Continuous, Intermittent, and No Glucose Monitoring All Associated with Negligible Changes in Average Blood Glucose Among Nondiabetic Adults After 6 to 18 Months

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Key Findings

- Nondiabetic adults prescribed a continuous glucose monitor (CGM), intermittent glucose monitoring (such as testing strips), or no glucose monitoring had negligible changes to their average HbA1c 6 to 18 months following their prescription or initial HbA1c.
- Patients prescribed continuous glucose monitoring had an average HbA1c increase from 5.49 to 5.50%, while those prescribed intermittent glucose monitoring had an average HbA1c increase from 5.55 to 5.62%.
- Patients with no glucose monitoring had an average HbA1c increase from 5.55% to 5.57%.

Continuous glucose monitors (CGMs) are typically prescribed for individuals with diabetes to support glucose management and awareness.[1] Some clinicians have expanded CGM use to patients without diabetes, in hopes of understanding blood glucose patterns and promoting behavior change. However, there is limited evidence that CGMs meaningfully affect glycemic outcomes in this population. Current guidelines do not recommend CGMs for nondiabetic patients, and concerns have been raised about cost, accessibility, and overdiagnosis.[2,3]

To examine whether blood glucose monitoring influences average blood glucose as measured by HbA1c, we studied 9,675 adults without evidence of diabetes who had a baseline HbA1c between 5.0% and 5.9%. Lower HbA1c values represent better blood glucose control over time, while higher values represent less controlled blood glucose levels. Patients were categorized into three groups: those prescribed CGMs, those prescribed intermittent glucose monitoring (such as testing strips), and those who received neither. All patients had a follow-up HbA1c result between 6 and 18 months later. Patients were matched by year and time between their HbA1c labs in the study period.

We found that average HbA1c 6 to 18 months following an initial HbA1c showed negligible changes regardless of glucose monitoring method. Patients prescribed a CGM had their average HbA1c rise from 5.49% to 5.50%, as seen in Figure 1. Patients prescribed intermittent glucose monitoring had a slightly greater increase, from 5.55% to 5.62%. Among patients with no glucose monitoring, a slight rise was also observed, from 5.55% to 5.57%.

