Diabetes 101: An Overview for Medical Translators and Interpreters

Tracy Young BSN, MA, RN, CHI
Introduction
1. True or False: There are only three types of diabetes.
2. True or False: Globally, the number of people with diabetes rose from 108 million in 1980 to 422 million in 2014 (290% increase).
What we will cover

- Types and definitions of diabetes mellitus
- Epidemiology of diabetes mellitus (causes and risks)
- Cultural implications
- State-of-the-art and controversial treatments
Adults with diabetes (2018 data)

- 32.1 million of all ages - 13% of US population has diabetes
- Percentage increases with age, those over 65 = 26.8%
- Diabetes and race: American Indian, Hispanic, Blacks, Asians, and Whites

Race and education related to diabetes

**Appendix Table 3. Age-adjusted prevalence of diagnosed diabetes by detailed race/ethnicity, education level, and sex among adults aged 18 years or older, United States, 2017–2018.**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total Percentage (95% CI)</th>
<th>Men Percentage (95% CI)</th>
<th>Women Percentage (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race/ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>14.7 (14.6–14.7)</td>
<td>14.5 (14.4–14.6)</td>
<td>14.8 (14.7–14.9)</td>
</tr>
<tr>
<td>Asian, non-Hispanic, overall</td>
<td>9.2 (8.0–10.5)</td>
<td>10.0 (8.3–12.0)</td>
<td>8.5 (7.0–10.5)</td>
</tr>
<tr>
<td>Asian Indian</td>
<td>12.6 (9.3–16.7)</td>
<td>13.9 (10.3–18.6)</td>
<td>11.1 (6.6–18.0)</td>
</tr>
<tr>
<td>Chinese</td>
<td>5.6 (3.9–8.1)</td>
<td>5.9 (3.5–9.8)</td>
<td>5.3 (3.2–8.8)</td>
</tr>
<tr>
<td>Filipino</td>
<td>10.4 (8.1–13.4)</td>
<td>10.9 (7.6–15.4)</td>
<td>10.0 (6.8–14.6)</td>
</tr>
<tr>
<td>Other Asian</td>
<td>9.9 (8.1–12.2)</td>
<td>11.5 (8.5–15.3)</td>
<td>8.7 (6.2–11.9)</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>11.7 (10.8–12.7)</td>
<td>11.4 (10.0–12.9)</td>
<td>12.0 (10.9–13.1)</td>
</tr>
<tr>
<td>Hispanic, overall</td>
<td>12.5 (11.5–13.5)</td>
<td>13.7 (12.3–15.2)</td>
<td>11.6 (10.2–13.0)</td>
</tr>
<tr>
<td>Central/South American</td>
<td>8.3 (8.0–8.6)</td>
<td>9.2 (8.8–9.6)</td>
<td>7.6 (7.2–8.0)</td>
</tr>
<tr>
<td>Cuban</td>
<td>6.5 (4.6–9.2)</td>
<td>7.3 (4.2–12.5)</td>
<td>6.0 (3.6–9.8)</td>
</tr>
<tr>
<td>Mexican</td>
<td>14.4 (13.1–15.8)</td>
<td>16.2 (14.2–18.3)</td>
<td>12.8 (11.1–14.8)</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>12.4 (10.1–15.1)</td>
<td>13.0 (9.5–17.6)</td>
<td>11.9 (9.0–15.5)</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>7.5 (7.2–7.8)</td>
<td>8.6 (8.1–9.0)</td>
<td>6.6 (6.2–7.0)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>13.3 (12.4–14.2)</td>
<td>13.0 (11.8–14.4)</td>
<td>13.6 (12.3–15.1)</td>
</tr>
<tr>
<td>High school</td>
<td>9.7 (9.1–10.4)</td>
<td>11.2 (10.4–12.1)</td>
<td>8.6 (7.9–9.4)</td>
</tr>
<tr>
<td>More than high school</td>
<td>7.5 (7.2–7.9)</td>
<td>8.3 (7.8–8.8)</td>
<td>6.8 (6.4–7.3)</td>
</tr>
</tbody>
</table>

Note: CI = confidence interval.
Data sources: 2017–2018 National Health Interview Survey, except American Indian/Alaska Native data, which were from the Indian Health Service National Data Warehouse (2017 data only).

The many faces of diabetes in American youth
Diabetes epidemic

Figure 3. Age-adjusted, county-level prevalence of diagnosed diabetes among adults aged 20 years or older, United States, 2004, 2008, and 2016

Note: Data were unavailable for some US territories. Data sources: US Diabetes Surveillance System; Behavioral Risk Factor Surveillance System.

Abbreviations

- **ADA** - American Diabetes Association *AND* Autoimmune Diabetes in Adults
- **BG** - Blood Glucose
- **CGM** - Continuous Glucose Monitor
- **DM** - Diabetes Mellitus
- **FBS** - Fasting Blood Sugar
- **GDM** - Gestational Diabetes Mellitus
- **LADA** - Latent Autoimmune Diabetes in Adults
- **MODY** - Maturity-Onset Diabetes of the Young
Basic anatomy

- Oesophagus
- Liver
- Bile ducts
- Gallbladder
- Stomach
- Pancreas
NORMAL closed loop pancreas

Glucose in blood stream

Pancreas produces insulin hormone into blood stream

Insulin hormone maintains glucose homeostasis

Insulin “unlocks” cell for glucose to enter
Five types of diabetes mellitus

1. Diabetes type I
2. Diabetes type I.5
3. Diabetes type II
4. MODY
5. Gestational diabetes
DM type I

Glucose in blood stream

Pancreas produces insulin hormone in blood stream

Insulin hormone maintains glucose homeostasis

Insulin "unlocks" cell for glucose to enter
DM type I: Frequency, causes, risk factors

