Reducing risk of diabetes complications

There are an estimated one million people with diagnosed diabetes in Australia. Of all people with diabetes, about 85% have type 2 diabetes and 12% have type 1 diabetes. While type 1 diabetes is believed to be caused by an interaction of genetic predisposition and environmental factors, type 2 diabetes is largely preventable by maintaining a healthy lifestyle. Diabetes may progress to a range of health complications, including heart disease, kidney disease, blindness and lower limb amputation. The risk of diabetes complications is reduced when blood glucose levels, blood pressure and lipids are kept as close to normal as possible.

Learning objectives

After completing this activity, pharmacists should be able to:

- Determine key considerations that may need to be taken into account for team care when assisting a person with diabetes manage their medications
- Identify including lifestyle changes which can reduce the risk of complications
- Educate patients on the need to optimise cardiovascular, skin, eye, foot care risk factors which impact on diabetes management
- Reinforce the need for regular monitoring of cardiovascular as well as hypoglycaemic adherence.

Successful completion of this activity is demonstrated by answering eight of the nine multiple choice questions correctly.

This activity has been accredited for 1.5 hrs of Group 1 CPD (or 1.5 CPD credits) suitable for inclusion in an individual pharmacist’s CPD plan which can be converted to 3 hrs of Group 2 CPD (or 3 CPD credits) upon successful completion of relevant assessment activities. Accreditation number: A1411AP0.

Under the auspices of the Australian Pharmacy Council, the Australian College of Pharmacy may accredit continuing professional development for pharmacists that is eligible to be used as supporting evidence of continuing competence.

The competency standards addressed by this activity include (but may not be limited to) 1.3, 2.1, 2.2, 2.3, 4.1, 4.2, 7.1, 7.2, 7.3.

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Introduction

There are an estimated one million people with diagnosed diabetes in Australia. However, this is likely to be an underestimate—for every four adults with diagnosed diabetes, there are estimated to be one with undiagnosed diabetes. Of all people with diabetes, about 85% have type 2 diabetes and 12% have type 1 diabetes.\(^{(1)}\) While type 1 diabetes is believed to be caused by an interaction of genetic predisposition and environmental factors, type 2 diabetes is largely preventable by maintaining a healthy lifestyle. Modifiable risk factors for type 2 diabetes include physical inactivity, unhealthy diet, obesity, tobacco smoking, high blood pressure and high blood lipids. Diabetes may progress to a range of health complications, including heart disease, kidney disease, blindness and lower limb amputation. For example, diabetes was the leading cause and accounted for one in three new cases of end-stage kidney disease requiring dialysis or transplantation.\(^{(1)}\)

The risk of diabetes complications is reduced when blood glucose levels, blood pressure and lipids are kept as close to normal as possible. Good management of diabetes also includes feet, urine and eye checks as well as lifestyle measures.\(^{(2)}\)

*Diabetes Management in General Practice 2014/15* offers a useful summary of the goals for diabetes management.\(^{(3)}\) (Table 1)
Table 1: Type 2 diabetes: goals for optimum management (adapted from Ref 3)

