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Ohio Cardiovascular and Diabetes Health Collaborative

Effective Diabetes Prevention for Adults:

Prediabetes Screening and Treatment, Part 1

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Clinicians are challenged to identify and manage both prediabetes and obesity in patients.

Prediabetes is defined as a blood glucose level that is higher than normal but not high enough for a diabetes diagnosis. In adult patients with prediabetes, 85% of individuals have overweight or obesity.[1,2] Approximately one in three American adults have prediabetes, usually with overweight or obesity. However, more than 8 in 10 adults with prediabetes do not know they have it. Treatment should be individualized to reflect the severity of both conditions.[3,4]

This article is the first in a two-part series, providing up-to-date information on prediabetes and obesity, which are common conditions that often occur together. It discusses an integrated approach to screening for prediabetes and obesity, as well as how to effectively communicate results and manage lifestyle changes for diabetes prevention and obesity management. A second article, "Effective Diabetes Prevention for Adults: Medical and Surgical Treatment of Obesity, Part 2," presents emerging evidence on various combinations of treatments. Both articles address the challenges of providing effective treatment for patients and suggest strategies to improve access to care.

Screening for Prediabetes and Obesity

Prediabetes has a 5% to 10% annual risk and a 70% lifetime risk of progression to type 2 diabetes, with individuals in the upper ranges of HbA1C and body mass index (BMI) facing an ever-greater likelihood of conversion.[5-7] Early intervention is critical, as intensive life changes, including healthier eating and regular physical activity, can reduce the risk of developing type 2 diabetes by half.[2,3]

Age and BMI are the strongest risk factors for prediabetes and annual obesity screening using BMI calculated from measured height and weight is recommended.[8] For individuals with a BMI below 35kg/m^2, waist circumference can add further risk stratification.[9] Risk assessment tools for prediabetes are available in both print and online formats; screening recommendations outlined below are based on criteria from the Centers for Disease Control and Prevention.[5-7,10-12]

1. **Screen every three years for all people beginning at age 35, OR Screen every three years for all people who are overweight or obese (BMI is ≥ 25 kg/m² [or ≥23 kg/m² in Asian Americans]) and who have one or more of the following risk factors at any age:**
   - African American, Hispanic/Latino, Native American, Asian American, or Pacific Islander
   - History of hypertension, cardiovascular disease, polycystic ovarian syndrome, or gestational diabetes
   - High-density lipoprotein (HDL) cholesterol < 35 mg/dL and/or a triglyceride level > 250 mg/dL
   - Physically inactive
   - First degree relative with type 2 diabetes
2. **If a patient has been determined to have prediabetes, monitor annually:**
   - A1C is 5.7%-6.4% or a fasting glucose is 100-125 mg/dL

Other prediabetes screening considerations are as follows:

- The American Diabetes Association (ADA) recommends that:
  - A person with a negative screening test be retested every 3 years, and
  - If a person has a positive screen, confirming with a repeat test, treating per recommendations (see next section), and rechecking the prediabetes test at least annually.

What Is a Prediabetes Positive Screen?[4,6]

HbA1C:
5.7%-6.4%

Fasting glucose:
100-125 mg/dL (ADA)[3]
or
110-125 mg/dL (Medicare eligibility for diabetes prevention program reimbursement)[13]

A person with prediabetes and no symptoms of diabetes should have HbA1C measured annually.[5]

Communicating a positive test for prediabetes to a patient

It is important to tell patients when they have prediabetes and describe how this impacts them with clear language. The Centers for Disease Control and Prevention uses this message for those with prediabetes:

"You have prediabetes. This means that your blood sugar level is higher than normal, but not high enough yet to be diagnosed as diabetes. Prediabetes puts you at increased risk of developing type 2 diabetes, heart disease, and stroke."[9]

Treating Prediabetes: Partnering With Patients to Normalize Prediabetes Measures and Treat Obesity

