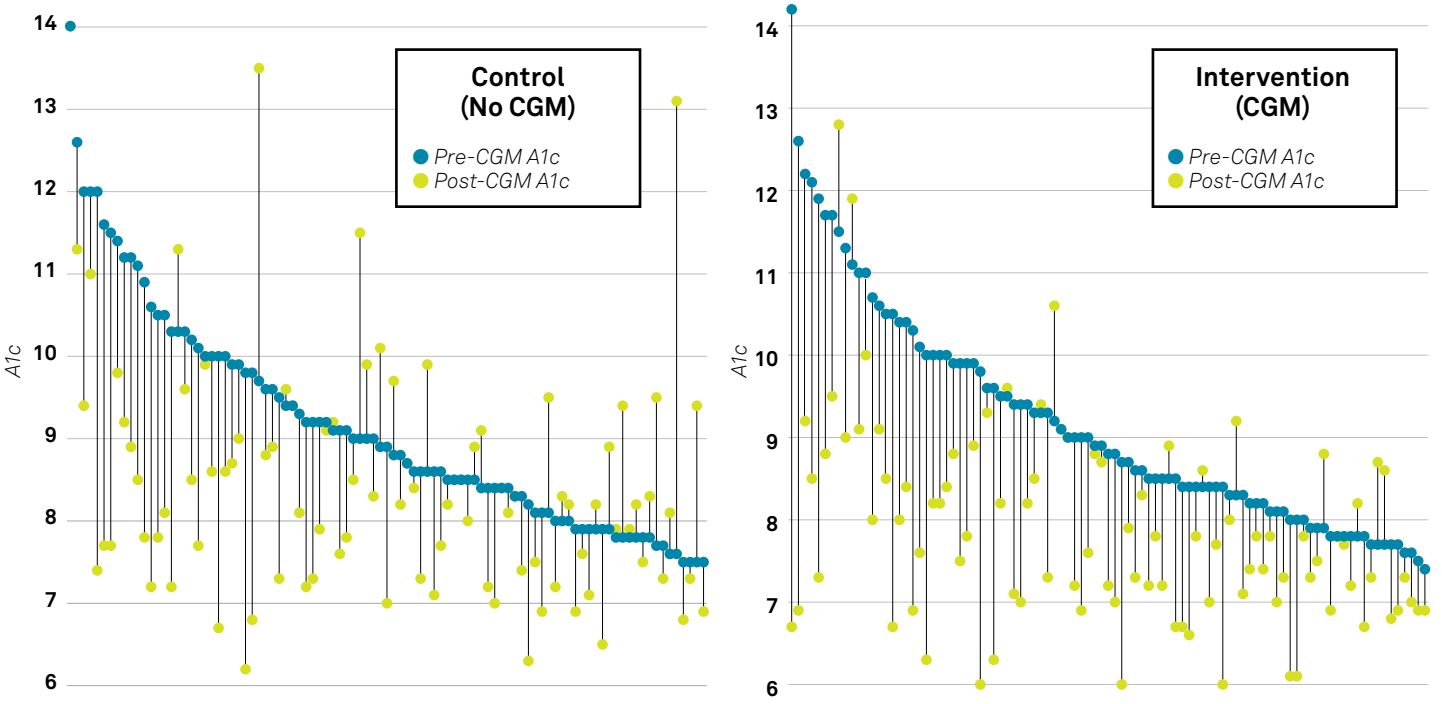
Figure 1

Change in HbA1c Over a 3-month Period in CGM (Intervention) Patients Compared with No CGM (Control) Patients



Moving Upstream

Earlier use of continuous glucose monitors leads to improvements in glycemic control

By Stephen Shields, MPH, and Elizabeth L. Ciemins, PhD, MPH, MA

Rates of type 2 diabetes (T2DM) continue to increase, and many individuals with T2DM do not meet recommended glycemic targets necessary to prevent micro- and macrovascular complications of T2DM.[1] For many patients with T2DM, the primary care provider (PCP) is the only physician treating their diabetes.[2] At the same time, use of continuous glucose monitors (CGMs) has been increasing among patients with T2DM.[3,4] However, the effects of real-time CGM on glycemia in primary care patients with T2DM, particularly among those not on intensive insulin therapy, have not been studied in real-world settings. In this prospective, embedded pragmatic clinical trial with retrospectively matched control patients, we sought to examine the association of real-time CGM use with glycemic control among individuals with T2DM receiving primary care.