<table>
<thead>
<tr>
<th>Encourage all people with type 2 diabetes to approach/reach these goals</th>
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<tbody>
<tr>
<td><strong>Diet</strong></td>
</tr>
<tr>
<td>Normal healthy eating. If concerns regarding cardiovascular risk, advise Mediterranean diet. [The principal aspects of this diet include proportionally high consumption of olive oil, legumes, unrefined cereals, fruits, and vegetables, moderate to high consumption of fish, moderate consumption of dairy products (mostly as cheese and yogurt), moderate wine consumption, and low consumption of meat and meat products]</td>
</tr>
<tr>
<td><strong>Body mass index (kg/m²)</strong></td>
</tr>
<tr>
<td>Therapeutic goal is 5–10% loss for people overweight or obese with type 2 diabetes. With BMI &gt;35 and comorbidities or BMI &gt;40, greater weight loss measures should be considered. Note that BMI is a difficult parameter to standardise between different population groups</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
</tr>
<tr>
<td>At least 30 minutes of moderate physical activity on most if not all days of the week (total ≥150 minutes/week).</td>
</tr>
<tr>
<td><strong>Cigarette consumption</strong></td>
</tr>
<tr>
<td>0 (per day)</td>
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<tr>
<td><strong>Alcohol consumption</strong></td>
</tr>
<tr>
<td>≤2 standard drinks (20 g) per day for men and women.</td>
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<tr>
<td><strong>BGL</strong></td>
</tr>
<tr>
<td>6–8 mmol/L fasting and 8–10 mmol/L postprandial. Ongoing self-monitoring of blood glucose is recommended for people with diabetes using insulin, with hyperglycaemia arising from illness, with haemoglobinopathies, pregnancy or other conditions where data on glycaemic patterns is required. Routine self-monitoring of blood glucose in low-risk patients who are using oral glucose-lowering drugs (with the exception of sulfonylureas) is not recommended</td>
</tr>
<tr>
<td><strong>HbA1c (mmol/mol; %)</strong></td>
</tr>
<tr>
<td>Needs individualisation according to patient circumstances. Generally: • ≤53 mmol/mol (range 48–58) • ≤7% (range 6.5–7.5). Allowing for normal variation in test accuracy, HbA1c results which range between 6.5 and 7.5% would reflect this goal.</td>
</tr>
<tr>
<td><strong>Total cholesterol (mmol/L)</strong></td>
</tr>
<tr>
<td>&lt;4.0 Initiation of pharmacotherapy is dependent on the assessment of absolute cardiovascular risk (Refer to the Australian absolute CVD risk calculator). This requires using multiple risk factors, which is considered more accurate than the use of individual parameters. Once therapy is initiated the specified targets apply; however, these targets should be used as a guide to treatment and not as a mandatory target.</td>
</tr>
<tr>
<td><strong>LDL-C (mmol/L)</strong></td>
</tr>
<tr>
<td>≥1.0 Non-HDL-C (mmol/L) &lt;2.0 Triglycerides (mmol/L) &lt;2.0</td>
</tr>
<tr>
<td><strong>Blood pressure (mmHg)</strong></td>
</tr>
<tr>
<td>130/80 Vaccination Timed overnight collection (mcg/min): &lt;20 Spot collection (mg/L): &lt;20 Urinary albumin-to-creatinine ratio • Women (mg/mm mol): &lt;3.5 • Men (mg/mm mol): &lt;2.5</td>
</tr>
<tr>
<td><strong>Urinary albumin excretion</strong></td>
</tr>
<tr>
<td>Consider immunisation against influenza and pneumococcal disease, and dTPa vaccine</td>
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</tbody>
</table>

AusPharm.net.au pharmacy’s home page - this CPD is online at http://www.auspharmacist.net.au/continuinged.php?article=206
Team approach
The Diabetes guide highlights the importance of a team approach listing the general practitioner, pharmacist, practice nurse, diabetes educator, dietitian, podiatrist, ophthalmologist/optometrist, oral health professional, exercise professional and endocrinologist.

General practitioners are encouraged to enrol patients in the Annual Cycle of Care to have regular checks at the clinic. Evaluation of this program has shown improved outcomes. Medication Reviews either as Home Medicines Reviews (HMR), Residential Medication Management Reviews (RMMRs) or Hospital reviews offer other opportunities for pharmacists to assist with diabetes care as members of the team. These are included in the cycle of care.

