6   Use of health services

Introduction

Living with diabetes is challenging because it affects every aspect of a person's life. Support from family, multidisciplinary health-care teams, peers and various organisations, such as Diabetes Australia, can help individuals make the necessary adjustments towards improving a patient's health and quality of life.

Diabetes is a chronic condition requiring the use of a variety of health services for its control and for the early diagnosis and treatment of associated complications. People with diabetes use a range of health services to control blood sugar, blood pressure and blood lipid levels to reduce symptoms and the risk of complications, and to enhance their quality of life. Having complications as well as diabetes greatly increases the use of health services. People without diabetes who have a number of diabetes risk factors are also likely to use more health resources (Burke et al. 2007).

How is diabetes managed?

Diabetes management involves a combination of medical and non-medical approaches. The overall goal is for the patient to have a life that is as healthy, and as normal, as possible. This can be a demanding task because the condition requires careful attention and monitoring by the patient, their doctor and other health professionals.

The medical aims of diabetes management are:

- to remove the symptoms and short-term risks of high blood glucose
- to prevent longer term complications
- to detect and treat any complications early if they do arise.

Symptom control and longer term prevention can be achieved by maintaining normal blood glucose levels and by attention to lifestyle and its associated risk factors (such as diet and physical activity). Research studies have shown the benefits of improved blood glucose control in reducing the risk of complications in people with diabetes (UKPDS Group 1998; Stratton et al. 2000).

For both Type 1 and Type 2 diabetes, together with medication, a degree of blood glucose control can be brought about through lifestyle approaches, such as a healthy diet, regular exercise and resulting weight control. Avoiding smoking and maintaining good control of blood pressure and blood cholesterol levels as well as the lifestyle approaches help reduce the risk of complications such as heart attack and stroke.

Diabetes management guidelines

The annual cycle of care for diabetes describes the minimum level of care for people with diabetes. This is aimed at monitoring blood glucose control, and preventing or delaying the onset of complications. Care will often be managed by a general practitioner (GP); however, is also likely to involve nurses, specialists and allied health professionals as well as the patients themselves.

More information on diabetes management guidelines based on *Diabetes Management in General Practice* (13th edition 2007/8) (Diabetes Australia 2007b) and Medicare Service Incentive Payment items (DoHA 2007) for patients with diabetes mellitus are given in Table 6.1.

In Australia available research has identified the need for improved quality of diabetes care (Georgiou et al. 2004; Kemp et al. 2005). For example, in 1999 in divisions of general practice providing data for the National Divisions Diabetes Program (NDDP) fewer than 60% of patients were receiving care consistent with best-practice guidelines (Carter et al. 2000).

Medical and allied health services

GPs are usually the initial point of contact for people with diabetes and play a key role in coordinating the services that are needed because the condition and its complications affect several parts of the body. Patients and their carers also need information and support. Thus, a range of other health professionals may also be involved. GPs and other primary health-care professionals often manage diabetes in collaborative arrangements with specialised services. The Bettering the Evaluation and Care of Health (BEACH) report (Britt et al. 2007) established that diabetes was one of the main chronic conditions managed by GPs.

Table 6.1: Elements of the annual cycle of care for managing diabetes

Elements	Diabetes Management in General Practice	Medicare Service Incentive Payment
Measure HbA1c	Measure HbA1c at least six monthly.	Assess diabetes control by measuring HbA1c at least once every year.
Review smoking status, physical activity and nutrition	Minimal interventions in general practice settings can improve cessation rate of smoking. Encourage people with diabetes at least 30 minute walking (or equivalent) for 5 or more days a week. Nutrition management involves optimising weight and the introduction of a healthy eating plan.	Check smoking status; if applicable encourage cessation of smoking. Review levels of physical activity; reinforce information about appropriate levels of physical activity. Review diet; reinforce information about appropriate dietary choices.
Measure body mass index (BMI)	Maintain a BMI $\leq$ 25kg/m2 where practicable.	Measure weight and height and calculate BMI at least once every six months.
Measure blood pressure and lipids	Check blood pressure every three to four months; ensure that blood pressure is maintained at a target level of <130/80 mm Hg. Blood fats (cholesterol and triglycerides) tested every 12 months; targets are LDL cholesterol < 2.5 mmol/L, total cholesterol 4.0 mmol/L, HDL cholesterol > 1.0 mmol/L and triglycerides < 1.5 mmol/L.	Measure blood pressure at least once every six months. Measure total cholesterol, triglycerides and HDL cholesterol at least once every year.
Review medication	n.a.	Medication can be reviewed at least once every year.
Eye examination	Second yearly referral to an ophthalmologist/optometrist if the patient has no retinopathy, more frequently if abnormal.	Ensure that comprehensive eye examination is carried out at least once every two years.
Foot examination	Check for ulcers, infections or abnormalities at least once every six months.	Examine feet, at least once every six months.
Tests for microalbuminuria	Test for microalbuminuria at least once every year.	Test for microalbuminuria at least once every year.

