

Recommendations from the Canadian Diabetes Association *2003 guidelines for prevention and management of diabetes and related cardiovascular risk factors*

Stewart B. Harris, MD, MPH, FCFP, FACPM Cynthia N. Lank

In 2003, the Canadian Diabetes Association published evidence-based clinical practice guidelines for prevention and management of diabetes in Canada.¹ This article gives a brief summary of important changes from previous guidelines that are especially relevant to family practice. Readers are referred to the full guideline document¹ for grading and levels of evidence and comprehensive references.

Type 2 diabetes is a looming public health crisis. The increasing prevalence of the disease in Canada can be traced in part to emerging demographic trends that include an aging population,² increasing immigration among high-risk ethnic populations,³ increasing obesity among children and adults,⁴ and low levels of physical activity.⁵ Family physicians will have to care for more patients with diabetes who will live longer and with more advanced disease.⁶

As 80% of people with diabetes will die as a result of a vascular event,⁷ all coronary risk factors must be treated aggressively.⁸ Not only is cardiovascular disease (CVD) the most prevalent complication of diabetes, it is also the costliest.⁹ Reducing the burden of diabetes and CVD would substantially benefit public health and improve patients' quality of life.¹⁰ These facts underscore the importance of early screening and aggressive management of patients with diabetes in family practice.

Screening for prediabetes and diabetes

Prediabetes is a convenient term used to describe impaired glucose tolerance and impaired fasting glucose, dysglycemic states that increase patients' risk of developing both frank diabetes and CVD.¹¹ Type

2 diabetes is now known to be preventable,¹²⁻¹⁴ so it is essential that people at high risk be identified early enough to institute preventive measures. While not everyone with prediabetes progresses to diabetes, hyperglycemia is a continuing risk factor for CVD. Identifying patients with prediabetes will target people who would likely benefit from CVD risk factor reduction and strategies to prevent diabetes.

While the main strategy for preventing progression to diabetes is lifestyle modification (low-calorie, low-fat diet; 150 minutes per week of moderate physical activity; and moderate weight loss), pharmacologic intervention (metformin or acarbose) has also been shown to be effective.¹²⁻¹⁴ The age for initiating screening for diabetes has been lowered to 40.¹⁵ Earlier and more frequent testing might be needed for some high-risk patients. While the recommended screening test remains the fasting plasma glucose test, further testing with a 75-g oral glucose tolerance test is recommended for those with fasting glucose levels of 5.7 to 6.9 mmol/L and other risk factors for diabetes.¹⁶

