

# Diabetes mellitus

Diabetes is a chronic disease, characterised by hyperglycaemia (high blood glucose levels) caused by a deficiency of insulin, the hormone that metabolises glucose, and/or resistance to its action. Long-term complications of the disease include heart disease and stroke; foot ulceration, gangrene and lower limb amputation; kidney disease leading to kidney failure; and visual impairment which can result in blindness. Diabetes is the most common cause of blindness in those aged under 60 years, the second most common reason to start renal dialysis, and the most common cause of non-traumatic amputation. Pregnancy-related complications can also result from the condition. Tight control of glucose, lipids and blood pressure levels can prevent the development of diabetes complications. GPs play a crucial role in the prevention and care of diabetes since they are optimally placed to screen people at risk, provide follow-up care and advice to those with diabetes or at high risk, and refer patients to other health service providers. The aims of management are to identify and address patient concerns, relieve acute symptoms, optimise control of glycaemia and other risk factors for complications, and to treat complications (DHAC & AIHW 1999b).

## Type 1 diabetes

Type 1 diabetes is a disease in which the body's immune system destroys the insulin-producing beta cells in the pancreas, leading to a complete deficiency of insulin and consequent hyperglycaemia. Type 1 diabetes accounts for around 15% of all people with diabetes. It is one of the most common chronic conditions of childhood but can occur at any age. The onset of symptoms is usually quite sudden and tends to occur before age 40. People with type 1 diabetes need to inject themselves with insulin to survive. An estimated 43,000 persons in Australia had type 1 diabetes in 1995 (DHAC & AIHW 1999b).

Screening for early detection of type 1 diabetes is not recommended because symptoms appear soon after the onset of hyperglycaemia. When required, diagnosis is based on the oral glucose tolerance test (OGTT). Laboratory investigations usually undertaken include tests for glycated haemoglobin (HbA1c), kidney function (urea, creatinine, protein) and lipids. Current guidelines recommend that patients with type 1 diabetes be initially managed by a specialist physician. Referrals to an ophthalmologist and allied health professionals (dietician, diabetes nurse and podiatrist) are also required (RACGP & Diabetes Australia 1998).

GPs managed type 1 diabetes on only 209 occasions (at a rate of 0.2 per 100 encounters), representing 0.1% of all problems. This would suggest that a significant proportion of people with type 1 diabetes is cared for by specialists (endocrinologists, paediatricians and diabetes clinics) rather than in general practice. There were only 4 (1.9%) new cases seen (0.004 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 222,000 encounters for type 1 diabetes per year. Because the number of new cases of type 1 diabetes in the study sample is so low, generalisations from these cases to the whole of general practice would not be reliable. Figure 7 summarises the most frequent observations for all encounters at which type 1 diabetes was treated compared with those for new type 1 diabetes diagnoses.

Male and female patients managed for type 1 diabetes were in equal proportion, unlike the gender distribution of the total population attending general practice (57.7% females). The

largest group of them (37.9%) was aged 45–64. Of all patients, 12.3% were from non-English-speaking background and 2.2% were from Aboriginal or Torres Strait Islander origin. There were no statistically significant differences between the rates of encounters for type 1 diabetes in the NESB or Indigenous populations compared with all patients (0.2, 0.4 and 0.2 per 100 encounters respectively).

There were 401 reasons for encounter recorded, diabetes being the most common (47.2 per 100 encounters). The rate of 191.8 reasons for encounter per 100 encounters in these patients was well above average. Other frequent reasons were prescription requests (16.7 per 100), general check-up (8.8 per 100) and hypertension (7.0 per 100).

GPs treated 294 other problems at type 1 diabetes encounters. Hypertension was the most frequent of these (15.1 per 100 encounters), followed by depression (6.6 per 100) and ischaemic heart disease without angina (6.1 per 100). Urinary disease and heart failure were also among the top ten co-existing conditions. All of these comorbidities were managed with diabetes much more frequently than average, indicating an association between the conditions.

Medications were given at a rate of 78.5 per 100 problems and most of these were insulins (85.5%). While conventional insulins were used in the majority of cases (82.8%), the newer fast-acting analogue form, insulin lispro, ranked fourth among the medications prescribed, at a rate of 2.1 per 100 problems. Oral hypoglycaemic medications (metformin, gliclazide, acarbose, glibenclamide) were also administered but at a much lower rate.

Other forms of treatment were used at a rate of 29.7 per 100 problems and consisted mainly of advice on medication (6.7 per 100), advice on nutrition/weight (5.7 per 100), advice on treatment (3.9 per 100) and glucose tests performed in the GP's rooms (3.6 per 100).

GPs ordered pathology tests for type 1 diabetes problems relatively often (37.3 per 100 problems) compared with the average (17.0 per 100). Tests for glycohaemoglobin (HbA1c), which monitor glucose control, were the most widely requested (11.9 per 100), followed by glucose tolerance (7.2 per 100), electrolytes/urea/creatinine (4.2 per 100) and lipids tests (3.8 per 100). Imaging was not used in these patients.

Overall, there was an average rate of referrals for type 1 diabetes problems (7.2 per 100 problems) and they were mainly to endocrinologists and ophthalmologists and for hospital admission.

As the number of new cases of type 1 diabetes in the study sample is so low (only four new problems), the observations on the management of these particular cases may not reflect usual practice and are therefore not discussed further.

Patients		Reasons for encounter		Other problems managed	
	Per cent	All	New	All	New
		n 401	n 7	n 294	n 3
		Rate <sup>(a)</sup>		Rate <sup>(a)</sup>	
Male	50.0	47.2	56.1	15.1	9.6
Female	50.0	16.7	9.6	6.6	0.0
<b>Age</b>		8.8	34.3	6.1	0.0
<1–14	1.4	7.0	0.0	4.4	0.0
15–24	6.4	5.6	0.0	4.4	0.0
25–44	16.3	5.3	0.0	3.7	0.0
45–64	37.9	3.7	0.0	3.5	34.3
65–74	13.7	3.3	0.0	3.3	0.0
75+	24.3	3.1	31.4	3.2	0.0
<b>Origin</b>		2.8	0.0	3.0	0.0
NESB	12.3				
A&TSI	2.2				

  

Medications		Other treatments	
	All	All	New
	n 164	n 62	n 3
	Rate <sup>(b)</sup>		Rate <sup>(b)</sup>
Insulin isophane	33.8	6.7	56.1
Insulin	30.5	5.7	0.0
Metformin	3.3	3.9	0.0
Insulin lispro	2.1	3.6	0.0
Gliclazide	1.7	2.9	0.0
Acarbose	1.0	2.8	0.0
Influenza virus vaccine	1.0	2.8	0.0
Phenazopyridine	0.9	1.4	0.0
Enalapril mal	0.8	0.7	0.0
Insulin zinc susp	0.8	0.5	0.0
		0.4	0.0

  

Pathology		Imaging		Referrals		
	All	All	New	All	New	
	n 78	n 0	n 0	n 15	n 3	
	Rate <sup>(b)</sup>		Rate <sup>(b)</sup>		Rate <sup>(b)</sup>	
HbA1c	11.9			3.8	31.4	
Glucose tolerance	7.2			1.4	31.4	
EUC	4.2			1.2	0.0	
Lipids	3.8			0.5	0.0	
Liver function	3.6			0.4	0.0	
Full blood count	1.9					
Urine test	0.9					
Other test NEC	0.8					
Histology; skin	0.6					
Multibiochemical tests	0.5					

  

TYPE 1 DIABETES	
N = 209	
(0.1% of all problems managed)	
New problems = 4**	
(1.9% of all type 1 diabetes problems)	

(a) Rate per 100 type 1 diabetes encounters.

(b) Rate per 100 type 1 diabetes problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

\*\* The number of encounters for new problems is low so results should be interpreted with caution as they may be unreliable.

Figure 7: Type 1 diabetes

## Type 2 diabetes

Type 2 diabetes is characterised by high blood glucose levels and resistance to the action of insulin rather than absolute insulin deficiency. Type 2 diabetes is the most common form of the disease, accounting for 85% of all diabetes in Australia. It affects about 6% of Australians aged 25 or older, with half of these people being undiagnosed and largely asymptomatic. However, among Indigenous people diabetes prevalence rates range from 10 to 30%. Diabetes is also much more common among people from certain non-English-speaking backgrounds. It occurs mainly from middle age onwards, but in high-risk groups such as Indigenous Australians, it can manifest much earlier. People with type 2 diabetes do not necessarily require insulin and many can manage successfully with dietary and lifestyle modification alone or combined with oral hypoglycaemic medication, especially initially after diagnosis. Lipid disorders, hypertension and overweight are common in those with type 2 diabetes and, if not controlled, they increase the risk of complications (NHMRC 2000, DHAC & AIHW 1999b).

