بنام خداوند جان و خرد

Summary of Revisions: Standards of Medical Care in Diabetes—2024

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فاجعه تروریستی کرمان و شهادت تعداد زیادی از هم میهنانمان را تسلیت می گویم.

General Changes

- The field of diabetes care is rapidly changing as new research, technology, and treatments that can improve the health and well-being of people with diabetes continue to emerge.
- With annual updates since 1989, the American Diabetes Association (ADA) has long been a leader in producing guidelines that capture the most current state of the field.

General Changes

- The 2024 Standards of Care includes revisions to incorporate person-first and inclusive language. Efforts were made to consistently apply terminology that empowers people with diabetes and recognizes the individual at the center of diabetes care.
- Although levels of evidence for several recommendations have been updated, these changes are not outlined below where the clinical recommendation has remained the same.
- That is, changes in evidence level from, for example,E to C are not noted below.
- The 2024 Standards of Care contains, in addition to many minor changes that clarify recommendations or reflect new evidence, the following more substantive revisions.

Section Changes
Section 1. Improving Care and Promoting Health in Populations

- Recommendation 1.4 was updated to emphasize improving processes of care and health outcomes, costs, individual preferences and goals, and treatment burden.
- R1.4: Assess diabetes health care maintenance (Table 4.1) using reliable and relevant data metrics to improve processes of care and health outcomes, with attention to care costs, individual preferences and goals for care, and treatment burden. B

Section Changes
Section 1. Improving Care and Promoting Health in Populations

- The subsection “Status and Demographics of Diabetes Care,” formerly “Care Delivery Systems,” was updated to include current data with respect to cholesterol, blood pressure, and glycemic management.

- In 2015–2018, just 50.5% of U.S. community-dwelling adults with diabetes achieved A1C <7% and 75.4% achieved A1C <8%. The goal blood pressure of <130/80 mmHg was achieved by just 47.7% adults with diabetes, while 70.4% achieved blood pressure <140/90 mmHg. Lipid control, then defined as non-HDL cholesterol <130 mg/dL, was achieved by 55.7% adults with diabetes, and all three risk factors were controlled by just 22.2%. Importantly, many people who did not attain A1C, blood pressure, and lipid goals are not receiving any or adequate pharmacotherapy for glycemic, hypertension, and dyslipidemia management, respectively, which underscores the vital and urgent need for care delivery systems to engage and support people living with diabetes.

Section Changes
Section 1. Improving Care and Promoting Health in Populations

- The “Cost Considerations for Medication-Taking Behaviors” subsection now includes costs of insulin and glucose monitoring devices, with an update on insulin price lowering.

  - The cost of diabetes medications and devices is an ongoing barrier to achieving glycemic goals. Up to 25% of people with diabetes who are prescribed insulin report cost-related insulin underuse.
  - In 2023, three major insulin manufacturers lowered the prices of insulin, which may help reduce the financial burden of diabetes management, although costs for insulin delivery and glucose monitoring remain high.
  - Financial barriers remain a major source of health disparities, and costs should be a focus of treatment goals. Reduction in cost-related barriers to medication use is associated with better biologic and psychologic outcomes, including quality of life.

Section Changes
Section 1. Improving Care and Promoting Health in Populations

Tailoring Treatment for Social Context

- 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 people with diabetes with additional self-management support from lay health coaches, navigators, or community health workers when available. A
- 1.7 Consider the involvement of community health workers to support the management of diabetes and cardiovascular risk factors, especially in underserved communities and health care systems. B

Section Changes
Section 1. Improving Care and Promoting Health in Populations

- Tailoring Treatment for Social Context
  - Food Insecurity
  - Homelessness and Housing Insecurity
  - Migrant and Seasonal Agricultural Workers
  - Language Barriers
  - Health Literacy and Numeracy
  - Social Capital and Community Support

Section 2. Diagnosis and Classification of Diabetes

- The title of Section 2 was changed to “Diagnosis and Classification of Diabetes” to better represent real-world clinical practice (i.e., diagnosis occurs before classification).
- Recommendation 2.1a was added to emphasize the structured approach to diagnostic testing, and Recommendation 2.1b was updated to highlight the importance of confirmatory testing when an abnormal test result is identified.

- 2.1a Diagnose diabetes based on A1C or plasma glucose criteria, either the fasting plasma glucose (FPG) value, 2-h plasma glucose (2-h PG) value during a 75-g oral glucose tolerance test (OGTT), or random glucose value accompanied by classic hyperglycemic symptoms/crises criteria (Table 2.1). A
- 2.1b In the absence of unequivocal hyperglycemia (e.g., hyperglycemic crises), diagnosis requires confirmatory testing (Table 2.1). A

Section 2. Diagnosis and Classification of Diabetes

Table 2.1—Criteria for the diagnosis of diabetes in nonpregnant individuals

A1C ≥6.5% (≥48 mmol/mol). The test should be performed in a laboratory using a method that is NGSP certified and standardized to the DCCT assay.*
OR
FPG ≥126 mg/dL (≥7.0 mmol/L). Fasting is defined as no caloric intake for at least 8 h.*
OR
2-h PG ≥200 mg/dL (≥11.1 mmol/L) during OGTT. The test should be performed as described by the WHO, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.*
OR
In an individual with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥200 mg/dL (≥11.1 mmol/L). Random is any time of the day without regard to time since previous meal.

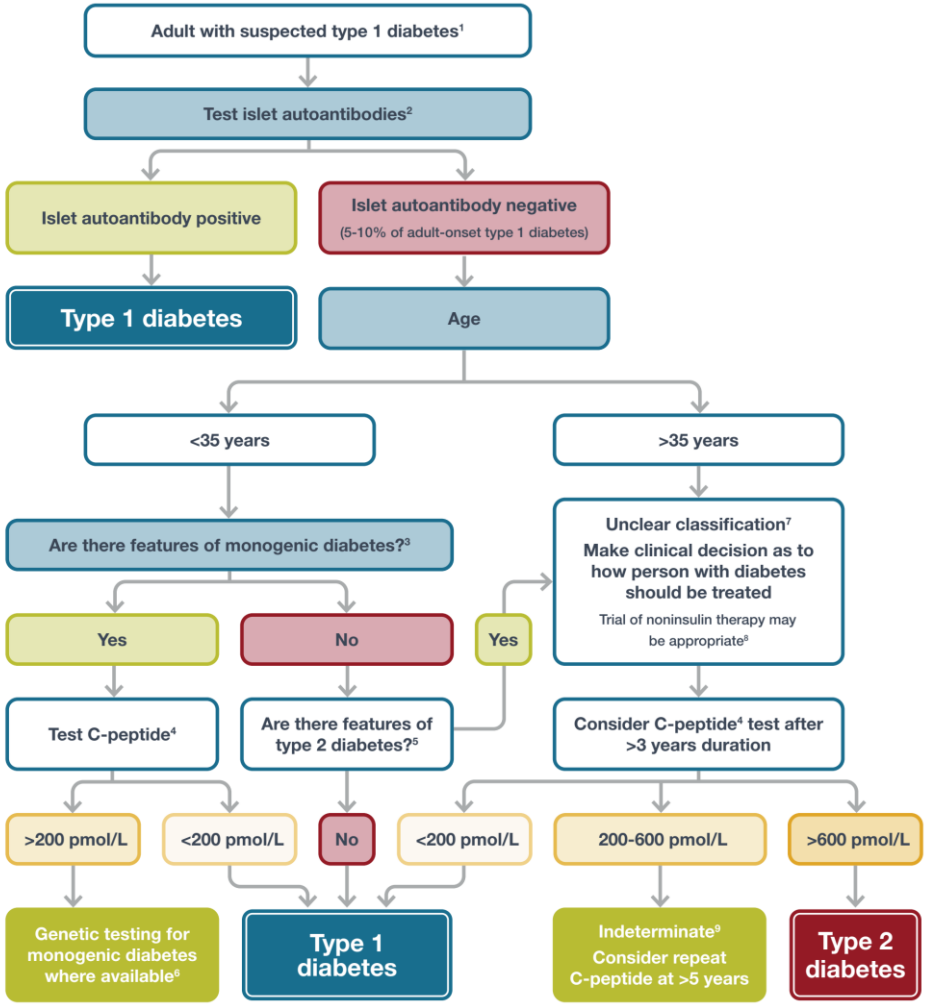
DCCT, Diabetes Control and Complications Trial; FPG, fasting plasma glucose; OGTT, oral glucose tolerance test; NGSP, National Glycohemoglobin Standardization Program; WHO, World Health Organization; 2-h PG, 2-h plasma glucose. *In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results obtained at the same time (e.g., A1C and FPG) or at two different time points.

Section 2. Diagnosis and Classification of Diabetes

- Tables 2.1 and 2.2 were modified to include A1C at the top of the testing hierarchy to acknowledge real-world practice when diagnosing diabetes and prediabetes, respectively.
- Recommendation 2.5 was added to emphasize the importance of differentiating which form of diabetes an individual has in order to facilitate personalized management.
- Figure 2.1 was added as a new figure to provide a structured framework for investigation of suspected type 1 diabetes in newly diagnosed adults.

- 2.5 Classify people with hyperglycemia into appropriate diagnostic categories to aid in personalized management. E

Section 2. Diagnosis and Classification of Diabetes



Section 2. Diagnosis and Classification of Diabetes

- The “Type 1 Diabetes” subsection was updated to refine diagnostic criteria for type 1 diabetes based on recent U.S. Food and Drug Administration (FDA) approval of a new drug to delay the incidence of type 1 diabetes. Recommendations 2.6 and 2.7, for type 1 diabetes, were updated accordingly.
- Recommendation 2.8 was added for consideration of standardized islet autoantibody tests for classification of diabetes in adults who phenotypically overlap with type 1 diabetes, and a new paragraph was added to highlight the possible association between coronavirus disease 2019 (COVID-19) infection and new-onset type 1 diabetes.

Section 2. Diagnosis and Classification of Diabetes

- 2.6 Screening for presymptomatic type 1 diabetes may be done by detection of autoantibodies to insulin, glutamic acid decarboxylase (GAD), islet antigen 2 (IA-2), or zinc transporter 8 (ZnT8). B
- 2.7 Having multiple confirmed islet autoantibodies is a risk factor for clinical diabetes. Testing for dysglycemia may be used to further forecast near-term risk. When multiple islet autoantibodies are identified, referral to a specialized center for further evaluation and/or consideration of a clinical trial or approved therapy to potentially delay development of clinical diabetes should be considered. B
- 2.8 Standardized islet autoantibody tests are recommended for classification of diabetes in adults who have phenotypic risk factors that overlap with those for type 1 diabetes (e.g., younger age at diagnosis, unintentional weight loss, ketoacidosis, or short time to insulin treatment). E

Section 2. Diagnosis and Classification of Diabetes

- Recommendation 2.15a was added to emphasize the role of several medication classes in increasing the risk of prediabetes and type 2 diabetes and the need for screening.
- Recommendation 2.15b was added to provide screening guidance for prediabetes and type 2 diabetes in individuals treated with second-generation antipsychotic medications.
- In the “Pancreatic Diabetes or Diabetes in the Context of Disease of the Exocrine Pancreas” subsection, Recommendation 2.17 was added to highlight the importance of screening for diabetes in people following an episode of acute pancreatitis or in individuals with chronic pancreatitis.
- In addition, the discussion on cystic fibrosis–related diabetes (CFRD) was incorporated into this subsection. Recommendation 2.19 was modified to clarify that while A1C is not recommended as a screening test for CFRD due to low sensitivity, it is widely used in clinical practice, and a value of ≥6.5% (≥48 mmol/mol) is consistent with a diagnosis of CFRD.

Section 2. Diagnosis and Classification of Diabetes

- 2.15a Consider screening people for prediabetes or diabetes if on certain medications, such as glucocorticoids, statins, thiazide diuretics, some HIV medications, and second-generation antipsychotic medications, as these agents are known to increase the risk of these conditions. E
- 2.15b In people who are prescribed second-generation antipsychotic medications, screen for prediabetes and diabetes at baseline and repeat 12–16 weeks after medication initiation or sooner, if clinically indicated, and annually. B

- 2.17 Screen people for diabetes within 3–6 months following an episode of acute pancreatitis and annually thereafter. Screening for diabetes is recommended annually for people with chronic pancreatitis. E

Section 2. Diagnosis and Classification of Diabetes

- 2.18 Annual screening for cystic fibrosis–related diabetes (CFRD) with an OGTT should begin by age 10 years in all people with cystic fibrosis not previously diagnosed with CFRD. B

- 2.19 A1C is not recommended as a screening test for CFRD due to low sensitivity. However, a value of ≥6.5% (≥48 mmol/mol) is consistent with a diagnosis of CFRD. B

- 2.20 Beginning 5 years after the diagnosis of CFRD, annual monitoring for complications of diabetes is recommended. E

Section 3. Prevention or Delay of Type 2 Diabetes and Associated Comorbidities

- Recommendation 3.2 was added to state the importance of monitoring individuals at risk for developing type 1 diabetes, as a younger age of seroconversion (particularly under age 3 years), the number of diabetes-related autoantibodies identified, and the development of autoantibodies against islet antigen 2 (IA-2) have all been associated with more rapid progression to clinical type 1 diabetes.
- Recommendation 3.15 was added to address use of teplizumab, which was approved to delay the onset of stage 3 type 1 diabetes in adults and pediatric individuals (aged 8 years and older) with stage 2 type 1 diabetes.

