POLICY: PATHS Community Medical Centers, as part of PATHS, are committed to provide quality health care that ensure the patients on-going health per the recommended national standards that are consider the gold standard for a particular area as well. It is also a commitment to contain unnecessary costs without sacrificing quality. To that end the Diabetic Clinical Practice Guidelines are listed below.

PERSONNEL: Medical Director, Providers, Clinical Support Staff

KEY RECOMMENDATIONS

- A1C is useful in screening for diabetes.
- Screen for diabetes in high-risk, asymptomatic, undiagnosed adults and children within the healthcare setting.
- Screen for diabetes in pregnancy using risk factor analysis and screening tests as defined in the guidelines.
- Lowering A1C has been associated with a reduction of microvascular and neuropathic complications of diabetes and possibly macrovascular disease.
- Aggressive A1C lowering may lead to increased mortality in patients with very long duration diabetes, known history of severe hypoglycemia, advanced atherosclerosis, and advanced age/fragility.
- Self-monitoring of blood glucose is an integral component of therapy.
- People with diabetes should receive individualized medical nutrition therapy as needed to achieve treatment goals.
- A regular physical activity program, adapted to the presence of complications is recommended for all patients with diabetes who are capable of participating.
- Blood pressure should be measured at every routine visit. Patients with diabetes and hypertension should be treated to a systolic blood pressure goal of <140mmHg. Lower systolic targets, such as <130mmHg, may be appropriate for certain individuals such as younger patients, if it can be achieved without undue treatment burden. Patients with diabetes should be treated to a diastolic blood pressure <90mmHg.
- In most adult patients with diabetes, measure fasting lipid profile at least annually. In adults with low-risk lipid values (LDL cholesterol <100mg/dL, HDL cholesterol >50 mg/dL, and triglyceride <150 mg/dL), lipid assessments may be repeated every two years.
• Statin therapy should be added to lifestyle modification therapy, regardless of baseline lipid levels for diabetic patients with overt CVD and without CVD who are over the age of 40 years and have one or more other CVD risk factors. Combination therapy has been shown not to provide additional cardiovascular benefit above statin therapy alone and is not recommended.

• Consider aspirin therapy (75-162 mg/day) as a primary prevention strategy in those at increased cardiovascular risk (10 year risk >10%). This includes most men >50 years of age or women >60 years of age who have at least one additional major risk factor (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria). For patients with CVD and documented aspirin allergy, clopidogrel should be used.

• Provide influenza vaccine annually to all diabetic patients > 6 months of age. Administer pneumococcal vaccine to all diabetic patients > 2 years of age. Administer hepatitis B vaccine to unvaccinated adults ages 19-59; consider administering hepatitis B vaccine to unvaccinated adults age >/60.

• Advise all patients not to smoke.

• Perform foot exams at diagnosis and annually thereafter. Patients with insensate feet should have a simple foot inspection every 3-6 months.

CRITERIA FOR TESTING FOR DIABETES IN ASYMPTOMATIC, UNDIAGNOSED ADULTS*

• Testing for diabetes should be considered in all individuals at age 45 years and above. If normal, it should be repeated at 3-year intervals. Testing should be conducted annually if risk factors are present or if A1C is 5.7-6.4.

• Testing should be considered beginning at age 18 or be carried out more frequently in adults who are overweight or obese (body mass index (BMI) ≥25 kg/m² or ≥ 120% over desired body weight) and who one or more additional risk factors for diabetes:
  • Habitually physically inactive
  • First degree relative with diabetes (i.e. parents or siblings with diabetes)
  • Member of a high-risk ethnic population (e.g. African-Americans, Hispanic Americans, Native Americans, Asian-Americans, Pacific Islanders)
  • Previously identified IFG* or IGT*
  • Hypertension (> 140/90)
  • High density lipoprotein (HDL) cholesterol level < 35 mg/dl (0.90 mmol/l) and /or a triglyceride level > 250 mg/dl (2.82 mmol/l)
  • History of gestational diabetes or delivery of babies > 9 lb
  • Polycystic ovarian syndrome (PCOS)
  • Clinical conditions associated with insulin resistance (e.g. PCOS or acanthosis nigricans)
  • Vascular disease

