

This guideline summary is based on the 2010 National Diabetes Guideline and was developed to assist Primary Care physicians and other health care professionals in the outpatient treatment of diabetes in adults aged 18 and older. The guideline was developed by the KP National Diabetes Guideline Development Team (GDT).

## Prevention

### INTERVENTION TO DELAY ONSET

- ▶ For patients with impaired glucose tolerance (IGT) or impaired fasting glucose (IFG),\* the GDT strongly recommends that first-line therapy include methods to promote healthy eating and to increase physical activity, which are targeted to achieve a sustained weight loss (5 to 7%), and delay the onset of diabetes.
- ▶ If therapy goals are not achieved in a reasonable timeframe through lifestyle interventions alone, adding metformin is an option.

\* Included studies defined impaired glucose tolerance as a glucose level of 140 to 199 post 75 g glucose load. The ADA defines impaired fasting glucose as FPG levels  $\geq 100$  mg/dl (5.6 mmol/L) but  $< 126$  mg/dl (7.0 mmol/L).

### POSTPARTUM FOLLOW-UP OF GESTATIONAL DIABETES (GDM)

- ▶ For women with GDM, the following are recommended:
  - Information/education about increased risk of developing type 2 diabetes following GDM
  - Long-term postpartum follow-up, including advice on diet, exercise, and behavior modification to prevent future progression to type 2 diabetes
  - Screening for diabetes 6 weeks after delivery, and then at least annually.

## Screening

### CANDIDATES TO SCREEN FOR TYPE 2 DIABETES

- ▶ Screening is recommended for asymptomatic adults with sustained blood pressure  $>135/80$  mm Hg (either treated or untreated) to establish an appropriate blood pressure target.
- ▶ Screening is recommended annually if patient has hyperlipidemia (LDL-C  $> 130$ ) and hypertension (BP = 140/90), or pre-diabetes (FPG 100-125 mg/dL, previously called "impaired glucose tolerance" or "impaired fasting

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glucose"); history of gestational diabetes or history of larger ( $>9$  lbs) babies.

- ▶ Screening is recommended at least every 5 years for all other adults with risk factors for diabetes, including:
  - Age 45 years or older OR
  - Under age 45 and overweight (BMI  $\geq 25$  kg/m<sup>2</sup>, may be lower in some ethnic groups) with additional risk factors:
    - ➔ Physical inactivity
    - ➔ First-degree relative with diabetes

- Members of a high-risk ethnic population (e.g., Black/African American, Latino, Native American, Asian American, Pacific Islander)
- Women who delivered a baby weighing > 9 lb or were diagnosed with GDM
- Hypertension ( $\geq 140/90$  mmHg) or on therapy for hypertension
- HDL cholesterol level < 35 mg/dl (0.90 mmol/L) and/or a triglyceride level > 250 mg/dL (2.82 mmol/L)
- Women with polycystic ovarian syndrome (PCOS)
- A1c  $\geq 5.7\%$ , IGT or IFG on previous testing
- Other clinical conditions associated with insulin resistance (e.g., morbid obesity (defined as BMI  $\geq 40$  kg/m<sup>2</sup>), acanthosis nigricans) and/or
- History of cardiovascular disease

### TEST TO SCREEN FOR IMPAIRED GLUCOSE TOLERANCE

- If a test for impaired glucose control is desired, a Fasting Plasma Glucose (FPG) test is currently recommended; 8-hour fasting required.
- HbA1c will be re-evaluated as a routine screening test.

## Pharmacological Management Management of Hypertension

### TARGET BLOOD PRESSURE

- The target blood pressure for patients with diabetes and hypertension is < 130/80 mmHg.

### THRESHOLD TO INITIATE DRUG THERAPY

- Initiate antihypertensive drug therapy in patients with diabetes with a systolic blood pressure of  $\geq 140$  mmHg and/or diastolic  $\geq 85$  to 90 mmHg.
- After three months of lifestyle therapy, if systolic BP is 130 to 139 mmHg or diastolic BP is 80 to 89 mmHg, initiate drug therapy.

### THRESHOLD TO INITIATE COMBINATION DRUG THERAPY

- When BP is  $\geq 150$  to 160/90 mmHg, initiate therapy with two drugs, either as a separate prescription or in fixed dose combinations.

