Preventing a Chronic Disease by Management of Prediabetes

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&
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Disclosures

Eden M. Miller, D.O.
• Eli Lilly
• Novo Nordisk
• Astra Zeneca
• Jenssen
• Abbott
• Omnipod
• Behringer Ingelheim

Kevin T. Miller, D.O.
• I have nothing to disclose
What is Prediabetes?

- A1c > 5.7% but less than 6.5%
  - An A1c between 6.0%-6.5% has a 5 year risk of between 25%-50% of developing diabetes
  - Those with A1c >6.0% should have aggressive intervention.
- FPG from 100mg/dl to 125mg/dl
- 2 h PPG 75-g OGTT 140mg/dl to 199mg/dl

Who should be screened?

- Adults with BMI > 25 or Asian Americans >23
- High risk Ethnic Groups (African American, Latino, Native American, Asian American or Pacific Islanders)
- All people aged 45 or older
- Family history of Type 2 DM (First Degree Relative)
- Women with dx of PCOS or Gestational Diabetes
- Patients with dx of CVD, or HTN
- Physical Inactivity, other dysmetabolic conditions (HDL <35 or TG >250 ) or acanthosis nigricans
- Score 5 or higher on Diabetes Risk Test
Epidemiology of Prediabetes in US

- In 2012, 86 million people in the U.S. had Prediabetes
- 29 million have diagnosis of T2DM
- 1.4 million new patients diagnosed every year
- Order of prevalence based on ethnicity
  - Native American 15.9%
  - African American 13.2%
  - Hispanic 12.8%
  - Asians 9.0%
  - Caucasian 7.6%

Cost of Diabetes Management

- $322 Billion cost diagnosed diabetes
- $244 Billion in direct care:
  - 43% In patient hospital care
  - 18% Prescription medication for complications
  - 12% Anti diabetic agents and supplies
  - 9% Office visits
  - 1 in 5 Health Care dollars spent of DM
  - 40% increase from 2007-2012

- Expenditure for people with diabetes is 2.3 times higher than patients without.
The Economic Burden of Elevated Blood Glucose Levels in 2012: Diagnosed and Undiagnosed Diabetes, Gestational Diabetes Mellitus, and Prediabetes

Timothy M. Dall1†, Wenya Yang2, Pragna Halder2, Bo Pang2, Marjan Massoudi3, Neil Wintfeld3, April P. Semilla1, Jerry Franz1 & Paul F. Hogan2

• 2007, researchers found that over five years, the cost of prediabetes increased 74 percent (to $44 billion) while the cost of undiagnosed diabetes rose a staggering 82 percent (to $33 billion).

• $244 billion for diagnosed diabetes, $33 billion for undiagnosed diabetes, $44 billion for prediabetes, and $1.3 billion for GDM.

• Prediabetes costs $510 annually per person (medical costs only); undiagnosed diabetes, $4,030; and diagnosed diabetes, $10,970. The cost of GDM per case averaged $5,800 in higher delivery costs and other costs during the newborn’s first year of life. This cost increased as the patient aged at time of diagnosis.

Conclusion

These statistics underscore the importance of finding ways to reduce the burden of prediabetes and diabetes through prevention and treatment.
Improved Identification of at Risk Population

- Ample Evidence that DM2 genetic basis
  - 70% risk Mono Zygotic Twins vs. 20-30% Dizygotic Twins
  - 40% risk if one parent and 70% if 2 parents have DM

- Over 65 Genetic markers identified that increase the risk of developing T2DM

- They are non coding variant genes and only increase risk by 10-30%

- Not Enough conclusive evidence exists yet to be able to predict T2DM using genetic testing.

- **Best Prediction models include:** age, obesity, sedentary, low fiber/high fat diet, family/cultural history, gestational DM, elevated fasting glucose. HTN, dyslipidemia, and certain medications (HCTZ, Beta Blockers, and Statins)

- FINRISK Study has show the greatest predictor developing T2DM

Limitations of Prediabetes Diagnosis

- No Guarantee individual will develop disease

- Diagnostic Criteria are not 100% sensitive or specific

- As a result little research on pharmacologic evidence for primary prevention since “at risk population is difficult to be certain”
ICD-10 codes for “Prediabetes”

- R 73.0 Abnormal Glucose
- R 73.01 Impaired Fasting Glucose
- R 73.02 Impaired Glucose Tolerance
- R 73.03 Prediabetes
- R 73.09 Other Abn. Glucose including A1c
- R 73.9 Hyperglycemia Unspecified
- E 88.81 Metabolic Syndrome/ Insulin Resistant
- E 66. Obesity

Evidence Based Risk-Reduction

- 7%-10% weight loss
- 150 minutes moderate exercise per week
- Increased Fiber, lower Saturated Fat, Increased Fruit and Vegetable diet (Mediterranean Diet)
- Results 40-70% relative risk reduction
Pharmacological Intervention

• Metformin (strongest evidence based but less cost effective than lifestyle, 31-70% relative risk reduction)

• Alpha Glucosidase inhibitors

• Pioglitizone (72% risk reduction-DeFranzo)

• Orlistat

What can we do in our communities?
Prediabetes Primary Care Workflow

Prediabetes Risk Test

DO YOU HAVE PREDIABETES?
Prediabetes Risk Test

1. Have you ever been told by a doctor or healthcare provider that you had prediabetes?
2. Have you been told by a doctor or healthcare provider that you have diabetes?
3. Do you have high blood pressure with treatment or untreated systolic blood pressure greater than 130 mm Hg or diastolic blood pressure greater than 80 mm Hg?
4. Are you physically active? (Not much if any)
5. Are you overweight or obese? (BMI >30 kg/m²)

If you answered yes to any of the above questions, you may have prediabetes. You should talk to your healthcare provider to find out if you need to take action to lower your risk.

