DIABETES CANADA

2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada

The Essentials

Presented Feb.25, 2019

Faculty/Presenter Disclosure

- **Faculty: Lengim Ingram, BscPharm, EPPh, CDE**
- **Relationships with commercial interests:**

  Consultant/Advisory Board Honorarium: Sanofi, Novo Nordisk

  Speaker's Honorarium: Merck, Janssen, Astra Zeneca,

  Grant or other payments: Abbott, Servier, BMI

Learning Objectives

- **By the end of this session, participants will be able to:**
  - Understand the **major changes** within the *2018 Diabetes Canada clinical practice guidelines*
  - Apply the recommendations in clinical practice
  - Use the tools in the guideline to provide better diabetes care for patients

Key Message

- Throughout the guidelines remains the importance of individualizing therapy for the person with diabetes

Screening for and Diagnosing Diabetes

2018 Diabetes Canada CPG – Chapter 4. Screening for Diabetes in Adults

2018

Screening for type 2 diabetes in adults

Screen every **3 years** in individuals **≥40 years of age** or in individuals at high risk using a risk calculator.

Screen earlier and/or more frequently (every 6 to 12 months) in people with additional risk factors for diabetes or for those at very high risk using a risk calculator

FPG <5.6 mmol/L and/or A1C <5.5%	FPG 5.6-6.0 mmol/L and/or A1C 5.5-5.9%*	FPG 6.1-6.9 mmol/L and/or A1C 6.0-6.4%**	FPG ≥7.0 mmol/L and/or A1C ≥6.5%
Normal Recreen as recommended	**At Risk** Rescreen more often	**Prediabetes** Rescreen more often	**Diabetes**

If both FPG and A1C are available, but discordant, use the test that appears furthest to the right side of the algorithm.

*Consider 75-g OGTT if 1 risk factors; ** Consider 75-g OGTT

2018 Diabetes Canada CPG – Chapter 3. Definition, Diagnosis & Classification of Diabetes, Prediabetes, Metabolic Syndrome

Diagnosis of Diabetes

FPG ≥7.0 mmol/L

Fasting = no caloric intake for at least 8 hours

or

A1C ≥6.5% (in adults)

Using a standardized, validated assay in the absence of factors that affect the accuracy of the A1C and not for suspected type 1 diabetes

or

2hPG in a 75 g OGTT ≥11.1 mmol/L

or

Random PG ≥11.1 mmol/L

Random = any time of the day, without regard to the interval since the last meal

FPG, fasting plasma glucose; OGTT, oral glucose tolerane test; PG, plasma glucose

2018 Diabetes Canada CPG – Chapter 3. Definition, Diagnosis & Classification of Diabetes, Prediabetes, Metabolic Syndrome

Confirmatory test required

- In the **absence of symptomatic hyperglycemia**, if a single lab test result is in the diabetes range, a **repeat confirmatory lab test** (FPG, A1C, 2hPG in a 75 g OGTT) must be done on another day
- **Repeat the same test** (in a timely fashion) to confirm
- But a **random PG** in the diabetes range in an **asymptomatic** individual should be **confirmed with an alternate test**
- If **results of two different tests** are available and **both are above** the diagnostic thresholds, the diagnosis of diabetes is **confirmed**

2hPG, 2-hour plasma glucose; *AIC,* glycated hemoglobin; *FPG,* fasting plasma glucose; OGTT, oral glucose tolerance test; *PG,* plasma glucose.

Screening for and Diagnosing Diabetes

Print

Healthcare Provider Tool

▼ **Screening and Diagnosis Calculator**

Measure Fasting Plasma Glucose (FPG) and/or A1C and enter test results:

FPG: ☐ mmol/L A1C: ☐ %

Calculate Screening / Diagnosis Result

► **Risk Factors for Type 2 Diabetes**

► **When to Screen for Diabetes**

► **Screening Algorithm**

This is only to be used as a decision support tool and is subject to these terms.
For more information, please see terms of use.

2018 Diabetes Canada CPG – The Essentials

Approach to Management

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ABCDES³ of Diabetes Care

- ✓**A** · A1C – optimal glycemic control (usually ≤7%)
- ✓**B** · BP – optimal blood pressure control (<130/80)
- ✓**C** · Cholesterol – LDL <2.0 mmol/L or >50% reduction
- ✓**D** · Drugs to protect the heart

  A – ACEi or ARB | S – Statin | A – ASA if indicated | SGLT2i/GLP-1 RA with demonstrated CV benefit if type 2 DM with CVD and A1C not at target
- ✓**E** · Exercise / Healthy Eating
- ✓**S** · Screening for complications
- ✓**S** • Smoking cessation
- ✓**S** · Self-management, stress and other barriers

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DIABETES CANADA

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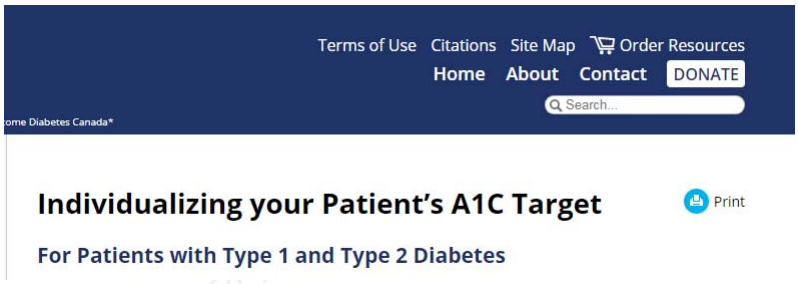
2018 Diabetes Canada CPG – Chapter 8. Targets for Glycemic Control