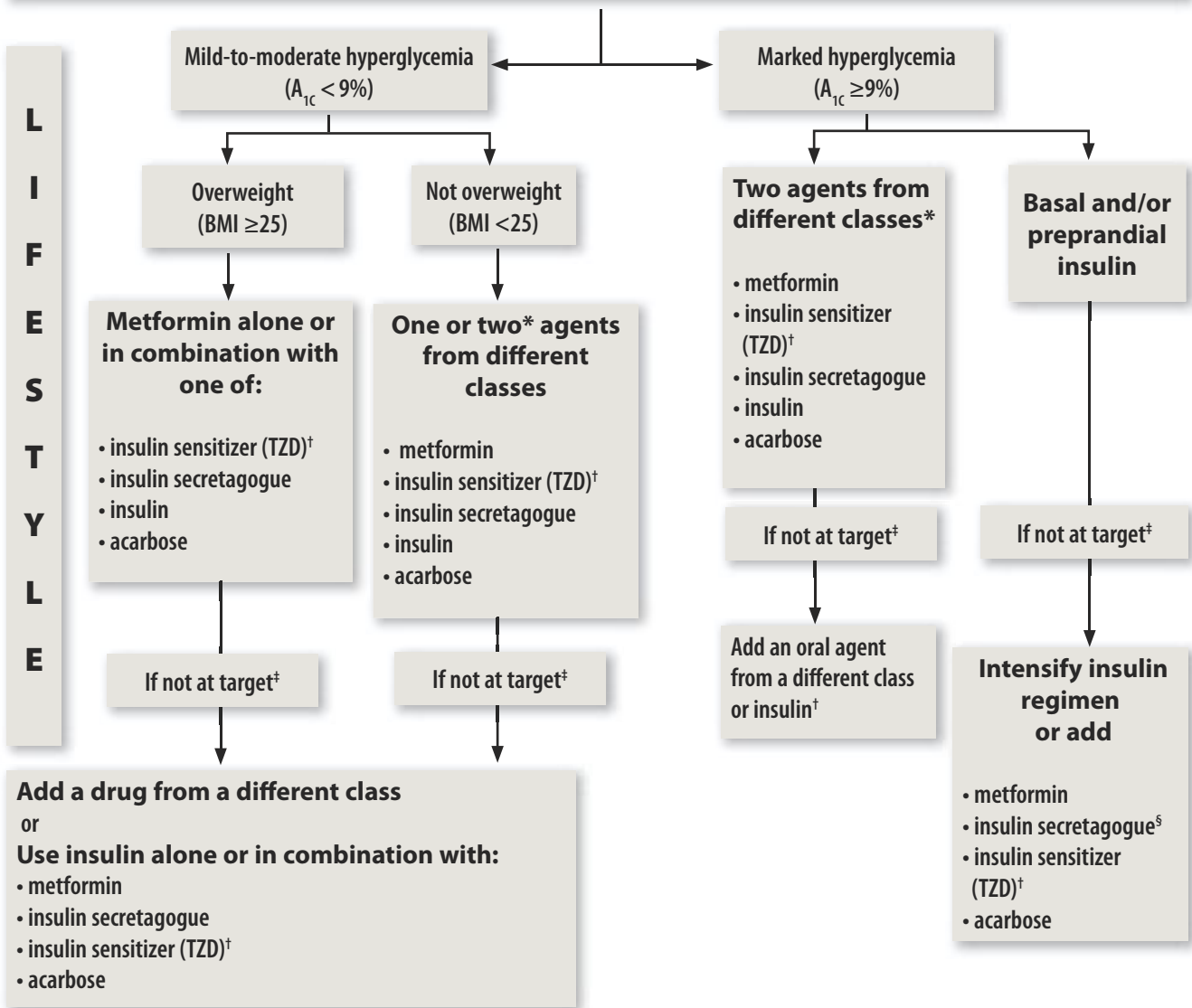
Glycemic control

Many patients have type 2 diabetes for several years before being diagnosed,¹⁷ and even short-term hyperglycemia can result in vascular changes. The new guidelines for managing patients with type 2 diabetes recommend aiming aggressively for glycemic targets as close to normal as early as possible to reduce risk of microvascular^{17,18} and macrovascular¹⁹ diseases (**Figure 1**).

Risk-reduction strategies for CVD

All CVD risk factors must be treated aggressively

Figure 1. Clinical assessment and initiation of nutrition therapy and physical activity



Timely adjustments to and/or addition of oral agents to and/or insulin should be made to attain target A_{1c} levels within 6 to 12 months.

BMI—body mass index

*Can be given as a combined formulation: rosiglitazone plus metformin (Avandamet)

[†]In combination with insulin, insulin sensitizers can increase risk of edema or congestive heart failure. Combination of an insulin sensitizer and insulin is currently not an approved indication in Canada.

[‡]**Glycemic targets:** For most people with diabetes, A_{1c} ≤ 7% (measure every 3 months), fasting or preprandial 4.0 to 7.0 mmol/L, 2 hours postprandial 5.0 to 10.0 mmol/L.

For those in whom it can be safely achieved, A_{1c} ≤ 6% (measure every 3 months), fasting or preprandial 4.0 to 6.0 mmol/L, 2 hours postprandial 5.0–8.0 mmol/L.

[§]If on preprandial insulin, do not add a secretagogue.

to reduce risk of vascular events in people with diabetes.⁸ Therapeutic priorities in the new guidelines (**Table 1**) are first, vascular protection for all people with diabetes, then blood pressure (BP) control for those with hypertension (regardless of whether nephropathy is present), and then renal protection for those with nephropathy (even in the absence of hypertension). The Canadian Diabetes Association's 2003 guideline BP²⁰ and lipid targets²¹ have been harmonized with other major guidelines

Table 1. Priorities for vascular and renal protection

PRIORITY OF CLINICAL ISSUE	TARGET POPULATION	INTERVENTIONS*
1. Vascular protection	All people with diabetes	ACE inhibitor (as indicated) Antiplatelet therapy (80–325 mg/d ASA) Blood pressure control Glycemic control Lifestyle modification: nutrition therapy, regular physical activity, weight management Lipids control Smoking cessation
2. Blood pressure control	All people with diabetes who are hypertensive (regardless of whether nephropathy is present)	Treat according to hypertension guidelines
3. Renal protection	All people with diabetes who have nephropathy (even in the absence of hypertension)	Treat according to nephropathy guidelines

* Listed in alphabetical order: ACE—angiotensin-converting enzyme, ASA—acetylsalicylic acid.

to ensure simplicity and consistency in application.

Lipid management. Diabetes is associated with high risk of CVD, so aggressive management of the full lipid profile is recommended (**Table 2**). A fasting lipid profile (total cholesterol, high-density lipoprotein-C, triglycerides, and calculated low-density lipoprotein-C) should be done at diagnosis and every 1 to 3 years as clinically indicated. If treatment for dyslipidemia is initiated, more frequent screening is appropriate.

