

### Editor's key points

- ▶ Family physicians are faced with a range of options when selecting the most appropriate treatment approach for people with diabetes. The challenge is compounded by the vast amount of new evidence that is disseminated to both clinicians and to people with diabetes. Guidelines are meant to summarize this evidence, but it is not feasible for FPs to implement every single guideline recommendation relevant to primary care.
- ▶ In this review the authors aimed to summarize the Diabetes Canada 2018 guidelines and identify key messages and recommendations for FPs. From the 313 recommendations in the guidelines, they highlight the 22 they deemed the highest priority for primary care.
- ▶ Providing care that is concordant with the latest guidelines requires repeated discussions featuring shared decision making with people with diabetes about opportunities to reduce the risk of diabetes complications, keep patients safe, and support self-management.

# Diabetes Canada 2018 clinical practice guidelines

## Key messages for family physicians caring for patients living with type 2 diabetes

Noah M. Ivers MD CCFP PhD Maggie Jiang Javed Alloo MD CCFP  
Alexander Singer MB BCh BAO CCFP Daniel Ngui MD CCFP  
Carolyn Gall Casey Catherine H. Yu MD FRCPC MHSC

### Abstract

**Objective** To summarize the 2018 Diabetes Canada clinical practice guidelines, focusing on high-priority recommendations for FPs managing people who live with type 2 diabetes.

**Quality of evidence** A prioritization process was conducted to focus the efforts of Diabetes Canada's guideline dissemination and implementation efforts. The resulting identified key messages for FPs to consider when managing patients with type 2 diabetes are described. Evidence supporting the guideline recommendations ranges from levels I to IV and grades A to D.

**Main message** Three key messages were identified from the 2018 guidelines as priorities for FPs: discussing opportunities to reduce the risk of diabetes complications, discussing opportunities to ensure safety and prevent hypoglycemia, and discussing progress on self-management goals and addressing barriers. A theme cutting across these key messages was the need to tailor discussions to the needs and preferences of each person. These important guideline recommendations are highlighted, along with information about relevant tools for implementing the recommendations in real-world practice.

**Conclusion** High-quality diabetes care involves a series of periodic conversations about self-management and about pharmacologic and nonpharmacologic treatments that fit with each patient's goals (ie, shared decision making). Incorporating these conversations into regular practice provides FPs with opportunities to maximize likely benefits of treatments and decrease the risk of harms, to support patients in initiating and sustaining desired lifestyle changes, and to help patients cope with the burdens of diabetes and comorbid conditions.

Family doctors and other primary care clinicians provide most of the care for Canadians living with diabetes and its complications.<sup>1</sup> The increasing number and complexity of cases of this chronic disease<sup>2</sup> provides an opportunity to ensure better supports are in place for persons with diabetes and their care providers. Given recent pharmacologic advances, as well as new evidence about the potential for specific benefits and harms, clinicians today are faced with a range of options when selecting the most appropriate treatment approach for people with diabetes. The challenge for FPs is compounded by the vast amount of new evidence available on a range of clinical topics relevant to the people with diabetes whom they see in their practices. Guidelines help to summarize evidence, but it is not feasible<sup>3</sup> or appropriate<sup>4</sup> for FPs to incorporate every single guideline recommendation relevant to primary care into practice. Which high-priority items deserve attention and action? Which recommendations should FPs make a special effort to understand and discuss with their patients?

Guidelines do not implement themselves.<sup>5</sup> To integrate guideline recommendations into routine clinical care, FPs must not only be aware of and agree with them, but also must be able to adopt and adhere to them whenever applicable.<sup>6</sup> To this end, a clinical practice guideline dissemination and implementation (D&I) committee, composed of interprofessional diabetes providers from across the country (some of whom contributed to writing the guideline but many of whom did not), was organized by Diabetes Canada to develop strategies for both people with diabetes and providers, hoping to support translating evidence-based recommendations into practice. Evaluation of the effects of these efforts is ongoing.<sup>7</sup>

The “Diabetes Canada 2018 clinical practice guidelines for the prevention and management of diabetes in Canada” were published in April 2018.<sup>8</sup> As part of the dissemination effort, a series of readable articles summarizing high-priority recommendations for primary care providers and outlining easy-to-apply practices were planned. This article summarizes the new guidelines, focusing on high-priority recommendations for FPs managing people who live with type 2 diabetes. Herein, we present these guideline recommendations and link these recommendations to approaches and tools that will help FPs put them into practice.

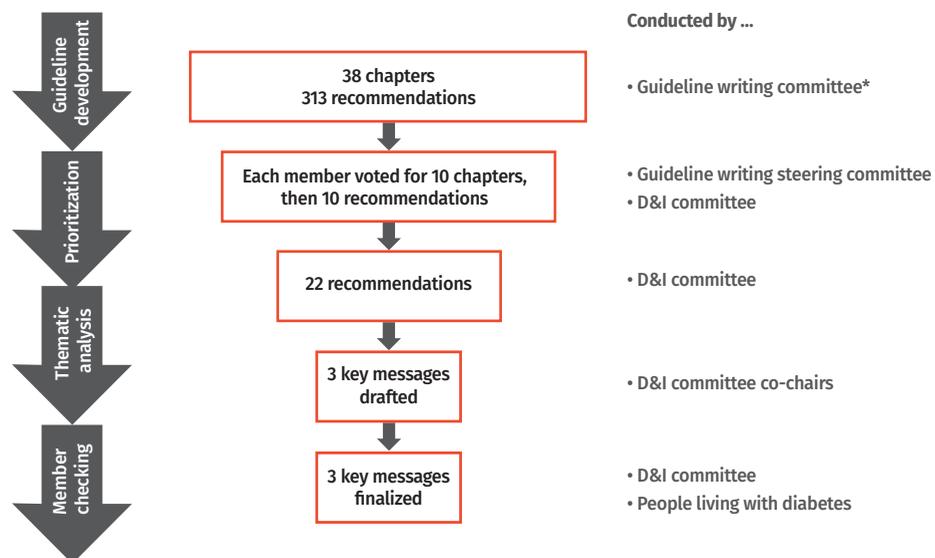
### Quality of evidence

Diabetes Canada is a health charity and advocacy organization that produces comprehensive national guidelines