Diagnosis is based on the oral glucose tolerance test (OGTT). Laboratory investigations usually undertaken include tests for glycated haemoglobin (HbA1c), kidney function (electrolytes, urea, creatinine, protein) and lipids. Healthy diet, ideal body weight and regular exercise are the most important objectives in patients with type 2 diabetes. If a trial diet for 8–12 weeks does not control blood glucose, oral hypoglycaemic medications can be used. Insulin may be needed if adequate control does not occur at maximum doses of oral hypoglycaemics. In a team approach, the GP has the central role in coordinating management of the patient and in education and counselling. Regular monitoring and follow-up of these patients by the GP is essential. Current guidelines recommend that patients with type 2 diabetes be referred to an endocrinologist when the disease is difficult to control or there are significant complications; and to an ophthalmologist at diagnosis and then at least 2 yearly. Referrals to allied health professionals (dietician, diabetes nurse and podiatrist) are also required (RACGP & Diabetes Australia 1998).

Type 2 diabetes problems were managed at 2,264 encounters (at a rate of 2.3 per 100 encounters), accounting for 1.6% of all problems recorded. Of these, 129 (5.7%) were new problems (0.1 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 2.4 million encounters for type 2 diabetes per year and around 137,000 new cases of type 2 diabetes diagnosed in general practice each year. Figure 8 summarises the most frequent observations for all encounters at which type 2 diabetes was treated compared with those for new type 2 diabetes diagnoses.

Slightly more males (52.7%) than females were managed for type 2 diabetes, in contrast with the total data set (42.3% males). The highest proportion of patients (38.7%) was in the 45–64 age bracket. People of non-English-speaking background represented 27.5% of patients, while 2.3% were people of Aboriginal or Torres Strait Islander origin. Encounters for type 2 diabetes problems occurred at a statistically significantly higher rate both in NESB and in Indigenous patients than in all patients (4.3, 4.5 and 2.3 per 100 encounters respectively). The rate difference between NESB and all patients is 2.0 (95% CI of the difference is 1.7–2.2), and between Indigenous and all patients the rate difference is 2.1 (95% CI of the difference is 1.3–3.0).

Of the 4,170 patient reasons for encounter recorded, the main one was diabetes (38.8 per 100 encounters). Other common reasons were requests for an endocrine check-up (15.1 per 100), prescription requests (15.1 per 100), cardiac check-up (11.7 per 100) and hypertension (7.7 per 100). The rate of 184.2 reasons for encounter per 100 encounters in these patients was above average.

There were 2,829 co-existing problems managed during type 2 diabetes encounters. The rate of total problems managed at these encounters (224.9 per 100 encounters) was very high and indicates that these patients had a high level of comorbidities compared with the total study sample. Hypertension was treated often in these patients (25.6 per 100 type 2 diabetes encounters). Also among the top ten were lipid disorders (8.4 per 100), ischaemic heart disease without angina (3.9 per 100) and heart failure (3.1 per 100). All of these comorbidities were much more frequently managed in patients managed for type 2 diabetes than in the total study sample, showing an association between these conditions and diabetes.

GPs used medications to manage type 2 diabetes at a rate of 75.6 per 100 problems. The main type prescribed was oral hypoglycaemics (metformin, gliclazide, glipizide, acarbose), accounting for 68.3% of all medications given for this condition. Sulfonylureas (glibenclamide, tolbutamide) and insulins were prescribed to a much lower degree: 13.1% and 9.3% of all medications used to treat type 2 diabetes respectively.

Other forms of management of type 2 diabetes were used at a rate of 41.2 per 100 problems. The most common of these were advice on nutrition/weight (15.0 per 100), glucose tests done in the GP's surgery (8.7 per 100) and advice on treatment (4.0 per 100).

Pathology tests were frequent in the management of type 2 diabetes, at a rate of 48.5 per 100 problems, compared with the average (17.0 per 100). As with type 1 diabetes, GPs requested tests for glycohaemoglobin (HbA1c) (13.5 per 100), glucose tolerance (12.7 per 100), lipids (6.6 per 100) and electrolytes/urea/creatinine (3.8 per 100). Imaging for type 2 diabetes problems was very rare.

Referrals to other health professionals and services were made at an average rate (7.6 per 100 type 2 diabetes problems). These included a wide range of specialties (ophthalmologists, dieticians, endocrinologists, podiatrists, diabetes clinics and diabetes education), reflecting the variety of complications associated with this disease.

New cases of type 2 diabetes were predominantly male (62.7%). The highest proportion of patients (46.4%) was first diagnosed at age 45–64. The main reasons for encounter recorded were diabetes, obtaining or following up test results, endocrine check-up and symptoms such as urinary frequency and excessive thirst. Hypertension (6.7 per 100 encounters for new type 2 diabetes problems) and lipid disorder (6.3 per 100) were the most frequent other conditions managed with newly diagnosed type 2 diabetes. Medications were given less often (44.9 per 100 problems) and other forms of treatment, principally advice on nutrition/weight, exercise and treatment, used more commonly (58.9 per 100) for new cases than for type 2 diabetes cases overall. As would be expected, GPs mostly prescribed oral hypoglycaemics (75.6% of all medications) for these patients, followed by sulfonylureas (13.2%) but no insulins were given. There was a higher rate of use of pathology testing (86.0 per 100 problems) among new cases, particularly glucose tolerance tests (26.8 per 100), probably to confirm a diagnosis of type 2 diabetes. The range of other tests ordered was similar to that for all type 2 diabetes cases. In contrast to type 2 diabetes patients overall, GPs often referred newly diagnosed cases to other health professionals (27.9 per 100 problems), mainly dieticians, ophthalmologists, diabetes clinics or for diabetes education and hospital admission.

Patients		Per cent	
Male		52.7	
Female		47.3	
Age			
<1–14		0.6	
15–24		0.9	
25–44		7.9	
45–64		38.7	
65–74		30.5	
75+		21.3	
Origin			
NESB		27.5	
A&TSI		2.3	

  

Reasons for encounter	All	New
	n 4,170	n 197
	Rate <sup>(a)</sup>	
Diabetes*	38.8	27.0
Endocrine check-up*	15.1	6.5
Prescription all*	15.1	2.9
Cardiac check-up*	11.7	4.8
Hypertension*	7.7	1.9
General check-up*	6.3	<0.7
Test results*	5.6	19.0
Blood test endocr/metab	5.2	3.2
Immunisation all*	4.9	1.0
Lipid disorder	2.2	1.2

  

Other problems managed	All	New
	n 2,829	n 92
	Rate <sup>(a)</sup>	
Hypertension*	25.6	6.7
Lipid disorder	8.4	6.3
Immunisation all*	5.9	1.0
IHD without angina	3.9	2.9
Heart failure	3.1	1.7
Osteoarthritis*	2.9	2.0
Depression*	2.6	<0.5
Asthma	2.2	<0.5
Acute bronchitis	1.8	1.9
Cardiac check-up*	1.7	1.4

  

Medications	All	New
	n 1,712	n 58
	Rate <sup>(b)</sup>	
Metformin	28.7	19.8
Gliclazide	18.4	10.1
Glibenclamide	8.7	6.0
Insulin isophane	3.3	0.0
Insulin	3.3	0.0
Glipizide	3.1	2.7
Glucose Indicate	2.5	1.8
Acarbose	1.5	1.6
Tolbutamide	1.2	0.0
Aspirin	0.4	0.0

  

Other treatments	All	New
	n 933	n 76
	Rate <sup>(b)</sup>	
Advice nutrition/weight	15.0	21.9
Test; glucose	8.7	4.4
Advice treatment	4.0	5.8
Counselling — problem	3.2	5.8
Advice exercise	3.2	6.0
Advice medication	2.8	2.6
Advice/education	1.9	6.3
Observe/wait	0.6	1.5
Advice alcohol	0.4	0.0
Advice health/body	0.3	1.4

  

TYPE 2 DIABETES	
N = 2,264	
(1.6% of all problems managed)	
New problems = 129	
(5.7% of all type 2 diabetes problems)	

  

Pathology	All	New
	n 1,098	n 111
	Rate <sup>(b)</sup>	
HbA1c	13.5	12.5
Glucose tolerance	12.7	26.8
Lipids	6.6	7.5
EUC	3.8	8.3
Full blood count	3.1	9.4
Liver function	2.9	6.4
Other test NEC	1.7	4.6
Multibiochemical tests	0.7	0.0
Blood test	0.5	0.4
Urine MC&S	0.4	2.7

  

Imaging	All	New
	n 3	n 1
	Rate <sup>(b)</sup>	
X-ray; chest	0.1	0.0
US/CT/contr; abdomen	0.1	0.6

  

Referrals	All	New
	n 172	N 36
	Rate <sup>(b)</sup>	
Ophthalmologist	1.9	5.0
Dietician/nutrition	1.2	5.1
Diabetes education	0.9	4.0
Endocrinologist	0.8	1.2
Diabetes clinic	0.8	3.5
Hospital admission	0.5	4.5
Physician	0.4	3.1
Podiatrist/chiroprapist	0.4	0.0
Specialist	0.2	0.8
Optometrist	0.1	0.9

(a) Rate per 100 type 2 diabetes encounters.

(b) Rate per 100 type 2 diabetes problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

Figure 8: Type 2 diabetes

## Gestational diabetes

Gestational diabetes is a carbohydrate intolerance with onset during the current pregnancy. In Australia, it affects about 6–9% of women during pregnancy but among Indigenous women, the proportion can be as high as 20%. Diabetes during pregnancy can lead to complications for both mother and foetus or newborn. These include babies that are large for gestational age leading to difficult labour and delivery; pregnancy induced hypertension; pre-term birth; pre-eclampsia; uterine bleeding; congenital abnormalities; foetal distress; and neonatal hypoglycaemia, respiratory distress and jaundice (DHAC & AIHW 1999b).