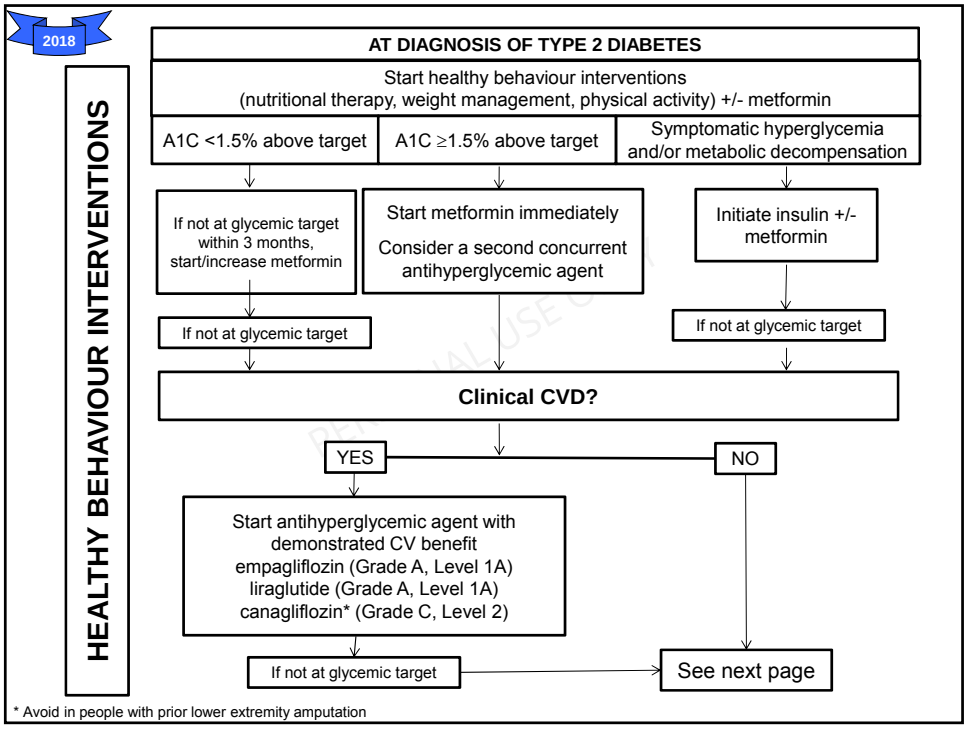
A1C Targets

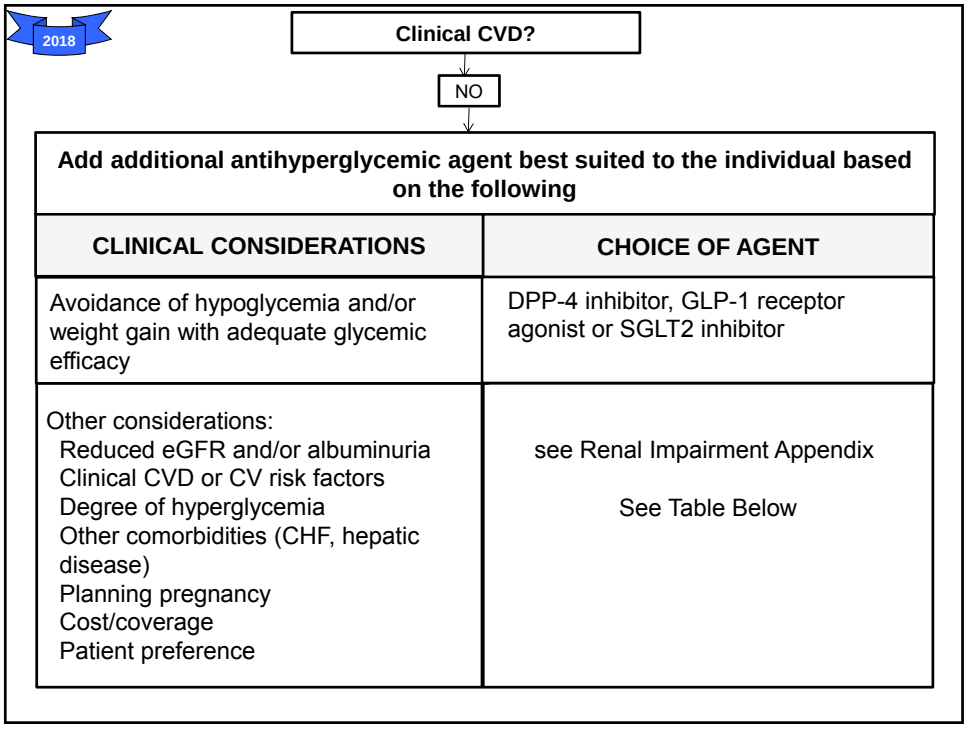
2018

≤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**	**7.1-8.0%**: Functionally dependent* **7.1-8.5%:** • Recurrent severe hypoglycemia and/or hypoglycemia unawareness • Limited life expectancy • Frail elderly and/or with dementia**
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 person's characteristics
** see Diabetes in Older People chapter

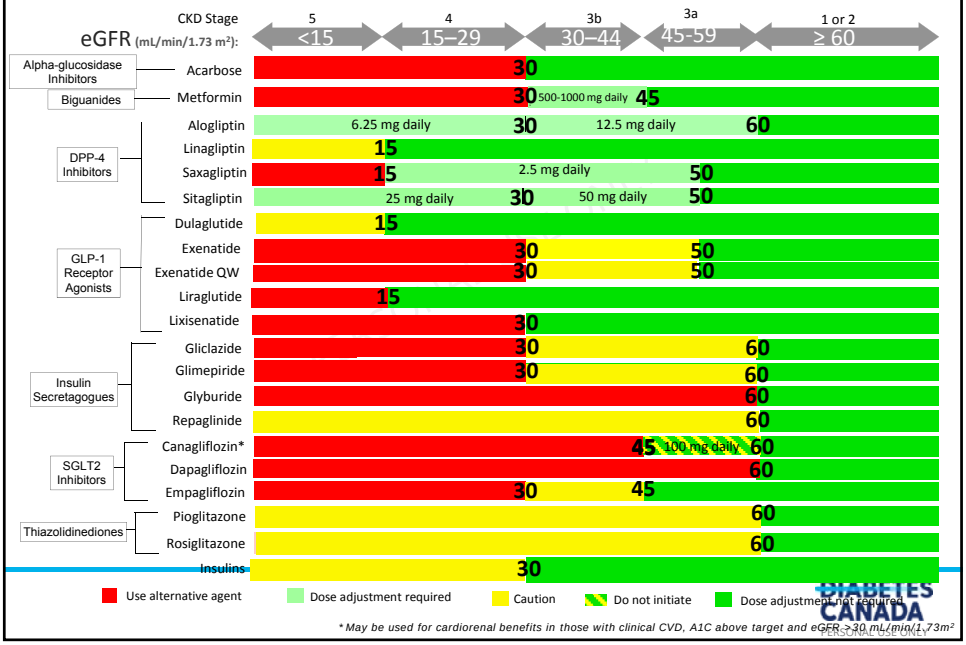



2018
HEALTHY BEHAVIOUR INTERVENTIONS
AT DIAGNOSIS OF TYPE 2 DIABETES
Start healthy behaviour interventions
(nutritional therapy, weight management, physical activity) +/- metformin
A1C <1.5% above target
A1C ≥1.5% above target
Symptomatic hyperglycemia and/or metabolic decompensation
If not at glycemic target within 3 months, start/increase metformin
Start metformin immediately
Consider a second concurrent antihyperglycemic agent
Initiate insulin +/- metformin
If not at glycemic target
If not at glycemic target
Clinical CVD?
YES
NO
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
See next page
* Avoid in people with prior lower extremity amputation


2018
Clinical CVD?
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 Renal Impairment Appendix
See Table Below

2018 Diabetes Canada CPG – Chapter 13. Pharmacologic Glycemic Management of Type 2 Diabetes

Antihyperglycemic Agents and Renal Function



* May be used for cardiorenal benefits in those with clinical CVD, A1C above target and eGFR > 30 mL/min/1.73m²

2018 Diabetes Canada CPG – Chapter 13. Pharmacologic Glycemic Management of Type 2 Diabetes

2018

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-glycemia	Weight	Relative A1C lowering when added to metformin	Other therapeutic considerations	Cost
GLP-1R agonists	lira: Superiority in T2DM 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	$$$$
SGLT2 inhibitors	Cana & empa: Superiority in T2DM patients with clinical CVD	Rare	↓↓	↓↓ to ↓↓↓	Genital infections, UTI, hypotension, dose-related changes in LDL-C. Caution with renal dysfunction, loop diuretics, in the elderly. Dapagliflozin not to be used if bladder cancer. Rare diabetic ketoacidosis (may occur with no hyperglycemia). Increased risk of fractures and amputations with canagliflozin. Reduced progression of nephropathy & CHF hospitalizations with empagliflozin and canagliflozin in those with clinical CVD	$$$
DPP-4 inhibitors	alo, saxa, sita: Neutral	Rare	Neutral	↓↓	Caution with saxagliptin in heart failure Rare joint pain	$$$
Insulin	glar: Neutral degludec: noninferior to glar	Yes	↑↑	↓↓↓↓	No dose ceiling, flexible regimens Requires subcutaneous injection	$-$$$$
Thiazolidinediones	Neutral	Rare	↑↑	↓↓	CHF, edema, fractures, rare bladder cancer (pioglitazone), cardiovascular controversy (rosiglitazone), 6-12 weeks for maximal effect	$$
α-glucosidase inhibitor (acarbose)		Rare	Neutral	↓	GI side-effects common Requires 3 times daily dosing	$$
Insulin secretagogue: Meglitinide		Yes	↑	↓↓	More rapid BG-lowering response Reduced postprandial glycemia with meglitinides but usually requires 3 to 4 times daily dosing.	$$
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	$$$

