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General practice management of type 2 diabetes

2016–18

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General practice management of type 2 diabetes: 2016–18

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We recognise the traditional custodians of the land and sea on which we work and live.

Supporting the education programs of Diabetes Australia

AstraZeneca SANOFI DIABETES & CARDIOVASCULAR

Type 2 diabetes: Goals for optimum management

The table on the reverse lists goals for optimum management that all people with type 2 diabetes should be encouraged to reach.

This table has been specifically designed as a card for you to pull out and place on your desk or nearby for easy reference.

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Type 2 diabetes: Goals for optimum management

Encourage all people with type 2 diabetes to approach/reach these goals	
Diet	Advise eating according to *Australian dietary guidelines*, with attention to quantity and type of food If concerns are held regarding cardiovascular disease (CVD) risk, advise individual dietary review
Body mass index (BMI)	Therapeutic goal is 5–10% weight loss for people who are overweight or obese with type 2 diabetes Those with BMI >35 kg/m^2 and comorbidities, or BMI >40 kg/m^2, greater weight loss measures should be considered Note that BMI is a difficult parameter to standardise between different population groups
Physical activity	At least 30 minutes of moderate physical activity on most if not all days of the week (total ≥150 minutes/week)
Cigarette consumption	0 per day
Alcohol consumption	Advise ≤2 standard drinks (20 g) per day for men and women
Blood glucose level (BGL)	Advise 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, people using sulphonylureas or other medicines that may cause hypoglycaemia, 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 sulphonylureas) is not recommended
Glycated haemoglobin (HbA1c)	Needs individualisation according to patient circumstances. Generally: • ≤53 mmol/mol (48–58 mmol/mol) • ≤7% (6.5–7.5%) Allowing for normal variation in test accuracy, HbA1c results that range between 6.5% and 7.5% (48 and 58 mmol/mol) would reflect this goal.
Total cholesterol <4.0 mmol/L	Initiation of pharmacotherapy is dependent on the assessment of absolute CVD risk (refer to the Australian absolute CVD risk calculator at www.cvdcheck.org.au). 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
High-density lipoprotein-cholesterol (HDL-C) ≥1.0 mmol/L	
Low-density lipoprotein-cholesterol (LDL-C) <2.0 mmol/L	
Non–HDL-C <2.5 mmol/L	
Triglycerides <2.0 mmol/L	
Blood pressure (BP) ≤140/90 mmHg	Lower BP targets may be considered for younger people and for secondary prevention in those at high risk of stroke, as long as treatment burden does not increase risk The target BP for people with diabetes and albuminuria/proteinuria remains <130/80 mmHg. As always, treatment targets should be individualised and monitored for side effects from medications used to lower BP
Urine albumin excretion	Urine albumin-to-creatinine ratio (UACR): • women: <3.5 mg/mmol • men: <2.5 mg/mmol Timed overnight collection: <20 mcg/min Spot collection: <20 mg/L
Vaccination	Consider immunisation against influenza and pneumococcal disease, and the diphtheria-tetanus-acellular pertussis (dTpa) vaccine

General practice management of type 2 diabetes

2016–18

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About the RACGP

The RACGP is Australia's largest professional general practice organisation and represents urban and rural general practitioners (GPs). We represent more than 33,000 members working in or towards a career in general practice and are proud that more than 22,500 GPs in Australia have chosen to be a member of the RACGP.

The RACGP is responsible for defining the nature of the general practice discipline, setting the standards and curriculum for education and training, maintaining the standards for quality clinical practice, and supporting GPs in their pursuit of excellence in patient care and community service. We offer our members access to a vast suite of clinical resources, business support tools, education programs and are proud to advocate for the general practice profession on behalf of all GPs.

The RACGP advocates and promotes high-quality diabetes management and care through:

- regular articles in *Australian Family Physician* (*AFP*), the most widely read peer-reviewed general practice journal in Australia, available at www.racgp.org.au/publications/afp
- online general practice education provided by *gplearning* – the RACGP's online learning portal
- advocacy on key issues related to diabetes management
- partnership with Diabetes Australia in the production of this handbook
- giving members access to an extensive library collection, with many items available electronically
- the flagship products *Guidelines for preventive activities in general practice* (Red Book), *Putting prevention into practice: Guidelines for the implementation of prevention in the general practice setting* (Green Book) and *Smoking, nutrition, alcohol, physical activity* (*SNAP): A population health guide to behavioural risk factors in general practice*, available at www.racgp.org.au/your-practice/guidelines

About Diabetes Australia

Diabetes Australia is the national body for people affected by all types of diabetes and those at risk. We are committed to reducing the impact of diabetes.

Diabetes Australia combines the voice of consumers, health professionals and researchers dedicated to diabetes.