Although the condition usually reverts to normality spontaneously after the birth, 10–50% of those who have had gestational diabetes will develop type 2 diabetes five years later and their babies are at increased risk of developing obesity and diabetes later in life. Therefore, follow-up of these women and their children is important (RACGP and Diabetes Australia 1998). Because oral hypoglycaemic agents are contraindicated in pregnancy, insulin is used if normal glucose levels cannot be achieved by dietary modification alone. Current guidelines recommend that patients with gestational diabetes be managed by a specialist physician and obstetrician from the time of diagnosis (RACGP & Diabetes Australia 1998).

The number of encounters for gestational diabetes (n=12) in the study sample was extremely low, indicating that this is a rare event medically and that patients with this condition are usually not managed in general practice, being referred to specialists instead. It is impossible to obtain a reliable picture of the care of these patients based on such few observations. Therefore, these results are not shown and just a brief description is included here for interest.

There were only 12 encounters at which GPs managed gestational diabetes problems, at a rate of 0.01 per 100 encounters, accounting for 0.008% of all problems. Most (75.7%) of the women managed with this condition were aged 25–44. The most common reasons for encounter were pre/post natal check-up (56.7 per 100 encounters) and seeking referral (18.2 per 100). The main other problems handled at these encounters were pre/post natal check-up (22.0 per 100 encounters) and hypertension (10.4 per 100). Referrals occurred at a rate of 25.0 per 100 problems and were made to endocrinologists, diabetes clinics and diabetes education. Medications were not prescribed and the tests performed or requested were for glucose level monitoring or glucose tolerance.

# Other related problems

## Hypertension

Hypertension is defined as systolic blood pressure of 140 mmHg or greater; and/or diastolic blood pressure of 90 mmHg or greater in people not taking medication for high blood pressure (WHO 1999). Hypertension is considered a condition in its own right, as well as a major risk factor for coronary heart disease, heart failure, stroke, kidney failure, dementia, premature labour and blindness, with the risk increasing along with the level of blood pressure. When diastolic blood pressure is lowered by 4–6 mmHg over two to three years, it is estimated that the risk of coronary heart disease events reduces by 14% and that of stroke events by 42%. In 1995 about 16% of Australians over 18 years of age had high blood pressure and/or were on treatment for the condition (DHAC & AIHW 1999, Collins et al. 1990).

Current WHO guidelines for the management of hypertension recommend that routine laboratory investigations include urine analysis for blood, protein and glucose; microscopic examination of urine; blood analysis for electrolytes, creatinine, glucose and total cholesterol. Lifestyle measures that are widely agreed to lower blood pressure and that should be considered in all suitable patients are weight reduction, reduction of excessive alcohol consumption, reduction in high salt intake and increase in physical activity. Smoking cessation and healthy eating patterns are important because they contribute to the treatment of associated risk factors and cardiovascular diseases. The guidelines recommend instituting immediate medication treatment for blood pressure and other co-existing conditions in high-risk patients, monitoring blood pressure and other risk factors for 3–6 months before deciding whether to use medications in medium-risk patients, and observing the patient over 6–12 months before deciding whether to give medications in low-risk patients. The main medication classes used are diuretics, beta blockers, calcium antagonists, ACE-inhibitors, angiotensin II antagonists and alpha adrenergic blockers. They are all effective in lowering blood pressure but differ in their side effects and coexisting conditions for which they might be used. Medication combinations may achieve the maximum blood pressure lowering effect with minimum side effects. During the period of evaluation and stabilisation of treatment, patients need to be monitored regularly. Since the treatment of hypertension is usually for life, doctors should provide patients with information on the problem, expected benefits and side effects of treatment, the importance of lifestyle measures and the need for regular follow up (WHO 1999).

Hypertension was the most common problem in general practice, managed on 7,994 occasions (at a rate of 8.2 per 100 encounters), accounting for 5.7% of all problems managed. Of these, 409 (5.1%) were new diagnoses of hypertension (0.4 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 8.5 million encounters for hypertension per year and around 435,000 new cases of hypertension diagnosed in general practice each year. Figure 9 summarises the most frequent observations for all encounters at which hypertension was treated compared with those for new hypertension diagnoses.

Most of the patients managed for hypertension were female (59.3%), reflecting the gender distribution of the total study sample. The majority of patients (91.9%) were aged over 44



years. Eighteen per cent were from non-English-speaking background and 0.6% from Aboriginal or Torres Strait Islander origin. Hypertension encounters were statistically significantly more common among NESB patients than in the whole of the population (10.2 vs 8.2 per 100 encounters respectively, which is a difference of 1.9 [95% CI of the difference is 1.4–2.4]). In the Indigenous group, on the other hand, encounters for hypertension occurred statistically significantly less often (4.3 per 100 encounters, the rate difference between Indigenous patients and all patients is 3.9 [95% CI of the difference is 2.4–5.5]).

A total of 14,837 patient reasons for encounter was recorded at the 7,994 encounters where hypertension was managed. This represents a rate of 185.6 per 100 encounters, considerably above average. Request for cardiac check-up was the most common patient reason for encounter recorded (40.7 per 100 hypertension encounters), followed by hypertension (28.4 per 100). Requests for medication, not necessarily for hypertension, were also frequent reasons (22.2 per 100).

The most common comorbidities managed with hypertension were lipid disorder (8.2 per 100 hypertension encounters) and diabetes (7.7 per 100). Both of these were above average rates, indicating an association between these conditions and hypertension. Depression, sleep disturbance and anxiety were also among the top ten other conditions cared for with hypertension. Overall, GPs treated 9,159 other problems during hypertension encounters. The patients managed at these encounters had a higher comorbidity level than average, with a rate of total problems managed of 214.6 per 100 hypertension encounters.

Medications were used frequently to treat hypertension, at a rate of 104 per 100 problems, highlighting the fact that patients are often given a combination of medications to better manage this condition. At the generic level, several types of medications featured among the top ten including calcium channel blockers (amlodipine, felodipine, verapamil, nifedipine), ACE-inhibitors (enalapril, perindopril, lisinopril), beta blockers (atenolol), diuretics (indapamide) and angiotensin II receptor antagonists (irbesartan). There is a wide range of antihypertensive medications available and the choice of medication depends on several factors such as other co-existing conditions, patient tolerance to side effects and age. Of all medications given for hypertension, ACE-inhibitors represented 31.3%, calcium channel blockers 24.5%, beta blockers 13.6%, diuretics 13.5% and angiotensin II receptor antagonists 6.8%. For the 77% of hypertension encounters where GPs recorded medication status, 10.9% were new medications, that is, they were used for the first time to treat hypertension in these patients. Of these new medications, irbesartan was the most popular – 20.4% of all new medications given for hypertension (results not presented).

GPs used other forms of management for hypertension problems at a much lower rate (14.2 per 100 problems) than medication. These included advice on nutrition/weight (3.5 per 100), exercise (1.7 per 100), smoking (0.3 per 100) and other lifestyle factors (0.6 per 100), as well as advice on medication (2.8 per 100) and treatment (0.9 per 100).

Pathology tests were ordered for hypertension at a rate of 11.9 per 100 problems, which is below the average. The most common tests ordered were lipids (3.1 per 100) and electrolytes/urea/creatinine (2.8 per 100). Overall, imaging was rarely used to investigate hypertension (0.6 per 100 problems).

GPs hardly ever referred hypertension patients to other health professionals or services (1.2 per 100 problems), suggesting that hypertension is mostly handled in general practice.

The sex distribution of new cases of hypertension was similar to that of all patients managed for hypertension, with most new diagnoses occurring in the 45–64 age bracket (50.2%). At encounters where newly diagnosed hypertension was managed, similar reasons for contacting the GP were recorded as for hypertension patients overall. Not surprisingly, lipid

disorder (5.2 per 100 encounters for new hypertension problems), diabetes (2.7 per 100) and obesity (2.6 per 100) were among the top ten other problems managed with newly diagnosed hypertension. New cases of hypertension were dealt with somewhat differently. There was less emphasis on giving medications initially (62.1 per 100 problems) and more widespread use of other forms of treatment (42.5 per 100 problems), particularly advice on nutrition and weight (12.7 per 100) and on exercise (6.6 per 100), education (4.2 per 100) and a 'wait and see' approach (3.7 per 100). This would indicate that in many cases, GPs were advising patients to introduce lifestyle measures as a first-line treatment for their hypertension, and reserving medication as a second option for those not achieving blood pressure control by these means alone. Where medications were indicated, the range used to care for new cases was similar to that for hypertension problems overall. The rate at which pathology tests were ordered to investigate new cases of hypertension (38.9 per 100 problems) was higher than that for all hypertension cases. The tests requested most frequently were lipids (9.4 per 100), electrolytes/urea/creatinine (7.7 per 100), full blood count (5.9 per 100) and liver function (3.0 per 100). Imaging tests were uncommon (3.7 per 100 problems), as were referrals to other health professionals or services (3.9 per 100).