Note: The Diabetes Management in General Practice applies to the management of Type 2 diabetes only.
Sources: DoHA 2007; Diabetes Australia 2007b.

Doctors use a blood test, called HbA_{1c} or glycated haemoglobin, to assess how well blood glucose has been controlled over recent months; and sometimes a fructosamine test is used to assess the preceding three weeks. Doctors also advise and monitor their patients on lifestyle measures and other risk factor control, check regularly for any early damage to the kidneys and feet, periodically refer them for expert check-ups of their eyes and periodically review any medicines they are prescribing and how their patients are using them.

General practitioner visits

In 2005–06 GPs managed diabetes (excluding gestational diabetes) at a rate of 3.5 per 100 encounters, representing 2.4% of all problems managed. Diabetes was the third most frequently managed chronic problem accounting for 6.9% of all chronic problems managed (Britt et al. 2007).

GPs provided clinical treatment (advice and counselling) for 23.3% of consultations for diabetes problems. Diabetes was the problem most frequently referred to specialists in 2005–06, with 6.9% of diabetes encounters generating a referral to specialists by GPs. During the same period, 4.9% of all diabetes encounters with GPs resulted in referral to allied health professionals, including dieticians, diabetes educators, diabetes clinics, and podiatrists (Britt et al. 2007).

Visits to medical specialists and allied health professionals

Diabetes complications may affect a number of the body's organs, necessitating treatment by specialists in areas such as endocrinology, cardiology, nephrology, obstetrics and ophthalmology.

Use of health services

Information from the 2004–05 NHS indicates that people with diabetes were over 2.5 times as likely as people without diabetes to have visited a specialist. In the two weeks before the survey, 13% of people with diabetes had visited a specialist, compared with 6% of those without diabetes (Figure 6.1).

Per cent
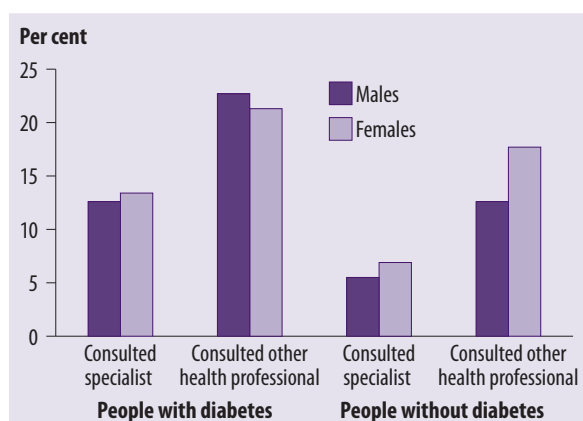
Notes
1. Based on self-reported information.
2. Data are for all persons.
Source: AIHW analysis of ABS 2004–05 National Health Survey data.

Figure 6.1: Consultations with a specialist or other health professional (excluding GPs), by diabetes status, 2004–05

In addition to the care provided by medical specialists, people with diabetes may also seek the advice of diabetes educators, nutritionists and podiatrists. The services of other allied health professionals and natural therapists may also be used.

Results from the 2004–05 NHS indicate that more people with diabetes (20.1%) sought advice from other health professionals than people without diabetes (15.1%).

Hospitalisations

Hospital services are required to treat the advanced stages of diabetes complications, which include heart disease, stroke, kidney disease, and foot, eye and nerve problems. People with diabetes may also be hospitalised when blood glucose is particularly unstable. Thus, hospitalisation data provide a picture of the more severe aspects of the disease. Australian hospitals data are a valuable source of information about

health service provision. In terms of diabetes, this gives an indication of the impact of diabetes and can help provide some background information on people with diabetes who are accessing services.

It is important to note that it is the condition responsible for the hospitalisation that is recorded as the principal diagnosis. Thus diabetes may not be the principal diagnosis even when the hospitalisation is for a complication of diabetes. Diabetes is more frequently recorded as an additional diagnosis, particularly when it is associated with coronary heart disease, stroke or kidney disease.

