UPDATED FOR 2024

Clinical Practice Guidelines
Quick Reference Guide

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DIABETES CANADA

Screening of Type 2 Diabetes

Assess risk factors for type 2 diabetes ANNUALLY:

- Family history (first-degree relative with type 2 diabetes)
- High risk populations (non-white, low socioeconomic status)
- History of GDM/prediabetes
- Cardiovascular risk factors
- Presence of end organ damage associated with diabetes
- Other conditions and medications associated with diabetes (see CPG Chapter 4, Screening for Diabetes in Adults, Table 1)

Who to screen

No risk factors	**Age <40 years** or low-moderate risk*	No screen indicated
	Age ≥40 years or high risk* (33% chance of developing type 2 diabetes within 10 years)	Screen every 3 years
Presence of risk factors	or very high risk (50% chance of developing type 2 diabetes within 10 years)	Screen every 6 to 12 months

How to screen

Test	Result	Dysglycemia category
A1C (%)†	6.0 – 6.4	Prediabetes
	≥6.5	Diabetes
FPG (mmol/L) No caloric intake for at least 8 hours	6.1 – 6.9	Impaired Fasting Glucose (IFG)
	≥7.0	Diabetes

Diagnosis of Diabetes (see CPG "Diabetes and Pregnancy" Chapter for diagnosis of gestational diabetes)

IF	Diagnosis of diabetes	Comments
ASYMPTOMATIC	TWO (2) results (A1C +/- FPG) in the diabetes range – [2nd result confirms the diagnosis in absence of symptoms]	E.g., when one A1C in diabetes range, order a repeat A1C test in a timely manner to confirm the diagnosis of diabetes, or if both A1C and FPG in diabetes range, diagnosis can be made immediately
Symptoms of overt hyperglycemia present§	only ONE (1) result in the diabetes range	In addition to A1C and FPG, diagnosis can be made with: 2hPG in a 75g OGTT or Random PG >11.1 mmol/L

* using a validated risk calculator (e.g., CANRISK)
† Be aware of factors that affect A1C accuracy (see CPG Chapter 9, Table 1)
§ Symptoms of overt hyperglycemia, e.g., polyuria, polydipsia, polyphagia, recent unexplained weight loss

A1C Targets for glycemic management

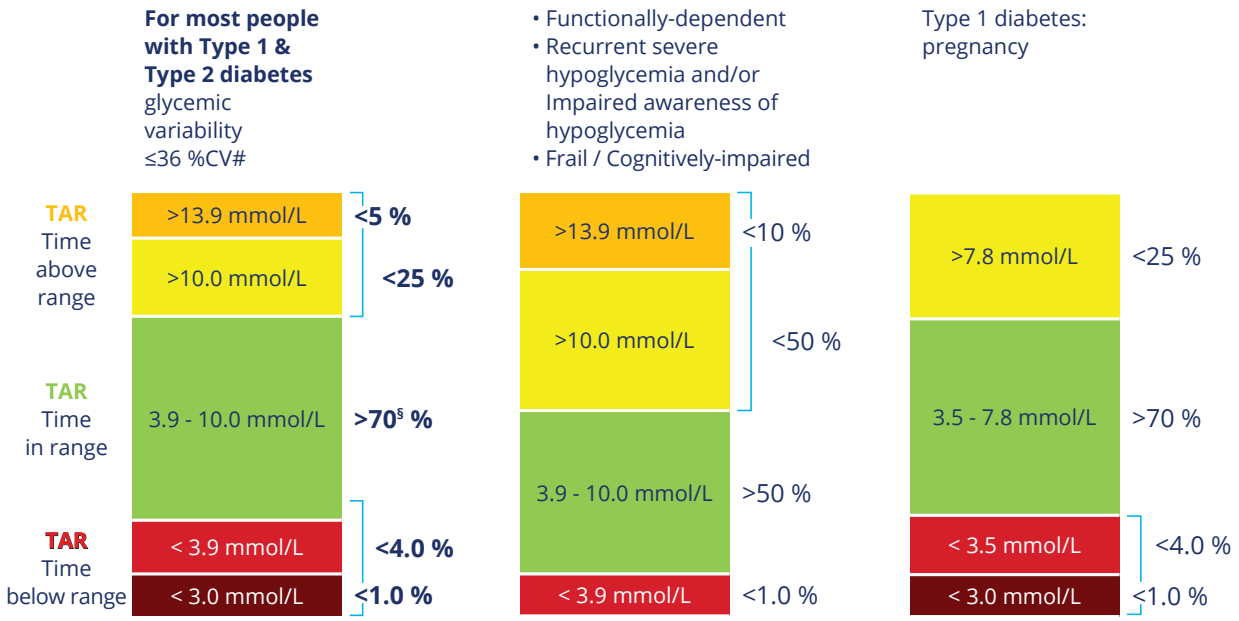
A1C (%)	Targets
<6.0	Selected adults with type 2 diabetes with potential for remission to normoglycemia
≤6.5*	Adults with type 2 diabetes to reduce the risk of chronic kidney disease and retinopathy if at low risk of hypoglycemia†
≤7.0	**MOST ADULTS WITH TYPE 1 OR TYPE 2 DIABETES**
7.1 ↓ 8.5	7.1-8.0%: Functionally dependent† 7.1-8.5%: • Recurrent severe hypoglycemia and/or hypoglycemia unawareness • Frail individuals and/or with cognitive impairment‡ • Limited life expectancy
Avoid higher A1C to minimize risk of symptomatic hyperglycemia and acute and chronic complications	

