PATIENT & CAREGIVER EDUCATION

About Hyperglycemia (High Blood Sugar)

This information describes hyperglycemia (HY-per-gly-SEE-mee-uh), what causes it, and how to recognize, prevent and treat it. It also talks about different types of diabetes.

What is hyperglycemia?

Hyperglycemia is when too much glucose (sugar) builds up in your bloodstream. This can cause you to feel tired and run down or get sick.

There are 2 types of hyperglycemia:

- **Acute hyperglycemia** happens when a person's blood glucose spikes suddenly over a period of days or weeks.
- **Chronic hyperglycemia** happens when a person's blood glucose rises slowly over a long period of time.

Causes of hyperglycemia

Hyperglycemia can happen if your body doesn't make enough insulin or can't easily use the insulin it makes. Insulin is a hormone that lets glucose go from your bloodstream into your cells. If your body does not have enough insulin, glucose stays in your bloodstream and causes hyperglycemia.

Treatment-related hyperglycemia

Some cancer treatments can raise your blood glucose and cause hyperglycemia, including chemotherapy and steroid treatment. Getting nutrition from tube feedings or total parenteral nutrition (TPN) can also cause hyperglycemia.

You may need to keep your blood glucose within a certain range during certain treatments. Your diabetes healthcare provider may prescribe insulin or oral (by mouth) diabetes medicine to improve your glucose levels. They will also explain how to check your blood sugar and how often.

Treatment-related hyperglycemia usually goes away after treatment ends. If it doesn't, you may have had blood glucose issues before treatment. Keep checking your blood glucose and taking your medicine until your diabetes healthcare provider tells you to stop.

Risk factors for hyperglycemia

Hyperglycemia is more likely to happen if you:

- Have type 1 or type 2 diabetes mellitus (DM) or pre-DM.
- Are not getting enough diabetes medicine to control your blood glucose levels.
- Are not injecting insulin correctly.
- Are using expired insulin or insulin that has gone bad. This can happen if insulin gets too hot or too cold.
- Have not been active enough.
- Eat too many carbohydrates. Read *How To Manage Your Blood*

Glucose (Blood Sugar) With Your Diet (www.mskcc.org/pe/blood-sugar-diet) to learn more.

- Are getting nutrition from tube feedings or TPN.
- Are sick or have an infection.
- Have physical stress, such as an injury or surgery.
- Have emotional stress, such as from treatment or problems in your personal life.
- Have had all or part of your pancreas removed.
- Are taking certain medications. Examples include:
  - Steroids, such as prednisone or dexamethasone (Decadron®).
  - Immunosuppressants, such as tacrolimus and sirolimus.
  - Certain types of chemotherapy, targeted therapy, immunotherapy, or hormone therapy. Talk with your healthcare provider to learn more.

Signs and symptoms of hyperglycemia

Your body's cells need glucose for energy to work as they're supposed to. For example, if the cells in your muscles don't have energy, you may feel tired and run down. If your white blood cells don't have energy, your body can struggle to fight off infection.

The signs and symptoms of high blood sugar can vary from mild to severe (very bad). They may happen acutely (suddenly) if there is a specific trigger. These include developing type-1 diabetes mellitus (T1DM) or steroid-induced hyperglycemia (high blood sugar caused by steroids).

For people with type-2 diabetes mellitus (T2DM), symptoms

usually start out mildly and develop slowly over a long time. Mild signs and symptoms can be hard to recognize and may not feel the same to everyone. Because of this, it can take many years to notice or diagnose T2DM.

Acute hyperglycemia

Acute hyperglycemia happens suddenly. Signs and symptoms of acute hyperglycemia include:

- Feeling very thirsty.
- Having a dry mouth.
- Feeling like you need to urinate (pee) often.
- Having dry skin.
- Feeling more hungry than usual.
- Having blurry vision.
- Feeling drowsy.

Severe hyperglycemia

Acute hyperglycemia can get worse if it is not treated. This can lead to a diabetes emergency, such as diabetic ketoacidosis (DKA).

DKA can be life-threatening. If you have DKA or think you have DKA, seek medical attention right away. Call your diabetes healthcare provider, go to your local emergency room, or call 911. Read *Diabetic Ketoacidosis (DKA) and Ketone Urine Testing* (www.mskcc.org/pe/dka-ketone-urine-testing) to learn more.

Signs and symptoms of DKA include:

- Feeling confused.

- Feeling shortness of breath.
- Having a dry mouth.
- Feeling weak.
- Having abdominal (belly) pain.
- Feeling nauseous (like you're going to throw up) or vomiting (throwing up).
- Falling into a coma.

Chronic (long-term) hyperglycemia

Chronic hyperglycemia develops over a long time. Signs and symptoms of chronic hyperglycemia include:

- Having wounds that heal more slowly than usual.
- Getting worse infections or infections more often than usual.
- Having little to no energy.
- Neuropathy (tingling or losing feeling in your fingers and toes).
- Skin changes, such as acanthosis nigricans (AK-un-THOH-sis NI-gruh-KANZ). These are dark, thick areas of soft skin. They usually form on the back of the neck, armpits, or groin area.
- Gum disease. Signs of this include red, sore, irritated gums.
- Any or all of the signs and symptoms of acute hyperglycemia.