for the prevention and management of diabetes in adults and children, with a focus on special populations (those with renal failure, Indigenous peoples, women of child-bearing age, etc). Following a rigorous methodology,<sup>9,10</sup> a guideline writing committee, composed of interprofessional diabetes experts, posed then answered clinically relevant questions, resulting in a series of recommendations.<sup>10</sup> The evidence supporting the recommendations ranges from levels I to IV and grades A to D.<sup>8</sup> The Diabetes Canada guideline committee includes primary care practitioners, endocrinologists, diabetes educators, other specialists, and people living with diabetes from across Canada. The resulting diabetes guideline is reviewed and launched in a 5-year cycle, with interim revisions in the event of important practice-changing evidence and treatment options. For the 2018 guidelines, 9 of the 10 authors responsible for developing recommendations for pharmacologic management of type 2 diabetes had no conflicts of interest with industry. In the case of disagreement about conflicts or outright conflicts of interest, committee members removed themselves from discussions. This article does not attempt to revise or critique the Diabetes Canada guideline recommendations but presents a family medicine-oriented approach to applying relevant recommendations in practice.

The guideline D&I committee co-chairs developed a process of prioritizing and distilling key messages relevant to primary care from 313 recommendations in 38 guideline chapters (Figure 1).<sup>8</sup> The prioritization was

**Figure 1. Prioritization of key messages from the Diabetes Canada 2018 clinical practice guidelines<sup>8</sup>**



D&I—dissemination and implementation.

\*Consisting of primary care practitioners, endocrinologists, diabetes educators, other specialists, and people living with diabetes.

completed anonymously by members of the guideline writing committee, people with diabetes, and members of the D&I committee. Given the large number of recommendations, the first step of the prioritization exercise was to select guideline chapters; each member was asked to select 10 chapters, then, from these chapters, to select and rank 10 recommendations. Based on the number of votes for each recommendation, a list of 22 recommendations was compiled. This was followed by thematic analysis and member checking to summarize key messages. Specifically, the co-chairs (endocrinologist C.H.Y. and FP N.M.I.) collaboratively sorted the recommendations into conceptually similar groups (themes) and drafted key messages that represented these themes. Next, they sought input from the committee members to refine the key messages, similar to the process of member checking in qualitative research.<sup>11</sup>

For this manuscript, we sought further input from FPs on the D&I committee to ensure that no important recommendations or concepts had been missed in summarizing the high-priority aspects of the guideline for the management of people with type 2 diabetes by FPs. This involved providing these FPs with the full list of recommendations via e-mail and asking them to identify any missing high-priority recommendations. During the process of converting themes into key messages, and during the process of writing this manuscript, input was sought from members of the D&I committee who live with diabetes to ensure that the content was informed by their needs and perspectives. As a final step, the entire committee identified tools that might support implementation of the key messages. To the extent possible, tools are informed by evidence regarding implementation of evidence in practice.<sup>12-15</sup> Some of these tools are identified in this manuscript; these and many others can be accessed at [guidelines.diabetes.ca](http://guidelines.diabetes.ca).

### Main message

The prioritization exercise resulted in 22 recommendations nominated for emphasis in dissemination and implementation efforts. These were then categorized into 3 key messages (**Table 1**)<sup>8,16</sup> and a cross-cutting theme, as described below.

Providing care that is concordant with the latest guidelines requires repeated discussions featuring shared decision making with people with diabetes about opportunities to reduce the risk of diabetes complications, keep patients safe, and support self-management. For this reason, long-term and short-term risks must be balanced in a way that incorporates consideration of each person's needs, preferences, and capabilities, along with the research evidence and clinician judgment. For example, glycemic targets will vary based on patient circumstances (**Figure 2**).<sup>8</sup> The recommendations highlighted here presume that diabetes care is being provided in an ongoing, relationship-based primary care

context, in which repeated consultations occur to routinely and iteratively set care goals and develop plans to achieve them. A revised acronym was developed as an aid to facilitate rapid assessment and action that incorporates the key messages presented here during these routine diabetes visits: ABCDES3 (**Figure 3**).<sup>8</sup>

As part of the guideline dissemination and implementation, Diabetes Canada produced updated diabetes care flow sheets, available online ([guidelines.diabetes.ca/docs/cpg/Appendix-3.pdf](http://guidelines.diabetes.ca/docs/cpg/Appendix-3.pdf)); a quick version focusing on ABCDES3 has also been produced ([guidelines.diabetes.ca/docs/CPG-quick-reference-guide-web-EN.pdf#page=10](http://guidelines.diabetes.ca/docs/CPG-quick-reference-guide-web-EN.pdf#page=10)), and providers might consider adapting this for use as a "stamp" (or form or template) in electronic medical records.

### Key message 1: discuss opportunities to reduce the risk of diabetes complications.

The guideline states that treatments should be added (as tolerated) to achieve hemoglobin A<sub>1c</sub> (HbA<sub>1c</sub>), blood pressure, and cholesterol targets in accordance with patient preferences and goals. Since the last guideline update in 2013, the main change in this aspect of the guideline reflects new evidence that canagliflozin, empagliflozin, and liraglutide reduce the risk of cardiovascular events in patients who have a history of vascular disease.<sup>8</sup> (Similar evidence for additional medications was not available at the time of guideline development.) The guideline states that evidence-based medications for vascular protection should be prescribed whenever appropriate:

- statins in those aged 40 or older or with complications;
- angiotensin-converting enzyme inhibitors or angiotensin receptor blockers in those aged 55 or older or with complications; and
- acetylsalicylic acid plus a sodium glucose transporter 2 inhibitor or glucagonlike peptide 1 receptor agonist with proven cardiovascular benefit (canagliflozin, empagliflozin, liraglutide) for those with vascular disease.

