

Diabetes Mellitus: ADA Standards of Medical Care in Diabetes (2019)

About the Guideline

- The American Diabetes Association (ADA) has developed diabetes care standards for more than 25 years.
- The standards are evidence-based and undergo a formal peer review process by the ADA Professional Practice Committee and Board of Directors.
- ADA standards are published in *Diabetes Care* every January.

Key Recommendations

Improving Care and Promoting Health

- Assess and consider the patient's social context, including food insecurity, housing instability, and financial barriers, when making treatment decisions.
- Include local community resources as referrals
- Telemedicine increases access to care for patients with diabetes.

Classification and Diagnosis

- Diabetes mellitus type 1
 - Type 1 diabetes is caused by autoimmune beta-cell destruction that usually leads to absolute insulin deficiency.
 - Diagnosis is based on the classic 3 P's (polyuria, polyphagia, polydipsia) plus two of the following lab results gathered from the same blood sample:
 - A1c level of 6.5% or higher
 - Fasting plasma glucose (FPG) > 126 mg/dL
 - Random blood glucose level > 200 mg/dL
- Diabetes mellitus type 2
 - Type 2 diabetes is a result of progressive loss of beta-cell insulin secretion, often with the concurrent development of insulin resistance.
 - Diagnosis is indicated by two of the following lab results gathered from the same sample:
 - A1c level of 6.5% or higher
 - Fasting plasma glucose (FPG) > 126 mg/dL
 - Random blood glucose level > 200 mg/dL
- Gestational diabetes mellitus (GDM) is diagnosed in the second or third trimester when clearly overt diabetes was not present prior to pregnancy.
- Prediabetes
 - Glucose levels do not fall in diabetic range but are too high to be considered normal. Prediabetes is diagnosed by the presence of impaired fasting glucose (IFG), impaired glucose tolerance (IGT), and/or an A1c level of 5.7% to 6.4%.
 - Testing should be performed in asymptomatic overweight or obese (body mass index [BMI] ≥ 25 kg/m² or ≥ 23 kg/m² for Asian Americans) individuals with any of the following risk factors:

- Race at high risk for developing diabetes (African American, Native American, Latino, Pacific Islander, Asian American)
- First-degree relative with diabetes
- History of cardiovascular disease (CVD)
- Hypertension (blood pressure \geq 149/90 mmHg, or currently receiving hypertensive therapy)
- High-density lipoprotein (HDL) cholesterol $<$ 35 mg/dL and/or triglycerides $>$ 250 mg/dL
- Women with polycystic ovarian syndrome (PCOS)
- Physical inactivity
- Specific types of diabetes
 - Monogenic diabetes syndromes (neonatal diabetes and maturity-onset diabetes of the young [MODY])
 - Diseases of exocrine pancreas (cystic-fibrosis [CF] and pancreatitis)
 - Drug- or chemically-induced diabetes related to glucocorticoid use, treatment for human immunodeficiency virus/acquired immunodeficiency syndrome [HIV/AIDS], or posttransplant related treatment.

Prevention or Delay of Diabetes Mellitus Type 2

- Test annually for the development of type 2 diabetes in individuals previously diagnosed with prediabetes.
- Individuals with prediabetes should be referred to a lifestyle modification program. Encourage an increase in moderate-intensity (brisk walking) physical activity for at least 150 minutes per week, with a weight-loss goal of 7% of initial body weight.
- Consider technology-assisted diabetes prevention programs, including smart phone and web-based applications and telehealth programs, to increase adherence.
- Medical nutrition therapy should be included in any lifestyle modification plan. Encourage the intake of quality foods such as nuts, legumes, whole grains, fruits, and vegetables, and limit the intake of refined and processed foods.
- Consider metFORMIN for the prevention of type 2 diabetes in individuals with prediabetes, especially in women with a history of GDM, a BMI \geq 35 kg/m², or those over 60 years old.
 - Vitamin B12 deficiency is associated with long-term use of metFORMIN, and levels should be measured periodically.
- Prediabetes is associated with heightened cardiovascular risk. Screen and treat modifiable risk factors.
- Discourage the use of tobacco. Tobacco use increases the risk for type 2 diabetes.