Section 3. Prevention or Delay of Type 2 Diabetes and Associated Comorbidities

- 3.2 In people with preclinical type 1 diabetes, monitor for disease progression using A1C approximately every 6 months and 75-g oral glucose tolerance test (i.e., fasting and 2-h plasma glucose) annually; modify frequency of monitoring based on individual risk assessment based on age, number and type of autoantibodies, and glycemic metrics. E

- 3.15 Teplizumab-mzwv infusion to delay the onset of symptomatic type 1 diabetes (stage 3) should be considered in selected individuals aged ≥8 years with stage 2 type 1 diabetes. Management should be in a specialized setting with appropriately trained personnel. B

Section 4. Comprehensive Medical Evaluation and Assessment of Comorbidities

- In Recommendation 4.1, language was modified to be more inclusive for comprehensive medical evaluation.
- 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. B
- Figure 4.1 was updated to include individual lifestyle choices when choosing treatment, and Table 4.1 was modified to include changes made throughout Section 4.
- Changes were made in the “Immunizations” subsection to reflect the COVID-19 post-pandemic period, and updates were made regarding the respiratory syncytial virus vaccine in adults ≥60 years of age with chronic conditions such as diabetes. Table 4.4, formerly Table 4.5, was revised to include these important vaccination updates.

American Diabetes Association®

From: **4. Comprehensive Medical Evaluation and Assessment of Comorbidities: Standards of Medical Care in Diabetes—2022**

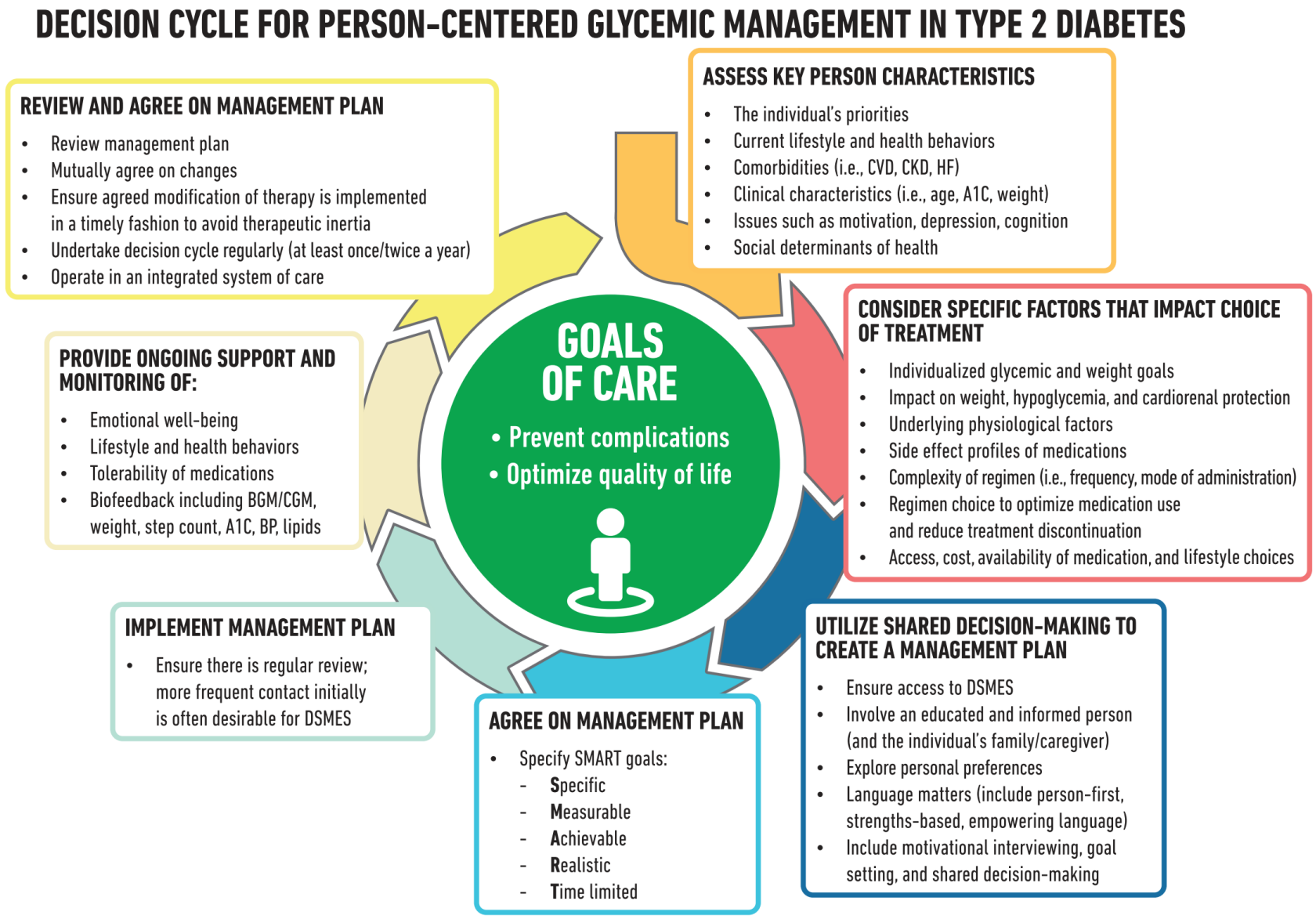


Figure Legend:

Decision cycle for patient-centered glycemic management in type 2 diabetes. Adapted from Davies et al. (104).

Highly recommended Immunizations for adults with diabetes (Advisory Committee on Immunization Practices and Centers for Disease Control and Prevention)

Vaccine	Recommended ages	Schedule	GRADE evidence type*	References
COVID-19	Recommended for all 6 months of age and older	Current initial vaccination and boosters		Centers for Disease Control and Prevention, Interim Clinical Considerations for Use of COVID-19 Vaccines, 2023 (295)
Hepatitis B	Recommended for adults with diabetes aged <60 years; for adults aged ≥60 years, hepatitis B vaccine may be administered at the discretion of the treating clinician based on the person's likelihood of acquiring hepatitis B infection			Weng et al., Universal Hepatitis B Vaccination in Adults Aged 19–59 Years: Updated Recommendations of the Advisory Committee on Immunization Practices—United States, 2022 (18)
Influenza	All people with diabetes advised not to receive live attenuated influenza vaccine	Annual		Centers for Disease Control and Prevention, Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices—United States, 2023–24 Influenza Season (296)
Pneumonia (PPSV23 [Pneumovax])	19–64 years of age, vaccinate with Pneumovax	One dose is recommended for those who previously received PCV13; if PCV15 was used, follow with PPSV23 ≥1 year later; PPSV23 is not indicated after PCV20; adults who received only PPSV23 may receive PCV15 or PCV20 ≥1 year after their last dose	2	Centers for Disease Control and Prevention, Updated Recommendations for Prevention of Invasive Pneumococcal Disease Among Adults Using the 23-Valent Pneumococcal Polysaccharide Vaccine (PPSV23) (23)
	≥65 years of age	One dose is recommended for those who previously received PCV13; if PCV15 was used, follow with PPSV23 ≥1 year later; PPSV23 is not indicated after PCV20; adults who received only PPSV23 may receive PCV15 or PCV20 ≥1 year after their last dose	2	Falkenhorst et al., Effectiveness of the 23-Valent Pneumococcal Polysaccharide Vaccine (PPV23) Against Pneumococcal Disease in the Elderly: Systematic Review and Meta-analysis (24)
PCV20 or PCV15	Adults 19–64 years of age, with an immunocompromising condition (e.g., chronic renal failure), cochlear implant, or cerebrospinal fluid leak	One dose of PCV15 or PCV20 is recommended by the Centers for Disease Control and Prevention	3	Kobayashi et al., Use of 15-Valent Pneumococcal Conjugate Vaccine and 20-Valent Pneumococcal Conjugate Vaccine Among U.S. Adults: Updated Recommendations of the Advisory Committee on Immunization Practices—United States, 2022 (25)
	19–64 years of age, immunocompetent	For those who have never received any pneumococcal vaccine, the CDC recommends one dose of PCV15 or PCV20		
	≥65 years of age, immunocompetent, have shared decision-making discussion with health care professionals	One dose of PCV15 or PCV20; PCSV23 may be given ≥8 weeks after PCV15; PPSV23 is not indicated after PCV20		
RSV	Older adults ≥60 years of age with diabetes appear to be a risk group	Adults aged ≥60 years may receive a single dose of an RSV vaccine		Centers for Disease Control and Prevention, CDC Recommends RSV Vaccine for Older Adults (29)
Tetanus, diphtheria, pertussis (Tdap)	All adults; pregnant individuals should have an extra dose	Booster every 10 years	2 for effectiveness, 3 for safety	Havers et al., Use of Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccines: Updated Recommendations of the Advisory Committee on Immunization Practices—United States, 2019 (297)
Zoster	≥50 years of age	Two-dose Shingrix, even if previously vaccinated	1	Dooling et al., Recommendations of the Advisory Committee on Immunization Practices for Use of Herpes Zoster Vaccines (298)

Section 4. Comprehensive Medical Evaluation and Assessment of Comorbidities

- The subsection on "Bone Health" has been extensively revised and updated to reflect the current best practices in the field. Recommendations 4.9–4.14 were added to include regular evaluation and treatment for bone health, and accompanying text was expanded to reflect these updates. Table 4.5 was added to include general and diabetes-specific risk factors for fracture.
- Recommendation 4.22 was added to include assessment and referral to appropriate health care professionals who specialize in disability management, which was expanded upon in the text.

- 4.22 An assessment of disability should be performed at each visit for people with diabetes. If a disability is impacting functional ability or capacity to manage their diabetes, a referral should be made to an appropriate health care professional specializing in disability (e.g., physical medicine and rehabilitation specialist, physical therapist, occupational therapist, speech-language pathologist). E

Section 4. Comprehensive Medical Evaluation and Assessment of Comorbidities

- 4.9 Fracture risk should be assessed in older adults with diabetes as a part of routine care in diabetes clinical practice, according to risk factors and comorbidities. A
- 4.10 Monitor bone mineral density using dual-energy X-ray absorptiometry of high-risk older adults with diabetes (aged >65 years) and younger individuals with diabetes and multiple risk factors every 2–3 years. A
- 4.11 Clinicians should consider the potential adverse impact on bone health when selecting pharmacological options to lower glucose levels in people with diabetes. Prioritizing medications with a proven safety profile for bones is recommended, particularly for those at elevated risk for fractures. A
- 4.12 To reduce the risk of falls and fractures, glycemic management goals should be individualized for people with diabetes at a higher risk of fracture. C Prioritize use of glucose-lowering medications that are associated with low risk for hypoglycemia to avoid falls. E
- 4.13 Advise people with diabetes on their intake of calcium and vitamin D to ensure it meets the recommended daily allowance for those at risk for fracture, either through their diet or supplemental means. B
- 4.14 Antiresorptive medications and osteoanabolic agents should be considered for people with diabetes who have low bone mineral density with a T-score ≤−2.0 or have experienced fragility fractures. B

Section 5. Facilitating Behavior Change and Well-being to Improve Health Outcomes

- The recommendations and text of Section 5 were adjusted to place focus on guiding the behavior of health care professionals rather than people with diabetes, thus aligning with the purpose of the Standards of Care as guidance for health care professionals.

- Recommendation 5.2 was updated to reflect five critical times to evaluate the need for diabetes self-management and education (DSMES): at diagnosis, when not meeting treatment goals, annually, when complicating factors develop, and when transitions in life and care occur.

- Recommendation 5.4 was updated to include a broader integration of cultural sensitivity in the context of person-centered care.

- Recommendation 5.5 reflects inclusion of telehealth and digital interventions for DSMES.

Section 5. Facilitating Behavior Change and Well-being to Improve Health Outcomes

- The “Diabetes Self-Management Education and Support” subsection text was updated to reflect changes in DSMES reimbursement policies and the importance of addressing barriers to using DSMES services.

- Recommendation 5.13 was added to the “Medical Nutrition Therapy” subsection to incorporate inclusive food-based eating patterns with key nutrition principles that are foundational to all people with diabetes, and Recommendation 5.20 was updated to emphasize including healthy fats within the context of a Mediterranean style of eating.

- A subsection on religious fasting was added, and the concept of chrononutrition (impact of eating on circadian rhythms) was introduced.

Section 5. Facilitating Behavior Change and Well-being to Improve Health Outcomes

- Recommendation 5.23 was updated to include advising alcohol abstainers to not begin use of alcohol for the purpose of improving health outcomes.
- The text on nonnutritive sweeteners was expanded to address the World Health Organization's conditional recommendation on their use and safety.
- In the "Physical Activity" subsection, Recommendation 5.31 was updated to define sedentary behavior and to be inclusive of all types of diabetes. The text of this subsection was updated to include a discussion of the application and benefits of high-intensity interval training.
- The subsection "Smoking Cessation: Tobacco, E-cigarettes, and Cannabis" was updated to include cannabis. Although not enough data are available to support a new recommendation, the text of this subsection was revised to include a discussion on cannabis use. In addition, Recommendation 5.33 was updated to advise that clinicians ask people with diabetes about use of cigarettes or other tobacco products and make appropriate referrals for cessation as a routine component of diabetes care and education.