Diabetes Canada has created several interactive clinical decision support tools to help reduce some of the barriers to implementing these recommendations, including an interactive tool to consider pharmacotherapy options for glycemic control that compares the relative advantages or limitations of different agents ([guidelines.diabetes.ca/bloodglucoselowering/pharmacologyt2](http://guidelines.diabetes.ca/bloodglucoselowering/pharmacologyt2)), an interactive tool for selecting agents for vascular protection ([guidelines.diabetes.ca/vascularprotection/riskassessment](http://guidelines.diabetes.ca/vascularprotection/riskassessment)), and a prescription for cardiovascular protection ([guidelines.diabetes.ca/docs/resources/prescription-for-cardiovascular-protection-with-diabetes.pdf](http://guidelines.diabetes.ca/docs/resources/prescription-for-cardiovascular-protection-with-diabetes.pdf)). People with diabetes also require routine monitoring (and relevant action) for neuropathy, nephropathy, and retinopathy, which can be facilitated with a flow sheet ([guidelines.diabetes.ca/docs/cpg/Appendix-3.pdf](http://guidelines.diabetes.ca/docs/cpg/Appendix-3.pdf)).<sup>8</sup>

**Table 1.** Selected high-priority type 2 diabetes recommendations and relevant tools for FPs: *Highlighted recommendations were prioritized for dissemination by those involved in preparing this review. They are not presented in any particular order and are not necessarily the most important recommendations for a given practice or patient; the full guideline is available at [guidelines.diabetes.ca](http://guidelines.diabetes.ca).*

KEY MESSAGE	GUIDELINE RECOMMENDATION	RELEVANT TOOLS
Discuss opportunities to reduce the risk of diabetes complications	If glycemic targets are not achieved with existing antihyperglycemic medications, other classes of agents should be added to improve glycemic control. The choice should be individualized taking into account the information below and in <b>Figure 2<sup>8</sup></b> (grade B, level II)	Interactive tool for selecting agents for glycemic control:  <a href="http://guidelines.diabetes.ca/bloodglucoselowering/pharmacology2">guidelines.diabetes.ca/bloodglucoselowering/pharmacology2</a>
	In people <b>without clinical CVD</b> in whom glycemic targets are not achieved with existing antihyperglycemic medication, incretin agents (DPP4Is or GLP1RAs) or SGLT2Is should be considered as add-on medication over insulin secretagogues, insulin, and TZDs to improve glycemic control, if lower risk of hypoglycemia or weight gain are priorities (grade A, level IA). Acarbose and orlistat can also be considered as add-on medication to improve glycemic control with a low risk of hypoglycemia and weight gain (grade D, consensus)	
	In people <b>with clinical CVD</b> in whom glycemic targets are not achieved with existing antihyperglycemic medication, an antihyperglycemic agent with demonstrated CV outcome benefit should be added to reduce the risk of major CV events (grade A, level IA for empagliflozin; grade A, level IA for liraglutide; grade C, level II for canagliflozin)	
	Insulin can be used at any time in the course of type 2 diabetes (grade D, consensus) (see link in Relevant Tools column for examples of insulin initiation and titration in people with type 2 diabetes). In people not achieving glycemic targets with existing non-insulin antihyperglycemic medication, the addition of a once-daily basal insulin regimen should be considered over premixed insulin or bolus-only regimens to reduce weight gain and hypoglycemia (grade B, level II)	Insulin prescription tool:  <a href="http://guidelines.diabetes.ca/reduce-complications/insulin-prescription-tool">guidelines.diabetes.ca/reduce-complications/insulin-prescription-tool</a>
	Long-acting insulin analogues should be considered over NPH insulin to reduce the risk of nocturnal and symptomatic hypoglycemia (grade A, level IA)	Examples of insulin initiation and titration in people with type 2 diabetes:  <a href="http://guidelines.diabetes.ca/docs/cpg/Appendix-9.pdf">guidelines.diabetes.ca/docs/cpg/Appendix-9.pdf</a>
	In people receiving insulin, doses should be adjusted or additional antihyperglycemic medication (non-insulin or bolus insulin) should be added if glycemic targets are not achieved (grade D, consensus)	
	<ul style="list-style-type: none"> <li>• A GLP1RA should be considered as add-on therapy to improve glycemic control with weight loss (grade A, level IA) before initiating bolus insulin or intensifying insulin to improve glycemic control with weight loss and a lower hypoglycemia risk compared with single or multiple bolus-insulin injections (grade A, level IA)</li> <li>• An SGLT2I should be considered as add-on therapy to improve glycemic control with weight loss and lower hypoglycemic risk compared with additional insulin (grade A, level IA)</li> <li>• A DPP4I could be considered as add-on therapy to improve glycemic control without weight gain or increased hypoglycemia risk compared with additional insulin (grade B, level II)</li> </ul>	
	All individuals with diabetes should follow a comprehensive, multifaceted approach to reducing CV risk, including the following: <ul style="list-style-type: none"> <li>• HbA<sub>1c</sub> target ≤ 7.0% implemented early in the course of diabetes (grade C, level III)</li> <li>• systolic BP of &lt; 130 mm Hg (grade C, level III) and diastolic BP of &lt; 80 mm Hg (grade B, level I)</li> <li>• additional vascular protective medications in most adult people with diabetes (see recommendations below) (grade A, level I for those with type 2 diabetes aged &gt; 40 y with albuminuria; grade D, consensus for those with type 1 diabetes)</li> <li>• achievement and maintenance of healthy weight goals (grade D, consensus)</li> <li>• healthy eating</li> <li>• regular physical activity (grade D, consensus)</li> <li>• smoking cessation (grade C, level III)</li> </ul>	Flow sheets:  <a href="http://guidelines.diabetes.ca/docs/cpg/Appendix-3.pdf">guidelines.diabetes.ca/docs/cpg/Appendix-3.pdf</a>  Interactive tool for selecting agents for vascular protection:  <a href="http://guidelines.diabetes.ca/vascularprotection/riskassessment">guidelines.diabetes.ca/vascularprotection/riskassessment</a>

