Health Disparities: High Prevalence of Diabetes in African Americans in Massachusetts

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What is Diabetes

**Type 1:**
- Is an **autoimmune** disorder
- Pancreas is **not able to make** the insulin hormone
- Blood sugar remains high as cellular uptake cannot occur
- There is **no** way to prevent Type 1 Diabetes

**Gestational:**
- Occurs when body **cannot** make enough insulin **during pregnancy**
- Hormones released during pregnancy cause insulin **resistance**
- Blood sugar remains high with no way to enter the cells
- **Preventable** with diet and physical activity

Information acquired from NIH
What is Diabetes

**Pre-diabetic:**
- Blood glucose levels are higher than normal but not high enough to be diagnosed as diabetes.
- Usually occurs in people who already have some insulin resistance or beta cells in the pancreas aren’t making enough insulin.
- Over time may lead to development of type 2 diabetes.

**Type 2:**
- The body doesn’t make enough insulin or does not use insulin efficiently.
- Resulting in too much glucose that stays in your blood, prevented from entering your cells.
- The most common type of diabetes, preventable/delayable with diet.

Information acquired from NIH

<table>
<thead>
<tr>
<th>A1C levels</th>
<th>Normal</th>
<th>Prediabetes</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.7%</td>
<td>6.5%</td>
<td></td>
</tr>
</tbody>
</table>
● Health disparity is a health difference within disadvantaged populations.

● The Black (Non-Hispanic) community is over twice as likely to have a diabetes diagnosis.
What are the risk factors?

Factors contributing to the health disparity such as:

- Higher **genetic predisposition** of gaining diabetes
- Lack of fresh quality **food and care**
- **Cost of treatment** can be too high
- All of these factors can be compounded and interplay to **increase risk** even further
Importance of a Zip Code

- Data collected in 2015 have shown that **poorer dietary habits** have a prominence in predominantly **lower-income** African American neighborhoods.

- Studies done by Portland State University showed that many African American patients felt that they faced **poor communication, discredited symptoms, and mistrust** when dealing with physicians. One third of participants were reported to have diabetes.

The demographic of Brockton, MA is 43.7% African American, 33.9% White, 11.9% Hispanic, 10.5% Other.
Cost of Treatment

- The annual cost of insulin is close to $6,000. Individuals earning $25,000 have a 2.5% higher prevalence of Type 2 Diabetes than those who earned $75,000 or more.

- The average annual out of pocket cost of insulin and other medication for privately insured individuals is $1,274.

- Individuals who are uninsured pay $2,456 out of pocket on insulin and medication prescriptions.

- The uninsured are more likely to report being unable to afford prescription medicines (38% versus 10%).
• There are currently **no definite** genetic determinants for Diabetes diagnosis.
  ○ Leptin resistance was thought of as a cure to the overconsumption from Type 2 diabetes
    ○ Disproven
  ○ The **HLA–DR7** gene is suspected to contribute to the **predisposition** of diabetes in African Americans.

• **Family history** is used to determine risk factors as there tends to be a **correlation** between immediate family members having diabetes (type 2) and patient diagnosis.
Map Graph of Diabetes in Massachusetts: 2006–2017

Rural Health Information Hub: Diagnosed Diabetes Prevalence 2017
https://www.ruralhealthinfo.org/data-explorer?id=192&state=MA
In 1993, 3.9% of Massachusetts Residents had diabetes; meanwhile, in 2015, 8.9% of the residents had diabetes. Over the course of 22 years, the percentage of individuals with diabetes increased more than double.
Of the 8.9% of residents:

- 12.3% of the individuals were **Black (non-Hispanic)**.
- 11.7% of the individuals were **Hispanic**.
- 8.7% of the individuals were **White (non-Hispanic)**.

![Diabetes Prevalence by Race and Ethnicity](chart.png)
For the mortality rate of Diabetes:

- **Black** individuals have a rate of **29.5** per 100,000 individuals.
  - This rate is **over double** the rate of the **general** population
- **Hispanic** individuals have a rate of **18.8** per 100,000 individuals.
- **White** individuals have a rate of **13.8** per 100,000 individuals.

![Graph showing Diabetes Age-Adjusted Mortality Rate per 100,000 Population by Race & Ethnicity]

Registry of Vital Records and Statics, 2014
Prevalence of Diabetes in African American versus General in US

African American Versus General population in US

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian or Alaska Native</td>
<td>15%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>12%</td>
</tr>
<tr>
<td>non-Hispanic Asian</td>
<td>10%</td>
</tr>
<tr>
<td>non-Hispanic Black</td>
<td>12%</td>
</tr>
<tr>
<td>non-Hispanic White</td>
<td>7%</td>
</tr>
</tbody>
</table>

Goldoftas 2014
There was a study conducted by the *African American Glucose and Insulin Genetic Epidemiology Consortium*:

- Considered the genetic determinants when looking at 30,000 African Americans and 57,000 individuals with European Ancestry.
  - Each individual had drawn blood samples to analyze their DNA.
- They discovered genetic variants associated with insulin levels and fasting glucose, and how they are expected to contain regulatory function.
  - It’s expected that portions of the regulatory functions are predictive protein coding function.
New developments within diabetes technology:

- Scientists from Harvard, Georgia Tech, and University of Missouri have developed a model of insulin producing pancreatic cells called “islets”
  - This has proven effective for treating type 1 diabetes in animal models for long-term immunosuppressive medicines.
Possible solutions

- Social programs establish equity in material acquisition for individuals that otherwise would succumb to socioeconomic disparity
- Policy changes
  - Decreasing cost of insulin for consumers by setting federal limits → preventing privatization of production
  - From a drug perspective: developing drugs that can be used to limit the need for consistent insulin consumption would be most ideal
Comparison between Massachusetts versus the U.S.

**U.S.**
- 7.4% White
- 12.1% Non hispanic Black
- 11.8% Hispanic

The average annual per capita cost of insulin costs is nearing $6,000.

**M.A.**
- 8.7% White
- 12.3% Non hispanic Black
- 11.7% Hispanic

A Massachusetts resident with diabetes spent an average $3,122 annually on insulin products in 2013, $4,684 annually on insulin itself.

**Both**
- The greatest prevalence of Diabetes is present in the Black Community
THANK YOU!

Any Question?
Sources


Sources