Pharmacist funding
Medscheck for Diabetes funded under the Guild 5th CPA provides an excellent opportunity in the pharmacy for pharmacists to assist their patients manage diabetes. Detailed information on this service is available on the following websites:

- Pharmacy Guild: [www.guild.org.au](http://www.guild.org.au)

A Diabetes MedsCheck provides an in-pharmacy review of medications with a focus on the consumer’s type 2 diabetes medicines management, monitoring devices, education and self-management. This service is targeted at consumers who are unable to gain timely access to other diabetes education or health services in their community and aims to:

- Optimise a consumer’s effective use of medicine through improving understanding of, and compliance with, their diabetes medication therapy;
- Improve a consumer’s effective use of blood glucose monitoring devices through training and education;
- Improve blood glucose control; and
- Reduce the risk of the consumer developing complications associated with type 2 diabetes. (5)

The Diabetes MedsCheck can be followed by a HMR but patients are ineligible under Medicare funding if they have had an HMR or a regular MedsCheck in the previous 12 months. The current controls on the number of MedsChecks that can be funded per month under the 5CPA are a constraint on optimum patient care.

When diabetes is left undiagnosed or unchecked for too long complications such as heart disease, kidney disease, blindness, limb amputation, erectile dysfunction and persistent infections are seen. Complications are classified as macrovascular (affecting large arteries) or microvascular (affecting capillaries and small blood vessels) and are listed in Table 2.
Table 2: Diabetes complications\textsuperscript{(2,3)}

<table>
<thead>
<tr>
<th>Macrovascular changes</th>
<th>Microvascular changes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cerebral</strong></td>
<td>Diabetic retinopathy</td>
</tr>
<tr>
<td>Transient Ischaemic Attacks (TIAs)</td>
<td>Cataracts</td>
</tr>
<tr>
<td>Strokes</td>
<td>Maculopathy</td>
</tr>
<tr>
<td><strong>Coronary</strong></td>
<td>Oral disease</td>
</tr>
<tr>
<td>Angina</td>
<td>Periodontal disease</td>
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<tr>
<td>Myocardial infarction</td>
<td></td>
</tr>
<tr>
<td>Cardiac failure</td>
<td></td>
</tr>
<tr>
<td><strong>Peripheral</strong></td>
<td>Nephropathy</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>End Stage renal disease</td>
</tr>
<tr>
<td>Ulcers- delayed healing</td>
<td>Microalbuminuria</td>
</tr>
<tr>
<td></td>
<td>Macroalbuminuria</td>
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<tr>
<td></td>
<td>Erectile dysfunction</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peripheral neuropathy</td>
</tr>
<tr>
<td></td>
<td>Autonomic neuropathy</td>
</tr>
<tr>
<td></td>
<td>Amputation</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Foot problems</strong></td>
<td></td>
</tr>
<tr>
<td>Neuropathic joint damage</td>
<td></td>
</tr>
<tr>
<td>Ulceration</td>
<td></td>
</tr>
<tr>
<td>Mechanical instabilities</td>
<td></td>
</tr>
<tr>
<td>Nerve damage</td>
<td></td>
</tr>
</tbody>
</table>

In type 1 diabetes, the major risk is microvascular complications, although macrovascular complications are also increased. The primary risk factor is hyperglycaemia, although other risk factors, such as hypertension and dyslipidaemia, may occur secondary to uncontrolled hyperglycaemia or renal disease.

In contrast, type 2 diabetes is usually part of the “metabolic syndrome”, which is associated with other risk factors including abdominal obesity, hypertension, dyslipidaemia, a prothrombotic state and insulin resistance. Although macrovascular disease is the major cause of morbidity and mortality in type 2 diabetes microvascular complications are often present when diabetes is diagnosed. Prevalence at diagnosis are: retinopathy, about 20%; neuropathy, 9%; and overt diabetic nephropathy, up to 10\%.\textsuperscript{(6)} Diabetes increases the risk of arterial disease two to sixfold.\textsuperscript{(3)}

