

CGMs... What Good are Thems?

OK, so I'm not a songwriter or a creator of catchy advertising jingles. What I am is a CDE and a Type-1 diabetic with a great deal of experience and interest in Continuous Glucose Monitoring (CGM) as a tool for managing diabetes. Since the infamous GlucoWatch was released several years ago (how could anything *look* so cool and *work* so badly?), I've been fascinated by this new and exciting field of biotechnology. So, I've taken it upon myself to try them all, evaluate them objectively, and find as many worthwhile applications for them as possible.

The current systems utilize a filament-like sensor inserted just below the skin to detect glucose concentrations. A transmitter attached to the sensor sends a signal to a monitor, which displays the data in numeric and graphic forms, with an update every few minutes. Alarms can be set to trigger if the sensor detects a reading above or below a target range set by the user. Fingerstick blood glucose measurements must be taken a couple of times daily and entered into the monitor in order to calibrate the system, and the sensors themselves last anywhere from approximately three to seven days.

While the data generated by the CGM systems is far from perfect (there is, on average, a 20% difference between the sensors' data and simultaneous fingerstick measurements), it is usually within the ballpark, and the alarms will capture most highs and lows before we can "feel" them coming on. More importantly, the trends on the graphs are pretty reliable – if they show you rising, you're likely rising. If they show you dropping, you're almost sure to be dropping. Having worn a CGM during some long bike outings, I can tell you that it's really cool to know where things stand without having to stop and prick your finger every 30 minutes!

So back to the title... exactly what can we glean from them CGM machines? After a couple of years using the systems myself and counseling my clients on their use, here's what I've come up with:

Early Detection of Highs and Lows

The high and low alarm systems in CGMs act sort of like "highway rumble strips" that keep us from veering off the road and into a ditch. The low glucose alarm can detect *pending* lows long before any symptoms appear. Although it may not detect every low, it will provide an early warning for the vast majority. This makes it considerably safer to work, drive, exercise, and aim for tighter glycemic control. Likewise, the high glucose alarm allows us to shorten the time spent in a high-glucose range and prevent diabetic ketoacidosis (DKA).

Post-Meal Control

The trend graphs (and specific data points) allow us to see when and how much glucose levels are rising after meals. They teach us which foods cause glucose levels to spike very high, and which ones produce a more modest post-meal increase.

Basal Insulin Verification

The job of any basal insulin, whether it is taken by injection or via an insulin pump, is to hold glucose levels steady (unchanged) between meals and during sleep. CGMs allow us to fine-tune basal insulin by showing whether glucose levels are rising, falling or holding steady in the absence of food, bolus insulin, exercise and other confounding variables.

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Optimizing Exercise Performance

For those who exercise frequently or compete in sports, CGM can be very helpful in optimizing glucose control in order to enhance athletic performance. The systems can aid in seeing the effects of insulin and snack adjustments, and can be useful for warding off high and low glucose levels during competition.

Forecasting

If your glucose is 90 mg/dL, how would you react? What if you knew that it is 90 and rising? How about 90 and dropping? Because the graphs and arrows on the CGM systems indicate the direction glucose levels are headed, individuals can make decisions based where their glucose is *headed*, not just where it is right now.

Peace Of Mind (without killing your fingers)

CGMs can provide valuable information at crucial points during the day. This includes before and during exercise, prior to driving, prior to test/exam-taking, and in the middle of the night. It is still a good idea to check blood glucose levels with a fingerstick before administering insulin.

As with most elements of diabetes care, the key to successful use of CGM is education. When you decide to give one of the systems a try, talk to your doctor and diabetes educator about the initial alarm settings and how, exactly, you are going to interpret the data. It's easy to become obsessed with such a volume of information, so make sure your plans and expectations are realistic.

CGM systems are still far from perfect. They're costly. The data is not always accurate. They alarm inappropriately at times. And who needs one more thing stuck to their skin? Nevertheless, continuous glucose monitors represent not only the future of diabetes management, but also one of the best self-management tools in the present day. There is no better system for keeping you out of harm's way, and no better tool for achieving the kind of HbA1c you've always wanted.

Most people who start using CGMs find them somewhat "addictive". That is, they feel a bit vulnerable and "in the dark" when they're not using it. So once you make the move to CGM, be prepared to use it on a consistent basis. And once you see the true effects of your current diabetes management plan, be prepared to change for the better!

By Gary Scheiner MS, CDE