Comprehensive Medical Evaluation and Assessment of Comorbidities

- Patient-centered collaborative care should focus on communication and should assess literacy, numeracy, health literacy, and any potential barriers to care.
- Care should be managed by a multidisciplinary team that may include primary care practitioners, specialists, dietitians, pharmacists, podiatrists, and any other health care practitioner that is appropriate.
- A comprehensive medical evaluation should be performed, with follow-up and ongoing care established.

- Provide vaccinations to adults and children with diabetes as routinely recommended, such as those for influenza, pneumococcal pneumonia, and hepatitis B virus.
- The following should be performed for individuals with diabetes and comorbid conditions:
 - Assessment of cardiovascular disease risk
 - Screening for autoimmune thyroid disease and celiac disease
 - Assess for cognitive impairment and dementia. In patients with dementia or cognitive impairment, intensive glucose control cannot be expected, and treatment should be focused on avoiding significant hypoglycemia
 - Individuals with prediabetes or type 2 diabetes and elevated liver enzymes or a fatty liver noted by ultrasound should be evaluated for nonalcoholic steatohepatitis and liver fibrosis
 - For patients with medically refractory chronic pancreatitis who require a total pancreatectomy, consider islet autotransplantation to prevent postsurgical diabetes.
 - Patients with HIV should be screened for prediabetes and diabetes at the following intervals:
 - Prior to initiation of antiretroviral therapy (ART), and 3 to 6 months after initiation.
 - When switching ART, and 3 to 6 months after switching.
 - If initial screening is normal, rescreen with a fasting blood glucose yearly.
 - A morning testosterone level should be measured for men with diabetes experiencing symptoms of hypogonadism, such as decreased libido or erectile dysfunction.
 - Mental health screenings should be performed for all patients with diabetes and for those with diabetes who are currently receiving antipsychotic medication. Assessments should include screening for anxiety, depression, disordered eating, and eating disorders.

Lifestyle Management

- Evaluate the need for education about diabetes self-management at each visit, if complications arise, and at any transitions of care.
- Diabetes self-management education should be patient-centered and take place in an individual or group setting, with the use of appropriate technology.
- Medical nutrition therapy and education is recommended and should address the following:
 - Effectiveness of nutrition therapy
 - Energy balance
 - Eating patterns and macronutrients (carbohydrates, protein, and fats)
 - Micronutrients and herbal supplements
 - Alcohol
 - Sodium
 - Nonnutritive sweeteners
- Physical activity recommendations include the following:
 - Children and adolescents should engage in at least 60 minutes per day of moderate-intensity activity.
 - Adults with type 1 and type 2 diabetes should engage in at least 150 minutes per week of moderate-intensity activity, and 2 to 3 sessions per week of resistance exercise. Those with type 2 diabetes should reduce sedentary behavior.
 - Older adults should engage in flexibility and balance training 2 to 3 times per week.
- Encourage the cessation of all tobacco and e-cigarette products.

- Consistent carbohydrate intake is recommended (this can be individualized to each patient and can be added to other diet orders).

Glycemic Targets

- For patients who have met treatment goals, perform an A1c test at least twice per year.
- For patients whose therapy has changed or for those not meeting their glycemic goals, perform an A1c test at least four times per year.
- Treatment changes can be made more efficiently with the use of point-of-care (POC) A1c testing.
- A reasonable glycemic goal for nonpregnant adults is an A1c < 7%.
 - Tighter control (A1c < 6.5%) may be reasonable for select patients.
 - A less stringent goal of A1c < 8% may be appropriate for individuals in the following situations:
 - History of severe hypoglycemia
 - Advanced microvascular and/or macrovascular complications
 - Extensive comorbidities
 - Difficult to control, long-standing diabetes
 - Limited life expectancy
- Glycemic targets and goals should be reassessed periodically.
- For individuals at risk for hypoglycemia, asymptomatic and symptomatic hypoglycemia should be discussed at each visit.
- For hypoglycemia in conscious patients, glucose (15 to 20 g) is the preferred treatment for a blood glucose < 70 mg/dL; however, any carbohydrate with glucose may be used.
 - Repeat blood glucose 15 minutes after treatment. If the patient is still hypoglycemic, repeat the treatment.
 - To prevent recurrence, a meal or snack should be consumed once blood glucose has returned to normal levels.
- For level 2 hypoglycemia (blood glucose < 54 mg/dL), glucagon should be prescribed. Education should be provided to school and work personnel, caregivers, and family members regarding the administration of glucagon.
- Reevaluate the patient's treatment regimen and cognitive function if persistent hypoglycemia occurs.

