

## Diabetes

### What is diabetes?

Diabetes is a condition in which the body can't properly use sugar for energy. To understand diabetes, you first need to know how we get fuel from the food we eat. Certain foods, called carbohydrate, break down to sugar during digestion. This sugar is put in the blood stream. As the amount of sugar in the blood goes up, our body puts out insulin from the pancreas. Insulin's job is to get sugar out of the blood and into the cells of the body where it can be used for energy. Diabetes causes the body to be unable to make or use insulin. This leaves too much sugar in the blood.

Common symptoms include:

- Increased thirst
- Frequent urination
- Extreme hunger
- Weight loss
- Fatigue

### What causes diabetes?

The ultimate cause of diabetes is the body not being able to make or use insulin. What causes this is not well known and differs for the types of diabetes. Genetics and environment both play a roll.

### Types of diabetes:

There are two main kinds of diabetes: Type 1 and Type 2

- Type 1 - your immune system kills off the cells of the pancreas that make insulin. When enough are gone, your pancreas stops making insulin and you must take insulin to live. Type 1 is more common in young people but can happen in older people too.
- Type 2 - your body still makes insulin but does not use it well. This is called insulin resistance, meaning your body is still making insulin but not able to use it well. Type 2 is most common in adults but is becoming more common in young people, particularly overweight adolescents.

### How is diabetes diagnosed?

Blood tests done by your doctor can confirm the amount of sugar in your blood and tell if it is in the normal range. Blood sugar may be tested after you have gone for several hours without eating or randomly. A test called hemoglobin A1C (Hgb A1c) can give information on the estimated average glucose for the past 3 months, giving a bigger picture than just one blood draw. In addition to testing blood sugar, other labs can be done to help determine the kind of diabetes – type 1 or type 2.

- **C-Peptide**  
Measures how much C-peptide is in a person's blood. Peptide levels typically mirror insulin levels in the body. Low levels of C-peptide and insulin can point to T1D.
- **Insulin Autoantibodies (IAA)**  
Identifies antibodies that destroy insulin.

- **Insulinoma-Associated-2 Autoantibodies (IA-2A)**  
Identifies antibodies against a specific enzyme in the insulin making cells (beta cells) of the pancreas and is a common T1D antibody tests.
- **Zinc Transporter 8 (ZnT8Ab)**  
Identifies antibodies targeting an enzyme that is specific to the beta cells.
- **Islet Cell Cytoplasmic Autoantibodies (ICA)**  
Identifies a type of islet cell antibodies present in up to 80 percent of people with T1D. Islet cells are a cluster of cells in the pancreas that contain the beta cells.
- **Glutamic Acid Decarboxylase Autoantibodies (GADA or Anti-GAD)**  
This test looks for antibodies built against a specific enzyme in the beta cells.

### **Potential complications of diabetes:**

Diabetes can cause both short-term and long-term problems.

- Short-term problem
  - Low blood sugars
  - Presence of ketones

**Low blood sugars** can be caused by extra activity, too little food or too much insulin. Early symptoms of low blood sugars are sweating, shaking and dizziness. If they go unnoticed or untreated, they can go on to more dangerous symptoms like confusion, unconsciousness, or seizures.

**Ketones** happen when the body cannot get sugar out of the blood for fuel. Fat is then broken down for fuel and ketones are made during this process. If not treated ketones can lead to diabetic ketoacidosis (DKA) which causes nausea, vomiting, confusion, and unresponsiveness. This can quickly become a medical emergency.

- Long-term complications are caused by years of high blood sugars. Include damage to:
  - Eyes
  - Kidneys
  - Heart
  - Nervous system.

Diabetes and uncontrolled blood sugars are the leading cause of blindness, kidney failure and amputations. Good control of blood sugars greatly minimizes the risk of these things happening.

### **Tests to monitor for complications of diabetes:**

Close follow-up with your doctor is essential for good health. Routine follow-up is recommended every 3-6 months. At these visits the Hgb A1c will be tested and blood sugars from home monitoring equipment will be reviewed to see if any parts of the treatment plan need changed.

Other tests include:

- Screening at time of initial type 1 diagnosis for other autoimmune conditions such as thyroid disorders and celiac disease
- Blood pressure at each routine visit
- Lipid testing after initial glucose control has been achieved and the child is  $\geq 2$  years old
- Kidney function testing once the child has been diagnosed with diabetes for 5 years **and** they reach puberty or are over age 10, whichever is first
- Dilated eye exam once the child has been diagnosed for 3-5 years and every 2 years after that

### **Ways to prevent complications:**

Since the risk of diabetes complications is more common in those with high blood sugars, every effort should be taken to control blood sugar daily. People with diabetes need to monitor their blood sugar several times each day and make changes to their treatment plan to bring most of the numbers into range. At regular doctor's visits issues can be identified when they are in the early stage and the doctor can adjust the treatment plan.

### **Treatment for diabetes:**

Type 1 diabetes is always treated with insulin. Since no insulin is produced by the pancreas it must be injected multiple times each day or administered by an insulin pump.

Type 2 diabetes may be treated with insulin, oral medication or other injectable medications. Changes in food intake and increased activity are also part of the treatment plan for type 2 since these can decrease insulin resistance.

### **Go to the Emergency Department or dial 911 right away if you have:**

High levels of ketones in your urine (moderate or larger) and the following:

- **Vomiting**
- **Stomach pain**
- **Deep, labored breathing**
- **Confusion**

Additional Information on diabetes can be found here:

American Diabetes Association- [www.diabetes.org](http://www.diabetes.org)

Beyond Type 1- [www.beyondtype1.org](http://www.beyondtype1.org)

Centers for Disease Control and Prevention- [www.cdc.gov](http://www.cdc.gov)

Children's Hospital- [www.childrensomaha.org](http://www.childrensomaha.org)

Juvenile Diabetes Research Foundation- [www.jdrf.org](http://www.jdrf.org)