



# Standards of Care in Diabetes—2023 Abridged for Primary Care Providers

American Diabetes Association

The American Diabetes Association's (ADA's) Standards of Care in Diabetes is updated and published annually in a supplement to the January issue of *Diabetes Care*. The Standards of Care is developed by the ADA's multidisciplinary Professional Practice Committee, which comprises expert diabetes health care professionals (HCPs). It includes the most current evidence-based recommendations for diagnosing and treating adults and children with all forms of diabetes. ADA's grading system uses **A**, **B**, **C**, or **E** to show the evidence level that supports each recommendation.

- **A**—Clear evidence from well-conducted, generalizable randomized controlled trials that are adequately powered
- **B**—Supportive evidence from well-conducted cohort studies
- **C**—Supportive evidence from poorly controlled or uncontrolled studies
- **E**—Expert consensus or clinical experience

This is an abridged version of the current Standards of Care containing the evidence-based recommendations most pertinent to primary care. The recommendations, tables, and figures included here retain the same numbering used in the complete Standards of Care. All of the recommendations included here are substantively the same as in the complete Standards of Care. The abridged version does not include references. The complete 2023 Standards of Care, including all supporting references, is available at professional.diabetes.org/standards.

## 1. IMPROVING CARE AND PROMOTING HEALTH IN POPULATIONS

### Diabetes and Population Health

Person-centered care considers individual patient comorbidities and prognoses; is respectful of and responsive to patient preferences, needs, and values; and ensures that patient values guide all clinical decisions.

Further, social determinants of health (SDOH)—often out of direct control of the individual and potentially representing lifelong risk—contribute to health care and psychosocial outcomes and must be addressed to improve all health outcomes.

### Recommendations

- 1.1 Ensure treatment decisions are timely, rely on evidence-based guidelines, include social community support, and are made collaboratively with patients based on individual preferences, prognoses, comorbidities, and informed financial considerations. **B**
- 1.2 Align approaches to diabetes management with the Chronic Care Model. This model emphasizes person-centered team care, integrated long-term treatment approaches to diabetes and comorbidities, and ongoing collaborative communication and goal-setting between all team members. **A**
- 1.3 Care systems should facilitate in-person and virtual team-based care, including those knowledgeable and experienced in diabetes management as part of the team and utilization of patient registries, decision support tools, and community involvement to meet patient needs. **B**

### Strategies for System-Level Improvement

#### Care Teams

Collaborative, multidisciplinary teams are best suited to provide care for people with diabetes and to facilitate patients' self-management with emphasis on avoiding therapeutic inertia to achieve recommended metabolic targets.

#### Telehealth

Telehealth may increase access to care for people with diabetes. Telehealth should be used complementary to in-person visits to optimize glycemic management in

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people with unmanaged diabetes. Evidence suggests that telehealth may be effective at reducing A1C in people with type 2 diabetes compared with or in addition to usual care. Interactive strategies that facilitate communication between HCPs and patients appear more effective.

**Behaviors and Well-Being**

Successful diabetes care requires a systematic approach to supporting patients' behavior change efforts, including high-quality diabetes self-management education and support (DSMES).

*Tailoring Treatment for Social Context*

*Recommendations*

- 1.5 Assess food insecurity, housing insecurity/homelessness, financial barriers, and social capital/social community support to inform treatment decisions, with referral to appropriate local community resources. **A**
- 1.6 Provide patients with additional self-management support from lay health coaches, navigators, or community health workers when available. **A**

Diabetes-related health inequities are well documented and have been associated with greater risk for diabetes, higher population prevalence, and poorer diabetes outcomes. Financial barriers to medication use continue to contribute to health disparities.

**2. CLASSIFICATION AND DIAGNOSIS OF DIABETES**

**Classification**

Diabetes can be classified into the following general categories:

- 1. Type 1 diabetes (due to autoimmune β-cell destruction, usually leading to absolute insulin deficiency including latent autoimmune diabetes of adulthood)
- 2. Type 2 diabetes (due to a progressive loss of β-cell insulin secretion frequently on the background of insulin resistance)
- 3. Specific types of diabetes due to other causes, e.g., monogenic diabetes syndromes (such as neonatal diabetes and maturity-onset diabetes of the young), diseases of the exocrine pancreas (such as cystic fibrosis and pancreatitis), and drug- or chemical-induced diabetes (such as with glucocorticoid use, in the treatment of HIV/AIDS, or after organ transplantation)
- 4. Gestational diabetes mellitus (GDM; diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation)

The classification of diabetes type is not always straightforward at presentation, and misdiagnosis may occur. Therefore, constant diligence and sometimes reevaluation is necessary. Children with type 1 diabetes typically present with polyuria and polydipsia, and approximately half present with diabetic ketoacidosis (DKA). Adults with type 1 diabetes can be diagnosed at any age and may not present with classic symptoms. They may have temporary remission from the need for insulin. The diagnosis may become more obvious over time and should be reevaluated if there is concern.

**Screening and Diagnostic Tests for Prediabetes and Type 2 Diabetes**

The diagnostic criteria for diabetes and prediabetes are shown in Table 2.2/2.5. Screening criteria for adults and children are listed in Table 2.3 and Table 2.4, respectively. Screening for prediabetes and type 2 diabetes risk through an informal assessment of risk factors

**TABLE 2.2/2.5** Criteria for the Screening and Diagnosis of Prediabetes and Diabetes

	Prediabetes	Diabetes
A1C	5.7–6.4% (39–47 mmol/mol)*	≥6.5% (48 mmol/mol)†
FPG	100–125 mg/dL (5.6–6.9 mmol/L)*	≥126 mg/dL (7.0 mmol/L)†
2-hour plasma glucose during 75-g OGTT	140–199 mg/dL (7.8–11.0 mmol/L)*	≥200 mg/dL (11.1 mmol/L)†
Random plasma glucose	–	≥200 mg/dL (11.1 mmol/L)‡

Adapted from Tables 2.2 and 2.5 in the complete 2023 Standards of Care. \*For all three tests, risk is continuous, extending below the lower limit of the range and becoming disproportionately greater at the higher end of the range. †In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results from the same sample or in two separate samples. ‡Only diagnostic in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis.

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## Lifestyle Behavior Change for Diabetes Prevention

### Recommendations

- 3.2** Refer adults with overweight/obesity at high risk of type 2 diabetes, as typified by the Diabetes Prevention Program (DPP), to an intensive lifestyle behavior change program to achieve and maintain a weight reduction of at least 7% of initial body weight through healthy reduced-calorie diet and  $\geq 150$  minutes/week of moderate-intensity physical activity. **A**
- 3.3** A variety of eating patterns can be considered to prevent diabetes in individuals with prediabetes. **B**

The DPP trial demonstrated that an intensive lifestyle intervention could reduce the risk of incident type 2 diabetes by 58% over 3 years. DPP has been proven to be cost-effective and technology-assisted programs may be effective and should be considered.

A list of the Centers for Disease Control and Prevention–recognized diabetes prevention lifestyle change programs is available ([cdc.gov/diabetes/prevention/find-a-program.html](http://cdc.gov/diabetes/prevention/find-a-program.html)).

## Pharmacologic Interventions

### Recommendations

- 3.6** Metformin therapy for the prevention of type 2 diabetes should be considered in adults at high risk of type 2 diabetes, as typified by the DPP, especially those aged 25–59 years with BMI  $\geq 35$  kg/m<sup>2</sup>, higher fasting plasma glucose (FPG) (e.g.,  $\geq 110$  mg/dL), and higher A1C (e.g.,  $\geq 6.0\%$ ), and in individuals with prior GDM. **A**
- 3.7** Long-term use of metformin may be associated with biochemical vitamin B12 deficiency; consider periodic measurement of vitamin B12 levels in metformin-treated individuals, especially in those with anemia or peripheral neuropathy. **B**

Various pharmacologic agents have been evaluated for type 2 diabetes prevention, and metformin has the strongest evidence base. However, no agents have been approved by the U.S. Food and Drug Administration (FDA) for diabetes prevention.

## Prevention of Vascular Disease and Mortality

### Recommendations

- 3.8** Prediabetes is associated with heightened cardiovascular (CV) risk; therefore, screening for and

treatment of modifiable risk factors for cardiovascular disease (CVD) are suggested. **B**

- 3.9** Statin therapy may increase the risk of type 2 diabetes in people at high risk of developing type 2 diabetes. In such individuals, glucose status should be monitored regularly and diabetes prevention approaches reinforced. It is not recommended that statins be discontinued. **B**
- 3.10** In people with a history of stroke and evidence of insulin resistance and prediabetes, pioglitazone may be considered to lower the risk of stroke or myocardial infarction (MI). However, this benefit needs to be balanced with the increased risk of weight gain, edema, and fracture. **A** Lower doses may mitigate the risk of adverse effects. **C**

## Person-Centered Care Goals

### Recommendations

- 3.11** In adults with overweight/obesity at high risk of type 2 diabetes, care goals should include weight loss or prevention of weight gain, minimizing the progression of hyperglycemia, and attention to CV risk and associated comorbidities. **B**
- 3.12** Pharmacotherapy (e.g., for weight management, minimizing the progression of hyperglycemia, CV risk reduction) may be considered to support person-centered care goals. **B**
- 3.13** More intensive preventive approaches should be considered in individuals who are at particularly high risk of progression to diabetes, including individuals with BMI  $\geq 35$  kg/m<sup>2</sup>, those at higher glucose levels (e.g., FPG 110–125 mg/dL, 2-hour postchallenge glucose 173–199 mg/dL, A1C  $\geq 6.0\%$ ), and individuals with a history of GDM. **A**

## 4. COMPREHENSIVE MEDICAL EVALUATION AND ASSESSMENT OF COMORBIDITIES

### Person-Centered Collaborative Care

#### Recommendations

- 4.1** A person-centered communication style that uses person-centered, culturally sensitive, and strength-based language and active listening; elicits individual preferences and beliefs; and assesses literacy, numeracy, and potential barriers to care should be used to optimize health outcomes and health-related quality of life (QoL). **B**

Diabetes treatment goals are to prevent or delay complications and optimize QoL (Figure 4.1). The use of



## Assessment of Selected Comorbidities

### Cancer

People with diabetes should be encouraged to undergo recommended age- and sex-appropriate cancer screenings and to reduce their modifiable cancer risk factors (obesity, physical inactivity, and smoking).