LOWER YOUR RISK

Tips for lowering your risk of type 2 diabetes:

1. Eat a healthy, balanced diet.
2. Get regular physical activity.
3.维持健康的体重。
4. Quit smoking.
5.限酒。
Patient Education Pamphlet

Did You Know?

- Prediabetes means blood sugar levels are high but not high enough to be called diabetes.
- People with prediabetes don’t usually have any symptoms.
- About 79 million Americans over the age of 20 have prediabetes. That’s about one in every three people!
- Women who have had diabetes during pregnancy are at increased risk for developing diabetes in the 10-20 years after pregnancy.
- Diabetes is a leading cause of heart disease, stroke, blindness, kidney disease and nerve damage.

Patient Education Pamphlet

Diabetes Risk Test
If you answer YES to any item write the number in the POINTS column. Add your points and write the number in the box next to TOTAL.

<table>
<thead>
<tr>
<th>DIABETES RISK TEST</th>
<th>YES POINTS</th>
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<tbody>
<tr>
<td>I had a baby weighing more than 9 pounds at birth OR I have had diabetes during pregnancy</td>
<td>1</td>
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<tr>
<td>I have a sister or a brother with diabetes</td>
<td>1</td>
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<tr>
<td>I have a parent with diabetes</td>
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<td>I am overweight. (See below)</td>
<td>5</td>
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<td>I am younger than 65 years of age AND get little or no exercise in a typical day</td>
<td>5</td>
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<td>I am between 45 and 64 years of age</td>
<td>5</td>
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<tr>
<td>I am 65 years of age or older</td>
<td>9</td>
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TOTAL POINTS

The good news is that lifestyle changes can prevent or delay diabetes in more than half of people with prediabetes.

Here are some ideas to get started:

- Learn about healthy food choices and start to make diet changes.
- Increase your physical activity.
- Learn coping skills to keep eating healthy and stay active!

At-Risk Weight Chart
If your weight is or over the weight listed next to your height add 2 points on the chart.

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>POINTS</th>
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<td>90+ lbs</td>
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Was your score 9 or higher?

A score of 9 or above does NOT mean you have diabetes but there are important steps you need to take now!

1. Schedule an appointment with your provider for a diabetes blood test.
2. Talk with your primary care team about ways to prevent diabetes.
3. Know there is good news if you have prediabetes!

Ask your care team about resources to help prevent diabetes today!
Patient Education Handout

Meal Planning - Plate Method

The plate method is easy!
- Start with a 9" plate
- Fill 1/2 with non-starchy vegetables
- Fill 1/4 with a protein
- Fill 1/4 with a carbohydrate

Portion sizes are key!

= protein portion size
= carbohydrate portion size

See the back for more portion size information

Patient Education Handout

Meal Planning - Sample Servings and Portion Sizes

Planning meals when you are trying to lose weight doesn’t have to be hard or include special “diet” food. Balanced meals with the right portion sizes is one of the best ways to help lose and control your weight. Changing how and what you eat will help you take the weight off for good. Your primary care team can help you plan meals that fit your diet and lifestyle.

Sample Servings

Carbohydrates
- Choose any 3 servings at each meal.
- Choose alternative breads and starches, fruits, some vegetables and some dairy items.
- Here are some examples of one serving of carbohydrates:
  - Breads and starches:
    - 1 slice bread, tortilla, or small roll
    - 1/2 cup rice or pasta
    - 1/2 cup cooked cereal
    - 1/2 cup dry cereal
    - 1/2 cup corn, peas, or potatoes
  - Fruits:
    - 1 piece, such as a medium pear or apple
    - 1 cup fresh fruit
    - 1/2 cup canned fruit in juice
  - Milk:
    - 1 cup skim or low-fat
    - 1 cup sugar-free low-fat yogurt

Meats and Proteins
- Choose 3-4 servings per meal.
- Exceptions of one serving of protein:
  - 1 ounce lean meat, poultry, or fish
  - 1 egg
  - 1 ounce cheese
  - 1/2 cup leafy green vegetables
  - 1/4 cup of cooked beans (black, kidney, or pinto)

Vegetables (non-starchy)
- Choose 3 servings per meal.
- 1 cup raw or 1/2 cup cooked

Fats
- Use only a little
- 1 teaspoon margarine, oil, or mayonnaise
- 1 tablespoon salad dressing or cream cheese

Portion Sizes

- 1 cup
- 1/2 cup
- 1 ounce
- 1/2 tablespoon
- 1 teaspoon

Developed by: [Image]
Community Resource Booklet

Central Oregon Nonprofit Community Resources for Preventing and Managing Type 2 Diabetes

All Materials Can Be Found For Free At:

www.cohealthcouncil/diabetes-clinical
Information Obtained

- American Diabetes Association
- National Institute of Health
- Centers for Disease
- Up to Date
- Diabetes Care