An Update on the Standards of Medical Care in Diabetes – 2017, With an Eye Toward 2018

Erika Gebel Berg, PhD
Director, Scientific and Medical Affairs
Corresponding Author, ADA’s Standards of Medical in Diabetes
American Diabetes Association
Standards of Care

• Funded out of the Association’s general revenues and does not use industry support.
• Published annually since 1989
• Reviewed and approved by the Association’s Board of Directors.
Process

• ADA’s Professional Practice Committee (PPC) conducts annual review & revision of the SOC.

• Searched Medline for human studies related to each subsection and published since January 1, 2016.

• Recommendations revised per new evidence, for clarity, or to better match text to strength of evidence.
Process

• PPC compiles new evidence into a table including new and proposed recommendations alongside supporting research/rationale
• The PPC has an in-person meeting to debate the final language of the recommendations
• Some sections receive external review
2018 Watch: General Changes

- Standards will be ADA’s sole source of Clinical Practice Recommendations
- The PPC will continue to update the Standards annually, but has the option to update more frequently online should the PPC determine that new evidence or regulatory changes merit immediate incorporation into the Standards
- ADA will begin taking proposals from the community for statements, consensus reports, scientific reviews, and clinical/research conferences

Coming in February: Interactive Standards of Care App with interactive tools

Professional.diabetes.org/SOC
Professional Practice Committee

William H. Herman, MD, MPH (Co-Chair)
Rita R. Kalyani, MD, MHS, FACP (Co-Chair)*
Andrea L. Cherrington, MD, MPH
Donald R. Coustan, MD
Ian de Boer, MD, MS
Robert James Dudl, MD
Hope Feldman, CRNP, FNP-BC
Hermes J. Florez, MD, PhD, MPH*
Suneil Koliwad, MD, PhD*
Melinda Maryniuk, MEd, RD, CDE
Joshua J. Neumiller, PharmD, CDE, FASCP*
Joseph Wolfsdorf, MB, BCh

Christopher Cannon, MD
Judith Fradkin, MD
David Maahs, MD, PhD
Medha N. Munshi, MD*
Guillermo E. Umpierrez*

ADA Staff
Erika Gebel Berg, PhD
(Corresponding author: eberg@diabetes.org)
Sheri Colberg-Ochs, PhD
Alicia H. McAuliffe-Fogarty, PhD, CPsychol
Sacha Uelmen, RDN, CDE
Robert E. Ratner, MD, FACP, FACE
Tamara Darsow, PhD
Matt Petersen
William Cefalu, MD

American Diabetes Association.
<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Description</th>
</tr>
</thead>
</table>
| **A**             | Clear evidence from well-conducted, generalizable randomized controlled trials that are adequately powered, including  
|                   |   - Evidence from a well-conducted multicenter trial  
|                   |   - Evidence from a meta-analysis that incorporated quality ratings in the analysis  
|                   | Compelling nonexperimental evidence, i.e., “all or none” rule developed by the Centre for Evidence-Based Medicine at the University of Oxford  
|                   | Supportive evidence from well-conducted randomized controlled trials that are adequately powered, including  
|                   |   - Evidence from a well-conducted trial at one or more institutions  
|                   |   - Evidence from a meta-analysis that incorporated quality ratings in the analysis  

| **B**             | Supportive evidence from well-conducted cohort studies  
|                   |   - Evidence from a well-conducted prospective cohort study or registry  
|                   |   - Evidence from a well-conducted meta-analysis of cohort studies  
|                   | Supportive evidence from a well-conducted case-control study  

| **C**             | Supportive evidence from poorly controlled or uncontrolled studies  
|                   |   - Evidence from randomized clinical trials with one or more major or three or more minor methodological flaws that could invalidate the results  
|                   |   - Evidence from observational studies with high potential for bias (such as case series with comparison with historical controls)  
|                   |   - Evidence from case series or case reports  
|                   | Conflicting evidence with the weight of evidence supporting the recommendation  

| **E**             | Expert consensus or clinical experience  

Updates in the SOC

• The following presentation will focus on specific changes in each section of the Standards of Care 2017 compared to previous years
• A discussion of what’s been debated for 2018
• The full version of the Standards of Care 2018 can be downloaded on December 8: Professional.diabetes.org/SOC
1. Improving Care and Promoting Health in Populations
Care Delivery Systems

- 33-49% of patients still do not meet targets for A1C, blood pressure, or lipids.
- 14% meet targets for all A1C, BP, lipids, and nonsmoking status.
- Progress in CVD risk factor control is slowing.
- Substantial system-level improvements are needed.
- Delivery system is fragmented, lacks clinical information capabilities, duplicates services & is poorly designed.

American Diabetes Association Standards of Medical Care in Diabetes. Promoting Health and Reducing Disparities in Populations. *Diabetes Care* 2017; 40 (Suppl. 1): S6-S10
Strategies for System-Level Improvement

- Provide care that is concordant with evidence-based guidelines
- Expand role of teams
- Track medication-taking behavior at a systems level
- Removing financial barriers
- **New emphasis for 2018**: Using data/EHR tools to improve processes, health outcomes, and reduce costs
Tailoring Treatment for Social Context

Key Recommendation

• Providers should assess social context, including potential food insecurity, housing stability, and financial barriers, and apply that information to treatment decisions. A

American Diabetes Association Standards of Medical Care in Diabetes. Promoting Health and Reducing Disparities in Populations. Diabetes Care 2017; 40 (Suppl. 1): S6-S10
Tailoring Treatment for Social Context

Key Recommendations

• Patients should be referred to local community resources when available. B

• Patients should be provided with self-management support from lay health coaches, navigators, or community health workers when available. A
Tailoring Treatment For Social Context

• Social Determinants of Health
  – Food Insecurity
  – Language Barriers
  – Homelessness

American Diabetes Association Standards of Medical Care in Diabetes. Promoting Health and Reducing Disparities in Populations. *Diabetes Care* 2017; 40 (Suppl. 1): S6-S10
2. Classification and Diagnosis of Diabetes
• Nearly 1 in 4 four adults living with diabetes – 7.2 million Americans – didn’t know they had the condition.

