications of medical and surgical care (T80 to T88 and T98.3, not including above)	5	6	11	0.4	0.0	0.1
Total^(a)	288	1,261	1,549	23.3	8.0	9.1

(a) Categories do not sum to the totals because multiple diagnoses and external causes can be recorded for each separation and external cause codes and diagnosis codes can be used together to describe an adverse event.

n.p. Not published.

Source: National Hospital Morbidity Database.

4.3 Mode of separation

The mode of separation records the status of the patient at the time of separation and, for some separation categories, the place to which the person was discharged or transferred. For each year in the period 1998–99 to 2007–08, over 99% of separations involving weight loss surgery procedures had a separation mode of *Other* (Table 4.16), compared to 92% of all separations (7.3 million) in 2007–08 (AIHW, 2009). This suggests that almost all patients went home after their episode of care.

There was some variation in reported mode of separation over the period in both public and private sectors. The proportion of separations for weight loss surgery that ended in *Discharge/transfer to another acute hospital* declined from 1.5% in 1998–99 to 0.2% in 2007–08, although the number of separations with this separation mode increased over that period. In 2007–08, 4.3% of all hospital separations ended in *Discharge/transfer to another acute hospital*.

Between 1998–99 and 2007–08, 52 separations for weight loss surgery had a separation mode of *Died*.

Table 4.16: Separations for weight loss surgery public and private hospitals and mode of separation, 1998–99 to 2007–08

	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08
Public hospitals										
Discharge/transfer to another acute hospital	6	3	6	4	6	8	6	7	9	14
Died	2	2	2	2	3	4	6	8	6	4
Other (including discharge to usual residence)	175	285	300	341	401	427	620	795	1,095	1,212
<i>Total^(a)</i>	184	293	312	350	413	444	637	816	1,118	1,234
Private hospitals										
Discharge/transfer to another acute hospital	2	10	7	7	10	12	14	19	32	24
Died	0	2	1	0	2	2	0	1	2	3
Other (including discharge to usual residence)	348	1,449	1,719	2,604	2,924	3,853	6,080	8,462	11,207	15,712
<i>Total^(a)</i>	351	1,463	1,727	2,612	2,951	3,868	6,107	8,482	11,246	15,748
All hospitals										
Discharge/transfer to another acute hospital	8	13	13	11	16	20	20	26	41	38
Died	2	4	3	2	5	6	6	9	8	7
Other (including discharge to usual residence)	523	1,734	2,019	2,945	3,325	4,280	6,700	9,257	12,302	16,924
Total^(a)	535	1,756	2,039	2,962	3,364	4,312	6,744	9,298	12,364	16,982

(a) The total includes the following categories that are too small to be shown individually: Discharge/transfer to a Residential Aged Care service, Discharge/transfer to psychiatric hospital, Discharge/transfer to other health care accommodation (includes Mothercraft hospitals), Left against medical advice/discharge at own risk and Not reported.

Source: National Hospital Morbidity Database.

4.4 Estimated cost of weight loss surgery

Cost of hospital care

This section presents an estimate of expenditure in public and private hospitals using Australian Refined Diagnosis Related Groups (AR-DRGs) and related cost information. AR-DRGs is an Australian admitted patient classification system which provides a clinically meaningful way of relating the number and type of patients treated in a hospital (that is, its casemix) to the resources expected to be used by the hospital. AR-DRG version 5.1 has been used to classify separations in this report.

For each AR-DRG, 2007–08 version 5.1 cost weights have been used – AR-DRG version 5.1 public cost weights for public hospitals; AR-DRG version 5.1 private cost weights for private hospitals. An estimate of expenditure in public and private hospitals can be made using AR-DRGs and related cost information. The Department of Health and Ageing uses the National Hospital Cost Data Collection (NHCDC) to estimate the costliness of an AR-DRG relative to other AR-DRGs, so that the average cost weight for all separations is 1.00. The NHCDC provides estimates of average costs for each separation for an AR-DRG with a cost weight of 1.00 – \$3,907 in the public sector (including depreciation) and 1.00 – \$2,895 in the private sector (based on 2007–08 AR-DRG version 5.1, DoHA 2009).

The most common AR-DRG for weight loss surgery in 2007–08 was *Major procedures for obesity*, with almost 11,800 separations in private hospitals (75% of separations) and 850 separations (69% of separations) in public hospitals (Table 4.17).