In 2004–05 there were a total of 74,490 hospitalisations with diabetes as a principal diagnosis and 531,069 with diabetes as any (principal or additional) diagnosis, accounting for 1% and 8% respectively of all hospitalisations for that year.

Type of diabetes

There are a greater number of hospitalisations for Type 2 diabetes than for Type 1. In 2004–05 Type 1 diabetes accounted for just over one-fifth (22%) of hospitalisations with a principal diagnosis of diabetes and 10% of those with any diagnosis of diabetes. Type 2 diabetes accounted for just over two-thirds (69%) of hospitalisations with a principal diagnosis of diabetes and 85% of those with any diagnosis of diabetes (Figure 6.2).

Per cent
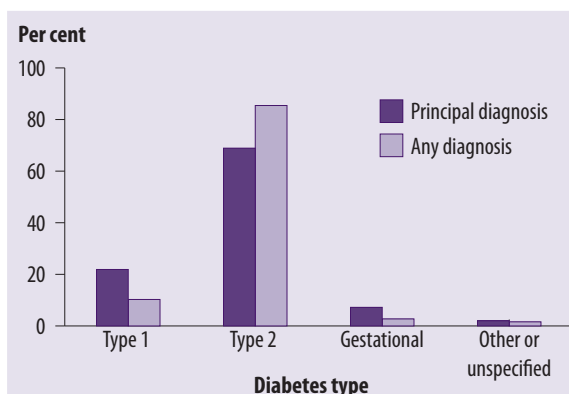
Note: Hospitalisations with any diagnosis of diabetes include those with a principal diagnosis of diabetes, classified according to ICD-10-AM codes. See Appendix 1.
Source: AIHW National Hospital Morbidity Database.

Figure 6.2: Proportion of diabetes hospitalisations by type of diabetes, 2004–05

Age and sex

Hospitalisations with any diagnosis of diabetes increase with age for both males and females (Figure 6.3). Among females in 2004–05, a small peak was seen for those aged 25 to 44 years, mainly due to gestational diabetes, however, males had higher rates of hospitalisations at ages between 45 to 74 years. A similar pattern occurred for hospitalisations with a principal diagnosis of diabetes.

As mentioned above, the peak in diabetes hospitalisations among females aged 25 to 44 years in 2004–05 was due to gestational diabetes (see Figure 6.4), with the greatest proportion of hospitalisations for gestational diabetes occurring among women aged 25–34 years. The increase in diabetes hospitalisations among men
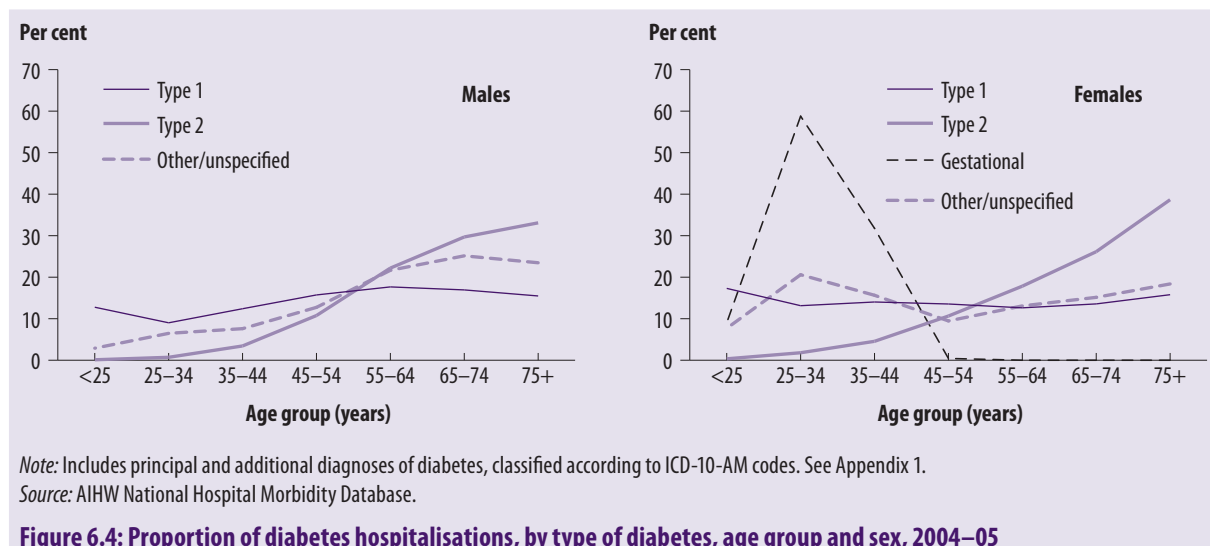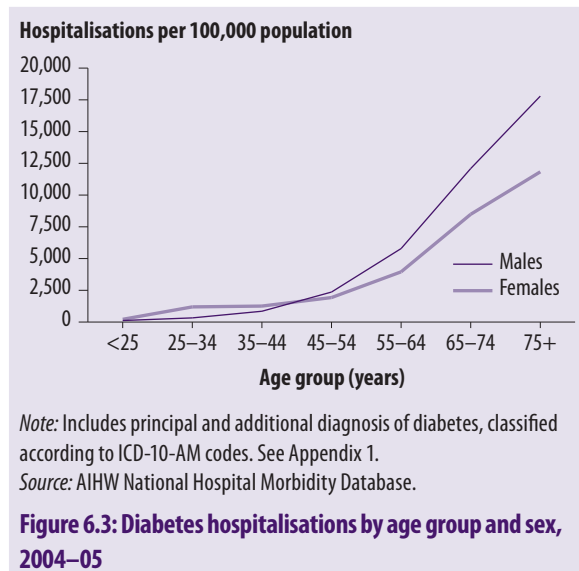
and women aged 55 years and over was attributed to Type 2 diabetes. Hospitalisation rates for Type 1 diabetes remained relatively constant across all age groups for both males and females.

