FYI

Diabetes

Hyperglycemia

You have diabetes, which means you have to deal with some of the problems that go along with having the disease. One of those problems is hyperglycemia. Hyperglycemia happens from time to time all people who have diabetes.

Hyperglycemia can be a serious problem if you don't treat it. Hyperglycemia is a major cause of many of the complications that happen to people who have diabetes. For this reason, it's important to know what hyperglycemia is, what its symptoms are, and how to treat it.

Hyperglycemia is the technical term for high blood sugar. High blood sugar happens when the body has too little, or not enough, insulin or when the body can't use insulin property.

A number of things can cause hyperglycemia. For example, if you have type 1diabetes, you may not have given yourself enough insulin. If you have type 2 diabetes, your body may have enough insulin, but it is not as effective as it should be.

The problem could be that you ate more than planned or exercised less than planned. The stress of an illness, such as a cold or flu, could also be the cause. Other stresses, such as family conflicts or school or dating problems, could also cause hyperglycemia.

What are the symptoms of hyperglycemia?

The signs and symptoms include: high blood sugar, high levels of sugar in the urine, frequent urination, and increased thirst.

Part of keeping your diabetes in control is checking your blood sugar often. Ask your doctor how often you should check and what your blood sugar levels should be. Checking your blood and then treating high blood sugar early will help you avoid the other symptoms of hyperglycemia.

It's important to treat hyperglycemia as soon as you detect it. If you fail to treat hyperglycemia, a condition called ketoacidosis (diabetic coma) could occur. Ketoacidosis develops when your body doesn't have enough insulin. Without insulin, your body can't use glucose for fuel. So, your body breaks down fats to use for energy.

When your body breaks down fats, waste products called ketones are produced. Your body cannot tolerate large amounts of ketones and will try to get rid of them through the urine. Unfortunately, the body cannot release all the ketones and they build up in your blood. This can lead to ketoacidosis.

Ketoacidosis is life threatening and needs immediate treatment. Symptoms include:

shortness of breathe	nausea and vomiting
Breathe that smells fruity	a very dry mouth

Talk to your doctor about how to handle this condition.

How do you treat hyperglycemia?

Often, you can lower your blood sugar level by exercising. However, if your blood sugar is above 240 mg/dl, check your urine for ketones. If you have ketones, do NOT exercise.

Exercising when ketones are present may make your blood sugar level go even higher. You'll need to work with your doctor to find the safest way for you to lower your blood sugar level.

Cutting down on the amount of food you eat might also help. Work with your dietitian to make changes in your meal plan. If exercise and changes in your diet don't work, your doctor may change the amount of your medication or insulin or possibly the timing of when you take it.

How do you prevent hyperglycemia?

Your best bet is to practice good diabetes control. The trick is learning to detect and treat hyperglycemia early – before it can get worse.

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Conditions & Treatments of Diabetes

In Type 1 Diabetes, the body does not produce insulin, which is needed to take sugar from the blood to the cells. You can learn more about these conditions and how to prevent them in this section. You will also find helpful information about insulin, diagnostic tests and tips on what to expect from your health provider.

Hypoglycemia
Hypoglycemia, or low blood sugar, can happen even during those times when you are doing all you can to control your diabetes.

Hyperglycemia
Hyperglycemia is a major cause of many of the complications that happen to people who have diabetes. For this reason, it is important to know what hyperglycemia is, what its symptoms are, and how to treat it.

Ketoacidosis
Ketoacidosis is a serious condition where the body has dangerously high levels of ketones – or acids that build up in the blood – and it can lead to diabetic coma (passing out for a long time) or even death.

Managing Your Blood Glucose
Keeping your blood sugar as close to normal as possible helps you feel better and reduces the risk of long-term complications of diabetes. Learn about checking your blood sugar, tight diabetes control, and an AIC test.

About Insulin
In people with Type 1 Diabetes, the pancreas no longer makes insulin. The beta cells have been destroyed. They need insulin shots to use glucose from meals. Learn more about insulin.