• Only 11.6 percent of adults with prediabetes knew they had it
• Screening with an informal assessment of risk factors or validated tools should be considered in asymptomatic adults. B

• Consider testing in asymptomatic adults of any age with BMI ≥25 kg/m² or ≥23 kg/m² in Asian Americans who have 1 or more add’l dm risk factors. B

• For all patients, testing should begin at age 45 years. B

• If tests are normal, repeat testing carried out at a minimum of 3-year intervals is reasonable. C

American Diabetes Association Standards of Medical Care in Diabetes.
Risk factors for Prediabetes and T2D

- A1C ≥5.7% (39 mmol/mol), IGT, or IFG on previous testing
- first-degree relative with diabetes
- high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
- women who were diagnosed with GDM
- history of CVD
- hypertension (≥140/90 mmHg or on therapy for hypertension)
- HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
- women with polycystic ovary syndrome
- physical inactivity
- other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans).
Recommendations: Screening for prediabetes/diabetes

- FPG, 2-h PG after 75-g OGTT, and the A1C are equally appropriate. B

- 2018 Watch: Expanded discussion on appropriate use of A1C

- In patients with diabetes, identify and, if appropriate, treat other CVD risk factors. B
Criteria for Testing for T2DM in Children & Adolescents

• Overweight or Obesity
• Risk Factors
  – Family history of type 2 diabetes in 1st or 2nd degree relative
  – Race/ethnicity
  – Signs of insulin resistance or conditions associated with insulin resistance
  – Maternal history of diabetes or GDM
• Changing for 2018 based on new position statement

3. Comprehensive Medical Evaluation and Assessment of Comorbidities
Patient-Centered Collaborative Care

- Defines a patient-centered communication style
- Expert Task Force convened by ADA and AADE published a paper on the use of language in diabetes care and education

Comprehensive Medical Evaluation

A complete medical evaluation should be performed at the initial visit to:

• Confirm & classify diagnosis B
• Detect complications & potential comorbid conditions E
• Review prior treatment & risk factor control E
• Begin formulation of care management plan B
• Develop a continuing care plan B

## Comprehensive Medical Evaluation

### Improved Evaluation Checklist Table for 2018

![Checklist Table](image)

---

**American Diabetes Association Standards of Medical Care in Diabetes. Comprehensive Medical Evaluation and Assessment of Comorbidities. Diabetes Care 2017; 40 (Suppl. 1): S25-S32**
Common Comorbidities

- Autoimmune Diseases (T1D)
- Cancer
- Cognitive Impairment Dementia
- Fatty Liver Disease
- Fractures
- Hearing Impairment
- HIV
- Low Testosterone (Men)
- Obstructive Sleep Apnea
- Periodontal Disease
- Psychosocial Disorders

Anxiety Disorders

- Consider screening for anxiety in people exhibiting anxiety or worries regarding diabetes complications, insulin injections or infusion, taking medications, and/or hypoglycemia that interfere with self-management behaviors. Refer for treatment if anxiety is present. B

- Persons with hypoglycemic unawareness, which can co-occur with fear of hypoglycemia, should be treated using blood glucose awareness training (or other evidence-based similar intervention) to help re-establish awareness of hypoglycemia and reduce fear of hypoglycemia. A

Depression

• Consider annual screening with age-appropriate depression screening measures. B

• Beginning at dx of complications or when there are significant changes in medical status, consider assessment for depression. B

• Referrals for treatment of depression should be made to mental health providers with experience using evidence-based treatment approaches. A

Disordered Eating Behavior

- Consider reevaluating the treatment regimen in people with diabetes who present with symptoms of disordered eating. B
- Consider screening for disordered eating using validated screening measures when hyperglycemia and weight loss are unexplained based on self-reported behaviors. B

Serious Mental Illness

• Annually screen people who are prescribed atypical antipsychotic medications for prediabetes or diabetes. B

• If a second-generation antipsychotic medication is prescribed, changes in weight, glycemic control, and cholesterol levels should be carefully monitored. C

• Incorporate monitoring of diabetes self-care activities into treatment goals in people with diabetes and serious mental illness. B

4. Lifestyle Management
Recommendations: Physical Activity

- Children with diabetes/prediabetes: at least 60 min/day physical activity B
- Most adults with type 1 C and type 2 B diabetes: 150+ min/wk of moderate-to-vigorous activity over at least 3 days/week with no more than 2 consecutive days without exercise. Shorter durations (minimum 75 min/week) of vigorous-intensity or interval training may be sufficient for younger and more physically fit individuals.
- Adults with type 1 C and type 2 B diabetes should perform resistance training in 2-3 sessions/week on nonconsecutive days

American Diabetes Association Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-43
Recommendations: Physical Activity

- All adults, and particularly those with type 2 diabetes, should decrease the amount of time spent in daily sedentary behavior. **B** Prolonged sitting should be interrupted every 30 min for blood glucose benefits, particularly in adults with type 2 diabetes. **C**

- Flexibility training and balance training are recommended 2–3 times/week for older adults with diabetes. Yoga and tai chi may be included based on individual preferences to increase flexibility, muscular strength, and balance. **C**

American Diabetes Association Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-43
Recommendations: Psychosocial Care

- Psychosocial care should be provided to all people with diabetes, with the goals of optimizing health outcomes and QOL.

- Psychosocial screening and follow-up include:
  - Attitudes
  - Expectations for medical mgmt. & outcomes
  - Affect/mood
  - Quality-of-life (QOL)
  - Resources- financial, social & emotional
  - Psychiatric history

American Diabetes Association Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-43
Recommendations: Psychosocial Care

• Providers should consider assessment for symptoms of diabetes distress, depression, anxiety, disordered eating, and cognitive capacities using patient-appropriate standardized and validated tools at the initial visit, at periodic intervals, and when there is a change in disease, treatment, or life circumstance. B

• Consider screening older adults (aged ≥65 years) with diabetes for cognitive impairment and depression. B

American Diabetes Association Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-43
Diabetes Distress

• Diabetes distress
  – Very common and distinct from other psychological disorders
  – Negative psychological reactions related to emotional burdens of managing a demanding chronic disease

• Recommendation: Routinely monitor people with diabetes for diabetes distress, particularly when treatment targets are not met and/or at the onset of diabetes complications. B

