Diabetes 101

- The Burden of Diabetes
- Risk Factors for Diabetes
- Types of Diabetes
- Symptoms of Low and High Blood Sugar
The Burden of Diabetes in the United States

1.9 million new cases were diagnosed in 2010 among people aged \( \geq 20 \) years\(^1\)

- Diabetes is found in 22–24% of residents in LTC settings\(^2\)*

*Assisted living facilities and nursing homes.

---


Diabetes Has a Major Impact on Individuals and Society

- Diabetes is the leading cause of kidney failure, new cases of blindness, and nontraumatic lower limb amputations among adults in the United States\(^1\).
- Individuals with diabetes have a heart disease-related death rate and stroke risk that is 2 to 4 times higher than those without diabetes\(^1\).
- The risk of death among individuals with diabetes is approximately **double** the risk for individuals of similar age who do not have diabetes\(^1\).
- The estimated direct cost of diabetes is projected to **triple**, from over $100 billion in 2007\(^1,2\) to over $300 billion by the year 2034\(^2\).
- 32% of Medicare spending is attributed to diabetes care\(^3\).

The Dual Epidemics of Obesity and Diabetes

**Obesity (BMI ≥30 kg/m²)**

1994

**Diabetes**

- Missing Data
- 14.0 - 17.9%
- 18.0 - 21.9%
- ≥26.0%

- Missing Data
- 4.5 - 5.9%
- 6.0 - 7.4%
- ≥9.0%

The Dual Epidemics of Obesity and Diabetes

Obesity (BMI ≥30 kg/m²)

2008

How Food Becomes Sugar (Glucose)

- During digestion, some food is broken down to glucose
- Insulin, a hormone made by the pancreas, lowers the level of sugar in the blood by helping sugar move from blood into cells
- The body’s cells use sugar for energy

Pancreas

How Glucose and Insulin Work Together

- Eating, stress, illness, and medications can RAISE glucose levels
- Insulin, exercise, and medications can LOWER glucose levels

BLOOD GLUCOSE LEVEL

EATING STRESS ILLNESS MEDICATIONS

INSULIN EXERCISE MEDICATIONS
How Insulin Works in a Healthy Individual

- In individuals who do NOT have diabetes, the body makes insulin to help the body use sugar for energy.
- Insulin levels rise in response to eating meals, but there is always some insulin in the blood.

Figure adapted with permission of the American Society for Clinical Investigation, Inc., from Twenty-four-hour profiles and pulsatile patterns of insulin secretion in normal and obese subjects. Polonsky KS, Given BD. Van Cauter E. J Clin Invest. Volume 18, 1988, 442-448; permission conveyed through Copyright Clearance Center, Inc.

Diabetes Is a Group of Diseases: Two Main Types

**Type 1 Diabetes**
- The pancreas does not make any or enough insulin
- Usually diagnosed in children and young adults

**Type 2 Diabetes**
- The body is not making enough insulin and/or the body is not using its insulin properly
- Environmental factors, such as diet, may increase the risk

Type 2 diabetes accounts for roughly 90%-95% of all adult cases of diabetes

What Is Associated with Type 2 Diabetes?

- Being obese
- Being of older age
- Having a family member who has diabetes
- Being a member of certain racial/ethnic groups
- Having diabetes during pregnancy

No one knows exactly what causes diabetes – but we do know what can increase the chance an individual can get type 2 diabetes

Type 2 Diabetes Is Progressive\textsuperscript{1-3}

\begin{center}
\begin{tikzpicture}
    \begin{axis}[
        title={\(\beta\)-cell function in relationship to the progression of type 2 diabetes},
        xlabel={Years From Diagnosis},
        ylabel={\(\beta\)-cell Function, \%},
        xmin=-12, xmax=12,
        ymin=0, ymax=100,
        xtick={-12,-8,-4,0,4,8,12},
        ytick={0,25,50,75,100},
        \end{axis}
    \end{tikzpicture}
\end{center}

At diagnosis, people with type 2 diabetes have already lost 50\% of \(\beta\)-cell function.

Given that people with type 2 diabetes in LTC will generally have a long-standing diagnosis, \(\beta\)-cell function is likely very low.

The beginning of the beta-cell loss was estimated by extrapolation back to 100\% function and the lack of significant insulin secretion by extrapolation forward.

IGT = impaired glucose tolerance.

Many individuals with type 2 diabetes will eventually need insulin.

Figure adapted with permission from Lebovitz HE. Insulin secretagogues: old and new. \textit{Diabetes Rev} 1999; 7(3):139-153.

What Is Hyperglycemia?¹,²

- Hyperglycemia is high blood sugar (glucose)¹
- May result from not enough production and/or use of insulin²
- Repeated episodes of high blood sugar can lead to complications²

Hyperglycemia can lead to problems in many parts of the body²

---

Hypercglycemia: Warning Signs to Look For¹*

- Blurry vision
- Very thirsty
- Need to urinate often
- Wounds that won’t heal

*Signs and symptoms of hyperglycemia may present differently in the elderly.²

What Is Hypoglycemia?

- Another name for hypoglycemia is low blood sugar (glucose)\(^1\)
- Blood sugar less than 70 mg/dl\(^2\)*
- May result from too much medication OR missed/poorly timed meals\(^1\)
- For treatment of hypoglycemia, review your facility protocol or check with the healthcare provider in charge\(^3\)

If not treated, could lead to falls, unconsciousness, or death\(^1,3\)

---

*Elderly have an elevated risk of hypoglycemia and may develop hypoglycemia at different blood sugar levels*

2. ADA. *Diabetes Care* 2011; 34(suppl 1):S11-S61.
Hypoglycemia: Warning Signs to Look For$^{1,2}$*

The person may be:
- Sweaty or clammy
- Sleepy or tired
- Dizzy or uncoordinated
- Irritable or confused
- Weak or shaky
- Hungry

*Signs and symptoms of hypoglycemia may present differently in the elderly.$^2$

Diabetes Can Cause Problems in Many Parts of the Body: What Problems Can You Look For?

**Eyes:**
- Blurred vision/vision loss

**Heart:**
- Chest pain
- Shortness of breath
- May not have any symptoms

**Kidneys:**
- Swelling in feet and legs
- Increase in blood pressure

**Nerves:**
- Unusual sensations: tingling, burning, numbness, or shooting pain
- Problems with digestion
- Sexual dysfunction

**Blood Vessels:**
- Slow healing of wounds

ADA. Diabetes Care 2010; 33(suppl 1):S11-S61.
Summary of Key Points

- Individuals with diabetes have high levels of blood sugar
- Recognizing the warning signs for hyperglycemia (high blood sugar) and hypoglycemia (low blood sugar) is important
- Type 2 diabetes is a progressive disease, and many individuals will require insulin over time
- Diabetes can cause serious problems in many parts of the body
Please click the link below to complete the Diabetes Training.

https://docs.google.com/forms/d/1S-vhu16LKqM_dWDJsF7XY_xYFUT-Gz4awljkwOGjVc/viewform