

Newer technology to control blood sugar works better than conventional methods

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Newer technologies designed to help people with type 1 diabetes monitor their blood sugar levels daily work better than traditional methods and require fewer painful needle sticks, new Johns Hopkins research suggests.

The research findings, published online in the July 10 issue of the [Annals of Internal Medicine](#), suggest that even though these diabetic control technologies are more costly, people with diabetes who use an insulin pump are more satisfied with their treatment and quality of life than those who give themselves insulin shots many times a day.

Researchers say they still want to investigate how patients using these convenient technologies fare in the long term as compared to those who use older methods.

"Our study was designed to help patients and physicians better understand the effectiveness of insulin pumps and [blood sugar](#) sensors that provide constant [glucose monitoring](#) compared to conventional approaches," says the study's senior author, Sherita Hill Golden, M.D., M.H.S., an associate professor in the division of [endocrinology and metabolism](#) at the Johns Hopkins University School of Medicine. "We found that certain devices confer real benefits."

Diabetes is a condition marked by the inability of the body to properly manage the level of glucose (sugar) in the blood. In type 1 diabetes, the body does not make insulin, the hormone that regulates the body's use of

sugar. Individuals with type 1 diabetes need insulin to keep [blood sugar levels](#) even before and after meals and at all other times. People with the disorder must therefore monitor their [glucose levels](#) frequently, usually by pricking their fingers many times a day to obtain blood and using a glucose monitor and test strips to detect blood sugar amounts.

Without strict control of glucose, diabetic individuals sustain serious and chronic complications, including blindness and tissue damage. Roughly 5 percent to 10 percent of people with diabetes have type 1, which used to be known as juvenile-onset diabetes.

In their study, Golden and her colleagues reviewed and re-analyzed data from 33 randomized controlled trials that compared the newer technologies to conventional methods of monitoring and controlling blood sugar levels. The new technologies they looked at were primarily real-time continuous glucose monitoring devices and insulin pumps.

The continuous monitoring devices track blood sugar levels all day and night, as often as every five minutes, using a sensor that is attached to the abdomen with a small needle held in place by tape. The sensor sends the results to a display that is worn on the belt. Diabetic individuals can make decisions about adjusting insulin therapy and/or activity levels based on the readouts. Patients still need to prick their fingers two to four times a day to make sure the device is working properly, but that is down from as many as eight to 10 times a day for patients trying to strictly control blood sugar. These devices also sound alarms if the blood sugar level is dangerously high or low.

The researchers found that children, teens and adults with type 1 diabetes who used continuous monitoring had lower blood glucose levels than those who used finger stick testing alone. They also spent less overall time with too much blood sugar (hyperglycemia). Both methods worked equally well to control hypoglycemia, the condition that results

when blood sugar levels are too low.

Insulin pumps are small devices attached to a small tube and needle that goes under the skin in the belly area. The devices provide insulin around the clock, as needed. People with diabetes can either program the device with the push of a button based on finger stick glucose measurements or link the pump to the continuous monitor. The latter is called a "sensor-augmented pump."

While there was little difference in blood sugar control in those who give themselves multiple insulin shots a day versus those who used [insulin pumps](#), those with [type 1 diabetes](#) who used the sensor-augmented pumps, pumps that include real-time continuous glucose monitoring devices, did much better controlling blood sugar than those who used finger stick testing and shots.

Since the new devices are more costly, Golden says it is important to make sure they are used by the patients who will get the most benefit from them.

"Those who use the devices as prescribed do the best at maintaining blood sugar control," she says. "Adherence is the key to effectiveness."

Golden says that not all insurance companies cover the new technologies. Medicare, for example, doesn't cover the real-time continuous glucose monitoring sensors. Golden says her study was unable to determine whether people over 65 benefit specifically from using the device.

Provided by Johns Hopkins University School of Medicine

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