UPDATED FOR 2025

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

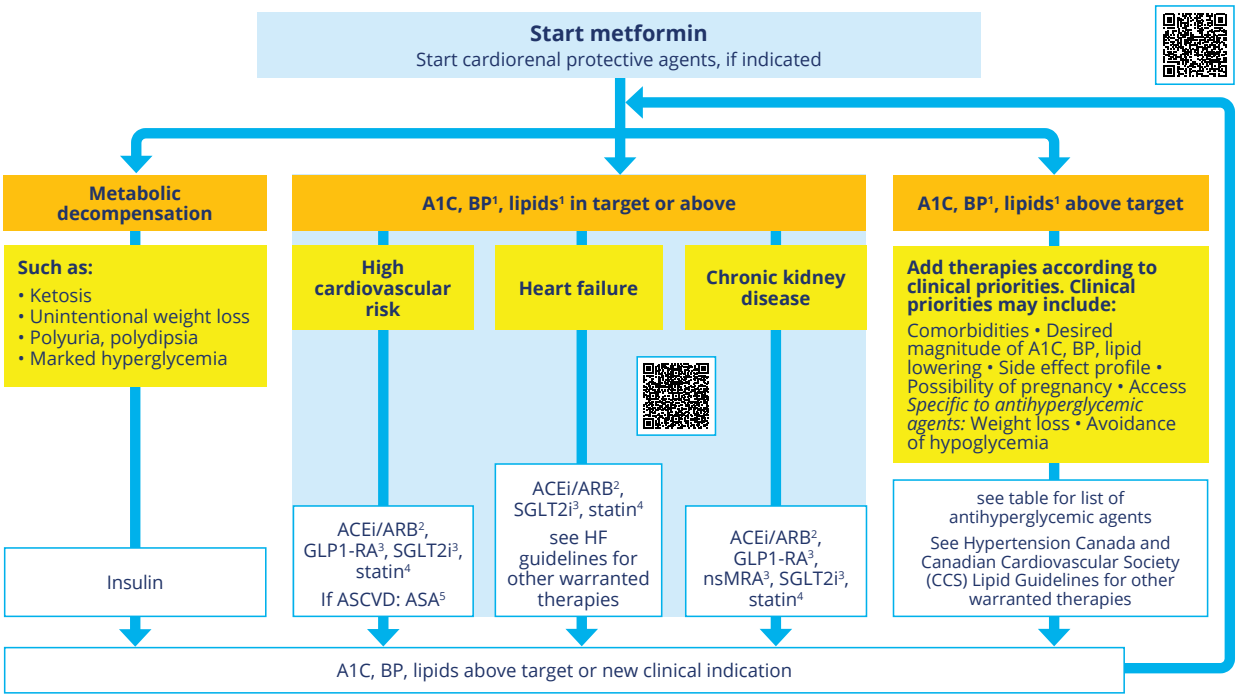
Test	Result	Dysglycemia category
A1C (%)†	6.0 – 6.4	Prediabetes
	≥6.5	Diabetes
FPG (mmol/L) No caloric intake for at least 8 hours	6.1 – 6.9	Impaired Fasting Glucose (IFG)
	≥7.0	Diabetes

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

Pharmacotherapy management for type 2 diabetes



[1] See Hypertension Canada / Canadian Cardiovascular Society (CCS) Lipid Guidelines for other warranted therapies. Treat to BP <130/80 mmHg; lipid targets 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)
[2] ACE-inhibitor or ARB (angiotensin receptor blocker) 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]).
[3] Should be given at doses that have demonstrated vascular protection as tolerated. Not approved by Health Canada for use in type 1 diabetes
[4] See CCS Lipid Guidelines for other warranted therapies.
[5] 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.

