Diabetes is a disease in which blood glucose levels are above normal. Over the years, high blood glucose damages nerves and blood vessels, which can lead to complications such as heart disease, stroke, kidney disease, blindness, nerve damage, gum infections, and peripheral vascular disease.

Impaired Fasting Glucose (IFG), Impaired Glucose Tolerance (IGT), and an A1C of 5.7-6.4% are included in a category of increased risk for future diabetes (also known as pre-diabetes). This is defined as blood glucose or A1C levels higher than normal but not high enough to be characterized as diabetes. People with IFG, IGT, and an increase A1C are at risk for developing type 2 diabetes and have an increased risk of heart disease and stroke. With modest weight loss and moderate physical activity, people with pre-diabetes can delay or prevent type 2 diabetes.

A1C testing is an appropriate test for diagnosing diabetes when A1C is greater than or equal to 6.5%. Diagnosis should be confirmed by a repeat A1C test unless clinical symptoms and glucose levels over 200 mg/dL are present.

A1C testing may not be reliable due to patient factors which preclude its interpretation (e.g. any anemia, hemoglobinopathy or abnormal erythrocyte turnover). In this case, previously recommended diagnostic measures should be used (fasting plasma glucose and 2 hour oral glucose tolerance test).

American Diabetes Association Criteria for testing for IFG and Diabetes in asymptomatic adults

1. All adults with a BMI > 25 and have additional risk factors
   - Physical inactivity
   - First-degree relative with diabetes
   - High risk ethnic population: African American, Latino, Native American, Pacific Islander. (Asian Americans ≥ 23)
   - Women who delivered a baby weighing > 9 lb or were diagnosed with gestational diabetes
   - Hypertension (>140/90 or on therapy for hypertension)
   - HDL <35 and/or triglycerides > 250
   - Women with polycystic ovarian syndrome
   - IGT or IFG on previous testing or A1C ≥ 5.7%
   - Other clinical conditions related to insulin resistance (severe obesity, acanthosis nigricans)
   - History of CVD

2. In the absence of the above criteria, testing for diabetes should begin at age 45.

3. If the results are normal, testing should be repeated in at least a 3 year interval, with consideration to more frequent testing depending on initial results and risk status.
Diagnosing Using Fasting Plasma Glucose Levels

<table>
<thead>
<tr>
<th>Plasma Glucose Result (mg/dL)</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 and below</td>
<td>Normal</td>
</tr>
<tr>
<td>100 to 125</td>
<td>Impaired Fasting Glucose - Diagnosis code R73.01</td>
</tr>
<tr>
<td>126 and above</td>
<td>Diabetes - Diagnosis code E11.9 or E13.9 - (See Addendum for further classification codes)</td>
</tr>
</tbody>
</table>

Diagnosing Using A1C

<table>
<thead>
<tr>
<th>Plasma Glucose Result (mg/dL)</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5.7</td>
<td>Normal</td>
</tr>
<tr>
<td>5.7-6.4%</td>
<td>Increased Risk for Diabetes (pre-diabetes) - Diagnosis code R73.09 and R73.9</td>
</tr>
<tr>
<td>≥6.5%</td>
<td>Diabetes - Diagnosis code E11.9 or E13.9 - (See Addendum for further classification codes)</td>
</tr>
</tbody>
</table>

Diagnosing Using Oral Glucose Tolerance Test

Oral Glucose Tolerance Test (OGTT) is defined based on the glucose response two hours after a 75 gram glucose load.

<table>
<thead>
<tr>
<th>Plasma Glucose Result (mg/dL)</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 140</td>
<td>Normal glucose tolerance</td>
</tr>
<tr>
<td>140 to 199</td>
<td>Impaired Glucose Tolerance-Diagnosis code R73.02</td>
</tr>
<tr>
<td>200 and above</td>
<td>Diabetes- Diagnosis code E11.9 or E13.9- (See Addendum for further classification codes)</td>
</tr>
</tbody>
</table>

Diagnosis code R73.09 (Other Abnormal Glucose), abnormal non-fasting glucose, would be used when the patient had an elevated glucose and was not fasting or when the practitioner is not certain which pre-diabetes code is appropriate.

Criteria for Diabetes Mellitus

1) Symptoms of diabetes and a casual plasma glucose greater than or equal to 200 mg/dl. Casual is defined as any time of day without regard to the time since the last meal. The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss.

2) Fasting plasma glucose greater than or equal to 126 mg/dl. Fasting is defined as no caloric intake for at least eight hours. To fit criteria for formal diagnosis of diabetes, the elevated
glucose must be confirmed by repeating the fasting glucose test a second time on a different day.

3.) Two-hour plasma glucose greater than or equal to 200 mg/dl during an oral glucose tolerance test. The test should be performed as described by the World Health Organization (WHO), using a glucose load containing the equivalent of 75g anhydrous glucose dissolved in water.

4.) A1c greater than or equal to 6.5%. The test should be performed in a laboratory using a method that is National Glycohemoglobin Standardization Program (NGSP) certified and standardized to the Diabetes Control and Complications Trial (DCCT) reference assay. Diagnosis should be confirmed by a repeat A1C test unless clinical symptoms and glucose levels over 200 mg/dL are present.

