Michigan’s Diabetes Crisis: Today and Future Trends

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Institute for Alternative Futures
During their lifetimes:

1/2 will become obese

1 in 3 males & 2 in 5 females will get diabetes

Earlier disability

Life expectancy ↓ 2-5 years

Hannon, Tamara, et.al., Childhood Obesity and Type 2 Diabetes Mellitus, *Pediatrics* Vol. 116 No. 2 August 1, 2005 pp. 473-480
Increasing Prevalence of Obesity

Michigan Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>Adults over 20 y/o</th>
<th>Obesity Health costs for MI = 30B/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>15-19%</td>
<td>No Data</td>
</tr>
<tr>
<td>2005</td>
<td>25-29%</td>
<td>10-14%</td>
</tr>
<tr>
<td>2015</td>
<td>30-34%</td>
<td>15-19%</td>
</tr>
<tr>
<td>2030</td>
<td>35-39%</td>
<td>20-24%</td>
</tr>
</tbody>
</table>

Diagnosed Diabetes Projections

CDC 2006 = Narayan, Impact of Recent Increase in Incidence on Future Diabetes Burden, *Diabetes Care* 2006;29:2114-2116
Progression of Diabetes

Increasing Prevalence

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population (M)</th>
<th>Percent of Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>17.5 M</td>
<td>6.3%</td>
</tr>
<tr>
<td>2010</td>
<td>32.3 M</td>
<td>11.2%</td>
</tr>
<tr>
<td>2015</td>
<td>39.7 M</td>
<td>12.8%</td>
</tr>
<tr>
<td>2025</td>
<td>53.1 M</td>
<td>15.3%</td>
</tr>
</tbody>
</table>

Improvements in therapies and medical management over time are factored in

Percent of Total Population with Diabetes

- <6%
- 6-7%
- 8-9%
- 10-11%
- 12-13%
- 14-15%
- 16-17%
- 18-19%

Progression of Diabetes

Increasing Annual Diabetes Cost in $ Billions*

**Total Annual Direct Medical and Indirect Societal Costs of Diabetes in Billions of Dollars**

*Constant 2010 Dollars

# Increasing Prevalence of Diabetes

## DIABETES IN MICHIGAN

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2010</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Diabetes</td>
<td>625,800</td>
<td>1,156,300</td>
<td>1,639,900</td>
</tr>
<tr>
<td>Pre-diabetes</td>
<td>1,452,700</td>
<td>2,629,600</td>
<td>2,728,800</td>
</tr>
<tr>
<td>Annual Cost</td>
<td>$4.8B*</td>
<td>$10.6B</td>
<td>$15.8B</td>
</tr>
</tbody>
</table>

*Cost of diagnosed diabetes only

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Increasing Prevalence of Diabetes

DIABETES COMPLICATIONS IN MICHIGAN

131,800
Total Visual Impairment

1,770
New Kidney Failure

2,300
New Amputations

**Michigan: Race and Hispanic Origin**

### AFRICAN AMERICANS
- **216,300 cases of diabetes**
- Twice as likely to be diagnosed with diabetes*
- Almost twice as likely to die from diabetes*

*Compared to non-Hispanic Whites*

### HISPANIC AMERICANS
- **50,600 cases of diabetes**
- 90% greater risk of developing diabetes*
- 70% greater risk of renal failure*
- 50% greater risk of dying from diabetes*

### NATIVE AMERICANS
- **7,600 cases of diabetes**
- Twice as likely to be diagnosed with diabetes*
- Over twice the risk of renal failure & amputations*
- Life span shortened 13-17 years

### Increasing Prevalence of Diabetes

**DIABETES IN METRO DETROIT**

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2010</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Diabetes</td>
<td>288,900</td>
<td>512,000</td>
<td>703,000</td>
</tr>
<tr>
<td>Pre-diabetes</td>
<td>649,400</td>
<td>1,131,700</td>
<td>1,130,100</td>
</tr>
<tr>
<td>Annual Cost</td>
<td>$2.2 B*</td>
<td>$4.7 B</td>
<td>$6.8 B</td>
</tr>
</tbody>
</table>

*Cost of diagnosed diabetes only

Diabetes Data & Forecasts. 2025 Diabetes Forecasts for State and Metropolitan Areas Study by the Institute for Alternative Futures. This study utilizes: a national model from Narayan, Impact of Recent Increase in Incidence on Future Diabetes Burden. Diabetes Care 2006, 29:2114-2116; the latest CDC projections by Boyle; US Census Bureau population estimates; and latest CDC national diabetes statistics and state prevalence rates.
What Can Be Done?

