

Diabetes Mellitus, Type 1

Type 1 diabetes mellitus is a chronic disease in which the body makes no or only low levels of the hormone insulin. This results in higher than normal levels of sugar, or glucose, in the blood. Diabetes can cause serious complications. However, with good medical care and education, your child with diabetes can lead a healthy, active life.

What is type 1 diabetes mellitus?

Children with type 1 diabetes cannot make enough insulin, which the body needs in order to use glucose (blood sugar) for energy. Lack of insulin allows blood sugar to rise high enough that it comes out in urine. Glucose in urine brings water along with it, so urination becomes frequent and the body loses water. This makes it easier for your child to become dehydrated.

Without insulin, the body uses fats for energy, which results in the body's becoming more acidic. This "acidosis" is not healthy and can cause certain symptoms. Your child will need insulin injections to replace the missing insulin.

Type 1 diabetes is a lifelong problem that requires close attention to medications, diet, and activity. Living with diabetes is difficult for children, especially during the teen years. However, learning to control diabetes allows your child to live a relatively normal life. Type 1 diabetes mellitus was formerly called "insulin-dependent" or "juvenile" diabetes.

What does it look like?

- Type 1 diabetes usually develops in previously healthy children. It can start at any age but most often occurs in children between the ages of 7 and 15.
- Typical symptoms of diabetes may develop gradually over time or all of a sudden:
 - Tiredness, lack of energy.
 - Frequent thirst; drinking a lot of water.
 - Frequent urination and sometimes wetting the bed.
 - Weight loss, despite eating a lot.
 - In girls, yeast infections of the vagina.

- ! • **Hypoglycemia** is a complication of treatment with insulin, occurring when the blood sugar level drops too low. It is very important to identify hypoglycemia. In infants and young children, it can affect intellectual development. Symptoms include:
 - Shakiness.
 - Sweating.

- Fussiness in infants.
- Behavior changes, such as drowsiness.
- In severe cases, confusion, coma, and seizures.

It can be difficult to recognize hypoglycemia in infants and young children. That's one reason why blood sugar levels are allowed to be higher in this age group than in older children.

- **Ketoacidosis.** If insulin levels become very low and blood glucose levels very high, your child may develop a condition called *diabetic ketoacidosis*. Inability to use glucose leads to production of acids in the body. Symptoms of diabetic ketoacidosis include:
 - Abdominal pain.
 - Nausea and vomiting.
 - Weakness or dizziness.
 - Confusion.

As ketoacidosis becomes worse, your child becomes more dehydrated. He or she may pass out and have trouble breathing. *This is an emergency!*

What causes type 1 diabetes?

- In type 1 diabetes, the body's own immune system destroys special cells in the pancreas. These cells, called beta cells, make the body's insulin. After the beta cells are destroyed, your child's body can no longer make enough insulin. The reason why the immune system destroys beta cells is unknown.
- A combination of factors may affect the risk of diabetes. These include genetic and environmental factors, such as infections or chemicals. Sometimes type 1 diabetes occurs when the pancreas is infected with a virus.


What puts your child at risk of type 1 diabetes?

- If you or any family members have diabetes, your child may be at higher risk.
- Certain racial/ethnic groups are at higher risk of diabetes, for example, people from Northern Europe.
- Another type of diabetes, type 2, is more frequent in overweight or obese children.

What are the possible complications of type 1 diabetes?

Type 1 diabetes can cause many types of complications. Learning to manage your child's blood glucose levels can reduce the long-term risk of these complications. Complications of diabetes include:

- Damage to the retina of the eye.
- Damage to the kidneys.
- Increased risk of diseases involving the blood vessels, including heart disease and stroke.


 Patients with diabetes are at risk of life-threatening complications:

- *Ketoacidosis*, as previously described.
- *Hypoglycemia*, caused by very low blood glucose levels.
- It is very important to know how to recognize and treat these complications. See later, under “Treatment of diabetic emergencies.”

How is type 1 diabetes treated?

If your child has type 1 diabetes, we may recommend a visit to an endocrinologist (an expert in treating hormone-related diseases, including diabetes). Treatments for type 1 diabetes include:

- *Insulin shots*. Treatment for type 1 diabetes focuses on replacing the insulin that the body cannot produce on its own. This is done by giving insulin injections (shots) on a regular schedule:
 - You’ll be taught to give your child insulin injections. Older children will learn to give themselves insulin shots.
 - The type, dose, and timing of insulin shots depend on your child’s blood glucose levels. For example, your child may need to take three or four shots of insulin per day. Shots are usually given before meals and at bedtime.
 - An insulin pump is a good choice for some diabetic patients, especially teens. A battery-powered pump is placed under the skin to provide a continuous supply of insulin.
 - Your child’s insulin treatment will be adjusted according to his or her blood glucose levels or other factors.
 - Additional changes may be needed in certain situations, for example, when your child gets sick or during periods of high stress.
- *Blood glucose monitoring*. You (or your child) will be taught to measure his or her blood glucose level several times a day. Recording the results will help to make sure diabetes is under the best possible control. Modern test devices have made blood glucose monitoring easier than ever.
- *Education*. You and your child will receive training in how to use insulin, how to monitor blood glucose levels, how to recognize danger signs of low or high glucose levels, and how to prepare appropriate meals for a person with diabetes.

 *Treatment of diabetic emergencies*. Learning how to recognize and treat hypoglycemia and ketoacidosis is an essential part of your child’s diabetes care:


- *Hypoglycemia* occurs when blood sugar levels drop too low:

- If symptoms are mild, the first step is to check your child’s blood sugar level. If symptoms are more severe (for example, if your child is becoming drowsy), start treatment immediately and check blood sugar levels later.

- Give your child something sweet, for example, juice or candy.

- Give your child a shot of glucagon. You will be supplied with and taught how to use this emergency medication. It is used when the blood sugar level needs to be raised immediately.

- *Ketoacidosis* occurs when your child’s blood sugar rises to a high level, meaning not enough insulin is present and so *acids* are produced.

- Call your endocrinologist or call our office—get medical help immediately! 

- Give insulin as instructed by the doctor.

- Give as much fluid as possible to manage dehydration.

- It can be very difficult to remember all of the information you need to manage your child’s diabetes, especially at first! With time, however, you and your child can learn what you need to know to keep diabetes under control. This allows your child to live as normal a life as possible while reducing the risk of serious complications.


Psychological issues. Having a child diagnosed with type 1 diabetes is a traumatic event for your family. Parents may feel anxious and guilty. Your diabetic child may feel rebellious, especially during the teenage years. Counseling may help your family to deal with difficult feelings and family conflicts.


When should I call your office?

Call your endocrinologist, or call our office, if any of the following occurs:

- Your child develops any of the symptoms of diabetes mellitus (fatigue, frequent thirst or hunger, excessive urination).

- You and your child are having difficulty performing diabetes self-management or keeping blood glucose levels under control.

- Your child develops symptoms of ketoacidosis (abdominal pain, nausea and vomiting, weakness or dizziness, and confusion). *This is an emergency!* 

- Your child has frequent episodes of hypoglycemia or develops moderate/severe hypoglycemia (confusion, weakness, sweating, paleness, unconsciousness, or seizures). *This is an emergency!* 

Where can I get more information?

- American Diabetes Association: www.diabetes.org or 1-800-DIABETES (1-800-342-2383).
- National Diabetes Information Clearinghouse: www.diabetes.niddk.nih.gov or 1-800-860-8747.