Diabetes Australia has four key activities:

- **National leadership** – National policy and advocacy, and raising of awareness of diabetes and its impact.
- **Management of diabetes** – Supporting and developing national self-management programs, and promoting the best possible management of diabetes to help prevent complications. These activities cover type 1, type 2 and gestational diabetes.
- **Prevention** – Supporting and developing prevention policies and programs for both the high-risk population (two million Australians at high risk) and the primary prevention at a whole-of-population level.
- **Research** – Supporting, funding and promoting the best diabetes research.

Diabetes Australia is the Australian member of the International Diabetes Federation (IDF), through which we work to reduce the impact of diabetes throughout the world, particularly in the Western Pacific region.

Working with general practice

Diabetes Australia publishes the *Diabetes Management Journal* quarterly, to inform GPs and health professionals in the field of diabetes management. This ensures that the latest information on the optimum care for people with diabetes, and the latest developments in diabetes management are delivered to frontline healthcare providers. The *Diabetes Management Journal* is available through Diabetes Australia, and professional membership of state and territory diabetes organisations at www.diabetesaustralia.com.au

National Diabetes Services Scheme

Diabetes Australia administers the National Diabetes Services Scheme (NDSS) in conjunction with state and territory diabetes organisations. The NDSS is an Australian Government initiative and has operated successfully for more than 28 years. The NDSS provides universal access for all Australians with diabetes to subsidised diabetes products, and education and support services. As at December 2015, there were more than 1.2 million Australians registered with the NDSS.

Through the NDSS, people with diabetes can receive telephone support via the National Helpline 1300 136 588, along with a range of diabetes information and educational resources and programs targeted for type 1, type 2 and gestational diabetes.

Educational resources from Diabetes Australia

Membership of state and territory diabetes organisations provides access to a wide range of educational resources and support for people with diabetes, their families and carers. To find out more, visit www.diabetesaustralia.com.au and click on your state or territory.

Acronyms

AACB	Australasian Association of Clinical Biochemists
ABI	ankle-brachial index
ACCORD	Action to Control Cardiovascular Risk in Diabetes
ACE	angiotensin converting enzyme
ACEI	angiotensin converting enzyme inhibitor
ACR	albumin-to-creatinine ratio
ADA	American Diabetes Association
ADEA	Australian Diabetes Educators Association
ADIPS	Australian Diabetes in Pregnancy Society
ADS	Australian Diabetes Society
ADVANCE	Advance in Diabetes and Vascular Disease
AEP	Accredited Exercise Physiologist
AHRQ	Agency for Healthcare Research and Quality
AIHW	Australian Institute of Health and Welfare
AN	acanthosis nigricans
APD	Accredited Practising Dietitian
ARA	angiotensin-receptor antagonist
ARB	angiotensin receptor blocker
AUSDRISK	Australian type 2 diabetes risk assessment tool
BGL	blood glucose level
BMI	body mass index
BP	blood pressure
CAD	coronary artery disease
CCM	Chronic Care Model
CDE	Credentialled Diabetes Educator
CDM	chronic disease management
CEITC	Centre for Excellence in Indigenous Tobacco Control
CI	confidence interval
CKD	chronic kidney disease
COI	conflict of interest
COPD	chronic obstructive pulmonary disease
CVD	cardiovascular disease
DBP	diastolic blood pressure
DE	diabetes educator

DKA	diabetic ketoacidosis
DR	diabetic retinopathy
DPP-4	dipeptidyl peptidase-4
DPP-4i	dipeptidyl peptidase-4 inhibitor
dTpa	diphtheria-tetanus-acellular pertussis
ECG	electrocardiogram
eGFR	estimated glomerular filtration rate
ELIXA	Evaluation of Lixisenatide in Acute Coronary Syndrome
EMPA-REG	Empagliflozin, Cardiovascular Outcomes, and Mortality in Type 2 Diabetes
EXAMINE	Examination of Cardiovascular Outcomes with Alogliptin versus Standard of Care
FBG	fasting blood glucose
FIELD	Fenofibrate Intervention and Event Lowering in Diabetes
FRE	Framingham risk evaluation
GAD	glutamic acid decarboxylase
GDM	gestational diabetes mellitus
GI	glycaemic index
GIP	glucose-dependent insulinotropic polypeptide
GLP-1	glucagon-like peptide-1
GLP-1 RA	glucagon-like peptide-1 receptor agonist
GP	general practitioner
GPMP	general practice management plan
HAPO	Hyperglycaemia and Adverse Pregnancy Outcome
HbA1c	glycated haemoglobin
HDL-C	high-density lipoprotein-cholesterol
HHS	hyperosmolar hyperglycaemic state
HOCM	hypertrophic obstructive cardiomyopathy
HONC	hyperosmolar nonketotic coma
IA-2	insulinoma antigen-2
IADPSG	International Association of the Diabetes and Pregnancy Study Groups
IBD	irritable bowel disease
IBS	irritable bowel syndrome
IDF	International Diabetes Federation
IFG	impaired fasting glucose
IGT	impaired glucose tolerance

