Treating Type 2 Diabetes Mellitus:

Key Message 1: Screening and lifestyle modifications are important factors in the detection and treatment of diabetes

Screening Criteria for Diabetes or Prediabetes in Asymptomatic Adults:

The American Association of Clinical Endocrinologists (AACE) and American Diabetes Association (ADA) share similar risk factors and criteria for testing for diabetes or prediabetes in asymptomatic adults (Table 1).[1, 2]

- Testing should begin at age 45 for all individuals, even those without risk factors.
- The AACE recommends screening for diabetes or prediabetes in the presence of risk factors.[2]
- As per the ADA, overweight or obese (Body Mass Index (BMI) ≥25 kg/m^2 or BMI ≥23 kg/m^2 in Asian Americans) adults should be tested if they have one or more of the risk factors listed in Table 1. [1]
- If results are normal, testing should be done at least every 3 years. However, patients with a higher risk should be screened more frequently (e.g., those with prediabetes should be tested yearly).[1, 3]

Table 1. Risk Factors for Prediabetes and Type 2 Diabetes: Criteria for Testing for Diabetes or Prediabetes in Asymptomatic Adults[1, 2]
Overweight (BMI 25 to <30 kg/m^2) or obese (BMI ≥30 kg/m^2)[a]
CVD or family history of T2D
Sedentary lifestyle
Race: Asian, African American, Hispanic, Native American (Alaska Natives and American Indians), or Pacific Islander
HDL-C <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
IGT, IFG, and/or metabolic syndrome
PCOS, acanthosis nigricans, NAFLD
Hypertension (BP >140/90 mm Hg or on therapy for hypertension)
History of gestational diabetes or delivery of a baby weighing more than 4 kg (9 lb)
Antipsychotic therapy for schizophrenia and/or severe bipolar disease[b]
Chronic glucocorticoid exposure[b]
Sleep disorders in the presence of glucose intolerance (A1C >5.7%, IGT, or IFG on previous testing), including OSA, chronic sleep deprivation, and night-shift occupation[b]
Abbreviations: A1C = hemoglobin A1C; BMI = Body Mass Index; BP = blood pressure; CVD = cardiovascular disease; HDL-C = high-density lipoprotein cholesterol; IFG = impaired fasting glucose; IGT = impaired glucose tolerance; NAFLD = nonalcoholic fatty liver disease; OSA = obstructive sleep apnea; PCOS = polycystic ovary syndrome; T2D = Type 2 Diabetes
a: As per the ADA, overweight or obese (BMI ≥25 kg/m2 or BMI ≥23 kg/m2 in Asian Americans) adults should be tested if they have one or more of the risk factors listed in the table. b: This risk factor is specific only to the AACE guidelines.

Diagnosis of Diabetes:

Per the AACE and the ADA, individuals must meet one of the following to be diagnosed with diabetes: [1, 2]

- Fasting Plasma Glucose (FPG) ≥126 mg/dL. Fasting is defined as no caloric intake for at least 8 h.
- 2-h PG ≥200 mg/dL during an oral glucose tolerance test (OGTT), defined as ingesting 75g of glucose dissolved in water the morning after an overnight fast.
- A1C ≥6.5%
- Symptoms of hyperglycemia (polyuria, polydipsia, polyphagia) or hyperglycemic crisis, a random plasma glucose ≥200mg/dL

Unless patient has a random plasma glucose of ≥200 mg/dL and experiences hyperglycemic symptoms, a second test is required to confirm diagnosis.

Prediabetes is defined as individuals who meet one of the following:

- FPG 100-125mg/dL
- 2h PG OGTT 140-199mg/dL
- A1C 5.7-6.4% (AACE states A1C should only be used as a screening tool in prediabetes while FPG and OGTT should be used for definitive diagnosis)[2]

Lifestyle Modifications:

The AACE and the ADA both emphasize the importance of lifestyle modifications for all patients with diabetes. [1, 3]The AACE provides a lifestyle therapy algorithm with increasing levels of intervention based on obesity or comorbidities. [3] The ADA strongly recommends diabetes self-management education (DSME) and diabetes self-management support (DSMS) programs. [1]These programs are patient centered and facilitate knowledge, skills, and abilities necessary for optimal diabetes self-care, which can improve outcomes and reduce costs. DSME and DSMS should be evaluated periodically:

1. At time of diagnosis
2. Annually for assessment of education, nutrition, and emotional needs
3. When new complicating factors arise that influence self-management
4. When transitions to care occur

Table 2. Lifestyle Therapy Recommendations based on ADA and AACE [1, 3]

Weight Loss	• In overweight or obese patients, weight loss of 5-10% of initial weight
Nutrition	• Maintain optimal weight • Calorie restriction (if BMI increased) • Plant-based diet; high polyunsaturated and monounsaturated fatty acids • Refer to a Medical Nutrition Therapy program, preferably provided by a registered dietitian • Education on carbohydrate counting, fat and protein gram estimation for patients on insulin therapy
Physical Activity	• 150 minutes or more of moderate-to-vigorous intensity activity per week ○ Spread over 3 days/week with no more than 2 consecutive days without activity • Resistance or strength training 2-3 sessions/week on nonconsecutive days • Increase as tolerated
Sleep	• About 7 hours per night • Basic sleep hygiene
Behavioral/Psychosocial Support	• Community engagement • Structured weight loss and physical activity programs • Consider screening older adults (aged ≥ 65 years) with diabetes for cognitive impairment and depression
Smoking Cessation	• Avoid cigarettes and other tobacco products or e-cigarettes • Smoking cessation counseling
Alcohol	• Alcohol moderation ○ No more than 1 drink/day for women and no more than 2 drinks/day for men • Educate on recognizing and managing delayed hypoglycemia with alcohol consumption

References:

1. Marathe, P.H., H.X. Gao, and K.L. Close, *American Diabetes Association Standards of Medical Care in Diabetes 2017.* J Diabetes, 2017. **9**(4): p. 320-324.
2. Handelsman, Y., et al., *American association of clinical endocrinologists and american college of endocrinology - clinical practice guidelines for developing a diabetes mellitus comprehensive care plan - 2015.* Endocr Pract, 2015. **21 Suppl 1**: p. 1-87.
3. Garber, A.J., et al., *Consensus Statement by the American Association of Clinical Endocrinologists and American College of Endocrinology on the Comprehensive Type 2 Diabetes Management Algorithm - 2017 Executive Summary.* Endocr Pract, 2017. **23**(2): p. 207-238.