### Cognitive Impairment/Dementia

See “13. OLDER ADULTS.”

### Nonalcoholic Fatty Liver Disease

#### Recommendation

**4.10** People with type 2 diabetes or prediabetes with cardiometabolic risk factors, who have either elevated liver enzymes (ALT) or fatty liver on imaging or ultrasound, should be evaluated for presence of nonalcoholic steatohepatitis and liver fibrosis. **C**

## 5. FACILITATING POSITIVE HEALTH BEHAVIORS AND WELL-BEING TO IMPROVE HEALTH OUTCOMES

Essential to achieving diabetes treatment goals are DSMES, medical nutrition therapy (MNT), routine physical activity, tobacco cessation counseling when needed, health behavior counseling, and psychosocial care.

### DSMES

#### Recommendations

- 5.2** There are four critical times to evaluate the need for DSMES to promote skills acquisition to aid treatment plan implementation, MNT, and well-being: at diagnosis, annually and/or when not meeting treatment targets, when complicating factors develop (medical, physical, psychosocial), and when transitions in life and care occur. **E**
- 5.4** DSMES should be person-centered, may be offered in group or individual settings, and should be communicated with the entire diabetes care team. **A**
- 5.5** Digital coaching and digital self-management interventions can be effective methods to deliver DSMES. **B**
- 5.9** Consider addressing barriers to DSMES access through telehealth delivery of care **B** and other digital health solutions. **C**

### MNT

All HCPs should refer people with diabetes for individualized MNT provided by a registered dietitian

nutritionist who is knowledgeable and skilled in providing diabetes-specific MNT.

### Goals of Nutrition Therapy for Adults With Diabetes

- To promote and support healthful eating patterns, emphasizing a variety of nutrient-dense foods in appropriate portion sizes, to improve overall health and:
  - Achieve and maintain body weight goals
  - Attain individualized glycemic, blood pressure (BP), and lipid goals
  - Delay or prevent diabetes complications
- To address individual nutrition needs based on personal and cultural preferences, health literacy and numeracy, access to healthful foods, willingness and ability to make behavioral changes, and existing barriers to change
- To maintain the pleasure of eating by providing nonjudgmental messages about food choices while limiting food choices only when indicated by scientific evidence
- To provide an individual with diabetes the practical tools for developing healthy eating patterns rather than focusing on individual macronutrients, micronutrients, or single foods

### Assessing Food Insecurity

Any member of the health care team can screen for food insecurity using The Hunger Vital Sign. Households are considered at risk if they answer either or both of the following statements as “often true” or “sometimes true” (compared with “never true”):

“Within the past 12 months, we worried whether our food would run out before we got money to buy more.”

“Within the past 12 months, the food we bought just didn’t last, and we didn’t have money to get more.”

### Physical Activity

#### Recommendations

- 5.28** Children and adolescents with type 1 diabetes **C** or type 2 diabetes or prediabetes **B** should engage in 60 minutes/day or more of moderate- or vigorous-intensity aerobic activity, with vigorous muscle-strengthening and bone-strengthening activities at least 3 days/week.
- 5.29** Most adults with type 1 diabetes **C** and type 2 diabetes **B** should engage in 150 minutes or more of moderate- to vigorous-intensity aerobic activity per week, spread over at least 3 days/week, with no

more than 2 consecutive days without activity. Shorter durations (minimum 75 minutes/week) of vigorous-intensity or interval training may be sufficient for younger and more physically fit individuals.

- 5.30 Adults with type 1 diabetes **C** and type 2 diabetes **B** should engage in 2–3 sessions/week of resistance exercise on nonconsecutive days.
- 5.31 All adults, and particularly those with type 2 diabetes, should decrease the amount of time spent in daily sedentary behavior. **B** Prolonged sitting should be interrupted every 30 minutes for blood glucose benefits. **C**
- 5.32 Flexibility training and balance training are recommended 2–3 times/week for older adults with diabetes. Yoga and tai chi may be included based on individual preferences to increase flexibility, muscular strength, and balance. **C**
- 5.33 Evaluate baseline physical activity and sedentary time. Promote increase in nonsedentary activities above baseline for sedentary individuals with type 1 diabetes **E** and type 2 diabetes. **B** Examples include walking, yoga, housework, gardening, swimming, and dancing.

## Smoking Cessation: Tobacco and E-Cigarettes

### Recommendations

- 5.34 Advise all individuals not to use cigarettes and other tobacco products or e-cigarettes. **A**
- 5.35 After identification of tobacco or e-cigarette use, include smoking cessation counseling and other forms of treatment as a routine component of diabetes care. **A**

## Psychosocial Care

### Recommendations

- 5.38 Psychosocial care should be provided to all people with diabetes, with the goal of optimizing health-related QoL and health outcomes. Such care should be integrated with routine medical care and delivered by trained HCPs using a collaborative, person-centered, culturally informed approach. **A** When indicated and available, qualified mental health professionals should provide additional targeted mental health care. **B**
- 5.39 Diabetes care teams should implement psychosocial screening protocols that may include but are not limited to attitudes about diabetes, expectations for treatment and outcomes, general and diabetes-related mood, stress and/or QoL,

available resources (financial, social, family, and emotional), and/or psychiatric history. Screening should occur at periodic intervals and when there is a change in disease, treatment, or life circumstances. **C**

- 5.40 When indicated, refer to mental health professionals or other trained HCPs for further assessment and treatment for symptoms of diabetes distress, depression, suicidality, anxiety, treatment-related fear of hypoglycemia, disordered eating, and/or cognitive capacities. Such specialized psychosocial care should use age-appropriate standardized and validated tools and treatment approaches. **B**
- 5.42 Routinely monitor people with diabetes, caregivers, and family members for diabetes distress, particularly when treatment targets are not met and/or at the onset of diabetes complications. Refer to a qualified mental health professional or other trained HCP for further assessment and treatment if indicated. **B**

Please refer to the ADA position statement “Psychosocial Care for People With Diabetes” for a list of assessment tools and additional details and the ADA Mental Health Toolkit (<https://professional.diabetes.org/meetings/mental-health-toolkit>) for assessment questionnaires and surveys.

## Sleep Health

### Recommendation

- 5.55 Consider screening for sleep health in people with diabetes, including symptoms of sleep disorders, disruptions to sleep due to diabetes symptoms or management needs, and worries about sleep. Refer to sleep medicine and/or a qualified behavioral health professional as indicated. **B**

The associations between sleep problems and diabetes are complex: sleep disorders are a risk factor for developing type 2 diabetes and possibly GDM. Moreover, sleep disturbances are associated with less engagement in diabetes self-management and may interfere with the achievement of glycemic targets among people with type 1 and type 2 diabetes.

## 6. GLYCEMIC TARGETS

### Assessment of Glycemic Control

Glycemic control is assessed by the A1C measurement, continuous glucose monitoring (CGM) using time in range (TIR) and/or glucose management indicator (GMI), and blood glucose monitoring (BGM).

