

Screening for Type 2 Diabetes Mellitus in Adults: Recommendations and Rationale

U.S. Preventive Services Task Force*

This statement summarizes the current U.S. Preventive Services Task Force (USPSTF) recommendations on screening for type 2 diabetes in adults and updates the 1996 recommendations on this topic. The complete USPSTF recommendation and rationale statement on this topic, which includes a brief review of the supporting evidence, is available through the USPSTF Web site (www.preventiveservices.ahrq.gov) and the National Guideline Clearinghouse (www.guideline.gov) and in print through the Agency for Healthcare Research and Quality (AHRQ) Publications Clearinghouse (call 800-358-9295 or e-mail ahrqpubs@ahrq.gov). The

complete information on which this statement is based, including evidence tables and references, is available in the accompanying article in this issue and in the summary of the evidence and systematic evidence review on this topic on the Web sites already mentioned. The summary of the evidence is also available in print through the AHRQ Publications Clearinghouse.

Ann Intern Med. 2003;138:212-214.

www.annals.org

See related article on pp 215-229.

* For a list of the members of the U.S. Preventive Services Task Force, see the Appendix.

SUMMARY OF THE RECOMMENDATIONS

The U.S. Preventive Services Task Force (USPSTF) concludes that the evidence is insufficient to recommend for or against routinely screening asymptomatic adults for type 2 diabetes, impaired glucose tolerance, or impaired fasting glucose. This is a **grade I recommendation**. (See **Appendix Table 1** for a description of the USPSTF classification of recommendations.)

The USPSTF found good evidence that available screening tests can accurately detect type 2 diabetes during an early, asymptomatic phase. (See Appendix Table 2 for a description of the USPSTF classification of levels of evidence.) The USPSTF also found good evidence that intensive glycemic control in patients with clinically detected (not screening detected) diabetes can reduce the progression of microvascular disease. However, the benefits of tight glycemic control on microvascular clinical outcomes take years to become apparent. It has not been demonstrated that beginning diabetes control early as a result of screening provides an incremental benefit compared with initiating treatment after clinical diagnosis. Existing studies have not shown that tight glycemic control significantly reduces macrovascular complications, including myocardial infarction and stroke. The USPSTF found poor evidence to assess possible harms of screening. As a result, the USPSTF could not determine the balance of benefits and harms of routine screening for type 2 diabetes.

The USPSTF recommends screening for type 2 diabetes in adults with hypertension or hyperlipidemia. This is a **grade B recommendation**.

The USPSTF found good evidence that, in adults who have hypertension and clinically detected diabetes, lowering blood pressure below conventional target blood pressure values reduces the incidence of cardiovascular events and cardiovascular mortality; this evidence is considered fair when extrapolated to cases of diabetes detected by screening. Among patients with hyperlipidemia, there is good evidence that detecting di-

abetes substantially improves estimates of individual risk for coronary heart disease, which is an integral part of decisions about lipid-lowering therapy.

CLINICAL CONSIDERATIONS

In the absence of evidence of direct benefits of routine screening for type 2 diabetes, the decision to screen individual patients is a matter of clinical judgment. Patients at increased risk for cardiovascular disease may benefit most from screening for type 2 diabetes, since management of cardiovascular risk factors leads to reductions in major cardiovascular events. Clinicians should assist patients in making that choice. In addition, clinicians should be alert to symptoms suggestive of diabetes (for example, polydipsia and polyuria) and test anyone with these symptoms.

Screening for diabetes in patients with hypertension or hyperlipidemia should be part of an integrated approach to reduce cardiovascular risk. Lower targets for blood pressure (that is, diastolic blood pressure \leq 80 mm Hg) are beneficial for patients with diabetes and high blood pressure. The third report of the Adult Treatment Panel III of the National Cholesterol Education Program recommends lower targets for low-density lipoprotein cholesterol for patients with diabetes. Attention to other risk factors, such as physical inactivity, diet, and overweight, is also important, both to decrease risk for heart disease and to improve glucose control.

Three tests have been used to screen for diabetes: fasting plasma glucose (FPG), 2-hour postload plasma glucose, and hemoglobin A_{1c}. The American Diabetes Association (ADA) has recommended the FPG test for screening (values \geq 6.99 mmol/L [\geq 126 mg/dL] indicate diabetes) because it is easier and faster to perform, more convenient and acceptable to patients, and less expensive than other screening tests. The FPG test is more reproducible than the

2-hour plasma glucose test, has less intraindividual variation, and has similar predictive value for development of microvascular complications of diabetes. Compared with the FPG test, the 2-hour plasma glucose test may lead to more individuals being diagnosed as diabetic. Hemoglobin A_{1c} is more closely related to FPG than to 2-hour plasma glucose, but at the usual cut-points it is less sensitive in detecting lower levels of hyperglycemia. The random capillary blood glucose test has been shown to have reasonable sensitivity (75% at a cut-point of ≥ 6.66 mmol/L [≥ 120 mg/dL]) in detecting persons who have an FPG level greater than or equal to 6.99 mmol/L (≥ 126 mg/dL) or a 2-hour plasma glucose level greater than or equal to 11.1 mmol/L (≥ 200 mg/dL), if results are interpreted according to age and time since last meal; however, the random blood glucose test is less well standardized for screening for diabetes.

