GLOBAL BURDEN OF DIABETES

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No conflicts of interest to disclose with regard to the content of this presentation.

Current RO1 funding from NIH National Heart Lung & Blood Institute.
### Diabetes is a Worldwide Epidemic

2013 ~ 382 million people with diabetes.

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total world population (billions)</td>
<td>7.0</td>
<td>8.3</td>
</tr>
<tr>
<td>Adult population (20–79 years, billions)</td>
<td>4.4</td>
<td>5.6</td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global prevalence (%)</td>
<td>8.3</td>
<td>9.9</td>
</tr>
<tr>
<td>Number of people with diabetes (millions)</td>
<td>366</td>
<td>552</td>
</tr>
</tbody>
</table>

Key Diabetes Statistics

• 2012 alone 1.5 million deaths.

• Direct annual global cost of diabetes > US$ 827 billion.

• Losses in GDP worldwide estimated to be US$ 1.7 trillion from 2010 to 2030.
Global Burden of Diabetes

http://www.idf.org/worlddiabetesday/facts-figures
# Number of people with diabetes (20-79 years), 2010 and 2030

<table>
<thead>
<tr>
<th>COUNTRY/TERRITORY</th>
<th>2010 MILLIONS</th>
<th>COUNTRY/TERRITORY</th>
<th>2030 MILLIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 India</td>
<td>50.8</td>
<td>1 India</td>
<td>87.0</td>
</tr>
<tr>
<td>2 China</td>
<td>43.2</td>
<td>2 China</td>
<td>62.6</td>
</tr>
<tr>
<td>3 United States of America</td>
<td>26.8</td>
<td>3 United States of America</td>
<td>36.0</td>
</tr>
<tr>
<td>4 Russian Federation</td>
<td>9.6</td>
<td>4 Pakistan</td>
<td>13.8</td>
</tr>
<tr>
<td>5 Brazil</td>
<td>7.6</td>
<td>5 Brazil</td>
<td>12.7</td>
</tr>
<tr>
<td>6 Germany</td>
<td>7.5</td>
<td>6 Indonesia</td>
<td>12.0</td>
</tr>
<tr>
<td>7 Pakistan</td>
<td>7.1</td>
<td>7 Mexico</td>
<td>11.9</td>
</tr>
<tr>
<td>8 Japan</td>
<td>7.1</td>
<td>8 Bangladesh</td>
<td>10.4</td>
</tr>
<tr>
<td>9 Indonesia</td>
<td>7.0</td>
<td>9 Russian Federation</td>
<td>10.3</td>
</tr>
<tr>
<td>10 Mexico</td>
<td>6.8</td>
<td>10 Egypt</td>
<td>8.6</td>
</tr>
</tbody>
</table>

* CHINA now # 1

U.S. Diabetes Statistics

- 25.8 million — 8.3% of the U.S. population
  1 of every 10 adults.
- 7 million undiagnosed.
- 2011 diabetes in 65–74yr. age group highest rates, 21.8%.
- 215,000 youth < 20 yrs. has diabetes.
- ~ 79 million adults ≥ 20 yrs. pre-diabetes.

www.cdc.gov/diabetes/statistics
Number (in Millions) of Civilian, Noninstitutionalized Persons with Diagnosed Diabetes, United States, 1980–2011

www.cdc.gov/diabetes/statistics/prev/national/figracesex.htm
# Emerging Diabetes Projections

(persons 20-79 years)

<table>
<thead>
<tr>
<th>Region</th>
<th>2010 millions</th>
<th>2030 millions</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFRICA</td>
<td>12.1</td>
<td>23.9</td>
<td>98</td>
</tr>
<tr>
<td>Middle East &amp; North Africa</td>
<td>26.6</td>
<td>51.7</td>
<td>94</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>58.7</td>
<td>101.0</td>
<td>72</td>
</tr>
</tbody>
</table>
21.5 million people have diabetes - 1 in 20 adults

Lowest prevalence across regions

Highest percentage of undiagnosed people

Highest percentage of deaths under the age of 60

Lowest diabetes-related expenditure – 1% of worldwide total

<table>
<thead>
<tr>
<th>Diabetes in Africa (20-79 years)</th>
<th>2014</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (millions)</td>
<td>924</td>
<td>1,511</td>
</tr>
<tr>
<td>Adult population (millions)</td>
<td>425.5</td>
<td>775.5</td>
</tr>
<tr>
<td>Number of people with diabetes (millions)</td>
<td>21.5</td>
<td>41.5</td>
</tr>
<tr>
<td>Regional prevalence (%)</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Comparative prevalence (%)</td>
<td>5.9</td>
<td>6</td>
</tr>
<tr>
<td>Undiagnosed cases (millions)</td>
<td>13.4</td>
<td>-</td>
</tr>
<tr>
<td>Total diabetes-related deaths (thousands)</td>
<td>480.9</td>
<td>-</td>
</tr>
<tr>
<td>Deaths under the age of 60 (%)</td>
<td>75.1</td>
<td>-</td>
</tr>
<tr>
<td>Total diabetes-related health expenditure (USD billions)</td>
<td>4.5</td>
<td>6.4</td>
</tr>
</tbody>
</table>
Definition of Diabetes Mellitus

• Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.