Table 4.17: Separations for patients admitted for weight loss surgery by AR-DRG version 5.1, public and private hospitals, 2007–08

AR-DRG		Public	Private	Total
K04Z	Major Procedures for Obesity	850	11,793	12,643
Z01B	OR Procedures W Diagnoses Other Contacts W Health Services W/O Cat/Sev CC	15	2,216	2,231
X06B	Other Procedures for Other Injuries W/O Catastrophic or Severe CC	83	701	784
901Z	Extensive OR Procedure Unrelated to Principal Diagnosis	146	448	594
G03C	Stomach, Oesophageal and Duodenal Procedures W/O Malignancy W/O Cat or Sev CC	56	214	270
K40Z	Endoscopic or Investigative Procedure for Metabolic Disorders W/O CC	0	128	128
G03B	Stomach, Oesophageal and Duodenal Procedures W/O Malignancy W Cat or Sev CC	27	57	84
X06A	Other Procedures for Other Injuries W Catastrophic or Severe CC	21	38	59
H08B	Laparoscopic Cholecystectomy W/O Closed CDE W/O Cat or Sev CC	2	22	24
K62C	Miscellaneous Metabolic Disorders Age <75 W/O Catastrophic or Severe CC	0	19	19
A06Z	Tracheostomy or Ventilation >95 hours	8	5	13
G45B	Other Gastroscopy for Non-Major Digestive Disease, Sameday	0	12	12
T01C	OR Procedures for Infectious and Parasitic Diseases W/O CC	2	10	12
T01B	OR Procedures for Infectious and Parasitic Diseases W Severe or Moderate CC	1	7	8
G03A	Stomach, Oesophageal and Duodenal Procedures W Malignancy	3	5	8
Other		20	73	93
Total		1,234	15,748	16,982

Abbreviations: W—with; W/O—without, CC—complications and comorbidities; Cat/Sev—catastrophic or severe, CDE—common bile duct exploration; OR—operating room.

Source: National Hospital Morbidity Database.

Aggregate costs

Table 4.18 presents information on the average cost a for the top five AR-DRGs reported for weight loss surgery in 2007–08. It shows that *Major procedures for obesity* accounted for 57% of reported public hospitals costs for weight loss surgery and 84% of private hospital costs for weight loss surgery. It is important to note that the reported costs for public and private hospitals are not comparable, since private hospital treatment may include medical, pharmacy and pathology costs that are not included in cost weights for private hospitals, but are included in cost weights for public hospitals.

Table 4.18: Average cost for selected AR-DRGs for weight loss surgery separations(\$), cost by volume (\$'000), 2007–08

AR-DRG		Public hospitals		Private hospitals	
		Average cost (\$)	Cost by volume (\$'000)	Average cost (\$)	Cost by volume (\$'000)
K04Z	Major Procedures for Obesity	8,392	7,133.2	6,801	80,217.8
Z01B	OR Procedures W Diagnoses Other Contacts W Health Services W/O Cat/Sev CC	3,046	45.7	2,433	5,401.3
X06B	Other Procedures for Other Injuries W/O Catastrophic or Severe CC	4,275	354.8	3,379	2,395.71
901Z	Extensive OR Procedure Unrelated to Principal Diagnosis	15,807	2,307.8	10,033	4,585.1
G03C	Stomach, Oesophageal and Duodenal Procedures W/O Malignancy W/O Cat or Sev CC	9,079	508.4	5,148	1,132.6
Total cost by volume ('000)			12,457.3		95,987.0

Notes:

AR-DRG version 5.1 public hospital cost weights 2007–08 were applied to AR-DRG version 5.1 DRGs.

AR-DRG version 5.1 private hospital cost weights 2007–08 were applied to AR-DRG version 5.1 DRGs.

Abbreviations: W—with; W/O—without, CC—complications and comorbidities; Cat/Sev—catastrophic or severe

In 2007–08, the estimated cost of separations for weight loss surgery was \$108 million (Table 4.19). In constant price terms (adjusting for inflation), expenditure on weight loss surgery in public hospitals increased by an average of 16.3% per year between 1998–99 and 2007–08, compared to 43.1% per year in private hospitals.

Between 1998–99 and 2007–08, the average cost weight of that care declined slightly. This may reflect the change in the profile of procedures with an increase in the proportion of less expensive same-day procedures.