Patients		Reasons for encounter		Other problems managed	
	Per cent	All	New	All	New
		n 14,837	n 734	n 9,159	n 447
		Rate <sup>(a)</sup>		Rate <sup>(a)</sup>	
Male	40.7	Cardiac check-up*	30.2	Lipid disorder	5.2
Female	59.3	Hypertension*	25.4	Diabetes*	2.7
<b>Age</b>		Prescription all*	8.4	Immunisation all*	4.0
<1–14	0.1	General check-up*	6.2	Osteoarthritis*	3.9
15–24	0.5	Immunisation all*	4.1	Depression*	2.5
25–44	7.4	Test results*	5.4	Menopausal complaint	2.9
45–64	38.7	Diabetes*	1.3	Sleep disturbance	0.8
65–74	29.2	Back complaint*	2.5	Oesophageal disease	1.3
75+	24.0	Cough	3.0	Anxiety*	1.6
<b>Origin</b>		Blood test endocr/metab	1.5	Asthma	1.5
NESB	18.3				
A&TSI	0.6				

  

Medications		Other treatments	
	All	All	New
	n 8,323	n 1,139	n 174
	Rate <sup>(b)</sup>		Rate <sup>(b)</sup>
Atenolol	5.5	Advice nutrition/weight	12.7
Amlodipine	3.6	Advice medication	2.0
Enalapril mal	2.0	Advice exercise	6.6
Indapamide	2.7	Counselling — problem	3.0
Irbesartan	9.2	Advice/education	4.2
Felodipine	5.5	Advice treatment	0.9
Perindopril	5.1	Observe/wait	3.7
Verapamil hcl	1.7	Advice lifestyle	2.5
Lisinopril	1.3	Advice smoking	0.2
Nifedipine	2.3	Electrical tracings	1.0

  

**HYPERTENSION**

N = 7,994

(5.7% of all problems managed)

New problems = 409

(5.1% of all hypertension problems)

  

Pathology		Imaging		Referrals		
	All	All	New	All	New	
	n 958	n 48	n 15	n 97	n 16	
	Rate <sup>(b)</sup>		Rate <sup>(b)</sup>		Rate <sup>(b)</sup>	
Lipids	9.4	X-ray; chest	1.8	Cardiologist	0.6	
EUC	7.7	US/CT/contrast	0.4	ECG	2.4	
Full blood count	5.9	Echocardiography	0.2	Physician	0.2	
Liver function	3.0	US/CT/contrast; urinary	0.6	Hospital admission	0.0	
Glucose tolerance	1.3	X-ray; spinal	0.0	Other health profess	0.2	
Thyroid function	2.0	Test; Doppler	0.2	Holter monitor	0.3	
Multibiochemical tests	2.2	Plain X-ray; bone(s)	0.0	Specialist	0.0	
Other test NEC	0.8	X-ray; hip	0.0	Ophthalmologist	0.0	
Blood test	1.0	US/CT/contrast; brain	0.3	Dietician/nutrition	0.0	
Urine MC&S	1.7			Urologist	0.0	

(a) Rate per 100 hypertension encounters.

(b) Rate per 100 hypertension problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

**Figure 9: Hypertension**

## Hypertension in pregnancy

Hypertension affects about 10% of pregnant women. Hypertension in pregnancy includes both pre-eclampsia and chronic hypertension. Pre-eclampsia refers to hypertension developing in the second half of pregnancy in women with normal blood pressure before pregnancy, whose blood pressure returns to normal within three months after delivery. Pre-eclampsia can affect the woman's liver, kidneys, brain, clotting system and lead to impaired placental function and consequent foetal growth retardation. Current Australian guidelines recommend that for the management of hypertension in pregnancy the obstetrician should remain the doctor in charge and seek advice from other specialists when indicated (Brown et al. 1999, Australasian Society for the Study of Hypertension in Pregnancy 1993).

The number of encounters for hypertension in pregnancy in the study sample was extremely low (n=7), indicating that patients with this condition are usually not managed in general practice, being referred to specialists instead. It is impossible to obtain a reliable picture of the care of these patients based on such few observations. Therefore, these results are not shown.

Of the seven contacts with hypertension in pregnancy, six were new diagnoses. In all instances patients were aged 25–44 and consulted the GP for a pre/post natal check-up. All new cases were referred for hospital admission. No treatments or investigations were recorded at these encounters.

## Lipid disorders

Lipid disorders (dyslipidaemias) refer to abnormal levels of lipids and lipoproteins in the blood. They may lead to coronary heart disease, peripheral vascular disease, or skin, pancreatic or neurological conditions. Sometimes raised lipids levels are a manifestation of another condition such as diabetes, excessive alcohol intake, chronic kidney failure or thyroid disease, or result from the use of certain medications. Lipids tests have become common since the recommendation that all adult Australians should have their plasma lipids measured to help assess their risk of cardiovascular disease. Diet is the cornerstone of management of lipid disorders. Weight reduction and increased physical activity may help too. If medication therapy is needed, the choice of medication depends on the lipid abnormality. The range of lipid-lowering medications covers statins, fibrates, resins, nicotinic acid and fish oils, the first two being the most widely used (Simons 2000, Sullivan 2000, Colquhoun 2000).

Lipid disorders were managed on 2,392 occasions (at a rate of 2.5 per 100 encounters) and represented 1.7% of all problems handled by GPs. New problems constituted 13.1% (0.3 per 100 encounters) of all lipid disorder problems. Based on 103 million Medicare-claimed general practice consultations, this equates to about 2.5 million encounters for lipid disorders per year and around 333,000 new cases of lipid disorders diagnosed in general practice each year. Figure 10 summarises the most frequent observations for all encounters at which lipid disorders were treated compared with those for new lipid disorder diagnoses.

Males and females were managed for lipid disorders in equal proportions, unlike the distribution in the total data set (57.7% females). The largest proportion of patients (47.0%) was in the age range 45–64 years. Those from non-English-speaking background constituted 22.2% of patients and 0.4% were Aboriginals or Torres Strait Islanders. There were statistically significant differences between the rates of encounters for lipid disorder problems among these groups, being higher in the NESB and lower in the Indigenous populations compared with all patients (3.7, 0.8 and 2.5 per 100 encounters respectively). The rate difference between NESB and all patients is 1.2 (95% CI of the difference is 0.9–1.5), and between Indigenous and all patients the rate difference is 1.7 (95% CI of the difference is 0.8–2.6).

Of the 4,383 reasons for encounter recorded at these encounters, lipid disorders were the most common (27.2 per 100 lipid disorder encounters), followed by prescription requests for any condition (20.5 per 100), test results (19.5 per 100) and cardiac check-ups (14.1 per 100). The rate of 183.2 reasons for encounter per 100 encounters in these patients was above average.

Hypertension was a very frequent co-existing problem with lipid disorders, managed at a rate of 27.6 per 100 lipid disorder encounters. Diabetes was also relatively common in these patients (8.1 per 100). Both these comorbidities were well above the average rate. GPs handled a total of 3,068 other problems at encounters for lipid disorders. The high level of co-existing problems in these patients is indicated by the very high rate of total problems managed at hypertension encounters (228.3 per 100 encounters).

Medications were used to treat lipid disorders at a lower rate (66.1 per 100 problems) than average. Statins were by far the most popular medications given, making up 90.8% of all medications given for this condition. Other types of lipid-lowering medications also among the top ten but prescribed at a much lower rate were fibrates (gemfibrozil) and resin binders (cholestyramine). For the 73% of lipid disorder encounters where GPs recorded medication

status, 23.4% were new medications, that is, they were used for the first time to treat this condition in these patients. Of these new medications, atorvastatin was the most popular, representing 55.5% of all new medications given for lipid disorders (results not presented).

Other treatments for lipid disorders were also used relatively frequently (35.7 per 100 problems). Not surprisingly, these were mainly in the form of advice and education on lifestyle issues and medication. GPs gave patients advice on nutrition and weight (22.5 per 100), exercise (3.9 per 100), other lifestyle factors (1.1 per 100), medication use (2.1 per 100) and treatment (0.8 per 100).

Pathology tests were very common in the investigation and management of lipid disorders (53.3 per 100 problems) compared with the average (17.0 per 100). As would be expected, lipid tests ranked first (31.7 per 100), followed by liver function (7.4 per 100) and glucose tolerance tests (3.8 per 100). Imaging was rarely performed for this condition (0.2 per 100 problems).

GPs referred patients managed for lipid disorders to other health professionals and services only occasionally (1.2 per 100 problems). Given that diet is such an integral part of the treatment of this condition, it is interesting to note that referrals to dietitians/nutritionists occurred at a rate of only 0.7 per 100 problems.