In the absence of unequivocal hyperglycemia with acute metabolic decompensation, these criteria should be confirmed by repeat testing on a different day. The oral glucose tolerance test is not recommended for routine clinical use. Different criteria are used to diagnose gestational diabetes in pregnant women.

**Recommendations for Management of Diabetes**

1) Complete history and physical examination upon initial diagnosis (including a fasting plasma glucose, HgbA1C, lipid profile, serum creatinine, urinalysis for glucose, ketones, protein and evidence of infection, determination for microalbuminuria, urine culture if evidence of infection and thyroid function tests when indicated, neurological examination, foot and skin examinations).

2) Screen for psychosocial problems such as depression and diabetes related distress, anxiety, eating disorders, and cognitive impairment when self-management is poor.

3) Hemoglobin A1C level:
   a. Every three months if treatment changes or patient is not meeting goal A1C
   b. Twice per year if stable and meeting goals
   c. In general, recommend goal Hemoglobin A1C level under 7.0%
      This A1C goal does not apply to all patients
      Goal A1C must be determined for each specific patient by their physician based on a balance of the benefits of glucose control versus the risk of a severe low glucose event.
      Less stringent A1C goals may be appropriate for patients with a history of severe hypoglycemia, patients with limited life expectancies, children, individuals with comorbid conditions, and those with longstanding diabetes and minimal or stable microvascular complications.

4) **Dilated** retinal eye exam yearly by an Ophthalmologist or Optometrist

5) Annual foot exam for all patients with diabetes. All patients with insensate feet, foot deformities, and/or history of foot ulcers should have foot exam at every visit. Include general foot self-care education.

6) Fasting cholesterol panel is reasonable at diagnosis, at the initial medical evaluation (and/or age 40), and every 1-2 years thereafter.

7) Microalbumin measurement once yearly—spot urine test for microalbumin to creatinine ratio in mg/gm creatinine. Annual serum creatinine level, regardless of urine albumin excretion.

8) Blood pressure at every diabetes visit: recommend BP < 140/90

9) Lower blood pressure targets, such as <130/80, may be appropriate for certain individuals such as younger patients, if it can be achieved without undue treatment burden
10) Patients with blood pressure >120/80 should be advised on lifestyle changes to reduce blood pressure. Provide patient education regarding regular meal planning, nutritional guidelines, need for regular exercise, and home glucose monitoring.

11) Provide patient education regarding weight loss and smoking cessation, if indicated, at each visit.

12) Check weight as a vital sign at every diabetes visit.

13) Recommend yearly dental exam/referral.

14) Recommend annual influenza vaccine.

15) Recommend pneumococcal vaccine at diagnosis and revaccinate per CDC guidelines.

16) Recommend hepatitis B vaccine to unvaccinated adults ages 19-59, consider ages 60+

**American Diabetes Association Recommended Treatment**

1) Consider aspirin therapy as a primary prevention strategy in those with Type I or Type 2 diabetes at increased cardiovascular risk (10-year risk >10%). This includes most men >50 and women >60 who have at least one additional major risk factor (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria).
   a) Aspirin should not be recommended for CVD prevention for adults with diabetes at low CVD risk (10-year CVD risk <5%), since the potential adverse effects from bleeding likely offset the potential benefits.
   b) In patients in these age groups with multiple other risk factors (e.g., 10-year risk 5-10%), clinical judgment is required to determine aspirin recommendation for each specific patient.
   c) Use aspirin therapy (75-162 mg/day) as a secondary prevention strategy in those with diabetes and a history of CVD.
   d) For patients with CVD and documented aspirin allergy, clopidogrel (75 mg/day) should be used.

2) Pharmacological therapy for patients with diabetes and hypertension should be with a regimen that includes either an ACE inhibitor or an angiotensin receptor blocker (ARB). If ACE inhibitors, ARBs, or diuretics are used, kidney function and serum potassium levels should be closely monitored.

3) Consider screening those with type 1 diabetes for other autoimmune diseases as appropriate (i.e., thyroid, vitamin B12 deficiency, celiac disease).

4) Statin therapy: treatment initiation (and initial dose) is driven primarily by risk status rather than LDL levels. A screening lipid profile is reasonable at diabetes diagnosis, at the initial medical evaluation (and/or age 40), and periodically thereafter.
   a) In all patients with diabetes who are ≥ or equal to age 40, moderate intensity statin treatment should be considered in addition to lifestyle therapy.
   b) High-dose therapy should be considered if increased CVD risk is present.
   c) In patients under age 40 with type 1 diabetes, treatment with a moderate dose of statin should be considered if the patient has increased CVD risk, or with a high dose of statin if the patient has overt CVD.

**Addendum**


**References**


American Diabetic Association: Physician’s Guide to Insulin Dependent (Type I) Diabetes


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Chief Medical Officer
Medical Associates Clinic & Health Plans

Date

President
Medical Associates Clinic

Date

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