Table 4.19: Separations, average cost weight for weight and estimated cost loss surgery^(a), by public and private hospitals, 1998–99 to 2007–08

	Change (Per cent)											Avg since 2004–05
	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	1998–99	
Public hospitals												
Separations	184	293	312	350	413	444	637	816	1,118	1,234	23.5	24.7
Average cost weight ^(a)	3.3	2.3	2.5	2.5	2.6	2.8	2.6	2.6	2.5	2.6	-2.6	0.4
Estimated cost, current prices (\$'000) ^(a)	2,347	2,598	3,019	3,483	4,270	4,823	6,349	8,306	11,107	12,457	20.4	25.2
Estimated cost, constant prices (\$'000) ^{(a)(c)}	3,093	3,336	3,751	4,197	4,971	5,419	6,879	8,634	11,107	12,025	16.3	20.5
Private hospitals												
Separations	351	1,463	1,727	2,612	2,951	3,868	6,107	8,482	11,246	15,748	52.6	37.1
Average cost weight ^(a)	2.2	2.3	2.4	2.3	2.3	2.3	2.2	2.1	2.0	2.1	-0.6	-1.5
Estimated cost, current prices (\$'000) ^(b)	2,249	9,794	9,794	17,558	19,761	25,577	38,933	51,879	66,304	95,987	51.8	35.1
Estimated cost, constant prices (\$'000) ^{(b)(c)}	3,698	15,303	14,467	23,728	24,426	29,845	42,877	55,249	66,304	93,101	43.1	29.5
All hospitals												
Separations	535	1,756	2,039	2,962	3,364	4,312	6,744	9,298	12,364	16,982	46.8	36.0
Average cost weight ^(a)	2.6	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	-2.0	-1.4
Estimated cost, current prices (\$'000)	4,596	12,392	12,813	21,042	24,031	30,400	45,282	60,184	77,412	108,444	42.1	33.8
Estimated cost, constant prices (\$'000) ^(c)	6,791	18,639	18,217	27,924	29,397	35,264	49,756	63,882	77,412	105,125	35.6	28.3

(a) AR-DRG version 5.1 public hospital cost weights 2007–08 were applied to AR-DRG version 5.1 DRGs for the years 2004–05 to 2007–08 and applied to version 5.0 AR-DRGs for all other years.

(b) AR-DRG version 5.1 private hospital cost weights 2007–08 were applied to AR-DRG version 5.1 DRGs for the years 2004–05 to 2007–08 and applied to version 5.0 AR-DRGs for all other years.

(c) Expressed in terms of prices in the reference year 2006–07. The ABS Government Final Consumption Expenditure, State and Local—Hospitals & Nursing Homes deflator was used for public hospitals. The ABS Household Final Consumption Expenditure Hospital Services deflator was used for private hospitals.

Abbreviations: Avg—Average.

Source: National Hospital Morbidity Database.

Medicare benefits

Data on the number of services and benefits paid for weight loss surgery-related procedures were obtained from Medicare Benefits Schedule (MBS) Item Reports (Medicare Australia 2010).

Between 2004–05 to 2007–08, the number of weight loss surgery procedures billed to Medicare increased substantially. *Revision of gastric band* (Item 14215) more than doubled, from 31,100 services completed in 2004–05 to 84,800 in 2007–08. It should be noted that *Revision of gastric band* includes the addition or removal of fluid from an implanted reservoir of the gastric band, and this procedure would generally not require admission to hospital.

Benefits paid through the MBS during 2007–08 were \$15.2 million in current price terms (unadjusted for inflation), an average change of almost 40% from 2004–05 (Table 4.20). In constant price terms, total benefits paid through the MBS increased by an average of 33.7% annually between 2004–05 and 2007–08 (Table 4.20). During 2007–08, 42% of total benefits paid were for *Revision of gastric banding* (\$6.3 million), followed by *Gastric reduction/Laparoscopic adjustable gastric banding* (39% of total benefits).