Section 5. Facilitating Behavior Change and Well-being to Improve Health Outcomes

- Recommendation 5.36 in the “Psychosocial Care” subsection was updated to provide greater detail for psychosocial screening protocols, including diabetes-related mood concerns, stress, and quality of life.

- Recommendation 5.39 was changed to specify the frequency for diabetes distress screening and to highlight the role of health care professionals in addressing diabetes distress. The accompanying text also includes links to validated measures of diabetes distress.

- Recommendation 5.40 has been updated to include screening for fear of hypoglycemia.
- Recommendation 5.41 has been updated to reflect increased frequency for depression screening and monitoring in people with a history of depression.
- In the “Sleep Health” subsection, Recommendation 5.51 was added to recommend practicing sleep-promoting routines and habits.

Section 6. Glycemic Goals and Hypoglycemia

- The title of Section 6 was changed to “Glycemic Goals and Hypoglycemia,” and hypoglycemia content throughout the Standards of Care was consolidated into this section.
- Recommendation 6.1 was updated to include more frequent glycemic assessment for populations needing closer glycemic monitoring.
- 6.1 Assess glycemic status by A1C and/or appropriate continuous glucose monitoring (CGM) metrics at least two times a year. Assess more frequently (e.g., every 3 months) for individuals not meeting treatment goals, with frequent or severe hypoglycemia or hyperglycemia, changing health status, or growth and development in youth. E

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- The “Glycemic Assessment by A1C” subsection was revised to reflect recent data on the strengths and limitations of the A1C assay and to include a discussion of the benefits and limitations of serum glycated protein assays as alternatives to A1C.
- Table 6.2 was updated to outline CGM metrics and recommended glycemic goals.
- The subsections “Glucose Lowering and Microvascular Complications” and “Glucose Lowering and Cardiovascular Disease Outcomes” were updated to include evidence on long-term follow-up of clinical trials of tight glycemic management and to put these findings into the context of newer diabetes medications with cardiovascular and renal benefits.

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Section 6. Glycemic Goals and Hypoglycemia

Table 6.2—Standardized CGM metrics for clinical care in nonpregnant individuals with type 1 or type 2 diabetes

Metric	Interpretation	Goals
1. Number of days CGM device is worn		14-day wear for pattern management
2. Percentage of time CGM device is active		70% of data from 14 days
3. Mean glucose	Simple average of glucose values	*
4. Glucose management indicator	Calculated value approximating A1C (not always equivalent)	*
5. Glycemic variability (%CV) target	Spread of glucose values	≤36%†
6. TAR: % of readings and time >250 mg/dL (>13.9 mmol/L)	Level 2 hyperglycemia	<5% (most adults); <10% (older adults)
7. TAR: % of readings and time 181–250 mg/dL (10.1–13.9 mmol/L)	Level 1 hyperglycemia	<25% (most adults); <50% (older adults)‡
8. TIR: % of readings and time 70–180 mg/dL (3.9–10.0 mmol/L)	In range	>70% (most adults); >50% (older adults)
9. TBR: % of readings and time 54–69 mg/dL (3.0–3.8 mmol/L)	Level 1 hypoglycemia	<4% (most adults); <1% (older adults)§
10. TBR: % of readings and time <54 mg/dL (<3.0 mmol/L)	Level 2 hypoglycemia	<1%

CGM, continuous glucose monitoring; CV, coefficient of variation; TAR, time above range; TBR, time below range; TIR, time in range. *Goals for these values are not standardized. †Some studies suggest that lower %CV targets (<33%) provide additional protection against hypoglycemia for those receiving insulin or sulfonylureas. ‡Goals are for level 1 and level 2 hyperglycemia combined. §Goals are for level 1 and level 2 hypoglycemia combined. Adapted from Battelino et al. (32).

Section 6. Glycemic Goals and Hypoglycemia

- Recommendations 6.8a and 6.8b were added to clarify the clinical scenarios where deintensifying diabetes medications is appropriate, and text in the “Setting and Modifying Glycemic Goals” subsection was added to discuss the rationale for this update.

- 6.8a Deintensify hypoglycemia-causing medications (insulin, sulfonylureas, or meglitinides), or switch to a medication class with lower hypoglycemia risk, for individuals who are at high risk for hypoglycemia, within individualized glycemic goals. B

- 6.8b Deintensify diabetes medications for individuals for whom the harms and/or burdens of treatment may be greater than the benefits, within individualized glycemic goals. B

Section 6. Glycemic Goals and Hypoglycemia

- Recommendations 6.11a, 6.11b, and 6.11c were added to clarify when and how health care professionals should review an individual's hypoglycemia history, awareness, and risk. Table 6.5, which provides a summary of hypoglycemia risk factors (formerly in Section 4), was updated to reflect recent evidence.
- The "Hypoglycemia Risk Assessment" subsection was added to provide the background and rationale for Table 6.5.

- 6.11a History of hypoglycemia should be reviewed at every clinical encounter for all individuals at risk for hypoglycemia and evaluated as indicated. C
- 6.11b Clinicians should screen all individuals at risk for hypoglycemia for impaired hypoglycemia awareness. E
- 6.11c Clinicians should consider an individual's risk for hypoglycemia (see Table 6.5) when selecting diabetes medications and glycemic goals. E

Section 6. Glycemic Goals and Hypoglycemia

Table 6.5—Assessment of hypoglycemia risk among individuals treated with insulin, sulfonylureas, or meglitinides

Clinical/biological risk factors	Social, cultural, and economic risk factors
Major risk factors • Recent (within the past 3–6 months) level 2 or 3 hypoglycemia • Intensive insulin therapy* • Impaired hypoglycemia awareness • End-stage kidney disease • Cognitive impairment or dementia	Major risk factors • Food insecurity • Low-income status§ • Homelessness • Fasting for religious or cultural reasons
Other risk factors • Multiple recent episodes of level 1 hypoglycemia • Basal insulin therapy* • Age ≥75 years† • Female sex • High glycemic variability‡ • Polypharmacy • Cardiovascular disease • Chronic kidney disease (eGFR <60 mL/min/1.73 m^2 or albuminuria) • Neuropathy • Retinopathy • Major depressive disorder	Other risk factors • Low health literacy • Alcohol or substance use disorder

Major risk factors are those that have a consistent, independent association with a high risk for level 2 or 3 hypoglycemia. Other risk factors are those with less consistent evidence or a weaker association. These risk factors are identified through observational analyses and are intended to be used for hypoglycemia risk stratification. Individuals considered at high risk for hypoglycemia are those with ≥1 major risk factor or who have multiple other risk factors (determined by the health care professional incorporating clinical judgment) (87,88,92,94–97,113,146). Proximal causes of hypoglycemic events (e.g., exercise and sleep) are not included. eGFR, estimated glomerular filtration rate.*Rates of hypoglycemia are highest for individuals treated with intensive insulin therapy (including multiple daily injections of insulin, continuous subcutaneous insulin infusion, or automated insulin delivery systems), followed by basal insulin, followed by sulfonylureas or meglitinides. Combining treatment with insulin and sulfonylureas also increases hypoglycemia risk.†Accounting for treatment plan and diabetes subtype, the oldest individuals (aged ≥75 years) have the highest risk for hypoglycemia in type 2 diabetes; younger individuals with type 1 diabetes are also at very high risk.‡Tight glycemic control in randomized trials increases hypoglycemia rates. In observational studies, both low and high A1C are associated with hypoglycemia in a J-shaped relationship.§Includes factors associated with low income, such as being underinsured or living in a socioeconomically deprived area.

Section 6. Glycemic Goals and Hypoglycemia

- Several recommendations were added to and updated within the “Hypoglycemia Assessment, Prevention, and Treatment” subsection.
- Recommendation 6.11d was added to highlight the benefits of continuous glucose monitoring (CGM) use for hypoglycemia prevention.
- Recommendation 6.12 was revised to provide hypoglycemia treatment guidance inclusive of individuals using automated insulin delivery (AID) systems, and details were added to the text.
- Recommendation 6.13 was revised to clarify criteria for prescribing glucagon and express preference for glucagon preparations that do not have to be reconstituted.
- Table 6.6 was added to summarize currently available glucagon products and their monthly costs.
- Recommendation 6.14 was added to address the need for patient education for hypoglycemia prevention and treatment, especially for insulin users.
- Recommendations 6.15 and 6.16 were updated to communicate how hypoglycemic events should inform modification of the diabetes treatment plan and to direct clinicians to use evidence-based interventions to reestablish awareness of hypoglycemia, respectively.

Section 6. Glycemic Goals and Hypoglycemia

- 6.11d Use of CGM is beneficial and recommended for individuals at high risk for hypoglycemia. A
- 6.12 Glucose is the preferred treatment for the conscious individual with glucose <70 mg/dL (<3.9 mmol/L), although any form of carbohydrate that contains glucose may be used. Fifteen minutes after initial treatment, repeat the treatment if hypoglycemia persists. B
- 6.13 Glucagon should be prescribed for all individuals taking insulin or at high risk for hypoglycemia. Family, caregivers, school personnel, and others providing support to these individuals should know its location and be educated on how to administer it. Glucagon preparations that do not have to be reconstituted are preferred. E
- 6.14 All individuals taking insulin A or at risk for hypoglycemia C should receive structured education for hypoglycemia prevention and treatment, with ongoing education for those who experience hypoglycemic events.
- 6.15 One or more episodes of level 2 or 3 hypoglycemia should prompt reevaluation of the treatment plan, including deintensifying or switching diabetes medications if appropriate. E
- 6.16 Refer individuals with impaired hypoglycemia awareness to a trained health care professional to receive evidence-based intervention to help reestablish awareness of symptoms of hypoglycemia. A

Section 6. Glycemic Goals and Hypoglycemia

Table 6.7—Components of hypoglycemia prevention for individuals at risk for hypoglycemia at initial, follow-up, and annual visits

Hypoglycemia prevention action	Initial visit	Every follow-up visit	Annual visit
Hypoglycemia history assessment	✓	✓	✓
Hypoglycemia awareness assessment	✓		✓
Cognitive function and other hypoglycemia risk factor assessment	✓		✓
Structured patient education for hypoglycemia prevention and treatment	✓	✓*	✓*
Consideration of continuous glucose monitoring needs	✓	✓	✓
Reevaluation of diabetes treatment plan with deintensification, simplification, or agent modification as appropriate	✓	✓†	✓†
Glucagon prescription and training for close contacts for insulin-treated individuals or those at high hypoglycemic risk	✓		✓
Training to reestablish awareness of hypoglycemia	✓‡		✓‡

- Table 6.7 was added to summarize the components of hypoglycemia prevention and their recommended frequency.

- The listed frequencies are the recommended minimum; actions for hypoglycemia prevention should be done more often as needed based on clinical judgment.*Indicated with recurrent hypoglycemic events or at initiation of medication with a high risk for hypoglycemia.†Indicated with any level 2 or 3 hypoglycemia, intercurrent illness, or initiating interacting medications.‡Indicated when impaired hypoglycemia awareness is detected.

Section 7. Diabetes Technology

- Recommendation 7.1 was added to state that people with diabetes should be offered any type of diabetes device (e.g., insulin pens, connected pens, glucose meters, and CGM or AID systems), and Recommendation 7.2 was added to emphasize the need to start CGM early in type 1 diabetes, even at diagnosis, to promote early achievement of glycemic goals.

- Recommendation 7.3 was added to emphasize that health care professionals should acquire sufficient knowledge for the use and application of diabetes technology for people with diabetes, and the text has been expanded to discuss the need for both knowledge and competency for interprofessional teams managing diabetes care.

- Recommendation 7.8 was modified to align with Section 14, “Children and Adolescents,” to support initiation of an insulin pump and/or AID system early for individuals with type 1 diabetes, even at diagnosis.

- Recommendation 7.15 was updated to reflect the benefits of intermittently scanned CGM in less intensively treated people with type 2 diabetes.

Section 7. Diabetes Technology

- 7.1 Diabetes devices should be offered to people with diabetes. A
- 7.2 Initiation of continuous glucose monitoring (CGM) should be offered to people with type 1 diabetes early in the disease, even at time of diagnosis. A
- 7.3 Consider establishing competencies based on role in practice setting for health care professionals working with diabetes technology. E
- 7.8 Initiation of CSII and/or AID early, even at diagnosis, in the treatment of diabetes can be beneficial depending on a person's or caregiver's needs and preferences. C
- 7.15 rtCGM A or isCGM B 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.

Section 7. Diabetes Technology

- The text on CGM systems was expanded to include updates on systems that are cleared for integration with AID systems and to include the benefits of CGM use in type 2 diabetes for those using nonintensive insulin therapy and/or not using insulin therapy.
- In addition, the text was updated to include suggestions to streamline the approach to CGM interpretation by various methods, such as assessing data sufficiency and reviewing glycemic trends to modify therapeutic approaches.
- The text on real-time CGM was updated to outline the systems that can be used by pregnant individuals with diabetes, and substances that interfere with CGM device accuracy were updated in the text and in Table 7.4.