Length of stay in hospital

In 2004–05, the average length of stay in hospital for hospitalisations with any diagnosis of diabetes was 5.6 days, and this was slightly longer than for those with a principal diagnosis of diabetes (4.8 days). In contrast, the average length of stay for all hospitalisations was 3.4 days. Males had a longer average length of stay for hospitalisations with a principal diagnosis of diabetes (5.3 days compared with 4.4 days for females). The average length of stay for hospitalisations with any diagnosis of diabetes was similar for males and females.

Trends

Over the period 2000–01 to 2004–05, both the number of diabetes hospitalisations and the rate steadily increased. Between 2000–01 and 2004–05, the rates of hospitalisation for any diagnosis of diabetes increased by 35%, from 1,932 hospitalisations per 100,000 people to 2,608 per 100,000. Between the same two years, a 32% increase was observed in the rate of hospitalisations where diabetes was the principal diagnosis (272 hospitalisations per 100,000 people in 2000–01 compared with 358 hospitalisations in 2004–05 (Figure 6.5). Part of this increase may be the result of changes

Hospitalisations per 100,000 population

Note: Includes principal and additional diagnosis of diabetes, classified according to ICD-10-AM codes. See Appendix 1.
Source: AIHW National Hospital Morbidity Database.

Figure 6.3: Diabetes hospitalisations by age group and sex, 2004–05

Note: Includes principal and additional diagnoses of diabetes, classified according to ICD-10-AM codes. See Appendix 1.
Source: AIHW National Hospital Morbidity Database.

Figure 6.4: Proportion of diabetes hospitalisations, by type of diabetes, age group and sex, 2004–05

Use of health services

made to the way complications are coded in hospitalisations data (see Appendix 1).

Males had higher hospitalisation rates than females over the five-year period.

Hospitalisations per 100,000 population

Males, principal diagnosis
Males, any diagnosis
Females, principal diagnosis
Females, any diagnosis
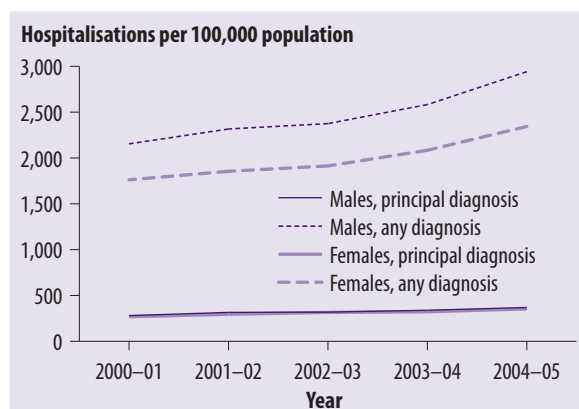
Notes
1. Directly age-standardised to the 2001 Australian population.
2. Hospitalisations with any diagnosis of diabetes include those with a principal diagnosis of diabetes, classified according to ICD-10-AM codes. See Appendix 1.
Source: AIHW National Hospital Morbidity Database.