Table 4.20: Weight loss surgery, services and benefits paid through the Medicare Benefits Schedule, by item, 2004–05 to 2007–08

	2004–05	2005–06	2006–07	2007–08	Change
					Avg since 2004–05
MBS items (Services)					
Revision of gastric band (Item 14215)	31,122	47,128	61,222	84,799	39.7
Gastric reduction or LAGB (Item 30511)	4,349	6,080	7,531	11,350	37.7
Biliopancreatic diversion including laparoscopic (Item 30512)	186	239	241	214	4.8
Repair, revision of replacement of long-term implanted reservoir (Item 31441)	424	579	643	771	22.1
Initiation of anaesthesia for procedures for morbid obesity (Item 20791)	4,432	5,930	7,266	11,280	36.5
Total	40,513	59,956	76,903	108,414	38.8
MBS benefits, current prices (\$'000)					
Revision of gastric band (Item 14215)	2,187	3,375	4,467	6,331	42.5
Gastric reduction or LAGB (Item 30511)	2,207	3,101	3,881	5,861	38.5
Biliopancreatic diversion including laparoscopic (Item 30512)	112	146	155	138	7.4
Repair, revision of replacement of long-term implanted reservoir (Item 31441)	63	86	97	118	23.5
Initiation of anaesthesia for procedures for morbid obesity (Item 20791)	1,022	1,408	1,746	2,721	38.6
Total	5,591	8,116	10,346	15,170	39.5
MBS benefits, constant prices (\$'000)^(a)					
Revision of gastric band (Item 14215)	2,409	3,594	4,467	6,141	36.6
Gastric reduction or LAGB (Item 30511)	2,431	3,302	3,881	5,685	32.7
Biliopancreatic diversion including laparoscopic (Item 30512)	123	156	155	134	2.9
Repair, revision of replacement of long-term implanted reservoir (Item 31441)	69	91	97	114	18.3
Initiation of anaesthesia for procedures for morbid obesity (Item 20791)	1,126	1,500	1,746	2,639	32.8
Total	6,158	8,643	10,346	14,714	33.7

(a) Expressed in terms of prices in the reference year 2006–07. The ABS Household Final Consumption Expenditure Hospital Services deflator was used.

Abbreviations: Avg—Average.

Source: Medicare Australia.

Appendix 1: Technical notes

Definitions

If not otherwise indicated, hospitals-related data elements were defined according to the 2006–07 definitions in the *National health data dictionary* versions 12, 12 supplement and 13 (NHDC 2003; AIHW 2004; HDSC 2006). Further details on data presented from the National Hospital Morbidity Database in this report can be accessed from our online metadata registry: <<http://meteor.aihw.gov.au/content/index.phtml/itemId/344846>>.

Data presentation

Separations are presented by the state or territory of the hospital, not by the state or territory of usual residence of the patient. The totals in tables include data only for those states and territories for which data were available, as indicated in the tables.

Throughout the publication, percentages may not add up to 100.00 because of rounding. Percentages and population rates printed as 0.0 or 0 may denote less than 0.05 or 0.5, respectively.

Suppressions of data

Certain state and territory specific data were not published for confidentiality reasons (for private hospitals in Tasmania, the Australian Capital Territory and the Northern Territory), or because only one public hospital was represented in the cell, or because a proportion or rate related to a small number of events and was therefore not very meaningful.

The abbreviation 'n.p.' (Not published) has been used in these tables to denote these suppressions. For these tables, the totals include the suppressed information.

Conventions used in this report

Standard admitted patient care data analyses

For Chapter 4, the counts of separations do not include separations for *Newborns* with no qualified days, and records for *Hospital boarders* or *Posthumous organ procurement*.

Counts

Counts of separations

For tables with counts of separations by groups of diagnoses, procedures or external causes, a separation is counted once for the group if it has at least one diagnosis/procedure/external cause reported within the group. As more than one diagnosis, procedure or external cause can be reported for each separation, the data are not additive and therefore the totals in the tables may not equal the sum of counts in the rows.

Funding source

Presented in Table 4.7, the category *Public patients* includes separations for patients whose funding source was reported as:

- *Australian Health Care Agreements*
- *Reciprocal Health Care Agreements*
- *No charge raised in public hospitals*
- *Other hospital or public authority with a patient election status of Public (regardless of hospital sector).*

The category *Other* includes separations for which the funding source was reported as:

- *Other compensation*
- *Department of Defence*
- *Correctional facilities*
- *Other hospital or public authority with a patient election status of Private or Not reported*
- *No charge raised (in private hospitals)*
- *Other*
- *Not reported.*

Population rates

Unless noted otherwise (see below), population and separation rates presented in this report are age-standardised, calculated using the direct standardisation method and 5-year age groups. The total Australian population for 30 June 2007 was used as the population for which expected rates were calculated. The Australian Bureau of Statistics' population estimates for 30 June 2007 and for 31 December 2007 were used for the observed rates as detailed below.