* The recommended screening test for non-pregnant adults is the FPG (fasting plasma glucose). IFG = Impaired Fasting Glucose IGT = Impaired Glucose Tolerance
DETECTION AND DIAGNOSIS OF GESTATIONAL DIABETES

- Risk assessment for gestational diabetes (GDM) should be undertaken at the first prenatal visit.
  - Women with clinical characteristics consistent with a high risk for GDM (marked obesity, personal history of GDM, glycosuria, diagnosis of PCOS, or a strong family history of diabetes) should undergo glucose testing as soon as possible.
  - High risk women not found to have GDM at the initial screening and average risk women should be tested between 24 and 28 weeks of gestation.
  - Low-risk status requires no glucose testing but this category is limited to women meeting all of the following criteria:
    - Age < 25 years
    - Weight normal before pregnancy
    - Member of an ethnic group with low prevalence of GDM
    - No known diabetes in first-degree relatives
    - No history of abnormal glucose tolerance
    - No history of poor obstetric outcome

- Perform a diagnostic 75-g oral glucose tolerance test (OGTT), with plasma glucose measurement fasting and at 1 and 2h, at 24-48 weeks gestation in women not previously diagnosed with overt diabetes.
- The OGTT should be performed in the morning after an overnight fast of at least 8h.
- Diagnosis of GDM requires at least two of the following plasma glucose values:
  - Fasting: ≥92 mg/dl
  - 1hr: ≥180 mg/dl
  - 2hr: ≥153 mg/dl

Women with GDM should be screened for diabetes 6-12 weeks post partum and should be followed up with subsequent screening for the development of diabetes or pre-diabetes.

PREVENTION AND SCREENING FOR TYPE 2 DIABETES IN CHILDREN

Testing* should be done every 2 years starting at age 10 or at onset of puberty in any child who is overweight (defined as BMI > 85th percentile for age and sex, weight for height > 85th percentile, or weight > 120% of ideal weight for height) and has any 2 of the following risk factors:

- Family history of type 2 diabetes in first- or second-degree relatives
- Membership in a high-risk ethnic group (see above)
- Signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, or PCOS)
- Maternal history of diabetes or GDM

*The recommended screening test is the FPG (fasting plasma glucose).

SYMPTOMS OF DIABETES

- Polyuria
- Polydipsia
- Unexplained weight loss
- Blurred vision
CRITERIA FOR THE DIAGNOSIS OF DIABETES MELLITUS

<table>
<thead>
<tr>
<th>Normoglycemic</th>
<th>IFG or IGT (Pre-Diabetes)**</th>
<th>Diabetes mellitus (DM)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPG &lt; 100 mg/dl</td>
<td>IFG = FPG &gt; 100 and &lt; 125 mg/dl</td>
<td>Symptoms of DM and random Plasma glucose concentration &gt;/ = 200mg/dl</td>
</tr>
</tbody>
</table>

2-hr postload glucose  
IGT = 2hr PG >/ = 140 and <200mg/dl  
FPG > 126 mg/dl  
2-hr PG > 200 mg/dl (OGTT)

* A diagnosis of diabetes must be confirmed, on a subsequent day, by measurement of FPG, 2-hr PG or random plasma glucose (if symptoms present.) ** Glucometer readings are not diagnostic. The FPG test is greatly preferred because of ease of administration, convenience, acceptability to patients, and lower cost. Fasting is defined as no caloric intake for at least 8 hr. This test requires the use of a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water. ** IFG and IGT are risk factors for future diabetes and cardiovascular disease. Refer to CCNV Pre-Diabetes Clinical Practice Guideline for additional recommendations.

