Prevention of diabetes, as well as early detection and treatment of both prediabetes and diabetes, is critical to the health of our country. Because evidence-based guidelines are key to our ability to effectively address the nation’s diabetes epidemic, the American Diabetes Association (ADA) updates its “Standards of Medical Care in Diabetes” annually to incorporate new evidence or clarifications.

The 2016 standards, available at professional.diabetes.org/jfp, are a valuable resource. Among the latest revisions: an expansion in screening recommendations, a change in the age at which aspirin therapy for women should be considered, and a change in A1C goals for pregnant women with diabetes.

As members of the ADA’s primary care advisory group, we use a question and answer format in the summary that follows to highlight recent revisions and review other recommendations that are of particular relevance to physicians in primary care. It is important to note, however, that ADA recommendations are not intended to preclude clinical judgment and should be applied in the context of excellent medical care.

Diagnosis and screening
Have the 2016 ADA standards changed the way diabetes is diagnosed?
No. The criteria for a diagnosis of diabetes did not change. Diabetes and prediabetes are still screened for and diagnosed with any of the following: a fasting plasma glucose (FPG); a 2-hour 75-g oral glucose tolerance test (OGTT); a random plasma glucose >200 mg/dL with symptoms of hyperglycemia; or A1C criteria (TABLE 1). The wording was changed, however, to make it clear that no one test is preferred over another for diagnosis.

Have screening recommendations been revised?
Yes. In addition to screening asymptomatic adults of any age who are overweight or obese and have one or more additional risk factors for diabetes, the 2016 standards recommend screening all adults 45 years and older, regardless of weight.

Is an A1C <7% the recommended treatment goal for everyone with diabetes?
No. An A1C <7% is considered reasonable for most, but not all, nonpregnant adults. In the last few years, the ADA has focused more on individualized targets. Tighter control (<6.5%)—which is associated with lower rates of eye disease, kidney disease, and nerve damage—may be appropriate for patients who have no significant hypoglycemia, no cardiovascular disease (CVD), a shorter duration of diabetes, or a longer expected lifespan.

Conversely, a higher target (<8%) may be appropriate for patients who are older, have longstanding diabetes, advanced macrovascular or microvascular disease, established complications, or a limited life expectancy.
Pregnancy. The 2016 standards have a new target for pregnant women with diabetes: The ADA previously recommended an A1C <6% for this patient population, but now recommends a target A1C between 6% and 6.5%. This may be tightened or relaxed, however, depending on individual risk of hypoglycemia.

In focusing on individualized targets and hypoglycemia avoidance, the ADA notes that attention must be paid to fasting, pre-meal, and post-meal blood glucose levels to achieve treatment goals. The 2016 standards emphasize the importance of patient-centered diabetes care, aligned with a coordinated, team-based chronic care model.

Diabetes self-management education and support is indicated for those who are newly diagnosed, and should be provided periodically based on glucose control and progression of the disease. All patients should receive education on hypoglycemia risk and treatment.

Prediabetes and prevention

What is prediabetes and what can I do to prevent patients with prediabetes from developing diabetes?

Patients with impaired glucose tolerance, impaired fasting glucose, or an A1C between 5.7% and 6.4% are considered to have prediabetes and are at risk for developing type 2 diabetes.

Family physicians should refer patients with prediabetes to intensive diet, physical activity, and behavioral counseling programs like those based on the Diabetes Prevention Program study (www.niddk.nih.gov/about-niddk/research-areas/diabetes/diabetes-prevention-program-dpp/Pages/default.aspx). Goals should include a minimum 7% weight loss and moderate-intensity physical activity, such as brisk walking, for at least 150 minutes per week.

Lifestyle modification programs have been shown to be very effective in preventing diabetes, with about a 58% reduction in the risk of developing type 2 diabetes after 3 years. The 2016 standards added a recommendation that physicians encourage the use of new technology, such as text messaging or smart phone apps, to support such efforts.

Should I consider initiating oral antiglycemics in patients with prediabetes?

Yes. Pharmacologic agents, including metformin, acarbose, and pioglitazone, have been shown to decrease progression from predia-
For patients with diabetes, a sustained weight loss of 5% may improve glycemic control and reduce the need for medication.

**Glycemic treatment**

*What are some of the key factors that distinguish the different type 2 diabetes medications from one another?*

An increasing understanding of diabetes pathophysiology has led to a wider array of medications, making treatment more complex than ever. It is important for physicians to have a strong working knowledge of the various classes of antidiabetic agents and the subtleties between drugs in the same class to best individualize treatment.

Here are the highlights of each class of medication listed in the ADA/European...
Patients who fail to achieve or maintain their A1C goal after one year may need to begin insulin therapy.
Patients ≥40 years will need moderate-to high-intensity statin therapy to lower their atherosclerotic cardiovascular disease risk.

The following medications are not included in the algorithm but are included in the 2016 standards, and may be helpful for certain patients:

- **Alpha-glucosidase inhibitors** delay the absorption of glucose from the proximal to distal GI tract, thereby reducing postprandial hyperglycemia. Flatulence and leakage of stool—the most common adverse effects—have limited their use in the United States.