**Macrovascular complications**

Large-vessel disease, including coronary heart disease and stroke, is the greatest overall cause of morbidity and mortality in diabetes. Hyperglycaemia promotes the development of atherosclerosis of the major vessels especially coronary and aorto-ili-o-femoral systems. Hypertension promotes the development and progression of vascular disease. The United Kingdom Prospective Diabetes Study (UKPDS) showed that intensive blood glucose control alone failed to reduce macrovascular complications significantly although it did reduce microvascular complications.\textsuperscript{(7)} It did show that treating hypertension did reduce macrovascular complications.\textsuperscript{(8)}

The Steno trial showed that a target-driven, long-term, intensified intervention aimed at multiple risk factors in patients with type 2 diabetes and microalbuminuria reduces the risk of cardiovascular and microvascular events by about 50 percent.\textsuperscript{(9)}
Reducing risk of cardiovascular events in people with type 2 diabetes requires concurrent management of lifestyle factors, blood pressure, lipids and blood glucose. Having type 2 diabetes more than doubles the risk of dying from cardiovascular causes.

Tight glycaemic control helps prevent long-term cardiovascular events in people newly diagnosed with type 2 diabetes. However, in the short term (3 to 5 years) it has a limited effect on cardiovascular outcomes and lowering blood pressure or low-density lipoprotein (LDL) cholesterol levels seems to be more effective. Improved control of blood glucose has been found to prevent or reduce microvascular complications (retinopathy, renal disease and neuropathy).


People at high cardiovascular risk (>15% risk of a cardiovascular event in the next 5 years) benefit from a statin and an antihypertensive, regardless of cholesterol level and blood pressure. This benefit is uncertain with antihypertensive drug therapy if BP < 110/70 mm Hg.

**Lifestyle changes**
Dietary modification, alcohol limitation, regular exercise and smoking cessation are recommended to help prevent cardiovascular disease, based on evidence from short-term lifestyle-intervention studies and observational studies. Lifestyle change also halves the progression from impaired glucose tolerance to type 2 diabetes.

Cardiovascular risk factors are reduced by moderation of salt intake, weight reduction and exercise. A dietician or a diabetes educator may be useful. Diabetes Australia also offers dietary guidance and information about low glycaemic index foods.

**Hypertension**
Blood pressure lowering reduces cardiovascular events and all-cause mortality in people with type 2 diabetes in the same manner as for the general population. While no difference is noted between different classes of BP-lowering therapy for CVD outcomes, there is clear evidence that in people with type 2 diabetes, antihypertensive therapy with an angiotensin receptor blocker (ARB) or angiotensin converting enzyme (ACE) inhibitor decreases the rate of progression of albuminuria, and may reduce the risk of decline in renal function.

If monotherapy does not sufficiently reduce blood pressure a calcium channel blocker or a low dose thiazide or thiazide-like diuretic may be considered.

**Lipid lowering**
Preferred agents are HMGCoA reductase inhibitors, ezetimibe or resins. Although statins have been linked to worsened glycaemic control and a small increase in diabetes onset, for people at high cardiovascular risk the benefits of statin therapy outweigh the harms. For example, for every 255 people at high cardiovascular risk without diabetes, statin treatment for 4 years results in 5.4 fewer major coronary events and 1 extra case of diabetes.

Statins differ in potency but none has a proven advantage over another. Evidence suggests that the efficacy of statins in reducing cardiovascular risk depends on the extent of LDL cholesterol lowering rather than the specific drug used. High doses of all statins are associated with an increased risk of myopathy. More than 80% of the LDL-lowering effect of any statin is achieved with 50% of its...
maximum dose so careful monitoring is necessary. TGA has advised health professionals to limit the prescribing of high dose (80 mg/day) simvastatin and to be aware of new contraindications and precautions for the use of simvastatin with other medicines. (14)

Elevated triglycerides are usually associated with low HDL-C, which may reflect the additional presence of increased CVD risk as reflected by the calculation of absolute risk. Severe hypertriglyceridaemia increases the risk of acute pancreatitis which is of increased concern if the person with diabetes is taking a DPP4- inhibitor (gliptin) or a GLP-1 analogue (e.g. exenatide).

