Keeping patients safe when they are at risk of hypoglycemia

For patients using insulin or insulin secretagogues, e.g. glyburide, gliclazide, repaglinide:

Recognize

- ASK at each visit
- ASSESS impact, including fear/intentional avoidance of lows
- SCREEN for hypoglycemia unawareness

Act/Treat

- EDUCATE on appropriate treatment and the need to have fast-acting sugar treatment available at all times

Prevent

- CONSIDER medications with lower risk of hypoglycemia
- DISCUSS POSSIBLE CAUSES and how to avoid future hypoglycemia

Reduce Driving Risk

- EDUCATE patients 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 again. Note: Brain function may not be fully restored until 40 minutes after hypoglycemia is resolved

  If a patient is unaware of symptoms of hypoglycemia, he/she must check their BG before driving and every 2 hours while driving, or wear a real-time continuous glucose monitor

Keeping patients 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 for women with type 1 or type 2 diabetes

Pregnancy should be planned, with 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

3 Quick questions to help your patients meet their goals

For patients who are not making expected progress, try asking these questions to identify a path forward:

1. How important is it for you to <insert self-management goal> **- low, medium, or high?**
(Goal examples: increase levels of physical activity, reduce weight, improve A1C, lower BP)

If importance (motivation) is rated low, ask what would need to happen for importance to go up?

A high level of importance will indicate that the person is ready to change.

2. How confident are you in your ability to <insert target outcome here> **- low, medium, or high?**
If their confidence is rated low, explore what needs to happen to increase their confidence. Usually this has to do with improving knowledge, skills or resources and support.

A high level of confidence indicates that the person is ready to change.

3. Can we set a specific goal for you to try before the next time we meet? What steps will you take to achieve it?
Encourage S.M.A.R.T. Goals:

Specific **M**easurable **A**chievable **R**ealistic **T**imely

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.

ABCDES of diabetes care

		GUIDELINE TARGET (or personalized goal)
A	**A1C** targets	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
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)
D	**Drugs** for CVD risk reduction	ACEi/ARB (if CVD, age ≥55 with risk factors, OR diabetes complications) Statin (if CVD, age ≥40 for type 2, OR diabetes complications) ASA (if CVD) SGLT2i/GLP1ra with demonstrated CV benefit (if have type 2 with CVD and A1C not at target)
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** for complications	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 - 1-2 yrs
S	**Smoking** cessation	If smoker: Ask permission to give advice, arrange therapy and provide support
S	**Self-management,** stress, other barriers	Set personalized goals (see "individualized goal setting" panel) Assess for stress, mental health and financial or other concerns that might be barriers to achieving goals

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2018 Clinical Practice Guidelines

Quick Reference Guide

DIABETES CANADA

guidelines.diabetes.ca

diabetes.ca | 1-800-BANTING (226-8464)

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Screening and diagnosis of type 2 diabetes in adults

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
No risk factors	**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
FPG (mmol/L) No caloric intake for at least 8 hours	6.1 – 6.9	IFG
	≥7.0	Diabetes
A1C (%)**	6.0 – 6.4	Prediabetes
	≥6.5	Diabetes

If asymptomatic and A1C or FPG are in the diabetes range, repeat the same test (A1C or FPG) as a confirmatory test. If both FPG and A1C are available and only one is in the diabetes range, repeat the test in the diabetes range as the confirmatory test. If both A1C and FPG are available and are each in the diabetes range, diabetes is confirmed. If symptoms of overt hyperglycemia are present, diagnosis of diabetes can be determined with one test (A1C, FPG, 2hPG, random PG) in the diabetes range, see Chapter 3, CPG.

*using a validated risk calculator (e.g. CANRISK)

**Use a standardized, validated assay. Be aware of factors that affect A1C accuracy (see CPG Chapter 9, Table 1)

Targets for glycemic control

A1C%	Targets
≤6.5	Adults with type 2 diabetes to reduce the risk of CKD and retinopathy if at low risk of hypoglycemia*
≤7.0	**MOST ADULTS WITH TYPE 1 OR TYPE 2 DIABETES**
7.1 → 8.5	Functionally dependent*: **7.1-8.0%** Recurrent severe hypoglycemia and/or hypoglycemia unawareness: **7.1-8.5%** Limited life expectancy: **7.1-8.5%** Frail elderly and/or with dementia†: **7.1-8.5%**
	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.

* based on class of antihyperglycemic medication(s) utilized and the person's characteristics

† see Diabetes in Older People chapter, p. S283

Blood glucose-lowering therapies (type 2 diabetes)

At diagnosis of type 2 diabetes

Start healthy behaviour interventions (nutritional therapy, weight management, physical activity) +/- metformin

- **A1C <1.5% above target** → If not at glycemic target within 3 months, Start/Increase metformin → If not at glycemic target → Clinical CVD?
- **A1C ≥1.5% above target** → Start **metformin** immediately. Consider a second concurrent antihyperglycemic agent → Clinical CVD?
- **Symptomatic hyperglycemia and/or metabolic decompensation*** → Initiate insulin† +/- metformin → If not at glycemic target → Clinical CVD?

Clinical CVD?

