

Emerging Technologies In Diabetes Research

The JDRF Emerging Technologies E-Newsletter

Special Edition

Results from the Continuous Glucose Monitoring Trials

The results of a long-awaited JDRF-funded trial found that people with type 1 diabetes who used continuous glucose monitoring (CGM) devices to help manage their diabetes experienced significant improvements in blood sugar control.

Results from the multi-center study were presented at the European Association for the Study of Diabetes (EASD) annual meeting in Rome, and portions were published in the October 2 issue of the *New England Journal of Medicine*. A key part of JDRF's Artificial Pancreas Project, the CGM study involved more than 300 patients from eight to 72 years old, with HbA1c levels between seven and 10 percent. It took place at 10 academic-, community-, and managed care-based practices across the country, and was coordinated by the Jaeb Center for Health Research in Tampa, Fla.

Patients were assigned either to use CGM or to a control group using standard blood sugar monitoring, and were followed for 26 weeks. The study looked at the effects of CGM devices on blood sugar control, principally assessed by measurement of the HbA1c level. Three age groups were analyzed separately: eight to 14 years of age, 15 to 24 years of age, and 25 years of age or older.

The trial showed that improvements in blood sugar control were greatest for patients 25 years of age or older. Their HbA1c levels improved by an average of 0.53 percent compared with control patients. That's significant, as the DCCT study showed years ago that lower HbA1c levels conferred a much reduced risk of one developing diabetes complications. It showed that a 10 percent improvement in HbA1c represents a 40 percent reduction in the risk of developing diabetic retinopathy, which can cause blindness; that means adults in the study saw their risk for diabetic complications go down significantly from the benefits of using CGM devices.

The trial also looked at secondary measurements—improvements were also significantly greater in CGM patients, including the percentage of patients able to achieve an HbA1c level below seven percent, or a 10 percent relative or 0.5 percent absolute drop.

Equally important, the improvement in HbA1c occurred without an increase in low blood sugar emergencies, which is always a concern when attempting to tighten glucose control.

In children from eight to 14 years old, the average decrease in HbA1c was not significantly different in the CGM and control groups; however, the CGM group was more likely to lower their HbA1c by at least 10 percent and achieve HbA1c levels below seven percent. Fifteen-to-24-year-old CGM patients, as a group, did not experience significant improvements in glucose control compared with the control group.

As noted at the EASD meeting, CGM use varied with age: 83 percent of the patients 25 years and older used the devices six days or more per week, but that dropped off to 30 percent of the 15 to 24 year olds and 50 percent of the 8 to 14 year olds.

Although the study was not specifically designed to measure the frequency of CGM use on HbA1c, the data suggests that patients within all three age groups, including teens and young adults, who used the device at least six days a week, had substantially lower A1c levels after six months compared with patients who used CGM less than six days a week.

These results are very important, because they show that continuous glucose monitors are more than devices of convenience for people with diabetes—they are tools that can substantially improve blood sugar control when used regularly. The lower levels of regular CGM use among children and teenagers underscore the importance of continued research into a closedloop artificial pancreas—a device that uses CGM data to administer appropriate doses of insulin through a pump without the need for involvement of the patient, or for young children, their parents—and that's exactly on what our APP project is focused.