Diabetes Prevention: Keeping Our Eyes on the Prize!

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Thank you!
24 million with Diabetes

57 million with Pre-diabetes

Current Definitions of Pre-Diabetes

- **A1C**
  - 5.7% - 6.4%

- **Impaired Fasting Glucose (IFG)**
  - Fasting Blood Glucose Test (FBG)
    - Blood is tested after 8-hr fast.
    - 100 < 126 mg/dl (110 < 126 in rest of the world)

- **Impaired Glucose Tolerance (IGT)**
  - Oral Glucose Tolerance Test (OGTT)
    - Following the FBG patient is given 75 gm glucose solution.
    - 2 hrs later blood is tested again.
    - Fasting < 100 and 2-hr = 140 - < 200 mg/dl

- **Combined IFG and IGT (CIFGT)**
  - Fasting < 126 mg/dl and 2-hr = 140 - < 200 mg/dl

Lifetime Risk for Diabetes

- **Lifetime – from birth till death**
  - 33% (male), 39% (female)
    (Narayan KMV, et al. JAMA 2003;290:1884-1890)

- **Annual – adults**
  - ~ 1%

Intervention Time Window

- Tabak et al. - changes in glucose concentrations, insulin sensitivity, and insulin secretion as much as 3-6 years before diagnosis of diabetes in British Civil Servants (Lancet, Published Online June 8, 2009)

Other “Complications” of Pre-diabetes

- 5-year risk of total mortality increased 50-60%
- 5-year risk of CVD mortality increased 150%
  (Barr et al. Circulation 2007;116: July 18 online)
- Prevalent retinopathy about 8%
Lifestyle Intervention Trials
(All participants had pre-diabetes)

- Pan et al. (1997)
- Tuomilehto et al. (2001)
- Kosala et al. (2005)

Effect of Treatment on Incidence of Diabetes in the DPP
All participants had Impaired Glucose Tolerance (IGT)

<table>
<thead>
<tr>
<th></th>
<th>Placebo</th>
<th>Metformin</th>
<th>Lifestyle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Incidence</td>
<td>11.0%</td>
<td>7.8%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Relative reduction</td>
<td>----</td>
<td>31%</td>
<td>58%</td>
</tr>
<tr>
<td>Number needed to treat</td>
<td>----</td>
<td>13.9</td>
<td>6.9</td>
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</tbody>
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Further Benefits of Lifestyle Intervention:
Other CVD risk factors are also improved

- ↑ BP was present in 30% of subjects at entry - then ↑ in placebo and metformin groups, significantly ↓ with lifestyle
- TG levels ↓ in all treatment groups, but ↓ significantly more with lifestyle intervention

Further Benefits of Lifestyle Intervention:
Other CVD risk factors are also improved

- Lifestyle intervention significantly ↑ HDL level and ↓ cumulative incidence of the proatherogenic LDL phenotype B
- At 3 yr F/U the use of medications to achieve goals in the lifestyle group was 27–28% ↓ for hypertension and 25% ↓ for hyperlipidemia compared with placebo and metformin groups

Longer-term Impact?

- Finnish Diabetes Prevention Study (Lancet 2006)
  - During the total 7-year follow-up, the incidence of type 2 diabetes was still reduced by 43%.
- China DaQing Diabetes Prevention Study (Lancet 2008)
  - During the total 20-year follow-up, the incidence of type 2 diabetes was still reduced by 43%.
### Long-term Impact?

- **U.S. Diabetes Prevention Program Outcomes Study (Lancet 2009)**
  - During the total 10-year follow-up, the incidences of type 2 diabetes was still reduced by 34% in the lifestyle group and by 18% in the metformin group.

### Risk Factors for Type 2 Diabetes

- Age 45 and over
- Family History (first degree relatives with type 2)
- Ethnicity (African American, Hispanic, South Asian, Pacific Islander, and Native American)
- History of gestational diabetes.

### Risk Factors for Type 2 Diabetes

- Delivery of infants weighing 9 or more lbs.
- Poly Cystic Ovary Syndrome (PCOS)
- Overweight especially with abdominal obesity
- Presence of cardiovascular disease, hypertension, impaired glucose
- Physical inactivity

### Characteristics of a Person with Pre-Diabetes

- Fasting glucose between 100 and 125 mg/dl
- OGTT glucose levels between 140-199 mg/dl
- Borderline dyslipidemia
- Pre hypertension
- Elevated triglycerides
- Overweight or obese
- Decreased frequency of exercise
- Fair to poor eating habits

### Case Studies
Role of the Primary Care Provider

- Screen
- Educate
- Screen
- Educate
- Screen
- Educate

…Get the point!

Role of the Primary Care Provider

- Be vigilant in monitoring the risk factors for diabetes.
- Monitor urine protein/microalbumin, serum glucose, and lipid markers.
- Evaluate vital signs.
- Educate patients and their communities about the risk factors for and signs and symptoms of the different types of diabetes.
- Refer patients with pre-diabetes to available community diabetes prevention programs!

The (Y-DPP) referral process

- Simple, requiring minimal time on the part of the provider
- The basic measurements required include a blood glucose measurement, vital signs, and the BMI
- The patient takes the referral form to the YMCA once completed by the Primary Care Provider
National Diabetes Prevention Program

Goal:
• Systematically scale the translated model of the Diabetes Prevention Program (DPP) for high risk persons in collaboration with community-based organizations that have necessary infrastructure, health payers, public health, academia, and others to reduce the incidence of type 2 diabetes in the United States.

Four Key Pillars

(1) Training the work force that can implement the program cost effectively

(2) Implementing a recognition program that will contribute to assuring quality, lead to reimbursement, and allow CDC to develop a registry of programs for public reporting

Update on National Diabetes Prevention Program

• CDC signed contract with Emory University to establish DTTAC and currently developing Master Trainer curriculum and unifying Lifestyle Coach curriculum – expected final draft Nov/Dec 2010
• CDC currently developing the criteria for program recognition – expected final draft Sept 2010

Four Key Pillars

(3) Implementing sites that will build the infrastructure and some will provide a “laboratory” for additional refinement of this prevention system

(4) Increasing referrals and utilization of the prevention system through health marketing and other strategies
Update on National Diabetes Prevention Program

- CDC and Y-USA announced 11 model sites
- Y-USA and UnitedHealth Group announced 6 model sites
- CDC signed contract with MACRO – formative work
- Other partners and future efforts

New York State YMCA Diabetes Prevention Program (Y-DPP)

- For more information please contact:
  Tracy Mills, MPP
  NYS Diabetes Department of Health Diabetes Prevention and Control Program
  (518) 408-0125
txv03@health.state.ny.us

Evaluations

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