American Diabetes Association Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-43
Referral for Psychosocial Care

Table 4.2—Situations that warrant referral of a person with diabetes to a mental health provider for evaluation and treatment

- If self-care remains impaired in a person with diabetes distress after tailored diabetes education
- If a person has a positive screen on a validated screening tool for depressive symptoms
- In the presence of symptoms or suspicions of disordered eating behavior, an eating disorder, or disrupted patterns of eating
- If intentional omission of insulin or oral medication to cause weight loss is identified
- If a person has a positive screen for anxiety or fear of hypoglycemia
- If a serious mental illness is suspected
- In youth and families with behavioral self-care difficulties, repeated hospitalizations for diabetic ketoacidosis, or significant distress
- If a person screens positive for cognitive impairment
- Declining or impaired ability to perform diabetes self-care behaviors
- Before undergoing bariatric or metabolic surgery and after surgery if assessment reveals an ongoing need for adjustment support

American Diabetes Association Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-43
2018 Watch

• Emphasis on technology-based platforms for the delivery of diabetes self-management education

• Text updates to clarify that there IS NO ADA DIET. The Standards say that there is no ideal macronutrient distribution and that eating plans should be individualized.
5. Prevention or Delay of Type 2 Diabetes
Recommendations: Prevention or Delay of T2DM

- Patients with prediabetes should be referred to an intensive diet and physical activity behavioral counseling program adhering to the tenets of the DPP targeting a loss of 7% of body weight, and should increase their moderate physical activity to at least 150 min/week. 

American Diabetes Association Standards of Medical Care in Diabetes. Prevention or delay of type 2 diabetes. Diabetes Care 2017; 40 (Suppl. 1): S44-S47
Recommendations: Prevention or Delay of T2DM

• Based on cost-effectiveness of diabetes prevention, such programs should be covered by third-party payers. B

• Metformin therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those with BMI $\geq 35$ kg/m$^2$, aged $< 60$ years, women with prior gestational diabetes (GDM), those with rising A1C despite lifestyle intervention. A

American Diabetes Association Standards of Medical Care in Diabetes. Prevention or delay of type 2 diabetes. Diabetes Care 2017; 40 (Suppl. 1): S44-S47
New 2017 Recommendation: Prevention or Delay of T2DM

• Long-term use of metformin may be associated with biochemical vitamin B12 deficiency, and periodic measurement of vitamin B12 levels should be considered in metformin-treated patients, especially in those with anemia or peripheral neuropathy. B
Recommendations: Prevention or Delay of T2DM

• Monitor at least annually for the development of diabetes in those with prediabetes. E

• Screening for and treatment of modifiable risk factors for CVD is suggested. B

American Diabetes Association Standards of Medical Care in Diabetes. Prevention or delay of type 2 diabetes. Diabetes Care 2017; 40 (Suppl. 1): S44-S47
Recommendations: Prevention or Delay of T2DM

• DSME and DSMS programs are appropriate for people with prediabetes to receive education and support to develop and maintain behaviors that can prevent or delay the onset of diabetes. B

• Technology assisted tools can be useful elements of effective lifestyle modification to prevent diabetes. B

American Diabetes Association Standards of Medical Care in Diabetes. Prevention or delay of type 2 diabetes. Diabetes Care 2017; 40 (Suppl. 1): S44-S47
6. Glycemic Targets
# Approach to the Management of Hyperglycemia

<table>
<thead>
<tr>
<th>Patient / Disease Features</th>
<th>More stringent</th>
<th>A1C 7%</th>
<th>Less stringent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risks potentially associated with hypoglycemia and other drug adverse effects</td>
<td>low</td>
<td></td>
<td>high</td>
</tr>
<tr>
<td>Disease duration</td>
<td>newly diagnosed</td>
<td></td>
<td>long-standing</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>long</td>
<td></td>
<td>short</td>
</tr>
<tr>
<td>Relevant comorbidities</td>
<td>absent</td>
<td></td>
<td>few / mild</td>
</tr>
<tr>
<td>Established vascular complications</td>
<td>absent</td>
<td></td>
<td>severe</td>
</tr>
<tr>
<td>Patient attitude and expected treatment efforts</td>
<td>highly motivated, adherent, excellent self-care capabilities</td>
<td></td>
<td>less motivated, nonadherent, poor self-care capabilities</td>
</tr>
<tr>
<td>Resources and support system</td>
<td>readily available</td>
<td></td>
<td>limited</td>
</tr>
</tbody>
</table>
CGM in the New

- Lots of new CGM data and regulatory changes
- New “flash” CGM approved for adults—due to significant differences between “flash” CGM and other CGM devices, more discussion is needed on outcomes and regarding specific recommendations.
- SMBG requirements changed
## Classification of Hypoglycemia

<table>
<thead>
<tr>
<th>Level</th>
<th>Glycemic criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glucose alert value (level 1)</strong></td>
<td>≤70 mg/dL (3.9 mmol/L)</td>
<td>Sufficiently low for treatment with fast-acting carbohydrate and dose adjustment of glucose-lowering therapy</td>
</tr>
<tr>
<td><strong>Clinically significant hypoglycemia (level 2)</strong></td>
<td>&lt;54 mg/dL (3.0 mmol/L)</td>
<td>Sufficiently low to indicate serious, clinically important hypoglycemia</td>
</tr>
<tr>
<td><strong>Severe hypoglycemia (level 3)</strong></td>
<td>No specific glucose threshold</td>
<td>Hypoglycemia associated with severe cognitive impairment requiring external assistance for recovery</td>
</tr>
</tbody>
</table>

American Diabetes Association Standards of Medical Care in Diabetes. Glycemic targets. Diabetes Care 2017; 40 (Suppl. 1): S48-S56
Recommendations: Hypoglycemia

- Individuals at risk for hypoglycemia should be asked about symptomatic and asymptomatic hypoglycemia at each encounter. C

- Glucose (15–20 g) preferred treatment for conscious individual with blood glucose ≤ 70 mg/dL. E

- Glucagon should be prescribed for those at increased risk of clinically significant hypoglycemia, defined as blood glucose < 54 mg/dL, so it is available if needed. E

- Hypoglycemia unawareness or episodes of severe hypoglycemia should trigger treatment re-evaluation. E