The ADA recommends confirmation of a diagnosis of diabetes with a repeated FPG test on a separate day, especially for patients with borderline FPG results and patients with normal FPG levels for whom suspicion of diabetes is high. The optimal screening interval is not known. The ADA, on the basis of expert opinion, recommends an interval of every 3 years but shorter intervals in high-risk persons.

Regardless of whether the clinician and patient decide to screen for diabetes, patients should be encouraged to exercise, eat a healthy diet, and maintain a healthy weight, choices that may prevent or forestall the development of type 2 diabetes. More aggressive interventions to establish and maintain these behaviors should be considered for patients at increased risk for diabetes, such as those who are overweight, have a family history of diabetes, or have a racial or ethnic background associated with an increased risk (for example, Native American persons). Intensive programs of lifestyle modification (diet, exercise, and behavior) should also be considered for patients who have impaired fasting glucose or impaired glucose tolerance, since several large trials have demonstrated that these programs can significantly reduce the incidence of diabetes in these patients. Evidence and recommendations regarding counseling about diet, physical activity, and obesity are provided in the USPSTF evidence summaries "Counseling to Promote a Healthy Diet," "Counseling to Promote Physical Activity," and "Screening and Treatment for Obesity in Adults," available on the Agency for Healthcare Research and Quality Web site at www.preventiveservices.ahrq.gov.

The brief review of the evidence that is normally included in USPSTF recommendation statements is available in the complete recommendation and rationale statement on the USPSTF Web site (www.preventiveservices.ahrq.gov).

RECOMMENDATIONS OF OTHERS

The ADA acknowledged that data from prospective studies were insufficient to determine the benefits of diabetes screening and thus concluded that the decision to test

for diabetes should be based on clinical judgment and patient preference (1). On the basis of expert consensus, the ADA recommends clinicians consider screening for diabetes with the FPG test beginning at age 45 years and at a younger age for individuals with such risk factors as family history, overweight, and hypertension, among others. The American College of Obstetricians and Gynecologists endorses the ADA recommendations (2). The American Heart Association recommends measuring fasting blood glucose in persons 20 years of age and older according to risk for diabetes, as part of overall risk assessment for cardiovascular disease (3). The Canadian Task Force on Preventive Health Care is currently updating its recommendations on diabetes screening.

Appendix Table 1. U.S. Preventive Services Task Force Grades and Recommendations*

Grade	Recommendation
A	The USPSTF strongly recommends that clinicians routinely provide [the service] to eligible patients. <i>The USPSTF found good evidence that [the service] improves important health outcomes and concludes that benefits substantially outweigh harms.</i>
B	The USPSTF recommends that clinicians routinely provide [the service] to eligible patients. <i>The USPSTF found at least fair evidence that [the service] improves important health outcomes and concludes that benefits outweigh harms.</i>
C	The USPSTF makes no recommendation for or against routine provision of [the service]. <i>The USPSTF found at least fair evidence that [the service] can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.</i>
D	The USPSTF recommends against routinely providing [the service] to asymptomatic patients. <i>The USPSTF found at least fair evidence that [the service] is ineffective or that harms outweigh benefits.</i>
I	The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing [the service]. <i>Evidence that the [service] is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.</i>

* The U.S. Preventive Services Task Force (USPSTF) grades its recommendations according to one of five classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms).

Appendix Table 2. U.S. Preventive Services Task Force Grades for Strength of Overall Evidence*

Grade	Definition
Good	Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes
Fair	Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies; generalizability to routine practice; or indirect nature of the evidence on health outcomes
Poor	Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes

* The U.S. Preventive Services Task Force (USPSTF) grades the quality of the overall evidence for a service on a three-point scale (good, fair, poor).

APPENDIX

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*Members of the Task Force at the time these recommendations were finalized.

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References

1. Screening for diabetes. American Diabetes Association. *Diabetes Care*. 2002; 25:S21-S24.
2. American College of Obstetricians and Gynecologists. Guidelines for Women's Health Care. 2nd ed. Washington, DC: American Coll of Obstetricians and Gynecologists; 2002:210-3.
3. Pearson TA, Blair SN, Daniels SR, Eckel RH, Fair JM, Fortmann SP, et al. AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update: Consensus Panel Guide to Comprehensive Risk Reduction for Adult Patients Without Coronary or Other Atherosclerotic Vascular Diseases. American Heart Association Science Advisory and Coordinating Committee. *Circulation*. 2002;106:388-91. [PMID: 12119259]