ROLE OF THE A1C ASSAY IN THE DIAGNOSIS OF DIABETES

For the diagnosis of diabetes:
- The A1C assay is an accurate, precise measure of chronic glycemic levels and correlates well with the risk of diabetes complications.
- The A1C assay has several advantages over laboratory measures of glucose.
- Diabetes should be diagnosed when A1C is ≥ 6.5%. Diagnosis should be confirmed with a repeat A1C test. Confirmation is not required in symptomatic subjects with plasma glucose levels >200 mg/dl (>11.1 mmol/l).
- If A1C testing is not possible, previously recommended diagnostic methods (e.g., FPG or 2HPG, with confirmation) are acceptable.
- A1C testing is indicated in children in whom diabetes is suspected but the classic symptoms and a casual plasma glucose >200 mg/dl (>11.1 mmol/l) are not found.

For the identification of those at high risk for diabetes:
- The risk for diabetes based on levels of glycemia is a continuum, therefore, there is no lower glycemic threshold at which risk clearly begins.
- The categorical clinical states pre-diabetes, IFG, and IGT fail to capture the continuum of risk and will be phased out of use as A1C measurements replace glucose measurements.
- As for the diagnosis of diabetes, the A1C assay has several advantages over laboratory measures of glucose in identifying individuals at high risk for developing diabetes.
- Those with A1C levels below the threshold for diabetes but ≥ 5.7% should receive demonstrably effective preventive interventions. Those with A1C below this range may still be at risk and, depending on the presence of other diabetes risk factors, may also benefit from prevention efforts.
- The A1C level at which population-based preventive services begin should be based on the nature of the intervention, the resources available, and the size of the affected population.
RECOMMENDATIONS FOR GLYCEMIC CONTROL IN NON-PREGNANT ADULTS

<table>
<thead>
<tr>
<th>A1C (%  )</th>
<th>Mean Plasma Glucose mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>126</td>
</tr>
<tr>
<td>7</td>
<td>154</td>
</tr>
<tr>
<td>8</td>
<td>183</td>
</tr>
<tr>
<td>9</td>
<td>212</td>
</tr>
<tr>
<td>10</td>
<td>240</td>
</tr>
<tr>
<td>11</td>
<td>269</td>
</tr>
<tr>
<td>12</td>
<td>298</td>
</tr>
</tbody>
</table>

Pre-prandial capillary plasma glucose <7.0% (patients <65 years old), <8% (≥65 years old)
Peak postprandial capillary plasma glucose <180 mg/dL (<10.0 mol/l)

- Goals should be individualized based on:
  - Duration of diabetes
  - Age/life expectancy
  - Comorbid conditions
  - Known CVD or advanced microvascular complications
  - Hypoglycemia unawareness
  - Individual patient considerations
- More or less stringent glycemic goals may be appropriate for individual patients.
- Postprandial glucose may be targeted if A1C goals are not met despite reaching pre-prandial glucose goals.

CORRELATION BETWEEN A1C LEVELS AND MEAN PLASMA GLUCOSE LEVELS

HYPOGLYCEMIA

- Individuals at risk for hypoglycemia should be asked about symptomatic and asymptomatic hypoglycemia at each encounter.
- Glucagon should be prescribed for all individuals at significant risk of severe hypoglycemia and caregivers or family members of these individuals should be instructed on its administration.
- Insulin-treated patients with hypoglycemia unawareness or an episode of severe hypoglycemia should be advised to raise their glycemic targets to strictly avoid further hypoglycemia for at least several weeks, to partially reverse hypoglycemia unawareness, and to reduce risk of further episodes.
CORONARY HEART DISEASE (CHD) SCREENING AND TREATMENT

Recommendations:

- In patients with known CVD, ACE inhibitor and statin therapy (if not contraindicated) should be used to reduce the risk of cardiovascular events. Consider aspirin therapy (75-162 mg/day) as a primary prevention strategy in those at increased cardiovascular risk (10 year risk >10%). This includes most men >50 years of age or women >60 years of age who have at least one additional major risk factor (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria).