**Glycemic Assessment**

**Recommendations**

- 6.1 Assess glycemic status (A1C or other glycemic measurement such as TIR or GMI) *at least* two times a year in patients who are meeting treatment goals (and who have stable glycemic control). **E**
- 6.2 Assess glycemic status at least quarterly and as needed in patients whose therapy has recently changed and/or who are not meeting glycemic goals. **E**

**Glucose Assessment by CGM**

**Recommendations**

- 6.3 Standardized, single-page glucose reports from CGM devices with visual cues, such as the ambulatory glucose profile (AGP), should be considered as a standard summary for all CGM devices. **E**
- 6.4 TIR is associated with the risk of microvascular complications and can be used for assessment of glycemic control. Additionally, time below range (TBR) and time above range (TAR) are useful parameters for the evaluation of the treatment plan (Table 6.2). **C**

**Glycemic Goals**

**Recommendations**

- 6.5a An A1C goal for many nonpregnant adults of <7% (53 mmol/mol) without significant hypoglycemia is appropriate. **A**

- 6.5b If using AGP/GMI to assess glycemia, a parallel goal for many nonpregnant adults is TIR of >70% with TBR <4% and time <54 mg/dL <1%. For those with frailty or at high risk of hypoglycemia, a target of >50% TIR with <1% TBR is recommended. (See Figure 6.1 and Table 6.2.) **B**
- 6.6 On the basis of HCP judgment and patient preference, achievement of lower A1C levels than the goal of 7% may be acceptable and even beneficial if it can be achieved safely without significant hypoglycemia or other adverse effects of treatment. **B**
- 6.7 Less stringent A1C goals (such as <8% [64 mmol/mol]) may be appropriate for patients with limited life expectancy or where the harms of treatment are greater than the benefits. HCPs should consider deintensification of therapy if appropriate to reduce the risk of hypoglycemia in patients with inappropriate stringent A1C targets. **B**

The factors to consider in individualizing goals are depicted in Figure 6.2 in the complete 2023 Standards of Care. Recommended glycemic targets for many nonpregnant adults are shown in Table 6.3. For specific guidance, see “6. Glycemic Targets,” “14. Children and Adolescents,” and “15. Management of Diabetes in Pregnancy,” and “16. Diabetes Care in the Hospital” in the complete 2023 Standards of Care. For information about glycemic targets for older adults, see Table 13.1 in “13. OLDER ADULTS.”

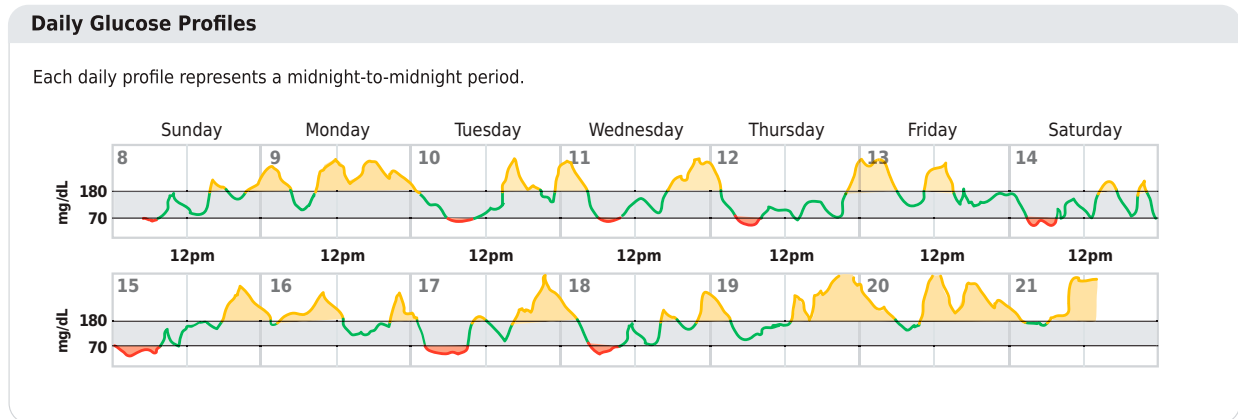
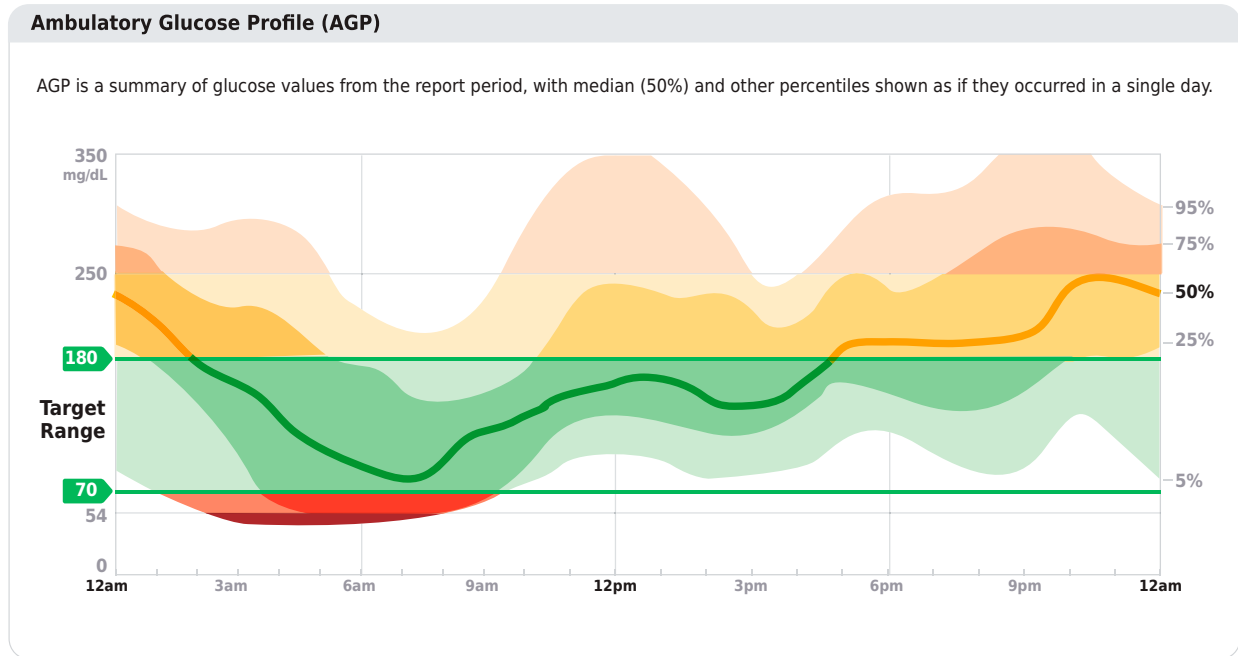
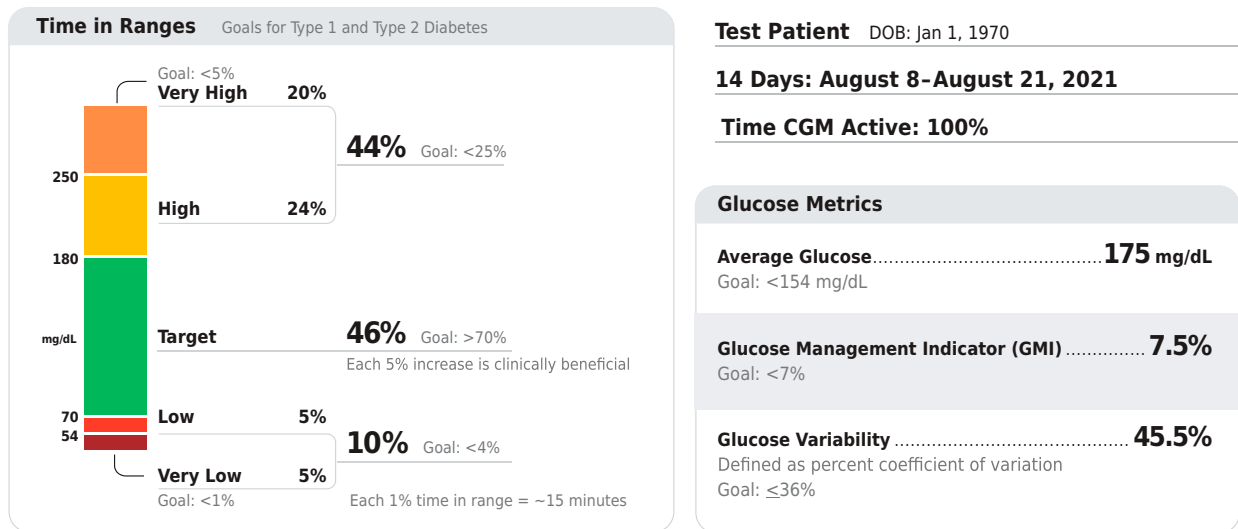
**TABLE 6.2** Standardized CGM Metrics for Clinical Care

1. Number of days CGM device is worn (recommend 14 days)	
2. Percentage of time CGM device is active (recommend 70% of data from 14 days)	
3. Mean glucose	
4. GMI	
5. Glycemic variability (%CV) target ≤36%*	
6. TAR: % of readings and time >250 mg/dL (>13.9 mmol/L)	Level 2 hyperglycemia
7. TAR: % of readings and time 181–250 mg/dL (10.1–13.9 mmol/L)	Level 1 hyperglycemia
8. TIR: % of readings and time 70–180 mg/dL (3.9–10.0 mmol/L)	In range
9. TBR: % of readings and time 54–69 mg/dL (3.0–3.8 mmol/L)	Level 1 hypoglycemia
10. TBR: % of readings and time <54 mg/dL (<3.0 mmol/L)	Level 2 hypoglycemia

\*Some studies suggest that lower %CV targets (<33%) provide additional protection against hypoglycemia for those receiving insulin or sulfonylureas. %CV, percentage coefficient of variation. Adapted from Battelino T, Danne T, Bergenstal RM, et al. Diabetes Care 2019;42:1593–1603.



### AGP Report: Continuous Glucose Monitoring



**FIGURE 6.1** Key points included in standard AGP report. Reprinted from Holt RIG, DeVries JH, Hess-Fischl A, et al. Diabetes Care 2021;44:2589–2625.

