Continuous Glucose Monitors (CGMs): What Are They? Should I Have One?

What is a CGM?
A CGM is a small device that continuously checks blood sugar levels throughout the day and night. It is a small sensor worn on the back of the arm or lower part of the stomach and is a tool used for the management of diabetes. CGMs work by checking the glucose in the fluid between cells (interstitial fluid), rather than in the blood through a fingerstick. It tracks sugar levels throughout the day and night, every one to five minutes depending on the device. These devices can help patients and their doctors keep track of blood sugar patterns and can decrease the risk of low blood sugars (hypoglycemia) and high blood sugars (hyperglycemia). Wearers can also share their numbers with their family members and care team.

There are several different types of available devices. Patients should work with their diabetes providers to see which one would be best and will be covered by insurance. The differences between devices are listed in the table below:

Who should use CGM devices?
You should consider a CGM if you:

- Have Type 1 Diabetes
- Take one or more insulin shots each day
- Have episodes of low blood sugar levels (hypoglycemia)
- Have low blood sugar levels without symptoms (hypoglycemia unawareness)
- Are using an insulin pump (such as *Medtronic*, *Tandem*, or *Omnipod*)
- Are children (age varies by device) with Type 1 or Type 2 diabetes on insulin therapy
- Are pregnant with gestational diabetes or pre-existing type 1 or type 2 diabetes

PROS and CONS of Using Continuous Glucose Monitoring Devices

Pros	Cons
Waterproof	Not available for all ages
Adjustable alarms and alerts	Cost (varies by insurance coverage)

Detects glucose trends and patterns Increased confidence in diabetes management Potential for improved quality of life with diabetes Reduces the number of finger sticks needed Provides day and night-time glucose levels (24 hours) Ability to share glucose levels with family and care team Compatible with smartphones and other smart devices Compatible with some insulin pump technology Improves blood sugar control (Hemoglobin A1C and variability in blood sugar levels) Reduces or assists in avoiding complications, such as low blood sugar (hypoglycemia) and high blood sugars (hyperglycemia)	Insurance coverage may limit access to device(s) Technology challenges Potential for alarm fatigue Potential for skin irritation (contact dermatitis) Delay between CGM readings and serum blood glucose levels Some devices require comparing finger sticks Must remove device for radiology imaging such as MRIs, CTs, and X-rays Some substances may interfere with the device causing error in the readings (see table below)

Comparison of Available CGM Devices

	Freestyle® Libre (14 Day)	Freestyle® Libre 2	Freestyle® Libre 3	Dexcom G6®	Dexcom G7®	Eversense®	Medtronic Guardian 3®
Alarms and Alerts	NO	YES	YES	YES	YES	YES	YES

Glucose Reading Frequency	1 minute	1 minute	1 minute	5 minutes	5 minutes	5 minutes	5 minutes
Sensor Warm-up	60 minutes	60 minutes	60 minutes	2 hours	30 minutes	24 hours	2 hours
Sensor Period	14 days	14 days	14 days	10 days	10 days (12-hour grace period)	6 months	7 days
Calibration Required	NO	NO	NO	NO	NO	YES (Twice daily – every 12 hours)	YES (2 to 4 times a day)
FDA Approved Application Sites	Back of the Arm	Back of the Arm	Back of the Arm	Stomach Ages 2 to 17: upper buttocks	Stomach Ages 2-6: upper buttocks	Implantable (under the skin)	Back of the arm Stomach
Age	18 years and older	4 years and older	4 years and older	2 years and older	2 years and older	18 years and older	14 to 75 years old
Smartphone Applications	FreeStyle LibreLink	FreeStyle Libre 2	FreeStyle Libre 3	Dexcom G6 Dexcom Clarity	Dexcom G7 Dexcom Clarity	Eversense	Guardian Connect
Interfering substances	Vitamin C (greater than 500 milligrams daily) Salicylic Acid	Vitamin C (greater than 500 milligrams daily)	Vitamin C (greater than 500 milligrams daily)	Acetaminophen (greater than 4 grams daily) Hydroxyurea	Acetaminophen (greater than 4 grams daily) Hydroxyurea	Mannitol Tetracycline	Acetaminophen

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Resources:

ADCES:
https://www.diabeteseducator.org/docs/default-source/practice/educator-tools/role_cgm_12272021.pdf
https://www.diabeteseducator.org/danatech/glucose-monitoring/continuous-glucose-monitors-(cgm)/cgm-101/pros-cons-of-cgm

American Diabetes Association:
https://diabetesjournals.org/care/article/45/Supplement_1/S97/138911/7-Diabetes-Technology-Standards-of-Medical-Care-in
https://diabetes.org/tools-support/devices-technology/choosing-cgm

Dexcom:
https://www.dexcom.com/en-us

Eversense:
https://www.ascensiadiabetes.com/eversense/

Freestyle Libre:
https://www.freestyle.abbott/us-en/home.html
https://www.freestyle.abbott/us-en/safety-information.html

Interstitial Fluid:
https://www.medtronicdiabetes.com/customer-support/sensors-and-transmitters-support/why-sensor-glucose-does-not-equal-blood-glucose

Medtronic:
https://hcp.medtronic-diabetes.com.au/guardian-sensor-3

https://www.medtronic.com/us-en/healthcare-professionals/products/diabetes/continuous-glucose-monitoring-systems/guardian-sensor-3.html