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

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-glycemia**	**Weight**	**Relative A1C Lowering when added to metformin**	**Other therapeutic considerations**	**Cost**
GLP-1R agonists	lira: Superiority in T2DM 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	$$$$
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Insulin	glar: Neutral degludec: noninferior to glar	Yes	↑↑	↓↓↓↓	No dose ceiling, flexible regimens Requires subcutaneous injection	$-$$$$
Thiazolidinediones	Neutral	Rare	↑↑	↓↓	CHF, edema, fractures, rare bladder cancer (pioglitazone), cardiovascular controversy (rosiglitazone), 6-12 weeks for maximal effect	$$
α-glucosidase inhibitor (acarbose)		Rare	Neutral	↓	GI side-effects common Requires 3 times daily dosing	$$
Insulin secretagogue: **Meglitinide** **Sulfonylurea**		 Yes Yes	 ↑ ↑	 ↓↓ ↓↓	More rapid BG-lowering response Reduced postprandial glycemia with meglitinides but usually requires 3 to 4 times daily dosing. Gliclazide and glimepiride associated with less hypoglycemia than glyburide. Poor durability	 $$ $
Weight loss agent (orlistat)		None	↓	↓	GI side effects Requires 3 times daily dosing	$$$

Types of insulin			
Insulin type (trade name)	**Onset**	**Peak**	**Duration**
BOLUS (prandial or mealtime) insulins			
Rapid-acting insulin analogues (clear) • Insulin aspart (NovoRapid®) • Insulin glulisine (Apidra®) • Insulin lispro (Humalog®) U-100 U-200 • Faster-acting insulin aspart (Fiasp®)	 9–20min 10–15min 10–15min 4min	 1–1.5h 1–1.5h 1–2h 0.5-1.5h	 3–5h 3.5–5h 3–4.75h 3-5h
Short-acting insulins (clear) • Insulin regular (Humulin®-R, Novolin® ge Toronto) • Insulin regular U-500 (Entuzity® (U-500)	 30min 15min	 2–3h 4-8h	 6.5h 17-24h
BASAL insulins			
Intermediate-acting (cloudy) • Insulin neutral protamine Hagedorn (Humulin® N, Novolin® ge NPH)	1–3h	5–8h	Up to 18h
Long-acting insulin (clear) • Insulin detemir (Levemir®) • Insulin glargine U-100 (Lantus®) • Insulin glargine U-300 (Toujeo®) • Insulin glargine biosimilar (Basaglar®) • Insulin degludec U-100, U-200 (Tresiba®)	90min	Not applicable	U-100 glargine 24h, detemir 16–24h U-300 glargine >30h degludec 42h
PREMIXED insulins			
Premixed regular insulin –NPH (cloudy) • Humulin® 30/70 • Novolin® ge 30/70, 40/60, 50/50	A single vial or cartridge contains a fixed ratio of insulin (% of rapid-acting or short-acting insulin to % of intermediate-acting insulin)		
Premixed insulin analogues (cloudy) • Biphasic insulin aspart (NovoMix® 30) • Insulin lispro/lispro protamine (Humalog® Mix25 and Mix50)			

2018 Diabetes Canada CPG – Chapter 13. Pharmacologic Glycemic Management of Type 2 Diabetes

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Examples of Insulin Initiation and Titration Regimens in People With Type 2 Diabetes

All people starting insulin should be counseled about the recognition, prevention and treatment of hypoglycemia. Consider a change in type or timing of insulin administration if glycemic targets are not being reached.

Example A: Basal insulin (degludec U-100 or U-200, detemir, glargine U-100 or U-300, NPH) added to non-insulin antihyperglycemic agents

- Insulin should be titrated to achieve target fasting BG levels of 4.0 to 7.0 mmol/L or individualized targets (e.g. 4.0 to 5.5 mmol/L if A1C target ≤7.0% not achieved; higher fasting BG targets may be considered in some people with diabetes where the goal of avoiding hypoglycemia is important, see Chapter 8. Targets for Glycemic Control, p. S42).
- Individuals can be taught self-titration, or titration may be done in conjunction with a health-care provider.
- Suggested starting dose is 10 units once daily at bedtime.
- Suggested titration is 1 unit per day until target is reached. (Degludec should be titrated by 2 units every 3 to 4 days or 4 units once a week).
- A lower starting dose, slower titration and higher targets may be considered for elderly or normal- weight subjects.
- In order to safely titrate insulin, people with diabetes must perform self-monitoring of blood glucose at least once a day fasting.
- Insulin dose should not be increased if the individual experiences 2 episodes of hypoglycemia (BG <4.0 mmol/L) in 1 week or any episode of nocturnal hypoglycemia.
- Non-insulin antihyperglycemic agents (especially insulin secretagogues) may need to be reduced if daytime hypoglycemia occurs.

DIABETES CANADA

Insulin Initiation and Titration Suggestions for Type 2 Diabetes

People starting insulin should be counseled about the prevention, recognition and treatment of hypoglycemia.
The following are suggestions for insulin initiation and titration. Clinical judgment must always be used as the suggestions may not apply to every patient.

Basal Insulin (only) as an add-on to Antihyperglycemic Agents
(Basaglar™, Lantus®, Levemir®, Toujeo™, Tresiba®, Humulin® N, Novolin® ge NPH)

- Target fasting blood glucose (BG) of 4-7 mmol/L. The fasting BG target can be changed to 4-5.5 mmol/L if not achieving adequate overall glycemic control.
- Most patients will need 40-50 units at bedtime to achieve target but there is no maximum dose.
- Start at a low dose of 10 units at bedtime (may start at lower dose [0.1 -0.2 units/kg] for lean patients [<50 kg]).
- If using Tresiba®, the dose can be increased by 2-4 units every week until fasting BG target is achieved.
- Patient should gently self-titrate by increasing the dose by 1 unit every 1 night until fasting BG target is achieved.
- If fasting hypoglycemia occurs, the dose of bedtime basal should be reduced.
- Metformin and the secretagogue are usually maintained when basal insulin is added.

Dosing and Titration Example

Starting dose 10 units at bedtime.

Increase dose by 1 unit every 1 night until fasting blood glucose has reached the target of 4-7 mmol/L.

guidelines.diabetes.ca/BloodGlucoseLowering/InsulinPrescriptionTool

- For current basal insulin users, maintain the basal dose and add bolus insulin with each meal at a dose equivalent to 10% of the basal dose. For example, if the patient is on 50 units of basal insulin, add 5 units of bolus insulin with each meal.
- For new insulin users starting a full Basal + Bolus regimen, calculate Total Daily Insulin dose (TDI) as 0.3 to 0.5 units/kg, then distribute as follows:
  - 40% of TDI dose as basal insulin (Lantus®, Levemir®, Toujeo™, Humulin® N, Novolin®ge NPH) at bedtime.
  - 20% of TDI dose as prandial (bolus) insulin prior to each meal.
  - Rapid-acting insulin analogues (Apidra®, Fiasp®, Humalog®, NovoRapid®) should be given 0-10 minutes before eating.
  - Short-acting insulin (Humulin® R, Novolin® ge Toronto) should be given 30 minutes before eating.
- An alternative distribution is 50% basal insulin (at bedtime) and 50% bolus insulin (distributed among the meals of the day).
- Adjust the dose of the basal insulin to achieve the target fasting BG level (usually 4-7 mmol/L).
- Adjust the dose of the bolus (prandial) insulin to achieve postprandial BG levels (usually 5-10 mmol/L) or pre-prandial BG levels for the subsequent meal (usually 4-7 mmol/L).