The age and sex profile of new lipid disorder cases was similar to that of patients managed for this condition overall. The patient reason most often recorded at encounters for newly diagnosed lipid disorders was getting test results (47.0 per 100 encounters), indicating that these tests usually form the basis for diagnosis. Lipid disorders (21.0 per 100) and cardiac check-up (10.6 per 100) were other common recorded reasons for encounter. As with all people having lipid disorders, hypertension (17.2 per 100 encounters) and diabetes (6.7 per 100) were the most frequent other problems managed with new cases of lipid disorders. For the initial management of this condition, GPs tended to rely less on medication (38.9 per 100 problems) and more on other forms of treatment (68.4 per 100), especially advice on nutrition/weight (49.8 per 100) and exercise (7.6 per 100). When medications were given, these were generally statins (92.3% of all medications used). Pathology tests were ordered less often in new cases (32.6 per 100 problems) than for lipid disorder problems overall, lipids tests being the most frequently ordered (22.8 per 100). Imaging was virtually excluded from the range of investigations undertaken for this problem. The rate of referrals remained low among new lipid disorder cases (4.1 per 100 problems), even to dietician/nutrition professionals (3.3 per 100).

Patients		Per cent	
Male		48.9	
Female		51.1	
Age			
<1–14		0.1	
15–24		0.7	
25–44		12.1	
45–64		47.0	
65–74		28.9	
75+		11.3	
Origin			
NESB		22.2	
A&TSI		0.4	

  

Reasons for encounter	All	New
	n 4,383	n 553
	Rate <sup>(a)</sup>	
Lipid disorder	27.2	21.0
Prescription all*	20.5	7.8
Test results*	19.5	47.0
Cardiac check-up*	14.1	10.6
Blood test endocr/metab	12.8	10.3
Hypertension*	8.5	4.4
Blood test NOS	4.5	3.3
General check-up*	4.4	3.2
Immunisation all*	4.1	2.4
Diabetes*	3.0	3.6

  

Other problems managed	All	New
	n 3,068	n 346
	Rate <sup>(a)</sup>	
Hypertension*	27.6	17.2
Diabetes*	8.1	6.7
Immunisation all*	4.4	2.2
IHD without angina	4.4	0.7
Menopausal complaint	3.1	4.0
Osteoarthritis*	3.0	1.8
Oesophageal disease	2.9	2.3
Depression*	2.9	2.3
Abnormal test results*	2.8	7.4
Back complaint*	1.8	1.2

  

Medications	All	New
	n 1582	n 122
	Rate <sup>(b)</sup>	
Simvastatin	29.3	12.7
Atorvastatin	20.9	17.0
Pravastatin	7.1	5.8
Gemfibrozil	4.3	1.8
Fluvastatin	2.7	0.0
Aspirin	0.2	0.0
Cholestyramine	0.2	0.0
Enalapril mal	0.2	0.0
Fruzemide	0.1	0.0
Captopril	0.1	0.5

  

Other treatments	All	New
	n 855	n 214
	Rate <sup>(b)</sup>	
Advice nutrition/weight	22.5	49.8
Advice exercise	3.9	7.6
Counselling — problem	2.2	2.6
Advice medication	2.1	1.7
Advice/education	1.6	2.7
Advice lifestyle	1.1	1.1
Advice treatment	0.8	0.6
Advice health/body	0.6	0.8
Observe/wait	0.2	1.1
Advice alcohol	0.2	0.1

  

LIPID DISORDERS		
N = 2,392		
(1.7% of all problems managed)		
New problems = 313		
(13.1% of all lipid disorder problems)		

  

Pathology	All	New
	n 1,275	n 102
	Rate <sup>(b)</sup>	
Lipids	31.7	22.8
Liver function	7.4	2.6
Glucose tolerance	3.8	1.3
Full blood count	2.4	1.6
EUC	1.8	0.3
Cardiac enzymes	1.5	0.8
Other test NEC	1.0	0.2
Blood test	0.9	1.3
Multibiochemical tests	0.7	1.0
Thyroid function	0.6	0.0

  

Imaging	All	New
	n 4	n 1
	Rate <sup>(b)</sup>	
US/CT/contr; abdomen	0.1	0.4
US/CT/contrast; brain	0.1	0.0
Plain X-ray; bone(s)	<0.1	0.0
X-ray; chest	<0.1	0.0

  

Referrals	All	New
	n 29	n 13
	Rate <sup>(b)</sup>	
Dietician/nutrition	0.7	3.3
Cardiologist	0.1	0.2
Physician	0.1	0.3
Other health profess	0.1	0.0
Dermatologist	0.1	0.0
Interpreter	<0.1	0.0
ECG	<0.1	0.0
Hypnotherapy	<0.1	0.0
Surgeon	<0.1	0.2
Hospital admission	<0.1	0.0

(a) Rate per 100 lipid disorder encounters.

(b) Rate per 100 lipid disorder problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

Figure 10: Lipid disorders

## Cardiovascular check-up

GPs conducted cardiovascular check-ups on 1,204 occasions (rate 1.2 per 100 encounters), amounting to 0.8% of all problems managed. Of the total, 101 (8.4%) were new cases (rate 0.1 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 1.3 million encounters for cardiovascular check-ups per year. Figure 11 summarises the most frequent observations for all encounters at which cardiovascular check-ups were held compared with those for new cardiovascular check-ups.

Most patients undergoing a cardiovascular check-up were in the 45 years and over age range (84.9%) and the majority were women (61.2%). People from non-English-speaking background made up 16.5% of these patients and 0.2% were from Aboriginal or Torres Strait Islander origin. There were no statistically significant differences between the rates of encounters for cardiovascular check-up in NESB patients compared with all patients. But cardiovascular check-ups were statistically significantly less common among the Indigenous population (NESB 1.4, Indigenous 0.3, all patients 1.2 per 100 encounters, and the rate difference between Indigenous patients and all patients is 1.0 [95% CI of the difference is 0.3–1.6]).

Of the 2,365 patient reasons for encounter recorded, cardiac check-up (80.5 per 100 encounters), requests for medication (15.4 per 100), vaccinations (10.2 per 100) and general check-up (5.6 per 100) were the most common. The rate of reasons for encounter in these patients (196.4 per 100) was well above average.

Other problems managed at these encounters included vaccinations (11.3 per 100 cardiovascular check-up encounters), providing prescriptions (7.5 per 100), female gynaecological examination (4.8 per 100), diabetes (3.4 per 100) and lipid disorder (3.2 per 100), among a total of 1,422 problems.

Medications were given after cardiovascular check-up at a rate of 41.4 per 100 problems, which is considerably below average. The following were the most frequent types: calcium channel blockers (amlodipine, felodipine), beta blockers (atenolol, metoprolol), ACE-inhibitors (enalapril, perindopril, captopril), diuretics (indapamide, frusemide) and angiotensin II receptor antagonists (irbesartan). Of all medications used after cardiovascular check-ups, ACE-inhibitors represented 26.5%, calcium channel blockers 20.4%, diuretics 14.1%, beta blockers 13.1%, angiotensin II receptor antagonists 5.2%, alpha blockers 3.9%, antiplatelet medications 2.5%, anticoagulants 1.7%, statins 1.6%, antiarrhythmics 1.1% and nitrates 1.1%. For the 69% of cardiovascular check-up encounters where GPs recorded medication status, 8.8% were new medications, that is, they were used for the first time after a cardiovascular check-up in these patients. Of these new medications, irbesartan was the most popular – 14.0% of all new medications given after a cardiovascular check-up (results not presented).

This set of results suggests some confusion in the GPs' minds about how to label the problem they are managing at these encounters. A label of cardiovascular check-up implies that the patient is well and therefore does not require medication. However, at these encounters only 8.4% were new cases and there was an overall medication use rate of 41.4 per 100 problems, of which only 8.8% were given for the first time. This indicates that at many of these contacts GPs were actually managing a cardiovascular problem already diagnosed previously but, instead of recording the real problem being managed, they labelled it as 'check-up'. For instance, they may have been dealing with cases of hypertension that was controlled by medication so the patients were 'well' and, in the GPs' mind, not hypertensive any more. Therefore, they chose not to label the problem 'hypertension'.



Other treatments were provided at a rate of 16.4 per 100 problems and involved mainly giving advice on nutrition/weight, exercise, other lifestyle issues, medication and treatment.

Pathology testing was requested at a rate of 10.9 per 100 problems, which is below the average. Lipids (4.2 per 100), glucose tolerance (1.7 per 100) and electrolytes/urea/creatinine (1.3 per 100) were the tests ordered most frequently. Imaging was not generally used as part of cardiovascular check-ups.

Patients undergoing cardiovascular check-ups were referred to other health professionals or services very infrequently (1.5 per 100 problems). When this happened, it was mostly to cardiologists or for electrocardiography.

While the general pattern of encounters for new cardiovascular check-ups was similar to that described above, it is interesting to note that a relatively large proportion of patients (30.1%) being examined for the first time was aged 25–44 years. This indicates significant awareness among both patients and GPs of the importance of prevention and monitoring of cardiovascular disease from a younger age.