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KEY MESSAGE	GUIDELINE RECOMMENDATION	RELEVANT TOOLS
	<p>Statin therapy should be used to reduce CV risk in adults with type 1 or type 2 diabetes with any of the following features:</p> <ul style="list-style-type: none"> <li>• clinical CVD (grade A, level I)</li> <li>• age ≥40 y (grade A, level I, for type 2 diabetes; grade D, consensus for type 1 diabetes)</li> <li>• age &lt;40 y and 1 of the following ...                             <ul style="list-style-type: none"> <li>-diabetes duration &gt;15 y and age &gt;30 y (grade D, consensus)</li> <li>-microvascular complications (grade D, consensus)</li> <li>-warrants therapy based on the presence of other risk factors according to the “2016 Canadian Cardiovascular Society guidelines for the management of dyslipidemia for the prevention of cardiovascular disease in the adult”<sup>16</sup> (grade D, consensus)</li> </ul> </li> </ul> <p>For individuals not at their LDL-C goal despite statin therapy, a combination of statin therapy with second-line agents can be used to achieve the goal, and the agent used should be selected based upon the size of the existing gap to LDL-C goal (grade D, consensus). Generally, ezetimibe should be considered (grade D, consensus). In people with diabetes who also have concomitant clinical CVD, a PCSK9 inhibitor can be used (grade A, level I)</p> <p>ACEIs or ARBs, at doses that have demonstrated vascular protection, should be used to reduce CV risk in adults with type 1 or type 2 diabetes with any of the following:</p> <ul style="list-style-type: none"> <li>• clinical CVD (grade A, level I)</li> <li>• age &gt;55 y with an additional CV risk factor or end organ damage (albuminuria, retinopathy, left ventricular hypertrophy) (grade A, level I)</li> <li>• microvascular complications (grade D, consensus)</li> </ul> <p>Note: Among women with childbearing potential, ACEIs, ARBs, or statins should only be used if there is reliable contraception</p> <p>In people with established CVD, low-dose ASA therapy (81-162 mg) should be used to prevent CV events (grade B, level II)</p> <p>ASA should not be used routinely for the primary prevention of CVD in people with diabetes (grade A, level IA). ASA can be used in the presence of additional CV risk factors (grade D, consensus)</p> <p>Clopidogrel 75 mg can be used in people unable to tolerate ASA (grade D, consensus)</p> <p>In adults with type 2 diabetes with clinical CVD in whom glycemic targets are not achieved with existing antihyperglycemic medication, an antihyperglycemic agent with demonstrated CV outcome benefit should be added to reduce the risk of major CV events (grade A, level IA for empagliflozin; grade A, level IA for liraglutide; grade C, level II for canagliflozin)</p>	
<p>Discuss opportunities to ensure safety and prevent hypoglycemia</p>	<p>Drivers with diabetes treated with insulin secretagogues or insulin ...</p> <ul style="list-style-type: none"> <li>• should maintain a log of their SMBG measurements either by using a memory-equipped BG meter or an electronic record of BG measurement performed at a frequency deemed appropriate by the person with diabetes and his or her health care team. For commercial drivers, for initial commercial license application, the record should include the last 6 mo (or since the diagnosis of diabetes if &lt; 6 mo). BG logs should be verifiable on request (grade D, consensus)</li> <li>• should always have BG monitoring equipment and supplies of rapidly absorbable carbohydrate within easy reach (eg, attached to the driver’s side visor or in the centre console) (grade D, consensus)</li> <li>• should consider measuring their BG level immediately before and at least every 4 h while driving or wear a real-time CGM device (grade D, consensus)</li> <li>• should not drive when their BG level is &lt;4.0 mmol/L (grade C, level III for type 1 diabetes; grade D, consensus for type 2 diabetes). If the BG level is &lt;4.0 mmol/L, they should not drive until at least 40 min after successful treatment of hypoglycemia has increased their BG level to at least 5.0 mmol/L (grade C, level III for type 1 diabetes; grade D, consensus for type 2 diabetes)</li> <li>• must refrain from driving immediately if they experience severe hypoglycemia while driving and notify their health care provider as soon as possible (no longer than 72 h) (grade D, consensus)</li> </ul>	<p>Educational handout for safe driving:</p> <p><a href="https://guidelines.diabetes.ca/docs/patient-resources/drive-safe-with-diabetes.pdf">guidelines.diabetes.ca/docs/patient-resources/drive-safe-with-diabetes.pdf</a></p>