Figure 6.5: Trends in diabetes hospitalisations, 2000–01 to 2004–05

Medicines use

People with diabetes often require medication regimes to control high blood glucose levels. Further, people with the condition frequently have associated health problems such as high blood pressure and high blood lipids (cholesterol and related substances) that may necessitate taking multiple medicines. Clinical trials have shown that good control of blood glucose, blood lipids and blood pressure in patients with diabetes delays the onset and slows the progression of complications (DCCT Research Group 1993; HPS Collaborative Group 2003; UKPDS Group 1998b).

Medicines for diabetes

Self-reported data on medicine use from the 2004–05 NHS indicates that one-fifth (21%) of people with diabetes were using insulin, 68% were using other pharmaceutical medicines and only 4% were using vitamin or mineral supplement or herbal or natural medicines (ABS 2006a).

Oral medicines used by people with diabetes include: 40% were using metformin, 20% were using gliclazide and 6% were using other oral blood glucose lowering agents. Over 90% of these medicines were reported to be for the treatment of Type 2 diabetes. Metformin and gliclazide were also the most common medicines prescribed for diabetes in general practice (28.3 and 14.7 per 100 problems managed respectively) in the 2003–04 BEACH study (Britt et al. 2004).

During the 1990s the use of insulins and oral glucose-lowering medicines in Australia increased and the trend has continued over the past few years (Figure 6.6) reflecting the increase in the number of people being diagnosed with diabetes and changing treatment practices. These results refer to the use of prescription medicines in the community (excluding public hospitals). Medicines use is expressed in the World Health Organization standard measurement unit—defined daily doses (DDDs) per 1,000 population per day (DDD/1,000/day). This is based on the assumed average dose per day of a medicine used for its main indication in adults. The DDD enables valid comparisons between medicines independent of differences in price, formulation and quantity per prescription.

In 2006, 15 DDD/1,000/day of insulin were dispensed while oral hypoglycaemics were dispensed at a rate of 30 DDD/1,000/day (Figure 6.6).

Insulins

All people with Type 1 diabetes and some people with Type 2 diabetes need insulin to control their blood glucose levels. Insulin helps the body use or store the glucose it gets from food. People whose pancreas does not make insulin (Type 1 diabetes) need insulin injections to survive. Some people with Type 2 diabetes also require insulin injections to improve diabetes control. Giving suitable doses of insulin to people with diabetes temporarily restores their ability to process carbohydrates, fats and proteins, to store glycogen in the liver, and to convert glucose to fat.

There are several types of insulin that differ in how soon the insulin starts working (onset), when it works most (peak time) and how long it lasts in the body (duration). Fast-acting insulin
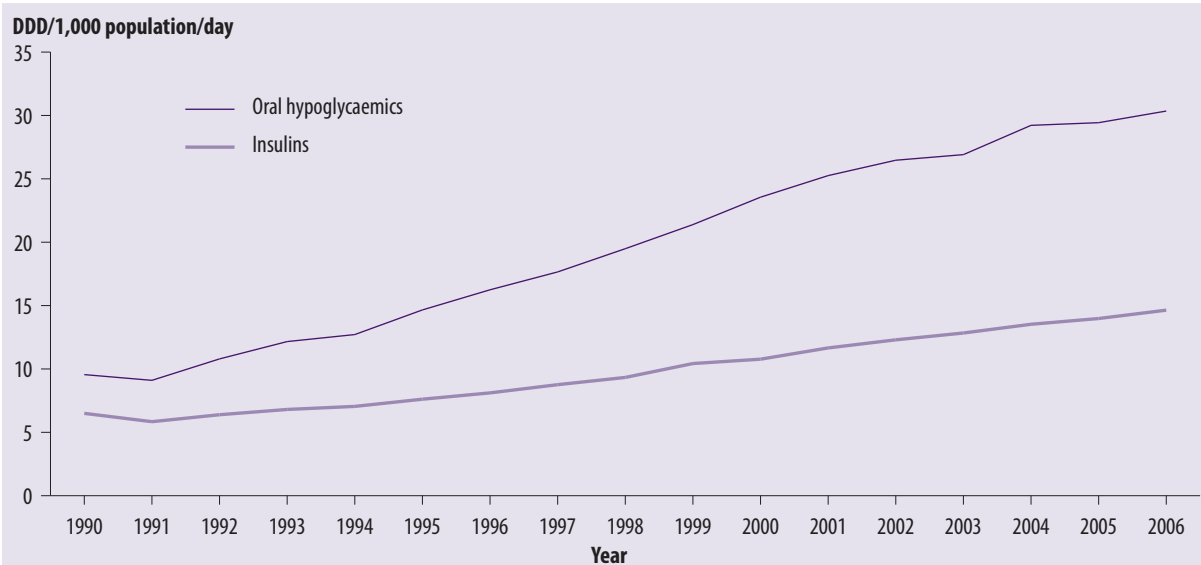
Note: Data relate to products dispensed through community pharmacies only; medicines provided in public hospitals and highly specialised medicines available to outpatients through public hospital pharmacies are not included.
Source: DoHA Drug Utilisation Sub-Committee Database.