- Consider use of beta blockers for two years following myocardial infarction (MI).

- Metformin may be used in patients with stable congestive heart failure (CHF) if renal function is normal. It should be avoided in unstable or hospitalized patients with CHF.

- Thiazolidinediones cause or exacerbate CHF; observe patients closely after treatment initiation or dose increase for: excessive, rapid weight gain, dyspnea, and/or edema

- In asymptomatic patients, consider a risk factor evaluation to stratify patients by 10-year risk; treat accordingly

LIPID AND BLOOD PRESSURE GOALS (FOR NONPREGNANT ADULTS)

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Lipids (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic &lt;140</td>
<td>LDL cholesterol &lt;100 (&lt;70 in pt with overt CVD)</td>
</tr>
<tr>
<td>Diastolic &lt;90</td>
<td>HDL cholesterol &gt;40</td>
</tr>
<tr>
<td></td>
<td>Triglycerides &lt;150</td>
</tr>
</tbody>
</table>

Patients with diabetes and hypertension should be treated to a systolic blood pressure goal of <140 mm/Hg. Lower systolic targets, such as <130 mm/Hg, may be appropriate in certain individuals, such as younger patients, if it can be achieved without undue treatment burden. Patients with diabetes should be treated to a diastolic blood pressure of <90mm/Hg.

Treatment:

- Lifestyle therapy for hypertension consists of weight loss (if overweight), DASH-style dietary pattern (including reducing sodium and increasing potassium), moderation of alcohol intake and increased physical activity.

- Pharmacologic therapy for patients with diabetes and hypertension should include an ACE inhibitor or an ARB. A thiazide diuretic should be added if GFR ≥30 and a loop diuretic if GFR <30.

- Multiple drug therapy (two or more drugs at maximal doses) is generally required to achieve blood pressure targets.

- If ACE inhibitors, ARBs or diuretics are used, kidney function and potassium levels should be monitored.

If drug-treated patients do no reach the above targets on maximal tolerated statin therapy, a reduction in LDL cholesterol of ~30-40% from baseline is an alternative therapeutic goal.

Triglyceride levels of <150 mg/dL and HDL cholesterol >40mg/dL in men and >50 in women are desirable. However, LDL cholesterol-targeted statin therapy remains the preferred strategy.
# NEPHROPATHY SCREENING AND TREATMENT

**General Recommendations:**
- Optimize glucose control to reduce risk and/or slow the progression of nephropathy
- Optimize blood pressure control to reduce risk and/or slow the progression of nephropathy
- Limit protein intake to the recommended daily allowance (0.8 g/kg) in those with any degree of chronic kidney disease (CKD)

**Screening:**
- Perform an annual test for the presence of microalbuminuria if not previously macroalbuminuric in 2 of 3 specimens within a 3-6 month period:
  - in type 1 diabetic patients with diabetes duration of > 5 years
  - in all type 2 diabetics starting at diagnosis and during pregnancy
- Measure serum creatinine annually for the estimation of glomerular filtration rate (GFR) in all adults with diabetes regardless of the degree of urine albumin excretion

**Treatment:**
- ACE inhibitors or ARBs are recommended for treatment of both micro and macroalbuminuria except during pregnancy
- With presence of nephropathy, initiate protein restriction to < 0.8 g/kg body weight/day (~ 10% of daily calories). Further restriction may be useful in slowing the decline of GFR in patients whose nephropathy is progressing despite maximized glycemic and blood pressure control and use of ACE inhibitors and/or ARBs.
- Use of Metformin is contraindicated in patients with impaired renal function (creatinine > 1.5 or GFR < 30)
- Monitor serum creatinine and potassium levels for development of acute kidney disease and hyperkalemia when ACE inhibitors, ARBs or diuretics are used
- In patients with type 2 diabetes, hypertension and microalbuminuria, both ACE inhibitors and ARBs have been shown to delay the progression of macroalbuminuria. In patients with type 2 diabetes, hypertension, macroalbuminuria and renal insufficiency (serum creatinine >1.5 mg/dl), ARBs have been shown to delay the progression of nephropathy.