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KEY MESSAGE	GUIDELINE RECOMMENDATION	RELEVANT TOOLS
	Private and commercial drivers with diabetes and hypoglycemia unawareness or history of severe hypoglycemia in the past 12 mo must measure their BG level immediately before and at least every 2 h while driving or wear a real-time CGM device (grade D, consensus)	
	If any of the following occur, health care professionals should inform people with diabetes treated with insulin secretagogues or insulin to no longer drive, and should report their concerns about the person's fitness to drive to the appropriate driving licensing body: <ul style="list-style-type: none"> <li>• any episode of severe hypoglycemia while driving in the past 12 mo (grade D, consensus)</li> <li>• &gt; 1 episode of severe hypoglycemia while awake but not driving in the past 12 mo (grade D, consensus)</li> </ul>	
	BP targets should be individualized for older adults who are functionally dependent, or who have orthostasis, or who have a limited life expectancy (grade D, consensus)	Interactive tool for individualizing HbA <sub>1c</sub> target:
	In older patients with diabetes and multiple comorbidities or frailty, strategies should be used to strictly prevent hypoglycemia, which include the choice of antihyperglycemic therapy and less-stringent HbA <sub>1c</sub> targets (grade D, consensus). Antihyperglycemic agents that increase the risk of hypoglycemia or have other side effects should be discontinued in these people (grade C, level III)	<a href="https://guidelines.diabetes.ca/reduce-complications/a1ctarget">guidelines.diabetes.ca/reduce-complications/a1ctarget</a>
	A higher HbA <sub>1c</sub> target can be considered in older people with diabetes taking antihyperglycemic agents with risk of hypoglycemia, with any of the following (grade D, consensus for all) ... <ul style="list-style-type: none"> <li>• functionally dependent: 7.1%-8.0%</li> <li>• frail or with dementia: 7.1%-8.5%</li> <li>• end of life: HbA<sub>1c</sub> measurement is not recommended. Avoid symptomatic hyperglycemia and any hypoglycemia</li> </ul>	Interactive tool for selecting agents for glycemic control:  <a href="https://guidelines.diabetes.ca/bloodglucoselowering/pharmacology2">guidelines.diabetes.ca/bloodglucoselowering/pharmacology2</a>
	In older people with type 2 diabetes, sulfonylureas should be used with caution because the risk of hypoglycemia increases substantially with age (grade D, level IV). <ul style="list-style-type: none"> <li>• DPP4Is should be used over sulfonylureas as second-line therapy to metformin because of a lower risk of hypoglycemia (grade B, level II)</li> <li>• In general, initial doses of sulfonylureas in older people should be half of those used for younger people, and doses should be increased more slowly (grade D, consensus)</li> <li>• Gliclazide and gliclazide MR (grade B, level II) and glimepiride (grade C, level III) should be used instead of glyburide, as they are associated with a reduced frequency of hypoglycemic events</li> <li>• Meglitinides can be used instead of glyburide to reduce the risk of hypoglycemia (grade C, level II for repaglinide; grade C, level III for nateglinide), particularly in individuals with irregular eating habits (grade D, consensus)</li> </ul>	Therapeutic considerations for renal impairment:  <a href="https://guidelines.diabetes.ca/docs/cpg/Appendix-7.pdf">guidelines.diabetes.ca/docs/cpg/Appendix-7.pdf</a>
	In older people with type 2 diabetes with no other complex comorbidities but with clinical CVD and in whom glycemic targets are not achieved with existing antihyperglycemic medications, an antihyperglycemic agent with demonstrated CV outcome benefit could be added to reduce the risk of major CV events (grade A, level IA for empagliflozin; grade A, level IA for liraglutide; grade C, level II for canagliflozin)	
	Adults with diabetes and CKD should be given a “sick-day” medication list that outlines which medications should be held during times of acute illness (grade D, consensus)	Sick-day planning handout:  <a href="https://guidelines.diabetes.ca/docs/cpg/Appendix-8.pdf">guidelines.diabetes.ca/docs/cpg/Appendix-8.pdf</a>

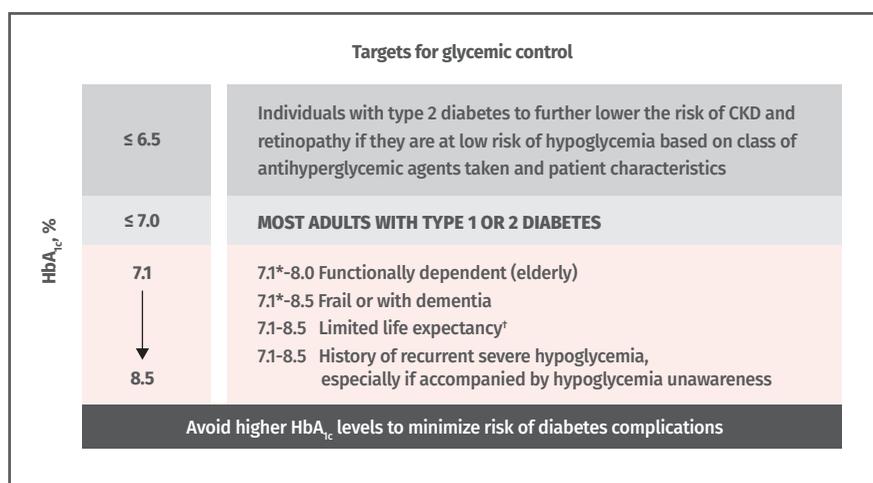
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KEY MESSAGE	GUIDELINE RECOMMENDATION	RELEVANT TOOLS
Discuss progress on self-management goals and address barriers	Individuals with diabetes should be regularly screened for diabetes-related psychological distress (eg, diabetes distress, psychological insulin resistance, fear of hypoglycemia) and psychiatric disorders (eg, depression, anxiety disorders) by validated self-report questionnaire or clinical interview (grade D, consensus). Plans for self-harm should be asked about regularly as well (grade C, level III)	Handouts about self-management:  <b>guidelines.diabetes.ca/patientresources</b>
	Collaborative care by interprofessional teams should be provided for individuals with diabetes and depression to improve the following: <ul style="list-style-type: none"> <li>• depressive symptoms (grade A, level I)</li> <li>• adherence to antidepressant and non-insulin antihyperglycemic medications (grade A, level I)</li> <li>• glycemic control (grade A, level I)</li> </ul>	Handouts about identifying and managing diabetes-related distress:  <b>guidelines.diabetes.ca/selfmanagementeducation/psychosocial</b>
	Psychosocial interventions should be integrated into diabetes care plans, including the following: <ul style="list-style-type: none"> <li>• motivational interventions (grade D, consensus)</li> <li>• stress management strategies (grade C, level III)</li> <li>• coping skills training (grade A, level IA for type 2 diabetes; grade B, level II for type 1 diabetes)</li> <li>• family therapy (grade A, level IB)</li> <li>• case management (grade B, level II)</li> </ul>	
	People with diabetes should ideally accumulate a minimum of 150 min of moderate- to vigorous-intensity aerobic exercise each wk, spread over at least 3 d of the wk, with no more than 2 consecutive d without exercise, to improve glycemic control (grade B, level II) and to reduce risk of CVD and overall mortality (grade C, level III). Smaller amounts (90-140 min/wk) of exercise or planned physical activity can also be beneficial for glycemic control but to a lesser extent (grade B, level II)	Interactive tool to provide specific exercise advice:  <b>guidelines.diabetes.ca/selfmanagementeducation/patool</b>
	Interval training (short periods of vigorous exercise alternating with short recovery periods at low to moderate intensity or rest from 30 s to 3 min each) can be recommended to people willing and able to perform such training to increase gains in cardiorespiratory fitness in type 2 diabetes (grade B, level II)	Sample exercise prescriptions for patients with diabetes:  <b>guidelines.diabetes.ca/docs/resources/diabetes-and-physical-activity-your-exercise-prescription.pdf</b>
	People with diabetes (including elderly people) should perform resistance exercise at least twice a wk and preferably 3 times/wk (grade B, level II) in addition to aerobic exercise (grade B, level II). Initial instruction and periodic supervision by an exercise specialist can be recommended (grade C, level III)	
	Setting specific exercise goals, problem solving potential barriers to physical activity, providing information on where and when to exercise, and self-monitoring should be performed collaboratively between the person with diabetes and the health care provider to increase physical activity and improve HbA <sub>1c</sub> levels (grade B, level II)	
	In addition to achieving physical activity goals, people with diabetes should minimize the amount of time spent in sedentary activities and periodically break up long periods of sitting (grade C, level III)	
	People with diabetes should be offered timely self-management education that is tailored to enhancing self-care practices and behaviour (grade A, level IA)	
	Technologies, such as Internet-based computer programs and glucose monitoring systems, brief text messages, and mobile applications can be used to support self-management in order to improve glycemic control (grade A, level IA)	