End of life: A1C measurement not recommended. Avoid symptomatic hyperglycemia and any hypoglycemia.
* Target 6.0 to <6.5 for adults with type 2 diabetes with potential for remission to prediabetes
† Based on class of antihyperglycemic medication(s) utilized and the person's characteristics
‡ See Diabetes in Older People chapter

Blood Glucose (BG) Targets for glycemic management (when indicated/accessible)

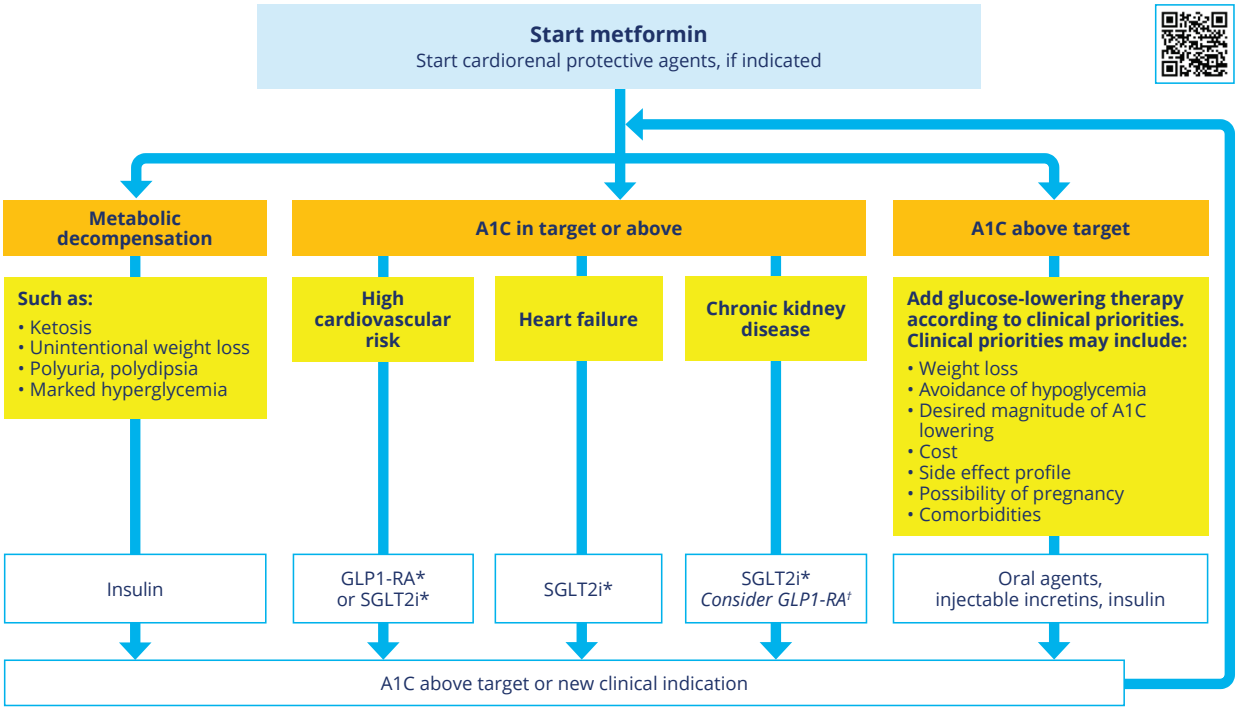
Blood Glucose (BG) Targets	Fasting / Preprandial BG (mmol/L)	2-hr Postprandial BG (mmol/L)
For most people with diabetes	4.0 – 7.0	5.0 – 10.0