Figure 6.6: Community use of insulins and oral blood glucose-lowering medicines, 1990–2005

reaches the blood within 15 minutes of injection, peaks 30–90 minutes later and may last for up to 5 hours. In 2006, fast-acting human insulin was dispensed at a rate of 3.2 DDD/1,000/day.

Human intermediate-acting insulin reaches the blood 2–6 hours after injection, peaks 4–14 hours later and stays in the blood for about 14–20 hours. This type was dispensed at a rate of 3.4 DDD/1,000/day in 2006.

Long-acting insulin takes 6–14 hours to start working. It has no peak or a very small peak 10–16 hours after injection and stays in the blood between 20 and 24 hours. Long-acting insulin was dispensed less frequently and no recent data are available on the daily dispense rate of this type.

Some types of insulin come mixed together to make it easier to inject two kinds of insulin at the same time. Human intermediate-acting combined with fast acting insulin is the most common insulin of this kind and was the most common insulin dispensed overall in 2006 (5.8 DDD/1,000/day).

Oral blood glucose–lowering medicines

Biguanides lower blood glucose by suppressing glucose production in the liver and also promote the action of insulin by increasing the uptake of glucose in the tissues (especially muscle). Metformin belongs to this class of medicines. It's use has increased since the 1990s and in 2006 it was the most frequently dispensed oral hypoglycaemic medicine overall (15.3 DDD/1,000/day) (Figure 6.7).

Metformin is among the top 20 most commonly prescribed medicines in general practice; in 2003–04 it accounted for 1.2% of all prescriptions issued by general practitioners (Britt et al. 2004).

Sulfonylurea medicines stimulate the beta cells in the pancreas to release more insulin. Chlorpropamide, glipizide, glibenclamide, gliclazide and tolbutamide are members of this class. Gliclazide was the most commonly dispensed sulfonylurea in 2004 (7.0 DDD/1,000/ day), followed by glimepiride (3.5 DDD/1,000/ day) (Figure 6.7). While the use of metformin has continued to increase since 1990, gliclazide use peaked in 2000 and has since decreased slightly. This coincided with the inclusion of glimepiride in the Pharmaceutical Benefits Scheme (PBS) and Repatriation Pharmaceutical Benefits Scheme during 2000.

Alpha glucosidase inhibitors help the body lower blood glucose by blocking the gut enzymes that

Use of health services

break down starches (such as bread, potatoes and pasta) and certain sugars into glucose. Their action slows the rise in blood glucose levels after a meal. Acarbose is a member of this class and was dispensed at a rate of 0.2 DDD/1,000/day in 2006 (Figure 6.7).

