



## Complete Summary

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### GUIDELINE TITLE

Standards of medical care in diabetes. II. Testing for prediabetes and diabetes in asymptomatic patients.

### BIBLIOGRAPHIC SOURCE(S)

American Diabetes Association (ADA). Standards of medical care in diabetes. II. Testing for pre-diabetes and diabetes in asymptomatic patients. Diabetes Care 2008 Jan;31(Suppl 1):S13-4.

### GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American Diabetes Association (ADA). Standards of medical care in diabetes. II. Screening for diabetes. Diabetes Care 2007 Jan;30(Suppl 1):S5-7.

## COMPLETE SUMMARY CONTENT

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## SCOPE

### DISEASE/CONDITION(S)

- Type 2 diabetes mellitus
- Pre-diabetes (impaired fasting glucose [IFG] or impaired glucose tolerance [IGT])

### GUIDELINE CATEGORY

Evaluation  
Risk Assessment  
Screening

### **CLINICAL SPECIALTY**

Endocrinology  
Family Practice  
Internal Medicine  
Pediatrics  
Preventive Medicine

### **INTENDED USERS**

Advanced Practice Nurses  
Allied Health Personnel  
Nurses  
Physician Assistants  
Physicians  
Public Health Departments

### **GUIDELINE OBJECTIVE(S)**

- To make recommendations regarding testing for pre-diabetes and type 2 diabetes in asymptomatic patients
- To provide clinicians, patients, researchers, payers, and other interested individuals with the components of diabetes care, treatment goals, and tools to evaluate the quality of care

### **TARGET POPULATION**

- Asymptomatic adults at risk of developing type 2 diabetes mellitus (i.e., individuals with body mass index [BMI]  $\geq 25$  kg/m<sup>2</sup> and additional risk factors)
- Asymptomatic adults  $\geq 45$  years of age without risk factors
- Children at risk of developing diabetes mellitus (i.e., those with a BMI  $> 85^{\text{th}}$  percentile for age and sex, weight for height  $> 85^{\text{th}}$  percentile, or weight  $> 120\%$  of ideal for height, plus two additional risk factors)

### **INTERVENTIONS AND PRACTICES CONSIDERED**

1. Assessment of risk factors for type 2 diabetes
2. Testing for pre-diabetes and type 2 diabetes with fasting plasma glucose [FPG] or 2-hour oral glucose tolerance test [OGTT]
3. Repeat testing if needed
4. Identifying and treating other cardiovascular (CVD) risk factors if appropriate

**Note:** Guideline developers considered but did not recommend screening for type 1 diabetes in asymptomatic patients

### **MAJOR OUTCOMES CONSIDERED**

## METHODOLOGY

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

Not stated

### **NUMBER OF SOURCE DOCUMENTS**

Not stated

### **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

### **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

#### **American Diabetes Association's Evidence Grading System for Clinical Practice Recommendations**

#### **A**

Clear evidence from well-conducted, generalizable, randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted multicenter trial
- Evidence from a meta-analysis that incorporated quality ratings in the analysis
- Compelling non-experimental evidence (i.e., "all or none" rule developed by the Center for Evidence Based Medicine at Oxford\*)

Supportive evidence from well-conducted randomized, controlled trials that are adequately powered, including:

- Evidence from a well-conducted trial at one or more institutions
- Evidence from a meta-analysis that incorporated quality ratings in the analysis

*\*Either all patients died before therapy and at least some survived with therapy, or some patients died without therapy and none died with therapy. Example: use of insulin in the treatment of diabetic ketoacidosis.*

#### **B**

Supportive evidence from well-conducted cohort studies, including:

- Evidence from a well-conducted prospective cohort study or registry
- Evidence from a well-conducted meta-analysis of cohort studies

Supportive evidence from a well-conducted case-control study

## **C**

Supportive evidence from poorly controlled or uncontrolled studies, including:

- Evidence from randomized clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results
- Evidence from observational studies with high potential for bias (such as case series with comparison with historical controls)
- Evidence from case series or case reports

Conflicting evidence with the weight of evidence supporting the recommendation

## **E**

Expert consensus or clinical experience

### **METHODS USED TO ANALYZE THE EVIDENCE**

Systematic Review

### **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

### **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

### **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Not stated

### **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Recommendations have been assigned ratings of A, B or C, depending on the quality of evidence (see "Rating Scheme for the Strength of the Evidence"). Expert opinion (E) is a separate category for recommendations in which there is as yet no evidence from clinical trials, in which clinical trials may be impractical, or in which there is conflicting evidence. Recommendations with an "A" rating are based on large, well-designed clinical trials or well done meta-analyses. Generally, these recommendations have the best chance of improving outcomes when

applied to the population to which they are appropriate. Recommendations with lower levels of evidence may be equally important but are not as well supported.

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The recommendations were reviewed and approved in October 2007 by the Professional Practice Committee and, subsequently, by the Executive Committee of the Board of Directors.

# **RECOMMENDATIONS**

## **MAJOR RECOMMENDATIONS**

The evidence grading system (A through C, E) is defined at the end of the "Major Recommendations" field.

### **Testing for Pre-diabetes and Diabetes in Asymptomatic Patients**

- Testing to detect pre-diabetes and type 2 diabetes in asymptomatic people should be considered in adults who are overweight or obese (body mass index [BMI]  $\geq 25$  kg/m<sup>2</sup>) and who have one or more additional risk factors for diabetes. In those without these risk factors, testing should begin at age 45. (B)
- If tests are normal, repeat testing should be carried out at least at 3-year intervals. (E)
- To test for pre-diabetes or diabetes, either a fasting plasma glucose (FPG) test or a 2-h oral glucose tolerance test (OGTT) (75-g glucose load) or both are appropriate. (B)
- An oral glucose tolerance test may be considered in patients with impaired fasting glucose (IFG) to better define the risk of diabetes. (E)
- In those identified with pre-diabetes, identify and, if appropriate, treat other cardiovascular disease (CVD) risk factors. (B)

### **Criteria for Testing for Pre-Diabetes and Diabetes in Asymptomatic Adult Individuals**

- |    |   |
|----|---|
| 1. | Testing should be considered in all adults who are overweight (BMI $\geq 25$ kg/m <sup>2</sup> *) and have additional risk factors: <ul style="list-style-type: none"><li>• Physical inactivity</li><li>• First-degree relative with diabetes</li></ul> |
|----|---|

	<ul style="list-style-type: none"> <li>• Members of a high-risk ethnic population (e.g., African American, Latino, Native American, Asian American, and Pacific Islander)</li> <li>• Women who delivered a baby weighing &gt;9 lb or have been diagnosed with gestational diabetes mellitus (GDM)</li> <li>• Hypertension (<math>\geq 140/90</math> mmHg or on therapy for hypertension)</li> <li>• High-density lipoprotein (HDL) cholesterol level &lt;35 mg/dL (0.90 mmol/L) and/or a triglyceride level &gt;250 mg/dL (2.82 mmol/L)</li> <li>• Women with polycystic ovarian syndrome (PCOS)</li> <li>• Impaired glucose tolerance (IGT) or IFG on previous testing</li> <li>• Other clinical conditions associated with insulin resistance (e.g., severe obesity and acanthosis nigricans)</li> <li>• History of CVD</li> </ul>
2.	In the absence of the above criteria, testing for pre-diabetes and diabetes should begin at age 45 years
3.	If results are normal, testing should be repeated at least at 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.

\*At-risk BMI may be lower in some ethnic groups.