Section 7. Diabetes Technology

Table 7.4—Continuous glucose monitoring devices interfering substances

Medication	Systems affected	Effect
Acetaminophen		
>4 g/day	Dexcom G6, Dexcom G7	Higher sensor readings than actual glucose
Any dose	Medtronic Guardian	Higher sensor readings than actual glucose
Ascorbic acid (vitamin C), >500 mg/day	FreeStyle Libre 14 day, FreeStyle Libre 2, FreeStyle Libre 3	Higher sensor readings than actual glucose
Hydroxyurea	Dexcom G6, Dexcom G7, Medtronic Guardian	Higher sensor readings than actual glucose
Mannitol (intravenously or as peritoneal dialysis solution)	Senseonics Eversense	Higher sensor readings than actual glucose
Sorbitol (intravenously or as peritoneal dialysis solution)	Senseonics Eversense	Higher sensor readings than actual glucose

Section 7. Diabetes Technology

- Recommendation 7.24 was refined to emphasize the usefulness of insulin pens or insulin injection aids for people with dexterity issues or vision impairment.
- The text on AID systems was updated to include benefits reported from real-world studies.
- Recommendation 7.33 was added to emphasize continuation of personal CGM use in hospitalized individuals with diabetes when clinically appropriate in a hybrid fashion and under an institutional protocol.

- 7.24 Insulin pens or insulin injection aids are recommended for people with dexterity issues or vision impairment or when decided by shared decision-making to facilitate the accurate dosing and administration of insulin. C
- 7.33 In people with diabetes using personal CGM, the use of CGM should be continued when clinically appropriate during hospitalization, with confirmatory point-of-care glucose measurements for insulin dosing and hypoglycemia assessment and treatment under an institutional protocol. B

Section 8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

- Language throughout the section was amended to be person centered and to emphasize the importance of weight management within the overall context of the treatment of people with diabetes, and the justification for a weight-based approach to diabetes treatment has been expanded. The recommendations and text pertaining to weight management treatment have been expanded to acknowledge the expected range of benefits across the spectrum of weight loss.
- Recommendations 8.2a, 8.2b, and 8.3 were expanded to incorporate additional anthropometric measurements beyond BMI (i.e., waist circumference, waist-to-hip ratio, and/or waist-to-height ratio) to encourage individualized assessments of body fat mass and distribution.
- Recommendation 8.6 was added to highlight that approaches to treating obesity should be individualized and that any of the established approaches (i.e., intensive behavioral interventions, pharmacologic treatment, or metabolic surgery) can be considered in people with obesity and diabetes alone or in combination.

Section 8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

- 8.2a To support the diagnosis of obesity, measure height and weight to calculate BMI and perform additional measurements of body fat distribution, like waist circumference, waist-to-hip ratio, and/or waist-to-height ratio. E

- 8.2b Monitor obesity-related anthropometric measurements at least annually to inform treatment considerations. E

- 8.3 Accommodations should be made to provide privacy during anthropometric measurements. E

- 8.6 Individualize initial treatment approaches for obesity (i.e., lifestyle and nutritional therapy, pharmacologic agents, or metabolic surgery) A based on the person's medical history, life circumstances, preferences, and motivation. C Consider combining treatment approaches if appropriate. E

Section 8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

- Recommendation 8.8b was updated to suggest counseling strategies to address barriers to access.
- Recommendations 8.11a and 8.11b were updated to highlight the effectiveness of weight maintenance programs and to suggest monitoring weight loss progress while providing ongoing support for maintaining goals long term.
- Recommendation 8.17 was added to include glucagon-like peptide 1 (GLP-1) receptor agonists or a dual glucose-dependent insulinotropic polypeptide (GIP) and GLP-1 receptor agonist with greater weight loss efficacy as preferred pharmacotherapy for obesity management in people with diabetes.
- Recommendation 8.18 was added to address the importance of reevaluation for obesity treatment intensification or deintensification for people with diabetes to reach their weight goals.
- The text of the “Metabolic Surgery” subsection was updated to emphasize preventing and addressing therapeutic inertia pertaining to weight management goals in people with obesity and type 2 diabetes.

Section 8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

- 8.8b Consider structured programs delivering behavioral counseling (face-to-face or remote) to address barriers to access. E
- 8.11a For those who achieve weight loss goals, long-term (≥1 year) weight maintenance programs are recommended, when available. Effective programs provide monthly contact and support, recommend ongoing monitoring of body weight (weekly or more frequently) and other self-monitoring strategies, and encourage regular physical activity (200–300 min/week). A
- 8.11b For those who achieve weight loss goals, continue to monitor progress periodically, provide ongoing support, and recommend continuing adopted interventions to maintain goals long term. E
- 8.17 In people with diabetes and overweight or obesity, the preferred pharmacotherapy should be a glucagon-like peptide 1 receptor agonist or dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide 1 receptor agonist with greater weight loss efficacy (i.e., semaglutide or tirzepatide), especially considering their added weight-independent benefits (e.g., glycemic and cardiometabolic). A

Section 8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

- Recommendation 8.19 was updated in response to growing evidence of the long-term benefits of metabolic surgery treatment in people with obesity and type 2 diabetes.
- Recommendation 8.20 now includes a link to accredited metabolic and bariatric surgery centers.
- Recommendation 8.25 was added to emphasize the importance of monitoring weight loss progress of individuals who have undergone metabolic surgery. In the case of inadequate progress, potential barriers and additional weight loss interventions should be considered.
- Table 8.1 was updated to include the recent FDA approvals and price changes for several obesity pharmacotherapies.

- This section is endorsed by The Obesity Society.

Section 8. Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes

- 8.19 Consider metabolic surgery as a weight and glycemic management approach in people with diabetes with BMI ≥30.0 kg/m2 (or ≥27.5 kg/m2 in Asian American individuals) who are otherwise good surgical candidates. A

- 8.20 Metabolic surgery should be performed in high-volume centers with interprofessional teams knowledgeable about and experienced in managing obesity, diabetes, and gastrointestinal surgery (www.facs.org/quality-programs/accreditation-and-verification/metabolic-and-bariatric-surgery-accreditation-and-quality-improvement-program/). E

- 8.25 Monitor individuals who have undergone metabolic surgery for insufficient weight loss or weight recurrence at least every 6–12 months. E In those who have insufficient weight loss or experience weight recurrence, assess for potential predisposing factors and, if appropriate, consider additional weight loss interventions (e.g., obesity pharmacotherapy). C

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendation 9.2 was updated to reflect preference of insulin analogs or inhaled insulin over injectable human insulins to minimize hypoglycemia risk for most adults with type 1 diabetes.
- Recommendation 9.3 was added to include early use of CGM for adults with type 1 diabetes, and Recommendation 9.4 was added to indicate consideration for use of AID systems for adults with type 1 diabetes.
- Recommendation 9.5 was expanded to include educating adults with type 1 diabetes on how to modify their insulin dose based on concurrent glycemia, glycemic trends, and sick day management.
- Recommendation 9.6 was added to suggest prescribing glucagon for individuals taking insulin or at high risk for hypoglycemia.
- Recommendation 9.7 was added to emphasize the importance of regular treatment plan evaluation for individuals with diabetes to ensure individualized goals are met.

Section 9. Pharmacologic Approaches to Glycemic Treatment

- 9.1 Treat most adults with type 1 diabetes with continuous subcutaneous insulin infusion or multiple daily doses of prandial (injected or inhaled) and basal insulin. A
- 9.2 For most adults with type 1 diabetes, insulin analogs (or inhaled insulin) are preferred over injectable human insulins to minimize hypoglycemia risk. A
- 9.3 Early use of continuous glucose monitoring is recommended for adults with type 1 diabetes to improve glycemic outcomes and quality of life and minimize hypoglycemia. B
- 9.4 Automated insulin delivery systems should be considered for all adults with type 1 diabetes. A
- 9.5 To improve glycemic outcomes and quality of life and minimize hypoglycemia risk, most adults with type 1 diabetes should receive education on how to match mealtime insulin doses to carbohydrate intake and, additionally, to fat and protein intake. They should also be taught how to modify the insulin dose (correction dose) based on concurrent glycemia, glycemic trends (if available), sick-day management, and anticipated physical activity. B

Section 9. Pharmacologic Approaches to Glycemic Treatment

- 9.6 Glucagon should be prescribed for all individuals taking insulin or at high risk for hypoglycemia. Family, caregivers, school personnel, and others providing support to these individuals should know its location and be educated on how to administer it. Glucagon preparations that do not require reconstitution are preferred. E

- 9.7 Insulin treatment plan and insulin-taking behavior should be reevaluated at regular intervals (e.g., every 3–6 months) and adjusted to incorporate specific factors that impact choice of treatment and ensure achievement of individualized glycemic goals. E

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendation 9.14 was updated to highlight the importance of early combination therapy when shortening the time to attainment of individualized treatment goals for adults with type 2 diabetes.
- Recommendation 9.15 was added to reflect that pharmacologic therapies should address both individualized glycemic and weight goals in adults with type 2 diabetes without cardiovascular and/or kidney disease.
- Recommendation 9.16 was added to advise consideration of additional glucose-lowering agents for adults with type 2 diabetes not meeting their individualized glycemic goals.
- Recommendation 9.17 was added to highlight the importance of treatment intensification and combination of approaches pertaining to weight management and their alignment with glycemic management goals for adults with type 2 diabetes.
- Recommendation 9.18 was updated to reflect prioritizing glycemic management agents that also reduce cardiovascular and kidney disease risk in adults with type 2 diabetes and established/high risk of atherosclerotic cardiovascular disease, heart failure, and/or chronic kidney disease.

Section 9. Pharmacologic Approaches to Glycemic Treatment

- 9.14 Early combination therapy can be considered in adults with type 2 diabetes at treatment initiation to shorten time to attainment of individualized treatment goals. A
- 9.15 In adults with type 2 diabetes without cardiovascular and/or kidney disease, pharmacologic agents should address both the individualized glycemic and weight goals (Fig. 9.3). A
- 9.16 In adults with type 2 diabetes who have not achieved their individualized glycemic goals, selection of subsequent glucose-lowering agents should take into consideration the individualized glycemic and weight goals as well as the presence of other metabolic comorbidities and the risk of hypoglycemia. A
- 9.17 In adults with type 2 diabetes who have not achieved their individualized weight goals, additional weight management interventions (e.g., intensification of lifestyle modifications, structured weight management programs, pharmacologic agents, or metabolic surgery, as appropriate) are recommended. A

Section 9. Pharmacologic Approaches to Glycemic Treatment

- 9.18 In adults with type 2 diabetes and established or high risk of atherosclerotic cardiovascular disease, heart failure (HF), and/or chronic kidney disease (CKD), the treatment plan should include agent(s) that reduce cardiovascular and kidney disease risk (e.g., sodium–glucose cotransporter 2 inhibitor [SGLT2] and/or glucagon-like peptide 1 receptor agonist [GLP-1 RA]) (Fig. 9.3 , Table 9.2 , Table 10.3B, and Table 10.3C) for glycemic management and comprehensive cardiovascular risk reduction, independent of A1C and in consideration of person-specific factors (Fig. 9.3) (see Section 10, “Cardiovascular Disease and Risk Management,” for details on cardiovascular risk reduction recommendations). A
- For adults with type 2 diabetes who have heart failure, Recommendation 9.19 was added to recommend sodium–glucose cotransporter 2 (SGLT2) inhibitors for glycemic management and prevention of heart failure hospitalizations.
- 9.19 In adults with type 2 diabetes who have HF (with either reduced or preserved ejection fraction), an SGLT2 inhibitor is recommended, for glycemic management and prevention of HF hospitalizations (see Section 10, “Cardiovascular Disease and Risk Management,” for details on cardiovascular risk reduction recommendations). A

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendations 9.20 and 9.21 were added to reflect individualized recommendations for individuals with type 2 diabetes and chronic kidney disease.

- 9.20 In adults with type 2 diabetes who have CKD (with confirmed estimated glomerular filtration rate [eGFR] of 20–60 mL/min per 1.73 m2 and/or albuminuria), an SGLT2 inhibitor should be used for minimizing progression of CKD, reduction in cardiovascular events, and reduction in hospitalizations for HF (Fig. 9.3); however, the glycemic benefits of SGLT2 inhibitors are reduced at eGFR <45 mL/min per 1.73 m2 (see Section 11, “Chronic Kidney Disease and Risk Management” for details on renal risk reduction recommendations). A

- 9.21 In adults with type 2 diabetes and advanced CKD (eGFR <30 mL/min per 1.73 m2), a GLP-1 RA is preferred for glycemic management due to lower risk of hypoglycemia and for cardiovascular event reduction. B

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendation 9.22 was updated to reflect that insulin therapy should be considered at any stage irrespective of other glucose-lowering medications in certain circumstances.

- 9.22 In adults with type 2 diabetes, initiation of insulin should be considered regardless of background glucose-lowering therapy or disease stage if there is evidence of ongoing catabolism (e.g., unexpected weight loss), if symptoms of hyperglycemia are present, or when A1C or blood glucose levels are very high (i.e., A1C >10% [>86 mmol/mol] or blood glucose ≥300 mg/dL [≥16.7 mmol/L]). E

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendation 9.23 was updated to include a dual GIP and GLP-1 receptor agonist as an additional option for greater glycemic management that is preferred to insulin, and Recommendation 9.24 was updated to reflect reassessing insulin dosing upon addition or dose escalation of a GLP-1 receptor agonist or a dual GIP and GLP-1 receptor agonist.