Diabetes Technology

- Diabetes technology is the term used to describe any device, hardware, or software used to manage blood glucose levels, prevent complications, decrease the burden of living with diabetes, and improve a patient's quality of life.
- Use insulin syringes or insulin pens for insulin delivery.
 - Consider patient preference, insulin type, and dosing regimen, cost and self-management capabilities. Use insulin injection aids for dexterity issues or vision impairment.
- Insulin pumps are an option for most adults, children, and adolescents with type 1 diabetes requiring multiple daily insulin injections.
- Individuals using an insulin pump or administering multiple daily insulin injections should monitor blood glucose either by using continuous glucose monitoring or by self-monitoring at the following times:
 - Prior to meals and snacks

- At bedtime
- Periodically prior to exercise, and postprandially
- When low blood sugar is suspected
- Prior to driving
- Self-monitoring and continuous glucose monitoring require extensive diabetes education, training, and support for optimal implementation and ongoing use.
- Practitioners should be aware of anything that may interfere with glucose meter accuracy, such as counterfeit strips, oxygen, temperature, and any interfering substances.
- Real-time continuous glucose monitoring is an additional tool to help improve glucose control and reduce the risk of hypoglycemia.
 - Consider it for children and adolescents with type 1 diabetes. It may be used with multiple daily insulin injections or with a continuous subcutaneous insulin infusion.
 - Real-time continuous glucose monitoring is also a useful tool to lower A1c in adults with type 1 diabetes who are not meeting their glycemic targets.
 - It may be useful for patients at risk for frequent hypoglycemic episodes.
 - It may help to improve neonatal outcomes and A1c levels in pregnant women with type 1 diabetes.
- For adults requiring frequent glucose testing, intermittently scanned continuous glucose monitoring may be considered as a substitute for self-monitoring of blood glucose.
- To improve glycemic control, automated insulin delivery systems may be considered for children (older than 7) and adults with type 1 diabetes.

Obesity Management for the Treatment of Type 2 Diabetes

- Calculate and record BMI upon each patient encounter.
- For patients with type 2 diabetes who are overweight or obese and ready to lose weight, diet, physical activity, and behavioral therapy to achieve and maintain a > 5% weight loss is recommended.
 - A 500 to 750 kcal/day energy deficit is recommended to achieve weight loss.
 - Diets should be individualized.
 - Once short-term weight loss goals are achieved, long-term goals should be made, and a long-term maintenance plan should be developed.
 - For select patients, a ≤ 800 kcal/day diet with total meal replacements may be prescribed for a short time (3 months)
- Medications for glucose lowering or medications for comorbid conditions that are associated with weight gain should be avoided, if possible.
- Weight-loss medications may be considered for select patients after the benefits and risks have been discussed.
- A comprehensive readiness and mental health assessment should be performed prior to consideration of metabolic surgery.
- For surgical candidates with type 2 diabetes with a BMI ≥ 35 kg/m² (≥ 32.5 kg/m² for Asian Americans), metabolic surgery is recommended if weight loss cannot be achieved or maintained with nonsurgical methods.
- For patients with type 2 diabetes with a BMI ≥ 30 kg/m² (≥ 27.5 kg/m² for Asian Americans), metabolic surgery may be considered if weight loss cannot be achieved or maintained with nonsurgical methods.

- Metabolic surgery should only be performed in high-volume centers by an experienced multidisciplinary team.
- Post-surgery, patients will require lifelong support and monitoring of their nutritional and micronutrient status.
- Assess the need for mental health services for ongoing medical and psychosocial changes post-surgery.
- Medical devices for weight loss are not currently recommended.