Transplantation
Diabetes sometimes damages kidneys so badly that they no longer work. When kidneys fail, one option is a kidney transplant. There are also pancreas transplants, as well islet cell transplants.

Related Conditions
Learn more about celiac disease, hemochromatosis and frozen shoulder, and how they relate to Type 1 Diabetes, in this section.

Ketoacidosis

Ketoacidosis is a serious condition that can lead to diabetic coma (passing out for a long time) or even death. Ketoacidosis may happen to people with Type 1 Diabetes.

Ketoacidosis occurs rarely in people with Type 2 Diabetes. But some people – especially older people – with Type 2 Diabetes may experience a different serious condition. It is called hyperosmolar nonketotic coma

Ketoacidosis means dangerously high levels of ketones. Ketones are acids that build up in the blood. They appear in urine when your body does not have enough insulin. Ketones can poison the body. They are a warning sign that your diabetes is out of control or that you are getting sick.

Treatment for ketoacidosis usually takes place in hospitals. But you can help prevent ketoacidosis by learning the warning signs and checking your urine and blood regularly.

What are the warning signs of ketoacidosis?

Ketoacidosis usually develops slowly. But when vomiting occurs, this life-threatening condition can develop in a few hours. The first symptoms are:

Thirst or a very dry mouth
Frequent urination
High blood sugar levels
High levels of ketones in the urine

Next, other symptoms appear:

Constantly feeling tired
Dry or flushed skin
Nausea, vomiting, or abdominal pain (Vomiting can be caused by many illnesses, not just ketoacidosis. If vomiting continues for more than two hours, contact your health care provider.)
A hard time breathing (short, deep breaths).
Fruity odor on breath
A hard time paying attention, or confusion

Ketoacidosis is dangerous and serious. If you have any of the above symptoms, contact your health care provider IMMEDIATELY, or go to the nearest emergency room of your local hospital.

How do you know if you have large amounts of ketones?

A simple urine test can detect ketones. You use a test strip, like a blood testing strip. Ask your health care provider when and how you should test for ketones. May experts advise to check your urine for ketones when your blood sugar is more than 240 mg/dl.

When you are ill (when you have a cold or the flu, for example), check for ketones every 4 to 6 hours. And check every 4 to 6 hours when your blood sugar is more than 240 mg/dl.

Also, check for ketones when you have any symptoms of ketoacidosis.

What if you find higher-than-normal levels of ketones?

If your health care provider has not told you what levels of ketones are dangerous, then call when you find moderate amounts after more that one test. Often, your health care provider can tell you what to do over the phone.

Call your health care provider at once if:

Your urine tests show large ketones
Your urine tests show large ketones and your blood sugar level is high.
You have vomited more than twice in 4 hours and your urine tests show high ketones

Do **NOT** exercise when your urine tests show ketones and your blood sugar is high. High levels of ketones and your blood sugars can mean your diabetes is out of control. Check with your health care provider about how to handle this situation.

What causes ketoacidosis?

Ketones mean your body is burning fat to get energy. Moderate or large amounts of ketones in your urine are dangerous. They upset the chemical balance of the blood.

Commonly, the flu, a cold, or other infections may sometimes bring on a ketoacidosis.

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Checking Your Blood Glucose

People with diabetes work to keep their blood sugar (glucose) as near to normal as possible. Keeping your blood glucose in your target range can help prevent or delay the start of diabetes complications such as nerve, eye, kidney, and blood vessel damage.

When you learned you had diabetes, you and your health care team worked out a diabetes care plan. The plan aims to balance the foods you eat with your exercise and possibly diabetes pills or insulin. You can do two types of checks to help keep track of how your plan is working. These are blood glucose checks and urine ketone checks.

Blood Sugar (Glucose) Monitoring Checks

Blood glucose monitoring is the main tool you have to check your diabetes control. This check tells you your blood glucose level at any one time. Keeping a log of your results is vital. When you bring this record to your health care provider, you have a good picture of your body's response to your diabetes care plan. Blood glucose checks let you see what works and what doesn't. This allows you and your doctor, dietitian, or nurse educator to make needed changes.