Patients		Per cent	
Male		38.8	
Female		61.2	
Age			
<1–14		1.0	
15–24		2.1	
25–44		12.1	
45–64		35.7	
65–74		26.5	
75+		22.7	
Origin			
NESB		16.5	
A&TSI		0.2	

  

Reasons for encounter	All	New
	n 2,365	n 208
	Rate <sup>(a)</sup>	
Cardiac check-up*	80.5	80.3
Prescription all*	15.4	6.0
Immunisation all*	10.2	10.3
General check-up*	5.6	6.3
Female genital check*	3.7	4.5
Blood test endocr/metab	3.6	2.2
Test results*	3.4	<0.8
Cough	2.1	2.0
Rash*	2.0	3.5
Hypertension*	1.9	<0.8

  

Other problems managed	All	New
	n 1,422	n 129
	Rate <sup>(a)</sup>	
Immunisation all*	11.3	11.6
Prescription all*	7.5	1.3
Female genital check*	4.8	6.1
Diabetes*	3.4	2.8
Lipid disorder	3.2	1.6
Osteoarthritis*	2.6	5.3
Menopausal complaint	2.5	<0.8
Dermatitis	2.1	3.4
Blood test endocr/metab	2.1	1.7
URTI, acute	2.0	<0.8

  

Medications	All	New
	n 499	n 14
	Rate <sup>(b)</sup>	
Amlodipine	3.4	1.2
Atenolol	3.0	0.0
Enalapril mal	2.7	0.0
Indapamide	2.3	0.0
Irbesartan	1.9	0.5
Metoprolol	1.8	0.0
Perindopril	1.8	3.6
Felodipine	1.7	1.4
Captopril	1.7	0.0
Frusemide	1.7	2.0

  

Other treatments	All	New
	n 198	n 21
	Rate <sup>(b)</sup>	
Advice nutrition/weight	3.3	1.3
Advice exercise	2.9	0.0
Advice medication	1.7	1.4
Reassurance, support	1.5	5.4
Advice/education	1.5	1.9
Counselling — problem	1.3	2.9
Advice lifestyle	1.3	4.9
Advice treatment	0.7	1.0
Observe/wait	0.5	0.0
Electrical tracings	0.3	0.0

  

CARDIOVASCULAR CHECK-UP	
N = 1,204	
(0.8% of all problems managed)	
New problems = 101	
(8.4% of all cardiovascular check-up problems)	

  

Pathology	All	New
	n 131	n 10
	Rate <sup>(b)</sup>	
Lipids	4.2	5.9
Glucose tolerance	1.7	1.8
EUC	1.3	0.0
Full blood count	0.9	1.1
Liver function	0.9	0.0
Other test NEC	0.5	0.0
Prostate specific Ag	0.3	0.0
Multibiochemical tests	0.2	0.5
Coagulation	0.1	0.0
Digoxin	0.1	0.0

  

Imaging	All	New
	n 2	n 0
	Rate <sup>(b)</sup>	
Mammography; F	0.1	0.0
X-ray; arm	0.1	0.0

  

Referrals	All	New
	n 18	n 3
	Rate <sup>(b)</sup>	
Cardiologist	0.6	2.1
ECG	0.5	0.4
Endocrinologist	0.2	0.0
Specialist	0.1	0.0
Other health profess	0.1	0.0

(a) Rate per 100 cardiovascular check-up encounters.

(b) Rate per 100 cardiovascular check-up problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

Figure 11: Cardiovascular check-up

## Overweight and obesity

The body mass index (BMI) gives a measure of overweight and obesity. It is calculated by dividing a person's weight (kg) by height squared (m<sup>2</sup>). A BMI of 25 or greater indicates overweight and 30 or greater indicates obesity. People who are overweight or obese are at increased risk of coronary heart disease, stroke, heart failure and type 2 diabetes. High blood pressure and high blood cholesterol are also associated with overweight and obesity. Obesity can lead to reduced life expectancy as well. An estimated 7.5 million adult Australians (aged 25 years and over) are overweight and almost 2.6 million of these people are obese. In Australia, men are more likely to be overweight than women and the proportion of overweight people increases with age, peaking at age 55–74 years. Although the proportion of overweight Indigenous men is similar to that of all Australian men, the rate of obesity is higher among Indigenous men. Rates of overweight and obesity are much higher for Indigenous women than for all Australian women (AIHW 2001).

General practitioners are seen as having a key influence in the community in creating awareness of the risks associated with overweight and obesity. As such they are expected to provide leadership in the prevention of overweight and obesity (NHMRC 1997). Current general practice guidelines recommend that GPs educate patients about behaviours such as modifying their diet (RACGP 1996). However, although Australian GPs have a strong interest in nutrition, they appear to lack time, confidence and adequate knowledge to provide nutrition counselling (Helman 1997). Studies have shown that most nutrition advice given by GPs is disease specific and that the main conditions for which advice is given are heart disease, hyperlipidaemia, obesity and diabetes (Helman 1997). There is evidence that most patients think that their GP should be interested in their weight and exercise (Richmond et al. 1996). When counselling on weight reduction, GPs have tended to use verbal advice alone, referrals being rare (Heywood et al. 1994). However, a combination of the skills of a dietician and the patient's GP has been shown to lead to better outcomes in terms of weight reduction in overweight patients (Pritchard et al. 1999).

SAND, a substudy of the BEACH program, provides information on the rates of overweight and obesity among adult patients (aged 18 years and over) attending general practice for any problem, not just those being managed for overweight and obesity (Sayer et al 2000). This is based on height and weight as reported by the patients. For the period described in this report, for a sample of 30,485 patient encounters, these rates were: 32.8% overweight and 18.4% obese, making a total of 51.2% overweight or obese. This compares with 56% overweight and 19% obese among the general population aged 18 years and over, based on physical measurements (AIHW 1999). In the SAND sample, a higher proportion of males were overweight or obese (57.2%) than females (47.0%). The proportions of overweight or obese patients increased with age and were mostly in the 45–64 and 65–74 year ranges.

Overweight and obesity problems were managed at 668 encounters (at a rate of 0.7 per 100 encounters), accounting for 0.5% of all problems seen. Given that the prevalence of overweight and obesity among general practice patients in the study was 51.2%, the rate of management of this problem is very low, clearly indicating that this is an area that GPs could tackle more vigorously. New problems represented 107 (16.0%) of all overweight and obesity problems (0.1 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 710,000 encounters for overweight and obesity problems per year and around 114,000 new cases of overweight and obesity diagnosed in general practice each year. Figure 12 summarises the most frequent observations for all encounters at which overweight and obesity was treated compared with those for new overweight and obesity diagnoses.

Females made up the vast majority of patients treated for this problem (69.9%). This is interesting given that the prevalence of overweight and obesity in general practice patients was higher in males than in females and suggests that women are more likely than men to seek assistance to shed excess weight. Patients were largely in the 25–44 (37.2%) and 45–64 (40.9%) year ranges. Only 7.2% of patients were aged 65–74, which is one of the age groups among which overweight and obesity is most prevalent. This suggests that more could be done to encourage these patients to control their weight. Sixteen per cent of patients were of non-English-speaking background and 1.8% were of Aboriginal or Torres Strait Islander origin. There were no statistically significant differences between the rates of encounters for overweight and obesity problems in the NESB or Indigenous populations compared with all patients (0.8, 1.0 and 0.7 per 100 encounters respectively).

A total of 1,141 patient reasons for encounter was recorded at encounters where overweight and obesity was treated, at an above average rate of 170.8 per 100 encounters. Obesity (22.2 per 100 overweight and obesity encounters) and overweight (21.7 per 100) were the most common reasons. Endocrine/metabolic symptoms and check-up, cardiac check-up, hypertension, back complaints and depression were also among the top ten reasons for encounter.

GPs managed 723 other problems at these encounters. The most frequent comorbidities were hypertension (16.8 per 100 encounters), lipid disorder (5.2 per 100), depression (4.4 per 100) and diabetes (3.8 per 100). The rates of hypertension and diabetes in these patients were double the average for the total data set, indicating a strong association between the conditions.

Medication use was not common in the management of overweight and obesity (23.6 per 100 problems). The most widely used were appetite suppressants (phentermine and diethylpropion hydrochloride) and herbal remedies, accounting for 37.4%, 16.4% and 36.6% of all medications given for overweight and obesity problems respectively.

GPs relied much more on other forms of treatment to manage this condition (105.8 per 100 problems). These included providing advice on nutrition/weight (71.5 per 100), advice on exercise (26.3 per 100) and advice on other lifestyle issues (2.1 per 100).

When pathology tests were ordered (at a rate of 21.2 per 100 problems), they were mostly for lipids (6.7 per 100), glucose tolerance (4.0 per 100) and thyroid function (2.7 per 100). Imaging was not used to investigate overweight and obesity problems.

Overall, referrals to other health professionals were much lower than might have been expected in these cases (8.9 per 100 problems). In particular, referrals to dietitians/nutritionists occurred at a rate of only 6.2 per 100 problems.

Most new cases of overweight and obesity were females (73.4%) and in the age group 25–44 (46.2%). At these encounters, the same range of reasons for seeking GP assistance was recorded as for all patients managed for overweight and obesity. The most frequent other conditions cared for in new cases of overweight and obesity were depression (8.7 per 100 problems) and hypertension (7.9 per 100). Medications were given at the same rate as that of all overweight and obesity cases, the most popular being phentermine and diethylpropion hydrochloride. Non-medication management and investigations of new cases were similar to those used in all problems. GPs referred patients they managed with newly diagnosed overweight and obesity at a rate of 10.3 per 100 problems, almost exclusively to dietitians/nutritionists (9.5 per 100).