The overall long-term goal for patients with prediabetes and obesity is to reach and maintain the normoglycemic range while effectively addressing obesity. Evidence-based treatment options include intensive lifestyle modification, pharmacotherapy, bariatric surgery, and management of other health conditions.[14-19] Referral to a dietitian alone has not been shown to be effective in reducing the progression of prediabetes to diabetes, reducing weight by 5% or more, or increasing activity to recommended levels. In the clinical setting a patient-centered approach is essential; treatment decisions should be individualized based on patient readiness, related medical comorbidities, and severity of obesity.[19]

Lifestyle Modification[10, 15-18]

For patients with prediabetes, lifestyle change programs aim to foster sustained, long-term behavior modification that supports the achievement and maintenance of clinically meaningful weight loss. Specific program targets include weight loss of at least 4% to 7% of baseline body weight at the start of treatment, physical activity levels of > 150 minutes of exercise per week, and healthier food choices.[10,14] The risk of progressing from prediabetes to diabetes, as well as developing cardiovascular disease or related conditions, is significantly reduced for individuals who achieve and maintain weight loss, increase physical activity, and improve their eating habits.[20,21]

While diet changes have the most direct impact on weight, exercise, especially aerobic exercise, also plays an important role in maintaining weight loss. Over time, resistance training is particularly effective for preserving lean body mass. Additionally, behavioral skills (e.g., tracking food intake and physical activity) help individuals adopt, adjust to, and sustain changes in their diet and exercise habits.

A key question for patients adopting any lifestyle change is, "Would you do this long-term?" If the answer is no, then another plan should be considered. Lifestyle changes are only effective when they are consistently maintained over time. Consider the following evidence-based recommendations for patients with prediabetes to help them reach and sustain recommended behavioral goals.

1. **Refer patients to a Diabetes Prevention Program (DPP)**
   Referral to a DPP is the first-line recommendation by the Centers for Disease Control and Prevention and other organizations.[10,22-25]A DPP is an evidence-based, one-year program, offered as a weekly group class, which engages participants to develop diet, exercise, tracking, and behavioral skills to achieve recommended weight loss and behavior change. DPP participants also receive individual coaching throughout the program. Typically, there is no cost to participants who have insurance coverage for a DPP. Active engagement in a DPP reduces the

risk of developing diabetes by 56%.[16,20-26] Preventing prediabetes from progressing to diabetes was associated with a 28% reduction in microvascular complications over 15 years in one study, with the lower risk primarily tied to avoiding the onset of diabetes.[25]

DPP classes are offered primarily in-person or through web-based distance learning platforms, but may also be delivered using asynchronous artificial intelligence tools. Live distance learning is more accessible for many participants, making it easier for them to attend regularly. It is as effective as in-person classes. However, asynchronous DPP tend to show lower retention rates and overall weight loss. They also require a higher level of technological literacy. On the positive side, these programs help overcome some language, scheduling, and group barriers.[27,28]

A DPP can be recommended along with medical or surgical treatment for obesity and/or prediabetes, as lifestyle changes improve the effectiveness of medical and surgical treatments for obesity, prediabetes, and metabolic syndrome. Patients should check with their insurance plan regarding coverage of DPP.

2. **Partner with patients to find their best dietary approach**
No single diet or approach is best proven to prevent diabetes or cardiovascular disease, or to achieve and maintain weight loss. Therefore, clinicians should work with patients to identify a dietary approach that best fits their preferences and situation, so it can be adopted long-term. Referral to a registered dietitian may help patients select and implement one of these dietary approaches to fit their needs, but may not be covered by insurance plans.