ACEI—angiotensin-converting enzyme inhibitor, ARB—angiotensin receptor blocker, ASA—acetylsalicylic acid, BG—blood glucose, BP—blood pressure, CGM—continuous glucose monitoring, CKD—chronic kidney disease, CV—cardiovascular, CVD—cardiovascular disease, DPP4I—dipeptidyl peptidase 4 inhibitor, GLP1RA—glucagonlike peptide 1 receptor agonist, HbA<sub>1c</sub>—hemoglobin A<sub>1c</sub>, LDL-C—low-density lipoprotein cholesterol, MR—modified release, NPH—neutral protamine Hagedorn, PCSK9—proprotein convertase subtilisin-kexin type 9, SGLT2I—sodium glucose transporter 2 inhibitor, SMBG—self-monitoring of blood glucose, TZD—thiazolidinedione.

Grades and levels of evidence are defined in the methods chapter of the guidelines ([guidelines.diabetes.ca/browse/chapter2](http://guidelines.diabetes.ca/browse/chapter2)). Briefly, grade A and level I evidence is the strongest and most relevant. Level IV evidence is the weakest, and grade D recommendations are supported by level IV evidence or consensus.<sup>8</sup> Data from the Diabetes Canada Clinical Practice Guidelines Expert Committee.<sup>8</sup>

**Figure 2. Individualizing HbA<sub>1c</sub> targets for patients with diabetes**

CKD—chronic kidney disease, HbA<sub>1c</sub>—hemoglobin A<sub>1c</sub>.

\*Lower limit applies only if the patient is taking antihyperglycemic agents with the risk of hypoglycemia.

†At the end of life, HbA<sub>1c</sub> measurement is not recommended. Avoid symptomatic hyperglycemia and any hypoglycemia.

Adapted from the Diabetes Canada Clinical Practice Guidelines Expert Committee.<sup>8</sup>

**Figure 3. The ABCDES3 of routine diabetes visits**

- A:** A<sub>1c</sub> targets (without hypoglycemia)
- B:** Blood pressure targets (without falls)
- C:** Cholesterol targets
- D:** Drugs to reduce cardiac risk when appropriate (statins, ACEIs or ARBs, ASA, SGLT2Is, GLP1RA)
- E:** Exercise targets and healthy eating
- S:** Supporting self-management by addressing stress, mental health, and other barriers
- S:** Smoking cessation (ask, advise, assess, assist, arrange)
- S:** Screening for complications (neuropathy, nephropathy, retinopathy)

ACEI—angiotensin-converting enzyme inhibitor, ARB—angiotensin receptor blocker, ASA—acetylsalicylic acid, GLP1RA—glucagon like peptide 1 receptor agonist, SGLT2I—sodium glucose transporter 2 inhibitor.

Adapted from the Diabetes Canada Clinical Practice Guidelines Expert Committee.<sup>8</sup>

**Key message 2: discuss opportunities to ensure safety and prevent hypoglycemia.** The guideline states that targets for HbA<sub>1c</sub> levels and treatments should be individualized based on goals, preferences, and functional status, as described in **Figure 2**.<sup>8</sup> Lower targets are appropriate when priority is placed on reducing the risk of

microvascular outcomes and when the treatments used do not place the patient at risk of hypoglycemia. Higher targets are appropriate when reducing the risk of long-term complications is a lower priority. Diabetes Canada has an interactive tool to help tailor glycemc targets to optimize relevant outcomes while avoiding hypoglycemia ([guidelines.diabetes.ca/bloodglucoselowering/a1ctarget](http://guidelines.diabetes.ca/bloodglucoselowering/a1ctarget)).