## DEFINITIONS OF ABNORMALITIES IN ALBUMIN EXCRETION

<table>
<thead>
<tr>
<th>Category</th>
<th>Spot Collection (µg/mgcreatinine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Microalbuminuria</td>
<td>30-299</td>
</tr>
<tr>
<td>Macro (clinical) albuminuria</td>
<td>300</td>
</tr>
</tbody>
</table>

## GFR CALCULATOR FOR ADULTS

GFR (mL/min/1.73 m²) = \(186 \times \text{Scr}^{-1.154} \times \text{Age}^{-0.203} \times (0.742 \text{ if female}) \times (1.210 \text{ if African-American})\) (conventional units)

*The equation does not require weight because the results are reported normalized to 1.73 m² body surface area, which is an accepted average adult surface area.*
STAGES OF CKD

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>GFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kidney damage with normal or increased GFR</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Kidney damage with mildly decreased GFR</td>
<td>60-89</td>
</tr>
<tr>
<td>3</td>
<td>Moderately decreased GFR</td>
<td>30-59</td>
</tr>
<tr>
<td>4</td>
<td>Severely decreased GFR</td>
<td>15-29</td>
</tr>
<tr>
<td>5</td>
<td>Kidney failure</td>
<td>&lt;15</td>
</tr>
<tr>
<td></td>
<td><strong>dialysis</strong></td>
<td></td>
</tr>
</tbody>
</table>

MANAGEMENT OF CKD IN DIABETES

<table>
<thead>
<tr>
<th>GFR (ML/MIN/1.73 M²)</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>• Yearly measurement of creatinine, urinary albumin excretion, potassium</td>
</tr>
<tr>
<td>45-60</td>
<td>• Referral to nephrology if possibility for non-diabetic kidney disease exists (duration type I diabetes &lt;10 years, heavy proteinuria, abnormal findings on renal US, resistant hypertension, rapid fall in GFR, or active urinary sediment)</td>
</tr>
<tr>
<td></td>
<td>• Consider need for dose adjustment of medications</td>
</tr>
<tr>
<td></td>
<td>• Monitor eGFR every 6 months</td>
</tr>
<tr>
<td></td>
<td>• Monitor electrolytes, bicarbonate, hemoglobin, calcium, phosphorus, parathyroid hormone at least yearly</td>
</tr>
<tr>
<td></td>
<td>• Assure vitamin D sufficiency</td>
</tr>
<tr>
<td></td>
<td>• Consider bone density testing</td>
</tr>
<tr>
<td></td>
<td>• Referral for dietary counseling</td>
</tr>
<tr>
<td>30-44</td>
<td>• Monitor eGFR every 6 months</td>
</tr>
<tr>
<td></td>
<td>• Monitor electrolytes, bicarbonate, calcium, phosphorus, parathyroid hormone, hemoglobin, albumin, weight every 3-6 months</td>
</tr>
<tr>
<td></td>
<td>• Consider need for dose adjustment of medications</td>
</tr>
<tr>
<td>&lt;30</td>
<td>• Referral to nephrologist</td>
</tr>
</tbody>
</table>

IMMUNIZATION RECOMMENDATIONS

**Influenza**
- Annually provide an influenza vaccine to all diabetic patients > 6 months of age.

**Pneumococcal**
- Administer pneumococcal vaccine to all diabetic patients > 2 years of age.
- Provide at least one lifetime pneumococcal vaccine for adults with diabetes. A one-time revaccination is recommended for individuals > 64 years of age previously immunized when they were < 65 years of age if the vaccine was administered > 5 years ago.
MEDICATION NUTRITION THERAPY (MNT)