A1C Targets for glycemic management

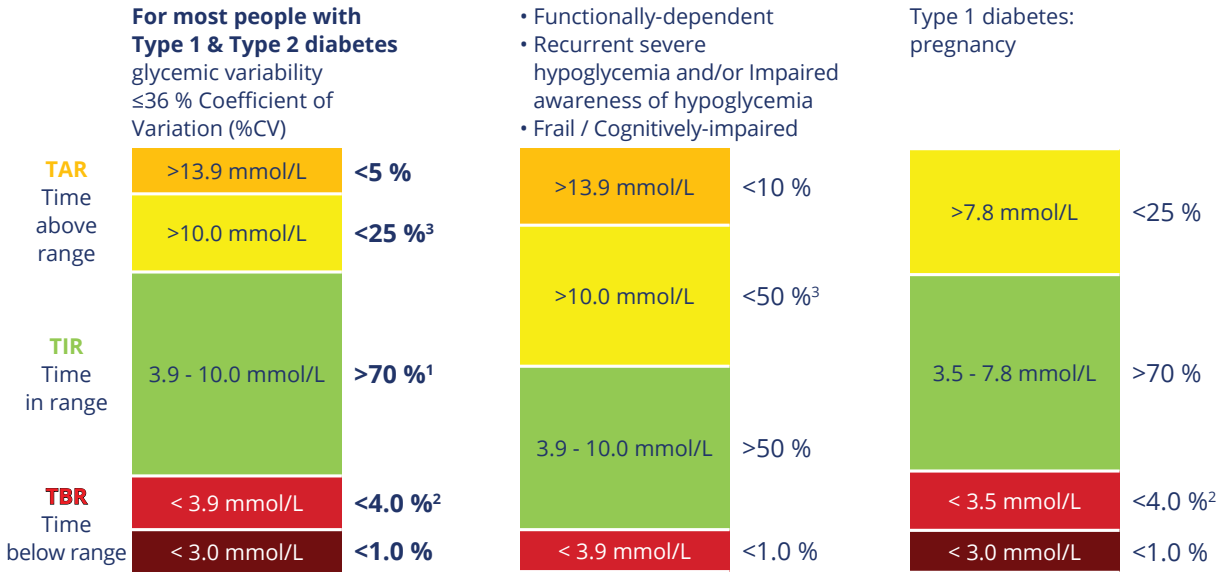
A1C (%)	Targets
<6.0	Selected adults with type 2 diabetes with potential for remission to normoglycemia
≤6.5[1]	Adults with type 2 diabetes to reduce the risk of chronic kidney disease and retinopathy if at low risk of hypoglycemia[2]
≤7.0	**MOST PEOPLE WITH TYPE 1 OR TYPE 2 DIABETES**
≤8.0 **≤8.5** **7.1 – 8.5**	Functionally dependent[3,4] Frail individuals and/or with cognitive impairment[3,4] Limited life expectancy[3,4] Recurrent level 3 hypoglycemia and/or impaired awareness of hypoglycemia
Avoid higher A1C to minimize risk of symptomatic hyperglycemia and acute and chronic complications	

[1] Target A1C 6.0 – 6.4 % for adults with type 2 diabetes with potential for remission to prediabetes
[2] Based on class of antihyperglycemic medication(s) utilized and the person's characteristics
[3] If therapy includes sulfonylurea or insulin, A1C 7.1 % is the recommended lower limit
[4] In frail, older adults, especially those living in continuing care homes, may rely less on A1C; focus on avoiding symptomatic hyperglycemia and any hypoglycemia. 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
If not at A1C ≤7.0 % despite the above BG targets →	4.0 – 5.5	5.0 – 8.0

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



* 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

[1] Corresponds with an A1C of approximately 7%. Every absolute 10% change in %TIR correlates with 0.5 – 0.8 % change in A1C

[2] includes values smaller than 3.0 mmol/L

[3] includes values greater than 13.9 mmol/L

Antihyperglycemic Agents and Kidney Function

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

eGFR (mL/min/1.73 m²)	Biguanides	Incretins					SGLT2 Inhibitors			Secretagogues	Others	Insulins
		DPP4 Inhibitors			GIP/GLP1-RA	GLP1-RA						
	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†	No dose change†	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†		10 mg†	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 sulfonylureas		

Increase frequency of monitoring renal function

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

Keeping people safe when they are sick or at risk of dehydration

Re-hydrate appropriately: non-caffeinated, minimal sugar fluids – electrolyte replacement solutions (Gastrolyte®, Hydralyte®, Pedialyte®); clear soup; water; diet soda (diet ginger-ale); watered down apple juice

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

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

*mineralocorticoid receptor antagonist (finerenone, eplerenone, spironolactone)

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

For people 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

Common Antihyperglycemic Agents for use in type 2 diabetes

Medication	A1C lowering	Weight	Hypo-glycemia	Other adverse effects	Other therapeutic considerations
1ST LINE FOR MOST PEOPLE					
BIGUANIDES: Decrease hepatic glucose production; increase insulin sensitivity and glucose uptake by muscles and tissues; reduce intestinal glucose absorption					
• Metformin 500mg, 850mg • Metformin ER (extended-release) 500mg, 1000mg	↓↓	↔	negligible risk	• GI side effects, such as diarrhea, abdominal pain, nausea, vomiting • Vitamin B12 deficiency	• diarrhea tends to resolve over time and is minimized with starting low dose, slow titration, taking with meals, and using extended-release preparation • Assess vitamin B12 levels periodically or with symptoms or impaired proprioception or peripheral neuropathy
2ND LINE (in alphabetical order)					
INCRETINS: *DPP4i (physiologic effect):* stimulate glucose-dependent insulin secretion, slow gastric inhibiting glucagon release; *GLP-1 RA ± GIP RA (physiologic and pharmacologic effect):* stimulate glucose-dependent insulin secretion, slow gastric inhibiting glucagon release, slow gastric emptying, enhance satiety					
DPP4 inhibitors: • linagliptin 5mg • saxagliptin 2.5mg, 5mg • sitagliptin 25mg, 50mg, 100mg	↓	↔	negligible risk		• avoid using with other incretins • caution with saxagliptin in people with heart failure
GIP/GLP1 receptor agonists: • tirzepatide 2.5mg, 5mg, 7.5mg, 10mg, 12.5mg, 15mg	↓↓↓	↓↓↓	negligible risk	• GI: nausea, vomiting, diarrhea, constipation • worsening retinopathy seen with rapid A1C lowering	• avoid using with other incretins • contraindicated with personal or family history of medullary thyroid cancer or multiple endocrine neoplasia syndrome type 2