American Diabetes Association Standards of Medical Care in Diabetes. Glycemic targets. Diabetes Care 2017; 40 (Suppl. 1): S48-S56
7. Obesity Management for the Treatment of Type 2 Diabetes
Recommendations: Assessment

- At each patient encounter, BMI should be calculated and documented in the medical record. B
  - Discuss with the patient
  - Asian American cutpoints:

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;23 BMI kg/m(^2)</td>
</tr>
<tr>
<td>Overweight</td>
<td>23.0 - 27.4 kg/m(^2)</td>
</tr>
<tr>
<td>Obese</td>
<td>27.5 - 37.4 kg/m(^2)</td>
</tr>
<tr>
<td>Extremely obese</td>
<td>≥37.5 kg/m(^2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Body Mass Index Category (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23.0* or 25.0-26.9</td>
</tr>
<tr>
<td>Diet, physical activity &amp; behavioral therapy</td>
<td>+</td>
</tr>
<tr>
<td>Pharmacotherapy</td>
<td>+</td>
</tr>
<tr>
<td>Metabolic surgery</td>
<td>+</td>
</tr>
</tbody>
</table>

* Asian-American individuals

† Treatment may be indicated for selected, motivated patients.

Metabolic Surgery

- Evidence supports gastrointestinal operations as effective treatments for overweight T2DM patients.

- Randomized controlled trials with postoperative follow-up ranging from 1 to 5 years have documented sustained diabetes remission in 30–63% of patients, though erosion of remission occurs in 35-50% or more.

- With or without diabetes relapse, the majority of patients who undergo surgery maintain substantial improvement of glycemic control for at least 5 to 15 years.
Recommendations: Metabolic Surgery

• Metabolic surgery *should be recommended as an option* to treat T2DM for all appropriate surgical candidates with BMIs ≥ 40 (37.5*) and those with BMIs 35.0-39.9 (32.5-37.4*) when hyperglycemia is inadequately controlled despite lifestyle & optimal medical therapy. A

• Metabolic surgery *should be considered* for the treatment of T2DM in adults with BMIs 30-34.9 (27.5-32.4*) when hyperglycemia is inadequately controlled despite optimal medical control by either oral or injectable medications (including insulin). B

• Metabolic surgery should be performed in high-volume centers with multidisciplinary teams that understand and are experienced in the management of diabetes and gastrointestinal surgery. C

Recommendations: Metabolic Surgery

- Long-term lifestyle support and routine monitoring of micronutrient/nutritional status must be provided after surgery. C
- People presenting for metabolic surgery should receive a comprehensive mental health assessment. B Surgery should be postponed in patients with histories of alcohol or substance abuse, significant depression, suicidal ideation, or other mental health conditions until these conditions have been fully addressed. E
- People who undergo metabolic surgery should be evaluated to assess the need for ongoing mental health services to help them adjust to medical and psychosocial changes after surgery. C

Adverse Effects

• Costly
• Some associated risks
• Outcomes vary
• Patients undergoing metabolic surgery may be at higher risk for depression, substance abuse, and other psychosocial issues

8. Pharmacologic Approaches to Glycemic Treatment
Recommendations: Pharmacologic Therapy For Type 1 Diabetes

- Most people with T1DM should be treated with multiple daily injections of prandial insulin and basal insulin or continuous subcutaneous insulin infusion (CSII). A

- Individuals who have been successfully using CSII should have continued access after they turn 65 years old. E

American Diabetes Association Standards of Medical Care in Diabetes. Approaches to glycemic treatment. Diabetes Care 2017; 40 (Suppl. 1): S64-S74
## 2018 Watch: Diabetes Medications and CVOT

<table>
<thead>
<tr>
<th>Intervention</th>
<th>DPP-4 Inhibitors</th>
<th>GLP-1 Receptor Agonists</th>
<th>SGLT2 Inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAVOR-TIMI 53 (129)</td>
<td>EXAMINE (144) (n = 5,380)</td>
<td>TECOS (132) (n = 14,671)</td>
<td>LEIXA (139) (n = 6,068)</td>
</tr>
<tr>
<td>EXAMINE (144)</td>
<td>TECOS (132)</td>
<td>LEIXA (139)</td>
<td>SUSTAIN-6 (138)* (n = 3,297)</td>
</tr>
<tr>
<td>TECOS (132)</td>
<td>LEIXA (139)</td>
<td>SUSTAIN-6 (138)*</td>
<td>EXCEL (140) (n = 14,752)</td>
</tr>
<tr>
<td>LEADER (137)</td>
<td>SUSTAIN-6 (138)*</td>
<td>EXCEL (140)</td>
<td>EMPA-REG OUTCOME (133) (n = 7,020)</td>
</tr>
<tr>
<td>SUSTAIN-6 (138)*</td>
<td>EXCEL (140)</td>
<td>EMPA-REG OUTCOME (133)</td>
<td>CANVAS (135) (n = 4,330)</td>
</tr>
<tr>
<td>EXSCEL (140)</td>
<td>EMPA-REG OUTCOME (133)</td>
<td>CANVAS (135)</td>
<td>CANVAS-R (135) (n=5812)</td>
</tr>
<tr>
<td>Intervention</td>
<td>Canagliflozin vs. placebo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saxagliptin/Placebo</td>
<td>Alogliptin/placebo</td>
<td>Sitagliptin/placebo</td>
<td>Lixisenatide/placebo</td>
</tr>
<tr>
<td>Liraglutide/placebo</td>
<td>Semaglutide/placebo</td>
<td>Exenatide QW/placebo</td>
<td>Empagliflozin/placebo</td>
</tr>
<tr>
<td>Liraglutide/ placebo</td>
<td>Exenatide QQW/placebo</td>
<td>Empagliflozin/placebo</td>
<td></td>
</tr>
<tr>
<td>Liraglutide/ placebo</td>
<td>Exenatide QQW/placebo</td>
<td>Empagliflozin/placebo</td>
<td></td>
</tr>
<tr>
<td>Type 2 diabetes and history of ACS (&lt;180 days)</td>
<td>T2D/ CVD, renal disease, or HF, at ≥50 years of age or CV risk at ≥60 years of age</td>
<td>T2D/with or without known CVD or additional risk factors for CVD</td>
<td></td>
</tr>
<tr>
<td>T2D/ACS within 15–90 days before randomization</td>
<td>T2D/ ACS within 15–90 days before randomization</td>
<td>T2D/ preexisting CVD</td>
<td></td>
</tr>
<tr>
<td>T2D/ preexisting CVD</td>
<td>T2D/ preexisting CVD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior CVD/CHF (%)</td>
<td>78/13</td>
<td>100/28</td>
<td>74/18</td>
</tr>
<tr>
<td>100/22</td>
<td>81/18</td>
<td>59/24</td>
<td>73.1/16.2</td>
</tr>
<tr>
<td>99/10</td>
<td>65.6/14.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary outcome§</td>
<td>3-point MACE HR 1.00 (0.89–1.12)</td>
<td>3-point MACE HR 0.96 (&lt;1.16)</td>
<td>4-point MACE HR 0.98 (0.89–1.08)</td>
</tr>
<tr>
<td>4-point MACE HR 1.02 (0.89–1.17)</td>
<td>3-point MACE HR 0.74 (0.58–0.97)</td>
<td>3-point MACE HR 0.91 (0.83–1.00)</td>
<td></td>
</tr>
<tr>
<td>(ITT) HR 0.95 (0.85–1.07)</td>
<td>3-point MACE HR 0.86 (0.74–0.99)</td>
<td>3-point MACE HR 0.86 (0.75–0.97)§</td>
<td></td>
</tr>
<tr>
<td>Progression to albuminuria** HR 0.73 (0.47–0.77)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New Recommendation: Pharmacologic Therapy For T2DM

