

Diabetes is a disturbance of carbohydrate metabolism. Diabetes occurs when your pancreas cannot make enough insulin or when your body cannot use the insulin effectively, known as insulin resistance.

The immunosuppressant medicines essential for the future health of your transplanted organ can produce a rise in blood sugar level in those with existing diabetes or produce glucose intolerance or diabetes in those who do not have diabetes prior to transplantation.

Insulin is the hormone that helps control blood sugar levels in the body. It is made in the pancreas. The immunosuppressant medicines can alter insulin production. The effect on blood sugar levels can vary from person to person and different doses of the medicines.

It is important to maintain normal blood sugar levels. Elevated blood sugar can cause multiple problems for the brain, heart, feet, eyes, kidneys and nerves with increased cardiovascular complications such as myocardial infarcts (heart attacks) and make you at greater risk for infection and delayed wound healing.

What are your blood sugar level targets?

- Pre-meal sugar level:
90-110 mg/dL
- 2 hour post-meal blood sugar:
< 180 mg/dL

Blood sugar monitoring

Self-blood sugar monitoring is the key to successful diabetes management. If you have elevated blood sugars post-transplant, you should check levels at least 2-4 times per day or more frequently if you are experiencing fluctuations in your levels.

Typical times for blood sugar checks include before meals, two hours following meals, bedtime and possibly overnight. Monitoring helps you to identify your current control, blood sugar patterns and possible reasons for blood sugar changes.

Diabetes is a quiet condition where your body does not always sense changes in your blood sugar levels—monitoring helps you to gain and maintain control. **IT IS IMPORTANT THAT YOU BRING YOUR BLOOD SUGAR RECORDS TO YOUR APPOINTMENTS** with your healthcare team so that medication changes can be made if required.

What is high blood sugar?

High blood sugar refers to sugar levels greater than 200 mg/dL. It is called hyperglycemia.

Symptoms of high blood sugar levels

The signs of high blood sugar are:

- fatigue / feeling tired
- thirst
- nausea
- frequent urination
- blurred vision
- weight loss

However, it is important to note that these symptoms often go unnoticed or do not occur until blood sugar levels are very high—greater than 250 mg/dL.

Diabetes (continued)

High blood sugar can be caused by:

- overeating
- stress
- insufficient amount of insulin
- inactivity
- illness
- weight gain
- certain medicines

If you experience high blood sugar levels, you should:

- call your doctor or transplant coordinator
- take your insulin as prescribed
- check your blood sugar levels every 2-4 hours
- drink plenty of sugar-free fluids (1 glass per hour)
- see your doctor if you have uncontrolled vomiting or diarrhea

What is low blood sugar?

Low blood sugar refers to sugar levels less than 70 mg/dL. It is called hypoglycemia.

The first symptoms of low blood sugar are:

- sweating
- headache, dizziness
- hunger
- shaking
- nervousness
- palpitations
- faintness

Later signs can include:

- confusion
- agitation

If a person has had diabetes for many years or if they are experiencing low blood sugar levels frequently, they can lose their ability to sense the first symptoms described above (the body's warning signs), this is called "hypoglycemia awareness." This can be dangerous because the person may not be able to treat the low blood sugar himself or herself and may require someone to help them.

Treatment for all blood sugar levels less than 70 mg/dL requires the person with diabetes to follow the "Rule of 15."

1. Take 15 grams of quick acting sugar carbohydrates (3-4 glucose tablets), regular soda or juice (4 oz.)
2. Wait 15 minutes
3. Recheck blood sugar level
4. If blood sugar less than 70 mg/dL, repeat steps 1-4

Contact your coordinator or doctor if you are experiencing low blood sugar levels frequently.

Why am I taking insulin?

You are taking insulin because insulin is needed to control your blood sugar levels in your body. It is important to control blood sugar levels because elevations can cause complications to the brain, heart, feet, eyes, kidneys and nerves. Elevated blood sugars make you at greater risk for infection and delayed healing.

Diabetes (continued)

What are the types of insulin?

There are many different types of insulin available to help people control their blood sugar levels. These insulins differ in how fast they work (onset), when they have their greatest effect (peak) and how long they work (duration). Most insulins prescribed today are made from genetically altered bacteria that is chemically identical to human insulin.

Rapid-Acting Insulin:

Humalog[®], Novolog[®], Apidra

ONSET: less than 15 minutes

PEAK: 1-2 hours

DURATION: 3-4 hours

Regular-Acting Insulin:

Humulin R, Novolin R

ONSET: 30 minutes - 1 hour

PEAK: 2-3 hours

DURATION: 3-6 hours

Intermediate-Acting Insulin:

Humulin N, Novolin N

ONSET: 2-4 hours

PEAK: 4-10 hours

DURATION: 10-16 hours

Long-Acting Insulin:

Lantus, Levemir

ONSET: 2-4 hours

PEAK: peakless; relatively flat

DURATION: 20-24 hours

Pre-mixed Insulin:

Rapid-Acting: 50/50, 75/25, 70/30

Regular mix: 70/30, 50/50

ONSET: Depends on mix

PEAK: Depends on mix

DURATION: Depends on mix

How is insulin given?

Insulin is administered primarily through an injection — either by syringe, insulin pen or insulin pump. Inhaled insulin has recently become available but is only suitable for a small group of people.

Education is important to ensure insulin is administered safely and effectively.