Basal insulin = 40% of TDI:
40% x 50 units
- Basal bedtime = 20 units

Bolus insulin = 60% of TDI:
60% x 50 units
- Bolus = 30 units

= 10 units with each meal

Premixed Insulin Before Breakfast and Before Dinner
(Humalog® Mix25™, Humalog® Mix50™, NovoMix® 30, Humulin® 30/70, Novolin®ge 30/70)

- Target fasting and pre-supper BG levels of 4-7 mmol/L.
- Most patients with type 2 diabetes will need 40-50 units twice a day to achieve target but there is no maximum dose.
- Start at a low dose of 5 to 10 units twice daily (before breakfast and before supper).
- Patient can gently self-titrate by increasing the breakfast dose by 1 unit every day until the pre-supper BG is at target.
- Patient can gently self-titrate by increasing the supper dose by 1 unit every day until the fasting BG target is at target.
- Beware of hypoglycemia post-breakfast or post-supper. Stop increasing dose if this occurs.
- Premixed analogue insulins (Humalog® Mix25™, Humalog® Mix50™, NovoMix® 30) should be given 0 to 10 minutes before eating.
- Premixed regular insulins (Humulin® 30/70, Novolin® ge 30/70) should be given 30 minutes before eating.
- Continue Metformin and consider stopping secretagogue.

Dosing and Titration Example

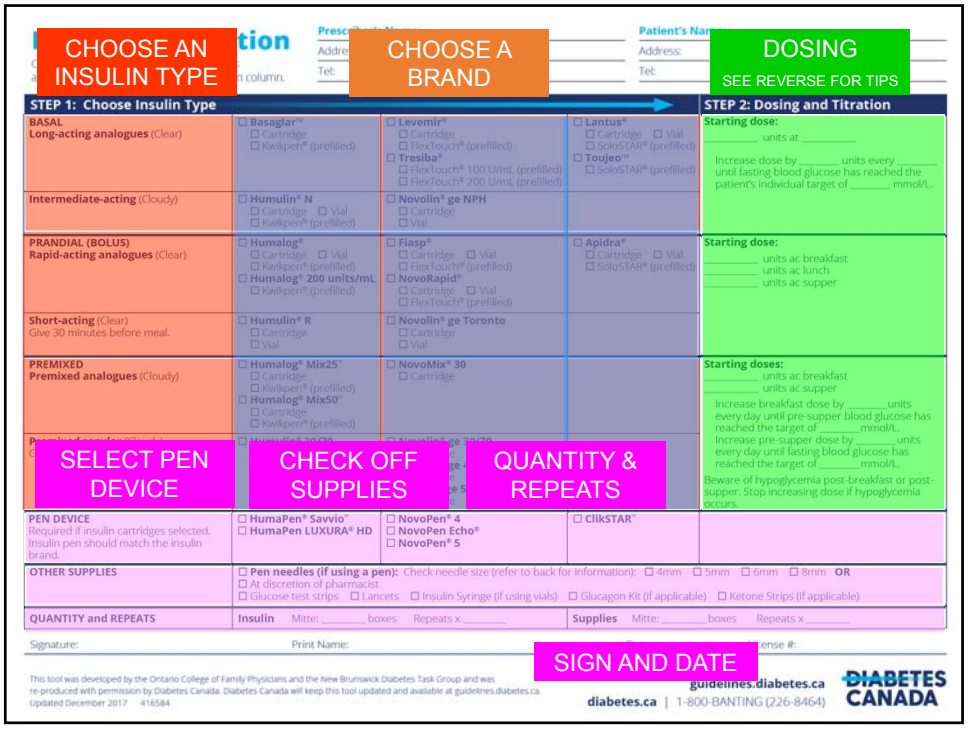
10 units ac breakfast , 10 units ac supper.

Increase breakfast dose by 1 unit every 1 day until pre-supper blood glucose has reached the target of 4-7 mmol/L (usual target).

Increase supper dose by 1 unit every 1 day until fasting blood glucose has reached the target of 4-7 mmol/L (usual target).

Selection of Pen Needle

- Forum for Injection Technique (FIT) Canada recommends that 4, 5, and 6mm needles are suitable for all people with diabetes regardless of BMI. In addition, there is no clinical reason for recommending needles longer than 8mm. Initial insulin therapy should start with the shorter needle length (Berard L, et al. FIT Forum for Injection Technique Canada. Recommendations for Best Practice in Injection Technique. October 2011).



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  - A – ACEi or ARB | S – Statin | A – ASA if indicated | SGLT2i/GLP-1 RA with demonstrated CV benefit if type 2 DM with CVD and A1C not at target
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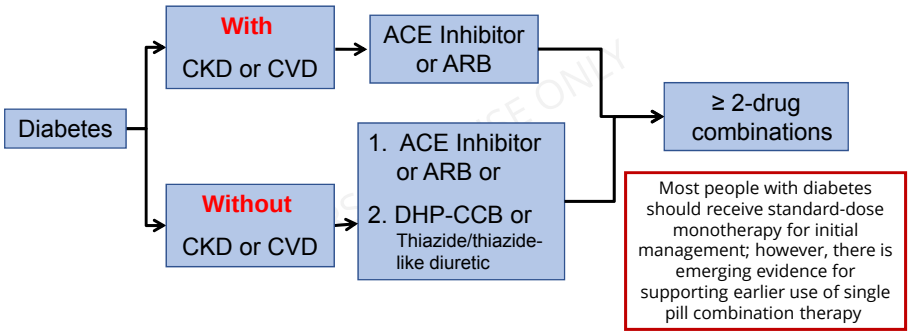
DIABETES CANADA

2018 Diabetes Canada CPG – Chapter 26. Hypertension

Pharmacotherapy for Hypertension in Patients with Diabetes – Summary

Threshold ≥130/80 mmHg and Target <130/80 mmHg



Check serum **potassium** and **creatinine** at **baseline** and **within 1 to 2 weeks** of initiation of an **ACEI or ARB**

Combinations of agents that block the **RAAS** (ACEi, ARB, DRI) **should not be used**

More than 3 drugs may be needed to reach target values for people with diabetes

Hypertension CANADA

CKD, chronic kidney disease; CVD, cardiovascular disease; DHP-CCB, dihydropyridine calcium channel blocker; DRI, direct renin inhibitor

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DIABETES CANADA

2018 Diabetes Canada CPG – Chapter 25. Dyslipidemia

Who Should Receive Statins?

(regardless of baseline LDL-C)

- **Cardiovascular disease** *or*
- **Age ≥40 yrs** *or*
- **Microvascular complications** *or*
- **DM >15 yrs duration and age >30 yr** *or*
- **Warrants therapy** based on the *2016 Canadian Cardiovascular Society Guidelines for the Diagnosis and Treatment of Dyslipidemia*

Among women with childbearing potential, statins should only be used in the presence of proper preconception counselling & reliable contraception. Stop statins prior to conception.

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2018 Diabetes Canada CPG – Chapter 23. Cardiovascular Protection in People with Diabetes

2018

Antihyperglycemic therapy selection

In adults with type 2 diabetes with **clinical CVD** in whom glycemic targets are not achieved with existing antihyperglycemic medication(s) and with **eGFR >30** mL/min/1.73m^2, an antihyperglycemic agent with demonstrated **CV outcome benefit should be added** to reduce the risk of major CV events [Grade A, Level 1A for **empagliflozin**; Grade A, Level 1A for **liraglutide**; Grade C, Level 2 for **canagliflozin**]