### Testing for Type 2 Diabetes in Asymptomatic Children

Criteria	<ul style="list-style-type: none"> <li>• Overweight (BMI &gt;85<sup>th</sup> percentile for age and sex, weight for height &gt;85<sup>th</sup> percentile, or weight &gt;120% of ideal for height)</li> </ul> <p>Plus any two of the following risk factors:</p> <ul style="list-style-type: none"> <li>• Family history of type 2 diabetes in first or second-degree relative</li> <li>• Race/ethnicity (Native American, African American, Latino, Asian American, and Pacific Islander)</li> <li>• Signs of insulin resistance or conditions associated with insulin resistance (e.g., acanthosis nigricans, hypertension, dyslipidemia, or PCOS)</li> <li>• Maternal history of diabetes or gestational diabetes mellitus</li> </ul>
Age of initiation	Age 10 years or at onset of puberty, if puberty occurs at a younger age
Frequency	Every 2 years
Test	FPG preferred

### Definitions:

### American Diabetes Association's Evidence Grading System for Clinical Practice Recommendations

## **A**

Clear evidence from well-conducted, generalizable, randomized controlled trials that are adequately powered, including:

- Evidence from a well-conducted multicenter trial
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Supportive evidence from well-conducted randomized, controlled trials that are adequately powered, including:

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Supportive evidence from well-conducted cohort studies, including:

- Evidence from a well-conducted prospective cohort study or registry
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Supportive evidence from a well-conducted case-control study

## **C**

Supportive evidence from poorly controlled or uncontrolled studies, including:

- Evidence from randomized clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results
- Evidence from observational studies with high potential for bias (such as case series with comparison with historical controls)
- Evidence from case series or case reports

Conflicting evidence with the weight of evidence supporting the recommendation

## **E**

Expert consensus or clinical experience

## **CLINICAL ALGORITHM(S)**

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Screening of high-risk asymptomatic patients for diabetes and pre-diabetes may help to prevent the progression of pre-diabetes to diabetes and reduce the risk of complications of diabetes by early recognition and treatment.

### POTENTIAL HARMS

Not stated

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- Evidence is only one component of decision-making. Clinicians care for patients, not populations; guidelines must always be interpreted with the needs of the individual patient in mind. Individual circumstances such as comorbid and coexisting diseases, age, education, disability, and, above all, patient's values and preferences must also be considered and may lead to different treatment targets and strategies. Also, conventional evidence hierarchies such as the one adapted by the American Diabetes Association may miss some nuances that are important in diabetes care. For example, while there is excellent evidence from clinical trials supporting the importance of achieving glycemic control, the optimal way to achieve this result is less clear. It is difficult to assess each component of such a complex intervention.
- While individual preferences, comorbidities, and other patient factors may require modification of goals, targets that are desirable for most patients with diabetes are provided. These standards are not intended to preclude more extensive evaluation and management of the patient by other specialists as needed.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

In recent years, numerous health care organizations, ranging from large health care systems such as the U.S. Veteran's Administration to small private practices have implemented strategies to improve diabetes care. Successful programs have published results showing improvement in process measures such as measurement of A1C, lipids, and blood pressure. Successful interventions have

been focused at the level of health care professionals, delivery systems, and patients. Features of successful programs reported in the literature include:

- Improving health care professional education regarding the standards of care through formal and informal education programs.
- Delivery of diabetes self-management education (DSME), which has been shown to increase adherence to standard of care.
- Adoption of practice guidelines, with participation of health care professionals in the process. Guidelines should be readily accessible at the point of service, such as on patient charts, in examining rooms, in "wallet or pocket cards," on Personal Digital Assistants (PDAs), or on office computer systems. Guidelines should begin with a summary of their major recommendations instructing health care professionals what to do and how to do it.
- Use of checklists that mirror guidelines have been successful at improving adherence to standards of care.
- Systems changes, such as provision of automated reminders to health care professionals and patients, reporting of process and outcome data to providers, and especially identification of patients at risk because of failure to achieve target values or a lack of reported values.
- Quality improvement programs combining continuous quality improvement or other cycles of analysis and intervention with provider performance data.
- Practice changes, such as clustering of dedicated diabetes visits into specific times within a primary care practice schedule and/or visits with multiple health care professionals on a single day and group visits.
- Tracking systems either with an electronic medical record or patient registry have been helpful at increasing adherence to standards of care by prospectively identifying those requiring assessments and/or treatment modifications. They likely could have greater efficacy if they suggested specific therapeutic interventions to be considered for a particular patient at a particular point in time.
- A variety of non-automated systems, such as mailing reminders to patients, chart stickers, and flow sheets, have been useful to prompt both providers and patients.
- Availability of case or (preferably) care management services, usually by a nurse. Nurses, pharmacists, and other non-physician health care professionals using detailed algorithms working under the supervision of physicians and/or nurse education calls have also been helpful. Similarly dietitians using medical nutrition therapy (MNT) guidelines have been demonstrated to improve glycemic control.
- Availability and involvement of expert consultants, such as endocrinologists and diabetes educators.

