

## **Hypoglycemia in Cystic Fibrosis: Patient Information**

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### **Introduction:**

Hypoglycemia (Low Blood Sugar) is a condition that may occur in individuals with Cystic Fibrosis (CF) due to the use of insulin in Cystic Fibrosis Related Diabetes (CFRD). It may also occur spontaneously due to irregularities in pancreatic insulin secretion or due to use of CFTR modulators. Hypoglycemia occurs when a blood glucose (sugar) level goes below the normal range and is generally considered to be a blood glucose level below 70 mg/dl for people with diabetes.

### **Hypoglycemia in CF:**

As seen in other types of diabetes, hypoglycemia is also common in people with CFRD who are on insulin therapy. Hypoglycemia could occur as a result of miscalculating carbohydrate intake or meal insulin boluses. Other factors like exercise, alcohol consumption, weight loss and related medical conditions (like kidney or liver failure) are also associated with risk of hypoglycemia.

While most individuals on CF modulators have not experienced hypoglycemia, a small percentage of individuals on these modulators have experienced hypoglycemia. Although rare, hypoglycemia is a known side effect of some CF modulators.

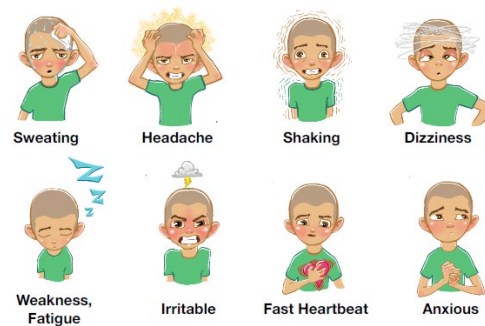
Additionally, people with CF without diabetes (who are not on glucose-lowering therapy or CF modulators) can also develop spontaneous hypoglycemic episodes. These episodes are commonly seen after large carbohydrate containing meals or sugary drinks, and is called reactive or post-prandial hypoglycemia. Low glucose levels may also occur after prolonged fasting, with greater risk during times of illness – this is called fasting hypoglycemia.

### **Normal Glucose Regulation by the Body:**

Glucose (sugar) is the major form of fuel for the body, including the brain, muscles, and other organs. The largest source of this fuel is from the carbohydrates we eat that turn into sugar in our bodies. In healthy individuals, the glucose level in the blood is maintained in a narrow range through an interplay of several hormones. Insulin is the main hormone that helps glucose enter into the body's cells to be used for fuel (both immediate use and storage for later use), and this also helps the blood glucose levels from going too high. Other hormones including glucagon and epinephrine (also known as adrenaline) prevent glucose level from dropping abnormally low.

### **Symptoms of Hypoglycemia:**

Symptoms of hypoglycemia include feeling shaky, hungry, sweaty, jittery, heart pounding, feeling warm, tired, weak, dizzy and/or tingling. Once the glucose level drops below <54 mg/dl, individuals can start to experience difficulty concentrating, blurry vision and altered mental status. Symptoms of severe hypoglycemia include seizure, coma, or rarely death.



### **Treatment and Prevention of Hypoglycemia:**

For people with CF who are on insulin/diabetes medication(s): when blood glucose <70 mg/dl, adults should eat or drink 15–20 grams of fast-acting (glucose only or glucose-containing) carbohydrates (or 0.3 grams/kg in kids/youth) such as 4

ounces of juice, 1 tablespoon of honey, or 4 glucose tabs, then repeat the glucose level in 15 minutes. If the glucose level is again <70 mg/dl, then the same amount of fast-acting carbohydrates should be eaten/drunk again and the blood glucose level should be repeated in 15 minutes. These steps may be repeated several times. Once the glucose level reaches  $\geq$ 70 mg/dl, a meal or snack should be eaten to help stabilize the glucose level. For severe hypoglycemia, emergency glucagon (injection or nasal spray) should be given, followed by medical evaluation.

Dietary interventions are the first line of management for people with CF who are experiencing reactive hypoglycemia. Eating frequent balanced meals and snacks (ensuring protein, healthy fats and high-fiber foods are included) and limiting sugary drinks (juice, regular soda) may help reduce episodes of hypoglycemia that occur after eating.

### **Talking to Your CF Health Care Team:**

If you are having symptoms that suggest you may be having episodes of hypoglycemia, you should let your CF health care team know to determine the cause and best treatment of your symptoms. If you have CFRD and are having frequent episodes of glucose <70 mg/dl, you should let the provider managing your diabetes know so that your insulin/medication doses and treatment approach may be adjusted to help stabilize your glucose levels. Continuous glucose monitoring (CGM) sensors and insulin pump therapy may also be beneficial options to consider in people with CFRD.

### **For More Information:**

[Hypoglycemia \(Low Blood Glucose\) | ADA \(diabetes.org\)](https://diabetes.org/low-blood-glucose)

<https://my.clevelandclinic.org/health/diseases/11647-hypoglycemia-low-blood-sugar>

<https://www.cdc.gov/diabetes/basics/low-blood-sugar.html>