- 9.23 In adults with type 2 diabetes, a GLP-1 RA, including a dual glucose-dependent insulinotropic polypeptide (GIP) and GLP-1 RA, is preferred to insulin (Fig. 9.4). A

- 9.24 If insulin is used, combination therapy with a GLP-1 RA, including a dual GIP and GLP-1 RA, is recommended for greater glycemic effectiveness as well as beneficial effects on weight and hypoglycemia risk for adults with type 2 diabetes. Insulin dosing should be reassessed upon addition or dose escalation of a GLP-1 RA or dual GIP and GLP-1 RA. A

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendation 9.25 was broadened to include any glucose-lowering agents if justified for additional benefits (e.g., weight management, cardiometabolic, or kidney benefits) to treatment goals.

- 9.25 In adults with type 2 diabetes, glucose-lowering agents may be continued upon initiation of insulin therapy (unless contraindicated or not tolerated) for ongoing glycemic and metabolic benefits (i.e., weight, cardiometabolic, or kidney benefits). A

- Recommendation 9.26 was added to suggest reassessing the need and/or dosages for other glucose-lowering agents that are associated with higher risk of hypoglycemia when initiating or intensifying insulin treatment.

- 9.26 To minimize the risk of hypoglycemia and treatment burden when starting insulin therapy in adults with type 2 diabetes, reassess the need for and/or dose of glucose-lowering agents with higher hypoglycemia risk (i.e., sulfonylureas and meglitinides). A

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Recommendations 9.28 and 9.29 were added to provide guiding principles of care for people with obstacles that may impede their diabetes management.

- 9.28 Routinely assess all people with diabetes for financial obstacles that could impede their diabetes management. Clinicians, members of the diabetes care team, and social services professionals should work collaboratively, as appropriate and feasible, to support these individuals by implementing strategies to reduce costs, thereby improving their access to evidence-based care. E

- 9.29 In adults with diabetes and cost-related barriers, consider use of lower-cost medications for glycemic management (i.e., metformin, sulfonylureas, thiazolidinediones, and human insulin) within the context of their risks for hypoglycemia, weight gain, cardiovascular and kidney events, and other adverse effects. E

Section 9. Pharmacologic Approaches to Glycemic Treatment

- Figure 9.1 was updated to reflect a terminology change from “hybrid closed-loop technology” to “automated insulin delivery systems.”

- Table 9.1 was updated to reflect terminology updates, and Table 9.2 was updated to include counseling people with diabetes about potential for ileus (subcutaneous semaglutide) and to include that dual GIP and GLP-1 receptor agonist treatment is not recommended for individuals with a history of gastroparesis.

- Tables 9.3 and 9.4 were updated to reflect changes in cost for several agents.

USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES

HEALTHY LIFESTYLE BEHAVIORS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)

TO AVOID THERAPEUTIC INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3–6 MONTHS)

Goal: Cardiorenal Risk Reduction in High-Risk Individuals with Type 2 Diabetes (in addition to comprehensive CV risk management)*

+ASCVD†

Defined differently across CVOTs but all included individuals with established CVD (e.g., MI, stroke, any revascularization procedure). Variably included: conditions such as transient ischemic attack, unstable angina, amputation, symptomatic or asymptomatic coronary artery disease.

+Indicators of high risk

While definitions vary, most comprise ≥55 years of age with two or more additional risk factors (including obesity, hypertension, smoking, dyslipidemia, or albuminuria)

+ASCVD/Indicators of High Risk

GLP-1 RA# with proven CVD benefit **EITHER/ OR** SGLT2i§ with proven CVD benefit

If A1C above target

- For patients on a GLP-1 RA, consider adding SGLT2i with proven CVD benefit or vice versa
- TZD^

+HF

Current or prior symptoms of HF with documented HFrEF or HFpEF

+HF

SGLT2i§ with proven HF benefit in this population

+CKD

eGFR <60 mL/min per 1.73 m² OR albuminuria (ACR ≥3.0 mg/mmol [30 mg/g]). These measurements may vary over time; thus, a repeat measure is required to document CKD.

+CKD (on maximally tolerated dose of ACEi/ARB)

PREFERABLY

SGLT2i§ with primary evidence of reducing CKD progression

Use SGLT2i in people with an eGFR ≥20 mL/min per 1.73 m²; once initiated should be continued until initiation of dialysis or transplantation

OR

GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

If A1C above target, for patients on SGLT2i, consider incorporating a GLP-1 RA or vice versa

If additional cardiorenal risk reduction or glycemic lowering needed

Goal: Achievement and Maintenance of Glycemic and Weight Management Goals

Glycemic Management: Choose approaches that provide the efficacy to achieve goals:

Metformin OR Agent(s) including COMBINATION therapy that provide adequate EFFICACY to achieve and maintain treatment goals

Prioritize avoidance of hypoglycemia in high-risk individuals

In general, higher efficacy approaches have greater likelihood of achieving glycemic goals

Efficacy for glucose lowering

Very High:
Dulaglutide (high dose), Semaglutide, Tirzepatide

Insulin

Combination Oral, Combination Injectable (GLP-1 RA/Insulin)

High:
GLP-1 RA (not listed above), Metformin, SGLT2i, Sulfonylurea, TZD

Intermediate:
DPP-4i

Achievement and Maintenance of Weight Management Goals:

Set individualized weight management goals

General lifestyle advice: medical nutrition therapy/eating patterns/ physical activity

Intensive evidence-based structured weight management program

Consider medication for weight loss

Consider metabolic surgery

When choosing glucose-lowering therapies:

Consider regimen with high-to-very-high dual glucose and weight efficacy

Efficacy for weight loss

Very High:
Semaglutide, Tirzepatide

High:
Dulaglutide, Liraglutide

Intermediate:
GLP-1 RA (not listed above), SGLT2i

Neutral:
DPP-4i, Metformin

If A1C above target

Identify barriers to goals:

- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g., diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact achievement of goals

* In people with HF, CKD, established CVD, or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin; † A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; ^ Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HHF, and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CVD.

	Efficacy[1]	Hypoglycemia	Weight change[2]	CV effects		Renal effects		Oral/SQ	Cost	Clinical considerations
				Effect on MACE	HF	Progression of DKD	Dosing/use considerations*			
Metformin	High	No	Neutral (potential for modest loss)	Potential benefit	Neutral	Neutral	• Contraindicated with eGFR <30 mL/min per 1.73 m^2	Oral	Low	• GI side effects common; to mitigate GI side effects, consider slow dose titration, extended release formulations, and administration with food • Potential for vitamin B12 deficiency; monitor at regular intervals
SGLT2 inhibitors	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	• 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 • Increased risk of genital mycotic infections • Necrotizing fasciitis of the perineum (Fournier gangrene), rare reports: institute prompt treatment if suspected • Attention to volume status, blood pressure; adjust other volume-contracting agents as applicable
GLP-1 RAs	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 • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions	SQ; oral (semaglutide)	High	• Risk of thyroid C-cell tumors in rodents; human relevance not determined (liraglutide, dulaglutide, exenatide extended release, semaglutide) • 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 • Counsel patients about potential for ileus (semaglutide SQ) • Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected
Dual GIP and GLP-1 RA	Very high	No	Loss (very high)	Under investigation	Under investigation	Under investigation	• See label for renal dose considerations • No dose adjustment • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions	SQ	High	• Risk of thyroid C-cell tumors in rodents; human relevance not determined • 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 • Not recommended for individuals with history of gastroparesis • Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected
DPP-4 inhibitors	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	• Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Joint pain • Bullous pemphigoid (postmarketing): discontinue if suspected
Thiazolidinediones	High	No	Gain	Potential benefit: pioglitazone	Increased risk	Neutral	• No dose adjustment required • Generally not recommended in renal impairment due to potential for fluid retention	Oral	Low	• Congestive HF (pioglitazone, rosiglitazone) • Fluid retention (edema; heart failure) • Benefit in NASH • Risk of bone fractures • Weight gain: consider lower doses to mitigate weight gain and edema
Sulfonylureas (2nd generation)	High	Yes	Gain	Neutral	Neutral	Neutral	• Glyburide: generally not recommended in chronic kidney disease • Glipizide and glimepiride: initiate conservatively to avoid hypoglycemia	Oral	Low	• 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) • Use with caution in persons at risk for hypoglycemia
Insulin **Human**	High to very high	Yes	Gain	Neutral	Neutral	Neutral	• Lower insulin doses required with a decrease in eGFR; titrate per clinical response	SQ; inhaled	Low (SQ)	• Injection site reactions • Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs
Analogs								SQ	High	

Section 10. Cardiovascular Disease and Risk Management

- Recommendation 10.12 was revised to recommend monitoring of serum creatinine/estimated glomerular filtration rate and potassium within 7–14 days after initiation of treatment with an ACE inhibitor, angiotensin receptor blocker, mineralocorticoid receptor agonist, or diuretic.
- 10.12 For adults treated with an ACE inhibitor, ARB, mineralocorticoid receptor antagonist (MRA), or diuretic, serum creatinine/estimated glomerular filtration rate and serum potassium levels should be monitored within 7–14 days after initiation of therapy and at least annually. B
- Recommendation 10.24 was added to include bempedoic acid treatment for people with diabetes and without established cardiovascular disease who are intolerant to statin therapy. In addition, Recommendation 10.28b recommends bempedoic acid or proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitor therapy with monoclonal antibody treatment or inclisiran siRNA as alternative cholesterol-lowering therapy. A new subsection, “Intolerance to Statin Therapy,” was added to expand on these updates.
- 10.28b For people with diabetes and ASCVD intolerant to statin therapy, PCSK9 inhibitor therapy with monoclonal antibody treatment, A bempedoic acid therapy, A or PCSK9 inhibitor therapy with inclisiran siRNA E should be considered as an alternative cholesterol-lowering therapy.

Section 10. Cardiovascular Disease and Risk Management

- Recommendation 10.35b has been modified to recommend an interprofessional team approach that includes a cardiovascular or neurological specialist to decide on the length of treatment with dual antiplatelet therapy in people with diabetes after an acute coronary syndrome or ischemic stroke/transient ischemic attack.

- Recommendations 10.39a and 10.39b were added to include screening of adults with diabetes for asymptomatic heart failure by measuring a natriuretic peptide level to facilitate the prevention or progression to symptomatic stages of heart failure.

- 10.39a Adults with diabetes are at increased risk for the development of asymptomatic cardiac structural or functional abnormalities (stage B heart failure) or symptomatic (stage C) heart failure. Consider screening adults with diabetes by measuring a natriuretic peptide (B-type natriuretic peptide [BNP] or N-terminal pro-BNP [NT-proBNP]) to facilitate prevention of stage C heart failure. B
- 10.39b In asymptomatic individuals with diabetes and abnormal natriuretic peptide levels, echocardiography is recommended to identify stage B heart failure. A

Section 10. Cardiovascular Disease and Risk Management

- Recommendation 10.40 was modified to include screening for peripheral artery disease with ankle-brachial index testing in asymptomatic people with diabetes aged ≥50 years, microvascular disease in any location, foot complications, or any end-organ damage from diabetes. Peripheral artery disease screening should be considered for individuals with diabetes for ≥10 years or more.

- 10.40 In asymptomatic individuals with diabetes and age ≥50 years, microvascular disease in any location, or foot complications or any end-organ damage from diabetes, screening for PAD with ankle-brachial index testing is recommended to guide treatment for cardiovascular disease prevention and limb preservation. A In individuals with diabetes duration ≥10 years, screening for PAD should be considered. B

Section 10. Cardiovascular Disease and Risk Management

- Recommendation 10.42a was updated to recommend either an SGLT2 inhibitor or an SGLT1/2 inhibitor for people with diabetes and established heart failure with preserved or reduced ejection fraction to reduce risk of worsening heart failure and cardiovascular death. Additional text includes a discussion on cardiovascular outcomes trials of the SGLT1/2 inhibitor sotagliflozin.