Goals and recommendations:
- For weight loss, either low-carbohydrate or low-fat calorie-restricted diets may be effective in the short term (up to one year).
- For patients on low-carbohydrate diets, monitor lipid profiles, renal function and protein intake (in those with nephropathy) and adjust hypoglycemic therapy as needed.
- For early CKD, reduce daily protein intake to 0.8 – 1.0 g/kg; for later stage CKD, restrict daily protein intake to 0.8 g/kg to improve measures of renal function.
- Saturated fat should be <7% of total calories.
- Intake of trans fat should be minimized.
- Weight loss is recommended for all overweight (BMI 25.0-29.9 kg/m²) or obese (BMI > 30.0 kg/m²) adults who have, or are at risk for developing, type 2 diabetes.
- Drug therapy for obesity and surgery to induce weight loss may be appropriate.
- Nonnutritive sweeteners are safe when consumed within the acceptable FDA daily intake levels.
- Routine supplementation with antioxidants is not advised because of lack of evidence of efficacy and concern related to long-term safety.
- Chromium supplementation in patients with diabetes or obesity is not recommended.
- Patients with diabetes should be advised to perform at least 150 min/week of moderate intensity aerobic physical activity (50-70% of maximum heart rate).
- In the absence of contraindications, people with type 2 diabetes should be encouraged to perform resistance training three times per week.
- Bariatric surgery should be considered for adults with BMI >35 kg/m² and type 2 diabetes, especially if the diabetes is difficult to control with lifestyle and pharmacologic therapy.

DAILY CALORIE GOAL

This table shows how many servings from the different food groups should be consumed for each daily calorie level. Each column lists the total grams of carbs, the recommended number of food servings from each food group, and how many grams of carbs are in these servings.
- Current recommendations of total carbs for a healthy diet is 50% of total calorie needs.
- A minimum of 1200 calories per day is the minimum necessary to meet your nutrient needs.

<table>
<thead>
<tr>
<th>Total carbs (gr/serving)</th>
<th>1200</th>
<th>1500</th>
<th>1800</th>
<th>2000</th>
<th>2200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starches (15 grams)</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Fruits (15 grams)</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Milk &amp; Yogurt (12 grams)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Vegetables, non-starchy (5 grams)</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
Lean meat, meat substitute

<table>
<thead>
<tr>
<th>Food</th>
<th>4oz</th>
<th>6oz</th>
<th>7oz</th>
<th>8oz</th>
<th>8oz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fats</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

CARBOHYDRATE GRAMS PER FOOD SERVING

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch: breads, cereals and grain; starchy vegetables, crackers and snacks; beans, peas and lentils</td>
<td>15</td>
</tr>
<tr>
<td>Fruits</td>
<td>15</td>
</tr>
<tr>
<td>Milk: fat-free, low-fat, 1% reduced fat, 2% whole</td>
<td>12</td>
</tr>
<tr>
<td>Sweets, desserts and other carbohydrates</td>
<td>15</td>
</tr>
<tr>
<td>Non-starchy vegetables</td>
<td>5</td>
</tr>
</tbody>
</table>

Meat and meat substitutes
- Lean such as cottage cheese or fish
- Medium-fat such as beef or egg
- High-fat such as cheese or sausage
- Plant-based proteins such as beans or tofu

Fats
- Varies

Alcohol
- Varies

EXERCISE GUIDELINES

The goal is to exercise 150 minutes a week (e.g., a 30-minute walk, 5 days a week). An alternative strategy is to use a pedometer with the goal of 10,000 steps per day. More complex fitness formulas are not needed for the majority of people. If more vigorous exercise will be attempted, an exercise tolerance test, an exercise prescription, and/or supervision by a fitness professional may be indicated in order to avoid health risks, over-exertion, and injury.

Vigorous activity should be avoided in the presence of ketosis.

In the absence of contraindications, people with type 2 diabetes should be encouraged to perform resistance training three times per week.