Pharmacologic Approaches to Glycemic Treatment

- Treatment for most individuals with type 1 diabetes involves a continuous subcutaneous insulin infusion or multiple daily injections of prandial and basal insulin.
- Rapid-acting insulin analogs should be used to decrease the risk of hypoglycemia.
- For type 2 diabetes, metFORMIN is the preferred initial medication and should be continued as long as tolerated.
- Consider introducing insulin to patients with type 2 diabetes if one of the following is present:
 - Continued weight loss (catabolism)
 - Symptomatic hyperglycemia
 - A1c > 10%
 - Blood glucose \geq 300 mg/dL
- For patients with newly diagnosed type 2 diabetes who have an A1c \geq 1.5% above their glycemic target, consider dual therapy.
- Consider sodium-glucose cotransporter 2 (SGLT2) inhibitors or glucagon-like peptide 1 (GLP-1) receptor agonists for patients with type 2 diabetes with known atherosclerotic cardiovascular disease (CVD) or with known chronic kidney disease (CKD).
 - A SGLT2 inhibitor is preferred for patients with type 2 diabetes and CVD, who are also at a high risk for heart failure.
 - A GLP-1 is preferred over insulin for its glucose-lowering effect in type 2 diabetes.
- Reevaluate the medication regimen at routine intervals (every 3 to 6 months) for optimal management.

Cardiovascular Disease and Risk Management

- Measure blood pressure (BP) at all visits. Patients with a BP \geq 140/90 mmHg should follow up with a BP reading confirmation on a different day using multiple readings.
- All patients with hypertension (HTN) should be encouraged to monitor their BP at home.
- For patients with diabetes and HTN, considerations should include the following:
 - An individualized treatment plan based on patient preferences and risk stratification.
 - For patients who are also at risk for CVD, a BP of 130/80 mmHg is a reasonable goal.
 - For those without a risk for CVD, the BP goal should be < 140/90 mmHg.
 - For patients who are also pregnant with diabetes and preexisting HTN, and who are being treated with antihypertensive therapy, BP targets should be between 120/80 and 160/105 mmHg.
- For patients with diabetes and a BP > 120/80 mmHg, treat with the following lifestyle modifications:
 - Weight loss, if appropriate
 - DASH (Dietary Approaches to Stop Hypertension) diet
 - Increased potassium intake
 - Moderation of alcohol intake

- Increased physical activity
- For patients with a confirmed BP of $\geq 140/90$ mmHg, lifestyle modifications and pharmacologic therapy is recommended.
- For patients with a confirmed BP of $\geq 160/100$ mmHg, lifestyle modifications and two different antihypertensives are recommended.
- Treatment of HTN in the setting of diabetes should also address the risk of CVD. Treatment may include angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), thiazide-like diuretics, and/or dihydropyridine calcium channel blockers.
- Multidrug regimens may be required for HTN management, but caution should be used with certain combinations.
- An ACE inhibitor or ARB is the recommended first-line treatment for patients with diabetes and HTN.
- Serum creatinine, estimated glomerular filtration rate (eGFR), and serum potassium should be monitored in patients being treated with an ACE inhibitor, ARB, or diuretic.
- For lipid management, lifestyle modifications should focus on weight loss and the inclusion of a Mediterranean or DASH diet. Encourage a reduction of saturated fat intake.
- Monitor lipid levels in adults not taking statins or other lipid-lowering therapy at initial diagnosis and at least every 5 years, or more frequently if indicated.
- Monitor lipid levels 4 to 12 weeks after the initiation of statin or lipid-lowering therapy.
- For secondary prevention in patients with diabetes and CVD, aspirin therapy (75 to 162 mg/day) is recommended.
- Dual antiplatelet therapy should be initiated for patients with diabetes according to the risk or presence of CVD.
- Use caution with thiazolidinediones in patients with type 2 diabetes due to the increased risk of heart failure.

Microvascular Complications and Foot Care

- Optimize glucose and blood pressure control to reduce the risk or slow the progression of chronic kidney disease and diabetic retinopathy.
- Monitor kidney function and perform eye exams at routine intervals and as needed.
- All patients with diabetes should be screened for peripheral neuropathy at routine intervals and as needed.
- Patients with known sensory loss or prior ulcerations or amputation(s) should have their feet inspected at every visit. All other patients should be examined annually.
- Initial pharmacologic treatment for diabetic neuropathic pain includes duloxetine, gabapentin, or pregabalin.
- Signs and symptoms of diabetic autonomic neuropathies should be discussed during a history and physical exam. Diabetic autonomic neuropathies may include the following:
 - Resting tachycardia and/or orthostatic hypotension
 - Hypoglycemia unawareness
 - Gastroparesis
 - Constipation, diarrhea, or fecal incontinence
 - Erectile dysfunction
 - Neurogenic bladder
 - Sudomotor dysfunction with an increase or decrease in sweating.