• In patients with long-standing suboptimally controlled type 2 diabetes and established atherosclerotic cardiovascular disease, empagliflozin or liraglutide should be considered as they have been shown to reduce cardiovascular and all-cause mortality when added to standard care. Ongoing studies are investigating the cardiovascular benefits of other agents in these drug classes. B
2018 Watch

- New type 2 diabetes treatment algorithm
- New table including drug effects and patient factors to help guide treatment choices as part of patient-provider shared decision making.
Start with Monotherapy unless:

- If A1C is greater than or equal to 9%, consider Dual Therapy.
- If A1C is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, consider Combination Injectable Therapy (See Figure 8.2).

### Monotherapy

<table>
<thead>
<tr>
<th><strong>EFFICACY</strong></th>
<th><strong>Metformin</strong></th>
<th><strong>Lifestyle Management</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HYPO RISK</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>WEIGHT</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>SIDE EFFECTS</td>
<td>GI/lactic acid</td>
<td></td>
</tr>
<tr>
<td>COSTS*</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

If A1C target not achieved after approximately 3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

### Dual Therapy

<table>
<thead>
<tr>
<th><strong>EFFICACY</strong></th>
<th><strong>Metformin +</strong></th>
<th><strong>Lifestyle Management</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SULfonylurea</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Thiazolidinediones</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>DPP-4 Inhibitor</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>SGLT2 Inhibitor</td>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>GLP-1 receptor agonist</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Insulin (basal)</td>
<td>Highest</td>
<td></td>
</tr>
</tbody>
</table>

If A1C target not achieved after approximately 3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

### Triple Therapy

<table>
<thead>
<tr>
<th><strong>EFFICACY</strong></th>
<th><strong>Metformin +</strong></th>
<th><strong>Lifestyle Management</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SULfonylurea</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Thiazolidinediones</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>DPP-4 Inhibitor</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>SGLT2 Inhibitor</td>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>GLP-1 receptor agonist</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>P1 receptor agonist</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Insulin (basal)</td>
<td>Highest</td>
<td></td>
</tr>
</tbody>
</table>

If A1C target is not achieved after approximately 3 months of triple therapy and patient (1) on oral combination, move to basal insulin or GLP-1 RA, (2) on GLP-1 RA, add basal insulin, or (3) on optimally titrated basal insulin, add GLP-1 RA or continue insulin. Metformin therapy should be continued, while other oral agents may be discontinued on an individual basis to avoid unnecessarily complex or costly regimens (i.e., adding a fourth antihyperglycemic agent).
Recommendations: Pharmacological Therapy For T2DM

- If noninsulin monotherapy at maximal tolerated dose does not achieve or maintain the A1C target over 3 months, add a second oral agent, a GLP-1 receptor agonist, or basal insulin. A

- Use a patient-centered approach to guide choice of pharmacologic agents. E

- Don’t delay insulin initiation in patients not achieving glycemic goals. B

American Diabetes Association Standards of Medical Care in Diabetes. Approaches to glycemic treatment. Diabetes Care 2017; 40 (Suppl. 1): S64-S74
Recommendations: Pharmacologic Therapy For T2DM

- Metformin, if not contraindicated and if tolerated, is the preferred initial pharmacologic agent for T2DM. A

- Consider insulin therapy (with or without additional agents) in patients with newly dx’d T2DM who are markedly symptomatic and/or have elevated blood glucose levels (≥300 mg/dL) or A1C (≥10%). E
Combination Injectable Therapy in T2DM

American Diabetes Association Standards of Medical Care in Diabetes.
Approaches to glycemic treatment. Diabetes Care 2017; 40 (Suppl. 1): S64-S74
Initiate Basal Insulin
Usually with metformin +/- other noninsulin agent

Start: 10 U/day or 0.1-0.2 U/kg/day
Adjust: 10-15% or 2-4 units once or twice weekly to reach FBG target
For hypo: Determine & address cause; if no clear reason for hypo, ↓ dose by 4 units or 10-20%

If A1C not controlled, consider combination injectable therapy

Add 1 rapid-acting insulin injection before largest meal
Start: 4 units, 0.1 U/kg, or 10% basal dose. If A1C <8%, consider ↑ basal by same amount
Adjust: ↑ dose by 1-2 units or 10-15% once or twice weekly until SMBG target reached
For hypo: Determine and address cause; if no clear reason for hypo, ↑ corresponding dose by 2-4 units or 10-20%