Continuous Glucose Monitoring (CGM) Targets for glycemic management (when indicated*/accessible)



§ Corresponds with an A1C of approximately 7%; # glycemic variability reported as % coefficient of variation (%CV)
* When not at risk of hypoglycemia, may consider targeted, periodic use of CGM in engaged individuals to identify therapeutic gaps, tailor therapy and support individualized daily self-management
Every absolute 10% change in %TIR correlates with 0.5-0.8% change in A1C

Pharmacotherapy for optimizing glycemia and cardiorenal risk



* Choose an agent that has demonstrated evidence of benefit, refer to the text.
† Based on the FLOW trial that was not reviewed for this update, refer to the text.
GLP1-RA = glucagon-like peptide-1 receptor agonist; SGLT2i = sodium-glucose cotransporter-2 inhibitor

Antihyperglycemic Agents and Kidney Function

Maximum Daily Dose of Regular Release Formulation (Unless specified with footnotes)

Increase frequency of monitoring renal function	Biguanides	Incretins					SGLT2 Inhibitors			Secretagogues	Others	Insulins
		DPP4 Inhibitors			GIP/GLP1-RA	GLP1-RA						
eGFR (mL/min/1.73 m²)	Metformin	Linagliptin	Saxagliptin	Sitagliptin			Canagliflozin	Dapagliflozin	Empagliflozin			
≥60	2,550 mg (2,000 mg)*	5 mg	5 mg	100 mg	Tirzepatide 15 mg‡	Dulaglutide 4.5 mg‡ Liraglutide 1.8 mg Semaglutide SQ 2 mg‡ Semaglutide PO 14 mg	300 mg	10 mg	25 mg	Gliclazide 320 mg; (120 mg)* Glimepiride 8 mg Glyburide 20 mg Repaglinide 12mg	Acarbose 300 mg Pioglitazone 45 mg	No maximum daily dose
45-59							100 mg†	No dose change†	10 mg†	Gliclazide, Glimepiride, Repaglinide - No dose change Avoid Glyburide		
30-44	1,000 mg		2.5 mg	50 mg								Dose reduction may be needed
25-29	500 mg			25 mg			Do not initiate but can continue†			Dose reduction may be needed		
20-24								Do not initiate but can continue†			Pioglitazone - No dose change Acarbose - Limited data available	
15-19									Do not initiate but can continue†			
<15 or Dialysis	Avoid		Avoid		Limited data available	Limited data available				Avoid		

Dose reduction | Avoid | Limited data available | Do not initiate but can continue

*Extended release formulation † Cardiorenal benefits preserved, but reduced glucose-lowering efficacy expected ‡ Administered weekly

DPP4 = Dipeptidyl peptidase 4; eGFR = estimated glomerular filtration rate; GIP = glucose-dependent insulinotropic polypeptide; GLP1 = glucagon-like peptide-1; RA = receptor agonist; SGLT2 = sodium-glucose cotransporter-2; SQ = subcutaneous; PO = oral

Drugs for Cardiovascular and/or Renal Protection

Does the individual have / Is the person :