2018 Diabetes Canada CPG – The Essentials

2018

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- ✓**E** · Exercise / Healthy Eating
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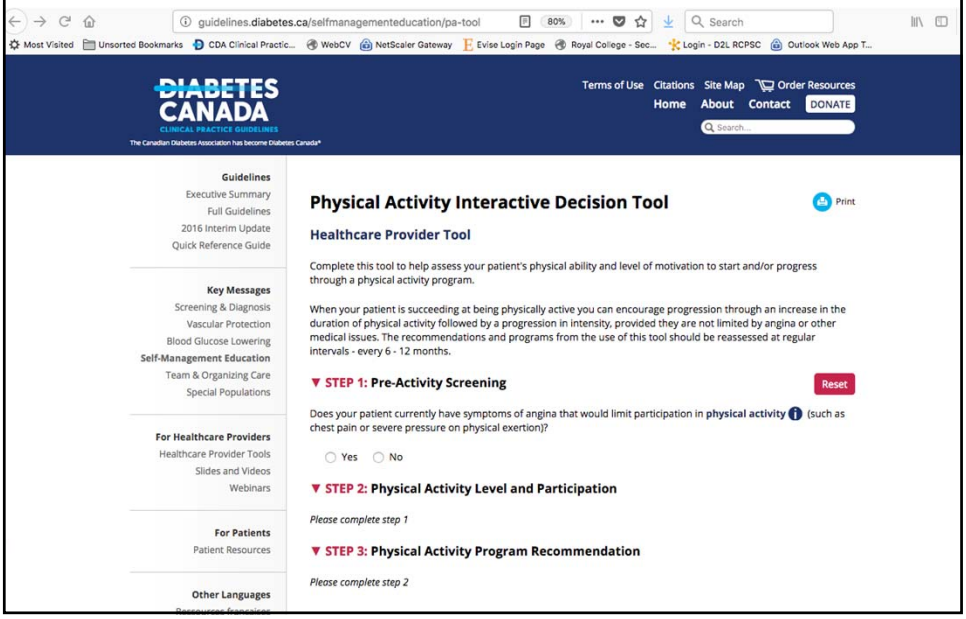
- ✓**S** • Smoking cessation
- ✓**S** · Self-management, stress and other barriers

2018 Diabetes Canada CPG – Chapter 10. Physical Activity

Tools available at guidelines.diabetes.ca



2018 Diabetes Canada CPG – Chapter 10. Physical Activity

Smarter Step Count Prescription

Health-care Provider Guidelines

Suggest step count increments at each clinic visit to reach goal (an increase of 3,000 steps per day above the baseline step count within 1 year).

Steps per day at baseline	Clinic Visit 1 (0 months)	Clinic Visit 2 (3 months)	Clinic Visit 3 (6 months)	Clinic Visit 4 (9 months)
<5,000	+500	+750	+750	+1,000
5,000–7,499	+750	+1,000	+1,250	
≥7,500	+1,000/+2,000	+1,000		

Start Date:

Patient's Name:

Baseline Step Count: _____ Recommended Step Count: _____

Clinic Visit Number: _____ Start Date for Step Increase: _____

Patient Step Count Prescription

Today's Date:

Patient's Name:

- Please try to complete at least _____ steps per day until your next clinic visit.
- Please record your step counts in your log sheets at the end of each day.
- Please bring your log sheets to the next clinic visit which will be in about three months.

Physician's Name:

Physician's Signature:

2018 Diabetes Canada CPG – Appendix 4

2018 Diabetes Canada CPG – Chapter 11. Nutrition

2018

Nutritional management of hyperglycemia in type 2 diabetes

Clinical assessment
Health behaviour interventions by Registered Dietitan

↓

Initiate intensive healthy behaviour interventions or energy restriction and increased physical activity to achieve/maintain a healthy body weight

↓

Provide counselling on a diet best suited to the individual based on values, preferences, and treatment goals using the advantages/disadvantages listed in Table 1

↓

If not at target

↓

Continue healthy behaviour interventions and add pharmacotherapy

↓

Timely adjustments to healthy behaviour interventions and/or pharmacotherapy should be made to attain A1C within 2 to 3 months for healthy behaviour interventions alone or 3 to 6 months for any combination with pharmacotherapy

Table 1. Properties of dietary interventions

Properties of dietary interventions (listed in the order they are presented in the text)

Dietary interventions	A1C	CV benefit	Other advantages	Disadvantages
Macronutrient-based approaches				
Low-glycemic-index diets	↓	↓CVD	↓LDL-C, ↓CRP, ↓hypoglycemia, ↓diabetes Rx	None
High fibre diets	↓ (viscous fibre)	↓CVD	↓LDL-C, ↓non-HDL-C, ↓apo B (viscous fibre)	GI side effects (transient)
High MUFA diets	↔	↓CVD	↓Weight, ↓TG, ↓BP	None
Low-carbohydrate diets	↔	-	↓TG	↓Micronutrients, ↑renal load
High-protein diets	↓	-	↓TG, ↓BP, preserve lean mass	↓Micronutrients, ↑renal load
Mediterranean dietary pattern	↓	↓CVD	↓retinopathy, ↓BP, ↓CRP, ↑HDL-C	None
Alternate dietary patterns				
Vegetarian	↓ (144,249)	↓CHD (151)	↓Weight (147), ↓LDL-C (148)	↓vitamin B12
DASH	↓ (250)	↓CHD (159)	↓Weight, ↓LDL-C (157,250), ↓BP (28,157), ↓CRP	None
Portfolio	-	↓CVD (160,161)	↓LDL-C (160,161), ↓CRP, ↓BP	None
Nordic	-	-	↓LDL-C+↓non-HDL-C (167–169)	None
Popular weight loss diets				
Atkins	↔	-	↓Weight, ↓TG, ↑HDL-C, ↓CRP	↑LDL-C, ↓micronutrients, ↓adherence
Protein Power Plan	↓	-	↓Weight, ↓TG, ↑HDL-C	↓Micronutrients, ↓adherence, ↑renal load
Ornish	-	-	↓Weight, ↓LDL-C, ↓CRP	↔ FPG, ↓adherence
Weight Watchers	-	-	↓Weight, ↓LDL-C, ↑HDL-C, ↓CRP	↔ FPG, ↓adherence
Zone	-	-	↓Weight, ↓LDL-C, ↓TG, ↑HDL-C	↔ FPG, ↓adherence
Dietary patterns of specific foods				
Dietary pulses/legumes	↓ (174)	↓CVD	↓Weight (177), ↓LDL-C (175), ↓BP (176)	GI side effects (transient)
Fruit and vegetables	↓ (181,182)	↓CVD (78)	↓BP	None
Nuts	↓ (186)	↓CVD (142)	↓LDL-C (187,251), ↓TG, ↓FPG	Nut allergies (some individuals)
Whole grains	↓ (oats)	↓CHD (98)	↓LDL-C, FPG (oats, barley)	GI side effects (transient)
Dairy	↔	↓CVD (147,196)	↓BP, ↓TG (when replacing SSBs)	Lactose intolerance (some individuals)
Meal replacements	↓	-	↓Weight	Temporary intervention

* ↓ t = <1% decrease in A1C.
† Adjusted for medication changes.

A1C, glycated hemoglobin; *apo B*, apolipoprotein B; *BMI*, body mass index; *BP*, blood pressure; *CHD*, coronary heart disease; *CHO*, carbohydrate; *CRP*, C reactive protein; *CV*, cardiovascular; *CVD*, cardiovascular disease; *DASH*, dietary approaches to stop hypertension; *FPG*, fasting plasma glucose; *GI*, gastrointestinal; *HDL-C*, high-density lipoprotein cholesterol; *LDL-C*, low-density lipoprotein cholesterol; *MUFA*, monounsaturated fatty acid; *SSBs*, sugar-sweetened beverages; *TC*, total cholesterol; *TG*, triglycerides.