**Note:** For patients with diabetes and hypertension, the target blood pressure is < 130/80 mmHg.

### INITIAL TREATMENT IN THE ABSENCE OF MICROALBUMINURIA

- A thiazide-type diuretic is strongly recommended for the treatment of diabetes and hypertension in the absence of heart failure, known coronary heart disease, or microalbuminuria.
- Because most patients with hypertension and diabetes will need more than one drug to control their hypertension effectively, combination therapy with HCTZ/ACE inhibitors is an option for first-line therapy.

### STEP-CARE THERAPY FOR HYPERTENSION (EXCERPTED FROM THE NATIONAL HYPERTENSION GUIDELINE)

- **For two drugs:**  
If blood pressure is not controlled on a thiazide-type diuretic alone, then a thiazide-type diuretic + ACEI is recommended.
- **For three drugs:**  
If blood pressure is not controlled on a thiazide-type diuretic + ACEI, then adding a dihydropyridine calcium channel-blocker is recommended.
- **For four drugs:**  
If blood pressure is not controlled on a thiazide-type diuretic + ACEI + dihydropyridine calcium channel-blocker, then adding a beta blocker or spironolactone is recommended.

### DRUG THERAPY FOR PATIENTS WITH DIABETES, HYPERTENSION, AND MICROALBUMINURIA

- If a patient with diabetes, hypertension, and microalbuminuria (or albuminuria) is intolerant to an ACE inhibitor, substitute an ARB (angiotensin receptor blocker) to prevent progression of renal disease in the absence of contraindications.

### DRUG THERAPY FOR MICROALBUMINURIA IN NORMOTENSIVE PATIENTS

- In normotensive adults under age 55 who have diabetes and microalbuminuria, an ACE inhibitor is recommended to prevent progression to end-stage renal disease.
- In normotensive adults with diabetes, microalbuminuria (or albuminuria) and ACE inhibitor allergy or intolerance, there is insufficient evidence to recommend for or against the use of ARBs to prevent progression to end-stage renal disease.

### MONITORING OF MICROALBUMIN

- Continued monitoring of microalbumin is optional in patients with diabetes and established microalbuminuria, who are on an ACE inhibitor or ARB.

## Management of Blood Glucose

### GLUCOSE CONTROL

- ▶ Intensive glucose control is strongly recommended for patients with diabetes if not contraindicated.

### INITIAL DRUG THERAPY

- ▶ Metformin is recommended as the first-line glucose lowering drug in patients with type 2 diabetes.

### STEP-CARE THERAPY

- ▶ Following failure to achieve goals on monotherapy, more than one medication is recommended.
- ▶ There is insufficient evidence to recommend an optimal medication combination for type 2 diabetes not controlled with a single agent.

### GLYCEMIC CONTROL TARGET

- ▶ An overall treatment goal of HbA1c < 7% is recommended for adults with known diabetes.<sup>†</sup>
- ▶ An individualized HbA1c goal using shared decision-making is recommended:
  - A less stringent treatment goal,<sup>§</sup> is recommended for patients with comorbid diseases,<sup>†</sup> adults ≥ 65 years of age, and patients with unusual conditions.
  - Conversely, more stringent goals are an option in individual patients.

† HEDIS 2009 lists the following exclusions (comorbidities) for the HbA1c indicator < 7% goal: ≥ 65 years of age; and/or coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA) in the current and/or prior measurement year, regardless of setting; ischemic vascular disease (IVD) in the current and/or prior measurement year, regardless of setting; and, at least one encounter in the measurement year, regardless of setting, of the following—chronic heart failure (CHF); prior myocardial infarction (MI); chronic renal failure (CRF)/end-stage renal disease (ESRD); dementia; blindness; and/or, amputation.

§ HEDIS 2009 offers HbA1c < 8% as a treatment goal for those not eligible for the treatment goal of < 7%. Eligibility is to be based on laboratory data to identify the most recent HbA1c test during the measurement year.

## Lipid Management

### LDL-C GOALS

- ▶ An LDL-C goal of < 100 mg/dL, with an optional goal of < 70 mg/dL, is recommended for all people with diabetes age 40 or older.

**NOTE:** In some people, a target LDL < 70 to 100 mg/dL may be difficult to achieve. In these cases, use clinical judgment to weigh the benefits and risks of intensifying drug therapy.