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**TABLE 6.3** Summary of Glycemic Recommendations for Many Nonpregnant Adults With Diabetes

A1C	<7.0% (53 mmol/mol)*#
Preprandial capillary plasma glucose	80-130 mg/dL* (4.4-7.2 mmol/L)
Peak postprandial capillary plasma glucose†	<180 mg/dL* (10.0 mmol/L)

\*More or less stringent glycemic goals may be appropriate for individual patients. #CGM may be used to assess glycemic target as noted in Recommendation 6.5b and Figure 6.1. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations (as per Figure 6.2 in the complete 2023 Standards of Care). †Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals. Postprandial glucose measurements should be made 1–2 hours after the beginning of the meal, generally peak levels in patients with diabetes.

**Hypoglycemia**

Recommendations regarding the classification of hypoglycemia are outlined in Table 6.4. See the complete 2023 Standards of Care for detailed hypoglycemia strategies.

*Recommendations*

- 6.10** Occurrence and risk for hypoglycemia should be reviewed at every encounter and investigated as indicated. Awareness of hypoglycemia should be considered using validated tools. **C**
- 6.11** Glucose (approximately 15–20 g) is the preferred treatment for the conscious individual with blood glucose <70 mg/dL (3.9 mmol/L), although any form of carbohydrate that contains glucose may be used. Fifteen minutes after treatment, if BGM shows continued hypoglycemia,

the treatment should be repeated. Once the BGM or glucose pattern is trending up, the individual should consume a meal or snack to prevent recurrence of hypoglycemia. **B**

- 6.12** Glucagon should be prescribed for all individuals at increased risk of level 2 or 3 hypoglycemia, so that it is available should it be needed. Caregivers, school personnel, or family members providing support to these individuals should know where it is and when and how to administer it. Glucagon administration is not limited to HCPs. **E**
- 6.13** Hypoglycemia unawareness or one or more episodes of level 3 hypoglycemia should trigger hypoglycemia avoidance education and reevaluation and adjustment of the treatment plan to decrease hypoglycemia. **E**
- 6.14** Insulin-treated patients with hypoglycemia unawareness, one level 3 hypoglycemic event, or a pattern of unexplained level 2 hypoglycemia should be advised to raise their glycemic targets to strictly avoid hypoglycemia for at least several weeks in order to partially reverse hypoglycemia unawareness and reduce risk of future episodes. **A**
- 6.15** Ongoing assessment of cognitive function is suggested with increased vigilance for hypoglycemia by the clinician, patient, and caregivers if impaired or declining cognition is found. **B**

**7. DIABETES TECHNOLOGY**

Diabetes technology includes insulin delivery devices such as insulin pumps (also called continuous subcutaneous insulin infusion [CSII]) and connected insulin pens, glucose monitoring devices via CGM systems and glucose meters, automated insulin delivery (AID) systems that integrate CGM and insulin delivery with algorithms to modulate insulin delivery, and diabetes self-management support software.

**General Device Principles**

*Recommendations*

- 7.1** The type(s) and selection of devices should be individualized based on a person’s specific needs, preferences, and skill level. In the setting of an individual whose diabetes is partially or wholly managed by someone else (e.g., a young child or a person with cognitive impairment or dexterity, psychosocial, and/or physical limitations), the caregiver’s skills and preferences are integral to the decision-making process. **E**

**TABLE 6.4** Classification of Hypoglycemia

Glycemic Criteria/Description	
Level 1	Glucose <70 mg/dL (3.9 mmol/L) and ≥54 mg/dL (3.0 mmol/L)
Level 2	Glucose <54 mg/dL (3.0 mmol/L)
Level 3	A severe event characterized by altered mental and/or physical status requiring assistance for treatment of hypoglycemia

Reprinted from Agiostratidou G, Anhalt H, Ball D, et al. Diabetes Care 2017;40:1622–1630.

**TABLE 7.3** CGM Devices

Type of CGM	Description
rtCGM	CGM systems that measure and display glucose levels continuously.
isCGM with and without alarms	CGM systems that measure glucose levels continuously but require scanning for visualization and storage of glucose values.
Professional CGM	CGM devices that are placed on the person with diabetes in the HCP's office (or with remote instruction) and worn for a discrete period of time (generally 7–14 days). Data may be blinded or visible to the person wearing the device. The data are used to assess glycemic patterns and trends. Unlike rtCGM and isCGM devices, these devices are clinic-based and not owned by the person with diabetes.

**7.2** When prescribing a device, ensure that people with diabetes/caregivers receive initial and ongoing education and training, either in-person or remotely, and ongoing evaluation of technique, results, and their ability to utilize data, including uploading/sharing data (if applicable), to monitor and adjust therapy. **C**

**7.5** Initiation of CGM, CSII, and/or AID early in the treatment of diabetes can be beneficial depending on a person's/caregiver's needs and preferences. **C**

**BGM**

*Recommendations*

**7.7** People who are on insulin using BGM should be encouraged to check their blood glucose levels when appropriate based on their insulin therapy. This may include checking when fasting, prior to meals and snacks, after meals, at bedtime, prior to exercise, when hypoglycemia is suspected, after treating low blood glucose levels until they are normoglycemic, when hyperglycemia is suspected, and prior to and while performing critical tasks such as driving. **B**

**7.9** Although BGM in individuals on noninsulin therapies has not consistently shown clinically significant reductions in A1C, it may be helpful when altering nutrition plan, physical activity, and/or medications (particularly medications that can cause hypoglycemia) in conjunction with a treatment adjustment program. **E**

**CGM Devices**

Table 6.2 summarizes CGM-derived glycemic metrics, and Table 7.3 defines the available types of CGM devices.

*Recommendations*

**7.11** Real-time CGM (rtCGM) **A** or intermittently scanned CGM (isCGM) **B** should be offered for diabetes management in adults with diabetes on multiple daily injections (MDI) or CSII who are capable of using the devices safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's circumstances, preferences, and needs.

**7.12** rtCGM **A** or isCGM **C** should be offered for diabetes management in adults with diabetes on basal insulin who are capable of using the devices safely (either by themselves or with a caregiver). The choice of device should be made based on the individual's circumstances, preferences, and needs.

**7.15** In people with diabetes on MDI or CSII, rtCGM devices should be used as close to daily as possible for maximal benefit. **A** isCGM devices should be scanned frequently, at a minimum once every 8 hours. **A** People with diabetes should have uninterrupted access to their supplies to minimize gaps in CGM. **A**

**7.17** Periodic use of rtCGM or isCGM or use of professional CGM can be helpful for diabetes management in circumstances where continuous use of CGM is not appropriate, desired, or available. **C**

**7.18** Skin reactions, either due to irritation or allergy, should be assessed and addressed to aid in successful use of devices. **E**

**Inpatient Care**

*Recommendation*

**7.30** People with diabetes who are competent to safely use diabetes devices such as insulin pumps and CGM systems should be supported to continue using them in an inpatient setting