Older Adults

- Assess cognitive function and ability for self-care and functional independence at initial visit, annually, and as needed.
- Hypoglycemia should be avoided and should be managed by adjusting glycemic targets and pharmacologic interventions.
- Diabetes education should be considered for the staff of skilled nursing facilities and long-term care centers to improve the management and care of diabetic patients.
- All therapies may be relaxed for end-of-life care. Care should focus on comfort, palliation, and the preservation of dignity and quality of life.

Children and Adolescents

- Education and interventions should be age-appropriate and include individual nutrition therapy, encouragement of physical activity, and strategies to prevent hypoglycemia.
- Carbohydrate intake should be monitored to achieve optimal glycemic control.
- At the initial visit and at all follow-up visits, assess psychosocial status and evaluate stress regarding family and peers; also assess for disturbed eating behaviors.
- Consider screening for thyroid disease, celiac disease, and other autoimmune disorders at the initial visit and as needed.
- Measure BP at every visit, and measure lipid levels soon after diabetes diagnosis and at routine intervals.
- Encourage cessation of all tobacco products and e-cigarettes.
- Children and adolescents should be screened for microvascular complications at each visit, and nonalcoholic fatty liver disease, obstructive sleep apnea, polycystic ovary syndrome (in adolescent girls), CVD, and dyslipidemia annually.
- Screen for prediabetes and type 2 diabetes in appropriate children and adolescents.

Management of Diabetes in Pregnancy

- Maintain A1c less than 6.5% prior to conception to reduce the risk of congenital anomalies, preeclampsia, macrosomia, and other complications.
- Lifestyle modifications may be sufficient to manage GDM.
- Insulin is the preferred treatment for hyperglycemia in GDM. Insulin does not cross the placenta.
- MetFORMIN should be discontinued once a pregnancy is confirmed.

Diabetes Care in the Hospital

- For all patients with diabetes or those with hyperglycemia (blood glucose > 140 mg/dL) admitted to the hospital, perform an A1c, if not performed in the last 3 months.
- Validated or computerized protocols should guide insulin administration.
- Consultation with a diabetic educator or team should be considered for all patients with diabetes admitted to the hospital.
- Insulin therapy and blood glucose targets should be individualized for critically ill and noncritically ill patients.
- The preferred treatment for hospitalized noncritically ill patients with poor oral intake or taking nothing by mouth (NPO) is basal insulin or basal insulin with bolus correction. For those with adequate oral intake, basal, prandial, and correction insulin is preferred.
- Sole use of sliding-scale insulin is not recommended in the hospital setting.

- The adoption and implementation of a hypoglycemia management protocol is recommended.
- Diabetic ketoacidosis (DKA) and hyperosmolar hyperglycemic syndrome (HHS)
 - Treat and correct any underlying causes.
 - Continuous intravenous insulin is the standard of care.
 - Administer a bridge dose of subcutaneous basal insulin at least 2 to 4 hours before discontinuation of IV insulin infusion.
- Discharge
 - Coordinate the following:
 - Perform a medication reconciliation and review any new medications or prescriptions.
 - Schedule a follow-up appointment with a primary care provider, an endocrinologist, or a diabetes educator within 30 days of discharge for all patients newly diagnosed with diabetes or an elevated A1c.
 - Provide referrals for ongoing outpatient education and follow-up.

Diabetes Advocacy

- The ADA advocates for people living with diabetes and strives to decrease the risk of these individuals being discriminated against due to diabetes.
- The ADA focuses on making sure that cost is not a barrier to successful diabetes management.

Reference:

American Diabetes Association. (2017). Standards of medical care in diabetes. *Diabetes Care*, 40(Suppl. 1), S1–S135. Accessed March 2020 via the Web at http://care.diabetesjournals.org/content/diacare/suppl/2016/12/15/40.Supplement_1.DC1/DC_40_S1_final.pdf

American Diabetes Association. (2019). Standards of medical care in diabetes. *Diabetes Care*, 42(Suppl. 1), S1–S183. Accessed March 2020 via the Web at https://care.diabetesjournals.org/content/42/Supplement_1/S4

Link to Practice Guideline:

https://care.diabetesjournals.org/content/42/Supplement_1/S4