

Review of the Canadian Diabetes Risk Assessment Questionnaire (CANRISK)

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Abstract

The CANRISK score is a validated clinical tool for estimating the risk of prediabetes and undiagnosed type 2 diabetes in Canadian adults. It can be used to guide screening decisions but is not diagnostic. High and very high scores warrant HbA1c or other diagnostic testing for diabetes every 3-5 years or annually, respectively. The tool was developed and validated in Canadian cohorts, including multi-ethnic populations, and performs comparably to FINDRISC. Clinicians should apply judgment for high-risk features that are not captured by the CANRISK calculator.

I. HOW TO USE

When to Use

Use the CANRISK score in asymptomatic adults without known diabetes to assess risk of type 2 diabetes or prediabetes.¹ The result can guide whether additional screening tests for diabetes are indicated. The tool may be clinician- or self-administered.

Pearls / Pitfalls

The CANRISK score calculator does not replace diagnostic testing for diabetes. All patients who meet criteria for diabetes screening either by this CANRISK calculator or by other criteria require follow-up testing with a Hemoglobin A1c (HbA1c), fasting plasma glucose, or oral glucose tolerance test.

This score was developed for Canadian adults aged 40-74 years, and may have limited generalizability to non-Canadian populations. CANRISK may still be used in adults outside of this age range, but results should be interpreted with caution. Limited studies have been conducted in adults >75 years of age. For adults aged 18-39, consider a lower cut-off for high risk, such as 19 or 21 points.

CANRISK was modeled after the Finnish Diabetes Risk Scores (FINDRISC) with added predictors (ethnic-

ity, gestational diabetes history and macrosomia, and education level).² This calculator relies on accurate self-reporting for several lifestyle variables (e.g., physical activity, vegetable and fruit intake). Waist circumference improves risk discrimination beyond BMI but is commonly measured incorrectly (over clothing, wrong anatomic site).

The CANRISK calculator does not capture all risk factors for diabetes such as chronic medical conditions (e.g., obstructive sleep apnea, non-alcoholic fatty liver disease), medication use (e.g., steroids, antipsychotics), alcohol use, and socioeconomic features. This score should not be used as a substitute for clinical judgment, as individualized assessment allows incorporation of these additional contributors.

Why Use

Diabetes is highly prevalent, affecting over 10% of the global population.³ It is estimated that over one-third of adults with diabetes are undiagnosed, largely due to a prolonged asymptomatic phase.⁴ Importantly, even in the absence of symptoms, cumulative exposure to hyperglycemia is strongly associated with the development of diabetes-related complications. Fortunately, simple and widely available screening tests can identify individuals in the preclinical stage, enabling earlier detection. Risk assessment tools, such as this calculator, help target screening toward those at highest risk, thereby supporting

proactive diabetes prevention and management efforts. Early detection followed by timely lifestyle or pharmacologic interventions not only delays or prevents disease progression, but also reduces the long-term risk of complications associated with dysglycemia.

The Canadian Task Force for Preventive Health Care (CTFPHC) recommends risk-based screening for type 2 diabetes and acknowledges tools such as CANRISK for one approach to stratify risk.⁵ It does not require laboratory testing for risk assessment, potentially reducing unnecessary blood testing and associated costs.

II. NEXT STEPS

Advice

This calculator is intended for risk assessment purposes. According to the CTFPHC recommendations, patients at low-moderate risk do not require routine screening for diabetes, high risk patients should be screened every 3-5 years, and very high risk patients should be screened annually. HbA1c is the preferred blood test, but fasting plasma glucose (FPG, defined as no caloric intake for ≥ 8 hours preceding testing), or 2-hour plasma glucose (PG) during 75-g oral glucose tolerance test (OGTT) are acceptable alternative diagnostic tests.

Table 1. Criteria for diagnosis of diabetes and prediabetes in nonpregnant individuals

	Normoglycemic	Prediabetes	Diabetes
HbA1c	<5.7%	5.7-6.4%	$\geq 6.5\%$
FPG	<100 mg/dL (<5.5 mmol/L)	100-125 mg/dL (5.6-6.9 mmol/L)	≥ 126 mg/dL (≥ 7.0 mmol/L)
2-h PG during OGTT	<140 mg/dL (<7.8 mmol/L)	140-199 mg/dL (7.8-11.0 mmol/L)	≥ 200 mg/dL (≥ 11.1 mmol/L)
Random glucose	--	--	≥ 200 mg/dL (≥ 11.1 mmol/L) in setting of classic symptoms of hyperglycemia

Unless there is clear evidence of significant hyperglycemia (such as hyperglycemic crises), a diagnosis requires two abnormal results—either from two different types of tests which may be performed at the same time, or from the same test repeated on separate occasions.

For additional guidance on type 2 diabetes screening from the CTFPHC, please refer to the [Canadian Task Force on Preventive Health Care guidelines](#).

