Pre-Diabetes

Definition/ cut-off value	Impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) are referred to as pre-diabetes. These conditions are characterized by hyperglycemia that does not meet the diagnostic criteria for diabetes mellitus (1). (See Clarification for more information.)

Presence of pre-diabetes diagnosed by a physician as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders. |

Participant category and priority level

Category	Priority
Breastfeeding Women	I
Non-Breastfeeding	III, IV, V, or VI

Justification	An individual who is identified as having pre-diabetes is at relatively high risk for the development of type 2 diabetes and cardiovascular disease (CVD).

The Expert Committee on the Diagnosis and Clarification of Diabetes Mellitus (2, 3) recognized a group of individuals whose glucose levels, although not meeting criteria for diabetes, are nevertheless too high to be considered normal. The blood tests used to measure plasma glucose and to diagnose pre-diabetes include a fasting plasma glucose test and a glucose tolerance test (see Clarification for more information). Individuals with a fasting plasma glucose level between 100-125 mg/dl are referred to as having impaired fasting glucose (IFG). Individuals with plasma glucose levels of 140-199 mg/dl after a 2-hour oral glucose tolerance test are referred to as having impaired glucose tolerance (IGT).

Many individuals with IGT are euglycemic and, along with those with IFG, may have normal or near normal glycosylated hemoglobin (HbA1c) levels. Often times, individuals with IGT manifest hyperglycemia only when challenged with the oral glucose load used in standardized oral glucose tolerance test.

The prevalence of IFG and IGT increases greatly between the ages of 20-49 years. In people who are >45 years of age and overweight (BMI $\geq$25), the prevalence of IFG is 9.3%, and for IGT, it is 12.8% (4).

Screening for pre-diabetes is critically important in the prevention of type 2 diabetes. The American Diabetes Association recommends (5) that testing to detect pre-diabetes should be considered in all asymptomatic adults who are overweight (BMI $\geq$25) or obese (BMI $\geq$30) and who have one or more additional risk factors (see Table 1 in Clarification). |

IFG and IGT are not clinical entities in their own right but, rather, risk factors for future diabetes as well as CVD. (Note: During pregnancy, IFG and IGT are diagnosed as gestational diabetes.) They can be observed as intermediate stages in many of the disease processes. IFG and IGT are associated with the metabolic syndrome, which includes obesity (especially abdominal or visceral obesity), dyslipidemia (the high-triglyceride and/or low HDL type), and hypertension. Dietary recommendations include monitoring of calories, reduced carbohydrate intake and high fiber consumption. Medical nutrition therapy (MNT) aimed at producing 5-10% loss of body weight and increased exercise have been variably demonstrated to prevent or delay the development of diabetes in people with IGT. However, the potential impact of such interventions to reduce cardiovascular risk has not been examined to date (2, 3).

WIC nutrition services can support and reinforce the MNT and physical activity recommendations that participants receive from their health care providers. In addition, WIC nutritionists can play an important role in providing women with counseling to help them achieve or maintain a healthy weight after delivery.

The WIC food package provides high fiber, low fat foods emphasizing consumption of whole grains, fruits, vegetables and dairy products. This will further assist WIC families in reducing their risk for diabetes.

References

1. American Diabetes Association. Clinical practice recommendations: standards of medical care in diabetes. Diabetes Care. 2008 Jan; 31 Suppl 1:S12-54.

2. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the expert committee on the diagnosis and classification of diabetes mellitus. Diabetes Care.1997; 20:1183-1197.

3. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Follow-up report on the diagnosis of the diabetes mellitus. Diabetes Care. 2003; 26:3160-3167.

4. American Diabetes Association National Institute of Diabetes and Digestive and Kidney Diseases. Position statement on prevention or delay of type 2 diabetes. Diabetes Care. 2004; 27:S47.

5. American Diabetes Association. Executive summary: standards of medical care in diabetes. Diabetes Care. 2008 Jan; 31 Suppl 1:S5-11.

Additional Related Reference

Garber A-J, et al. Diagnosis and management of pre-diabetes in the continuum of Hyperglycemia: When do the risks of diabetes begin? A consensus statement from the American College of Endocrinology and the American Association of Clinical Endocrinologists. ACE/AACE Consensus Statement Endocrine Practice 2008 Oct; 14(7):933-946.

Clarification Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Hyperglycemia is identified through a fasting blood glucose or an oral glucose tolerance test (1).

Impaired fasting glucose (IFG) is defined as fasting plasma glucose (FPG) $\geq$100 or $\geq$125 mg/dl ($\geq$5.6 or $\geq$6.1 mmol/l), depending on study and guidelines (2).

Impaired glucose tolerance (IGT) is defined as a 75-g oral glucose tolerance test (OGTT) with 2-h plasma glucose values of 140-199 mg/dl (7.8-11.0 mmol/l).

The cumulative incidence of diabetes over 5-6 years was low (4-5%) in those individuals with normal fasting and normal 2-h OGTT values, intermediate (20-34%) in those with IFG and normal 2-h OGTT or IGT and a normal FPG, and highest (38-65%) in those with combined IFG and IGT (4).

Recommendations for testing for pre-diabetes and diabetes in asymptomatic, undiagnosed adults are listed in Table 1 below.

Table 1. Criteria and Methods for Testing for Pre-Diabetes and Diabetes in Asymptomatic Adults

1. Testing should be considered in all adults who are overweight (BMI $\geq 25^*$) and have additional risk factors:
    - physical inactivity
    - first-degree relative with diabetes
    - members of a high-risk ethnic population (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
    - women who delivered a baby weighing >9 lb or were diagnosed with gestational diabetes mellitus
    - hypertension (blood pressure $\geq$140/90 mmHg or on therapy for hypertension)
    - HDL cholesterol level <35 mg/dl and/or a triglyceride level >250 mg/dl
    - women with polycystic ovarian syndrome (PCOS)
    - IGT or IFG on previous testing
    - other clinical conditions associated with insulin resistance (e.g., severe obesity and acanthosis nigricans)
    - history of CVD

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.

4. To test for pre-diabetes or diabetes, either an FPG test or 2-hour oral glucose tolerance (OGTT; 75-g glucose load), or both, is appropriate.

5. An OGTT may be considered in patients with impaired fasting glucose (IFG) to better define the risk of diabetes.

6. In those identified with pre-diabetes, identify and if appropriate, treat other CVD risk factors.

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