If A1C not controlled, advance to basal-bolus

Add ≥2 rapid-acting insulin injections before meals (‘basal-bolus’)
Start: 4 units, 0.1 U/kg, or 10% basal dose/meal. If A1C <8%, consider ↑ basal by same amount
Adjust: ↑ dose(s) by 1-2 units or 10-15% once or twice weekly to achieve SMBG target
For hypo: Determine and address cause; if no clear reason for hypo, ↑ corresponding dose by 2-4 units or 10-20%

Add GLP-1 RA
If not tolerated or A1C target not reached, change to 2 injection insulin regimen
If goals not met, consider changing to alternative insulin regimen

Change to premixed insulin twice daily (before breakfast and supper)
Start: Divide current basal dose into ½ AM, ½ PM or ¼ AM, ¾ PM
Adjust: ↑ dose by 1-2 units or 10-15% once or twice weekly until SMBG target reached
For hypo: Determine and address cause; if no clear reason for hypo, ↑ corresponding dose by 2-4 units or 10-20%

If A1C not controlled, advance to 3rd injection

Change to premixed analog insulin 3 times daily (breakfast, lunch, supper)
Start: Add additional injection before lunch
Adjust: ↑ doses by 1-2 units or 10-15% once or twice weekly to achieve SMBG target
For hypo: Determine and address cause; if no clear reason for hypo, ↑ corresponding dose by 2-4 units or 10-20%
Average wholesale price (AWP) does not necessarily reflect discounts, rebates, or other price adjustments that may affect the actual cost incurred by the patient but highlights the importance of cost considerations.
There have been substantial increases in the price of insulin in the past decade, and cost-effectiveness is an important consideration.

<table>
<thead>
<tr>
<th>Insulins</th>
<th>Compounds</th>
<th>Dosage form/product</th>
<th>Median AWP package price (min, max)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid-acting analogs</td>
<td>Lispro</td>
<td>U-100 vial</td>
<td>$306</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-100 3 mL cartridges</td>
<td>($306, $379)</td>
</tr>
<tr>
<td></td>
<td>Aspart</td>
<td>U-100 vial</td>
<td>$306</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-100 3 mL cartridges</td>
<td>$380</td>
</tr>
<tr>
<td></td>
<td>Glulisine</td>
<td>U-100 vial</td>
<td>$283</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-100 prefilled pen</td>
<td>$365</td>
</tr>
<tr>
<td></td>
<td>Inhaled insulin</td>
<td>Inhalation cartridges</td>
<td>$557 ($453, $754)</td>
</tr>
<tr>
<td>Short-acting</td>
<td>Human Regular</td>
<td>U-100 vial</td>
<td>$165</td>
</tr>
<tr>
<td>Intermediate-acting</td>
<td>Human NPH</td>
<td>U-100 vial</td>
<td>$165</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-100 prefilled pen</td>
<td>$350</td>
</tr>
<tr>
<td>Concentrated Human Regular insulin</td>
<td>U-500 Human Regular insulin</td>
<td>U-100 vial</td>
<td>$165</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-500 prefilled pen</td>
<td>$213</td>
</tr>
<tr>
<td>Basal analogs</td>
<td>Glargine</td>
<td>U-100 vial; U-100 prefilled pen; U-300 prefilled pen</td>
<td>$298</td>
</tr>
<tr>
<td></td>
<td>Detemir</td>
<td>U-100 vial; U-100 prefilled pen</td>
<td>$323</td>
</tr>
<tr>
<td></td>
<td>Degludec</td>
<td>U-100 prefilled pen; U-200 prefilled pen</td>
<td>$355</td>
</tr>
<tr>
<td>Premixed products</td>
<td>NPH/Regular 70/30</td>
<td>U-100 vial</td>
<td>$165</td>
</tr>
<tr>
<td></td>
<td>Lispro 50/50</td>
<td>U-100 vial</td>
<td>$350</td>
</tr>
<tr>
<td></td>
<td>Lispro 75/25</td>
<td>U-100 vial</td>
<td>$317</td>
</tr>
<tr>
<td></td>
<td>Aspart 70/30</td>
<td>U-100 vial</td>
<td>$394</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U-100 prefilled pen</td>
<td>$394</td>
</tr>
</tbody>
</table>

AWP listed alone when only one product and/or price.
9. Cardiovascular Disease and Risk Management
Cardiovascular Disease

- CVD is the leading cause of morbidity & mortality for those with diabetes.
- Largest contributor to direct/indirect costs
- Common conditions coexisting with type 2 diabetes (e.g., hypertension, dyslipidemia) are clear risk factors for ASCVD.
- Diabetes itself confers independent risk
- Control individual cardiovascular risk factors to prevent/slow CVD in people with diabetes.
- Systematically assess all patients with diabetes for cardiovascular risk factors.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87
Hypertension

- Common DM comorbidity
- Prevalence depends on diabetes type, age, BMI, ethnicity
- Major risk factor for ASCVD & microvascular complications
- In T1DM, HTN often results from underlying kidney disease.
- In T2DM, HTN coexists with other cardiometabolic risk factors.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87
Diabetes and Hypertension: A Position Statement by the American Diabetes Association

Diabetes Care 2017;40:1273–1284 | https://doi.org/10.2337/dc17-0026

Ian H. de Boer, Sripal Bangalore, Athanase Benetos, Andrew M. Davis, Erin D. Michos, Paul Muntner, Peter Rossing, Sophia Zoungas, and George Bakris
Recommendations for the Treatment of Confirmed Hypertension in People With Diabetes

- Initial BP between 140/90 mmHg and 160/100 mmHg
  - Start one agent
    - Albuminuria*
      - No
      - Yes
        - Start one drug: ACEI, ARB, CCB, Diuretic
  - Lifestyle management

- Initial BP ≥ 160/100 mmHg
  - Start two agents
    - Albuminuria*
      - No
      - Yes
        - Start drug from 2 of 3 options: ACEI, ARB, CCB, Diuretic

Assess BP Control and Adverse Effects

- Treatment tolerated and target achieved
  - Continue therapy
- Not meeting target
  - Add agent from complementary drug class: ACEI, ARB, CCB, Diuretic
- Adverse effects
  - Consider change to alternative medication: ACEI, ARB, CCB, Diuretic

Assess BP Control and Adverse Effects

- Not meeting target on two agents
  - Adverse effects
  - Consider Addition of Mineralocorticoid Receptor Antagonist; Refer to Specialist With Expertise in BP Management
Recommendations: Hypertension/ Blood Pressure Treatment

• Patients with BP >120/80 should be advised on lifestyle changes to reduce BP. **B**

• Patients with confirmed BP >140/90 should, in addition to lifestyle therapy, have prompt initiation and timely subsequent titration of pharmacological therapy to achieve blood pressure goals. **A**

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87
Recommendations: Hypertension/ Blood Pressure Treatment

- Patients with confirmed office-based blood pressure >160/100mmHg should, in addition to lifestyle therapy, have prompt initiation and timely titration of two drugs or a single pill combination of drugs demonstrated to reduce cardiovascular events in patients with diabetes.

