Prediabetes & Type 2 Diabetes Prevention
Cari Ritter, PA-C

Presenter Disclosure Information

In compliance with the accrediting board policies, the American Diabetes Association requires the following disclosure to the participants:

Cari Ritter, PA-C

Disclosed no conflict of interest
Learning Objectives

• Screen patients for prediabetes and type 2 diabetes risk

• Choose appropriate pharmacologic agents for diabetes management

• Identify and treat modifiable risk factors for cardiovascular disease

• Refer patients to a Diabetes Prevention Program or a Diabetes Self-Management Program

What is Prediabetes?

Fasting plasma glucose

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>&gt;126 mg/dL</td>
</tr>
<tr>
<td>Prediabetes</td>
<td>100 mg/dL</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td>100 mg/dL</td>
</tr>
<tr>
<td>Normal</td>
<td>100 mg/dL</td>
</tr>
</tbody>
</table>

2-hour plasma glucose on OGTT

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>&gt;200 mg/dL</td>
</tr>
<tr>
<td>Prediabetes</td>
<td>140 mg/dL</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td>140 mg/dL</td>
</tr>
<tr>
<td>Normal</td>
<td>140 mg/dL</td>
</tr>
</tbody>
</table>

Hemoglobin A1C

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>&gt;6.5%</td>
</tr>
<tr>
<td>Prediabetes</td>
<td>5.7%</td>
</tr>
<tr>
<td>Normal</td>
<td>5.7%</td>
</tr>
</tbody>
</table>

Any abnormality must be repeated and confirmed on a separate day using the same test.

The diagnosis of diabetes can also be made based on unequivocal symptoms and a random glucose >200 mg/dL.
Prevalence of Prediabetes

- 84.1 million people (33.9% of U.S. adults aged 18 years or older) had prediabetes in 2015
- Nearly half of adults aged 65 years or older had prediabetes
- Among adults with prediabetes, 11.6% reported being told by HCP that they had this condition
- Prevalence of prediabetes was similar among racial and ethnic groups

Risk Factors for Type 2 Diabetes and CVD

- Associated with:
  - Family history of diabetes
  - Obesity (especially abdominal or visceral)
  - Physical inactivity
  - Dyslipidemia
  - High triglycerides and/or low HDL cholesterol
  - Hypertension
- Interventions to reduce rate of progression to diabetes:
  - Healthy diet
  - Physical activity
  - Weight loss
  - Pharmacotherapy
Case Study

**Introduction**

- Mr. N is an Asian male who just turned 45 years old. He comes in for a routine checkup a week after his birthday. He has mild asthma and is a-pack-a-day smoker but is considering quitting. He has no other health complaints and hasn’t had a checkup in 3 years.

- He is an investment banker and spends long hours at the office on his computer. He claims that he has limited time to exercise. No one in his immediate family has had diabetes but his father has hypertension.

- **Physical exam:** height, 5’9” (175 cm); weight, 180 lbs (82 kg); BMI, 26.7 kg/m²; BP, 130/80 mmHg
Consider testing (screening) all adults with a BMI ≥25 kg/m² (≥23 in Asian Americans) and additional risk factors.

• If no risk factors, consider screening no later than age 45 years.
• If normal results, repeat testing (screening) at ≤3-year intervals. More frequently depending on initial test results and risk factors.
• Test yearly if prediabetes.

Criteria for Screening for Prediabetes in Asymptomatic Adults

**DIABETES RISK FACTORS**
- Physical inactivity
- First-degree relative with diabetes
- High-risk race/ethnicity
- Women diagnosed with GDM
- Hypertension (≥140/90 mmHg or on therapy for hypertension)
- HDL-C <35 mg/dL and/or a TG >250 mg/dL
- A1C ≥5.7%, IGT, or IFG on previous testing
- Other clinical conditions associated with insulin resistance, such as severe obesity, acanthosis nigricans, PCOS
- History of CVD

**Case Study (cont’d)**

**Discussion Question**
Should Mr. N be screened for type 2 diabetes?
A. Yes
B. No
Risk Assessment for Diabetes

- Be proactive in an effort to improve outcomes
- Assess for risk factors
- Ask patients to take the ADA Diabetes Risk Test.* (5 or more=risk)
- If diagnosed with diabetes/prediabetes
  - refer to a Diabetes Prevention Program
  - continue ongoing diabetes screening

* Available at: diabetes.org/risktest
Overview of Type 2 Diabetes Prevention Trials: Lifestyle Modification Intervention

• Lifestyle intervention continues to have an effect, even after 20 years

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Intervention</th>
<th>Treatment</th>
<th>Risk reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Da Qing(^1,2)</td>
<td>577</td>
<td>Lifestyle</td>
<td>6 years</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20 years</td>
<td>43%</td>
</tr>
<tr>
<td>Finnish DPS(^3,4)</td>
<td>523</td>
<td>Lifestyle</td>
<td>3+ years</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 years</td>
<td></td>
</tr>
<tr>
<td>Diabetes Prevention Program</td>
<td>3,324</td>
<td>Lifestyle</td>
<td>3 years</td>
<td>58%</td>
</tr>
<tr>
<td>Program (DPP)(^5,6)</td>
<td></td>
<td></td>
<td>10 years</td>
<td>34%</td>
</tr>
</tbody>
</table>


Diabetes Prevention Program

Refer patients to an intensive behavioral lifestyle intervention program modeled on the Diabetes Prevention Program to:

• achieve and maintain 5-7% loss of initial body weight
• increase moderate-intensity physical activity (such as brisk walking) to at least 150 min/week