How to prevent hyperglycemia

Check your blood glucose

Knowing your blood glucose level is the first step to preventing hyperglycemia. Checking your blood glucose tells you if your glucose levels within your target range. The target range is when

your glucose is not too high or too low.

Your diabetes healthcare provider or educator will:

- Tell you how often to check your blood glucose.
- Set your target range based on your health and treatment plan.
- Use your blood glucose readings to adjust your medications as needed.

What is a safe blood glucose range?

MSK's target blood glucose range for people getting cancer care is usually 100 to 200 milligrams per deciliter (mg/dL). Your diabetes healthcare provider may have different recommendations for you.

How to check your blood glucose at home

You can check your blood glucose level at home using one of these devices:

- A blood glucose meter (or glucometer). You can buy a blood glucose meter at your local pharmacy with or without a prescription. Read *How to Check Your Blood Glucose (Blood Sugar) Using a Blood Glucose Meter* (www.mskcc.org/pe/check-blood-sugar) to learn more.
- A continuous glucose monitor (CGM). Read *About Your Continuous Glucose Monitor (CGM)* (www.mskcc.org/pe/cgm) to learn more.

Keep track of your blood glucose results and medicine

Keep track of your blood glucose results and doses of insulin on a blood glucose log. This will help your diabetes healthcare provider safely adjust your medications.

You can use the blood glucose monitoring log at the end of this resource.

Practice a healthy and active lifestyle

The best way to prevent hyperglycemia and manage your blood glucose is to practice a healthy and active lifestyle. Use your blood glucose readings to guide lifestyle choices to reach your target range. Talk with your diabetes healthcare team about how to do this safely.

Here are some tips for managing your blood glucose levels at home:

Follow a healthy diet

Follow a healthy diet and stay on your meal plan. We recommend following a consistent carbohydrate meal plan, which means having a certain amount of carbohydrates for each meal. Read *How To Manage Your Blood Glucose (Blood Sugar) With Your Diet* (www.mskcc.org/pe/blood-sugar-diet) to learn more.

Stay well-hydrated

Drink enough liquids to stay hydrated. Follow your healthcare provider's instructions for how much liquid to drink.

Drink sugar-free liquids

Drink sugar-free, flavored water, sparkling water (seltzer) or other zero-calorie drinks. Avoid regular soda and fruit juice made with real fruit. These usually have a lot of sugar and can raise your blood glucose.

Get enough physical activity

Physical activity can help keep your blood glucose at a healthy level. Follow your healthcare provider's instructions on how much activity is safe for you.

Take your diabetes medicine as prescribed

Follow your diabetes healthcare provider's instructions for taking your diabetes medicine. They will help you plan for what to do if you miss a dose of your medicine.

When to call your diabetes healthcare provider

MSK recommends talking with your diabetes healthcare provider within 10 days after leaving the hospital. Call them if:

- You have new hyperglycemia.
- You were just diagnosed with diabetes.
- Your diabetes medicines have changed.
- Your blood glucose has been above your target range most of the time over the past 2 to 3 days.

Call your diabetes healthcare provider right away if:

- Your blood glucose is lower than 70 mg/dL or higher than 400 mg/dL. These can be dangerous.
- You're vomiting, or you have diarrhea more than 3 times in 24 hours (1 day).
- You have DKA or think you have DKA.
- You do not feel well and are unsure if you should take your diabetes medications.

- You have a fever of 101° F (38.3° C) or higher.

Go to your local emergency room or call 911 if you cannot contact your healthcare provider right away.

Blood Glucose Monitoring Log

Name: _____ MRN:_____ Date: _____

Insulin sliding scale blood glucose (BG) level:	**Before breakfast**	**Before lunch**	**Before dinner**	**Daily**
	Rapid-acting insulin dose (units)	Rapid-acting insulin dose (units)	Rapid-acting insulin dose (units)	Long-acting insulin dose (units)
70 to 99 mg/dL				___units same time each day
100 to 149 mg/dL				
150 to 199 mg/dL				
200 to 249 mg/dL				
250 to 299 mg/dL				
300 to 349 mg/dL				
350 to 399 mg/dL				
400 mg/dL or higher				

MSK's target blood glucose range for people getting cancer care is usually 100 to 200 mg/dL. Your diabetes healthcare provider may have different recommendations for you. Always check your blood

glucose before you take any kind of insulin. Take insulin as directed by your healthcare provider.

Date	BG before breakfast (fasting)	Rapid-acting insulin dose	BG before lunch	Rapid-acting insulin dose	BG before dinner	Rapid acting insulin dose	BG at bedtime	Long-acting insulin dose

If you have questions or concerns, contact your healthcare provider. A member of your care team will answer Monday through Friday from 9 a.m. to 5 p.m. Outside those hours, you can leave a message or talk with another MSK provider. There is always a doctor or nurse on call. If you're not sure how to reach your healthcare provider, call 212-639-2000.

For more resources, visit www.mskcc.org/pe to search our virtual library.

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