- YES → Start antihyperglycemic agent with demonstrated CV benefit empagliflozin (Grade A, Level 1A) liraglutide (Grade A, Level 1A) canagliflozin†† (Grade C, Level 2) → If not at glycemic target → Add additional antihyperglycemic agent
- NO → **Add additional antihyperglycemic agent best suited to the individual based on the following:**

Clinical Considerations	Choice of Agent
Avoidance of hypoglycemia and/or weight gain with adequate glycemic efficacy	DPP-4 inhibitor, GLP-1 receptor agonist or SGLT2 inhibitor
Other considerations: Reduced eGFR and/or albuminuria; Clinical CVD or CV risk factors; Degree of hyperglycemia; Other comorbidities (CHF, hepatic disease‡); Planning pregnancy‡; Cost/coverage; Patient preference	See Table below

Add additional antihyperglycemic agent best suited to the individual by prioritizing patient characteristics (agents listed in alphabetical order by CV outcome data)

Class**	Effect on CVD outcomes	Hypo-glyce-mia	Weight	Relative A1C lowering when added to metformin	Other therapeutic considerations	Cost
GLP-1 receptor agonists	lira: Superiority in people with type 2 diabetes with clinical CVD exenatide LAR & lixi: Neutral	Rare	↓↓	↓↓ to ↓↓↓	GI side-effects Gallstone disease Contraindicated with personal/family history of medullary thyroid cancer or MEN 2 Requires subcutaneous injection	$$$$
SGLT2 inhibitors	cana & empa: Superiority in people with type 2 diabetes with clinical CVD	Rare	↓↓	↓↓ to ↓↓↓	Genital infections, UTI, hypotension, dose-related changes in LDL-C. Caution with renal dysfunction, loop diuretics, in the elderly. Dapagliflozin not to be used if bladder cancer. Rare diabetic ketoacidosis (may occur with no hyperglycemia). Increased risk of fractures and amputations with canagliflozin Reduced progression of nephropathy and CHF hospitalizations with empagliflozin and canagliflozin in persons with clinical CVD	$$$
DPP-4 Inhibitors	Neutral (alo, saxa, sita)	Rare	Neutral	↓↓	Caution with saxagliptin in heart failure Rare joint pain	$$$
Insulin	glar: Neutral degludec: noninferior to glar	Yes	↑↑	↓↓ to ↓↓↓↓	No dose ceiling, flexible regimens Requires subcutaneous injection	$-$$$$
Thiazolidinediones	Neutral	Rare	↑↑	↓↓	CHF, edema, fractures, rare bladder cancer (pioglitazone), cardiovascular controversy (rosiglitazone), 6-12 weeks required for maximal effect	$$
Alpha-glucosidase inhibitors (acarbose)		Rare	Neutral	↓	GI side-effects common Requires 3 times daily dosing	$$
Insulin secretatogue: Meglitinide		Yes	↑	↓↓	More rapid BG-lowering response Reduced postprandial glycemia with meglitinides but usually requires 3 to 4 times daily dosing	$$
Sulfonylurea		Yes	↑	↓↓	Gliclazide and glimepiride associated with less hypoglycemia than glyburide Poor durability	$
Weight loss agent (orlistat)		None	↓	↓	GI side effects Requires 3 times daily dosing	$$$

alo, alogliptin; *cana*, canagliflozin; *empa*, empagliflozin; *glar*, glargine; *lira*, liraglutide; *exe LAR*, exenatide long-acting release; *lixi*, lixisenatide; *saxa*, saxagliptin; *sita*, sitagliptin.

HEALTHY BEHAVIOUR INTERVENTIONS

If not at glycemic targets → Add another antihyperglycemic agent from a different class and/or add/intensify insulin regimen
Make timely adjustments to attain target A1C within 3-6 months

* May include dehydration, DKA, HHS
** Listed by CV outcome data
† Insulin may be required at any point for symptomatic hyperglycemia/metabolic decompensation or if unable to achieve glycemic targets with other antihyperglycemic agents
†† Avoid in people with prior lower extremity amputation
‡ See product monographs

Which cardiovascular protection medications are indicated for my patient?

Does the patient have cardiovascular disease? - Cardiac ischemia (silent or overt) - Peripheral arterial disease - Cerebrovascular/carotid disease	YES	**Statin[1]** + **ACEi/ARB[2]** + **ASA[3]**
AND if the patient is NOT at glycemic target	ADD	**Liraglutide, Empagliflozin** or **Canagliflozin[4]** (*only* for patients with type 2 diabetes)
NO ↓ **Does the patient have microvascular disease?** - Retinopathy - Kidney disease (ACR ≥2.0) - Neuropathy	YES	**Statin[1]** + **ACEi/ARB[2]**
NO ↓ **Is the patient:** - age ≥55 with additional CV risk factors?	YES	**Statin[1]** + **ACEi/ARB[2]**
- age ≥40? - age ≥30 and diabetes >15 years? - warranted for statin therapy based on the Canadian Cardiovascular Society Lipid Guidelines?	YES	**Statin[1]**

1 Dose adjustments or additional lipid therapy warranted if lipid target (LDL-C <2.0 mmol/L) not being met.
2 ACE-inhibitor or ARB (angiotensin receptor blocker) should be given at doses that have demonstrated vascular protection (eg. perindopril 8 mg once daily [EUROPA trial], ramipril 10 mg once daily [HOPE trial], telmisartan 80 mg once daily [ONTARGET trial]).
3 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.
4 Canagliflozin: avoid in people with prior lower extremity amputation.