- CDC estimates 1.6 million Americans have DM type I: www.diabetes.org
- >85% of all cases are youth <20 years old (= affected gender)
- Etiology (cause): autoimmune destruction of pancreatic beta cells. Body makes an antibody against beta cells and eventually body destroys own beta cells
- Risk factors: family history, genetics, geography, age, race

Cultural considerations
LADA Latent Autoimmune Diabetes in Adults

Glucose in blood stream

Pancreas produces insulin hormone in a blood stream

Insulin hormone maintains glucose homeostasis

Insulin “unlocks” cell for glucose to enter
LADA- Diabetes I.5: Frequency, causes, risk factors

- Latent = hidden
- Accounts for 2-12% of all diabetes cases
- ADA-Autoimmune Diabetes in Adults
- Both type I and I.5 have antibodies which make it autoimmune (antibodies slightly different)
- Major difference between LADA and DM type I = no insulin needed for several months up to years after diagnosis
- Slow progression beta cell failure
- Risk factors: obesity, insulin resistance, diabetes type II

https://diabetes.diabetesjournals.org/content/54/suppl_2/S68
DM type II

Glucose in blood stream

Pancreas produces insulin hormone into blood stream

Insulin hormone maintains glucose homeostasis

Insulin “unlocks” cell for glucose to enter
DM type II: Frequency, causes, risk factors

- 90% of all diabetes is type II
- Otherwise known as “insulin resistance”
- Simply can’t get the glucose into the cells
- Sugar and insulin toxicity
- Not autoimmune
- Risk factors: obesity, inactivity, gestational diabetes
MODY (Mature Onset Diabetes of the Young)

Glucose in blood stream

Pancreas produces insulin hormone in blood stream

Insulin hormone maintains glucose homeostasis

Insulin “unlocks” cell for glucose to enter
MODY: Frequency, causes, risk factors

- Up to 5% of all diabetes cases may be due to MODY
- Inherited genetic mutation
- Not autoimmune
- 50% chance of passing along the gene mutation to their children
- Negatively affects beta cells - interrupts insulin production process
- There are 11 different types of MODY caused by changes in 11 different genes
- Risk factor: genetics
Gestational diabetes

Glucose in blood stream

Pancreas produces insulin hormone into blood stream

Insulin hormone maintains glucose homeostasis

Insulin "unlocks" cell for glucose to enter
Gestational Diabetes: Frequency, causes, risk factors

- 1-12% of pregnant women suffer from GDM
- Usually starts to develop around 6 months gestation
- Caused by pregnancy hormones
- Temporary form of diabetes
- Risk factors: more than 35 yrs. old, obesity, family history, previous history of GDM, poly cystic ovarian syndrome.
- Risk of developing regular DM within 5 years

[Health.Harvard.edu](http://Health.Harvard.edu)
State-of-the-art treatments: CGM

The sensor filament is less than 0.4 mm thick

For illustrative purposes only. Image not drawn to scale.
Closed loop artificial pancreas
State-of-the-art treatment: Insulin pods/patches
Smart insulin patches - the future?
A cure for DM type I?

- Cure: Pancreatic transplant for type I or any insulin-dependent
- Risks of the transplant (specifically the anti-rejection meds); benefits must outweigh the risks of DM
- Often because of ESRD, there is a simultaneous kidney and pancreas transplant
- Very few transplants performed: 500-1000/year in USA (www.kidney.org)
Can DM II be cured?

- No cure
- Controversial treatment plan:
  - “Reversing Type 2 diabetes starts with ignoring the guidelines” by TEDxPurdueU Dr. Sarah Hallberg
  - “carbohydrate/sugar toxicity” “ignore the ADA guidelines”
    https://www.youtube.com/watch?v=da1vvigy5tQ&t=222s
- Remission: Not taking meds; labs normal 6 months
- Reverse: (resolved) lost more than 30 pounds, high % don’t ever have to take meds again
## Summary

<table>
<thead>
<tr>
<th>TYPE OF DIABETES</th>
<th>RISK FACTORS</th>
<th>AUTOIMMUNE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM TYPE I</td>
<td>Family history, genetics, age, race</td>
<td>YES</td>
</tr>
<tr>
<td>DM TYPE 1.5</td>
<td>Obesity, insulin resistance, DM Type II</td>
<td>YES</td>
</tr>
<tr>
<td>DM TYPE II</td>
<td>Obesity, inactivity, GDM</td>
<td>NO</td>
</tr>
<tr>
<td>MODY</td>
<td>Genetics</td>
<td>NO</td>
</tr>
<tr>
<td>GDM</td>
<td>Obesity, &gt;35 years old, family history, poly cystic ovarian syndrome, history of GDM</td>
<td>NO</td>
</tr>
</tbody>
</table>
Post-Assessment/Poll question #3

True or False: Diabetes type I is treated with hormone replacement therapy.
Post-Assessment/Poll question #4

True False: Diabetes type II can be 100% cured.
Post-Assessment/Poll question #5

Which is true regarding Gestational Diabetes?

a) An elephant can have it also
b) It mostly happens to mothers under 30 years old
c) If you get it once, you are more likely to get it again
d) It is an autoimmune disease
Resources/Websites

- Adcesconnect.org- Association of Diabetes Care and Education Specialists
- Cdc.gov
- Diabetes.org= American Diabetes Association
- Mayoclinic.org
- Nih.gov
- Who.int
- Drperlmutter.com (Grain Brain)
Let food be thy medicine, 
& medicine be thy food.  
-Hippocrates

Thank you, Tracy
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