Who Should Check?

Experts feel that anyone with diabetes can benefit from checking their blood sugar. The American Diabetes Association recommends blood sugar checks if you have diabetes and are:

taking insulin or diabetes pills
on intensive insulin therapy
pregnant
having a hard time controlling your blood sugar levels
having severe low blood sugar levels or ketones from high blood sugar levels
having low blood sugar levels without the usual warning signs

Urine Checks

Urine checks for sugar are not as accurate as blood glucose checks. Urine testing for sugar should not be done unless blood testing is impossible.

A urine check for ketones is another matter. This check is important when your diabetes is out of control or when you are sick. You can find moderate or large amounts of ketones in urine when your body is burning fat instead of glucose for fuel. This happens when there is too little insulin at work. Everyone with diabetes needs to know how to check his or her urine for ketones.

How Blood Checks Work

You stick your finger with a special needle, called a lancet, to get a drop of blood. With some meters, you can also use your forearm, thigh or fleshy part of your hand. There are spring-loaded lancing devices that make sticking yourself less painful. Before using the lancing device, wash your hands or site you chose with soap and water. If you use your fingertip, stick the side of your fingertip by your fingernail to avoid having sore spots on the frequently used part of your finger.

Checking With a Blood Glucose Meter

Blood glucose meters are small-computerized machines that "read" your blood sugar. In all types of meters, your blood sugar level shows up as a number on a screen (like that on your pocket calculator). Be sure your doctor or nurse educator shows you the correct way to use your meter. With all the advances in blood glucose meters, using a meter is better than visual checking.

Are Meters Accurate?

Experts testing meters in the lab setting found them accurate and precise. That's the good news. The bad: Meter mistakes most often come from the person doing the blood checks. For good results you need to do each step correctly. Here are other things that can cause your meter to give a poor reading:

- a dirty meter
- a meter or strip that's not at room temperature
- an outdated test strip
- a meter not calibrated (set up for) the current box of test strips
- a blood drop that is too small

Ask your health care team to check your skills at least once a year. Error can creep in over time.

Checking for Ketones

You may need to check your urine for ketones once in a while. Ketones in the urine is a sign that your body is using fat for energy instead of using sugar because not enough insulin is available to use sugar for energy. Ketones in the urine is more common in type 1 diabetes.

Urine tests are simple, but to get good results, you have to follow directions carefully. Check to be sure that the strip is not outdated. Read the insert that comes with your strips. Go over the correct way to check with your doctor or nurse.

Here's how most urine tests go:

Get a sample of your urine in a clean container. Place the strip in the sample (you can also pass the strip through the urine stream). Gently shake excess urine off the strip. Wait for the strip pad to change color. The directions will tell you how long to wait. Compare the strip pads to the color chart on the strip bottle. This gives you a range of the amount of ketones in your urine. Record your results

What do your results mean? Small or trace amounts of ketones may mean that ketone buildup is starting. You should test again in a few hours. Moderate or large amounts are a danger sign. They upset the chemical balance of your blood and can poison the body. Never exercise when your urine checks show moderate or large amounts of ketones and your blood glucose is high. These are signs that your diabetes is out of control. Talk to your doctor at once if your urine results show moderate or large amounts of ketones. Keeping track of your results and related events is important. Your log gives you the date and your doctor and diabetic educator need to adjust your diabetes care plan.

When to Test

Ask you doctor or nurse when to check for ketones. You may be advised to check ketones when:

- your blood glucose is more than 300 mg/dl
- you feel nauseated, are vomiting, or have abdominal pain
- you are sick (for example, with a cold or flu)
- you feel tired all the time
- you are thirsty or have a very dry mouth
- your skin is flushed
- you have a hard time breathing, your breath smells "fruity"
- you feel confused or "in a fog"

These can be signs of high ketone levels that need your doctor's help.