Dietary modification, behavioural risk factor modification (e.g. weight loss, increased physical activity, alcohol avoidance) and diabetic control are central to the management of elevated triglycerides. Drug therapy with a fibrate and/or fish oil may be indicated if triglycerides are remain elevated. (13)

**Aspirin and protection from cardiovascular disease**

Regular use of low dose aspirin in reducing cardiovascular events in those with Type 2 diabetes but without evidence of cardiovascular disease is controversial. Low dose aspirin for primary prevention in people with diabetes may be considered if the overall cardiovascular benefits out-weight the risk of bleeding (2,3). The balance of benefits and harms for people without cardiovascular disease is less favourable — for every 1000 people treated with low-dose aspirin for 2 years, there are 6 fewer serious vascular events and 3 extra major extracranial bleeds per year. (2,5) Data in people with diabetes are limited and evidence of a benefit from low-dose aspirin is weak. Given current evidence, National Vascular Disease Prevention Alliance (NVDPA) guidelines do not recommend routine use of low-dose aspirin for people without known cardiovascular disease, including people with diabetes. (11)

**Microvascular complications**

The major mechanism of microvascular disease is the damaging effect of prolonged hyperglycaemia, with hypertension a further exacerbating factor. Screening for microvascular disease enables intervention at the earliest possible stage, maximising the effectiveness of treatment. (6)

**Renal damage**

Diabetic nephropathy is one of the common causes of end-stage renal disease (ESRD). (15) Aboriginal and Torres Strait Islanders, New Zealand Maori and South Pacific Islanders have particularly high rates of nephropathy and are at very high risk of progression to ESRD. (3) A large long-term cohort study has shown that diabetes and ESRD synergistically increase risks of CV events especially myocardial infarct and stroke. (16)

The earliest sign of diabetic renal disease is the presence of increase in urinary albumin excretion. Annual screening for microalbuminuria is recommended in the Annual Cycle of Care. (3)

The rate of decline in renal function is increased by hypertension. BP control is important to slow progression of renal damage. Ideal glycaemic control in patients without renal damage and in those with microalbuminuria delays the onset or progression of renal damage but the effect of glycaemic control on established renal damage is not clear. (15)

The significance of proteinuria (macroalbuminuria) is as follows:

- Ten year survival is poor once persistent significant proteinuria is present.
- Proteinuria is a cardiovascular risk factor independent from decreased GFR.
- Retinopathy will be present. The patient should be reviewed for retinal problems
- Urinary tract infections are common in diabetic nephropathy and will increase urine albumin excretion.
• Metformin should not be used in patients with diabetic nephropathy if calculated total GFR is <30 ml/min because of the risk of metformin accumulation and lactic acidosis.
• ACE inhibitors have been shown to slow progression of microalbuminuria and ARBs have been shown to slow progression of micro and macro albuminuria to clinical events.
• 24 hour urine protein excretion should be used to monitor progress and not first voided or timed overnight collections which are used to assess microalbuminuria.
• Referral to a nephrologist or physician experienced in treating renal disease is recommended.\(^{(3)}\)

Urine albumin excretion may be increased by urinary tract infections, high dietary protein intake, congestive cardiac failure, acute febrile illness, heavy exercise within 24 hours, menstrual or vaginal discharge and drugs such as NSAIDs.\(^{(15)}\)

Peripheral neuropathy
Peripheral neuropathy complicating diabetes most commonly affects the sensory and motor nerves of the lower limbs. Early clinical finding include paraesthesia (sometimes painful), decreased pain and touch sensation and impaired deep tendon reflexes. Reduced proprioception occurs later.\(^{\text{(3)}}\)

• Peripheral neuropathy affects sensory, motor and autonomic nerves.
• Foot care is especially important in patients with neuropathy.
• The general practitioner should check peripheral nerve function, reflexes and sensation at the annual review.