IMPROVE-IT	Improved reduction of outcomes: Vytorin efficacy international trial
IUCD	intrauterine contraceptive device
LADA	latent autoimmune diabetes of adults
LDL-C	low-density lipoprotein-cholesterol
LEADER	Liraglutide Effect and Action in Diabetes: Evaluation of Cardiovascular Outcome Results
MACE	major adverse cardiovascular events
MBS	Medicare Benefits Schedule
MI	myocardial infarction
MODY	maturity onset diabetes of the young
MR	modified release
NDSS	National Diabetes Services Scheme
NHMRC	National Health and Medical Research Council
NICE	National Institute for Health and Care Excellence
NICEQOF	National Institute for Health and Clinical Excellence Quality and Outcomes Framework
NIH	National Institutes of Health
NPH	Neutral Protamine Hagedorn
NPS	National Prescribing Service
NSAID	non-steroidal anti-inflammatory drug
NVDPA	National Vascular Disease Prevention Alliance
OCP	oral contraceptive pill
OGTT	oral glucose tolerance test
OHA	oral hypoglycaemic agent
OR	odds ratio
ORIGIN	Outcome Reduction with Initial Glargine Intervention
PAD	peripheral arterial disease
PAID	problem areas in diabetes
PBAC	Pharmaceutical Benefits Advisory Committee
PBS	Pharmaceutical Benefits Scheme
PCOS	polycystic ovary syndrome
PHN	Primary Health Network
PHQ-2	Patient health questionnaire-2
PHQ-9	Patient health questionnaire-9
PIP	Practice Incentives Program
PROactive	Prospective pioglitazone clinical trial in macrovascular events

RACGP	The Royal Australian College of General Practitioners
RANZCOG	The Royal Australian and New Zealand College of Obstetricians and Gynaecologists
RBG	random blood glucose
RCPA	The Royal College of Pathologists of Australasia
RCT	randomised controlled trial
RR	relative risk
RRR	relative risk reduction
SAVOR-TIMI	Saxagliptin Assessment of Vascular Outcomes Recorded in Patients with Diabetes Mellitus Thrombolysis in Myocardial Infarction
SBP	systolic blood pressure
SGLT2	sodium glucose co-transporter 2
SGLT2i	sodium glucose co-transporter 2 inhibitor
SIGN	Scottish Intercollegiate Guidelines Network
SIP	Service Incentive Payments
SMBG	Self-monitoring of blood glucose
SNAP	Smoking, nutrition, alcohol, physical activity
SOE	statement of evidence
STOP-NIDDM	Study to Prevent Non-Insulin-Dependant Diabetes Mellitus
SU	sulphonylureas
TBI	toe-brachial index
TCA	team care arrangement
TECOS	Trial to Evaluate Cardiovascular Outcomes after Treatment with Sitagliptin
TGA	Therapeutic Goods Administration
TIA	transient ischaemic attack
TZD	thiazolidinedione
UACR	Urine albumin-to-creatinine ratio
UKPDS	UK Prospective Diabetes Study
USPSTF	US Preventive Services Task Force
WHO	World Health Organization

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Summary, explanation and source of recommendations

The coding scheme for levels of evidence and grades of recommendation in this publication are provided in this summary. Refer to Section 1.3. How to use these guidelines for further explanation on how to use these recommendations.

National Health and Medical Research Council's levels of evidence and grades of recommendation

Levels of evidence	
Level	**Explanation**
I	Evidence obtained from a systematic review of level II studies
II	Evidence obtained from a randomised controlled trial (RCT)
III-1	Evidence obtained from a pseudo-RCT (ie alternate allocation or some other method)
III-2	Evidence obtained from a comparative study with concurrent controls: • non-randomised, experimental trial • cohort study • case-control study • interrupted time series with a control group
III-3	Evidence obtained from a comparative study without concurrent controls: • historical control study • two or more single arm study • interrupted time series without a parallel control group
IV	Case series with either post-test or pre-test/post-test outcomes
Practice Point	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees
Grades of recommendations	
Grade	**Explanation**
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s), but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

Scottish Intercollegiate Guidelines Network's levels of evidence and grades of recommendations (1999–2012)

Levels of evidence	
Level	**Explanation**
1++	High-quality meta-analyses, systematic reviews of randomised controlled trial (RCTs), or RCTs with a very low risk of bias
1+	Well-conducted meta-analyses, systematic reviews or RCTs with a low risk of bias
1–	Meta-analyses, systematic reviews of RCTs or RCTs with a high risk of bias
2++	High-quality systematic reviews of case control or cohort or studies High-quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2+	Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2–	Case control or cohort studies with a high risk of confounding bias or chance and significant risk that the relationship is not causal
3	Non-analytic studies (eg case reports, case series)
4	Expert opinion
Grades of recommendations	
A	At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+
C	A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+
Good practice points	Recommended best practice based on the clinical experience of the guideline development group