Atherosclerotic Cardiovascular Disease • Coronary artery disease, Peripheral arterial disease, Cerebrovascular/carotid disease	**GLP-1 RA[1] + SGLT2i[1] + Statin[2] + ACEi/ARB[3] + ASA[4]**
• Age >60 with ≥2 additional cardiovascular risk factors[5]	**GLP-1 RA[1] + SGLT2i[1] + Statin[2] + ACEi/ARB[3]**
• Chronic Kidney Disease (eGFR <60 mL/min/1.73m^2, ACR ≥2.0 mg/mmol)	**SGLT2i[1] + Statin[2] + ACEi/ARB[3] +/- GLP-1 RA +/- finerenone[6]**
• Heart Failure (see HF guidelines for other warranted therapies)	**SGLT2i[1] + Statin[2] + ACEi/ARB[3]**
• Retinopathy • Neuropathy • Left ventricular hypertrophy • Age ≥55 with additional cardiovascular risk factors[7]	**Statin[2] + ACEi/ARB[3]**
• Age ≥40 • Age ≥30 and diabetes >15 years • Warranted for statin therapy based on the Canadian Cardiovascular Society (CCS) Lipid Guidelines • Metabolic dysfunction-Associated Steatotic Liver Disease (MASLD) [6]	**Statin[2]**

1 GLP-1 RA / SGLT2i: Should be given at doses that have demonstrated vascular protection. Not approved by Health Canada for use in type 1 diabetes.
2 See Canadian Cardiovascular Society (CCS) Lipid Guidelines for other warranted therapies. Dose adjustments if lipid targets not being met, e.g., LDL-C ≤2.0 mmol/L (non-HDL-C ≤ 2.6 mmol/L, apo B ≤ 0.8 g/L); or, with ASCVD, LDL-C ≤1.8 mmol/L (non-HDL-C ≤2.4 mmol/L, apo B ≤0.7 g/L)
3 ACE-inhibitor or ARB should be given at doses that have demonstrated vascular protection (e.g., perindopril 8 mg once daily [EUROPA trial], ramipril 10 mg once daily [HOPE trial], telmisartan 80 mg once daily [ONTARGET trial]).
4 ASA should not routinely be used for the primary prevention of cardiovascular disease in people with diabetes. ASA may be used for secondary prevention. Consider clopidogrel if ASA-intolerant.
5 Tobacco use; dyslipidemia (use of a lipid modifying therapy or a documented untreated LDL ≥3.4 mmol/L or HDL-C <1.0mmol/L for men and <1.3 mmol/L for women, or triglycerides ≥2.3 mmol/L); or hypertension (use of blood pressure drug or untreated SBP ≥140 mm Hg or DBP ≥90 mmHg); central obesity
6 Adult with type 2 diabetes
7 TC > 5.2 mmol/L, HDL-C < 0.9 mmol/L, hypertension, albuminuria, smoking

Stepwise Approach to Insulin Regimens for People with Type 2 Diabetes

DECISION TO INITIATE INSULIN

If glycemic targets not met, or symptomatic hyperglycemia/metabolic decompensation

- Start **basal insulin**
- Titrate basal insulin until fasting glucose in target range
- Continue to optimize other antihyperglycemic agents

Basal

IF GLYCEMIC TARGETS NOT MET

- Add one injection per day of **bolus insulin**, with the largest meal
- Titrate bolus insulin until postprandial glucose in target range
- Consider stopping secretagogues to prevent hypoglycemia

Basal-Plus

IF GLYCEMIC TARGETS NOT MET

- Advance to **multiple injections** of bolus insulin at all meals
- Titrate bolus insulin until postprandial glucose in target range
- Avoid secretagogues

Basal-Bolus or Multiple Daily Injections

Educate on prevention and management of **hypoglycemia.**
If cardiorenal comorbidities change, reassess other antihyperglycemic agents.