Screening for Risks and Disease
Diabetes and America's Seniors

**Senior Population in Michigan**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 and older</td>
<td>1,334,500</td>
</tr>
<tr>
<td>Known diabetes</td>
<td>262,100</td>
</tr>
<tr>
<td>Undiagnosed diabetes</td>
<td>96,900</td>
</tr>
<tr>
<td>Pre-diabetes</td>
<td>667,200</td>
</tr>
<tr>
<td>Must find these:</td>
<td>764,100</td>
</tr>
</tbody>
</table>

Medicare pays for screening, but early on only 10% utilized it

Sources:
Screening

79,000,000 Americans Have Pre-diabetes

Diabetes Prevention Program:

- Lifestyle modification reduced incidence of diabetes 58% (71% seniors aged 60+) - 3 year follow-up
  - 30 minutes of physical activity 5 days a week
  - At least a 7% weight loss

- If 50% with prediabetes made these lifestyle changes, 330,000 fewer people would develop diabetes a year (~4,700,000 by 2025)
- 12,000,000 have undiagnosed diabetes
- May already be causing organ damage

What can be done?

Effective Management of Diabetes and its Comorbidities
Impact of Effective Management

- Effective management can lower decline of renal function by 30-70%
  - If 50% with diabetes complied with effective management it could prevent 15,000 cases of renal failure a year

Asheville Project

PATIENT SELF-MANAGEMENT PROGRAM

• Sponsored by employer – an investment
• Employees with diabetes volunteer
• Receive additional diabetes education
• Lab, glucometer, meds – no co-pays
• Meet with trained pharmacist
• Collaboration with doctor

Asheville Project

Results at 5 Years

Avg. Glycosylated Hemoglobin

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline</th>
<th>8 mos.</th>
<th>14 mos.</th>
<th>24 mos.</th>
<th>42 mos.</th>
<th>48 mos.</th>
<th>60 mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>7.6</td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
<td>6.7</td>
</tr>
</tbody>
</table>

LDL Cholesterol

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>121</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

Avg. Ann. Diabetic Sick-Leave

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline</th>
<th>14 mos.</th>
<th>24 mos.</th>
<th>36 mos.</th>
<th>48 mos.</th>
<th>60 mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>12.61</td>
<td>6.01</td>
<td>6.01</td>
<td>6.01</td>
<td>6.01</td>
<td>6.01</td>
</tr>
</tbody>
</table>

Total Individual Diabetes Medical Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>$6,127</td>
<td>$5,000</td>
<td>$4,000</td>
<td>$3,000</td>
<td>$2,000</td>
<td>$7,248</td>
</tr>
</tbody>
</table>

58% Savings

A Patient-Centered Medical Home

- Accountable team leader
- Continuity of care using evidence-based medicine
- Collaborative team of providers
- Ongoing Monitoring & support
- Electronic records
- Lifelong continuity of care
- Global payment with incentives for outcomes
- Entire health system of specialty care services
- Navigation, Education & coaching
- Shared decision-making
- Easy access to care
What can be done?

Prevention

Even if 50% of those with pre-diabetes dramatically changed their lifestyles starting now there would still be 48,400,000 people with diabetes in America in 2025

The only realistic solution is preventing pre-diabetes in the first place

Preventing Diabetes

Healthy Lifestyles

- Don't Smoke: 80%
- Maintain Healthy Wt.: 40%
- Eat 5 F&V/d: 20%
- Exercise 5X30: 3%
- Do all 4: 3%

Reeves, Healthy Lifestyle Characteristics Among Adults in the United States, 2000, *Arch Intern Med*, 2005
Preventing Diabetes

70% of premature death is lifestyle-related

50% of all illness & injuries in the last third of life can be eliminated by changing lifestyle

Healthy lifestyle can reduce cancer risk 36%, diabetes risk 93%, heart attack by 81%

Seniors who exercise 30 minutes 5 days a week and lose 7-15 pounds can prevent pre-diabetes from becoming diabetes by 71%

Why the “epidemic” of diabetes?