The pain of peripheral neuropathy can be difficult to manage. Antidepressants e.g. amitriptyline, duloxetine; anti-epileptic medications e.g. carbamazepine, gabapentin, pregabalin may help. Non-steroidal anti-inflammatory medications may help but in most cases would be contraindicated due to renal impairment and the combination of ACE inhibitors, ARBs and diuretics leading to the ‘Triple whammy effect’.\(^{(17)}\) Local measures may help e.g. desensitisation with capsaicin cream (Zostrix HP®) coverage with Opsite® and avoidance of pressure from bedclothes at night.\(^{(3)}\)

Autonomic neuropathy may result in:
• Orthostatic hypotension
• Impaired gastric emptying
• Diarrhoea
• Delayed/incomplete bladder emptying
• Erectile dysfunction and retrograde ejaculation in males
• Reduced vaginal lubrication with arousal in women
• Loss of cardiac pain, ‘silent’ ischaemia or infarction
• Sudden, unexpected cardio-respiratory arrest
• Difficulty recognising hypoglycaemia\(^{(3,13)}\)

Foot ulcers and amputations are a major cause of morbidity for people with diabetes. Risk factors for these complications are the presence of peripheral neuropathy, altered biomechanics in the foot and peripheral vascular disease.

Controlling hyperglycaemia and hypertension and identifying patients with peripheral neuropathy or peripheral vascular disease are important to prevent foot complications. Patients with reduced protective sensation or reduced foot pulses on examination should be assessed by a podiatrist, and all patients should be educated about daily foot care (inspection, washing and careful drying, moisturiser for dry skin and cracked heels, nail-care and use of practical footwear).
Ulcers: The most common sites of ulceration in people with diabetes are the plantar surfaces under the metatarsal heads. Complications include cellulitis, thrombotic arterial occlusion and gangrene that may result in amputation. It is difficult to heal ulcers when glycaemic control is not optimum.

Neuropathic joint damage and ischaemia of the leg and foot are other challenging complications resulting from microvascular damage.

Eye damage
Screening for eye complications should be undertaken at least once every 2 years, and preferably annually, to allow early identification of treatable disease.\(^3\)

Refractive errors occur as the lens alters shape with changes in blood glucose concentrations but should be able to be corrected once blood glucose levels are stable.\(^3\)

Cataracts occur prematurely in people with diabetes and may particularly have trouble with night vision.\(^3\)

Glaucoma may occur amongst people with and without diabetes, and can be a complication of diabetes if retinopathy develops.\(^18\)

Diabetic retinopathy occurs as a result of microvascular disease of the retina. In early stages the characteristic abnormality is increased vascular permeability. Without treatment, microvascular occlusions occur, resulting in retinal ischaemia and eventually, the growth of new vessels, termed proliferative retinopathy. Macular oedema, caused by increased vascular permeability, may occur at any stage. The most important treatable risk factors are hyperglycaemia and hypertension.

Risk reduction to reduce complications
1. Microvascular
   For both diabetic retinopathy and nephropathy, the benefit of good glycaemic control appears to be greatest in the early stages. It has not been so clearly demonstrated that glycaemic control delays the progression of nephropathy.

The targets for blood glucose control are: 6–8 mmol/L fasting and 8–10 mmol/L postprandial.\(^3\)

- Ongoing self-monitoring of blood glucose is recommended for people with diabetes using insulin, with hyperglycaemia arising from illness, pregnancy or other conditions where data on glycaemic patterns is required.
- Routine self-monitoring of blood glucose in low-risk patients who are using oral hypoglycaemic drugs (with the exception of sulfonylureas) is not recommended.