**TABLE 9.2 Medications for Lowering Glucose, Summary of Characteristics**

	Efficacy <sup>1</sup>	Hypoglycemia	Weight change <sup>2</sup>	CV effects		HF	Renal effects		Oral/SQ	Cost	Clinical considerations
				Effect on MACE	Progression of CKD		Dosing/use considerations <sup>3</sup>	Cost			
<b>Metformin</b>	High	No	Neutral (potential for modest loss)	Potential benefit	Neutral	Neutral	Benefit: canagliflozin, dapagliflozin, empagliflozin, ertugliflozin	Contraindicated with eGFR <30 mL/min per 1.73 m <sup>2</sup>	Oral	Low	<ul style="list-style-type: none"> <li>GI side effects common; to mitigate GI side effects, consider slow dose titration, extended release formulations, and administration with food</li> <li>Potential for vitamin B12 deficiency; monitor at regular intervals</li> </ul>
<b>SGLT2 inhibitors</b>	Intermediate to high	No	Loss (intermediate)	Benefit: canagliflozin, empagliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin, ertugliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin	See labels for renal dose considerations of individual agents	Glucose-lowering effect is lower for SGLT2 inhibitors at lower eGFR	Oral	High	<ul style="list-style-type: none"> <li>DKA risk, rare in T2DM; discontinue, evaluate, and treat promptly if suspected; be aware of predisposing risk factors and clinical presentation (including euglycemic DKA); discontinue before scheduled surgery (e.g., 3–4 days), during critical illness, or during prolonged fasting to mitigate potential risk</li> <li>Increased risk of genital mycotic infections</li> <li>Necrotizing fasciitis of the perineum (Fournier gangrene), rare reports; institute prompt treatment if suspected</li> <li>Attention to volume status, blood pressure; adjust other volume-contracting agents as applicable</li> </ul>
<b>GLP-1 RAs</b>	High to very high	No	Loss (intermediate to very high)	Benefit: dulaglutide, liraglutide, semaglutide (SQ) Neutral: exenatide once weekly, lixisenatide	Neutral	Benefit for renal endpoints in CVOTs, driven by albuminuria outcomes: dulaglutide, liraglutide, semaglutide (SQ)	See labels for renal dose considerations of individual agents	No dose adjustment for dulaglutide, liraglutide, semaglutide	SQ, oral (semaglutide)	High	<ul style="list-style-type: none"> <li>Risk of thyroid C-cell tumors in rodents; human relevance not determined (liraglutide, dulaglutide, exenatide extended release, semaglutide)</li> <li>Counsel patients on potential for GI side effects and their typically temporary nature; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g., stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for patients experiencing GI challenges</li> <li>Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected</li> <li>Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected</li> </ul>
<b>GIP and GLP-1 RA</b>	Very high	No	Loss (very high)	Under investigation	Under investigation	Under investigation	See label for renal dose considerations	No dose adjustment	SQ	High	<ul style="list-style-type: none"> <li>Risk of thyroid C-cell tumors in rodents; human relevance not determined</li> <li>Counsel patients on potential for GI side effects and their typically temporary nature; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g., stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for patients experiencing GI challenges</li> <li>Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected</li> <li>Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected</li> </ul>
<b>DPP-4 inhibitors</b>	Intermediate	No	Neutral	Neutral	Neutral (potential risk, saxagliptin)	Neutral	Renal dose adjustment required (sitagliptin, saxagliptin, alogliptin); can be used in renal impairment	No dose adjustment required for linagliptin	Oral	High	<ul style="list-style-type: none"> <li>Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected</li> <li>Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected</li> <li>Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected</li> <li>Joint pain</li> <li>Bulbous penphigoid (postmarketing); discontinue if suspected</li> </ul>
<b>Thiazolidinediones</b>	High	No	Gain	Potential benefit: pioglitazone	Increased risk	Increased risk	No dose adjustment required	Generally not recommended in renal impairment due to potential for fluid retention	Oral	Low	<ul style="list-style-type: none"> <li>Congestive HF (pioglitazone, rosiglitazone)</li> <li>Fluid retention (edema; heart failure)</li> <li>Benefit in MASH</li> <li>Risk of bone fractures</li> <li>Weight gain; consider lower doses to mitigate weight gain and edema</li> </ul>
<b>Sulfonylureas (2nd generation)</b>	High	Yes	Gain	Neutral	Neutral	Neutral	Glyburide: generally not recommended in chronic kidney disease	Glipizide and glimepiride: initiate conservatively to avoid hypoglycemia	Oral	Low	<ul style="list-style-type: none"> <li>FDA Special Warning on increased risk of CV mortality based on studies of an older sulfonylurea (tolbutamide); glimepiride shown to be CV safe (see text)</li> <li>Use with caution in persons at risk for hypoglycemia</li> </ul>
<b>Insulin</b>	High to very high	Yes	Gain	Neutral	Neutral	Neutral	Lower insulin doses required with a decrease in eGFR; titrate per clinical response		SQ, inhaled SQ	Low (SQ) High	<ul style="list-style-type: none"> <li>Injection site reactions</li> <li>Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs</li> </ul>

<sup>1</sup>For agent-specific dosing recommendations, please refer to manufacturers' prescribing information. <sup>1</sup>Tsapas A, Avgerinos I, Karagiannis T, et al. Ann Intern Med 2020;173:278–286. <sup>2</sup>Tsapas A, Karagiannis T, Kakotrichi P, et al. Diabetes Obes Metab 2021;23:2116–2124. CVOT, cardiovascular outcomes trial; GIP, gastric inhibitory polypeptide; GLP-1 RA, glucagon-like peptide 1 receptor agonist; MASH, nonalcoholic steatohepatitis; SQ, subcutaneous; T2DM, type 2 diabetes mellitus. Reprinted from Davies MJ, Arora VR, Collins BS, et al. Diabetes Care 2022;45:2753–2786.







## Treatment Strategies

### Lifestyle Intervention

#### Recommendation

**10.6** For people with BP >120/80 mmHg, lifestyle intervention consists of weight loss when indicated, a Dietary Approaches to Stop Hypertension (DASH)-style eating pattern including reducing sodium and increasing potassium intake, moderation of alcohol intake, and increased physical activity. **A**

### Pharmacologic Interventions

#### Recommendations

**10.8** Individuals with confirmed office-based BP  $\geq$ 160/100 mmHg should, in addition to lifestyle therapy, have prompt initiation and timely titration of two drugs or a single-pill combination of drugs demonstrated to reduce CV events in people with diabetes. **A**

**10.10** Multiple-drug therapy is generally required to achieve BP targets. However, combinations of ACE inhibitors and angiotensin receptor blockers (ARBs) and combinations of ACE inhibitors or ARBs with direct renin inhibitors should not be used. **A**

**10.11** An ACE inhibitor or ARB, at the maximum tolerated dose indicated for BP treatment, is the recommended first-line treatment for hypertension in people with diabetes and urinary albumin-to-creatinine ratio (UACR)  $\geq$ 300 mg/g creatinine **A** or 30–299 mg/g creatinine. **B** If one class is not tolerated, the other should be substituted. **B**

**10.12** For patients treated with an ACE inhibitor, ARB, or diuretic, serum creatinine/estimated glomerular filtration rate (eGFR) and serum potassium levels should be monitored at least annually. **B**

See Figure 10.2 in complete 2023 Standards of Care for more information on hypertension treatment strategies.

### Resistant Hypertension

#### Recommendation

**10.13** Individuals with hypertension who are not meeting BP targets on three classes of antihypertensive medications (including a diuretic) should be considered for mineralocorticoid receptor antagonist (MRA) therapy. **A**

## Lipid Management

### Lifestyle Intervention

#### Recommendations

**10.14** Lifestyle modification focusing on weight loss (if indicated); application of a Mediterranean or DASH eating pattern; reduction of saturated fat and *trans* fat; increase of dietary n-3 fatty acids, viscous fiber, and plant stanols/sterols intake; and increased physical activity should be recommended to improve the lipid profile and reduce the risk of developing ASCVD in people with diabetes. **A**

**10.15** Intensify lifestyle therapy and optimize glyce-mic control for patients with elevated triglyc-eride levels ( $\geq$ 150 mg/dL [1.7 mmol/L]) and/or low HDL cholesterol (<40 mg/dL [1.0 mmol/L] for men, <50 mg/dL [1.3 mmol/L] for women). **C**

### Ongoing Therapy and Monitoring With Lipid Panel

#### Recommendations

**10.16** In adults not taking statins or other lipid-lowering therapy, it is reasonable to obtain a lipid profile at the time of diabetes diagnosis, at an initial medical evaluation, and every 5 years thereafter if under the age of 40 years, or more frequently if indicated. **E**

**10.17** Obtain a lipid profile at initiation of statins or other lipid-lowering therapy, 4–12 weeks after initiation or a change in dose, and annually thereafter, as it may help to monitor the response to therapy and inform medication taking. **E**

### Statin Treatment

#### Primary Prevention

#### Recommendations

**10.18** For people with diabetes aged 40–75 years without ASCVD, use moderate-intensity statin therapy in addition to lifestyle therapy. **A**

**10.19** For people with diabetes aged 20–39 years with additional ASCVD risk factors, it may be reasonable to initiate statin therapy in addition to lifestyle therapy. **C**

**10.20** For people with diabetes aged 40–75 at higher CV risk, including those with one or

more ASCVD risk factors, it is recommended to use high-intensity statin therapy to reduce LDL cholesterol by  $\geq 50\%$  of baseline and to target an LDL cholesterol goal of  $< 70$  mg/dL. **B**

- 10.21** For people with diabetes aged 40–75 years at higher CV risk, especially those with multiple ASCVD risk factors and an LDL cholesterol  $\geq 70$  mg/dL, it may be reasonable to add ezetimibe or a PCSK9 inhibitor to maximum tolerated statin therapy. **C**
- 10.22** In adults with diabetes aged  $> 75$  years already on statin therapy, it is reasonable to continue statin treatment. **B**
- 10.23** In adults with diabetes aged  $> 75$  years, it may be reasonable to initiate moderate-intensity statin therapy after discussion of potential benefits and risks. **C**

### Secondary Prevention

#### Recommendations

- 10.25** For people of all ages with diabetes and ASCVD, high-intensity statin therapy should be added to lifestyle therapy. **A**
- 10.26** For people with diabetes and ASCVD, treatment with high-intensity statin therapy is recommended to target an LDL cholesterol reduction of  $\geq 50\%$  from baseline and an LDL cholesterol goal of  $< 55$  mg/dL. Addition of ezetimibe or a PCSK9 inhibitor with proven benefit in this population is recommended if this goal is not achieved on maximum tolerated statin therapy. **B**
- 10.27** For individuals who do not tolerate the intended intensity, the maximum tolerated statin dose should be used. **E**

See “10. Cardiovascular Disease and Risk Management” in the complete 2023 Standards of Care for detailed guidance on statin therapy in patients with diabetes.

### Treatment of Other Lipoprotein Fractions or Targets

#### Recommendations

- 10.28** For individuals with fasting triglyceride levels  $\geq 500$  mg/dL, evaluate for secondary causes of hypertriglyceridemia and consider medical therapy to reduce the risk of pancreatitis. **C**
- 10.29** In adults with moderate hypertriglyceridemia (fasting or nonfasting triglycerides 175–499 mg/dL), clinicians should address and treat lifestyle factors (obesity and metabolic syndrome), secondary factors (diabetes,

chronic liver or kidney disease and/or nephrotic syndrome, hypothyroidism), and medications that raise triglycerides. **C**

- 10.30** In individuals with ASCVD or other CV risk factors on a statin with controlled LDL cholesterol but elevated triglycerides (135–499 mg/dL), the addition of icosapent ethyl can be considered to reduce CV risk. **A**

### Other Combination Therapy

#### Recommendations

- 10.31** Statin plus fibrate combination therapy has not been shown to improve ASCVD and is generally not recommended. **A**
- 10.32** Statin plus niacin combination therapy has not been shown to provide additional CV benefit above statin therapy alone, may increase the risk of stroke with additional side effects, and is generally not recommended. **A**

### Lipid-Lowering Agents and Cognitive Function

The concern that lipid-lowering agents may adversely affect cognitive function is not currently supported by evidence and should not deter their use.