Thiazolidinedione agents (including glitazones such as rosiglitazone and pioglitazone) have been listed on the PBS only since 2003. In general, thiazolidinediones are recommended when either metformin or a sulfonylurea is contra-indicated or not tolerated, when combination therapy with metformin and a sulfonylurea fails, or when insulin (with or without oral medicines) no longer maintains blood glucose control (NPS 2004). In 2006 thiazolidinediones were dispensed at a rate of 2.3 DDD/1,000/day (Figure 6.7).
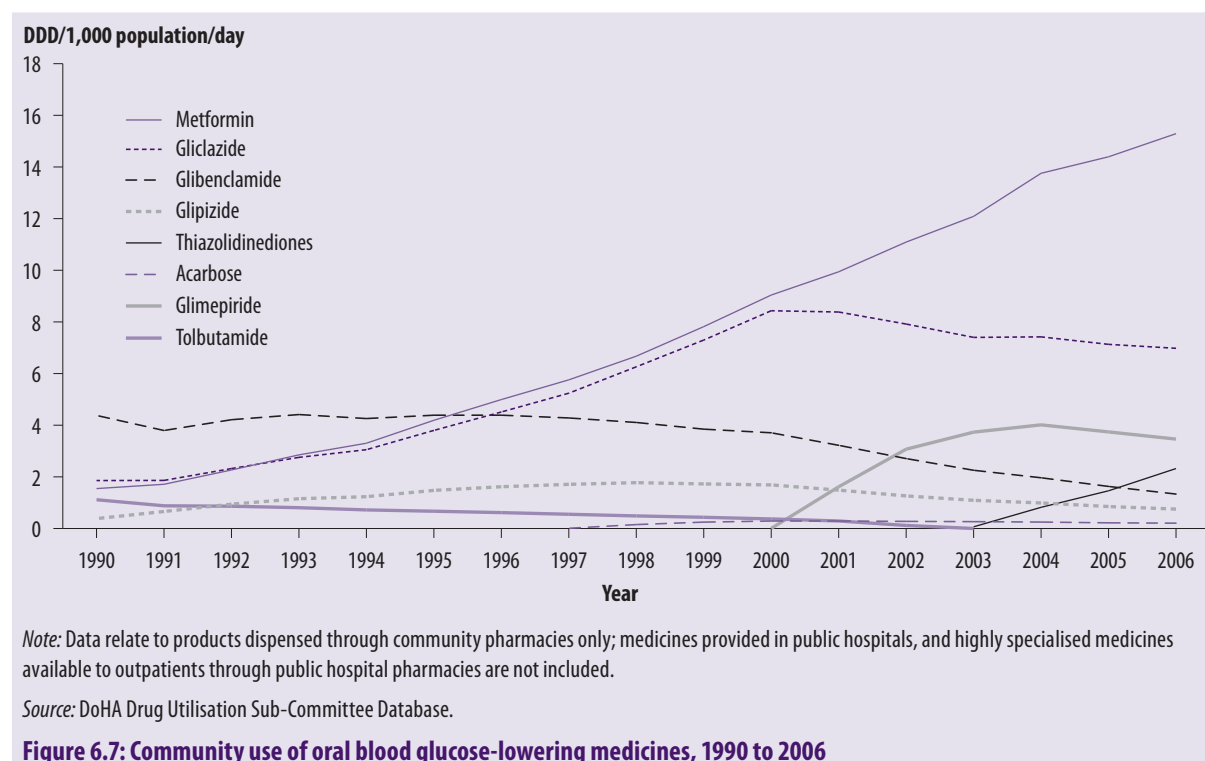
Medicines for associated conditions

The 2004–05 NHS showed that people with diabetes used medicines for cardiovascular conditions or its risk factors such as high blood pressure or high blood cholesterol at higher rates than those without diabetes. Blood pressure lowering medicines were used as follows: agents acting on renin-angiotensin system —includes ACE inhibitors and angiotensin II receptor antagonists (36%), beta-blocking agents (11%) and other antihypertensive medicines (7%). Cardiac therapy medicines were used by 6% of people with diabetes and 27% used serum lipid reducing agents.

In the 1999–2000 AusDiab study 35% of people with diabetes took blood pressure–lowering medicines, almost three times the proportion of people without diabetes (13%). More than twice the proportion of people with diabetes took blood cholesterol–lowering medicines than those without diabetes (15% and 7% respectively).

According to 2006 ANDIAB results, 55% of people with diabetes who were attending specialist diabetes services were on blood-pressure lowering treatments and 89% were on cholesterol lowering medicines (NADC 2007).

Note: Data relate to products dispensed through community pharmacies only; medicines provided in public hospitals, and highly specialised medicines available to outpatients through public hospital pharmacies are not included.

Source: DoHA Drug Utilisation Sub-Committee Database.

Figure 6.7: Community use of oral blood glucose-lowering medicines, 1990 to 2006

Pathology and other tests

There are a variety of pathology tests used in the diagnosis and management of diabetes. The more common tests include:

- oral glucose tolerance test (OGTT) which is a diagnostic test to assess absorption of glucose after a dose is given
- glycosylated haemoglobin (HbA1c) and fructosamine, which monitor glucose control
- microalbuminuria, which tests for amounts of protein (albumin) in the urine
- blood lipids tests, which include total cholesterol, triglycerides and HDL cholesterol.

Pathology tests processed by Medicare

Pathology tests billed to Medicare are subject to 'coning', that is, pathology companies charge Medicare for the three most expensive tests undertaken even where more tests were undertaken. Where a patient with diabetes is likely to receive multiple tests for monitoring the disease and its complications, the less expensive test may not be recorded in the Medicare data, i.e. it may 'drop' off the billing process due to coning (Britt et al. 2003).