The dietary approaches most proven for long-term weight loss and improved metabolic measures are summarized in Table 1.[3,4, 10, 29-45]

Table 1. Dietary Approaches Most Proven for Weight Loss and Improved Metabolic Measures

Dietary Approach	Overview	Benefits
Mediterranean-Style	Emphasizes plant-based food (vegetables, beans, nuts and seeds, fruits, and whole intact grains); fish and other seafood; olive oil as the principal source of dietary fat; dairy products (mainly yogurt and cheese) in low to moderate amounts; typically, fewer than four eggs/week; red meat in low frequency and amounts; wine in low to moderate amounts; and concentrated sugars or honey rarely. Following a low-calorie version of these choices is best for weight loss and risk reductions.	▪ Reduced risk of diabetes ▪ A1C reduction ▪ Lowered triglycerides ▪ Reduced risk of major cardiovascular events ▪ Low calorie version for weight loss
Healthy Plate/ Healthy Eating Index Approach	Used in the National Diabetes Prevention Program, the main message of the Healthy Plate/Healthy Eating is to focus on diet quality, with vegetables, fruits, beans, whole grains, and healthy oils. Focuses on portion control and better choices; avoidance and limitation of sugary beverages; and processed high carbohydrate and high fat foods. Adherence and individualization promoted by a simple approach.	▪ Reduced cardiovascular mortality ▪ Reduced all-cause mortality ▪ Promotes weight loss to 5% and reduced development of diabetes when part of a Diabetes Prevention Program
Dietary Approaches to Stop Hypertension (DASH)	Emphasizes vegetables, fruits, and low-fat dairy products; includes whole intact grains, poultry, fish, and nuts; reduced in saturated fat, red meat, sweets, and sugar-containing beverages. May also be reduced in sodium.	▪ A1C reduction ▪ Reduced risk of diabetes ▪ Weight loss, especially with low-calorie verision ▪ Lowered blood pressure
Vegetarian or Vegan	The two most common approaches found in the literature emphasize plant-based vegetarian eating devoid of all flesh foods but including egg (ovo) and/or dairy (lacto) products, or vegan eating devoid of all flesh foods and animal-derived products.	▪ Reduced risk of diabetes ▪ A1C reduction ▪ Weight loss ▪ Lowered LDL-C and non–HDL-C
Low Carbohydrate	Emphasizes vegetables low in carbohydrate (e.g., salad greens, broccoli, cauliflower, cucumber, cabbage); fat from animal foods, oils, butter, and avocado; and protein in the form of meat, poultry, fish, shellfish, eggs, cheese, nuts, and seeds. Some plans include fruit (e.g., berries) and a greater array of non-starchy vegetables. Avoids starchy and sugary foods (e.g., pasta, rice, potatoes, bread, and sweets). There is no consistent definition of "low" carbohydrate. In this review, a low carbohydrate eating pattern is defined as reducing carbohydrates to 26–45% of total calories.	▪ A1C reduction ▪ Weight loss ▪ Lowered blood pressure ▪ Increased HDL-C and lowered triglycerides
Very Low Carbohydrate	Similar to a low carbohydrate pattern but further limits carbohydrate- containing foods, and meals typically derive more than half of the calories from fat. Often has a goal of 20-50g of non-fiber carbohydrate per day to induce nutritional ketosis. In this review, a very low carbohydrate eating pattern is defined as reducing carbohydrate to <26% of total calories.	▪ Weight loss ▪ Lowered blood pressure ▪ Increased HDL-C and lowered triglycerides
Low Fat	Emphasizes vegetables, fruits, starches (e.g., breads/crackers, pasta, whole intact grains, starchy vegetables), lean protein sources (including beans), and low-fat dairy products. In this review, defined as total fat intake of ≤30% and saturated fat intake <10% of total calories.	▪ Reduced risk of diabetes ▪ Weight loss
Very Low Fat	Emphasizes fiber-rich vegetables, beans, fruits, whole intact grains, nonfat dairy, fish, and egg whites. Comprised of 70-77% carbohydrate (including 30-60 g fiber), 10% fat, and 13-20% protein.	▪ Weight loss ▪ Lowered blood pressure

Adapted from *Nutrition therapy for adults with diabetes or prediabetes: a consensus report* with additions from authors.[3,4,10,29-45]