American Diabetes Association's levels of evidence

Levels of evidence	Explanation
A	Clear evidence from well-conducted, generalisable randomised controlled trials (RCTs) that are adequately powered, including: • evidence from a well-conducted multicenter trial • evidence from a meta-analysis that incorporated quality ratings in the analysis Compelling non-experimental evidence (ie 'all or none' rule developed by the Centre for Evidence-Based Medicine at the University of Oxford) Supportive evidence from well-conducted RCTs that are adequately powered, including: • evidence from a well-conducted trial at one or more institutions • evidence from a meta-analysis that incorporated quality ratings in the analysis
B	Supportive evidence from well-conducted cohort studies: • evidence from a well-conducted prospective cohort study or registry • evidence from a well-conducted meta-analysis of cohort studies Supportive evidence from a well-conducted case-control study
C	Supportive evidence from poorly controlled or uncontrolled studies: • evidence from randomised clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results • evidence from observational studies with high potential for bias (such as case series with comparison with historical controls) • evidence from case series or case reports Conflicting evidence with the weight of evidence supporting the recommendation
E	Expert consensus or clinical experience

Summary of recommendations

Please note that the asterisk (*) that appears next to 'Grade' in the following recommendations are explained in Summary, explanation and source of recommendations.

3.1 Identifying risk of diabetes in asymptomatic patients

Recommendations	Reference	Grade*
Individuals should be screened for risk of diabetes every three years from 40 years of age using AUSDRISK	25 NHMRC, 2009	C
Individuals at high risk with any one of following risk factors: – AUSDRISK score of 12 or more – all people with a history of a previous cardiovascular event (acute myocardial infarction or stroke) – women with a history of gestational diabetes mellitus – women with polycystic ovary syndrome – patients on antipsychotic drugs	25 NHMRC, 2009	
• should be screened with fasting blood glucose (or glycated haemoglobin [HbA1c]) • every three years		B
Individuals at high risk with impaired glucose tolerance test or fasting glucose (not limited by age) should be screened:	25 NHMRC, 2009	C
• with fasting blood glucose (or HbA1c) • every 12 months		B C
Risk assessment should begin from 18 years of age in Aboriginal and Torres Strait Islander peoples	25 NHMRC, 2009	Practice Point

4. Preventing type 2 diabetes

Recommendations	Reference	Grade*
Lifestyle modifications that focus on increased physical activity, dietary change and weight loss should be offered to all individuals at high risk of developing type 2 diabetes Structured diabetes prevention programs are available	42 NHMRC, 2009	A
Bariatric surgery can be considered in selected morbidly obese individuals (based on weight alone or the presence of comorbidities) who are at high risk of type 2 diabetes	42 NHMRC, 2009	C
Individuals who are at high risk of diabetes should be identified through the use of risk assessment tools	42 NHMRC, 2009	C

5.1 Patient-centred diabetes care

Recommendations	Reference	Grade*
A patient-centred communication style that incorporates patient preferences, assesses literacy and numeracy, and addresses cultural barriers to care should be used	19 American Diabetes Association, 2015	B

5.2 A structured diabetes care program consistent with the Chronic Care Model

Recommendations	Reference	Grade*
Care should be aligned with components of the Chronic Care Model (CCM) to ensure productive interactions between a prepared proactive practice team and an informed activated patient	56 American Diabetes Association, 2016	A
When feasible, care systems should support team-based care, community involvement, patient registries and embedded decision-support tools to meet patient needs	56 American Diabetes Association, 2016	B
Treatment decisions should be timely and based on evidence-based guidelines that are tailored to individual patient preferences, prognoses and comorbidities	56 American Diabetes Association, 2016	B

5.3 Patient education and self management

Recommendations	Reference	Grade*
All people with type 2 diabetes should be referred for structured diabetes patient education	42 NHMRC, 2009	A
Diabetes education should be delivered in groups or individually	42 NHMRC, 2009	A
Diabetes education should be culturally sensitive and tailored to the needs of socioeconomically disadvantaged populations	42 NHMRC, 2009	B

6.1 Physical activity

Recommendations	Reference	Grade*
People with type 2 diabetes of all ages benefit from accumulating 30 minutes or more of moderate physical activity on most if not all days of the week	64 Briffa T et al, 2006	B
Exercise and physical activity (involving aerobic and/or resistance exercise) should be performed on a regular basis	65 SIGN, 2014	D

6.2 Diet

Recommendations	Reference	Grade*
Consumption of cereal foods (especially three serves a day of wholegrains) is associated with reduced risk of type 2 diabetes	71 NHMRC, 2013	B
Consumption of at least one and a half serves of dairy foods (eg milk, yoghurt, cheese) per day is associated with reduced risk of type 2 diabetes	71 NHMRC, 2013	C

6.3 Weight

Recommendations	Reference	Grade*
Adults with impaired fasting glucose, impaired glucose tolerance or diabetes can be strongly advised that the health benefits of 5–10% weight loss include prevention, delayed progression or improved control of type 2 diabetes	78 NHMRC, 2013	A
For adults with body mass index (BMI) >40 kg/m^2, or adults with BMI >35 kg/m^2 and comorbidities that may improve with weight loss, bariatric surgery may be considered, taking into account the individual situation	78 NHMRC, 2013	A
Use BMI to classify overweight or obesity in adults	78 NHMRC, 2013	B
For adults, use waist circumference, in addition to BMI, to refine assessment of risk of obesity-related comorbidities	78 NHMRC, 2013	C