CRITERIA FOR PERFORMING STRESS TESTING (PRIOR TO EXERCISE)

<table>
<thead>
<tr>
<th>CHD risk (10 year risk for CHD even)*</th>
<th>Low Risk (&lt;10%)</th>
<th>Moderate Risk (10-20%)</th>
<th>High Risk (&gt;20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity intensity/examples:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low**</td>
<td>Not necessary</td>
<td>Not necessary</td>
<td>Not necessary</td>
</tr>
<tr>
<td>Moderate paced walking, stretching, activities of daily living</td>
<td>Not necessary</td>
<td>Not necessary unless atypical CHD symptoms</td>
<td>Recommended</td>
</tr>
</tbody>
</table>
MANAGEMENT OF NEWLY DIAGNOSED TYPE 2 DIABETES IN CHILDREN AND ADOLESCENTS

Key action statements:

- Ensure that insulin therapy is initiated for children and adolescents with type 2 diabetes who are ketotic or in diabetic ketoacidosis and in whom the distinction between type 1 and type 2 diabetes mellitus is unclear and, in usual cases, should initiate insulin therapy for patients
  - Who have random venous or plasma BG concentrations ≥250mg/dL; or
  - Whose HbA1c is >9%
- In all other instances, clinicians should initiate a lifestyle modification program, including nutrition and physical activity, and start metformin as first-line therapy for children and adolescents at the time of diagnosis of type 2 diabetes mellitus
- Monitor HbA1c concentrations every three months and intensify treatment if treatment goals for finger-stick BG and HbA1c concentrations are not being met
- Advise patients to monitor finger-stick BG concentrations in patients who
  - Are taking insulin or other medications with a risk of hypoglycemia; or
  - Are initiating or changing their diabetes treatment regimen; or
  - Have not met treatment goals; or
  - Have intercurrent illnesses
- Incorporate the Academy of Nutrition and Dietetics’ Pediatric Weight Management Evidence-Based Nutrition Practice Guidelines into their dietary or nutrition counseling or patients with type 2 diabetes mellitus at the time of diagnosis and as part of ongoing management
- Encourage children and adolescents with type 2 diabetes mellitus to engage in moderate to vigorous exercise for at least 60 minutes daily and to limit nonacademic screen time to less than 2 hours per day

Resources:
Several tools are available online to assist providers in improving patient adherence to lifestyle modifications, including examples of activities to be recommended for patients:

- The American Academy of Pediatrics
  - [www.healthychildren.org](http://www.healthychildren.org)
  - [www.letsmove.gov](http://www.letsmove.gov)
- Academy of Nutrition and Dietetics:
  - [www.eatright.org/childhoodobesity/](http://www.eatright.org/childhoodobesity/)
  - [www.eatright.org/kids/](http://www.eatright.org/kids/)
- Pediatric Weight Management Evidence-Based Nutrition Practice Guidelines:
Type 2 diabetes mellitus
Fasting glucose ≥ 126 mg per dL
(7.00 mmol per L)
or
Random or two-hour post-glucose load
≥ 200 mg per dL (11.10 mmol per L)
or
A1c ≥ 6.5%

Lifestyle intervention
Weight loss
Decrease fat intake
Calorie restriction
Increase physical ability
Reinforce at every visit

Blood glucose not controlled
Begin Metformin therapy
Blood glucose not controlled over 3-6 months
Lifestyle + Metformin
If non-insulin monotherapy at maximal
tolerated dose does not achieve or maintain
the A1C target over 3-6 months, add a second
oral agent, a glucagon-like peptide 1 receptor
agonist or insulin
Blood glucose not controlled
Due to the progressive nature of
type 2 diabetes, insulin therapy is
eventually indicated for many
patients with type 2 diabetes

Fasting glucose > 250 mg per dL
or
Random blood glucose persistently
> 300 mg per dL
or
A1c > 10 percent

Lifestyle intervention
Weight loss
Decrease fat intake
Calorie restriction
Increase physical ability
Reinforce at every visit

Begin insulin therapy
Long or intermediate-acting insulin at
10 units per day or 0.2 units per kg per
day; increase by 2 units every three days.
Add short-acting pre-meal insulin as needed
to normalize postprandial blood pressure.
Control not achieved with oral medications
Transition back to oral agents as appropriate
## COMPONENTS OF THE COMPREHENSIVE DIABETES EVALUATION

