



## DIABETES MELLITUS UPDATED GUIDELINES, 2016

The American Diabetes Association (ADA) released the 2016 standards that highlight eight areas of importance to primary care providers including: diagnosis, glycemic targets, medical management, hypoglycemia, cardiovascular risk factor management, microvascular disease screening and management and inpatient diabetes management. This issue of *CLIPs* provides a review of the 2016 ADA guidelines. If you need further information, please contact the Center for Healthcare Innovation and Patient Outcomes Research (CHIPOR) at [CHIPOR@samford.edu](mailto:CHIPOR@samford.edu).

**Chamberlain JJ, Rhinehart AS, Shaefer CF, Neuman A. Diagnosis and management of diabetes: synopsis of the 2016 American Diabetes Association standards of medical care in diabetes. *Ann Intern Med.* 2016;164:542-552.**

### Diagnosis of prediabetes and diabetes

- Determining whether a patient has Type 1 or type 2 diabetes is important because of differences in medical management.
- Approximately 5% of diabetes cases are type 1 diabetes.
- Pregnant patients should be tested for gestational diabetes at 24 to 28 weeks gestation.
- Medications (e.g., glucocorticoids, thiazide diuretics, and atypical antipsychotics) may increase the risk for diabetes.

**Table 1: Criteria for diagnosis of prediabetes and diabetes**

Variable	Prediabetes	Diabetes
Hemoglobin A <sub>1c</sub> level, %	5.7-6.4	≥6.5
Fasting plasma glucose level (mg/dL)	100-125	≥126
Oral glucose tolerance test results (mg/dL)*	140-199	≥200**
Random plasma glucose level (mg/dL)	-	≥200***

\*2-h plasma glucose level after a 75-g oral glucose tolerance test.

\*\*Results should be confirmed by repeated testing.

\*\*\*Only diagnostic in a patient with classic symptoms of hyperglycemia or hyperglycemia crisis.

### Hemoglobin A<sub>1c</sub> testing

- Hemoglobin A<sub>1c</sub> level reflects the average glycemic index over several months increased levels are associated with increased risk of diabetes complications.
- Testing should be performed at least twice annually in those who meet treatment goals and quarterly in patients whose therapy has been changed or are not meeting goals.
- Hemoglobin A<sub>1c</sub> testing is limited by conditions that affect erythrocyte turnover (hemolysis or blood loss) and hemoglobin variants (e.g., sickle cell anemia).
- Glycemic control is best measured by results from HbA<sub>1c</sub> testing and self-monitored blood glucose (SMBG).

### Hypoglycemia

- Hypoglycemia is defined by a plasma glucose level < 70 mg/dL.
- Severe hypoglycemia has the potential to induce cognitive impairment and can be reversed with administration of 15-20 g of rapid-acting glucose.

### Medical Management of Diabetes

- Diabetes care management programs should address behavioral, dietary, lifestyle and pharmacological treatment of diabetes.

**Table 2: Antihyperglycemic therapy for type 2 diabetes mellitus**

Metformin	
Efficacy	High
Hypoglycemia risk	Low risk
Weight	Neutral/loss
Side effects	GI/lactic acidosis
Costs*	Low

If HbA<sub>1c</sub> target is not achieved after 3 months of monotherapy, a 2-drug combination may be administered.

Metformin +						
	SU	TZD	DDP-4 inhibitor	SGLT2 inhibitor	GLP-1 receptor agonist	Insulin (basal)
Efficacy	High	High	Intermediate	Intermediate	High	Highest
Hypoglycemia risk	Moderate	Low	Low	Low	Low	High
Weight	Gain	Gain	Neutral	Loss	Loss	Gain
Side effects	Hypoglycemia	Edema, HF, and fractures	Rare	GU/dehydration	GI	Hypoglycemia
Costs*	Low	Low	High	High	High	Variable

If HbA<sub>1c</sub> target not achieved after 3 months of dual therapy, a 3-drug combination may be administered.

Metformin +					
SU + TZD or DPP-4 inhibitor or SGLT2 inhibitor or GLP-1 receptor agonist or Insulin	TZD + SU or DPP-4 inhibitor or SGLT2 inhibitor or GLP-1 receptor agonist or Insulin	DPP-4 inhibitor + SU or TZD or SGLT2 inhibitor or Insulin	SGLT2 inhibitor + SU OR TZD or DPP-4 inhibitor or Insulin	GLP-1 receptor agonist + SU or TZD or Insulin	Insulin (Basal) + TZD or DPP-4 inhibitor or SGLT2 inhibitor or GLP-1 receptor agonist

If HbA<sub>1c</sub> target is not achieved on 3 months of triple therapy and patient is on an oral combination therapy, transition to injectable insulin products.

Metformin
Basal insulin + Mealtime insulin or GLP-1 receptor agonist

DPP-4=dipeptidyl peptidase-4; GI=gastrointestinal; GLP-1=glucagon-like peptide-1; GU=genitourinary; HbA<sub>1c</sub>=hemoglobin A<sub>1c</sub>; HF=heart failure; SGLT2=sodium-glucose cotransporter 2; SU=sulfonylurea; TZD=thiazolidinediones

### Cardiovascular risk management

- Controlling individual cardiovascular risk factors can slow or prevent atherosclerotic cardiovascular disease (ASCVD) in patients with diabetes.
- Blood pressure (BP) should be measured at each visit and the goal measure is less than 140/90 mmHg. Angiotensin converting enzyme (ACE inhibitors) or Angiotensin Receptor Blockers (ARBs) are generally used to reach BP goals.
- Lipid management is recommended for patients with elevated triglyceride levels (>150 mg/dL) and/or low HDL levels (<40 mg/dL for men and 50 mg/dL for women). Statins are recommended for patients with diabetes aged 40 years and older.
- Aspirin therapy (75-162 mg/day) is recommended in diabetes patients at an increased cardiovascular risk (10 year risk >10%).