The Australian Diabetes Society Position Statement discusses individualisation of HbA1c targets.\(^19\)

The general HbA1c target in people with Type 2 diabetes is ≤53mmol/mol (≤7%) but targets > 53mmol/L (7%) may be appropriate in people who have a history of severe hypoglycaemia, limited life expectancy, co-morbidities or who are elderly.\(^3,13\) However the Accord study, involving people with long-standing diabetes tight blood glucose control (HbA1c ≤42mmol/mol ≤6%) compared with less tight control (HbA1c 53mmol/mol to 63 mmol/mol (7-7.9%), resulted in 10 extra deaths per 1000 people over 3.5 years.\(^20\)
2. Macrovascular
The presence of diabetes should prompt aggressive management of cardiovascular risk factors, particularly hypertension and dyslipidaemia, to prevent macrovascular disease.

Three large randomised controlled trials failed to find any macrovascular benefit from treating to a low HbA1c target (approaching or below 48mmol/mol (6.5%). Lowering blood glucose reduces microvascular complications.\(^2\)

**Antihyperglycaemic medications**
In managing glycaemic control metformin remains initial drug therapy after trialling lifestyle measures. Sulfonylureas are the preferred addition to metformin as they reduce the incidence of microvascular complications. Insulin may be added if insufficient control. Insulin is known to reduce diabetes-related complications. Advice about prevention of hypoglycaemia should be provided for patients taking sulfonylureas or insulin.

The newer glucose-lowering agents are an alternative depending on patient factors e.g. Dipeptidyl peptidase-4 inhibitors (DPP-4) (gliptins- alogliptin, linagliptin, sitagliptin, saxagliptin, vildagliptin; glucagon-like peptides (GLP-1 analogues e.g. exenatide, liraglutide; thiazolidinediones e.g. pioglitazone or Sodium Glucose Transporters (SGLT-2) e.g. canagliflozin and dapagliflozin. All of these agents improve glycaemic control, but none has been shown to reduce microvascular or macrovascular outcomes when used as monotherapy or in combination with metformin or a sulfonylurea.\(^2\) No combination using a newer glucose-lowering drug is superior in both safety and HbA\(_1c\) reduction to any other. Choice should be based on patient factors such as the patient’s HbA\(_1c\) level, hypoglycaemic risk and weight gain.\(^2\)

The recent release of the McKellar *Guidelines for Managing Older People with Diabetes in Residential and Other Care Settings* offer a different perspective on the care of these people.\(^{21}\) The Guidelines were developed to aid clinical decision-making following an individualised comprehensive assessment of the older person. Targets are often much higher reflecting a realistic risk reduction approach particularly with the increased falls risk with hypoglycaemia.

One of the most important aspects of the pharmacist’s role in assisting people with diabetes is to encourage adherence not only to hypoglycaemic medications but also cardiovascular medications, adhering to lifestyle measures and when appropriate blood glucose monitoring. NPS have produced a ‘Diabetes Health tracker’ for people with diabetes to list their medical tests, and health checks to encourage self-management.\(^{32}\)

Managing diabetes requires a team approach and treatment of cardiovascular and microvascular risk factors through lifestyle measures, glycaemic control, lipid and blood pressure control and regular monitoring of all parameters.

- Blood pressure and lipids are a priority
- Blood glucose targets will depend on patient factors.
References:


13. eTG Therapeutic Guidelines Ltd September 2014.


Questions based on the above:

Indicate the correct answer in each of the following questions

1. Which statement is the most correct regarding diabetes, and cardiovascular control?
   (a) The target for optimum blood pressure control in a person with diabetes is 140/90mmHg
   (b) The target for total cholesterol in a person with diabetes is 5.5mmol/L
   (c) The target for HbA1c in a person with diabetes is below 53mmol/mol
   (d) The glucose fasting level for a person with diabetes is 7mmol/L
   (e) The glucose fasting level for a person with diabetes is 4mmol/L

2. The use of HMRs and Medscheck can assist a person with diabetes, however for payment which of the following statements are correct?
   (a) An HMR may be ordered by an endocrinologist annually
   (b) Medscheck can be done after an Home Medicine Review as long as it is within 12 months
   (c) A Diabetes Medscheck can be done after a HMR
   (d) Diabetes MedsCheck may be done in the pharmacy
   (e) If a general practitioner has enrolled a person with diabetes in an Annual Cycle of care they are not eligible for a HMR