Evidence suggests that these individual initiatives work best when provided as components of a multifactorial intervention. Therefore, it is difficult to assess the contribution of each component; however, it is clear that optimal diabetes management requires an organized, systematic approach and involvement of a coordinated team of health care professionals.

## **IMPLEMENTATION TOOLS**

Personal Digital Assistant (PDA) Downloads

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Staying Healthy

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

American Diabetes Association (ADA). Standards of medical care in diabetes. II. Testing for pre-diabetes and diabetes in asymptomatic patients. Diabetes Care 2008 Jan;31(Suppl 1):S13-4.

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

1998 (revised 2008 Jan)

### GUIDELINE DEVELOPER(S)

American Diabetes Association - Professional Association

### SOURCE(S) OF FUNDING

The American Diabetes Association (ADA) received an unrestricted educational grant from LifeScan, Inc., a Johnson and Johnson Company, to support publication of the 2008 Diabetes Care Supplement.

### GUIDELINE COMMITTEE

Professional Practice Committee

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

*Committee Members:* Irl Hirsch, MD, Chair; Martin Abrahamson, MD; Andrew Ahmann, MD; Lawrence Blonde, MD; Silvio Inzucchi, MD; Mary T. Korytkowski,

MN, MD, MSN; Melinda Maryniuk, MEd, RD, CDE; Elizabeth Mayer-Davis, MS, PhD, RD; Janet H. Silverstein, MD; Robert Toto, MD

## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **GUIDELINE STATUS**

This is the current release of the guideline.

This guideline updates a previous version: American Diabetes Association (ADA). Standards of medical care in diabetes. II. Screening for diabetes. Diabetes Care 2007 Jan;30(Suppl 1):S5-7.

## **GUIDELINE AVAILABILITY**

Electronic copies: Available from the [American Diabetes Association \(ADA\) Web site](#).

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- Introduction. Diabetes Care 31:S1-S2, 2008.
- Summary of revisions for the 2008 clinical practice recommendations. Diabetes Care 31:S3-S4, 2008.
- Executive summary: standards of medical care in diabetes. Diabetes Care 31:S5-S11, 2008.
- Strategies for improving diabetes care. Diabetes Care 31:S44, 2008.

Electronic copies: Available from the [American Diabetes Association \(ADA\) Web site](#).

The following are also available:

- Diagnosis and classification of diabetes mellitus. Diabetes Care 2008 Jan; 31 Suppl 1:S55-60. Electronic copies: Available from the [American Diabetes Association \(ADA\) Web site](#).
- 2008 clinical practice recommendations standards of care. Personal digital assistant (PDA) download. Available from the [American Diabetes Association \(ADA\) Web site](#).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This summary was completed by ECRI on April 2, 2001. The information was verified by the guideline developer on August 24, 2001. This summary was updated by ECRI on March 14, 2002, July 29, 2003, March 23, 2004, July 1, 2005, and March 16, 2006, and April 24, 2007. This summary was updated most recently by ECRI Institute on March 31, 2008. The updated information was verified by the guideline developer on May 15, 2008.

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Date Modified: 9/29/2008