6.4 Smoking cessation

Recommendations	Reference	Grade*
Smoking cessation should be a major focus of the management of people with smoking-related diseases	86 RACGP, 2011	A
All smokers should be offered brief advice to quit smoking	86 RACGP, 2011	A

6.5 Alcohol consumption

Recommendations	Reference	Grade*
People with diabetes can take alcohol in moderation as part of a healthy lifestyle, but should aim to keep within the target consumption recommended for people without diabetes	65 SIGN, 2014	B

8.1 Glycaemic monitoring

Recommendations	Reference	Grade*
Glycated haemoglobin (HbA1c) measurement should be used to assess long-term blood glucose control	96 NHMRC, 2009	A
Self-monitoring of blood glucose is recommended for patients with type 2 diabetes who are using insulin, where patients have been educated in appropriate alterations in insulin dose (Refer to Self-monitoring of blood glucose under Section 8.2. Medication for examples of instances when self-monitoring of blood glucose may be considered)	65 SIGN, 2014	B
Routine self-monitoring of blood glucose in people with type 2 diabetes who are using oral glucose-lowering drugs (with the exception of sulphonylureas) is not recommended	65 SIGN, 2010	B

In practice

Recommendations	Reference	Grade*
Blood glucose control should be optimised because of its beneficial effects on the development and progression of microvascular complications	96 NHMRC, 2009	A
The potential harmful effects of optimising blood glucose control in people with type 2 diabetes should be considered when setting individual glycaemic targets	96 NHMRC, 2009	A
The general glycated haemoglobin (HbA1c) target in people with type 2 diabetes is ≤53 mmol/mol (≤7%). Adjustments to diabetes treatment should be considered when HbA1c is above this level	96 NHMRC, 2009	A
Targets for self-monitoring of blood glucose levels are 6–8 mmol/L for fasting and preprandial, and 6–10 mmol/L for two hour postprandial	96 NHMRC, 2009	C

8.2.1 General medication

Recommendations	Reference	Grade*
Care should be taken to address the potential harmful effects of optimising blood glucose control when setting individual glycaemic targets	96 NHMRC, 2009	A
Interventions to achieve target glycated haemoglobin (HbA1c) should begin with lifestyle modification followed by pharmacological options selected on the basis of individual clinical circumstances, side effects and contraindications	96 NHMRC, 2009	A
Blood glucose control should be optimised because of its beneficial effects on the development and progression of microvascular complications	96 NHMRC, 2009	A

9. Managing cardiovascular disease risk

Recommendations	Reference	Grade*
Patients with pre-existing cardiovascular disease (CVD) are at high risk	149 NVDPA, 2012	A
All adults with type 2 diabetes and known prior CVD (except haemorrhagic stroke) should receive the maximum tolerated dose of a statin, irrespective of their lipid levels Note: The maximum tolerated dose should not exceed the maximum available dose (eg 80 mg atorvastatin, 40 mg rosuvastatin)	150 Baker IDI, 2015	A
Adults with any of the following conditions do not require absolute CVD risk assessment using the Framingham Risk Equation because they are already known to be at clinically determined high risk of CVD: • Diabetes and aged >60 years • Diabetes with microalbuminuria (>20 mcg/min or urine albumin-to-creatinine ratio [UACR] >2.5 mg/mmol for men, and >3.5 mg/mmol for women) • Moderate or severe chronic kidney disease (CKD) (persistent proteinuria or estimated glomerular filtration rate [eGFR] <45 mL/min/1.73 m^2) • A previous diagnosis of familial hypercholesterolaemia • Systolic blood pressure ≥180 mmHg or diastolic blood pressure ≥110 mmHg • Serum total cholesterol >7.5 mmol/L	149 NVDPA, 2012	D

Calculate risk level using an evidence-based tool: • National Vascular Disease Prevention Alliance charts, www.cvdcheck.org.au • New Zealand Cardiovascular Risk charts, www.health.govt.nz/publications • Heart Foundation NZ, www.knowyournumbers.co.nz	149 NVDPA, 2012	B
Aboriginal and Torres Strait Islander peoples are generally assumed to be at higher risk	149 NVDPA, 2012	B

Antihypertensive medication to manage cardiovascular risk

Recommendations	Reference	Grade*
Blood pressure-lowering therapy in people with diabetes should preferentially include an angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB)	149 NVDPA, 2012	A
If monotherapy does not sufficiently reduce blood pressure, add one of the following:		
• Calcium channel blocker	149 NVDPA, 2012	B
• Low-dose thiazide or thiazide-like diuretic	149 NVDPA, 2012	C