Blood pressure control. The recommended BP target is $\leq 130/80$ mm Hg. Treatment should be initiated at thresholds of >130 mm Hg systolic or >80 mm Hg diastolic (**Table 3**). Vascular protection and BP control are more important than only protecting renal function (**Table 1**). Patients at risk of vascular events or with hypertension should receive treatment to reduce risks, but might need additional therapy if they remain proteinuric (**Table 3**). As the presence of proteinuria might direct choice of pharmacologic agent for patients with hypertension,^{22–26} it is imperative that patients with diabetes be screened for nephropathy with a random albumin-to-creatinine ratio and have their creatinine clearance estimated (using, for example, the Cockcroft-Gault formula).

As multiple drugs are often required to lower BP to recommended targets,²⁷ the issue of which

Table 2. Lipid targets and treatment initiation parameters based on diabetic patients' risk of vascular events

RISK LEVEL	LDL-C (MMOL/L)	TC:HDL-C
High (most patients with diabetes)	<2.5 and	<4.0
Moderate (younger age and shorter duration of diabetes, no other complications of diabetes, and no other risk factors for vascular disease)	<3.5 and	<5.0
While TGs are not indicated as a treatment target, almost all patients with elevated TG levels can be identified as having elevated TC:HDL-C. Optimal TG is <1.5 mmol/L; optimal apo B is <0.9 g/L for high-risk patients and <1.05 g/L for moderate-risk patients		
LIPID STATUS	THERAPY*	
LDL-C above target	Lifestyle modification + statin	
High-risk patients with: • TG = 1.5–4.5 mmol/L and • HDL-C <1.0 mmol/L and • LDL-C at target	Lifestyle modification + statin or fibrate	
TG >4.5 mmol/L	Lifestyle modification + fibrate	

apo B—apolipoprotein B, HDL-C—high-density lipoprotein-C, LDL-C—low-density lipoprotein-C, TC—total cholesterol, TG—triglyceride

* When monotherapy plus lifestyle fails to achieve lipid targets, adding a second drug from another class should be considered.

Table 3. Treatment of hypertension in patients with diabetes

Indications for treatment: BP >130 mm Hg or >80 mm Hg despite lifestyle modification

Target: BP ≤ 130/80 mm Hg

If no nephropathy,

Initial drug choices are* any one of the following (in order of preference):

- an ACE inhibitor or
- an ARB or
- a cardioselective β-blocker or
- a thiazide-like diuretic or
- a long-acting calcium channel blocker

If BP targets cannot be reached despite use of one of these drugs alone, consider use of one or more of the above or other antihypertensive drugs in combination.

If nephropathy is present,

First-line drugs are:

Type 1 diabetes: ACE inhibitor

Type 2 diabetes: If creatinine clearance >60 mL/min, ACE inhibitor or ARB; if creatinine clearance ≤ 60 mL/min, ARB

Second-line drugs are:

ACE inhibitor and ARB in combination

or

Add non-dihydropyridine calcium channel blocker (diltiazem, verapamil)

*α-adrenergic blockers are *not* recommended as first-line agents for treating hypertension in people with diabetes.

ACE—angiotensin-converting enzyme, ARB—angiotensin receptor blockers, BP—blood pressure.

antihypertensive agent to use first could be less important than the fact that more than one agent will likely be needed. Although a linear relationship exists between the size of the incremental reduction in BP and hypertension-related complications, treatment decisions need to balance the potential benefits of lowered BP against the adverse effects of polypharmacy.

Conclusion

Patients with diabetes schedule up to nine visits to their family doctors each year, mostly for diabetes-related care.²⁸ This frequent contact affords opportunities for physicians to apply clinical practice guidelines. It is important for family doctors to be aware of and to implement current guidelines, particularly the new indications for screening for diabetes and its complications and the stringent glycemic, lipid, and BP targets

recommended to reduce risk of both macrovascular and microvascular diseases.

Care of patients with diabetes is complex, and barriers to implementing guideline recommendations abound.²⁹ If incorporated into practice, guidelines can help standardize and improve patient care and outcomes. These guidelines will ultimately be judged on their effect on outcomes. As the gatekeepers of the Canadian health care system, family physicians are ideally placed to ensure the recommendations are implemented and, in so doing, to help stem a looming epidemic. ❁

Acknowledgment

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Dr Harris was Chair of the Canadian Diabetes Association 2003 Clinical Practice Guideline Expert Committee. He is the Ian McWhinney Chair of Family Medicine Studies and an Associate Professor in the Department of Family Medicine at the University of Western Ontario in London. Ms Lank was Executive Editor of the “Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada.”

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