According to Medicare items processed in 2006, 943,532 were for glycosylated haemoglobin (HbA1c). Over 99% of these were for persons with established diabetes (Medicare Online Health Statistics 2007).

Pathology tests ordered by GPs

A survey of general practice activity (BEACH) found that in 2005–06, GPs ordered pathology tests for diabetes problems relatively frequently: 30% of diabetes contacts resulted in pathology orders, with 263 tests ordered per 100 diabetes contacts where at least one pathology test was ordered. The specific pathology tests requested by GPs in the management of diabetes have not been published. However, pathology tests for electrolytes/urea/creatinine were requested at a rate of 2.8 per 100 GP encounters. Tests for glycosylated haemoglobin (HbA1c) which are mainly for people with diabetes were requested at a rate of 1.0 per 100 encounters. Note that the

BEACH data do not capture whether the patients sent for pathology test ordered by the GP actually presents for the test, and therefore whether the test is performed (Britt et al. 2007).

Pathology tests at diabetes clinics

According to the ANDIAB data collection conducted in 2006, 93% of patients visiting specialist diabetes clinics had an HbA1c measurement in that year. Nearly 70% of patients attending specialist diabetes clinics had a microalbumin (or urinary protein level) recorded, and 79% had a cholesterol level recorded (66% had an HDL cholesterol level recorded, 76% had a triglyceride level recorded and 54% had an LDL cholesterol level recorded) (NADC 2007).

Programs and services

There are a number of programs and services available to people with diabetes providing information and support to help people in the self-management of their diabetes. Some programs also provide diabetes-related products at a subsidised cost, while others provide clinical consultations, counselling services, information and support services.

Organisations in Australia that provide services and support to people with diabetes and coordinating diabetes management include consumer, professional, research and education organisations. A number of agencies or programs central to the provision of services for diabetes management are described below. In addition to these organisations there are numerous others that are crucial to the provision of support and care for people with diabetes in Australia.

National Diabetes Services Scheme

The National Diabetes Services Scheme (NDSS) provides important support for many people with diabetes. The NDSS is an Australian Government program that provides products for the self-management of diabetes, such as blood and urine testing strips, syringes and needles for special injection systems, at subsidised prices. It also provides a range of information and education

services to people with diabetes and a variety of electronic and interpersonal communication strategies are used to deliver programs to communities and individuals throughout Australia. Diabetes Australia has administered the NDSS since it was introduced in 1987. As at 30 June 2006, 788,214 people with diabetes were registered for NDSS benefits and 228,774 (29%) of these were people requiring insulin. The NDSS distributed more than 3.2 million packets of blood glucose test strips during 2005–06 and 616,336 boxes of syringes and pen needles (Diabetes Australia 2007a).

Diabetes centres and educators

Diabetes centres, often referred to as Diabetes Ambulatory Care Centres, provide services such as diabetes education, nutrition advice and complications assessment to adults and children. As well as clinical management of the disease, centres generally aim to improve personal management of diabetes to minimise the effect of diabetes on daily living. Most patients attending diabetes centres are referred by GPs to receive specialist assessment and treatment, generally these are people whose diabetes is not managed as well as in other patients.

Staff of diabetes centres include an endocrinologist, diabetes nurse educators, dieticians and podiatrists. Many centres also provide training in diabetes care to other health professionals, and may conduct research into medical or social aspects of diabetes.

There were over 60 diabetes centres that were members of the National Association of Diabetes Centres (NADC) in 2006 (NADC 2007). The NADC promotes effective health care practice for people with diabetes. Over the past few years a number of the centres in the collective have participated in data collection through the ANDIAB project, enabling assessment and review of diabetes management. Some of these data have been reported in other sections of this report.

National Divisions Diabetes Program

The National Divisions Diabetes Program (NDDP) is a coordinated national approach to diabetes care in Australian General Practice.

As part of the NDDP Data Collation Project, 38 Divisions of General Practice reported having a diabetes program in 1999–00. At least 27% of GPs nationally participated in some aspect of a diabetes program.

In the 2004–05 annual survey of divisions, 98% of divisions conducted diabetes programs or activity (Hordacre et al. 2006). Approaches used to conduct these programs included: practice education (92%); GP education (89%); recall systems (80%); collaboration with other agencies (82%); community awareness (61%); and patient services (46%). Divisions also reported on services in their area, program highlights and barriers, advice to other divisions and future plans.