Hypoglycemia: Identifying and Treating

For people using glyburide, gliclazide, repaglinide or insulin

Signs of hypoglycemia	Classification of hypoglycemia	Treatment*
Adrenergic (autonomic) • Trembling • Palpitations • Sweating • Anxiety • Hunger • Nausea • Tingling **Neuroglycopenic** • Difficulty concentrating • Confusion • Weakness • Drowsiness • Vision changes • Slurred speech • Headache • Dizziness	**Level 1** • Glucose level below normal (often between 3.0 and 3.9 mmol/L) • Associated with autonomic symptoms • Without neuroglycopenic symptoms or changes to mental status **Level 2** • Glucose level below normal (often <3.0 mmol/L) • Associated with neuroglycopenic symptoms • Without significant impact on mental status • With or without autonomic symptoms	**Level 1 or 2 hypoglycemia:** • Ingest 15 g of carbohydrate, preferably as glucose or sucrose (i.e. tablets or solution). Glucose levels should be retested after 15 minutes and re-treated with another 15 g of carbohydrate if the glucose level remains <3.9 mmol/L **Examples of 15 g of carbohydrate:** • 4 x 4 g glucose tablets • 15 mL (3 teaspoons) or 3 packets of table sugar dissolved in water • 5 cubes of sugar • 150 mL juice or regular soft drink • 6 LifeSavers™ • 15 mL (1 tablespoon) honey
	Level 3 • Glucose level below normal (regardless of glucose reading) • Associated with neuroglycopenic symptoms resulting in significantly altered mental/physical status • Requires assistance to treat	**Level 3 hypoglycemia:** • Conscious: Treat with oral ingestion of 20 g of carbohydrate, preferably as glucose tablets or equivalent (if capable of swallowing) or 3 mg of glucagon intranasal or glucagon 1 mg SC/IM. Retreat with additional doses after 15 minutes if glucose level remains <3.9 mmol/L • Unconscious: Treat with glucagon (as above) or 10-25 g (20-50 mL of D50W) of glucose IV. Retreat with additional doses after 15 minutes if glucose level remains <3.9 mmol/L

* **After treatment of hypoglycemia,** consume usual meal or snack that is due at that time of the day. If a meal is >1 hour away, consume a snack (including 15 g carbohydrate and a protein source)

Keeping people with diabetes safe when they are at risk of hypoglycemia

Reduce Driving Risk

EDUCATE people at risk of hypoglycemia to drive safely with diabetes

PREPARE Keep fast-acting sugar within reach and other snacks nearby

BE AWARE of blood glucose (BG) before driving and every 4 hours during long drives. If BG is below 4 mmol/L, treat

STOP driving and treat if any symptoms appear

AFTER treating a low, **WAIT** until BG is above 5 mmol/L to start driving. Note: Brain function may not be fully restored for some time after blood glucose level returns to normal

If a person has impaired awareness of hypoglycemia, he/she must check their BG before driving and every 2 hours while driving, or monitor glucoses with a real-time continuous glucose sensor

Hypoglycemia Prevention Strategies

Psychoeducational training

• Structured diabetes education programs focused on recognizing and reducing frequency of hypoglycemia

Choice of pharmacotherapy

• Avoid, reduce dose of, or discontinue pharmacotherapies associated with increased risk of hypoglycemia if appropriate

• Consider long-acting analogues (insulin glargine-100, glargine-300, detemir, or degludec) over NPH insulin

• Consider second-generation basal insulin analogues (insulin glargine-300 and degludec) over insulin glargine-100 and detemir to reduce the risk of hypoglycemia, including nocturnal hypoglycemia in type 1 and type 2 diabetes

Glucose monitoring

• Use of continuous glucose monitoring (CGM) and increased frequency of capillary blood glucose (CBG) monitoring to identify episodes of hypoglycemia

Surgical (for type 1 diabetes)

• Islet cell transplant

• Pancreas transplant

Keeping people safe when they are at risk of dehydration (vomiting/diarrhea)

Re-hydrate appropriately (water, broth, diet soft drinks, sugar-free Kool-Aid™, diet Jell-O™; avoid caffeinated beverages).

Hold SADMANS meds. **Restart** once able to eat/drink normally.