<table>
<thead>
<tr>
<th>Medical History</th>
<th>Physical Examination</th>
<th>Laboratory Evaluation</th>
<th>Continuing Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age and characteristics of onset of diabetes</td>
<td>1. Height and weight</td>
<td>1. A1C</td>
<td>1. Eye exam, if indicated</td>
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<td>3. Eating patterns, nutritional status, weight history, and growth and development in children</td>
<td>3. Fundoscopic examination</td>
<td>3. Liver function tests</td>
<td>3. MNT, as indicated</td>
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<td>4. Diabetes education history and self management goal setting</td>
<td>4. Thyroid palpation</td>
<td>4. Test for microalbuminuria</td>
<td>4. Diabetes educator, if not provided by physician or practice staff</td>
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<td>5. Previous and current treatment:</td>
<td>5. Cardiac examination</td>
<td>5. Serum creatinine and calculated GFR in adults</td>
<td>5. Other services/specialists (endocrinology, cardiology, behavioral specialists, foot specialists) as indicated</td>
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<tr>
<td>b) Meal plans</td>
<td>7. Skin examination (for acanthosis nigricans and insulin injection sites)</td>
<td>7. Screen for celiac disease in Type 1 diabetes and as indicated in Type 2 diabetes</td>
<td>7. Psychosocial screening including: attitudes about illness; affect/mood; quality of life and resources</td>
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<tr>
<td>c) Review Self management goals</td>
<td>8. Foot examination</td>
<td>8. New onset type 1 diabetes should be screened for thyroid peroxidase and thyroglobin antibodies</td>
<td>8. Patient specific physical activity goals</td>
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<tr>
<td>d) SMBG results and patient use of data</td>
<td>a) inspection</td>
<td>9. Oral examination</td>
<td>9. Review need for patient to maintain an emergency preparedness/disaster kit including items important for medical care and self-management goals (and to update kit twice per year)</td>
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<td>6. Exercise history</td>
<td>b) palpation of DP and PT pulses</td>
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<td>10. Plan for managing diabetes during illness (sick day plan)</td>
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<td>7. Acute complications (DKA, hypoglycemic episodes)</td>
<td>c) presence/absence of patellar and Achilles reflexes</td>
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<td>(8. History of diabetes related complications (microvascular, macrovascular)</td>
<td>d) determination of proprioception, vibration and monofilament sensation</td>
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<td>9. Cardiovascular risk assessment</td>
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<td>10. Assessment for mood disorder</td>
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<td>11. Family history of diabetes</td>
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<td>12. Psychosocial/economic factors</td>
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<td>13. Tobacco, alcohol, substance use</td>
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<td>14. Contraception, reproduction, sexual</td>
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</table>
15. Assess for hypoglycemia

FREQUENCY OF CONTINUING CARE VISITS

1. Daily for initiation of insulin or change in regimen
2. Weekly for initiation of oral glucose-lowering agent(s) or change in regimen
3. Quarterly routine diabetes visits

Abbreviation List

ACE angiotensin converting enzyme
ARB angiotensin II receptor blocker
BMI body mass index
CHD coronary heart disease
CHF congestive heart failure
CKD chronic kidney disease
CVD cardiovascular disease
DM diabetes mellitus
FPG fasting plasma glucose
GDM gestational diabetes
GFR glomerular filtration rate
HDL high density lipoprotein
IFG impaired fasting glucose
IGT impaired glucose tolerance
LDL low density lipoprotein
MNT medical nutrition therapy
OGTT oral glucose tolerance test
PG postload glucose
SMBG self-monitoring of blood glucose

REFERENCES:


SIGNATURES:

_____________________________________________   ____________
Chief Clinical Officer       Date

_____________________________________________   ____________
Chief Medical Officer       Date

_____________________________________________   ____________
Chief Executive Officer       Date