Patients		Per cent	
Male		30.1	
Female		69.9	
Age			
<1–14		2.8	
15–24		9.5	
25–44		37.2	
45–64		40.9	
65–74		7.2	
75+		2.5	
Origin			
NESB		16.5	
A&TSI		1.8	

  

Reasons for encounter	All	New
	n 1,141	n 194
	Rate <sup>(a)</sup>	
Obesity (bmi > 30)	22.2	25.1
Overweight (bmi 25–30)	21.7	12.8
Endocr/metab symptom	9.9	19.2
Cardiac check-up*	8.6	6.5
Prescription all*	7.4	10.1
Hypertension*	5.3	3.8
Back complaint*	4.6	5.4
Endocrine check-up*	4.1	2.8
Depression*	3.9	11.0
General check-up*	3.7	5.4

  

Other problems managed	All	New
	n 723	n 106
	Rate <sup>(a)</sup>	
Hypertension*	16.8	7.9
Lipid disorder	5.2	3.2
Depression*	4.4	8.7
Diabetes*	3.8	1.6
Osteoarthritis*	3.3	0.9
Back complaint*	3.1	3.3
Female genital check*	2.5	2.0
Sprain/strain*	2.2	4.0
URTI, acute	2.1	0.9
Anxiety*	2.0	<0.5

  

Medications	All	New
	n 158	n 25
	Rate <sup>(b)</sup>	
Phentermine	8.9	13.6
Herbal remedy NEC	8.7	1.9
Diethylpropion hcl	3.9	6.7
Protein/Glucose/Vit/Min	0.7	0.3
Antiobesity	0.4	0.0
Atorvastatin	0.3	0.0
Frusamide	0.1	0.0
Gliclazide	0.1	0.0
Sodium valproate	0.1	0.0
Lisinopril	0.1	0.0

  

Other treatments	All	New
	n 707	n 113
	Rate <sup>(b)</sup>	
Advice nutrition/weight	71.5	73.2
Advice exercise	26.3	21.3
Advice lifestyle	2.1	1.4
Counselling — problem	1.0	2.3
Advice treatment	0.9	1.0
Advice/education	0.8	0.4
Other procedures NEC	0.7	1.7
Advice health/body	0.5	0.0
Counselling psychol	0.3	0.0
Reassurance, support	0.2	0.0

  

OVERWEIGHT and OBESITY	
N = 668	
(0.5% of all problems managed)	
New problems = 107	
(16.0% of all overweight and obesity problems)	

  

Pathology	All	New
	n 142	n 24
	Rate <sup>(b)</sup>	
Lipids	6.7	7.1
Glucose tolerance	4.0	1.2
Thyroid function	2.7	4.8
Liver function	1.7	2.9
Full blood count	1.7	2.2
EUC	1.0	0.2
Blood test	0.7	3.2
Multibiochemical tests	0.6	0.0
Hormone assay	0.6	0.8
Urine MC&S	0.3	0.0

  

Imaging	All	New
	n 1	n 1
	Rate <sup>(b)</sup>	
US/CT/contr; abdomen	0.1	0.8

  

Referrals	All	New
	n 60	n 11
	Rate <sup>(b)</sup>	
Dietician/nutrition	6.2	9.5
Surgeon	0.6	0.0
Hydrotherapy	0.3	0.0
Endocrinologist	0.3	0.0
Hospital admission	0.3	0.0
Acupuncture	0.3	0.0
Psychologist	0.2	0.0
Paediatrician	0.2	0.0
Allied health profess	0.2	0.0
Other health profess	0.1	0.0

(a) Rate per 100 overweight and obesity encounters.

(b) Rate per 100 overweight and obesity problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

**Figure 12: Overweight and obesity**

## Smoking

Smoking here refers to tobacco use in the form of packet cigarettes, roll-your-own cigarettes, pipes and cigars. Tobacco smoking increases the risk of coronary heart disease, stroke, peripheral vascular disease, some cancers and respiratory conditions such as asthma and emphysema. It is estimated that about 3.5 million adult Australians smoke tobacco products. About 26% of men and 21% of women smoke and the highest proportion of smokers is among those aged 18–34 years. After age 35, smoking rates decline with increasing age, to be lowest in those aged 75 years and above. Adult Indigenous Australians are at least twice as likely to smoke as other Australian adults (AIHW 2001).

Nicotine replacement therapy is an effective aid in smoking cessation (Silagy et al. 1994). Current general practice guidelines recommend that GPs educate patients about modifying behaviours such as smoking (RACGP 1996). Advice to stop smoking from GPs has been shown to reduce smoking rates among patients in Australia and there is evidence that most patients think that their GP should be interested in their smoking (Richmond et al. 1996). When counselling on smoking, GPs have tended to use verbal advice alone, referrals being rare (Heywood et al. 1994).

From the SAND substudy of the BEACH program, we have information on the rates of smoking among adult patients (aged 18 years and over) attending general practice for any problem (Sayer et al 2000). For the period described in this report, for a sample of 30,265 patient encounters, these rates were: 19.2% daily smokers, 5.6% occasional smokers and 27.0% previous smokers.

GPs managed smoking on 275 occasions (0.3 per 100 encounters), which represents 0.2% of all problems. The rate of management of smoking appears quite low given that almost one in five GP encounters with adults are with daily smokers. New problems accounted for 71 (25.8%) of all smoking problems (0.1 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 292,000 encounters at which smoking is managed per year and around 75,000 new cases of smoking problems treated in general practice each year. Figure 13 summarises the most frequent observations for all encounters at which smoking was treated compared with those for new smoking problems.

Slightly more males (53.0%) than females were managed for smoking problems, unlike the proportions attending general practice as a whole (57.7% females) and most of these patients (51.8%) were in the age range 25–44. About 12% of patients were of non-English-speaking background and 0.9% were of Aboriginal or Torres Strait Islander origin. There were no statistically significant differences between the rates of encounters for smoking problems in the NESB or Indigenous populations compared with all patients (0.2, 0.3 and 0.3 per 100 encounters respectively).

Smoking was the patient reason recorded most often at these encounters (51.5 per 100 encounters). Among other reasons were seeking health advice, obtaining test results and prescriptions, having cough and throat symptoms, and requesting a cardiovascular check-up. This suggests that in about half these encounters the management of smoking was instigated by the patient and in the other half it was opportunistic care initiated by the GP.

The most frequent other conditions managed with smoking problems included upper respiratory tract infections (7.9 per 100 encounters), hypertension (6.1 per 100) and depression (5.9 per 100). Acute bronchitis, asthma and lipid disorder were also among the top ten co-existing problems.

GPs used medications to help patients quit smoking at a rate of 44.7 per 100 problems, which is well below the average. Overwhelmingly this was in the form of nicotine therapy (97.2% of all medications given).

GPs relied more on other forms of therapy (73.8 per 100 problems), mainly giving patients advice related to smoking (64.0 per 100). They also provided reassurance and advice on other lifestyle issues.

Pathology tests were seldom requested in the management of smoking problems (5.8 per 100 problems). Lipids and glucose tolerance tests were the main types ordered. Imaging, in the form of chest X-rays, was also rare (1.4 per 100 problems).

Generally GPs themselves treated patients for smoking problems as the referral rate was very low (2.2 per 100 problems). Interestingly, hypnotherapy was at the top of the list of referrals to assist with quitting smoking.

The pattern of encounters for new cases of smoking problems was the same as that for all encounters during which smoking problems were managed.

<b>Patients</b>		<b>Reasons for encounter</b>		<b>Other problems managed</b>	
	<b>Per cent</b>	<b>All</b>	<b>New</b>	<b>All</b>	<b>New</b>
		n 511	n 140	n 359	n 86
		<b>Rate<sup>(a)</sup></b>		<b>Rate<sup>(a)</sup></b>	
Male	53.0	51.5	54.1	7.9	7.5
Female	47.0	8.6	10.5	6.1	3.8
<b>Age</b>		7.7	8.6	5.9	<0.8
<1–14	0.0	7.5	12.8	4.9	10.1
15–24	11.5	7.2	8.9	4.9	9.2
25–44	51.8	5.6	4.8	4.7	3.9
45–64	28.8	5.4	9.3	3.8	3.6
65–74	6.1	3.5	1.4	3.4	1.7
75+	1.7	3.1	5.4	3.4	2.7
<b>Origin</b>		3.0	5.3	3.1	2.4
NESB	11.7				
A&TSI	0.9				

  

<b>Medications</b>		<b>Other treatments</b>	
	<b>All</b>	<b>All</b>	<b>New</b>
	n 123	n 203	n 41
	<b>Rate<sup>(b)</sup></b>		<b>Rate<sup>(b)</sup></b>
Nicotine	43.4	64.0	48.2
Doxycycline hcl	0.9	3.0	2.1
Oxazepam	0.2	1.3	0.4
Senega + Ammonia	0.1	1.2	0.4
Nefazodone	0.1	1.0	4.0
		0.7	1.4
		0.7	0.0
		0.6	0.0
		0.5	2.1
		0.3	0.0

  

<b>Pathology</b>		<b>Imaging</b>		<b>Referrals</b>	
	<b>All</b>	<b>All</b>	<b>New</b>	<b>All</b>	<b>New</b>
	n 16	n 4	n 0	n 6	n 1
	<b>Rate<sup>(b)</sup></b>		<b>Rate<sup>(b)</sup></b>	<b>Rate<sup>(b)</sup></b>	
Lipids	1.8	1.3	0.0	1.3	1.4
Glucose tolerance	1.4			0.6	0.0
Liver function	1.1			0.2	0.0
EUC	0.7			0.1	0.0
Full blood count	0.6			0.1	0.0
Blood grouping/typing	0.3				

  

<b>SMOKING</b>	
N = 275	
(0.2% of all problems managed)	
New problems = 71	
(25.8% of all smoking problems)	

(a) Rate per 100 smoking encounters.