- **Bile acid sequestrants** (colesevelam) treat both hyperlipidemia and diabetes. The medications work by reducing glucose absorption from the GI tract. They reduce postprandial hyperglycemia, with a low risk of hypoglycemia. Colesevelam’s use is limited, however, because of the number of pills needed (6 daily).

- **Bromocriptine** affects satiety levels via the central nervous system, and is available in a specific formulation for the treatment of diabetes. “First-dose” hypotension, however, is an adverse effect of considerable concern.¹

- **Pramlintide**, an injectable amylin mimetic given to patients on prandial insulin, can reduce postprandial glucose levels. The most common adverse effects are upper GI symptoms and hypoglycemia. Due to the adverse effects and the need for an injection with each meal, pramlintide is used infrequently.

**Cardiovascular risk reduction**

**Has the ADA revised its recommendations for cardiovascular disease risk management?**

**Yes.** There have been several changes. The first is in terminology, with atherosclerotic cardiovascular disease (ASCVD) replacing CVD alone. While new recommendations for statin therapy for adults older than 40 years (TABLE 2)³ were also added, the emphasis remains on therapeutic lifestyle change as an effective treatment for hypertension. These modifications should include at least 150 minutes of moderate physical activity per week and, for most patients, a reduction in total calories, saturated fat, and sodium.

It is important to remind patients that to maximize the benefits in terms of treating hyperglycemia, hypertension, and dyslipidemia, such changes must be maintained over the long term.

**Aspirin therapy.** The ADA also revised its recommendation regarding aspirin therapy. Based on new evidence in the treatment of women with ASCVD risk, the standards now call for considering aspirin therapy (75-162 mg/d) in both women and men ≥50 years as a primary prevention strategy for those with type 1 or type 2 diabetes with a 10-year ASCVD risk of >10%. (The previous standards recommended this only for women older than 60 years.) Antiplatelet therapy is now recommended for patients younger than 50 years with multiple risk factors, and as secondary prevention in those with a history of ASCVD.¹⁰⁻¹¹

**Hypertension.** The ADA’s recommendations for treating hypertension in patients with diabetes have not changed; the goal remains <140/<90 mm Hg. Lower targets may be appropriate for younger patients, those with albuminuria, and individuals with additional CVD risk factors; however, systolic pressure <130 mm Hg has not been shown to reduce CVD outcomes, and diastolic pressure <70 mm Hg has been associated with higher mortality.²²

Optimal medication and lifestyle therapy are important to achieve goals, with avoidance of undue treatment burden. Angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs), but not both, should be included as part of treatment. Other agents, such as a thiazide diuretic, may be needed to achieve individual goals. Serum creatinine/eGFR and serum potassium levels should be monitored with the use of diuretics.

**Lipids.** The 2016 standards include notable changes in lipid management. The ADA sees a role for ezetimibe for select patients, based on studies such as the IMPROVE IT trial that included participants with diabetes. The ADA also added a table highlighting statin recommendations and delineating high and moderate-intensity statins (TABLE 3).¹ Those younger than 40 years with no other risk factors may not need a statin, but patients ages 40 or older will need moderate-to high-intensity statin therapy to effectively lower ASCVD risk.²⁴⁻²⁸
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**Microvascular complications**

**DIABETIC KIDNEY DISEASE**

**How should I diagnose nephropathy?**

The ADA changed the terminology, referring to “diabetic kidney disease” (DKD) rather than nephropathy to highlight the fact that the focus is on kidney disease directly linked to diabetes.

Other recommendations include an annual assessment of urinary albumin (eg, spot urine albumin-to-creatinine ratio and eGFR) for patients who have had type 1 diabetes for ≥5 years and all patients who have type 2 diabetes. Two out of 3 abnormal specimens collected within a 3- to 6-month period indicate the presence of albuminuria.

**What can be done to prevent or slow the progression of DKD?**

Optimal BP and glycemic control are key, along with diet and medication. For patients with DKD, dietary protein intake should be 0.8 g/kg body weight per day. ACE inhibitors and ARBs have been shown to slow the decline in eGFR in patients with elevated urinary albumin excretion (≥30 mg/day).

However, neither an ACE inhibitor nor an ARB is recommended for the primary prevention of DKD in patients who have normal BP, normal urine albumin-to-creatinine ratio (<30 mg/g), and normal eGFR. In addition, combined use of an ACE inhibitor and an ARB should be avoided, as it provides no additional benefit and increases the risk of adverse effects.

**RETNOPATHY**

**How should I manage retinopathy in patients with diabetes?**

As with the management of DKD, it is important to optimize glycemic and BP control to reduce the risk, or slow the progression, of retinopathy. Intensive diabetes management, with the goal of achieving near-normal glycemic levels, has been shown in large prospective randomized studies to prevent or delay the onset and progression of retinopathy.