### STATIN THERAPY: DM AND CAD

- ▶ Statin therapy is recommended for all patients with diabetes and CAD.

### STATIN THERAPY: INITIAL DOSE

- ▶ Initiate statin therapy with at least simvastatin 40 mg daily.<sup>†</sup>

† Lower doses are recommended for patients at high risk for rhabdomyolysis

### STATIN THERAPY: AGE 40 OR OLDER

- ▶ Statin therapy is recommended, regardless of baseline LDL-C. NNT = 23<sup>\*</sup>

\* For every 23 diabetics or people with coronary disease, aged 40 to 80 years, who are treated with 40 mg of simvastatin daily, for five years, one mortality or fatal or non-fatal vascular event will be prevented.

### STATIN THERAPY: AGE 39 OR UNDER

- ▶ For people with diabetes age 39 or younger WITH ≥ 1 risk factor:<sup>†</sup>
  - Statin therapy is RECOMMENDED when LDL-C ≥ 100 mg/dL
  - Statin therapy is OPTIONAL when LDL-C < 100 mg/dL.
- ▶ For people with diabetes age 39 or younger WITHOUT risk factors:<sup>†</sup>
  - Statin therapy is RECOMMENDED when LDL-C ≥ 130 mg/dL.
  - Statin therapy is OPTIONAL when LDL-C < 130 mg/dL.

† Risk factors include: duration of diabetes ≥ 10 years, HDL-C < 40 mg/dL, current smoker or family history of pre-mature CAD (Clinical CAD or sudden death in a first-degree relative aged < 55 (men) and < 65 (women)).

## Drug Therapy for Primary & Secondary Prevention of Cardiovascular Events

### ACE INHIBITOR THERAPY

- ▶ Drug therapy with ACE inhibitors is recommended for patients with diabetes aged ≥ 55 years with one or more cardiovascular risk factors (total cholesterol > 200 mg/dL, HDL cholesterol ≤ 35 mg/dL, hypertension, microalbuminuria, or current smoking); or a history of CVD (CAD, stroke, or peripheral vascular disease).

### BETA-BLOCKER THERAPY

- ▶ For CAD patients, non-intrinsic sympathomimetic activity (non-ISA) beta-blocker therapy is recommended, unless contraindicated.

### ASPIRIN THERAPY

- ▶ For patients ≥ 40 years old with diabetes, treatment with at least 81 mg/day aspirin is recommended unless contraindicated.

- ▶ Patients with aspirin allergy, bleeding tendency, aged > 85, or clinically active hepatic disease are not candidates for aspirin therapy.

### **MULTIFACTORIAL INTERVENTIONS FOR PREVENTING CVD**

- ▶ For patients with Type 2 diabetes, concurrent treatment of cardiovascular (CV) risk factors for the prevention of CV events is recommended.

## **Screening for Complications**

### **RETINAL SCREENING**

- ▶ Diabetic patients with background retinopathy, or more severe disease, should be monitored at least annually; and those without retinopathy should be screened every one to two years.

### **FOOT SCREENING**

- ▶ All patients with diabetes should have a foot screening that includes a monofilament test.
- ▶ Patients with an abnormal monofilament test are at a high risk for lower limb complications and are candidates for entry into a podiatry population-based foot care program, or equivalent.
- ▶ Annual foot screening is recommended.

## **Self-Management**

### **SELF-MANAGEMENT EDUCATION**

- ▶ Patient training in self-care behaviors is recommended as a component of any diabetes management program.

### **SELF-MONITORING OF BLOOD GLUCOSE IN TYPE 1 DIABETES**

- ▶ Self-monitoring of blood glucose (SMBG) is strongly recommended for patients with Type 1 diabetes.
- ▶ When SMBG is used, it is strongly recommended that results be accompanied by an appropriate adjustment in therapy.

### **SELF-MONITORING OF BLOOD GLUCOSE IN TYPE 2 DIABETES**

- ▶ Self-monitoring of blood glucose (SMBG) is recommended for patients with Type 2 diabetes.
- ▶ When SMBG is used, results should be accompanied by an appropriate adjustment in therapy.

### **SELF-TITRATION OF INSULIN**

- ▶ For patients with Type 2 Diabetes, self-titration of bedtime insulin dosage is recommended to enhance glucose control.