3. The following are complications from diabetes. Indicate the correct answer
   (a) Microvascular changes such as stroke or TIA
   (b) Peripheral vascular disease due to macrovascular changes
   (c) Microalbuminuria leading to nephropathy due to macrovascular changes
   (d) Peripheral neuropathy due to macrovascular changes
   (e) Diabetic retinopathy due to macrovascular changes

4. Cardiovascular and glycaemic control are will assist with the reduction of risks for a person with diabetes. Which of the following statements is correct?
   (a) Hypertension has little to do with the progression of diabetes
   (b) Reducing risk of cardiovascular events in people with type 2 diabetes requires concurrent management of lifestyle factors, blood pressure, lipids and blood glucose
   (c) Improved control of blood glucose has not been found to prevent or reduce microvascular complications
   (d) Intensive glycaemic control alone is the most important method of reducing risk from diabetes
   (e) Hypoglycemia promotes the development of atherosclerosis of major blood vessels

5. Indicate the correct answer in these statements about the use of agents to reduce risk of diabetes complications
   (a) The use of ACE inhibitors increases the rate of progression of micoalbuminuria
   (b) Low dose thiazide diuretics should not be used in people with diabetes due to the risk of increased in glucose and uric acid
   (c) Low dose simavastatin as a lipid lowering agent should not be used for people with diabetes
   (d) High doses of all statins are associated with an increased risk of myopathy
   (e) Fenofibrate should not be used if reduction in triglycerides is needed
6. Indicate the correct answer in these statements about reduction of risk of for people with diabetes.

(a) Diabetic nephropathy is one of the common causes of end stage renal disease and if established progression can be delayed by very tight glycaemic control.
(b) Fish oils should not be taken by people with diabetes to reduce triglycerides as they will increase blood glucose.
(c) Urinary albumin excretion should be checked at least every 12 months for people with diabetes.
(d) Good blood pressure control will not affect the progression of renal damage.
(e) Urinary tract infections are caused by hypoglycaemic medications taken by people with diabetes.

7. The indications for antiplatelet therapy in cardiovascular disease and diabetes have changed with increased emphasis on risk assessment. Which of the following statements is correct?

(a) High dose aspirin is routinely recommended in people with a history of cardiovascular disease.
(b) Low dose aspirin should be taken by all people over age 50 years of age even without a history of cardiovascular disease.
(c) Aspirin is routinely recommended in people with type 2 diabetes.
(d) The benefits of low-dose aspirin clearly offset the harms for people with diabetes who already have cardiovascular disease.
(e) Clopidogrel and aspirin are routinely recommended for people with diabetes.

8. There are many controversies regarding the use of statins for reduction of cholesterol. Indicate the correct statement.

(a) Statins should only be used in people with diabetes after dietary modification, and tight blood glucose control using hypoglycaemic medicines.
(b) Statins have been linked to increased glycaemic control and a small decrease in diabetes onset.
(c) Statin treatment has not been shown to reduce major coronary events.
(d) People at high cardiovascular risk (>15% risk of a cardiovascular event in the next 5 years) benefit from a statin and an antihypertensive agent.
(e) For every 255 people at high cardiovascular risk without diabetes, statin treatment for 4 years results in an increase of 5.4 major coronary events and 1 less case of diabetes.

9. To reduce the risk of diabetes complications a pharmacist assisting a person to manage their diabetes control should discuss all of the following points. Indicate the incorrect statement.

(a) The importance of adherence to antihypertensive, lipid lowering medicines as well as antihyperglycaemic medicines.
(b) Daily blood glucose monitoring for all people with diabetes who are taking metformin.
(c) At least annual blood tests as ordered by the medical practitioner.
(d) Optimum diet, weight, alcohol limitation, regular exercise and smoking cessation (where appropriate).
(e) Eye checks at least every 2 years and regular podiatry care.