- Lifestyle intervention including:
  - Weight loss if overweight
  - DASH-style diet
  - Moderation of alcohol intake
  - Increased physical activity

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87
Recommendations: Hypertension/ Blood Pressure Treatment

- Treatment for hypertension should include A
  - ACE inhibitor
  - Angiotensin II receptor blocker (ARB)
  - Thiazide-like diuretic
  - Dihydropyridine calcium channel blockers

- Multiple drug therapy (two or more agents at maximal doses) generally required to achieve BP targets.

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87
Recommendations: Hypertension/ Blood Pressure Treatment

• An ACE inhibitor or angiotensin receptor blocker, at the maximum tolerated dose indicated for blood pressure treatment, is the recommended first-line treatment for hypertension in patients with diabetes and urinary albumin–to–creatinine ratio ≥300 mg/g creatinine (A) or 30–299 mg/g creatinine (B). If one class is not tolerated, the other should be substituted. B

American Diabetes Association Standards of Medical Care in Diabetes. Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87
2018 Watch: Lipids

• What to do about PCSK9 Inhibitors?
• Simplified risk stratification scheme based on presence of two factors: Age and ASCVD
10. Microvascular Complications and Foot Care
Recommendations: Diabetic Retinopathy

- To reduce the risk or slow the progression of retinopathy
  - Optimize glycemic control A
  - Optimize blood pressure control A

Recommendations: Diabetic Retinopathy

Screening:

• Initial dilated and comprehensive eye examination by an ophthalmologist or optometrist:
  – Adults with type 1 diabetes, within 5 years of diabetes onset. B
  – Patients with type 2 diabetes at the time of diabetes diagnosis. B

Recommendations: Diabetic Retinopathy

Screening (2):

- If no evidence of retinopathy for one or more eye exam, exams every 2 years may be considered. B
- If diabetic retinopathy is present, subsequent examinations should be repeated at least annually by an ophthalmologist or optometrist. B
- If retinopathy is progressing or sight-threatening, more frequent exams required. B

2018 Watch: Diabetic Retinopathy

**Treatment:**

- Ranibizumab (Anti-VEGF treatment) has a new indication for diabetic retinopathy
- Non-inferiority with traditional panretinal laser photocoagulation therapy
- Pros and Cons discussed
Early recognition & management is important because:

1. DN is a diagnosis of exclusion.
3. Up to 50% of DPN may be asymptomatic.
4. Recognition & treatment may improve symptoms, reduce sequelae, and improve quality-of-life.

Screening:

- Assess all patients for DPN at dx for T2DM, 5 years after dx for T1DM, and at least annually thereafter. B
- Assessment should include history & 10g monofilament testing, vibration sensation (large-fiber function), and temperature or pinprick (small-fiber function) B
- Symptoms of autonomic neuropathy should be assessed in patients with microvascular & neuropathic complications. E

Treatment:

• Optimize glucose control to prevent or delay the development of neuropathy in patients with T1DM A & to slow progression in patients with T2DM. B

• Assess & treat patients to reduce pain related to DPN B and symptoms of autonomic neuropathy and to improve quality of life. E

Treatment:

• Either pregabalin or duloxetine are recommended as initial pharmacologic treatments for neuropathic pain in diabetes. A
Recommendations: Foot Care

- Perform a comprehensive foot evaluation annually to identify risk factors for ulcers & amputations. B
- All patients with diabetes should have their feet inspected at every visit. C
- History should contain prior hx of ulceration, amputation, Charcot foot, angioplasty or vascular surgery, cigarette smoking, retinopathy & renal disease; and should assess current symptoms of neuropathy and vascular disease. B

Exams should include inspection of the skin, assessment of foot deformities, neurologic assessment & vascular assessment including pulses in the legs and feet. B

Recommendations: Foot Care

• To perform the 10-g monofilament test, place the device perpendicular to the skin; Apply pressure until monofilament buckles.

• Hold in place for 1 second & release.

• The monofilament test should be performed at the highlighted sites while the patient’s eyes are closed.

2018 Watch: Foot Care

- CMS covers hyperbaric oxygen therapy (HOT) for diabetic foot ulcers in certain patients
- New section describes the mixed evidence regarding its use as an adjunctive treatment to enhance wound healing hyperbaric oxygen therapy in people with diabetic foot ulcers
- Additional evidence forthcoming
11. Older Adults
Older Adults

- 26% of patients aged >65 have diabetes.
- Older adults have higher rates of premature death, functional disability & coexisting illnesses.
- At greater risk for polypharmacy, cognitive impairment, urinary incontinence, injurious falls & persistent pain.
- Screening for complications should be individualized and periodically revisited.
- At higher risk for depression

• Functional, cognitively intact older adults (≥65 years of age) with significant life expectancy should receive diabetes care using goals developed for younger adults. C

• Determine targets & therapeutic approaches by assessment of medical, functional, mental, and social geriatric domains for diabetes management. C

Recommendations: Older Adults

- Glycemic goals for some older adults might be relaxed but hyperglycemia leading to symptoms or risk of acute hyperglycemic complications should be avoided in all patients. C

- Hypoglycemia should be avoided in older adults with diabetes. It should be screened for and managed by adjusting glycemic targets and pharmacologic interventions. B

Patients with DM in long-term care facilities need careful assessment to establish a glycemic goal & to make appropriate choices of glucose-lowering agents. E

Other CV risk factors should be treated in older adults with consideration of the time frame of benefit and the individual patient. E

