

Updated Review of the American Diabetes Association (ADA) Risk Calculator

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Abstract

The ADA risk calculator is a validated, non-invasive tool for asymptomatic adults without known diabetes to estimate type 2 diabetes risk and guide screening decisions. It uses age, sex, BMI, family history, hypertension, and physical activity, with a score ≥ 5 indicating high risk and need for screening. The calculator is not for symptomatic patients or high-risk groups. It has good discrimination (AUC 0.78-0.83) and high negative predictive value (96-99%), but low positive predictive value (10%), so abnormal results require confirmatory testing (e.g., HbA1c, FPG, or OGTT). It is a valuable adjunct alongside ADA screening criteria to identify individuals who may have diabetes and benefit from further testing.

I. HOW TO USE

When to Use

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

This calculator is not intended for use in patients with symptoms of hyperglycemia (e.g. polydipsia, polyuria, fatigue, blurred vision, recurrent infections, delayed wound healing). This calculator is also not recommended for use in particularly high-risk populations, which include patients with exposure to particular medicines (e.g., glucocorticoids, some HIV medications, and second-generation antipsychotic medications), pregnancy, cystic fibrosis, HIV, periodontal disease, history of pancreatitis, history of prediabetes or gestational diabetes, or history of organ transplantation. For these patients, earlier and more frequent screening for diabetes is indicated.

Pearls / Pitfalls

The American Diabetes Association (ADA) integrates this risk calculator as a simple, adjunctive resource to determine if a patient should be screened for diabetes. By the 2025 Standards of Care, this calculator should be used in addition to the following general population screening criteria¹:

- Screen all adults aged ≥ 35 years at least every 3 years

- Screen adults with BMI ≥ 25 kg/m² (≥ 23 kg/m² in Asian populations) who have ≥ 1 additional risk factor for diabetes
- Screen children and adolescents aged ≥ 10 years or at puberty (whichever comes first) if overweight (BMI $\geq 85^{\text{th}}$ percentile) or obese (BMI $\geq 95^{\text{th}}$ percentile) with ≥ 1 additional risk factor for diabetes

Risk factors for diabetes are defined as:

- **Adult:** A first-degree relative with diabetes, high-risk race and/or ethnicity (e.g., African American, Latino, Native American, and Asian American), history of cardiovascular disease, hypertension, dyslipidemia with high triglycerides >250 mg/dL and/or low HDL cholesterol <35 mg/dL, polycystic ovary syndrome (PCOS), insulin resistance (examples include acanthosis nigricans, severe obesity, or metabolic dysfunction-associated steatotic liver disease), and sedentary lifestyle
- **Pediatric:** A first-degree relative with diabetes, high-risk race and/or ethnicity (e.g., African American, Latino, Native American, and Asian American), insulin resistance, and maternal diabetes during the child's gestation

By comparison, the U.S. Preventive Services Task Force (USPSTF) guidance recommends screening for prediabetes and diabetes in adults aged 35-70 years with overweight or obesity.² With either guideline, the ADA risk calculator can serve as a practical adjunct to help

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

	Normoglycemic	Prediabetes	Diabetes
HbA1c	<5.7%	5.7-6.4%	≥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 the presence of classic symptoms of hyperglycemia

identify individuals who may benefit from earlier evaluation.

Notably, the ADA risk calculator does not take into account several of the aforementioned risk factors including race and/or ethnicity, cardiovascular disease, dyslipidemia, PCOS, insulin resistance, and maternal diabetes.

This ADA risk calculator does not replace diagnostic testing for diabetes. All patients who meet criteria for diabetes screening either by this ADA risk calculator or by other criteria require follow-up testing with a fasting plasma glucose, HbA1c, and/or oral glucose tolerance test.

Why Use

Diabetes is highly prevalent, affecting over 10% of the global population, and projected to rise.³ Estimates state that more than 1 in 3 adults living with diabetes are undiagnosed, owing largely to an extended presymptomatic phase.³ Even while asymptomatic, the length of time a person is exposed to elevated blood glucose is closely linked to the risk of developing complications. Fortunately, straightforward screening tests are available to identify individuals in the preclinical stage and allow for earlier detection. Use of risk calculators like this one help focus testing on those most likely to benefit and support proactive diabetes prevention strategies. Timely diagnosis and interventions (lifestyle or medical) have been shown not only to prevent the progression of disease, but also can lower the risk of long-term complications from dysglycemia.⁴⁻⁶

II. NEXT STEPS

Advice

This calculator is intended for risk assessment purposes. Patients with an elevated score (≥5) or another indication for diabetes screening should undergo formal diagnostic testing for diabetes.

HbA1c, 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) can each be used as diagnostic tests for diabetes with interpretation provided in [Table 1](#).

Unless there is clear evidence of significant hyperglycemia (such as hyperglycemic crises), a diagnosis re-

quires 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.