[cdc.gov/prediabetes](http://cdc.gov/prediabetes)

Diabetes Prevention Program

• Reduced type 2 diabetes by 58% over 3 years
  – 5-7% weight loss
  – 150 minutes of physical activity/week (brisk walking)
• Metformin most effective in individuals:
  – BMI ≥ 35 kg/m$^2$
  – <60 years of age
  – History of GDM

Lifestyle Modification: Facilitating Weight Loss

• Initial target: 1-2 pound/week weight loss
• Long-range goal: 7% loss of body weight
• Increase physical activity to at least 150 min/week
• Individualized medical nutrition therapy
Non-starchy vegetables ● Spinach ● Carrots ● Lettuce ● Greens ● Cabbage ● Green beans ● Broccoli ● Cauliflower ● Tomatoes

Grains and starchy foods ● Whole grain breads ● whole wheat or rye ● Whole grain ● High-fiber

Protein ● Chicken/turkey without skin ● Fish (tuna, salmon, cod, catfish) ● Tofu, eggs, low-fat cheese ● Lean cuts of beef and pork

Lifestyle Modification: Physical Activity

Adults
• ≥ 150 minutes/week of moderate-intensity aerobic activity
  - Spread over 3 or more days every week
  - No more than 2 consecutive days without exercise
• Resistance training ≥ 2 times/week
• Break up extended periods of sedentary time (every 30 minutes)

Children
• ≥ 60 minutes/day of physical activity
• For children with diabetes and prediabetes
Technology Tools for Prevention

Technology-assisted tools may be useful elements of effective lifestyle modification to prevent diabetes

- Internet-based social networks
- Distance learning
- DVD-based content
- Mobile Applications
- Fitness Trackers

American Diabetes Association Standards of Medical Care in Diabetes: 5. Prevention or delay of type 2 diabetes. Diabetes Care 2018; 41 (Suppl. 1): S51-S54

Overview of Prediabetes Trials: Pharmacologic Intervention

- Pharmacologic intervention provides benefit but with increased adverse effects with some drugs

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<tr>
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<th>Intervention</th>
<th>Treatment</th>
<th>Risk reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Prevention Program (DPP)1,2</td>
<td>IGT</td>
<td>Metformin</td>
<td>3 years 10 years</td>
<td>31% 18%</td>
</tr>
<tr>
<td>DREAM3</td>
<td>IGT</td>
<td>Rosiglitazone</td>
<td>3 years</td>
<td>60%</td>
</tr>
<tr>
<td>STOP-NIDDM4,5</td>
<td>IGT</td>
<td>Acarbose</td>
<td>3 years</td>
<td>21%</td>
</tr>
<tr>
<td>ACT NOW6</td>
<td>IFG</td>
<td>Pioglitazone</td>
<td>3 years</td>
<td>81%</td>
</tr>
</tbody>
</table>


Metformin For Prediabetes

Consider metformin therapy for prevention of type 2 diabetes in those with prediabetes, especially for those with

- BMI $\geq 35$ kg/m$^2$
- Age < 60 years
- Prior gestational diabetes
- Rising A1C despite lifestyle intervention

American Diabetes Association Standards of Medical Care in Diabetes. 5. Prevention or delay of type 2 diabetes. Diabetes Care 2018; 41 (Suppl. 1): S51-S54
Referrals

- National Diabetes Prevention Program
  
  [cdc.gov/prediabetes](https://cdc.gov/prediabetes)

- Team-based approach to care
  - Physician
  - Nurse practitioner/physician assistant
  - Certified diabetes educator
  - Registered dietitian
  - Pharmacist
  - Exercise physiologist
  - Social worker/psychologist

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Identify and Treat CV Risk Factors in People with Prediabetes

<table>
<thead>
<tr>
<th>Non-modifiable</th>
<th>Modifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Physical inactivity</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>Overweight/obesity</td>
</tr>
<tr>
<td>Gender</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Family history</td>
<td>Smoking</td>
</tr>
<tr>
<td></td>
<td>Abnormal lipid levels</td>
</tr>
</tbody>
</table>
Follow-up Screening/Counseling

- Shown to be important to success
- Provide follow-up screenings for the development of diabetes
  - At least every 12 months for those with prediabetes
  - At least every 3 years if screening is negative
- On a regular basis, search EHR to determine who needs to be screened/rescreened
- Continually screen for modifiable risk factors at each interaction

Evaluating Progress – What to Do

- Assess patient's concerns
- Reconcile their medications and lifestyle
- Revise the management plan as needed
  - If it doesn’t work in the patient’s life, it doesn’t work
- Ask the patient to identify one strategy/goal they would like to accomplish
- Provide information about materials available to achieve goals, such as weight loss or physical activity log
Conclusions

As a member of the healthcare team, **YOU** can make a difference.

- Only 11% of people with prediabetes are aware they have it
- Identify those at risk for diabetes:
  - Proactively assess risk and screen/rescreen
  - Assess/advise with management strategies
  - Refer to Diabetes Prevention Program
  - Continually follow-up and evaluate
- Collaborate with other members of the healthcare team

Helpful Resources
ADA’s DPP Charting Platform

• ~15% of ADA’s recognized DSMES programs are also Diabetes Prevention Programs

• ADA can assist your organization in becoming a CDC Recognized DPP provider with our web-based DPP Charting Platform that aligns with the CDC DPP data collection reporting requirements

• ADA conducts free monthly DPP Charting Platform webinars. Register at www.diabetes.org/erpqa

For more information on the DPP Charting Platform contact the ADA at: erp@diabetes.org or 1.888.232.0822

Thank You!