- Treatment of HTN is indicated in most older adults C
- Lipid-lowering and aspirin therapy may benefit those with life expectancy at least equal to the time frame of primary or secondary prevention trials. E
Recommendations: Older Adults

- Screening for geriatric syndromes may be appropriate in older adults with limitations in basic and instrumental activities of daily living. C

- Older adults with DM should be considered a high-priority population for depression screening and treatment. B

- Annual screening for early detection of mild cognitive impairment or dementia is indicated for adults 65 years of age or older. B

2018 Watch: Older Adults

• Older adults at higher risk of hyperglycemia
• Discussion surrounding how to lower that risk
  – Individualizing pharmacologic therapy
  – Avoid overtreatment
  – Simplify complex regimens
12. Children & Adolescents
Type 1 Diabetes

• ¾ of all cases of T1DM are dx’d in patients <18 yrs.
• Providers must consider many unique aspects to care & mgmt. of children & adolescents with T1DM.
• Attention to family dynamics, developmental stages, physiological differences is essential.
• Recommendations less likely to be based on clinical trial evidence.

American Diabetes Association Standards of Medical Care in Diabetes. Children and adolescents. *Diabetes Care* 2017; 40 (Suppl. 1): S105-S113
Type 1 Diabetes: Psychosocial Issues

• At diagnosis and during routine follow-up care, assess psychosocial issues and family stresses that could impact adherence to diabetes mgmt. Provide referrals to trained mental health professionals, preferably experienced in childhood diabetes. E

American Diabetes Association Standards of Medical Care in Diabetes. Children and adolescents. *Diabetes Care* 2017; 40 (Suppl. 1): S105-S113
Type 1 Diabetes: Psychosocial Issues

• Encourage family involvement in diabetes mgmt. tasks for children & adolescents, as premature transfer of diabetes care can result in nonadherence and deterioration in glycemic control. B

• Mental health professionals should be considered integral members of the pediatric diabetes multidisciplinary team. E

American Diabetes Association Standards of Medical Care in Diabetes. Children and adolescents. Diabetes Care 2017; 40 (Suppl. 1): S105-S113
Type 1 Diabetes: Psychosocial Issues

- Adolescents should have the option for time by themselves with their care provider(s) starting at age 12 years. E
- Starting at puberty, preconception counseling should be incorporated into routine diabetes care for all girls of childbearing potential. A
<table>
<thead>
<tr>
<th>Blood glucose goal range</th>
<th>A1C</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before meals</td>
<td>90–130 mg/dL (5.0–7.2 mmol/L)</td>
<td>&lt;7.5%</td>
</tr>
<tr>
<td>Bedtime/ overnight</td>
<td>90–150 mg/dL (5.0–8.3 mmol/L)</td>
<td></td>
</tr>
</tbody>
</table>

1. Goals should be individualized; lower goals may be reasonable.
2. Modify BG goals in youth w/ frequent hypos or hypoglycemia unawareness.

American Diabetes Association Standards of Medical Care in Diabetes. Children and adolescents. *Diabetes Care* 2017; 40 (Suppl. 1): S105-S113
Type 2 Diabetes

• Distinguishing between type 1 and type 2 can be challenging.

• Diabetes-associated autoantibodies and ketosis may be present in patients with features of type 2 such as obesity and acanthosis nigricans.

• Accurate diagnosis is critical.

American Diabetes Association Standards of Medical Care in Diabetes. Children and adolescents. Diabetes Care 2017; 40 (Suppl. 1): S105-S113
2018 Watch: Youth-onset Type 2 Diabetes

• Position statement currently in press on the evaluation and management of youth-onset type 2 diabetes
• Recommendations in the Standards expanded based on this review
• New screening and treatment recommendations
13. Management of Diabetes in Pregnancy
Gestational Diabetes Mellitus (GDM)

• Lifestyle change is an essential part of GDM management and may suffice for many women. Add medications if needed to achieve glycemic targets. A

• Insulin is the preferred medication for treating hyperglycemia in GDM, as it does not cross the placenta. Metformin and glyburide may be used but both, particularly metformin, cross the placenta. All oral agents lack long-term safety data. A

Gestational Diabetes Mellitus (GDM)

- Metformin, when used to treat polycystic ovary syndrome and induce ovulation, need not be continued once pregnancy has been confirmed.
General Principles for Management of Diabetes in Pregnancy

• Potentially teratogenic medications (ACE inhibitors, statins, etc.) should be avoided in sexually active women of childbearing age who are not using reliable contraception. B

• Fasting and postprandial SMBG are recommended in both GDM and preexisting diabetes in pregnancy to achieve glycemic control. Some women with preexisting diabetes should also test blood glucose preprandially. B

General Principles for Management of Diabetes in Pregnancy

• Due to increased red blood cell turnover, A1C is lower in normal pregnancy than in normal nonpregnant women. A1C target in pregnancy is 6 – 6.5% (42–48mmol/mol); <6% (42 mmol/mol) may be optimal if achievable without significant hypoglycemia, but the target may be relaxed to <7% (53 mmol/mol) if necessary to prevent hypoglycemia. B

• In pregnant patients with diabetes and hypertension, BP targets 120-160/80-105 are suggested. E

Glycemic Targets in Pregnancy

For women with gestational diabetes or preexisting type 1 or type 2 diabetes in pregnancy, the following targets are recommended:

– Fasting $\leq 95$ mg/dL (5.3 mmol/L) and either
– One-hour postprandial $\leq 140$ mg/dL (7.8 mmol/L) or
– Two-hour postprandial $\leq 120$ mg/dL (6.7 mmol/L)
2018 Watch: Pregnancy

- Discussion about the role of aspirin in the prevention of preeclampsia for pregnant women with type 1 or type 2 diabetes.

14. Diabetes Care in the Hospital
Recommendations: Diabetes Care in the Hospital

- Basal insulin or basal + bolus correction regimen is the preferred treatment for noncritically ill patients with poor oral intake or those who are taking nothing by mouth. An insulin regimen with basal, nutritional & correction components is the preferred treatment for noncritically ill patients with good nutritional intake. A

- The sole use of sliding scale insulin in the inpatient hospital setting is strongly discouraged. A

Thank you!

Email: eberg@diabetes.org