Saskatchewan Health Authority

Continuous Glucose Monitors

What is a continuous glucose monitor (CGM)?

A CGM device has a sensor that is worn on the skin and measures the glucose (sugar) level in the fluid between the cells and blood vessels under the skin (known as interstitial fluid). This is different from the glucose level in the blood, which is usually measured using a finger stick blood test and blood glucose monitor.

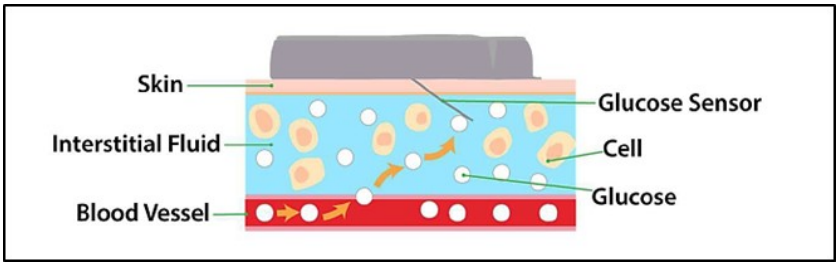


Image from: FreeStyle Libre 2 Getting Started Guide at https://provider.freestyle.abbott/ca-en/clinic-resources.html

Why are my CGM readings sometimes different from blood glucose monitor results?

When glucose levels in the body change, they always change first in the blood. After the blood has circulated throughout the body, glucose levels change in the fluid under the skin.

Generally, the glucose reading from the CGM sensor will be similar (within 1 to 2 mmol/L) to a finger stick blood sugar reading. However, if your blood glucose levels are changing rapidly, there could be a bigger difference between the two glucose readings due to a "lag time" (see next section).

In addition, any illness or medical condition that changes how the blood circulates and delivers glucose to the fluid under the skin will affect CGM glucose readings. This may occur with dehydration, shock, heavy bleeding, high fever and heart failure resulting in unreliable CGM glucose readings.

Are there times when it is required to have finger stick blood glucose tests?

YES, you will be required to have finger stick blood glucose tests:

√ When you are treated for a low blood sugar (hypoglycemia).

√ When you are ill or have a surgical procedure, accurate glucose readings are important to determine insulin doses, and making changes to diabetes medications. Blood glucose measurements (finger sticks) will be used until you are well.

√ When your CGM device might need to be removed because it may interfere with imaging procedures like CT scans and MRIs, and with some tools used during surgery. If your CGM is removed, blood glucose testing will be done until a new CGM device can be applied.

√ When you are admitted to hospital, you may use your CGM to watch for trends in your glucose levels. These glucose readings will not be used by nursing staff because CGM devices are not currently approved by Health Canada for use in the acute care hospital setting.

The Explanation for Glucose "Lag Time"

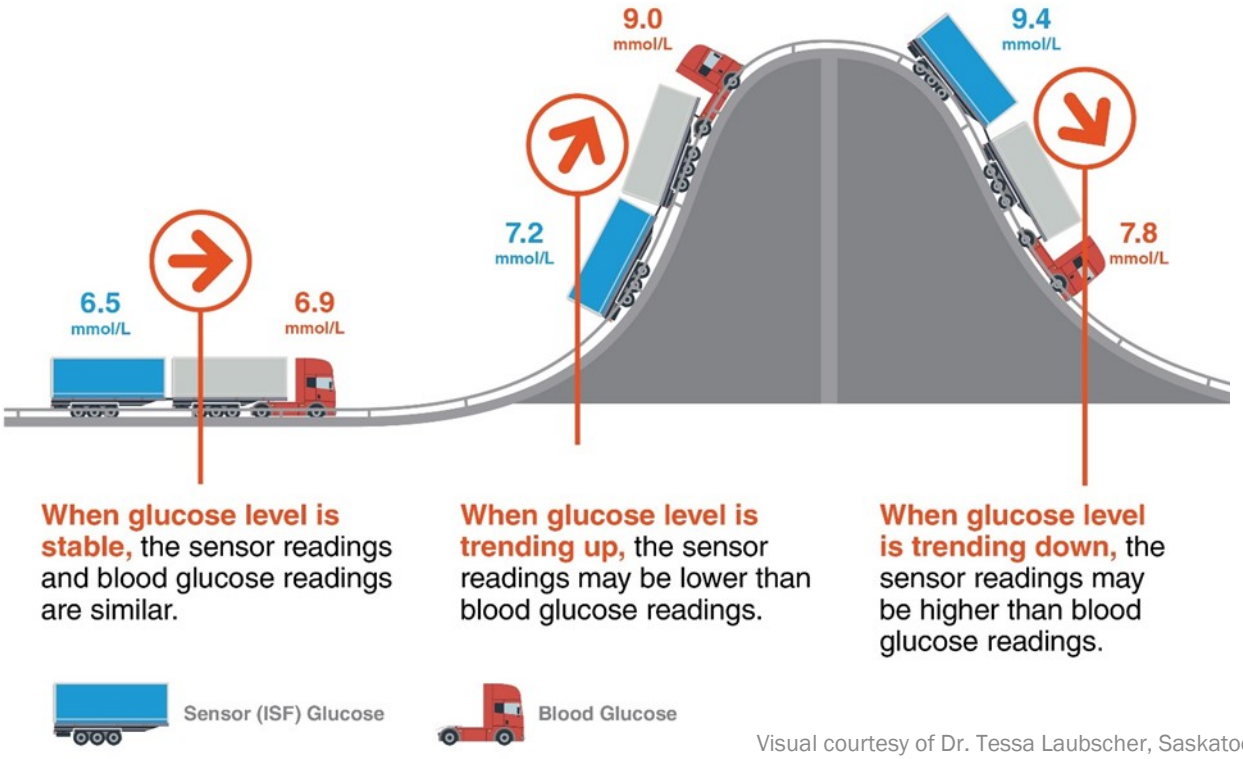
In the diagram below, big rig vehicles (semi-trucks, tractor-trailers) commonly seen on the roads are used to explain "lag time."

The red truck represents the blood glucose level, and the blue trailer represents the glucose level in the fluid under the skin measured by the CGM sensor.

When the blood glucose is not changing much (on "level ground") the CGM sensor glucose level (trailer) is just about the same as the blood glucose level (truck). But when the truck is heading uphill (blood glucose is climbing), the trailer "lags behind" the truck that is pulling it - the CGM glucose level has not climbed quite as high yet.

Similarly, when the truck starts to go downhill (blood glucose is falling), the CGM level "lags behind", remaining higher until the whole vehicle reaches level ground again. The steeper the hill (i.e. the more rapid the rise or fall in blood glucose levels), the bigger the differences will be between these two readings. Whether climbing or falling, the truck always reaches a certain level before the trailer; therefore, the CGM glucose level always lags behind the blood glucose level.

By using the trend arrows on your CGM reader, you can tell what direction the glucose levels are going and get an idea of the "lag time".



Visual courtesy of Dr. Tessa Laubscher, Saskatoon, SK.