(b) Rate per 100 smoking problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

**Figure 13: Smoking**



## Peripheral vascular disease

Peripheral vascular disease is caused by atherosclerosis (a thickening or hardening of the walls of a blood vessel) and results in a reduced blood supply or impaired return of blood affecting the limbs. This ranges from asymptomatic disease, through pain on walking, to pain at rest and limb-threatening ischaemia that can lead to amputation. The condition occurs mainly among the elderly and claims over 2,000 lives in Australia each year. Rehabilitation of elderly patients after amputation can prove difficult, with high community costs. Peripheral vascular disease shares many risk factors with ischaemic heart disease (AIHW 2001).

Investigations to help in diagnosing the condition include exercise testing to provide an objective measurement of walking distance, and duplex ultrasound scanning or arteriography to delineate the location and assess the extent of disease. Modification of risk factors is essential to reduce the likelihood of death from myocardial infarction or stroke in people with peripheral vascular disease. All patients should be advised to stop smoking, take regular exercise and lose weight if appropriate. They should also be screened for lipid disorders and diabetes. Treatment with antiplatelet agents such as aspirin is beneficial because it reduces the risk of cardiovascular events. Pain relievers may also be needed to numb severe pain. Exercise programs can significantly improve pain free and maximum walking distances (Beard 2000).

Peripheral vascular disease was managed at 215 encounters, at a rate of 0.2 per 100 encounters, amounting to 0.1% of all problems managed. Forty-five (20.9%) of these were new problems (0.05 per 100 encounters). Based on 103 million Medicare-claimed general practice consultations, this equates to about 228,000 encounters for peripheral vascular disease per year and around 48,000 new cases of peripheral vascular disease diagnosed in general practice each year. Figure 14 summarises the most frequent observations for all encounters at which peripheral vascular disease was treated compared with those for new peripheral vascular disease diagnoses.

Patients treated for this condition were more likely to be male (62.7%) than in the total data set (42.3%) and most patients were aged 65 years and over (70.1%). People from non-English-speaking background represented 13.6% of patients and those of Aboriginal or Torres Strait Islander origin accounted for 0.7%. There were no statistically significant differences between the rates of encounters for peripheral vascular disease problems in the NESB or Indigenous populations compared with all patients (0.2, 0.1 and 0.2 per 100 encounters respectively).

Of the 402 patient reasons for encounter recorded when peripheral vascular disease was managed, the most common were peripheral vascular disease (26.3 per 100 encounters), leg/thigh complaint (21.6 per 100) and medication requests for any condition (14.9 per 100). The relative number of reasons for encounter at these encounters (186.9 per 100) was above average.

The problems that GPs managed most frequently with peripheral vascular disease were hypertension (14.1 per 100 peripheral vascular disease encounters), diabetes (9.8 per 100), lipid disorder (7.4 per 100) and ischaemic heart disease without angina (4.1 per 100). The rates of all these comorbidities were much higher than average, indicating an association between the conditions and peripheral vascular disease. Overall, there were 265 other problems managed at peripheral vascular disease encounters. The high rate of total problems managed in these patients (223.2 per 100 encounters) points to a high comorbidity level in these patients.

Medications were used in the management of peripheral vascular disease at a relatively low rate (46.9 per 100 problems). Antiplatelet agents (aspirin), anticoagulants (warfarin) and calcium channel blockers (nifedipine) were the medication types given most often (11.6, 7.6 and 6.3 per 100 problems respectively). Of all medications used for peripheral vascular disease, aspirin represented 24.6%, warfarin 16.1% and nifedipine 13.3%.

Other forms of treatment for this condition were provided less often (30.7 per 100 problems). These were mainly in the form of advice on treatment (7.5 per 100) and advice on smoking (4.9 per 100). Counselling on nutrition/weight, exercise and on the condition itself were also among the top ten other treatments given.

Pathology tests were ordered for peripheral vascular disease at a rate of 15.8 per 100 problems, which is about average. The most frequent of these were coagulation tests (4.9 per 100), consistent with the use of anticoagulant medication in these patients, and lipids (2.9 per 100).

Imaging was requested more frequently than the average to study peripheral vascular disease (6.5 per 100 problems), the main form being Doppler imaging.

Referrals to other health professionals or services occurred relatively often overall (20.5 per 100 problems). They were most frequently to vascular surgeons (7.0 per 100), other surgeons (3.4 per 100), Doppler testing (2.8 per 100) and for hospital admission (2.6 per 100).

As there were only 45 encounters where GPs managed new problems, these results are discussed briefly and should be interpreted with caution. New cases of peripheral vascular disease were more evenly distributed among the sexes (females 51.6%). Other characteristics of these patients and their management were generally similar to those of peripheral vascular disease cases overall. However, GPs used other forms of treatment more frequently to manage new cases (42.2 per 100 problems), especially providing advice on smoking, treatment and exercise. Pathology tests were more common in newly diagnosed peripheral vascular disease (28.9 per 100 problems) than in problems overall and covered a wide range of tests. Imaging was requested at a rate of 11.1 per 100 problems, involving mainly Doppler tests. Referral of new cases was common (42.2 per 100 problems) and was made principally for Doppler testing and to vascular surgeons.

Patients		Reasons for encounter		Other problems managed		
	Per cent	All	New	All	New	
		n 402	n 95	n 265	n 72	
		Rate <sup>(a)</sup>		Rate <sup>(a)</sup>		
Male	62.7	PVD	26.3	Hypertension*	14.1	26.9
Female	37.3	Leg/thigh complaint	21.6	Diabetes*	9.8	6.7
<b>Age</b>		Prescription all*	14.9	Lipid disorder	7.4	12.6
<1–14	0.6	Test results*	7.4	IHD without angina	4.1	3.2
15–24	1.6	Cardiac check-up*	6.4	COPD	4.0	0.0
25–44	7.3	Foot & toe complaint	5.0	Immunisation all*	3.7	6.4
45–64	20.4	General check-up*	4.7	Anxiety*	3.5	10.7
65–74	34.5	Hypertension*	4.2	Musculoskeletal disease	3.2	6.3
75+	35.6	Chronic ulcer skin	4.2	Osteoarthritis*	2.7	1.8
<b>Origin</b>		Pain, chest NOS	3.5	Gout	2.5	0.0
NESB	13.6					
A&TSI	0.7					

  

Medications		Other treatments	
	All	All	New
	n 101	n 66	n 19
	Rate <sup>(b)</sup>		Rate <sup>(b)</sup>
Aspirin	11.6	7.5	10.6
Warfarin sodium	7.6	4.9	12.9
Nifedipine	6.3	2.7	0.0
Paracetamol/Codeine	3.2	2.5	3.1
Paracetamol	2.7	2.2	7.7
Frusemide	1.4	2.2	2.0
Simvastatin	1.1	2.1	2.9
Dextropropox/Paraceta	1.1	2.0	1.2
Cephalexin	1.1	1.3	1.2
Quinine sulphate	1.0	0.9	0.0
	5.0	0.8	0.0

  

Pathology		Imaging		Referrals		
	All	All	New	All	New	
	n 34	n 14	n 5	n 44	n 19	
	Rate <sup>(b)</sup>		Rate <sup>(b)</sup>	Rate <sup>(b)</sup>		
Coagulation	4.9	Doppler	3.4	Vascular surgeon	7.0	8.9
Lipids	2.9	Imaging other	1.2	Surgeon	2.8	4.0
Full blood count	1.5	US/CT/contr; vascular	0.7	Doppler test	2.8	12.8
Other test NEC	1.2	MRI	0.5	Hospital admission	2.6	2.2
EUC	1.1	US/CT/contrast	0.3	Physician	1.5	3.5
Thyroid function	0.9			Cardiologist	1.3	6.4
Glucose tolerance	0.8			Specialist	1.2	1.6
Blood test	0.7			Cardiothoracic surgeon	0.6	0.0
Calcium/phosphate	0.7			Ophthalmologist	0.4	2.0
B12	0.4			ECG	0.1	0.0
	1.8					

  

PERIPHERAL VASCULAR DISEASE	
N = 215	
(0.1% of all problems managed)	
New problems = 45**	
(20.9% of all peripheral vascular disease problems)	

(a) Rate per 100 peripheral vascular disease encounters.

(b) Rate per 100 peripheral vascular disease problems.

\* Includes multiple ICPC-2 or ICPC-2 PLUS codes (see Appendix 2).

\*\* The number of encounters for new problems is low so results should be interpreted with caution as they may be unreliable.

Figure 14: Peripheral vascular disease