Lipid medication to manage cardiovascular risk

Recommendations	Reference	Grade*
Use statins as first-line therapy	149 NVDPA, 2012	A

Antithrombotic therapy

Recommendations	Reference	Grade*
All adults with type 2 diabetes and known prior cardiovascular disease should receive long-term antiplatelet therapy unless there is a clear contraindication	150 Baker IDI, 2015	A
All adults with type 2 diabetes and a history of ischaemic stroke or transient ischaemic attack should receive:	150 Baker IDI, 2015	
• low-dose aspirin, or		A
• clopidogrel, or		A
• combination low-dose aspirin and extended-release dipyridamole		B
All adults with type 2 diabetes and recent acute coronary syndrome and/or coronary stent should receive, for 12 months after the event or procedure:	150 Baker IDI, 2015	
• combination low-dose aspirin and clopidogrel, or		B
• combination low-dose aspirin and prasugrel, or		B
• combination low-dose aspirin and ticagrelor		C
All adults with type 2 diabetes and a history of coronary artery disease, but no acute event in the past 12 months should receive:	150 Baker IDI, 2015	
• long-term low-dose aspirin, or		A
• long-term clopidogrel if intolerant to aspirin		B
In the presence of atrial fibrillation or other major risk factors for thromboembolism, there should be consideration of anticoagulant therapy according to other relevant guidelines	150 Baker IDI, 2015	Practice Point

10.1 Diabetic retinopathy

Recommendations	Reference	Grade*
Ensure that all people with diabetes have a dilated fundus examination and visual acuity assessment at the diagnosis of diabetes and at least every two years	158 NHMRC, 2008	None provided (Level I evidence)
Examine higher risk patients (eg longer duration of diabetes, or poor glycaemic control, blood pressure or blood lipid control) without diabetic retinopathy at least annually	158 NHMRC, 2008	None provided (Level I evidence)
Conduct annual screening for Aboriginal or Torres Strait Islander peoples with diabetes	158 NHMRC, 2008	None provided (Level IV evidence)

10.3 Neuropathy

Diabetic peripheral neuropathy

Recommendations	Reference	Grade*
All patients should be screened for distal symmetric polyneuropathy starting at diagnosis of type 2 diabetes and at least annually thereafter, using simple clinical tests	19 American Diabetes Association, 2015	B
Antidepressants, including tricyclics, duloxetine and venlafaxine should be considered for the treatment of patients with painful diabetic peripheral neuropathy	65 SIGN, 2014	A
Anticonvulsants, including pregabalin and gabapentin, should be considered for the treatment of patients with painful diabetic peripheral neuropathy	65 SIGN, 2014	A

10.4 Nephropathy

Recommendations	Reference	Grade*
Assessment Kidney status in people with type 2 diabetes should be assessed by:		
• annual screening for albuminuria (note that dipstick urine test is not adequate to identify albuminuria)	166 NHMRC, 2009	B
• annual estimated glomerular filtration rate (eGFR; in mL/min/1.73 m^2)	166 NHMRC, 2009	B
Management Reducing the risk or slowing the progression of nephropathy can be achieved by:		
• blood glucose control should be optimised aiming for a general glycated haemoglobin (HbA1c) target ≤7%	166 NMHRC 2009	A
• optimising blood pressure control	166 NMHRC 2009	A
In people with type 2 diabetes and microalbuminuria or macroalbuminuria, angiotensin receptor blocker (ARB) or angiotensin converting enzyme inhibitor (ACEI) antihypertensive should be used to protect against progression of kidney disease	166 NHMRC, 2009	A
People with type 2 diabetes should be informed that smoking increases the risk of chronic kidney disease	166 NHMRC, 2009	B
People with diabetes and microalbuminuria are considered at high cardiovascular disease risk, and should be treated with multifactorial interventions (refer to Chapter 9. Managing cardiovascular risk)	149 NVDPA, 2012	D

10.5 Foot complications

Recommendations	Reference	Grade*
Assess all people with diabetes and stratify their risk of developing foot complications	160 NHMRC, 2011	C
Assess risk stratification by inquiring about previous foot ulceration and amputation plus falls risk, visually inspecting the feet for structural abnormalities and ulceration, assessing for neuropathy using either the neuropathy disability score or a 10 g monofilament and palpating foot	160 NHMRC, 2011	C
People assessed as having intermediate-risk or high-risk feet should be offered a foot protection program. This includes foot care education, podiatry review and appropriate footwear	160 NHMRC, 2011	C
Pressure reduction, otherwise referred to as redistribution of pressure or offloading, is required to optimise the healing of plantar foot ulcers	160 NHMRC, 2011	B
Offloading of the wound can be achieved with the use of a total contact cast or other device rendered irremovable	160 NHMRC, 2011	B
People with diabetes-related foot ulceration are best managed by a multidisciplinary foot care team	160 NHMRC, 2011	C