• The chronic hyperglycemia is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels.
Characteristics of Type 2 Diabetes

• Obese or have a history of obesity

• Family history of disease is common

• Frequently goes undiagnosed for years

• Typically occurs in adulthood but increasing in youth
Global Diabetes Complications

- Three-to fourfold increase in End Stage Renal Disease (ESRD), diabetes the single leading cause of ESRD in most countries

- 171 million with vision loss or impairment due to diabetes

- 1 million limb amputations yearly — one every 30 seconds; 85% preventable
Overweight Risks Are Increasing

Projected prevalence of overweight (BMI $\geq 25$ kg/m$^2$), women aged 30 and above, 2005

Projected prevalence of overweight (BMI $\geq 25$ kg/m$^2$), women aged 30 and above, 2015

* Body mass index

< 9.9%
10–24.9%
25–48.9%
50–74.9%
> 75%

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Figure 3.2
Proportion of diabetes (%) attributable to weight gain by region (30+ years)

North America/Cuba
Western Europe
Latin America/Caribbean
Central and Eastern Europe
Middle East
Western Pacific – China and Vietnam
Western Pacific – Japan, Australia, Pacific Islands
Africa
South-East Asia

Proportion of diabetes (%)

Source: © IOTF (2)
# Causes of chronic diseases

<table>
<thead>
<tr>
<th>UNDERLYING SOCIOECONOMIC, CULTURAL, POLITICAL AND ENVIRONMENTAL DETERMINANTS</th>
<th>COMMON MODIFIABLE RISK FACTORS</th>
<th>INTERMEDIATE RISK FACTORS</th>
<th>MAIN CHRONIC DISEASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globalization</td>
<td>Unhealthy diet</td>
<td>Raised blood pressure</td>
<td>Heart disease</td>
</tr>
<tr>
<td>Urbanization</td>
<td>Physical inactivity</td>
<td>Raised blood glucose</td>
<td>Stroke</td>
</tr>
<tr>
<td>Population ageing</td>
<td>Tobacco use</td>
<td>Abnormal blood lipids</td>
<td>Cancer</td>
</tr>
<tr>
<td></td>
<td>Non-modifiable risk factors</td>
<td>Overweight/obesity</td>
<td>Chronic respiratory diseases</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td></td>
<td>Diabetes</td>
</tr>
<tr>
<td></td>
<td>Heredity</td>
<td></td>
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</tr>
</tbody>
</table>
Finnish Diabetes Prevention Program

- 522 patients with Impaired Glucose Tolerance
- Age: 40-65 years
- Mean BMI: 31 kg/m²
- Intervention: diet and exercise
- Mean duration of follow up: 3.2 years

IGT = impaired glucose tolerance; BMI = body mass index.
Finnish Diabetes Prevention Study: Reduction in Risk for Diabetes*

*P<0.001; 4-year results

U.S. Diabetes Prevention Program (DPP) Population

Gender Distribution
- Men: 32%
- Women: 68%

Age Distribution
- 25-44: 31%
- 45-59: 49%
- ≥ 60: 20%

The DPP Research Group, *Diabetes Care* 23:1619-29, 2000
Study Interventions

Eligible Participants

Randomized

Standard Lifestyle Recommendations

Intensive Lifestyle (n = 1079)

Metformin (n = 1073)

Placebo (n = 1082)
Incidence of Diabetes

- Placebo (n=1082)
- Metformin (n=1073, p<0.001 vs. Placebo)
- Lifestyle (n=1079, p<0.001 vs. Metformin, p<0.001 vs. Placebo)

Risk reduction:
- 31% by metformin
- 58% by lifestyle

The DPP Research Group, NEJM 346:393-403, 2002
WHAT WE HAVE

• Evidence that metabolic control works
• Evidence that prevention (lifestyle) works
• WHO Diabetes Guidelines
• IDF Clinical Practice Guidelines
• Global Epidemic of Type 2 Diabetes
WHAT WE NEED:

• Global Community committed to comprehensive, integrated approach supported by policies & infrastructure

• Health care personnel trained in diabetes prevention & management
IDF World Diabetes Campaign

اليوم العالمي لمرض السكر
14 November

world diabetes day

siku ya kisukari duniani
tarehe 14 mwezi wa 11

día mundial de la diabetes
14 noviembre

Pasaules Diabēta Diena
14. novembris

विश्व मधुमेह दिवस
14 नवंबर

روز جهانی دیابت
14 آبان ماه