### Antiplatelet Agents

#### Recommendations

- 10.33** Use aspirin therapy (75–162 mg/day) as a secondary prevention strategy in those with diabetes and a history of ASCVD. **A**
- 10.34** For individuals with ASCVD and documented aspirin allergy, clopidogrel (75 mg/day) should be used. **B**
- 10.35** Dual antiplatelet therapy (with low-dose aspirin and a P2Y12 inhibitor) is reasonable for a year after an acute coronary syndrome and may have benefits beyond this period. **A**
- 10.36** Long-term treatment with dual antiplatelet therapy should be considered for individuals with prior coronary intervention, high ischemic risk, and low bleeding risk to prevent major adverse cardiovascular events (MACE). **A**
- 10.37** Combination therapy with aspirin plus low-dose rivaroxaban should be considered for individuals with stable CAD and/or PAD and low bleeding risk to prevent major adverse limb and CV events. **A**



with type 1 diabetes with duration of  $\geq 5$  years and in all people with type 2 diabetes regardless of treatment. **B**

- 11.1b** In people with established DKD, urinary albumin (e.g., spot UACR) and eGFR should be monitored 1–4 times per year depending on the stage of the disease (see Figure 11.1 in the complete 2023 Standards of Care). **B**

## Treatment

### Recommendations

- 11.4a** In nonpregnant people with diabetes and hypertension, either an ACE inhibitor or an ARB is recommended for those with moderately increased albuminuria (UACR 30–299 mg/g creatinine) **B** and is strongly recommended for those with severely increased albuminuria (UACR  $\geq 300$  mg/g creatinine) and/or eGFR  $< 60$  mL/min/1.73 m<sup>2</sup>. **A**
- 11.4b** Periodically monitor serum creatinine and potassium levels for the development of increased creatinine and hyperkalemia when ACE inhibitors, ARBs, and MRAs are used, or hypokalemia when diuretics are used. **B**
- 11.4c** An ACE inhibitor or an ARB is not recommended for the primary prevention of CKD in people with diabetes who have normal BP, normal UACR ( $< 30$  mg/g creatinine), and normal eGFR. **A**
- 11.4d** Do not discontinue renin-angiotensin system blockade for increases in serum creatinine ( $\leq 30\%$ ) in the absence of volume depletion. **A**
- 11.5a** For people with type 2 diabetes and DKD, use of an SGLT2 inhibitor is recommended to reduce CKD progression and CV events in patients with an eGFR  $\geq 20$  mL/min/1.73 m<sup>2</sup> and urinary albumin  $\geq 200$  mg/g creatinine. **A**
- 11.5b** For people with type 2 diabetes and DKD, use of an SGLT2 inhibitor is recommended to reduce CKD progression and CV events in patients with an eGFR  $\geq 20$  mL/min/1.73 m<sup>2</sup> and urinary albumin ranging from normal to 200 mg/g creatinine. **B**
- 11.5c** In people with type 2 diabetes and DKD, consider use of SGLT2 inhibitors (if eGFR is  $\geq 20$  mL/min/1.73 m<sup>2</sup>), a GLP-1 receptor agonist, or a nonsteroidal MRA (if eGFR is  $\geq 25$  mL/min/1.73 m<sup>2</sup>) additionally for CV risk reduction. **A**

- 11.5d** In people with CKD and albuminuria who are at increased risk for CV events or CKD progression, a nonsteroidal MRA shown to be effective in clinical trials is recommended to reduce CKD progression and CV events. **A**
- 11.6** In people with CKD who have  $\geq 300$  mg/g urinary albumin, a reduction of 30% or greater in mg/g urinary albumin is recommended to slow CKD progression. **B**
- 11.7** For people with non-dialysis-dependent stage 3 or higher CKD, dietary protein intake should be aimed to a target level of 0.8 g/kg body weight per day. **A** For patients on dialysis, higher levels of dietary protein intake should be considered since protein energy wasting is a major problem in some individuals on dialysis. **B**
- 11.8** Patients should be referred for evaluation by a nephrologist if they have continuously increasing urinary albumin levels and/or continuously decreasing eGFR and if the eGFR is  $< 30$  mL/min/1.73 m<sup>2</sup>. **A**
- 11.9** Promptly refer to a nephrologist for uncertainty about the etiology of kidney disease, difficult management issues, and rapidly progressing kidney disease. **A**

## Diagnosis, Staging, and Surveillance of DKD

DKD is diagnosed based on the presence and degree of albuminuria and/or reduced eGFR in the absence of symptoms of other primary causes of kidney damage. Two of three specimens of UACR collected within a 3- to 6-month period should be abnormal before considering a patient to have albuminuria. eGFR should be calculated from serum creatinine using a validated formula. The Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation is generally preferred. Race should not be included in the formula as race is a social and not a biologic construct. CKD is staged as detailed in Figure 11.1 in the complete 2023 Standards of Care.

## Selection of Glucose-Lowering Medications for People With CKD

eGFR should be monitored while taking metformin, which can be used in patients with eGFR  $\geq 30$  mL/min/1.73 m<sup>2</sup>. Reassess benefits and risks of continuing treatment when eGFR falls to  $< 45$  mL/min/1.73 m<sup>2</sup>, and do not initiate metformin in patients with an eGFR already at this level. Temporarily discontinue at the time of or



## Foot Care

### Recommendations

- 12.21** Perform a comprehensive foot evaluation at least annually to identify risk factors for ulcers and amputations. **A**
- 12.22** The examination should include inspection of the skin, assessment of foot deformities, neurological assessment (10-g monofilament testing with at least one other assessment: pinprick, temperature, vibration), and vascular assessment, including pulses in the legs and feet. **B**
- 12.23** Individuals with evidence of sensory loss or prior ulceration or amputation should have their feet inspected at every visit. **A**
- 12.24** Obtain a prior history of ulceration, amputation, Charcot foot, angioplasty or vascular surgery, cigarette smoking, retinopathy, and renal disease and assess current symptoms of neuropathy (pain, burning, numbness) and vascular disease (leg fatigue, claudication). **B**
- 12.25** Initial screening for PAD should include assessment of lower-extremity pulses, capillary refill time, rubor on dependency, pallor on elevation, and venous filling time. Individuals with a history of leg fatigue, claudication, and rest pain relieved with dependency or decreased or absent pedal pulses should be referred for ankle-brachial index and for further vascular assessment as appropriate. **B**
- 12.26** A multidisciplinary approach is recommended for individuals with foot ulcers and high-risk feet (e.g., those on dialysis, those with Charcot foot, those with a history of prior ulcers or amputation, those with PAD). **B**
- 12.27** Refer individuals who smoke and have a history of prior lower-extremity complications, loss of protective sensation, structural abnormalities, or PAD to foot care specialists for ongoing preventive care and lifelong surveillance. **B**
- 12.28** Provide general preventive foot self-care education to all people with diabetes, including those with loss of protective sensation, on appropriate ways to examine their feet (palpation or visual inspection with an unbreakable mirror) for daily surveillance of early foot problems. **B**
- 12.29** The use of specialized therapeutic footwear is recommended for people with diabetes at high risk for ulceration, including those with loss of protective sensation, foot deformities, ulcers,

callous formation, poor peripheral circulation, or history of amputation. **B**

## 13. OLDER ADULTS

### Recommendations

- 13.1** Consider the assessment of medical, psychological, functional (self-management abilities), and social domains in older adults to provide a framework to determine targets and therapeutic approaches for diabetes management. **B**
- 13.2** Screen for geriatric syndromes (i.e., polypharmacy, cognitive impairment, depression, urinary incontinence, falls, persistent pain, and frailty) in older adults, as they may affect diabetes self-management and diminish QoL. **B**

Diabetes in older adults is associated with higher rates of premature death, functional disability, accelerated muscle loss, coexisting illnesses and geriatric syndromes. When assessing older adults with diabetes, it is important to accurately categorize the type of diabetes as well as their complications and treatment-related concerns, such as fear of hypoglycemia.

## Neurocognitive Function

### Recommendation

- 13.3** Screening for early detection of mild cognitive impairment or dementia should be performed for adults 65 years of age or older at the initial visit, annually, and as appropriate. **B**

People with diabetes have higher incidences of all-cause dementia, Alzheimer disease, and vascular dementia. Ongoing studies are evaluating whether preventing or delaying diabetes onset may help to maintain cognitive function in older adults. However, studies examining the effects of intensive glycemic and BP control have not demonstrated a reduction in cognitive decline.