11. Glycaemic emergencies

Recommendations	Reference	Grade*
The potential harmful effects of optimising blood glucose control in people with diabetes should be considered when setting individual glycaemic targets	96 NHMRC, 2009	A
Improving blood glucose control increases the risk of hypoglycaemia	96 NHMRC, 2009	None provided (Level I evidence)

13.2 Pregnancy with pre-existing diabetes

Recommendations	Reference	Grade*
Pre-pregnancy glycaemic control should be maintained as close to the non-diabetic range as possible, taking into account risk of maternal hypoglycaemia	65 SIGN, 2014	C
All women with diabetes should be prescribed *high-dose pre-pregnancy folate supplementation, continuing up to 12 weeks' gestation	65 SIGN, 2014	B
All women with pre-gestational diabetes should be encouraged to achieve excellent glycaemic control†	65 SIGN, 2014	D
Postprandial glucose monitoring should be carried out in pregnant women with type 1 or 2 diabetes Postprandial glucose monitoring should be carried out in pregnant women with gestational diabetes and may be considered in pregnant women with type 1 or 2 diabetes	65 SIGN, 2014	C
Pre-pregnancy care provided by a multidisciplinary team is strongly recommended for women with diabetes	65 SIGN, 2014	C

*5 mg of folate

†Glycated haemoglobin (HbA1c) <48 mmol/mol (6.5%) and consider stabilisation using metformin and/or insulin to achieve glycaemic targets. However, metformin has a category C rating in pregnancy. Continuation or initiation of metformin therapy should be considered only following full disclosure to the patient and under specialist supervision. Sulphonylureas may be associated with adverse neonatal outcomes and are thus best avoided[66,229–232]

Management

Recommendations	Reference	Grade*
Pregnant women with gestational diabetes mellitus should be offered dietary advice and blood glucose monitoring, and be treated with glucose-lowering therapy depending on target values for fasting and postprandial targets	65 SIGN, 2014	A

Follow-up of patients with a history of gestational diabetes mellitus

Recommendations	Reference	Grade*
Women with a history of gestational diabetes mellitus should receive a postpartum oral glucose tolerance test at 6–12 weeks	19 American Diabetes Association, 2015	E

14.1 Sick day management

Recommendations	Reference	Grade*
Patients should be educated to develop a sick day management plan after initial diagnosis. This plan should be reviewed at regular intervals	261 Australian Diabetes Educators Association, 2014	None provided
Assist in the development of a sick day care plan and preparation of a home sick day management kit for patients to use during episodes of sickness	261 Australian Diabetes Educators Association, 2014	None provided

15. Diabetes and end-of-life care

Recommendations	Reference	Grade*
To minimise the risks of hypoglycaemia and metabolic compensation, a blood glucose range of 6–15 mmol/L is appropriate for most palliative care patients	265 Diabetes UK, 2013	None provided
Maintain glycated haemoglobin (HbA1c) at no lower than 58 mmol/mol (7.5%) if on hypoglycaemic medication depending on the individual's life expectancy, as HbA1c will be less relevant in patients with months or days left to live	265 Diabetes UK, 2013	None provided

Updates in this edition

Chapter	
Summary of recommendations	This has been moved to the front of the handbook
4. Preventing type 2 diabetes	This chapter references interventions in clinical trials that may assist general practitioners (GPs) understand, and consider implementing with, patients at high risk of diabetes to prevent progress to type 2 diabetes
6. Lifestyle modification	This chapter has been reviewed and includes some practical updates for GPs to implement in patients diagnosed with type 2 diabetes
7. The person with diabetes – Assessment	Revision on practice guidelines on clinical assessment is included
8. Managing glycaemia	The new Australian blood glucose treatment algorithm developed in collaboration with the Australian Diabetes Society is now included (Figure 4) A table to guide clinical considerations of glucose-lowering agents is also newly embedded (Table 6) A revised insulin titration algorithm is included for premixed insulins
9. Managing cardiovascular risk	Updated information on antithrombotic therapy including aspirin
10. Managing microvascular and other complications	Expanded section on foot complications
11. Glycaemic emergencies	Expanded information on the management of diabetes glycaemic emergencies – including Appendix J. Detailed information on glycaemic emergencies
13. Diabetes and reproductive health	Revision of advice with emerging evidence, both in pregnancy with existing diabetes and gestational diabetes
16. Issues under debate	Revision of blood pressure targets is discussed, based upon new evidence particular to diabetes Possible new criteria for screening for diabetes in at-risk populations are discussed
Appendices The following appendices from the 2014–15 edition have been removed	Australian type 2 diabetes risk assessment tool (AUSDRISK) General outline of management of hyperosmolar nonketotic coma from glycaemic emergencies Potential drug interactions

1. Introduction

Diabetes is a national health priority. *The Australian National Diabetes Strategy 2016–2020* was released by the Australian Government in November 2013. The number of people with type 2 diabetes is growing, most likely the result of rising overweight and obesity rates, lifestyle and dietary changes, and an ageing population. Within 20 years, the number of people in Australia with type 2 diabetes may increase from an estimated 870,000 in 2014, to more than 2.5 million.[1] The most socially disadvantaged Australians are twice as likely to develop diabetes.