3. **Help patients become and stay more physically active**
Achieving and maintaining a minimum of 150 minutes or more of moderate-intensity physical activity each week greatly reduces the risk for developing both diabetes and cardiovascular disease.[3] Patients advised to increase physical activity show improved activity levels 6 to 12 months later. It is currently recommended to engage in resistance exercise at least twice a week and to avoid prolonged inactivity. Patients enrolled in Medicare Advantage have the option to join SilverSneakers, a health and fitness program specifically designed for adults aged 65 and older. This program offers access to community and commercial fitness facilities and programs at no cost to participants. Additionally, SilverSneakers can help reduce social isolation among older adults.[50]

4. **Address other health behaviors to reduce diabetes and cardiovascular risk[8]**
Tobacco use is the most significant modifiable risk factor for many individuals, increasing the likelihood of developing type 2 diabetes. Quitting tobacco reduces this risk by 30% to 40%.[51] Evaluation for tobacco use and referral for tobacco cessation supports should be part of routine care for those at risk for diabetes.

   Alcohol use, another important modifiable risk factor, increases the risk of diabetes, certain cancers, and other related health risks. Additional aspects of lifestyle modification include assessment and management of sleep and stress.

Additional Tools to Promote Behavior Change

- **Tracking:** Tracking food and exercise, on paper or with devices, increases weight loss and helps inform what facilitates or impedes consistency. Tracking can also increase awareness and motivation, especially in combination with a program or plan.[46-47]
- **Meal replacements: protein shakes/bars:** For decades, meal replacements, used as part of a diet plan and tracking, have improved weight loss and maintenance.[48] Recommend caution when using products that contain sugar, alcohols, or sweeteners.[48-49]
- **Commercial low-calorie diet and coaching plans:** These plans combine healthy eating approaches and tracking. They are typically successful in initial weight loss and maintenance, with continued participation, but can be costly or impractical in the long term. Employer wellness programs may provide discounts to improve affordability.[52]

Medical and Surgical Interventions

The recommended treatment of prediabetes and obesity always includes behavioral changes. For many people with obesity, achieving and sustaining ≥ 15% weight loss is needed to best reduce the risks and complications of obesity, including prediabetes. For this degree of obesity management, the addition of anti-obesity medications and surgical interventions, as well as the avoidance or minimization of treatments that worsen obesity, is usually required.[4,18,45,53] See the companion article, "*Effective Diabetes Prevention for Adults: Medical and Surgical Treatment of Obesity, Part 2*", for more information.

Management of Other Health Conditions

Assessment for and good management of medically related conditions, such as hypertension, dyslipidemia, and sleep apnea, reduces overall cardiovascular risk.[45] Additionally, assessment and treatment of mood disorders is often essential for patients to engage in lifestyle change. The dietary, activity, and weight management recommendations for prediabetes are consistent with the management of these conditions.

Additional Resources

- **Prediabetes: What It Is and How to Manage It**
  Evidence-based resources from the American Medical Association MAP™ to help healthcare teams implement and strengthen diabetes prevention efforts within their organizations.
  maptest.ama-assn.org/map-prediabetes
- **Prediabetes Risk Test**
  This quick questionnaire developed by the CDC estimates an individual's risk for prediabetes using basic health information.
  cdc.gov/prediabetes/risktest/index.html

Additional Cardi-OH Resources

- **Capsule 39 - Non-Pharmacologic Treatments for Insomnia: More Than Just Sleep Hygiene**
  cardi-oh.org/resources/capsule-39--non-pharmacologic-treatments-for-insomnia-more-than-just-sleep-hygiene
- **Podcast 32 - Addressing Unhealthy Alcohol Use: Strategies for Primary Care**
  cardi-oh.org/resources/podcast-32--addressing-unhealthy-alcohol-use-strategies-for-primary-care
- **Smoking Cessation: Frequently Asked Questions**
  cardi-oh.org/resources/smoking-cessation-frequently-asked-questions
- **Talking With Patients About Stress**
  cardi-oh.org/resources/talking-with-patients-about-stress

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