Two new high-priority recommendations in the 2018 guidelines involve preventing hypoglycemia. First, all people with diabetes who take agents that can cause hypoglycemia (ie, insulin or insulin secretagogues) should be counseled on safe driving (ie, having sugar on-hand to prevent lows). A new chapter in the 2018 guidelines ([guidelines.diabetes.ca/cpg/chapter21](http://guidelines.diabetes.ca/cpg/chapter21)) describes how to assess and manage private and commercial drivers, especially those who take insulin or insulin secretagogues.<sup>8</sup> Diabetes Canada has handouts to support conversations regarding safe driving, and the guidelines feature a sample diabetes and driving educational resource to fill out with people who have diabetes ([guidelines.diabetes.ca/docs/patient-resources/drive-safe-with-diabetes.pdf](http://guidelines.diabetes.ca/docs/patient-resources/drive-safe-with-diabetes.pdf)). Second, the guidelines recommend that medications that pose less risk of hypoglycemia should be used preferentially, especially in the elderly (ie, metformin or dipeptidyl peptidase 4 inhibitors in preference to insulin or insulin secretagogues). Likewise, risks of hypotension should be considered when managing blood pressure. As noted in the previous guideline, recommendations emphasize the safe use of medications when people with diabetes are unwell

and when they are at risk of hypovolemia. Euglycemic ketoacidosis is a particular risk with sodium glucose transporter 2 inhibitors, and these should be held on sick days (ie, when patients are at risk of dehydration).<sup>17</sup> The Diabetes Canada guidelines have an appendix to support sick-day planning ([guidelines.diabetes.ca/docs/cpg/Appendix-8.pdf](https://guidelines.diabetes.ca/docs/cpg/Appendix-8.pdf)) and an appendix for therapeutic considerations for renal impairment ([guidelines.diabetes.ca/docs/cpg/Appendix-7.pdf](https://guidelines.diabetes.ca/docs/cpg/Appendix-7.pdf)).<sup>8</sup> The website also features patient resources for primary care physicians to use with their patients for sick-day management ([guidelines.diabetes.ca/docs/patient-resources/stay-safe-when-you-have-diabetes-and-sick-or-at-risk-of-dehydration.pdf](https://guidelines.diabetes.ca/docs/patient-resources/stay-safe-when-you-have-diabetes-and-sick-or-at-risk-of-dehydration.pdf)), as well as for hypoglycemia identification, treatment, and prevention ([guidelines.diabetes.ca/docs/patient-resources/hypoglycemia-low-blood-sugar-in-adults.pdf](https://guidelines.diabetes.ca/docs/patient-resources/hypoglycemia-low-blood-sugar-in-adults.pdf)).

**Key message 3: discuss progress on self-management goals and address barriers.** People with diabetes should have an individualized plan for activity and nutrition. Intensive, group-based behavioural interventions can help patients to achieve their goals. Patients should be encouraged to seek nutrition counseling from a registered dietitian; in some regions dietitian consultations are available free of charge (eg, Ontario [[www.unlockfood.ca/en/default.aspx](http://www.unlockfood.ca/en/default.aspx)], British Columbia [[www.healthlinkbc.ca/dietitian-services](http://www.healthlinkbc.ca/dietitian-services)], and Manitoba [[www.wrha.mb.ca/prog/nutrition/files/204DADStickerEnglish.pdf](http://www.wrha.mb.ca/prog/nutrition/files/204DADStickerEnglish.pdf)]).

There is evidence that FPs can influence exercise levels.<sup>18</sup> The guidelines recommend routinely setting specific exercise goals with each patient, problem solving to address potential barriers to physical activity, providing information on where and when to exercise, and encouraging self-monitoring (eg, pedometer or other tracking system) are recommended. Diabetes Canada has an interactive tool that can help FPs to provide specific exercise advice ([guidelines.diabetes.ca/selfmanagementeducation/patool](https://guidelines.diabetes.ca/selfmanagementeducation/patool)), as well as various instructional videos demonstrating resistance and core exercises ([guidelines.diabetes.ca/patient-videos](https://guidelines.diabetes.ca/patient-videos)).

Supporting self-management also involves helping people address barriers to a healthy lifestyle including diabetes-related distress and comorbid conditions, such as depression or pain. Family physicians are particularly well positioned to identify the stressors experienced by patients and to support them in addressing their highest-priority needs. More frequent visits for people struggling to achieve their goals, ideally involving a structured team-based approach, can enable more effective implementation of self-management support.<sup>19</sup> For those not practising in contexts with easy access to a multidisciplinary team, resources from Diabetes Canada have been developed to help implement these recommendations in practice ([guidelines.diabetes.ca/reduce-complications/the-5rs](https://guidelines.diabetes.ca/reduce-complications/the-5rs)), including handouts for people

about self-management in general, featuring ABCDES3 for patients ([guidelines.diabetes.ca/docs/patient-resources/my-diabetes-care-not-just-about-blood-sugar.pdf](https://guidelines.diabetes.ca/docs/patient-resources/my-diabetes-care-not-just-about-blood-sugar.pdf)), plus handouts and practice tools that assist in identifying and managing sources of diabetes-related distress ([guidelines.diabetes.ca/selfmanagementeducation/psychosocial](https://guidelines.diabetes.ca/selfmanagementeducation/psychosocial)).

**Cross-cutting theme: tailor discussions based on the needs and preferences of each person.** Family physicians play a key role in managing care and supporting people with diabetes throughout the lifespan. The Diabetes Canada guideline features numerous recommendations that are specific to stages in the lifespan and the cultural contexts of people with diabetes. Specific chapters detail issues relevant to children, women of childbearing age, functionally dependent or frail elderly, as well as Indigenous peoples; we encourage providers to review the key messages and recommendations from these chapters. Diabetes Canada has handouts in French ([guidelines.diabetes.ca/ressourcesfrancaises](https://guidelines.diabetes.ca/ressourcesfrancaises)) and Chinese ([guidelines.diabetes.ca/chinese](https://guidelines.diabetes.ca/chinese)), covering, for example, dietary options for people with a range of backgrounds, and additional cultural adaptations are forthcoming. Diabetes Canada also offers a toll-free number (1 800 BANTING), as well as a resource manual ([guidelines.diabetes.ca/financial-support-and-services](https://guidelines.diabetes.ca/financial-support-and-services)), to support patients with diabetes who have low income or other need to identify local resources and services that might be helpful.