Management

A score of 5 or higher on the ADA risk calculator indicates that the patient is at a high risk for type 2 diabetes. Confirmatory testing such as FPG or HbA1c is recommended. Patients should also be counseled on lifestyle modifications, including healthy diet and regular physical activity, to reduce diabetes risk. Referral to evidence-based intensive lifestyle interventions, including the National Diabetes Prevention Program (N-DPP), or medical nutrition therapy, should be considered. In patients who are found to have prediabetes after screening, repeat screening for diabetes at 1-year intervals is reasonable, or sooner with new symptoms or change in risk.

In addition to lifestyle intervention, metformin should be considered for diabetes prevention in patients without diabetes who are at particularly high risk, including those aged 25-59 years with BMI ≥35 kg/m², fasting plasma glucose ≥110 mg/dL, and higher HbA1c ≥6.0%, and in those with a history of gestational diabetes mellitus.⁷

A score of less than 5 suggests lower risk, but patients should still receive general advice on maintaining a healthy lifestyle and have their risk reassessed periodically. It is important to note that some factors not captured by this calculator may still place the patient at risk for type 2 diabetes.

In people without prediabetes or diabetes after screening, repeat screening at a minimum of 3-year intervals is reasonable, or sooner with new symptoms or change in risk.

III. EVIDENCE

Evidence Appraisal

The ADA risk calculator was developed in 2009 using a cross-sectional design with data from 5,258 National Health and Nutrition Examination Survey (NHANES) 1999-2004 participants without known diabetes in the United States over the age of 20 years using fasting plasma glucose (FPG) measurements.⁸ The outcome of interest was undiagnosed diabetes, defined as FPG ≥126 mg/dL

without a prior diagnosis of diabetes. The included variables (age, sex, BMI, family history, hypertension, and physical activity) were selected based on clinical relevance and statistical significance with logistic regression. The calculator was then externally validated in NHANES 2005-2006 (n=1,640) and Atherosclerosis Risk in Communities (ARIC)/Cardiovascular Health Study (CHS) (n=19,728) cohorts, a cutoff of 5 or more points achieved an area under the curve (AUC) of 0.78-0.83 and sensitivity 72-79% with specificity 62-67%. The positive predictive value was 10% and the negative predictive value was 96-99%. A study in 2017 compared the performance of the ADA risk calculator against a similar CDC scoring system on 9,391 participants without diabetes in the NHANES 2009-2012 cohort.⁹ This study additionally found that the ADA score performed better (AUC 0.77), but could be enhanced with race and/or ethnicity data and HDL and LDL cholesterol levels. By comparison, the FINDRISC, which was designed for European adults, had a similar AUC of 0.75 for undiagnosed diabetes in an NHANES 1999-2010 cohort.¹⁰ Another study in 2017 applied the calculator to 1,415 subjects in the 4th Hong Kong Cardiovascular Risk Factors Prevalence Study in 2010-2012 and found that the risk test showed good accuracy (AUC 0.725) and outperformed age- and BMI-based screening criteria.¹¹ This risk calculator has been adapted into the ADA Standards of Care guidelines for diagnosis of diabetes with slight variation, adding gestational diabetes as part of the model.¹

The calculator has many unique strengths including a large, nationally representative sample, with rigorous validation in independent cohorts demonstrating consistent performance and easy applicability by patients or health-care providers without need for invasive or laboratory testing. Limitations of the calculator include the potential for self-reporting bias with variables such as physical activity, and low positive predictive value, necessitating additional testing. The tool is also not validated in pregnancy and should not be applied to high-risk populations.

The ADA risk calculator was formulated for U.S. adults; however, several analogous tools were developed internationally, including [FINDRISC](#) for European adult populations, the Cambridge Risk Score for the U.K., [AUSDRISK](#) for Australia, and [CANRISK](#) for Canada. These calculators share many common ques-

tions, but the weight of individual variables is tailored to population-specific data. More complex diabetes risk models have also been developed using electronic health record data to support personalized risk stratification and prevention strategies, such as the EHR-based model described by Kent et al.¹² These tools, however, differ in purpose and complexity and are not intended for use as simple, patient-facing screening instruments like the ADA risk calculator.

Formula

The point system for the ADA Risk Calculator is shown in [Table 2](#).

Table 2. The American Diabetes Association Risk Calculator

Addition of the selected points:		
	Value	Points
Age, years	<40	0
	40-49	+1
	50-59	+2
	60	+3
Sex	Female	0
	Male	+1
Previous gestational diabetes (if female)	No	0
	Yes	+1
First-degree relative with diabetes	No	0
	Yes	+1
Hypertension	No	0
	Yes	+1
Physically active	No	0
	Yes	+1
BMI, kg/m ²	<25	0
	25 to <30	+1
	30 to <40	+2
	≥40	+3

Facts & Figures

Interpretation

Individuals with an ADA risk score ≥5 should undergo formal screening for diabetes. Lower scores are not considered high risk; however, clinicians should confirm that the patient does not meet diabetes screening criteria by other risk factors outlined in the ADA guidelines.

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