## Hypoglycemia

### Recommendations

- 13.4** Because older adults with diabetes have a greater risk of hypoglycemia than younger adults, episodes of hypoglycemia should be ascertained and addressed at routine visits. **B**
- 13.6** For older adults with type 2 diabetes on multiple daily doses of insulin, CGM should be

**TABLE 13.1** Framework for Considering Treatment Goals for Glycemia, BP, and Dyslipidemia in Older Adults With Diabetes

Patient Characteristics/ Health Status	Rationale	Reasonable A1C Goal‡	Fasting or Preprandial Glucose	Bedtime Glucose	BP	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.0–7.5% (53–58 mmol/mol)	80–130 mg/dL (4.4–7.2 mmol/L)	80–180 mg/dL (4.4–10.0 mmol/L)	<130/80 mmHg	Statin, unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses* or two or more instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90–150 mg/dL (5.0–8.3 mmol/L)	100–180 mg/dL (5.6–10.0 mmol/L)	<130/80 mmHg	Statin, unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnesses** or moderate-to-severe cognitive impairment or two or more ADL impairments)	Limited remaining life expectancy makes benefit uncertain	Avoid reliance on A1C; glucose control decisions should be based on avoiding hypoglycemia and symptomatic hyperglycemia	100–180 mg/dL (5.6–10.0 mmol/L)	110–200 mg/dL (6.1–11.1 mmol/L)	<140/90 mmHg	Consider likelihood of benefit with statin

This table represents a consensus framework for considering treatment goals for glycemia, BP, and dyslipidemia in older adults with diabetes. The patient characteristic categories are general concepts. Not every patient will clearly fall into a particular category. Consideration of patient and caregiver preferences is an important aspect of treatment individualization. Additionally, a patient’s health status and preferences may change over time. ‡A lower A1C goal may be set for an individual if achievable without recurrent or severe hypoglycemia or undue treatment burden. \*Coexisting chronic illnesses are conditions serious enough to require medications or lifestyle management and may include arthritis, cancer, HF, depression, emphysema, falls, hypertension, incontinence, stage 3 or worse CKD, MI, and stroke. “Multiple” means at least three, but many patients may have five or more. \*\*The presence of a single end-stage chronic illness, such as stage 3–4 HF or oxygen-dependent lung disease, CKD requiring dialysis, or uncontrolled metastatic cancer, may cause significant symptoms or impairment of functional status and significantly reduce life expectancy. ADL, activities of daily living. Adapted from Kirkman MS, Briscoe VJ, Clark N, et al. *Diabetes Care* 2012;35:2650–2664.

considered to improve glycemic outcomes and decrease glucose variability. **B**

Older adults are at higher risk of hypoglycemia for many reasons and should be routinely queried about hypoglycemia and hypoglycemia unawareness. Glycemic targets and pharmacologic treatments may need to be adjusted to minimize hypoglycemia.

**Treatment Goals**

Providers caring for older adults with diabetes must take clinical, cognitive, and functional differences into consideration when setting and prioritizing treatment goals. Table 13.1 provides a treatment goal framework for older patients.

**Lifestyle Management**

*Recommendations*

**13.13** Optimal nutrition and protein intake is recommended for older adults; regular exercise, including aerobic activity, weight-bearing exercise, and/or resistance training, should be encouraged in all older adults who can safely engage in such activities. **B**

**13.14** For older adults with type 2 diabetes, overweight/obesity, and capacity to safely exercise, an intensive lifestyle intervention focused on dietary changes, physical activity, and modest weight loss (e.g., 5–7%) should be considered for its benefits on QoL, mobility and physical functioning, and cardiometabolic risk factor control. **A**

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## Pharmacologic Therapy

### Recommendations

- 13.15** In older adults with type 2 diabetes at increased risk of hypoglycemia, medication classes with low risk of hypoglycemia are preferred. **B**
- 13.16** Overtreatment of diabetes is common in older adults and should be avoided. **B**
- 13.17** Deintensification of treatment goals is recommended to reduce the risk of hypoglycemia if it can be achieved within the individualized A1C target. **B**
- 13.18** Simplification of complex treatment plans (especially insulin) is recommended to reduce the risk of hypoglycemia and polypharmacy and decrease the burden of the disease if it can be achieved within the individualized A1C target. **B**
- 13.19** Consider costs of care and insurance coverage rules when developing treatment plans in order to reduce risk of cost-related barriers to adherence. **B**

Older adults require individualized diabetes pharmacotherapy and glycemic targets. See Figure 9.3 for general recommendations regarding person- and drug-specific factors to consider when selecting glucose-lowering agents. Providers should consider the cost and complexity of treatment to reduce barriers to adherence.

Metformin is the first-line agent for older adults with type 2 diabetes, although it can cause problematic gastrointestinal side effects and vitamin B12 deficiency. Thiazolidinediones and longer-acting sulfonylureas should be avoided. Dipeptidyl peptidase 4 inhibitors are well tolerated. GLP-1 receptor agonists and SGLT2 inhibitors have CV and renal benefits that extend to older adults, although class-specific side effects may limit their use. Multiple daily insulin therapy may be too complex for many older patients. Simplification of the insulin plan to match an individual's self-management abilities has been shown to reduce hypoglycemia and disease-related distress without worsening glycemic outcomes. Figure 13.1 in the complete 2023 Standards of Care provides an approach to insulin plan simplification.

## Treatment in Skilled Nursing Facilities and Nursing Homes

### Recommendations

- 13.20** Consider diabetes education for the staff of long-term care (LTC) and rehabilitation

facilities to improve the management of older adults with diabetes. **E**

- 13.21** People with diabetes residing in LTC facilities need careful assessment to establish individualized glycemic goals and to make appropriate choices of glucose-lowering agents based on their clinical and functional status. **E**
- 13.22** Consider use of CGM to assess risk for hypoglycemia in older adults treated with sulfonylureas or insulin. **E**

Older adults in LTC may have irregular and unpredictable meal consumption, undernutrition, anorexia, or impaired swallowing. Meals tailored to patients' culture, preferences, and personal goals may increase QoL, satisfaction with meals, and nutrition status. It may be helpful to give insulin after meals to ensure that the dose is appropriate for the amount of carbohydrate consumed in the meal.

## End-of-Life Care

### Recommendations

- 13.23** When palliative care is needed in older adults with diabetes, HCPs should initiate conversations regarding the goals and intensity of care. Strict glucose and BP control are not necessary **E**, and simplification of regimens can be considered. Similarly, the intensity of lipid management can be relaxed, and withdrawal of lipid-lowering therapy may be appropriate. **A**
- 13.24** Overall comfort, prevention of distressing symptoms, and preservation of QoL and dignity are primary goals for diabetes management at the end of life. **C**

## 14. CHILDREN AND ADOLESCENTS

The management of diabetes in children and adolescents cannot simply be derived from care routinely provided to adults with diabetes. The epidemiology, pathophysiology, developmental considerations, and response to therapy in pediatric-onset diabetes are different from adult diabetes.

See "14. Children and Adolescents" in the complete 2023 Standards of Care for specific recommendations regarding the comprehensive treatment of type 1 and type 2 diabetes in children and adolescents. The ADA position statements "Type 1 Diabetes in Children and Adolescents" and "Evaluation and Management of





- preconception counseling should be incorporated into routine diabetes care. **A**
- 15.2** Family planning should be discussed, and effective contraception (with consideration of long-acting, reversible contraception) should be prescribed and used until an individual's treatment plan and A1C are optimized for pregnancy. **A**
- 15.3** Preconception counseling should address the importance of achieving glucose levels as close to normal as is safely possible, ideally A1C <6.5% (48 mmol/mol), to reduce the risk of congenital anomalies, preeclampsia, macrosomia, preterm birth, and other complications. **A**
- 15.5** In addition to focused attention on achieving glycemic targets **A**, standard preconception care should be augmented with extra focus on nutrition, diabetes education, and screening for diabetes comorbidities and complications. **B**
- 15.6** Individuals with preexisting type 1 or type 2 diabetes who are planning a pregnancy or who have become pregnant should be counseled on the risk of development and/or progression of DR. Dilated eye examinations should occur ideally before pregnancy or in the first trimester, and then pregnant individuals should be monitored every trimester and for 1 year postpartum as indicated by the degree of retinopathy and as recommended by the eye care HCP. **B**

The preconception care of people with diabetes is detailed in Table 15.1 in the complete 2023 Standards of Care.