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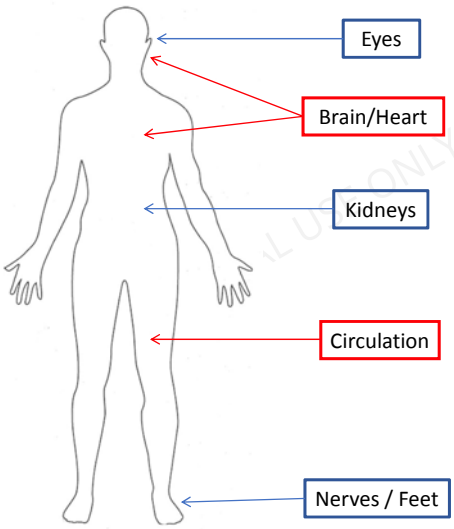
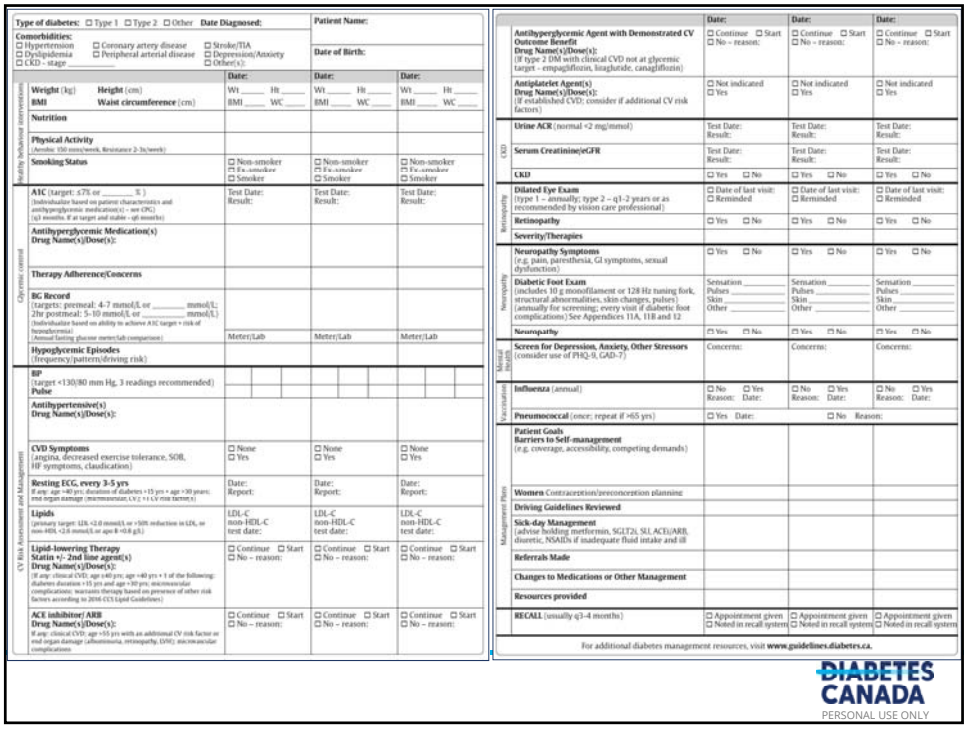
ABCDES³ of Diabetes Care

- ✓**A** · A1C – optimal glycemic control (usually ≤7%)
- ✓**B** · BP – optimal blood pressure control (<130/80)
- ✓**C** · Cholesterol – LDL <2.0 mmol/L or >50% reduction
- ✓**D** · Drugs to protect the heart

  A – ACEi or ARB | S – Statin | A – ASA if indicated | SGLT2i/GLP-1 RA with demonstrated CV benefit if type 2 DM with CVD and A1C not at target
- ✓**E** · Exercise / Healthy Eating
- ✓**S** · Screening for complications
- ✓**S** • Smoking cessation
- ✓**S** · Self-management, stress and other barriers

Screening for complications





Type of diabetes: ☐ Type 1 ☐ Type 2 ☐ Other Date Diagnosed:
Comorbidities:
☐ Hypertension ☐ Coronary artery disease ☐ Stroke/TIA
☐ Dyslipidemia ☐ Peripheral arterial disease ☐ Depression/Anxiety
☐ CKD – stage _____ ☐ Other(s):
Patient Name:
Date of Birth:

Healthy behaviour interventions
Glycemic control
CV Risk Assessment and Management

	Date:	Date:	Date:
Weight (kg) Height (cm) BMI Waist circumference (cm)	Wt ____ Ht ____ BMI ____ WC ____	Wt ____ Ht ____ BMI ____ WC ____	Wt ____ Ht ____ BMI ____ WC ____
Nutrition			
Physical Activity (Aerobic 150 mins/week. Resistance 2-3x/week)			
Smoking Status	☐ Non-smoker ☐ Ex-smoker ☐ Smoker	☐ Non-smoker ☐ Ex-smoker ☐ Smoker	☐ Non-smoker ☐ Ex-smoker ☐ Smoker
A1C (target: ≤7% or _____, %) (Individualize based on patient characteristics and antihyperglycemic medication(s) – see CPG) (q3 months. If at target and stable – q6 months)	Test Date: Result:	Test Date: Result:	Test Date: Result:
Antihyperglycemic Medication(s) Drug Name(s)/Dose(s):			
Therapy Adherence/Concerns			
BG Record (targets: premeal: 4–7 mmol/L or _____ mmol/L; 2hr postmeal: 5–10 mmol/L or _____ mmol/L) (Individualize based on ability to achieve A1C target + risk of hypoglycemia) (Annual fasting glucose meter/lab comparison)	Meter/Lab	Meter/Lab	Meter/Lab
Hypoglycemic Episodes (frequency/pattern/driving risk)			
BP (target <130/80 mm Hg, 3 readings recommended) Pulse			
Antihypertensive(s) Drug Name(s)/Dose(s):			
CVD Symptoms (angina, decreased exercise tolerance, SOB, HF symptoms, claudication)	☐ None ☐ Yes	☐ None ☐ Yes	☐ None ☐ Yes
Resting ECG, every 3-5 yrs If any: age >40 yrs; duration of diabetes >15 yrs + age >30 years; end organ damage (microalbuminuria LVZ + 1 CV risk factor(s))	Date: Report:	Date: Report:	Date: Report:
Lipids (primary target: LDL <2.0 mmol/L or >50% reduction in LDL, or non-HDL <2.6 mmol/L or apo B <0.8 g/L)	LDL-C non-HDL-C test date:	LDL-C non-HDL-C test date:	LDL-C non-HDL-C test date:
Lipid-lowering Therapy Statin +/- 2nd line agent(s) Drug Name(s)/Dose(s): (If any: clinical CVD; age ≤40 yrs; age >40 yrs + 1 of the following: diabetes duration >15 yrs and age >50 yrs; microvascular complications; warrants therapy based on presence of other risk factors according to 2016 CCS Lipid Guidelines)	☐ Continue ☐ Start ☐ No – reason:	☐ Continue ☐ Start ☐ No – reason:	☐ Continue ☐ Start ☐ No – reason:
ACE inhibitor/ ARB Drug Name(s)/Dose(s): If any: clinical CVD; age >55 yrs with an additional CV risk factor or end organ damage (albuminuria, retinopathy, LVH); microvascular complications	☐ Continue ☐ Start ☐ No – reason:	☐ Continue ☐ Start ☐ No – reason:	☐ Continue ☐ Start ☐ No – reason:

	Date:	Date:	Date:
Antihyperglycemic Agent with Demonstrated CV Outcome Benefit Drug Name(s)/Dose(s): (If type 2 DM with clinical CVD not at glycemic target – empagliflozin, liraglutide, canagliflozin)	☐ Continue ☐ Start ☐ No – reason:	☐ Continue ☐ Start ☐ No – reason:	☐ Continue ☐ Start ☐ No – reason:
Antiplatelet Agent(s) Drug Name(s)/Dose(s): (If established CVD; consider if additional CV risk factors)	☐ Not indicated ☐ Yes	☐ Not indicated ☐ Yes	☐ Not indicated ☐ Yes
CKD: Urine ACR (normal <2 mg/mmol)	Test Date: Result:	Test Date: Result:	Test Date: Result:
CKD: Serum Creatinine/eGFR	Test Date: Result:	Test Date: Result:	Test Date: Result:
CKD	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Retinopathy: Dilated Eye Exam (type 1 – annually; type 2 – q1-2 years or as recommended by vision care professional)	☐ Date of last visit: ☐ Reminded	☐ Date of last visit: ☐ Reminded	☐ Date of last visit: ☐ Reminded
Retinopathy	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Severity/Therapies			
Neuropathy: Neuropathy Symptoms (e.g. pain, paresthesia, GI symptoms, sexual dysfunction)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Diabetic Foot Exam (includes 10 g monofilament or 128 Hz tuning fork, structural abnormalities, skin changes, pulses) (annually for screening; every visit if diabetic foot complications) See Appendices 11A, 11B and 12	Sensation _____ Pulses _____ Skin _____ Other _____	Sensation _____ Pulses _____ Skin _____ Other _____	Sensation _____ Pulses _____ Skin _____ Other _____
Neuropathy	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Mental Health: Screen for Depression, Anxiety, Other Stressors (consider use of PHQ-9, GAD-7)	Concern:	Concern:	Concern:
Vaccination: Influenza (annual)	☐ No Reason: ☐ Yes Date:	☐ No Reason: ☐ Yes Date:	☐ No Reason: ☐ Yes Date:
Pneumococcal (once; repeat if >65 yrs)	☐ Yes Date:	☐ No Reason:	
Management Plans: Patient Goals Barriers to Self-management (e.g. coverage, accessibility, competing demands)			
Women Contraception/preconception planning			
Driving Guidelines Reviewed			
Sick-day Management (advise holding metformin, SGLT2i, SU, ACEi/ARB, diuretic, NSAIDs if inadequate fluid intake and ill			
Referrals Made			
Changes to Medications or Other Management			
Resources provided			
RECALL (usually q3-4 months)	☐ Appointment given ☐ Noted in recall system	☐ Appointment given ☐ Noted in recall system	☐ Appointment given ☐ Noted in recall system

For additional diabetes management resources, visit www.guidelines.diabetes.ca.

DIABETES CANADA
PERSONAL USE ONLY

2018 Diabetes Canada CPG – Chapter 29. Chronic Kidney Disease in Diabetes

Chronic Kidney Disease (CKD) Checklist

- ✓**SCREEN** with random urine albumin creatinine ratio (ACR) and serum creatinine for estimated glomerular filtration rate (eGFR) **at diagnosis** then **annually** (T2D)
- ✓**DIAGNOSE** with repeat confirmed ACR ≥2.0 mg/mmol and/or eGFR <60 mL/min
- ✓**DELAY** onset and/or progression with glycemic and blood pressure control and ACEi or ARB
- ✓**PREVENT** complications with dose adjustment, "sick day management" counselling and referral when appropriate

ACEi, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker

DIABETES CANADA
PERSONAL USE ONLY

2018 Diabetes Canada CPG – Chapter 29. Chronic Kidney Disease in Diabetes

Counsel all Patients About

Sick Day Medication List

Visit guidelines.diabetes.ca for patient handout

Instructions for Healthcare Professionals:
If patients become ill and are unable to maintain adequate fluid intake, or have an acute decline in renal function (e.g. due to gastrointestinal upset or dehydration), they should be instructed to hold medications which will:

A) Increase risk for a decline in kidney function:
- Angiotensin-converting enzyme inhibitor
- Angiotensin receptor blockers
- Direct renin inhibitors
- Non-steroidal anti-inflammatory drugs
- Diuretics
- SGLT2 inhibitors

B) Have reduced clearance and increase risk for adverse effects:
- Metformin
- Sulfonylureas (gliclazide, glimepiride, glyburide)

S sulfonylureas
A ACE-inhibitors
D diuretics, direct renin inhibitors

M metformin
A angiotensin receptor blockers
N non-steroidal anti-inflammatory
S SGLT2 inhibitors

Please complete the following card and give it to your patient.

Patients should be instructed that increased frequency of self blood glucose monitoring will be required and adjustments to their doses of insulin or oral antihyperglycemic agents may be necessary.

Instructions for Patients
When you are ill, particularly if you become dehydrated (e.g. vomiting or diarrhea), some medicines could cause your kidney function to worsen or result in side effects.

If you become sick and are unable to drink enough fluid to keep hydrated, you should **STOP** the following medications:

- Blood pressure pills
- Water pills
- Metformin
- Diabetes pills
- Pain medications
- Non-steroidal anti-inflammatory drugs (see below)

Please be careful not to take non-steroidal anti-inflammatory drugs (which are commonly found in pain medications (e.g. Advil) and cold remedies).

Please check with your pharmacist before using over-the-counter medications and discuss all changes in medication with your healthcare professional.

Please increase the number of times you check your blood glucose levels. If they run too high or too low, contact your healthcare professional.

If you have any problems, you can call:

2018 Diabetes Canada CPG – Chapter 29. Chronic Kidney Disease in Diabetes

2018

Role of SGLT2 inhibitor in CKD

In adults with type 2 diabetes with **clinical CVD** in whom **glycemic targets are not achieved** with existing antihyperglycemic medication(s) and who have an eGFR >30 mL/min/1.73 m2, an **SGLT2 inhibitor with proven renal benefit** may be considered to reduce progression of nephropathy [Grade B, Level 2 for empagliflozin; Grade C, Level 3 for canagliflozin]

DIABETES CANADA

2018 Diabetes Canada CPG – Chapter 32. Foot Care

Foot Care Checklist

- ✓**EDUCATE** about proper foot care
- ✓**EXAMINE** for structural, vascular, neuropathy problems **at diagnosis** then **annually**
- ✓**DO** a 10 gram monofilament assessment
- ✓**IDENTIFY** those at high risk of foot ulcers and educate, assess **more frequently**, consider footwear
- ✓**REFER** persons with foot ulcers and other complications to those specialized in foot care

2018 Diabetes Canada CPG – Chapter 33. Sexual Dysfunction & Hypogonadism in Men with Diabetes

Erectile Dysfunction (ED) Checklist

- ✓**SCREEN** all adult men regularly with sexual function history
- ✓**TREAT** erectile dysfunction with PDE-5 inhibitor as first-line therapy (if no contraindication)
- ✓**INVESTIGATE** for hypogonadism if men with ED do not respond to PDE-5 inhibitor therapy

PDE-5, phosphodiesterase type 5

2018 Diabetes Canada CPG – The Essentials

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ABCDES³ of Diabetes Care

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- ✓**B** • BP – optimal blood pressure control (<130/80)
- ✓**C** • Cholesterol – LDL <2.0 mmol/L or >50% reduction
- ✓**D** • Drugs to protect the heart
  - A – ACEi or ARB | S – Statin | A – ASA if indicated | SGLT2i/GLP-1 RA with demonstrated CV benefit if type 2 DM with CVD and A1C not at target
- ✓**E** • Exercise / Healthy Eating
- ✓**S** • Screening for complications
- ✓**S** • Smoking cessation
- ✓**S** • Self-management, stress and other barriers

DIABETES CANADA

2018 Diabetes Canada CPG – The Essentials

2018

ABCDES³ of Diabetes Care

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- ✓**B** • BP – optimal blood pressure control (<130/80)
- ✓**C** • Cholesterol – LDL <2.0 mmol/L or >50% reduction
- ✓**D** • Drugs to protect the heart
  - A – ACEi or ARB | S – Statin | A – ASA if indicated | SGLT2i/GLP-1 RA with demonstrated CV benefit if type 2 DM with CVD and A1C not at target
- ✓**E** • Exercise / Healthy Eating
- ✓**S** • Screening for complications
- ✓**S** • Smoking cessation
- ✓**S** • Self-management, stress and other barriers

DIABETES CANADA

PERSONAL USE ONLY

2018 Diabetes Canada CPG – Chapter 18. Diabetes and Mental Health

Screening for depressive and anxious symptoms is important in patients with diabetes

Purpose	Screening Tools
Diabetes-specific	•Problem Areas in Diabetes (PAID) Scale •Diabetes Distress Scale (DDS)
Quality of Life	•WHO-5
Depression/Anxiety	•Hospital Anxiety and Depression Scale (HADS) •Patient Health Questionnaire (PHQ-9) •Beck Depression Inventory (BDI)

Websites with psychological / psychiatric scales:
www.phqscreeners.com
www.outcometracker.org/scales_library.php.