If left undiagnosed or poorly managed, type 2 diabetes can lead to coronary artery disease (CAD), stroke, kidney failure, limb amputations and blindness. The early identification and optimal management of people with type 2 diabetes is therefore critical. General practice has the central role in type 2 diabetes management across the spectrum, from identifying those at risk right through to caring for patients at the end of life. These guidelines give up-to-date, evidence-based information tailored for general practice to support general practitioners (GPs) and their teams in providing high-quality management.[1]

In the development of the 2016–18 edition of *General practice management of type 2 diabetes*, The Royal Australian College of General Practitioners (RACGP) has focused on factors relevant to current Australian clinical practice. The RACGP has used the skills and knowledge of your general practice peers who have an interest in diabetes management and are members of the RACGP Specific Interests Diabetes Network.

This publication has been produced in accordance with the rules and processes outlined in the RACGP's conflict of interest (COI) policy. The RACGP's COI policy is available at www.racgp.org.au/support/policies/organisational

This edition represents 19 years of a successful relationship between the RACGP and Diabetes Australia. We acknowledge the support of the RACGP Expert Committee – Quality Care, the Medical Education and Scientific Committee of Diabetes Australia, and RACGP staff in the development of these guidelines.

1.1 Defining type 2 diabetes

Diabetes is a group of disorders and the 10th leading cause of deaths in Australia. There are four clinical classes of diabetes:[1]

- **Type 1 diabetes** – Results from ß-cell destruction due to an autoimmune process usually leading to insulin deficiency
- **Type 2 diabetes** – Results from a progressive insulin secretory defect on the background of insulin resistance
- **Gestational diabetes mellitus** (GDM) – Defined as glucose intolerance with onset or first recognition during pregnancy
- **Other specific types of diabetes** (Section 3.3. Impaired fasting glucose or impaired glucose tolerance) – Due to other causes such as genetic defects in ß-cell function, genetic defects in insulin action, diseases of the exocrine pancreas (eg cystic fibrosis), and drug-induced or chemical-induced causes (eg treatment of human immunodeficiency virus/acquired immune deficiency syndrome [HIV/AIDS] or after organ transplantation)

Type 2 diabetes is a largely preventable, chronic and progressive medical condition that results from two major metabolic dysfunctions: insulin resistance and then pancreatic islet cell dysfunction causing a relative insulin deficiency. In an individual, these occur due to modifiable lifestyle-related risk factors interacting with non-modifiable and genetic risk factors.

The relative insulin deficiency leads to chronic hyperglycaemia and multiple disturbances in carbohydrate, protein and fat metabolism including:

- ß-islet cell dysfunction, failure of response to insulin signalling and increased islet cell apoptosis
- α-cell dysfunction with elevated glucagon levels
- resultant disorders of hepatic gluconeogenesis and insulin resistance with elevated glucose production
- muscle cell insulin resistance with decreased glucose uptake
- kidney adaptation with altered gluconeogenesis and increased glucose reabsorption via increased sodium glucose transporter protein activity
- diminished incretin hormonal production or resistance
- maladaptive cerebral hormonal responses to insulin and appetite
- increased lipolysis with elevated free fatty acids.

1.2 A patient-centred approach

Throughout these guidelines we refer to patient-centred care.

The concept of patient-centred care incorporates the patient's experience of care and patients as partners in their healthcare.[2] In practice, this means providing care that is 'respectful of and responsive to individual patient preferences, needs and values, and ensures that patient values guide all clinical decisions'[3] and supports self management.

Understanding a patient's diabetes-related (and comorbidity) experiences can improve practitioner–patient communication and help the GP understand their patient's priorities for education, resources and management. This is essential for building and adapting diabetes management plans to be consistent with an individual patient's needs.

1.3 How to use these guidelines

These guidelines have been designed to provide pragmatic, evidence-based recommendations for use in general practice, and adopt the most recent recommendations from organisations including the National Health and Medical Research Council (NHMRC), Scottish Intercollegiate Guidelines Network (SIGN), American Diabetes Association (ADA) and other relevant sources. The recommendations tables include the reference or source of each recommendation, and the grade of recommendation. In cases where these are not available or current, results of systematic reviews and primary research studies have been considered to formulate the overall recommendation. References to support these recommendations are included.

In each section, where possible, information is presented as:

- recommendations
- clinical context (or what you need to know)
- in practice (or what you can do).

Information specific to the Aboriginal and Torres Strait Islander population is highlighted in boxed text. Recommendations in some areas are different for Aboriginal and Torres Strait Islander patients. It is therefore important to identify, record and report the Aboriginal and Torres Strait Islander status of patients.

The RACGP has a position paper outlining the processes of identification, available at www.racgp.org.au/yourracgp/faculties/aboriginal

Refer to Summary, explanation and source of recommendations.