CGMs are medical device systems made up of a *sensor* (a small wire catheter inserted under the skin on the arm or abdomen by patients), a *transmitter* that attaches to the sensor, and a *receiver* or smart device that displays levels of glucose in the interstitial fluids beneath the skin in real time with 250–300 readings per day. The monitors report time-in-, time-above-, and time-below-range, with time-in-range defined (by default) as between 70 and 180 mg/dL, though the range is customizable. Audible alarms (also customizable) warn patients when glucose levels are too high or too low so that adjustments can be made to lessen or avoid the impact of hyper- or hypoglycemia. Data can be shared with healthcare professionals, to help

them make more informed treatment decisions, and family members, who may help patients adjust their diet, activity, and medications accordingly. Finally, perhaps the most important feature for patients is the obviation of finger sticks, encouraging more consistent monitoring of glucose levels.

The Study

The study population comprised patients receiving primary care at Piedmont HealthCare, a multispecialty medical group based in Statesville, NC. CGMs were initiated in 95 adult primary care patients with T2DM. Patients were required to have two documented records of HbA1c ≥7.5, separated by 3–12 months. Patients needed to have a compatible smart device or were provided one (all used phones in this study). Patients were excluded if they had gestational or chemically induced T2DM, end-stage renal disease (ESRD), were on hospice or receiving palliative care, had bolus insulin in the past year, were pregnant, had alcohol or drug dependence, or had a history of personal CGM use.

Patients were enrolled between October 2021 and August 2022 for a three-month period. Using AMGA's Optum® data, CGM (i.e., intervention) patients were retrospectively matched to control patients who were not using a CGM and who received at least three months of care at Piedmont HealthCare between January 2019 and March 2020 or January and September 2021. Intervention patients were matched 1:1 with control patients on baseline HbA1c within 0.2 points and age within five years.

Outcomes

There were no significant differences between intervention and control patients on baseline HbA1c, age, race, ethnicity, insurance type, body mass index (BMI), or most chronic conditions, demonstrating that patients in both groups had similar baseline characteristics. Using the matched dataset, a linear regression analysis was conducted on change in HbA1c over the three-month study period controlling for baseline medication regimen and diagnoses of chronic kidney disease or diabetic nephropathy. After three months of CGM use, 86% of treatment patients had a decrease in HbA1c vs. 72% in the control group ($p < 0.01$; Figure 1). Intervention patients demonstrated a decrease in their HbA1c of 0.67 more points on average as compared with the control patients.

In addition, surveys revealed patient satisfaction with the CGMs in terms of spontaneity, feeling less restricted by their diabetes, and feeling more satisfaction with how their diabetes was going. Provider and clinic staff also expressed satisfaction in terms of making T2DM management easier, improving T2DM care, and satisfaction with the usefulness of the devices and their ability to positively impact glycemic control.

Overall, patients with T2DM but not yet on intensive insulin who used CGMs for the three-month study period demonstrated statistically significant reductions in HbA1c as compared with matched control patients ($p < 0.01$). Intervention patients were receptive and satisfied with using CGMs to monitor their diabetes. However, increased engagement sometimes also resulted in unwanted attention to their disease. Cost remains a barrier for some patients in some regions of the U.S., but data from studies like this one may encourage payers to increase coverage of CGMs, especially earlier in a patient's diabetes progression. GPJ

Data source: In addition to data provided by Piedmont HealthCare, this analysis used longitudinal clinical EHR data extracted, mapped, and normalized by Optum®.

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Stephen Shields, MPH*, is lead population health research analyst, and* ***Elizabeth L. Ciemins, PhD, MPH, MA****, is vice president, research & analytics, at AMGA.*

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