Our Lifestyles
### Dramatic Change in Our Food

<table>
<thead>
<tr>
<th></th>
<th>Calories (g)</th>
<th>Fat (g)</th>
<th>Sat Fat (g)</th>
<th>Carb (g)</th>
<th>Protein (g)</th>
<th>Sodium (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial Burrito</strong></td>
<td>1,174</td>
<td>60</td>
<td>23</td>
<td>142</td>
<td>52</td>
<td>2,295</td>
</tr>
<tr>
<td><strong>Tarahumara Burrito</strong></td>
<td>215</td>
<td>5</td>
<td>0.6</td>
<td>14</td>
<td>29</td>
<td>170</td>
</tr>
</tbody>
</table>

Community Action

Set up an environment in ways that make healthy choices easy

EAT WELL – Eat Better Mindlessly

Plant Slant

Smaller plates

Restaurant pledge

Healthy school lunches

Label “longevity foods”

Daily weight

Home gardens

Community Action

GET MOVING – Throughout the Day

Community Connections

Finding a Purpose

Diabetes Burden on Workers

- If onset of diabetes at age 40:
  - Quality of life shortened 18-22 years
  - Lifespan shortened 11-15 years
  - $2-4 \times \text{risk dying of heart disease}$
  - Avg. cost of complications $11,600/\text{year}^*$

*In 2010 dollars

Creating Healthy Employees

Bringing healthy behavior into the workplace
Creating Healthy Employees

Have a well designed wellness program

- **Health Risk Appraisal**
- **Advice Nurse**
- **Nutritional Counseling**
- **Health Education**

**Financial Incentives**
- $150 for health risk appraisal
- $20/mo for fitness center
- $14 per 1% weight lost
- $150 if quit smoking
- Redeemable points

**Online Support**
- Customized to employee needs
- Measure return on investment

Diabetes in Counties

Percent with Diagnosed Diabetes by County in 2007

Systems Dynamic Modeling of diabetes

Lifestyle Changes

Risks of diabetes

Pre-diabetes Management
Healthy lifestyles

Detection

Normal Blood Sugar

Diagnosed Pre-diabetes

Diagnosed Uncomplicated Diabetes

Diagnosed Complicated Diabetes

Death

Control of Diabetes
Clinical management, medications, self-monitoring & compliance, healthy lifestyles

Diabetes Prevalence

What can be done to reduce the prevalence of diabetes?

What can be done to reduce the prevalence of diabetes?

Clinical management ramped up from 48% in 2006 to 67% in 2012 with no further improvement after that.

Diabetes Prevalence

What can be done to reduce the prevalence of diabetes?

![Graph showing diabetes prevalence from 1980 to 2050. The baseline scenario shows a steady increase in cases per 1,000 adults. Clinical management and pre-diabetes lines show a reduction in cases starting in 2012.]

Ramp up management of pre-diabetes from 20% in 2006 to 50% in 2012 with no further improvement after that.

Diabetes Prevalence

What can be done to reduce the prevalence of diabetes?

![Graph showing diabetes prevalence from 1980 to 2050.](attachment:image.png)

- Baseline
- Clinical Mgmt
- Pre-diabetes
- Obesity

Obesity prevalence ramped down from 37% in 2006 to 27% in 2017 (1995 level) with no further improvement after that.

Reducing Diabetes Related Deaths

What can be done for reducing deaths associated with diabetes?

Challenges and Opportunities

• Diabetes is a rapidly growing societal burden for Michigan
• We know how to prevent and manage diabetes – must reach everyone
• My advice:
  › Health providers – screen & aggressively manage diabetes
  › Public – be proactive and get tested
  › Exercise 30 min × 5; eat 5 fruits & vegetables daily
Research funded by Novo Nordisk, Inc.

For more information: www.altfutures.org/diabetes2025