Management

All patients would benefit from general advice on healthy lifestyle including diet and exercise. The risk of diabetes

should be reassessed at least every 3-5 years, or sooner with new symptoms or change in risk factors.

III. EVIDENCE

Evidence Appraisal

The CANRISK score was developed to screen for prediabetes and undiagnosed type 2 diabetes in Canadian adults 40-74 years old based on an expert advisory group, a systematic review of diabetes screening questionnaires, and the FINDRISC questionnaire.^{1,2}

Following this initial report, Robinson & Nerenberg conducted a cross-sectional study in 6,223 adults of various ethnicities in Canada and found CANRISK had an AUC of 0.75 (95% CI: 0.73-0.78) compared to oral glucose tolerance test results, outperforming the FINDRISC score (AUC of 0.69).⁶ Further studies validated the score for use in adults of various ethnicities (African, Caribbean, Black, South Asian, Inuit, First Nations, and Métis) in Canada.⁷⁻¹⁰ There is limited data on the performance outside of Canadian populations.¹¹

While created for adults 40-74 years old, the CANRISK score has been evaluated in younger adults as well. Several studies report greater prediction of dysglycemia in adults age 18-39 years if a cutoff score of 19 or 21 is used instead of 33 for determining high risk.^{7,10,12} The score may not be as accurate in young adult women with a history of gestational diabetes.¹³ A validation study of CANRISK in older adults at senior living facilities (mean age 84.3) found that the CANRISK score demonstrated poor discrimination (AUC 0.57).¹⁴

Use of the CANRISK score is endorsed by CTFPHC and Diabetes Canada guidelines to inform screening intervals.^{5,15} A 2022 study of allied healthcare professionals in Canada showed that the risk assessment tool is widely used and valuable, though individuals identified several barriers, including readability and difficulty ascertaining body measurements.¹⁶ Overall, the CANRISK score is a practical, validated tool for diabetes risk stratification in Canadian adults, guiding screening and prevention. It is not diagnostic, and results should be interpreted in clinical context with appropriate confirmatory testing and counseling.

Formula

The CANRISK score is calculated by the addition of the selected points ([Table 2](#)).

Table 2. CANRISK score factors

Question		Points	
Age, years [†]	18-44	0	
	45-54	7	
	55-64	13	
	65-74	15	
Gender	Female	0	
	Male	6	
BMI	<25 kg/m ²	0	
	25-29 kg/m ²	4	
	30-34 kg/m ²	9	
	≥35 kg/m ²	14	
Waist circumference at the level of belly button (measure after breathing out)	Men	<94 cm (<37 in)	0
		94-102 cm (37-40 in)	4
		>102 cm (>40 in)	6
	Women	<80 cm (<31.5 in)	0
		80-88 cm (31.5-35 in)	4
		>88 cm (>35 in)	6
Physical activity such as brisk walking for at least 30 minutes each day	Yes	0	
	No	1	
Frequency of vegetable or fruit consumption	Every day	0	
	Not every day	2	
History of high blood pressure OR prescription for high blood pressure	No or don't know	0	
	Yes	4	
History of high blood sugar either from a blood test, during an illness, or during pregnancy	No or don't know	0	
	Yes	14	
Given birth to a large baby weighing 9 pounds (4.1 kg) or more	No, don't know, or not applicable	0	
	Yes	1	
Family history of diabetes (do not count multiple children or siblings twice)	No or don't know	0	
	One of the following: mother, father, brothers/sisters, children	2	
	Two of the following: mother, father, brothers/sisters, children	4	
	Three of the following: mother, father, brothers/sisters, children	6	
	All of the following: mother, father, brothers/sisters, children	8	
Ethnic groups of biological (blood) parents (if more than one group applies, choose the one with the highest score)	White (Caucasian)	0	
	Aboriginal	3	
	Other non-white (Latin American, Arab, West Asian)	3	
	Black (Afro-Caribbean)	5	
	East Asian (Chinese, Vietnamese, Filipino, Korean, etc.)	10	
	South Asian (East Indian, Pakistani, Sri Lankan, etc.)	11	
The highest level of education completed	University or college degree	0	
	Some college or university	0	
	High school diploma	1	
	Some high school or less	5	

[†]The CANRISK was created for adult populations aged 40-74. Scores for ages <40 are based on the CTFPHC recommendations on screening for T2D in adults

Facts & Figures

Table 3. Interpretation of CANRISK score

CANRISK Score	Risk Level	10-Year Risk of Diabetes [†]	Recommendation
0-32	Low-moderate	1-17%	The CTFPHC recommends not routinely screening for type 2 diabetes.
33-42	High	33%	The CTFPHC recommends screening every 3-5 years with HbA1c.
≥43	Very high	50%	The CTFPHC recommends annual screening with HbA1c.

[†]These predictions are based on the predictive value of the FINDRISC calculator.

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