- **S** sulfonylureas, other secretagogues
- **A** ACE-inhibitors
- **D** diuretics, direct renin inhibitors
- **M** metformin
- **A** angiotensin receptor blockers
- **N** non-steroidal anti-inflammatory drugs
- **S** SGLT2 inhibitors

Special considerations regarding pregnancy for women with type 1 or type 2 diabetes

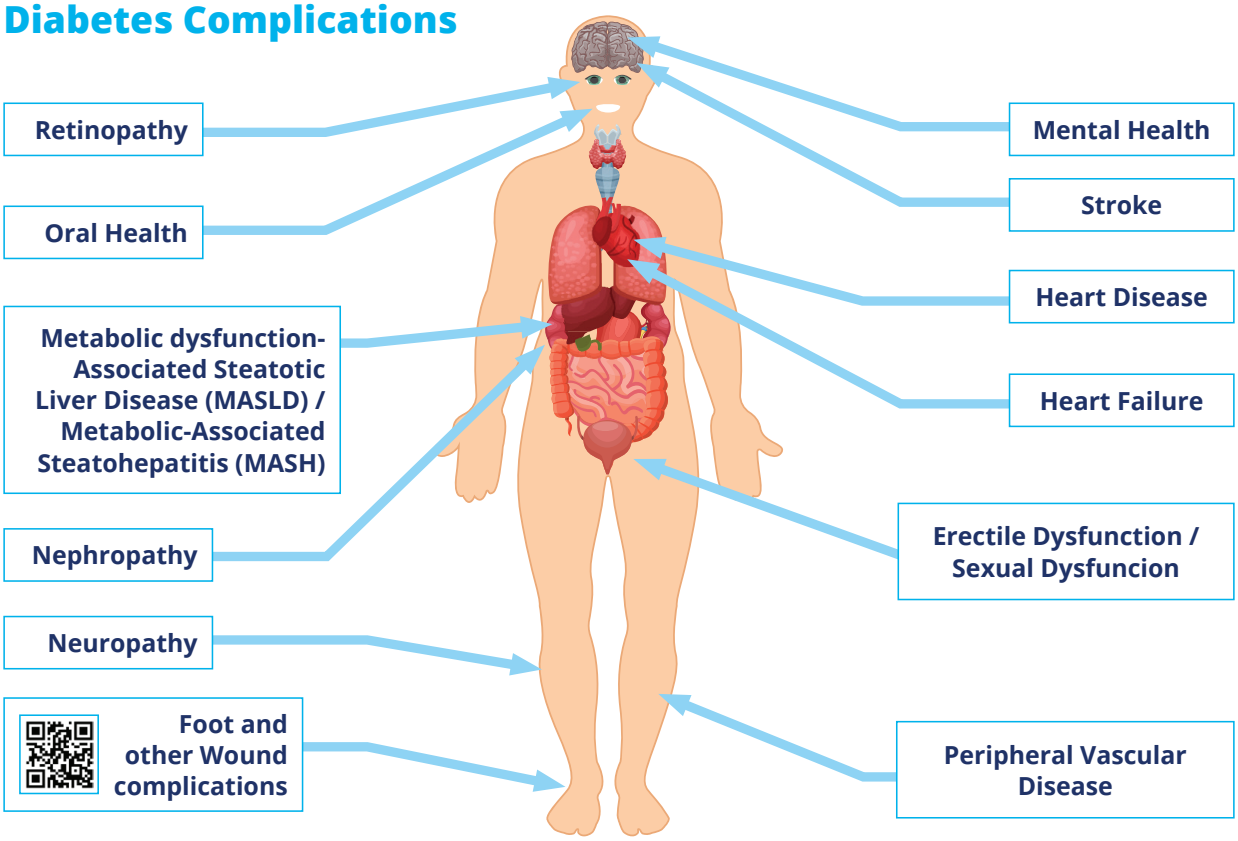
For women planning pregnancy, the following steps taken prior to conception:

- **A1C** 7% or less, but strive for ≤6.5% (ensure contraception until at personalized target)
- **Stop:**
  - Non-insulin antihyperglycemic agents (except metformin and/or glyburide)
  - Statins
  - ACEi/ARB prior to pregnancy, but if overt nephropathy exists, continue until detection of pregnancy
- **Start:**
  - Folic acid 1 mg per day x 3 months prior to conception
  - Insulin if target A1C is not achieved on metformin and/or glyburide (type 2)
  - Other antihypertensive agents safe for pregnancy (Labetalol, nifedepine XL) if hypertension control needed
- **Screen for complications:**
  - Eye appointment, serum creatinine, urine ACR, blood pressure
- Aim for **healthy BMI**
- Ensure appropriate **vaccinations** have occurred
- **Refer** to diabetes clinic

Individualized goal setting

Potential Self-management Goals	Examples
Eat healthier	See a dietitian to help develop a healthy eating plan.
Be more active	Increase physical activity with the goal of getting to 150 minutes aerobic activity/week and resistance exercise 2-3 times/week. Choose physical activity that meets preferences/needs.
Lose weight	Use strategies (e.g., reduce calories or portions) to lose 5-10% of initial weight.
Take medication regularly	Taking medication will help to improve symptoms and take control of your life. Consider using a pillbox or setting a timer.
Avoid hypoglycemia	Recognize the signs of hypoglycemia and take action to prevent it.
Check blood glucose	Establish a routine and act accordingly.
Check feet	Do a daily self-check and follow-up with a health-care provider if anything is abnormal.
Manage stress	Screen for distress (depressive and anxious symptoms) by interview or a standardized questionnaire (e.g. PHQ-9 www.phqscreeners.com).
Reduce or stop smoking	Identify barriers to quitting and develop a plan to address each of these.

Diabetes Complications



ABCDES of diabetes care

		GUIDELINE TARGET (or personalized goal)
A	**A1C** with other (CGM*, BG*) glycemic targets *when indicated/accessible	A1C ≤7.0% (or ≤6.5% to ↓ risk of CKD and retinopathy) If on insulin or insulin secretagogue, assess for hypoglycemia and ensure driving safety A1C 6.0 - <6.5% for selected adults with type 2 diabetes with potential remission to prediabetes A1C <6.0 for selected adults with type 2 diabetes with potential remission to normoglycemia
B	**BP** targets	BP <130/80 mmHg If on treatment, assess for risk of falls
C	**Cholesterol** targets	LDL-C ≤2.0 mmol/L (or >50 % reduction from baseline); Alternative: non-HDL-C ≤ 2.6 mmol/L, apo B ≤ 0.8 g/L If ASCVD, LDL ≤ 1.8 mmol/L. Alternative: non-HDL-C ≤2.4 mmol/L, apo B ≤0.7 g/L
D	**Drugs** for CV and/ or Cardiorenal protection	• GLP1-RA + SGLT2i with demonstrated cardiorenal benefits if type 2 with ASCVD, CKD or HF, OR Age >60 with ≥2 CV risk factors • ACEi/ARB if CVD, age ≥55 with risk factors, OR diabetes complications • Statin if age ≥40, age ≥30 and diabetes >15 years OR diabetes complications • ASA if CVD +/- finerenone if T2D + CKD with albuminuria
E	**Exercise** goals and healthy eating	• 150 minutes of moderate to vigorous aerobic activity/ week and resistance exercises 2-3 times/week • Follow healthy dietary pattern (eg Mediterranean diet, low glycemic index)
S	**Screening**	• Cardiac: ECG every 3-5 years if age >40 OR diabetes complications • Foot: Monofilament/Vibration yearly or more if abnormal • Kidney: Test eGFR and ACR yearly, or more if abnormal • Retinopathy: type 1 - annually; type 2 - every 1-2 years • Immunizations: ensure up-to-date as per NACI recommendations
S	**Smoking** cessation	If smoker: Ask permission to give advice, arrange therapy and provide support
S	**Self-management,** stress, sleep, other barriers	• Set personalized goals (see "individualized goal setting" panel) • Assess for stress, sleep, mental health and financial or other concerns that might be barriers to goals