- 10.42a In people with type 2 diabetes and established heart failure with either preserved or reduced ejection fraction, an SGLT2 inhibitor (including SGLT1/2 inhibitor) with proven benefit in this patient population is recommended to reduce the risk of worsening heart failure and cardiovascular death. A

Section 10. Cardiovascular Disease and Risk Management

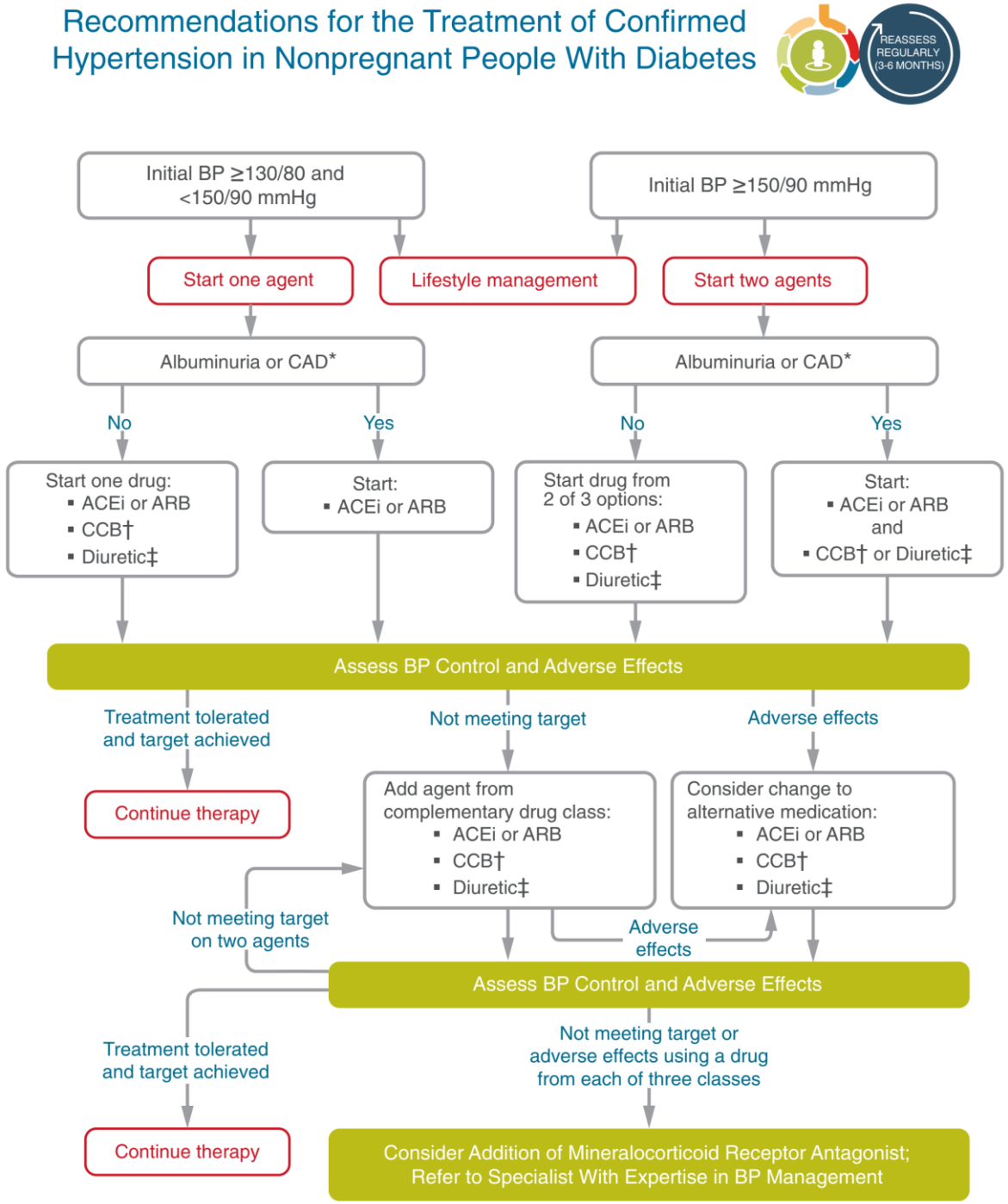
- Recommendations 10.45a–10.45e have been added to address treatment approaches for people with diabetes and heart failure, including the roles of an interprofessional team and pharmacological approaches to prevent heart failure progression and hospitalization.
- 10.45a In individuals with diabetes and asymptomatic stage B heart failure, an interprofessional approach to optimize guideline-directed medical therapy, which should include a cardiovascular disease specialist, is recommended to reduce the risk for progression to symptomatic (stage C) heart failure. A
- 10.45b In individuals with diabetes and asymptomatic stage B heart failure, ACE inhibitors/ARBs and β-blockers are recommended to reduce the risk for progression to symptomatic (stage C) heart failure. A
- 10.45c In individuals with type 2 diabetes and asymptomatic stage B heart failure or with high risk of or established cardiovascular disease, treatment with an SGLT inhibitor (including SGLT2 or SGLT1/2 inhibitors) is recommended to reduce the risk of hospitalization for heart failure. A
- 10.45d In individuals with type 2 diabetes and diabetic kidney disease, finerenone is recommended to reduce the risk of hospitalization for heart failure. A
- 10.45e In individuals with diabetes, guideline-directed medical therapy for myocardial infarction and symptomatic stage C heart failure is recommended with ACE inhibitors/ARBs, MRAs, angiotensin receptor/neprilysin inhibitor, β-blockers, and SGLT2 inhibitors, similar to guideline-directed medical therapy for people without diabetes. A

Section 10. Cardiovascular Disease and Risk Management

- Recommendation 10.47 was added to suggest including education on risks and signs of ketoacidosis and methods of management and tools for testing in people with type 1 diabetes, ketosis-prone type 2 diabetes, and/or those consuming ketogenic diets treated with SGLT inhibition.
- Figure 10.2 was modified to reflect changes in initial blood pressure values and treatment recommendations for confirmed hypertension in nonpregnant people with diabetes.

- This section is endorsed by the American College of Cardiology.

Section 10. Cardiovascular Disease and Risk Management



- Recommendations for the treatment of confirmed hypertension in nonpregnant people with diabetes. *An ACE inhibitor (ACEi) or angiotensin receptor blocker (ARB) is suggested to treat hypertension for people with coronary artery disease (CAD) or urine albumin-to-creatinine ratio 30–299 mg/g creatinine and strongly recommended for individuals with urine albumin-to-creatinine ratio ≥300 mg/g creatinine. †Dihydropyridine calcium channel blocker (CCB). ‡Thiazide-like diuretic; long-acting agents shown to reduce cardiovascular events, such as chlorthalidone and indapamide, are preferred. BP, blood pressure. Adapted from de Boer et al. (18).

Section 11. Chronic Kidney Disease and Risk Management

- Section 11 was updated to align with the latest consensus report on diabetes management in chronic kidney disease by the ADA and Kidney Disease: Improving Global Outcomes (KDIGO).
- Recommendation 11.4a was updated to include the role of ACE inhibitors or angiotensin receptor blockers in preventing the progression of kidney disease and reducing cardiovascular events.
- 11.4a In nonpregnant people with diabetes and hypertension, either an ACE inhibitor or an angiotensin receptor blocker (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 ≥300 mg/g creatinine) and/or eGFR <60 mL/min/1.73 m2 to prevent the progression of kidney disease and reduce cardiovascular events. A
- Recommendation 11.7 was updated to reflect dietary protein intake levels for individuals with stage 3 or higher chronic kidney disease who are currently treated with dialysis.
- 11.7 For people with non–dialysis-dependent stage G3 or higher CKD, dietary protein intake should be aimed to a target level of 0.8 g/kg body weight per day. A For individuals on dialysis, 1.0–1.2 g/kg/day of dietary protein intake should be considered since protein energy wasting is a major problem in some individuals on dialysis. B

Section 11. Chronic Kidney Disease and Risk Management

- Figure 11.1 was updated and illustrates chronic kidney disease progression, frequency of visits, and referral to nephrology according to glomerular filtration rate and albuminuria.

- Figure 11.2 was added to present a holistic approach for improving outcomes in individuals with diabetes and chronic kidney disease.

Section 11. Chronic Kidney Disease and Risk Management

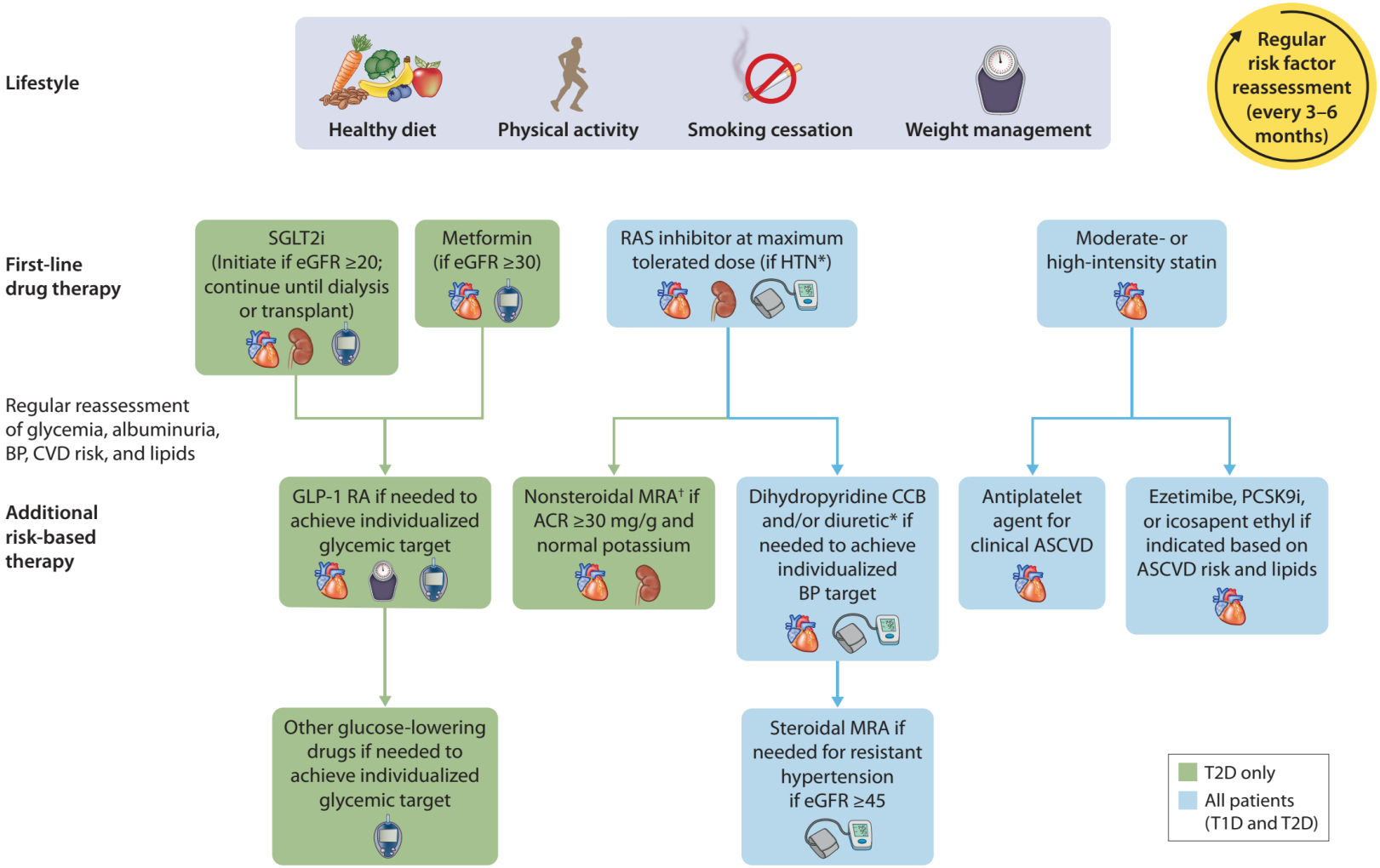
- Risk of CKD progression, frequency of visits, and referral to nephrology according to GFR and albuminuria. The numbers in the boxes are a guide to the frequency of screening or monitoring (number of times per year). Green reflects no evidence of CKD by estimated GFR or albuminuria, with screening indicated once per year. For monitoring of prevalent CKD, suggested monitoring varies from once per year (yellow) to four times or more per year (i.e., every 1–3 months, [deep red]) according to risks of CKD progression and CKD complications (e.g., cardiovascular disease, anemia, hyperparathyroidism). These are general parameters based only on expert opinion and underlying comorbid conditions, and disease state must be taken into account, as well as the likelihood of impacting a change in management for any individual. CKD, chronic kidney disease; GFR, glomerular filtration rate. Reprinted and adapted from de Boer et al. (1).

CKD is classified based on: • Cause (C) • GFR (G) • Albuminuria (A)				Albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–299 mg/g 3–29 mg/mmol	≥300 mg/g ≥30 mg/mmol
GFR categories (mL/min/1.73 m²) Description and range	G1	Normal or high	≥90	Screen 1	Treat 1	Treat and refer 3
	G2	Mildly decreased	60–89	Screen 1	Treat 1	Treat and refer 3
	G3a	Mildly to moderately decreased	45–59	Treat 1	Treat 2	Treat and refer 3
	G3b	Moderately to severely decreased	30–44	Treat 2	Treat and refer 3	Treat and refer 3
	G4	Severely decreased	15–29	Treat and refer* 3	Treat and refer* 3	Treat and refer 4+
	G5	Kidney failure	<15	Treat and refer 4+	Treat and refer 4+	Treat and refer 4+

Low risk (if no other markers of kidney disease, no CKD)
Moderately increased risk
High risk
Very high risk

Section 11. Chronic Kidney Disease and Risk Management

- Holistic approach for improving outcomes in people with diabetes and CKD. Icons presented indicate the following benefits: BP cuff, BP lowering; glucometer, glucose lowering; heart, cardioprotection; kidney, kidney protection; scale, weight management. eGFR is presented in units of mL/min/1.73 m2. *ACEi or ARB (at maximal tolerated doses) should be first-line therapy for hypertension when albuminuria is present. Otherwise, dihydropyridine calcium channel blocker or diuretic can also be considered; all three classes are often needed to attain BP targets. †Finerenone is currently the only ns-MRA with proven clinical kidney and cardiovascular benefits.