**TABLE 2**

<table>
<thead>
<tr>
<th>Age</th>
<th>Risk factors</th>
<th>Recommended statin intensity*</th>
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<tbody>
<tr>
<td>&lt;40 years</td>
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<tr>
<td></td>
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ACS, acute coronary syndrome; ASCVD, atherosclerotic cardiovascular disease; LDL, low-density lipoprotein.

*In addition to lifestyle therapy.

†Risk factors include LDL cholesterol ≥100 mg/dL, high blood pressure, smoking, overweight or obesity, and a family history of premature ASCVD.

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Statin (or combination) therapy for which patients?1

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†Risk factors include LDL cholesterol ≥100 mg/dL, high blood pressure, smoking, overweight or obesity, and a family history of premature ASCVD.
The presence of retinopathy is not a contraindication to aspirin therapy for ASCVD prevention, as aspirin does not increase the risk of retinal hemorrhage.

**When should patients with diabetes be screened for retinopathy?**

Patients with type 1 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist within 5 years of the onset of diabetes. Those with type 2 diabetes should have such an exam shortly after diagnosis. The exam should be repeated annually; if there is no evidence of retinopathy, however, 2-year intervals may be considered.

**PERIPHERAL NEUROPATHY**

**When and how should I screen patients with diabetes for neuropathy?**

All patients should be screened for diabetic peripheral neuropathy (DPN) starting at diagnosis of type 2 diabetes and 5 years after the diagnosis of type 1 diabetes, and continued at least annually thereafter. Assessment should include a detailed history and 10-g monofilament testing, as well as at least one of the following tests: pinprick, temperature, and vibration sensation.

It is important, too, to screen patients with more advanced diabetes for signs and symptoms of autonomic neuropathy. Signs and symptoms may include resting tachycardia, exercise intolerance, orthostatic hypotension, gastroparesis, constipation, impaired neurovascular function, and autonomic failure in response to hypoglycemia. In men, diabetic autonomic neuropathy may cause erectile dysfunction and/or retrograde ejaculation.

**How should I manage patients who have DPN?**

Tight glycemic control is the only measure that has been shown to prevent or delay the development of DPN or cardiac autonomic neuropathy in patients with type 1 diabetes, and to slow the progression of neuropathy in some patients with type 2 diabetes.

The FDA has approved pregabalin, duloxetine, and tapentadol for the treatment of pain associated with DPN. Tricyclic antidepressants, gabapentin, venlafaxine, carbamazepine, tramadol, and topical capsaicin, although not approved for the treatment of painful DPN, may also be effective in treating neuropathic pain.

For those with autonomic neuropathy, dietary changes and prokinetic agents such as erythromycin may alleviate gastroparesis. Due to extrapyramidal adverse effects, metoclopramide is reserved for the most severe and unresponsive cases. Recurrent urinary tract infections, pyelonephritis, incontinence, or palpable bladder should prompt an evaluation for bladder dysfunction. Controlling lipids and BP, quitting smoking, and making other lifestyle changes can reduce both the development and the progression of autonomic neuropathy.

**FOOT CARE/PERIPHERAL ARTERIAL DISEASE**

**What does the ADA recommend regarding foot care for patients with diabetes?**

The ADA’s standards recommend an annual comprehensive foot examination to identify risk factors predictive of ulcers and potential amputations. The exam should start with inspection and assessment of foot pulses and should seek to identify loss of peripheral
sensation. The examination should include inspection of the skin, assessment of foot deformities, neurologic assessment including 10-g monofilament testing and pinprick or vibration testing or assessment of ankle reflexes, and vascular assessment, including pulses in the legs and feet.40

It is also important to screen patients for peripheral arterial disease (PAD), with a comprehensive medical history and physical exam of pulses. Ankle-brachial index testing (ABI) should be performed in patients with signs or symptoms of PAD, including claudication or skin and hair changes in the lower extremities. ABI may be considered for all patients with diabetes starting at age 50 and in those younger than 50 years who have risk factors.41

Which patients with diabetes are at higher risk for foot complications? The following are risk factors for foot complications: previous amputation, prior foot ulcer, peripheral neuropathy, foot deformity, peripheral vascular disease, visual impairment, peripheral neuropathy (especially if on dialysis), poor glycemic control, and smoking. Patients with high-risk foot conditions should be educated about their risk and appropriate management.

A well-fitted walking shoe that cushions the feet and redistributes pressure is one option to help patients. Patients with bony deformities may need extra wide or deep shoes and patients with more advanced disease may need custom-fitted shoes.

When should patients be referred to a foot specialist? Refer patients to a foot care specialist for ongoing preventive care and lifelong surveillance if they smoke or have a history of lower-extremity complications, a loss of protective sensation, structural abnormalities, or PAD.

IMMUNIZATION

Are there special immunization recommendations for people with diabetes? No. Children and adults with diabetes should be vaccinated according to age-related recommendations for the general population, the standards state. The ADA also recommends that patients ages 19 to 59 years receive the hepatitis B vaccine if they haven’t already done so and that the vaccine be considered for those ≥60 years, as well. This is in keeping with the Centers for Disease Control and Prevention’s recommendation that adults with any medical, occupational, or other risk factor be immunized against hepatitis B.42

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References


