Obesity, Diabetes and Cardiovascular Disease

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Diabetes and Prediabetes

30.3 million Americans, or 9.4% of the population have diabetes.

23.1 million were diagnosed
7.2 million were undiagnosed.

1.5 million Americans are diagnosed with diabetes every year.

Americans age 65 and older remains high and increasing at 25.2%
12.0 million seniors (diagnosed and undiagnosed).

84.1 million Americans age 18 and older have prediabetes
Diabetes Rate by State, 2017

Select years with the slider to see historical data. Hover over states for more information. Click a state to lock the selection. Click again to unlock.

Percent of adults with diabetes
- 0 - 3.9%
- 4 - 7.5%
- 8 - 11.9%
- 12 - 15.9%
- 16%+

Diabetes among adults, 1990 to 2017
Natural History of Type 2 Diabetes

- Incretin effect
- β-Cell function
- Insulin resistance
- Insulin secretion
- Postprandial glucose
- Fasting glucose

Years from diagnosis: -10, -5, 0, 5, 10, 15

Onset, Diagnosis, Microvascular complications, Macrovascular complications, Prediabetes, Type 2 diabetes

Figure courtesy of CADRE.
TABLE 1. Criteria for Testing for Diabetes or Prediabetes in Asymptomatic Adults

1. Testing should be considered in overweight or obese (BMI ≥25 kg/m² or ≥23 kg/m² in Asian Americans) adults who have one or more of the following risk factors:
   - First-degree relative with diabetes
   - High-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
   - History of CVD
   - Hypertension (≥140/90 mmHg or on therapy for hypertension)
   - HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
   - Women with polycystic ovary syndrome
   - Physical inactivity
   - Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)

2. Patients with prediabetes (A1C ≥5.7% [39 mmol/mol], IGT, or IFG) should be tested yearly.

3. Women who were diagnosed with GDM should have lifelong testing at least every 3 years.

4. For all other patients, testing should begin at age 45 years.

5. If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.

IFG, impaired fasting glucose; IGT, impaired glucose tolerance.
Heart disease occurs 2-3x more often in adults with Type 2 Diabetes than those without.
Endothelial dysfunction drives atherosclerotic progression

Atherosclerosis is accelerated in T2D by hyperglycaemia, insulin resistance, inflammation and diabetic dyslipidaemia

T2D: type 2 diabetes
Figure adapted from Libby P. Circulation 2001;104:365
Visceral adiposity is related to inflammation, insulin resistance, dyslipidaemia and atherosclerosis

Interactions are complex, inter-related and not necessarily causal

- OBESITY
  - Adipocytokines
    - ↓ Adiponectin
    - ↑ inflammatory cytokines
    - ↑ Oxidative stress
  - Insulin resistance
  - Hypertension
  - Age

T2D
- Dyslipidaemia
- Endothelial dysfunction

Atherosclerosis

*Including: TNFα, IL-6, resistin, PAI-1, angiotensin
IL-6, interleukin 6; PAI-1, plasminogen activator inhibitor-1; T2D, type 2 diabetes
MAKING THE DIABETES HEART CONNECTION
Understanding the Link between Type 2 Diabetes and Cardiovascular Disease

DIABETES IN THE U.S.
Diabetes affects 28 million – one in eleven – people in the U.S. At least, 1 in 3 people will develop diabetes in their lifetime.

% of Population Living with Diabetes
15-20%
20-25%
25-30%
30-35%
35-40%
40%

UNKNOWN RISK OF CARDIOVASCULAR DISEASE
Of people with diabetes, LESS THAN HALF are aware of their increased risk of cardiovascular diseases.

This lack of awareness prevents people with diabetes, their families, and their healthcare providers from addressing risks and improving health.

COSTS OF DIABETES & RELATED CARDIOVASCULAR DISEASE
$245 BILLION
Annual estimated medical costs and economic losses from premature death and disability caused by diabetes.

More than 26% of cost of treating diabetes relates to cardiovascular complications.

CHANGE STARTS WITH AWARENESS

Saving lives starts with raising awareness of the risks and taking action to protect health.

You can help! Learn more about National Diabetes Heart Connection Day, November 9th, and year-round efforts: (list website)


Abdominal obesity is associated with increased risk of both diabetes and CVD

![Graph showing the relationship between waist circumference and frequency of CVD and diabetes in men](image)

CVD, cardiovascular disease
Population of 168,000 primary care patients across 63 countries
To decrease the Risk of Developing Diabetes
To decrease the Risk of Developing Cardiovascular Disease

✓ Decrease weight
✓ Strive for more of your blood sugar to be 90-140
✓ Exercise

Primary goal of prediabetes management is weight loss, as well as improve lipid profile and BP.

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Joint pain
Difficulty
Breathing
No Energy
Frustration
Failure
Depressed
Hunger vs Cravings
What to eat
Family situation
Denial
A 60 year male, with a history of Diabetes, has been large most of his adult life. He currently weighs 298 lbs and is 5’8”.

He is on Metformin, a SGLT-2 and on long acting insulin. He also takes a statin.

It is difficult for him to get around. He has trouble breathing. His feet are numb most of the time and he continually needs to get a new eye glass prescription.

One day he was rushed to the hospital as he was experiencing a cardiac event. The next day he had open heart surgery.

A month later he attended a family members wedding, smiling from ear to ear and with his heart pillow close to him at all times. The majority of the extended family had not seen him since his surgery. He proceeded to the buffet line and chose the large portions that he was always used to getting, and finished off with going to the bar and getting a regular coke.
Many months prior to this event, when asked to describe why her father was the best in the world, his daughter said this,

“ My dad always let me help out in the kitchen, he would let me choose the shape of the pancakes or stir noodles, then as I grew older we talked about the important stuff while we cooled in the kitchen- boys, life etc. We always ended up singing or dancing around as we cooked. We ate dinner as a family and my greatest memories of my dad are around mealt ime”
“Never judge someone by the way he looks, or a book by the way it’s covered; For inside those tattered pages, there’s a lot to be discovered.”

STEPHEN COSGROVE