Age standardisation

Standard separation rates (by hospital state) were directly age-standardised, using the estimated resident populations as at 31 December 2007. Separation rates by Remoteness Areas and socioeconomic categories (for more information, see SEIFA below) were directly age-standardised, using the estimated resident populations as at 30 June 2007.

Geographical location of usual residence

Data on the Remoteness Area of usual residence of admitted patients were derived from data supplied by the states and territories for the NHMD on the area of usual residence of the patients. The *National health data dictionary* specifies that these data should be provided as the state or territory and the SLA of usual residence. The data on usual area of residence has been aggregated to Remoteness Areas.

The classification is as follows:

- *Major cities*
- *Inner regional*
- *Outer regional*
- *Remote*
- *Very remote*

Although most separations included data on the state or territory of usual residence, not all states and territories were able to provide information on the area of usual residence in the form of an SLA code. Where necessary, the AIHW mapped the supplied area of residence data for each separation to 2007 SLA codes and to Remoteness Area categories. Because of the probabilistic nature of this mapping, the SLA and Remoteness Area data for individual separations may not be accurate; however, the overall distribution of separations by geographical areas is considered useful.

Socioeconomic advantage/disadvantage

The Socio-Economic Indexes For Areas 2006 (termed SEIFA 2006) (ABS 2008) are generated by the ABS using a combination of 2006 Census data such as income, education, health problems/disability, access to Internet, occupation/unemployment, wealth and living conditions, dwellings without motor vehicles, rent paid, mortgage repayments, and dwelling size. Composite scores are averaged across all people living in areas and defined for areas based on the Census collection districts. However, they are also compiled for higher levels of aggregation including SLA. The SEIFAs are described in detail on the ABS website <www.abs.gov.au>.

The SEIFA Index of Relative Advantage and Disadvantage is one of the ABS' SEIFA Indexes. The relative advantage and disadvantage scores indicate the collective socioeconomic status of the people living in an area, with reference to the situation and standards applying in the wider community at a given point in time. A relatively disadvantaged area is likely to have a high proportion of relatively disadvantaged people. However, such an area is also likely to contain people who are not disadvantaged, as well as people who are relatively advantaged.

Separation rates by socioeconomic status (SES) groups were generated by the AIHW by using the SEIFA Index of Relative Advantage and Disadvantage scores for the SLA of usual residence of the patient reported for each separation. The lowest SES group represents the 20% of the population living in areas with the least advantage/most disadvantage, and the highest SES group represents the 20% of the population living in areas with the least disadvantage/most advantage.

Glossary

Admitted patient: A patient who undergoes a hospital's formal admission process to receive treatment and/or care. This treatment and/or care is provided over a period of time and can occur in hospital and/or in the person's home (for hospital-in-the-home patients). METeOR identifier: 268957.

Adverse event: An incident in which harm resulted to a person receiving health care.

Age-standardisation: A set of techniques used to remove as far as possible the effects of differences in age when comparing two or more populations.

Australian Refined Diagnosis Related Groups (AR-DRGs): An Australian system of Diagnosis Related Groups (DRGs). DRGs provide a clinically meaningful way of relating the number and type of patients treated in a hospital (that is, its casemix) to the resources required by the hospital. Each AR-DRG represents a class of patients with similar clinical conditions requiring similar hospital services. METeOR identifier: 270195.

Average length of stay: The average number of patient days for admitted patient episodes. Patients admitted and separated on the same day are allocated a length of stay of 1 day.

Cost weights: The costliness of an AR-DRG relative to all other AR-DRGs such that the average cost weight for all separations is 1.00.

Funding source for hospital patient: Expected principal source of funds for an admitted patient episode or non-admitted patient service event. METeOR identifier: 270103.

Mode of separation: Status at separation of person (discharge/transfer/death) and place to which person is released (where applicable). METeOR identifier: 270094.

Principal diagnosis: The diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care. METeOR identifier: 333838.

Procedure: A clinical intervention that is surgical in nature, carries a procedural risk, carries an anaesthetic risk, requires specialist training and/or requires special facilities or equipment available only in the acute care setting. METeOR identifier: 333828.

Separation: An episode of care for an admitted patient, which can be a total hospital stay (from admission to discharge, transfer or death), or a portion of a hospital stay beginning or ending in a change of care type (for example, from acute to rehabilitation). Separation also means the process by which an admitted patient completes an episode of care whether by being discharged, dying, transferring to another hospital or changing type of care.

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