Section 12. Retinopathy, Neuropathy, and Foot Care

- Language in Recommendations 12.1, 12.2, 12.5, and 12.7 was refined to be more actionable by health care professionals.
- 12.1 Implement strategies to help people with diabetes reach glycemic goals to reduce the risk or slow the progression of diabetic retinopathy. A
- 12.2 Implement strategies to help people with diabetes reach blood pressure and lipid goals to reduce the risk or slow the progression of diabetic retinopathy. A
- 12.5 If there is no evidence of retinopathy from one or more annual eye exams and glycemic indicators are within the goal range, then screening every 1–2 years may be considered. If any level of diabetic retinopathy is present, subsequent dilated retinal examinations should be repeated at least annually by an ophthalmologist or optometrist. If retinopathy is progressing or sight-threatening, then examinations will be required more frequently. B
- 12.7 Counsel individuals of childbearing potential with preexisting type 1 or type 2 diabetes who are planning pregnancy or who are pregnant on the risk of development and/or progression of diabetic retinopathy. B

Section 12. Retinopathy, Neuropathy, and Foot Care

- Recommendation 12.6 was updated to indicate the application of FDA-approved artificial intelligence algorithms, and the text was updated with approved artificial intelligence algorithm details and clinical trials.

- 12.6 Programs that use retinal photography with remote reading or the use of U.S. Food and Drug Administration–approved artificial intelligence algorithms to improve access to diabetic retinopathy screening are appropriate screening strategies for diabetic retinopathy. Such programs need to provide pathways for timely referral for a comprehensive eye examination when indicated. B

Section 12. Retinopathy, Neuropathy, and Foot Care

- Recommendations 12.15 and 12.16 were added to address vision loss from diabetes, and the text was expanded to discuss complications of vision loss and the importance of evaluation and rehabilitation.
- 12.15 People who experience vision loss from diabetes should be counseled on the availability and scope of vision rehabilitation care and provided, or referred for, a comprehensive evaluation of their visual impairment by a practitioner experienced in vision rehabilitation. E

- 12.16 People with vision loss from diabetes should receive educational materials and resources for eye care support in addition to self-management education (e.g., glycemic management and hypoglycemia awareness). E

Section 12. Retinopathy, Neuropathy, and Foot Care

- The text in the “Neuropathy” subsection was updated to discuss the limited data available to support use of lidocaine 5% plaster/patch and gastric stimulation as efficacious therapies for people with diabetes.

- Lidocaine patches have limited data supporting their use in DPN and are not effective in more widespread distribution of pain (although they may be of use in individuals with nocturnal neuropathic foot pain). Lidocaine patches cannot be used for more than 12 h in a 24-h period.

- Gastric electrical stimulation using a surgically implantable device has received approval from the FDA, although there are very limited data in DPN and the results do not support gastric stimulation as an effective therapy in diabetic gastroparesis.

Section 12. Retinopathy, Neuropathy, and Foot Care

- In the "Foot Care" subsection, Recommendation 12.27 was updated to include toe pressures when screening for peripheral artery disease. In addition, Recommendation 12.28 was amended to include the importance of an interprofessional approach facilitated by a podiatrist with other appropriate team members for individuals who have foot ulcers and high-risk feet (e.g., individuals on dialysis, with Charcot foot, with prior ulcer or amputation history, or with peripheral artery disease).

- 12.27 Initial screening for peripheral arterial disease (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 with toe pressures and for further vascular assessment as appropriate. B
- 12.28 An interprofessional approach facilitated by a podiatrist in conjunction with other appropriate team members 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, and those with PAD). B

Section 12. Retinopathy, Neuropathy, and Foot Care

- Table 12.2 was updated to include “Fish skin graft” under “Acellular matrix tissues” for advanced wound therapies.

Table 12.2—Categories of advanced wound therapies

Negative-pressure wound therapy
Standard electrically powered
Mechanically powered
Oxygen therapies
Hyperbaric oxygen therapy
Topical oxygen therapy
Oxygen-releasing sprays, dressings
Biophysical
Electrical stimulation, diathermy
Pulsed electromagnetic fields, pulsed radiofrequency energy
Low-frequency noncontact ultrasound
Extracorporeal shock wave therapy
Growth factors
Becaplermin: platelet-derived growth factor
Fibroblast growth factor
Epidermal growth factor
Autologous blood products
Platelet-rich plasma
Leukocyte, platelet, fibrin multilayered patches
Whole blood clot
Acellular matrix tissues
Xenograft dermis
Bovine dermis
Xenograft acellular matrices
Small intestine submucosa
Porcine urinary bladder matrix
Ovine forestomach
Equine pericardium
Fish skin graft
Bovine collagen
Bilayered dermal regeneration matrix
Human dermis products
Human pericardium
Placental tissues
Amniotic tissues/amniotic fluid
Umbilical cord
Bioengineered allogeneic cellular therapies
Bilayered skin equivalent (human keratinocytes and fibroblasts)
Dermal replacement therapy (human fibroblasts)
Stem cell therapies
Autogenous: bone marrow–derived stem cells
Allogeneic: amniotic matrix with mesenchymal stem cells
Miscellaneous active dressings
Hyaluronic acid, honey dressings, etc.
Sucrose octasulfate dressing

Adapted with permission from Frykberg and Banks (95).

Section 13. Older Adults

- Recommendation 13.6 was modified to align with the revised Medicare reimbursement rules allowing CGM for adults with type 2 diabetes on any insulin.
- 13.6 For older adults with type 2 diabetes on insulin therapy, continuous glucose monitoring should be considered to improve glycemic outcomes and reduce hypoglycemia. B

- Recommendations 13.8a, 13.8b, and 13.8c were amended to highlight the heterogeneity present for treatment goals for older adults, especially those with intermediate or complex health conditions who need to personalize glycemic goals.
- 13.8a Older adults with diabetes who are otherwise healthy with few and stable coexisting chronic illnesses and intact cognitive function and functional status should have lower glycemic goals (such as A1C <7.0–7.5% [<53–58 mmol/mol]). C

Section 13. Older Adults

- Recommendations 13.8a, 13.8b, and 13.8c were amended to highlight the heterogeneity present for treatment goals for older adults, especially those with intermediate or complex health conditions who need to personalize glycemic goals.
- 13.8a Older adults with diabetes who are otherwise healthy with few and stable coexisting chronic illnesses and intact cognitive function and functional status should have lower glycemic goals (such as A1C <7.0–7.5% [<53–58 mmol/mol]). C
- 13.8b Older adults with diabetes and intermediate or complex health are clinically heterogeneous with variable life expectancy. Selection of glycemic goals should be individualized, with less stringent goals (such as A1C <8.0% [<64 mmol/mol]) for those with significant cognitive and/or functional limitations, frailty, severe comorbidities, and a less favorable risk-to-benefit ratio of diabetes medications. C
- 13.8c Older adults with very complex or poor health receive minimal benefit from stringent glycemic control, and clinicians should avoid reliance on glycemic goals and instead focus on avoiding hypoglycemia and symptomatic hyperglycemia. C

Section 13. Older Adults

- Recommendations 13.16a–13.16d were updated to highlight the need to deintensify therapy, most particularly hypoglycemia-causing medications (such as insulin, sulfonylureas, and meglitinides). These recommendations also suggest switching to classes of glucose-lowering medications with a lower risk of hypoglycemia to meet individualized glycemic goals. In addition, treatment plans for older adults with diabetes and other comorbidities (e.g., atherosclerotic cardiovascular disease, heart failure, and/or chronic kidney disease) should include agents that reduce cardiorenal risk, regardless of glycemia.

- 13.16a In older adults with diabetes, deintensify hypoglycemia-causing medications (e.g., insulin, sulfonylureas, or meglitinides) or switch to a medication class with low hypoglycemia risk for individuals who are at high risk for hypoglycemia, using individualized glycemic goals. B

Section 13. Older Adults

- 13.16b In older adults with diabetes, deintensify diabetes medications for individuals for whom the harms and/or burdens of treatment may be greater than the benefits, within individualized glycemic goals. E

- 13.16c Simplification of complex treatment plans (especially insulin) is recommended to reduce the risk of hypoglycemia and polypharmacy and decrease the treatment burden if it can be achieved using the individualized glycemic goals. B

- 13.16d In older adults with type 2 diabetes and established or high risk of atherosclerotic cardiovascular disease, heart failure, and/or chronic kidney disease, the treatment plan should include agents that reduce cardiorenal risk, irrespective of glycemia. A

Section 14. Children and Adolescents

- Recommendation 14.4 was added to state the need for insulin dosing adjustments according to meal composition.
- 14.4 Meal composition impacts postprandial glucose excursions. Education on the impact of high-fat and high-protein meals and the adjustment of insulin dosing is necessary. A
- In the “Psychosocial Care” subsection, Recommendation 14.10 was revised to include screening details for psychosocial and behavioral health concerns and for appropriate referral when indicated, and Recommendation 14.12 was updated to clarify diabetes distress and lower engagement in diabetes self-management behavior.
- 14.10 At diagnosis and during routine follow-up care, screen youth with type 1 diabetes for psychosocial concerns (e.g., diabetes distress, depressive symptoms, and disordered eating), family factors, and behavioral health concerns that could impact diabetes management with age-appropriate standardized and validated tools. Refer to a qualified behavioral health professional, preferably experienced in childhood diabetes, when indicated. B

Section 14. Children and Adolescents

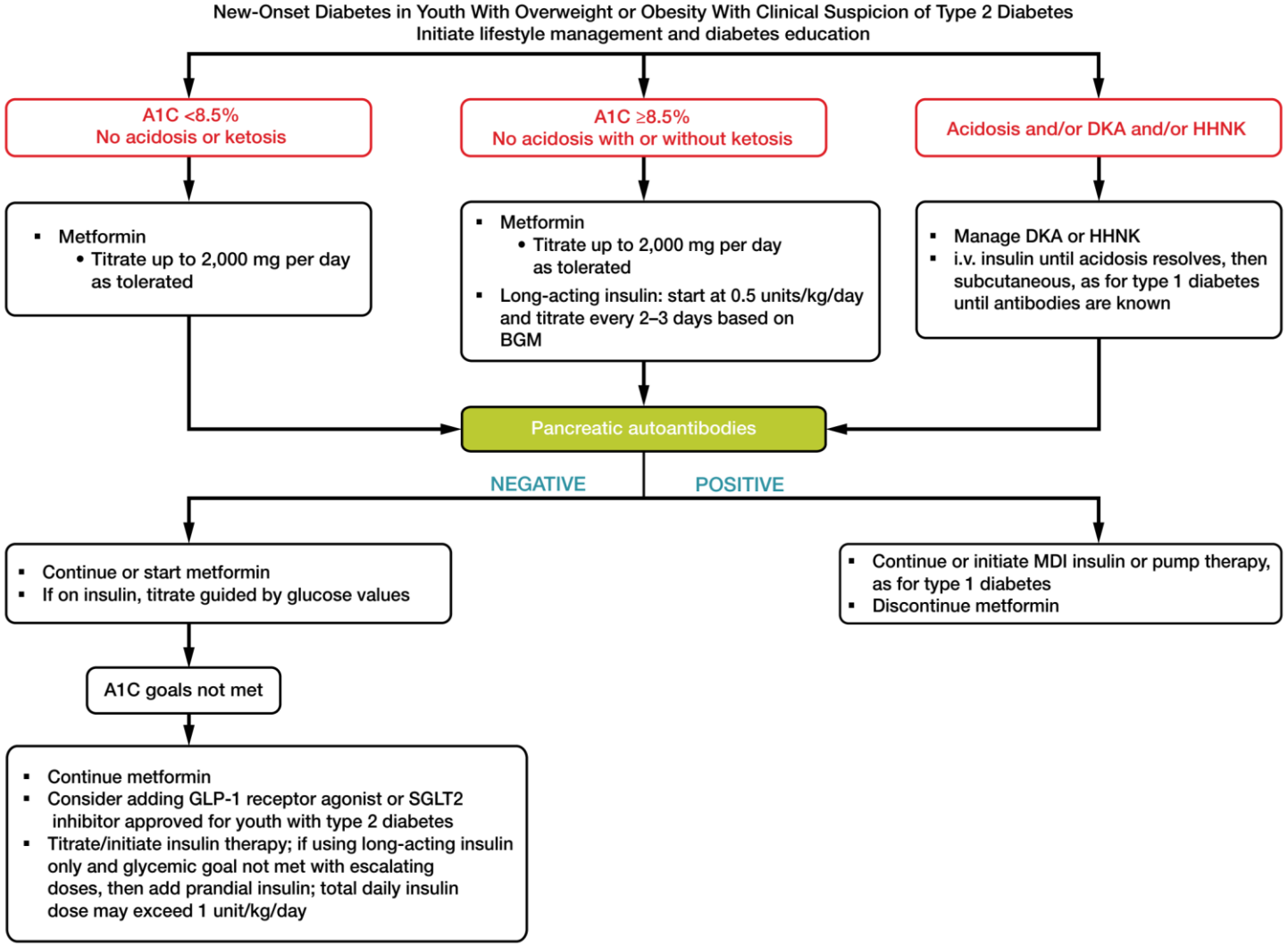
- In the “Psychosocial Care” subsection, Recommendation 14.10 was revised to include screening details for psychosocial and behavioral health concerns and for appropriate referral when indicated, and Recommendation 14.12 was updated to clarify diabetes distress and lower engagement in diabetes self-management behavior.
- 14.10 At diagnosis and during routine follow-up care, screen youth with type 1 diabetes for psychosocial concerns (e.g., diabetes distress, depressive symptoms, and disordered eating), family factors, and behavioral health concerns that could impact diabetes management with age-appropriate standardized and validated tools. Refer to a qualified behavioral health professional, preferably experienced in childhood diabetes, when indicated. B
- 14.12 Encourage developmentally appropriate family involvement in diabetes management tasks for children and adolescents, recognizing that premature or unsupportive transfer of diabetes care responsibility to the youth can contribute to diabetes distress, lower engagement in diabetes self-management behaviors, and deterioration in glycemia. A