## Management of GDM

### Recommendations

- 15.14** Lifestyle behavior change is an essential component of management of GDM and may suffice as treatment for many individuals. Insulin should be added if needed to achieve glycemic targets. **A**
- 15.15** Insulin is the preferred medication for treating hyperglycemia in GDM. Metformin and glyburide should not be used as first-line agents, as both cross the placenta to the fetus. **A** Other oral and noninsulin injectable glucose-lowering medications lack long-term safety data.
- 15.17** Telehealth visits for pregnant people with GDM improve outcomes compared with standard in-person care. **A**

## Pregnancy and Drug Considerations

### Recommendations

- 15.21** In pregnant individuals with diabetes and chronic hypertension, a BP threshold of 140/90 mmHg for initiation or titration of therapy is associated with better pregnancy outcomes than reserving treatment for severe hypertension, with no increase in risk of small-for-gestational-age birth weight. **A** There are limited data on the optimal lower limit, but therapy should be lessened for BP <90/60 mmHg. **E** A BP target of 110–135/85 mmHg is suggested in the interest of reducing the risk for accelerated maternal hypertension. **A**
- 15.22** Potentially harmful medications in pregnancy (i.e., ACE inhibitors, ARBs, statins) should be stopped prior to conception and avoided in sexually active individuals of childbearing potential who are not using reliable contraception. **B**

## Postpartum Care

### Recommendations

- 15.23** Insulin resistance decreases dramatically immediately postpartum, and insulin requirements need to be evaluated and adjusted as they are often roughly half the prepregnancy requirements for the initial few days postpartum. **C**
- 15.24** A contraceptive plan should be discussed and implemented with all people with diabetes of reproductive potential. **A**
- 15.25** Screen individuals with a recent history of GDM at 4–12 weeks postpartum, using the 75-g OGTT and clinically appropriate non-pregnancy diagnostic criteria. **B**
- 15.26** Individuals with overweight/obesity and a history of GDM found to have prediabetes should receive intensive lifestyle interventions and/or metformin to prevent diabetes. **A**
- 15.27** Breastfeeding is recommended to reduce the risk of maternal type 2 diabetes and should be considered when choosing whether to breast-feed or formula feed. **B**
- 15.28** Individuals with a history of GDM should have lifelong screening for the development of type 2 diabetes or prediabetes every 1–3 years. **B**
- 15.30** Postpartum care should include psychosocial assessment and support for self-care. **E**

## 16. DIABETES CARE IN THE HOSPITAL

Among hospitalized individuals, hyperglycemia, hypoglycemia, and glucose variability are associated with adverse outcomes, including death. Therefore, careful management of people with diabetes during hospitalization has direct and immediate benefits. When caring for hospitalized people with diabetes, consult with a specialized diabetes or glucose management team when possible.

### Hospital Care Delivery Standards

#### Recommendations

- 16.1** Perform an A1C test on all people with diabetes or hyperglycemia (blood glucose  $>140$  mg/dL [7.8 mmol/L]) admitted to the hospital if not performed in the prior 3 months. **B**
- 16.2** Insulin should be administered using validated written or computerized protocols that allow for predefined adjustments in the insulin dosage based on glycemic fluctuations. **B**

High-quality hospital care for diabetes requires standards for care delivery, which are best implemented using structured order sets, and quality improvement strategies for process improvement.

### Glycemic Targets in Hospitalized Adults

#### Recommendations

- 16.4** Insulin therapy should be initiated for the treatment of persistent hyperglycemia starting at a threshold  $\geq 180$  mg/dL (10.0 mmol/L) (checked on two occasions). Once insulin therapy is started, a target glucose range of 140–180 mg/dL (7.8–10.0 mmol/L) is recommended for most critically ill and noncritically ill patients. **A**
- 16.5** More stringent goals, such as 110–140 mg/dL (6.1–7.8 mmol/L) or 100–180 mg/dL (5.6–10.0 mmol/L), may be appropriate for selected patients and are acceptable if they can be achieved without significant hypoglycemia. **C**

Hyperglycemia in hospitalized patients is defined as blood glucose levels  $>140$  mg/dL (7.8 mmol/L). Hypoglycemia in hospitalized patients is classified the same as in any setting (Table 6.4).

### BGM

In hospitalized individuals with diabetes who are eating, point-of-care (POC) glucose monitoring should be

performed before meals; in those not eating, glucose monitoring is advised every 4–6 hours. Although CGM has theoretical advantages over POC glucose monitoring in detecting and reducing the incidence of hypoglycemia, it has not been approved by the FDA for inpatient use.

### Glucose-Lowering Treatment in Hospitalized Patients

#### Recommendations

- 16.6** Basal insulin or a basal plus bolus correction insulin regimen is the preferred treatment for noncritically ill hospitalized patients with poor oral intake or those who are taking nothing by mouth. **A**
- 16.7** An insulin regimen with basal, prandial, and correction components is the preferred treatment for most noncritically ill hospitalized patients with adequate nutritional intake. **A**
- 16.8** Use of a correction or supplemental insulin without basal insulin (often referred to as a sliding scale) in the inpatient setting is discouraged. **A**

### Insulin Therapy

In the critical care setting, continuous intravenous insulin infusion is the most effective method for achieving glycemic targets. When discontinuing intravenous insulin, a transition protocol is associated with less morbidity and lower costs of care.

In the noncritical care setting, insulin is the preferred treatment for hyperglycemia. However, in certain circumstances, it may be appropriate to continue home therapies, including oral glucose-lowering medications. The safety and efficacy of noninsulin glucose-lowering therapies in the hospital setting is an area of active research. (See “16. Diabetes Care in the Hospital” in the complete 2023 Standards of Care for details.) If oral medications are held in the hospital but will be reinstated after discharge, there should be a protocol for guiding resumption of home medications 1–2 days prior to discharge.

An insulin schedule with basal and correction components is necessary for all hospitalized individuals with type 1 diabetes, even when taking nothing by mouth, with the addition of prandial insulin when eating.

## Hypoglycemia

### Recommendations

- 16.9** A hypoglycemia management protocol should be adopted and implemented by each hospital or hospital system. A plan for preventing and treating hypoglycemia should be established for each individual. Episodes of hypoglycemia in the hospital should be documented in the medical record and tracked for quality improvement/quality assessment. **E**
- 16.10** Treatment regimens should be reviewed and changed as necessary to prevent further hypoglycemia when a blood glucose value of <70 mg/dL (3.9 mmol/L) is documented. **C**

People with or without diabetes may experience hypoglycemia in the hospital setting. While hypoglycemia is associated with increased mortality, in many cases, it is a marker of an underlying disease rather than the cause of fatality.

Insulin is one of the most common drugs causing adverse events in hospitalized patients, and errors in insulin dosing and/or administration occur relatively frequently.

### MNT in the Hospital

The goals of MNT in the hospital are to provide adequate calories to meet metabolic demands, optimize glycemic outcomes, address personal food preferences, and facilitate the creation of a discharge plan.

### Self-Management in the Hospital

Diabetes self-management in the hospital may be appropriate for specific individuals who wish to continue to perform self-care while acutely ill.

### Standards for Special Situations

See “16. DIABETES CARE IN THE HOSPITAL” in the complete 2023 Standards of Care for guidance on enteral/parenteral feedings, glucocorticoid therapy, perioperative care, and DKA and hyperosmolar hyperglycemic state.

### Transition From the Hospital to the Ambulatory Setting

#### Recommendation

- 16.11** A structured discharge plan should be tailored to the individual with diabetes. **B**

Discharge planning should begin at admission and be updated as individual needs change. See “16. Diabetes

Care in the Hospital” in the complete 2023 Standards of Care for a discussion of appropriate discharge planning.

## Preventing Admissions and Readmissions

People with diabetes are nearly twice as likely as those without diabetes to be readmitted after hospitalization. Strategies to reduce readmissions include targeting ketosis-prone type 1 diabetes, treating individuals with admission A1C >9% (75 mmol/mol) with insulin, and implementing a transitional care model.

## 17. DIABETES ADVOCACY

For a list of ADA advocacy position statements, including “Diabetes and Driving” and “Diabetes and Employment,” see “17. Diabetes Advocacy” in the complete 2023 Standards of Care.

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The complete *Standards of Care in Diabetes—2023* was developed by the ADA’s Professional Practice Committee: Nuha Ali ElSayed, MD, MMSc (Chair), Grazia Aleppo, MD, Vanita R. Aroda, MD, Raveendhara R. Bannuru, MD, PhD, FAGE (Chief Methodologist), Florence M. Brown, MD, Dennis Bruemmer, MD, PhD, Billy S. Collins, DHSc, PA-C, Marisa E. Hilliard, PhD, Diana Isaacs, PharmD, BCPS, BCACP, CDCES, BC-ADM, FADCES, FCCP, Eric L. Johnson, MD, Scott Kahan, MD, MPH, Kamlesh Khunti, MD, PhD, FRCP, FRCGP, FMedSci, Jose Leon, MD, MPH, Sarah K. Lyons, MD, Mary Lou Perry, MS, RDN, CDCES, Priya Prahalad, MD, PhD, Richard E. Pratley, MD, Jane Jeffrie Seley, DNP, MPH, MSN, BSN, RN, GNP, BC-ADM, CDCES, CDTC, FADCES, FAAN, Robert C. Stanton, MD, and Robert A. Gabbay, MD, PhD. American College of Cardiology—Designated Representatives (Section 10) include Sandeep R. Das, MD, MPH, FACC, and Mikhail Kosiborod, MD, FACC, FAHA. Designated subject matter experts are Kenneth Cusi, MD, FACP, FACE, Christopher H. Gibbons, MD, MMSc, John M. Giurini, DPM, Lisa Murdock, Jennifer K. Sun, MD, MPH, Crystal C. Woodward, Deborah Young-Hyman, PhD, FTOS, and Fel SBM, CDCES. ADA staff are Raveendhara R. Bannuru, MD, PhD, FAGE, Nuha Ali ElSayed, MD, MMSc, Robert A. Gabbay, MD, PhD, Malaika I. Hill, MA, and Laura S. Mitchell.