Formulate an **Action Plan** to support **Self-management**

guidelines.diabetes.ca/selfmanagementeducation/smeactionplan

Managing My Diabetes – My Action Plan

Date:

The change I want to make happen is:

My goal for the next month is:

Action Plan:
The specific steps I will take to reach my goal (what, when, where, how often):

Things that could make it difficult to achieve my goal:

My plan for overcoming these challenges are:

Support and resources I will need:

How important is it to me that I achieve my goal?
(scale of 0 to 10, with 0 being not important at all and 10 being extremely important):

How confident am I that I can achieve my goal?
(scale of 0 to 10, with 0 being not confident at all and 10 being extremely confident):

Follow-up date:

Other considerations

2018 Diabetes Canada CPG – Chapter 21. Diabetes & Driving

Diabetes and Driving

- The **fitness** of people with diabetes to drive should be assessed on an **individual** basis
- All drivers with diabetes should undergo a **medical examination** at least **every two years** to assess fitness to drive.
- **People with diabetes** should play an **active role in assessing their fitness to drive**
- Should **not drive** when **BG <4.0** mmol/L and should **wait at least 40 minutes** after treatment of hypoglycemia has increased their BG level to **at least 5.0 mmol/L**

Special Populations

DIABETES CANADA

2018 Diabetes Canada CPG – Chapter 36. Diabetes and Pregnancy

Preconception Checklist for Women with Pre-existing Diabetes

2018

- ✓ Use **reliable birth control** until adequate glycemic control
- ✓ Attain a **preconception A1C of ≤7.0%** (≤ 6.5% if safe)
- ✓ May remain on **metformin + glyburide** until pregnancy, otherwise **switch to insulin**
- ✓ Assess for and manage any **diabetes complications**
- ✓ **Folic Acid 1 mg/d**: 3 months pre-conception to at least 12 weeks gestation
- ✓ **Discontinue** potential embryopathic meds:
  - ✓ **ACE-inhibitors / ARB** (prior to or upon detection of pregnancy in those with significant proteinuria)
  - ✓ **Statin** therapy

DIABETES CANADA

2018 Diabetes Canada CPG – Chapter 37. Diabetes in Older People

Diabetes in the Elderly Checklist

2018

- ✓**ASSESS** for level of functional dependency (frailty)
- ✓**INDIVIDUALIZE** glycemic targets based on the above (A1C ≤8.5% for frail elderly) but if otherwise healthy, use the same targets as younger people
- ✓**AVOID** hypoglycemia in cognitive impairment
- ✓**SELECT** or **ADJUST** antihyperglycemic therapy carefully
  - ✓Caution with sulfonylureas or thiazolidinediones
  - ✓DPP-4 inhibitors should be used over sulfonylureas
  - ✓Basal analogues instead of NPH or human 30/70 insulin
- ✓**GIVE** regular diets instead of "diabetic diets" or nutritional formulas in nursing homes

DIABETES CANADA

2018 Diabetes Canada CPG – Chapter 38. Type 2 Diabetes and Indigenous Peoples

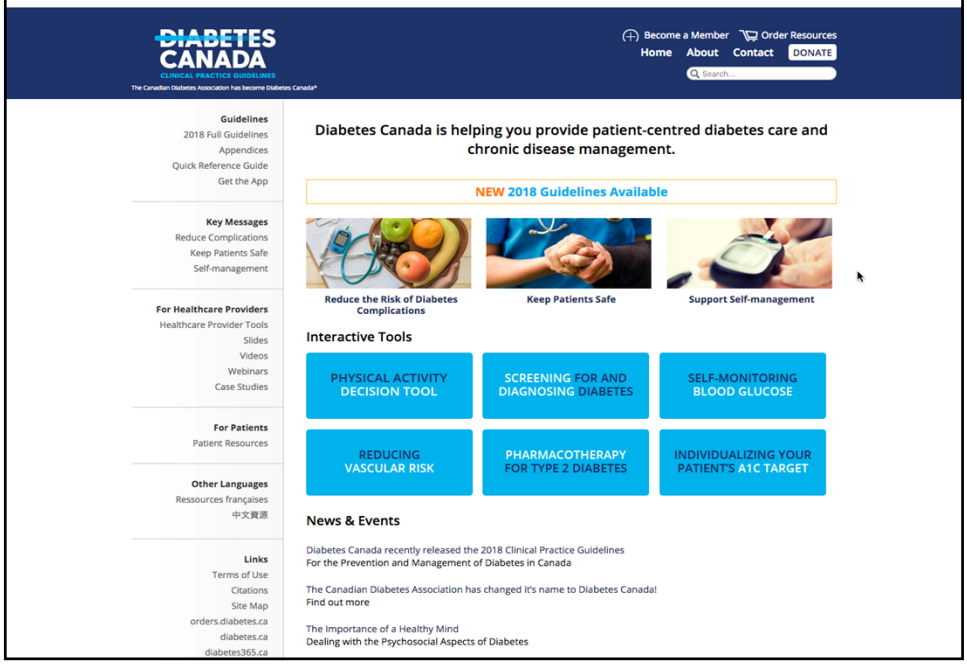
Type 2 Diabetes and Indigenous Peoples

2018

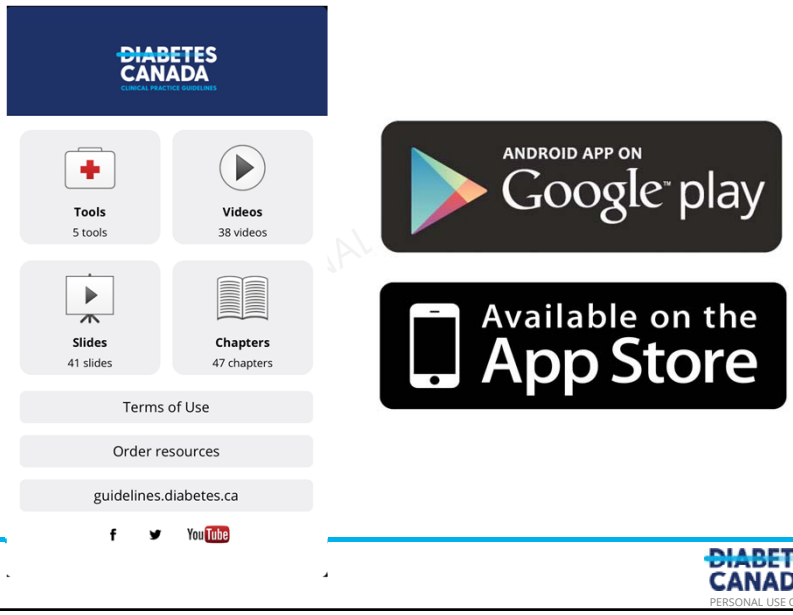
- ✓ Among the **highest-risk** populations
- ✓ **Prevention** strategies are **essential**
- ✓ Management **targets should be no different** from general population
- ✓ Focus on building a **therapeutic relationship**
- ✓ **Acknowledge** the legacy of colonization and its ongoing adverse effects on Indigenous health
- ✓ Use the **Educating for Equity (E4E) framework** to address social barriers and identify strategies for facilitating outcomes using a cultural approach

DIABETES CANADA

Visit guidelines.diabetes.ca



Or download the App



Diabetes Canada Clinical Practice Guidelines

http://guidelines.diabetes.ca – for health-care providers

1-800-BANTING (226-8464)

http://diabetes.ca – for people with diabetes

DIABETES CANADA