**Discussion.** Guidelines are meant to support clinical judgment not replace it. They should support shared decision making in practice. In that spirit, we present thematic groupings of guideline recommendations for adults with type 2 diabetes that we believe FPs will find important and useful. Specifically, the guidelines encourage 3 crucial conversations that FPs can have regularly with their patients to identify key considerations for comprehensive primary care across the lifespan. Family physicians might like to ask themselves and their patients with diabetes whether there are opportunities at each visit for the following:

- add treatments that might reduce the risk of diabetes complications,
- adjust treatment strategies to keep patients safe, and
- support patients in self-management by addressing their sources of stress and helping them set goals and plan accordingly.

Diabetes management typically requires adaptation over time by both the patient and the health professional with iterative goal setting. As biopsychosocial circumstances change, the treatment recommendations will also need to change. In the context of shared decision making, where the needs and preferences of the patient are considered, FPs can periodically identify opportunities to optimize treatment so that the risk of long-term

complications is minimized and to prevent immediate symptoms or side effects. The recommendations highlighted here offer guidance on how to achieve this. However, the evidence suggests that the best possible outcomes are achieved when FPs organize their diabetes care in a way that incorporates the patient-centred and evidence-based approaches of the chronic care model.

## Limitations

This summary tries to organize information from the full guideline relevant for FPs, but we understand that each practice and each patient is unique. The recommendations prioritized for emphasis in this document might not match the needs of each practice, and the needs of each patient must be assessed through shared decision making. Many patients with type 2 diabetes might not have coverage for medications, and the newer agents might be prohibitively expensive for such patients. It is also plausible that emergent evidence based on real-world data will identify issues with the newer agents that lead to changes in the guideline recommendations. We further recognize that access to supports to implement best practices is not equitably distributed.<sup>20,21</sup> For example, some patients have more ready access to allied health professionals than others. These factors (and others) undoubtedly affect diabetes care and outcomes. While many clinical activities are appropriate and advisable in the primary care of a patient with diabetes, the starting point for this summary was the text of the Diabetes Canada clinical practice guidelines. Many other guidelines related to the care of patients who have diabetes exist. The Diabetes Canada guidelines are aligned with the Canadian Cardiovascular Society guidelines for lipids<sup>16</sup> and the Hypertension Canada guidelines for blood pressure targets.<sup>22</sup> However, not all guidelines have the same recommendations, likely owing to variable weighting of the importance of different outcomes in the evidence base. For instance, recent guidelines from the American College of Physicians encourage higher HbA<sub>1c</sub> targets owing to the lack of evidence that lower targets are associated with reduced risk of cardiovascular outcomes.<sup>23</sup> Additionally, simplified lipid guidelines for FPs de-emphasize targets for low-density lipoprotein to focus on use of evidence-based medications (eg, statins).<sup>24</sup> Finally, it is important to note that this manuscript seeks only to summarize Diabetes Canada guideline recommendations deemed most relevant for the primary care management of adults with type 2 diabetes by a selected, albeit multidisciplinary, group; further information about prevention and management of all types of diabetes can be accessed at [guidelines.diabetes.ca](http://guidelines.diabetes.ca).

## Conclusion

High-quality diabetes care involves a series of periodic conversations about self-management and about both pharmacologic and nonpharmacologic treatments that fit with each patient's goals (ie, shared decision making).

Incorporating these conversations into regular practice provides FPs with opportunities to maximize likely benefits of treatments and decrease the risk of harms, to support patients in initiating and sustaining desired lifestyle changes, and to help patients cope with the burdens of both diabetes and comorbid conditions. Family physicians can access the guideline at [guidelines.diabetes.ca](http://guidelines.diabetes.ca) and might consider downloading the free smartphone app for quick access to guideline chapters and interactive tools at [guidelines.diabetes.ca/app](http://guidelines.diabetes.ca/app). 

**Dr Ivers** is a scientist at Women's College Research Institute in Toronto, Ont, a family physician at Women's College Hospital, Adjunct Scientist in ICES, Assistant Professor in the Department of Family and Community Medicine at the University of Toronto, and Innovation Fellow at the Women's College Hospital Institute for Health System Solutions and Virtual Care. **Ms Jiang** is a medical student at Queen's University in Kingston, Ont. **Dr Alloo** is a family physician at Nymark Medical Centre in Toronto. **Dr Singer** is Associate Professor in the Department of Family Medicine at the University of Manitoba in Winnipeg and a family physician at the Family Medical Centre at the University of Manitoba. **Dr Ngui** is a family physician at Fraser Street Medical in Vancouver, BC, and Clinical Associate Professor in the Department of Family Medicine at the University of British Columbia. **Ms Gall Casey** is Director of Education and Customer Insight at the Canadian Diabetes Association in Toronto. **Dr Yu** is a staff endocrinologist in the Department of Medicine at St Michael's Hospital in Toronto, Chair of the Clinical Practice Guidelines Dissemination and Implementation Committee at the Canadian Diabetes Association, Associate Scientist in the Keenan Research Centre of the Li Ka Shing Knowledge Institute of St Michael's Hospital, and Assistant Professor in the Department of Medicine at the University of Toronto.

### Contributors

All authors participated in the process of prioritizing the recommendations and contributed to preparing the manuscript for submission.

### Competing interests

None declared

### Correspondence

**Dr Noah M. Ivers**; e-mail [noah.ivers@utoronto.ca](mailto:noah.ivers@utoronto.ca)

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