GLP1 receptor agonists: • dulaglutide 0.75mg, 1.5mg • liraglutide 0.6mg, 1.2mg, 1.8mg • lixisenatide • semaglutide (oral) 3mg, 7mg, 14mg • semaglutide (sc) 0.25mg/0.5mg, 1mg, 2mg	↓↓ to ↓↓↓	↓↓ to ↓↓↓	negligible risk	• GI: nausea, vomiting, diarrhea, constipation • worsening retinopathy seen with rapid A1C lowering • pancreatitis reported in case reports, but not seen in larger studies	• avoid using with other incretins • contraindicated with personal or family history of medullary thyroid cancer or multiple endocrine neoplasia syndrome type 2
INSULINS: Regulate metabolism of carbohydrates, fat, and protein; promote absorption (storage) of glucose by tissues; reduce hepatic glucose production and secretion					
Basal insulins: • degludec U-100, U-200 • glargine U-100, U-300 • icodec **Bolus insulins:** • aspart • aspart (faster-acting) • glulisine • lispro U-100, U-200 **Premixed insulins:** • biphasic insulin aspart • lispro/lispro protamine	↓ to ↓↓↓	↑ to ↑↑	significant risk		• potentially greatest A1C reduction • no maximum dose
SECRETAGOGUES: stimulate receptors on pancreatic β-cells to stimulate endogenous insulin secretion					
Sulfonylureas: • gliclazide 80mg • gliclazide MR (modified-release) 30mg, 60mg **Meglitinides:** • Repaglinide 0.5mg, 1mg, 2mg	↓↓	↑	minimal / moderate risk		• relatively rapid glucose-lowering response • meglitinides reduce postprandial hyperglycemia with minimal, if any, reduction in fasting hyperglycemia • gliclazide preferred over glyburide due to lower risk of hypoglycemia • repaglinide contraindicated when co-administered with clopidogrel or with gembifrozil
SGLT2 INHIBITORS: Glucose-lowering effect due to reduced glucose reabsorption by the kidney leading to increased urinary glucose excretion; favourable impacts on renal and heart failure outcomes likely related to renal and systemic hemodynamic effects.					
• canagliflozin 100mg, 300mg • dapagliflozin 5mg, 10mg • empagliflozin 10mg, 25mg	↓↓ efficacy declines as eGFR declines	↓	negligible risk	• genital mycotic infections. women are at higher risk • rare but important risk for euglycemic diabetic ketoacidosis • increased risk of fractures with canagliflozin • increased risk of lower extremity amputation with canagliflozin • no increased risk of urinary tract infection	• to prevent euglycemia DKA, SGLT2 inhibitors should be held or not used if fasting, if consuming a low-carbohydrate diet, if at risk for volume depletion (diarrhea, sepsis), or prior to major surgery • caution in those at risk of volume depletion (e.g., loop diuretics) • dapagliflozin not to be used with bladder cancer

Not listed in this table: acarbose, insulin (basal NPH intermediate-acting; prandial regular U-100, U-500; premixed regular-NPH), sulfonylureas (glimepiride, glyburide), thiazolidinediones

Stepwise Approach to Insulin Regimens for People with Type 2 Diabetes

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

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

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

ABCDESSS 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	• ASCVD: ACEi/ARB[1], ASA, GLP1-RA[1], SGLT2i[1], statin[2] • CKD: ACEi/ARB[1], GLP1-RA[1], nsMRA[1], SGLT2i[1], statin[2] • HF: ACEi/ARB[1], SGLT2i[1], statin[2] (see HF guidelines for other warranted therapies) • age ≥55 with ≥1 CV risk factor, or diabetes complications: ACEi/ARB[1], statin[2] • age ≥40, age ≥30 and diabetes >15 years, or diabetes complications: statin[2]
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**	• Eye (retinopathy): type 1 - annually; type 2 - every 1-2 years • Foot: Monofilament/Vibration yearly or more if abnormal • Heart: ECG every 3-5 years if age >40 OR diabetes complications • Kidney: Test eGFR and ACR yearly, or more if abnormal • Liver: Fib-4 every 1 to 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

[1] use agents/doses that demonstrated cardiorenal benefits
[2] see Canadian Cardiovascular Society (CCS) Guidelines for other warranted therapies