Section 14. Children and Adolescents

- Recommendation 14.53 was modified to state “at least” a 7–10% decrease in excess weight for youth with overweight and obesity with type 2 diabetes when recommending developmentally and culturally appropriate comprehensive lifestyle programs.
- 14.53 Youth with overweight/obesity and type 2 diabetes and their families should be provided with developmentally and culturally appropriate comprehensive lifestyle programs that are integrated with diabetes management to achieve at least a 7–10% decrease in excess weight. C
- Recommendations 14.68 and 14.70 were updated to include consideration for empagliflozin prior to initiating and/or intensifying insulin therapy plans for glycemic management, and Fig. 14.1 was updated to include empagliflozin.
- 14.68 If glycemic goals are no longer met with metformin (with or without long-acting insulin), glucagon-like peptide 1 (GLP-1) receptor agonist therapy and/or empagliflozin should be considered in children 10 years of age or older. A
- 14.70 For youth not meeting glycemic goals, maximize noninsulin therapies (metformin, a GLP-1 receptor agonist, and empagliflozin) before initiating and/or intensifying insulin therapy plan. E

Section 14. Children and Adolescents

- Management of new-onset diabetes in youth with overweight or obesity with clinical suspicion of type 2 diabetes. A1C 8.5% = 69 mmol/mol. Adapted from the ADA position statement "Evaluation and Management of Youth-Onset Type 2 Diabetes".



Section 14. Children and Adolescents

- Recommendation 14.69 was added to suggest consideration for medication-taking behavior and the medications' effects on weight for youth with overweight or obesity and type 2 diabetes.

- The term "severe obesity" in Recommendation 14.72 was changed to "class 2 obesity or higher (BMI >35 kg/m2 or 120% of 95th percentile for age and sex, whichever is lower)" to provide greater details for adolescents being considered for metabolic surgery.
- 14.72 Metabolic surgery may be considered for the treatment of adolescents with type 2 diabetes who have class 2 obesity or higher (BMI >35 kg/m2 or 120% of 95th percentile for age and sex, whichever is lower) and who have elevated A1C and/or serious comorbidities despite lifestyle and pharmacologic intervention. A

- Recommendation 14.78 was updated to clarify protein intake according to age for those with nephropathy.
- 14.78 Protein intake should be at the recommended daily allowance of 0.85–1.2 g/kg/day (according to age). E

Section 14. Children and Adolescents

- The new subsection “Substance Use in Pediatric Diabetes” includes Recommendations 14.106 and 14.107 to discourage initiation of smoking (tobacco and electronic cigarettes) and to encourage smoking cessation. The text was expanded to discuss the adverse health effects of smoking and exposure to secondhand smoke for youth with diabetes.
- 14.106 Elicit a smoking history at initial and follow-up diabetes visits; discourage smoking in youth who do not smoke and encourage smoking cessation in those who do smoke. A
- 14.107 Electronic cigarette use should be discouraged. A

Section 14. Children and Adolescents

- In the “Transition from Pediatric to Adult Care” subsection, Recommendations 14.108 and 14.109 were revised to reflect the role of interprofessional teams in the transition from pediatric to adult care and to be more person centered. Recommendation 14.110 was added to give direction for the coordination between pediatric diabetes specialists and youth with diabetes and their caregivers on the timing of transfer to adult care.
- 14.108 Pediatric diabetes care teams should implement transition preparation programs for youth beginning in early adolescence and, at the latest, at least 1 year before the anticipated transfer from pediatric to adult health care. E
- 14.109 Interprofessional adult and pediatric health care teams should provide support and resources for adolescents, young adults, and their families prior to and during the transition process from pediatric to adult health care. E
- 14.110 Pediatric diabetes specialists should partner with youth with diabetes and their caregivers to decide on the timing of transfer to an adult diabetes specialist. E

Section 15. Management of Diabetes in Pregnancy

- “Reproductive potential” was changed to “childbearing potential” throughout the section to be more specific. “Women” was changed to “individuals” throughout the section, except for instances mentioning the title of a published study, to be more inclusive.

- In the “Preconception Care” subsection, Recommendation 15.4 was updated to highlight the approach of interprofessional care and the need for inclusion of an endocrinology health care professional, and Recommendation 15.5 was expanded to include physical activity for preconception care.
- 15.4 Individuals with preexisting diabetes who are planning a pregnancy should ideally begin receiving interprofessional care for preconception, which includes an endocrinology health care professional, maternal-fetal medicine specialist, registered dietitian nutritionist, and diabetes care and education specialist, when available. B
- 15.5 In addition to focused attention on achieving glycemic targets, A standard preconception care should be augmented with extra focus on nutrition, physical activity, diabetes self-care education, and screening for diabetes comorbidities and complications. B

Section 15. Management of Diabetes in Pregnancy

- In the “Glycemic Goals in Pregnancy” subsection, Recommendation 15.7 was modified to emphasize that all pregnant individuals with diabetes should monitor fasting, preprandial, and postprandial blood glucose levels, and Recommendation 15.10 was updated to include CGM use for pregnant individuals with type 1 diabetes.
- 15.7 Fasting, preprandial, and postprandial blood glucose monitoring are recommended in individuals with diabetes in pregnancy to achieve optimal glucose levels. Glucose goals are fasting plasma glucose <95 mg/dL (<5.3 mmol/L) and either 1-h postprandial glucose <140 mg/dL (<7.8 mmol/L) or 2-h postprandial glucose <120 mg/dL (<6.7 mmol/L). B
- 15.10 CGM is recommended in pregnancies associated with type 1 diabetes. A When used in addition to blood glucose monitoring, achieving traditional pre- and postprandial goals, real-time CGM can reduce the risk for large-for-gestational age infants and neonatal hypoglycemia in pregnancy complicated by type 1 diabetes. A

Section 15. Management of Diabetes in Pregnancy

- The text in “Insulin Physiology” was expanded to include information about changes to basal and bolus insulin requirements as pregnancy progresses for individuals with preexisting diabetes.
- The text in “Glucose Monitoring” was updated to differentiate lower limits of glucose thresholds based on blood and sensor glucose monitoring.
- Current recommendations for hypoglycemia thresholds include blood glucose <70 mg/dL (<3.9 mmol/L) and sensor glucose <63 mg/dL (<3.5 mmol/L)
- Language was added to “Continuous Glucose Monitoring in Pregnancy” to encourage individualization for CGM use in pregnant individuals with type 2 diabetes or gestational diabetes mellitus (GDM). Language was also added to clarify the international consensus on time in range for pregnant individuals with type 2 diabetes or GDM.
  - Target sensor glucose range 63–140 mg/dL (3.5–7.8 mmol/L): TIR, goal >70%
  - Time below range (<63 mg/dL [<3.5 mmol/L]): level 1 TBR, goal <4%
  - Time below range (<54 mg/dL [<3.0 mmol/L]): level 2 TBR, goal <1%
  - Time above range (>140 mg/dL [>7.8 mmol/L]): TAR, goal <25%

Section 15. Management of Diabetes in Pregnancy

- Recommendation 15.15 was updated to clarify that metformin and glyburide, individually or in combination, should not be used as first-line agents for treating hyperglycemia in pregnancy.

- 15.15 Insulin is the preferred medication for treating hyperglycemia in GDM. Metformin and glyburide, individually or in combination, 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. E

Section 15. Management of Diabetes in Pregnancy

- Language was added to the “Preeclampsia and Aspirin” subsection to note that individuals with GDM may also be candidates for aspirin therapy if they have a single high risk factor or multiple moderate risk factors.

- Recommendation 15.27 was updated to encourage breastfeeding efforts for all individuals with diabetes who are postpartum.
- 15.27 Breastfeeding efforts are recommended for all individuals with diabetes. A Breastfeeding is recommended for individuals with a history of GDM for multiple benefits, A including a reduced risk for type 2 diabetes later in life. B

- The “Postpartum Care” subsection was updated to explain that a preconception evaluation is needed for individuals with childbearing potential who have prediabetes or a history of GDM.

Section 16. Diabetes Care in the Hospital

- Recommendation 16.2 was expanded to emphasize the need for personalized approaches in the emergency department, intensive care unit and nonintensive care unit wards, gynecology-obstetrics/delivery units, dialysis suites, and psychiatric wards. The text has been expanded to encourage institutions to perform regular audits to monitor proper use of protocols and to ensure institute educational/training programs keep staff up to date.

- 16.2 Institutions should implement protocols using validated written or computerized provider order entry sets for management of dysglycemia in the hospital (including emergency department, intensive care unit [ICU] and non-ICU wards, gynecology-obstetrics/delivery units, dialysis suites, and behavioral health units) that allow for a personalized approach, including glucose monitoring, insulin and/or noninsulin therapy, hypoglycemia management, diabetes self-management education, nutrition recommendations, and transitions of care. B

Section 16. Diabetes Care in the Hospital

- Recommendation 16.4 was updated to reflect that insulin and other therapies should be initiated or intensified for treatment of persistent hyperglycemia starting at a threshold of 180 mg/dL (10.0 mmol/L).

- 16.4 Insulin A and/or other therapies B should be initiated or intensified for treatment of persistent hyperglycemia starting at a threshold of ≥180 mg/dL (≥10.0 mmol/L) (confirmed on two occasions within 24 h) for noncritically ill (non-ICU) individuals. A

- Recommendation 16.5a was added to delineate the glycemic goals for most critically ill individuals with hyperglycemia (target glucose range of 140–180 mg/dL [7.8–10.0 mmol/L]), and Recommendation 16.5b was updated to suggest more stringent goals (110–140 mg/dL [6.1–7.8 mmol/L]) for selected critically ill individuals if these goals can be achieved without significant hypoglycemia.

Section 16. Diabetes Care in the Hospital

- Recommendations 16.6 and 16.7 were added to indicate continued use of personal CGM devices and use of AID systems in conjunction with CGM, respectively, in the inpatient setting if clinically appropriate, with confirmatory point-of-care glucose measurements for insulin dosing decisions and hypoglycemia assessment, if resources and training are available, and according to an institutional protocol. The narrative has also been expanded to recommend a personalized approach for achieving glycemic goals throughout the hospital stay.
- 16.6 In people with diabetes using a personal continuous glucose monitoring (CGM) device, the use of CGM should be continued during hospitalization if clinically appropriate, with confirmatory point-of-care (POC) glucose measurements for insulin dosing decisions and hypoglycemia assessment, if resources and training are available, and according to an institutional protocol. B
- 16.7 For people with diabetes using an automated insulin delivery (AID) system along with CGM, the use of AID and CGM should be continued during hospitalization if clinically appropriate, with confirmatory POC blood glucose measurements for insulin dosing decisions and hypoglycemia assessment, if resources and training are available, and according to an institutional protocol. C

Section 16. Diabetes Care in the Hospital

- In the “Perioperative Care” subsection, a statement was added about the safe use of GLP-1 receptor agonists in the perioperative period.
- There are little data on the safe use and/or influence of GLP-1 receptor agonists on glycemia and delayed gastric emptying in the perioperative period.
- The “Glucose-Lowering Treatment in Hospitalized Patients” subsection discusses the evidence on the coadministration of a low dose of basal insulin analog while on intravenous insulin infusion.

Section 16. Diabetes Care in the Hospital

- For the management of diabetic ketoacidosis and hyperglycemic hyperosmolar state, the text has been expanded to include a nurse-driven protocol with a variable rate based on glucose values as an option.

- Recommendation 16.11 was added to indicate the use of SGLT2 inhibitors for individuals with type 2 diabetes hospitalized with heart failure during hospitalization and that SGLT2 inhibitors should be continued after recovery from acute illness if no contraindications are present.

- 16.11 For people with type 2 diabetes hospitalized with heart failure, it is recommended that use of a sodium–glucose cotransporter 2 inhibitor be initiated or continued during hospitalization and upon discharge, if there are no contraindications and after recovery from the acute illness. A

Section 17. Diabetes Advocacy

- The Care of Young Children With Diabetes in the Childcare and Community Setting advocacy statement has been updated.

  - *A complete list of members of the American Diabetes Association Professional Practice Committee can be found at https://doi.org/10.2337/dc24-SINT.
  - Duality of interest information for each author is available at https://doi.org/10.2337/dc24-SDIS.

Thank you and hope for a good rain