Average HbA1c Before and After Monitoring Prescription by Monitor Type

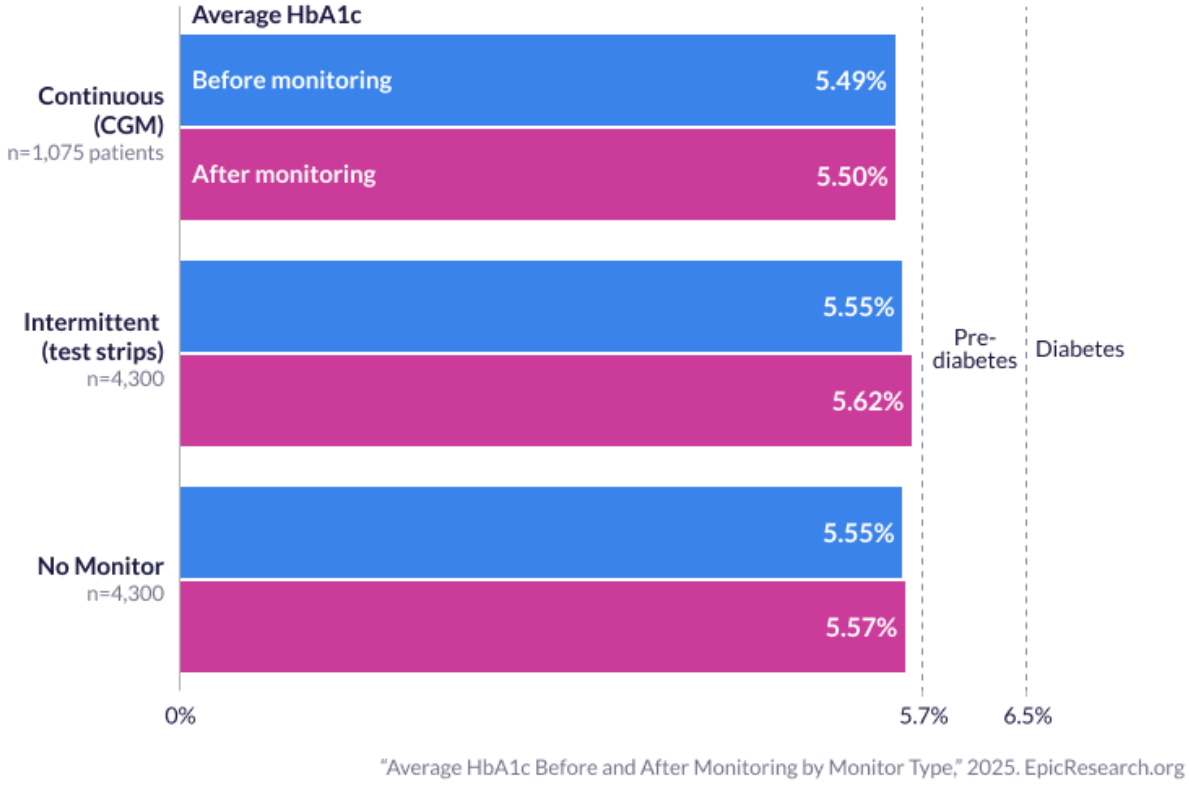

Figure 1. The average HbA1c among patients without diabetes before and after being prescribed a glucose monitoring method compared to those prescribed neither monitoring method.

A sensitivity analysis accounting for factors such as demographics and baseline HbA1c found similar results.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 300 million patient records from 1,700 hospitals and more than 40,000 clinics from all 50 U.S. states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

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Data Definitions

Term	Definition
Study period	03/09/2009 to 10/07/2024
Study population	CGM cohort: Patients prescribed a continuous glucose monitor with an HbA1c reading within +/- 30 days that was between 5.0 and 5.9% Intermittent monitoring cohort: Patients prescribed glucose test strips with an HbA1c reading within +/- 30 days that was between 5.0 and 5.9% Control cohort**:** Patients with an HbA1c reading between 5.0 and 5.9% who do not have a prescription for a CGM or glucose testing strips at that point or prior All: Adult patients with at least one non-problem list diagnosis prior to index event and no **indications of diabetes** on or prior to the index event
Exposures	First order for CGM device or glucose test strips within 30 days of an **HbA1c** reading • CGM: Prescription with a generic name containing “gluc” “mon” “con” for continuous glucose monitors or a procedure with CPT code 95249, 95250, or 95251 • Intermittent glucose monitor: Medication order with pharmaceutical subclass of “Medical Supplies and DME – Blood Glucose Tests” or “Medical Supplies and DME – Glucose Monitoring Test Supplies” and a form of “strip” or “lancet”
Outcomes	Change in **HbA1c** between index lab and a follow-up lab between 6 and 18 months later, using the lab closest to 12 months when multiple exist
Matching	Months between index **HbA1c** lab and follow-up lab and the index year
HbA1c	Lab result with LOINC code 17855-8, 17856-6, 41995-2, 4548-4, 4549-2 Exclude values outside of 3.0% to 29.0%
Indications of diabetes	The earliest of any of: • Diabetes diagnosis: A diagnosis of ICD-10-CM E10*-E11* • **HbA1c** results of 6.5% or higher • Order or procedure for a **diabetic medication**
Diabetic medication	DPP-4i: A medication order with a pharmaceutical class of ”ANTIHYPERGLYCEMIC, DPP-4 INHIBITORS” or “ANTIHYPERGLYCEMIC, DPP-4 INHIBITOR-BIGUANIDE COMBS” Sulfonylurea: A medication order with a pharmaceutical class of “ANTIHYPERGLYCEMIC, INSULIN-RELEASE STIM.- BIGUANIDE” or “ANTIHYPERGLYCEMIC, INSULIN-RELEASE STIMULANT TYPE” SGLT2i: A medication order with a pharmaceutical class of “ANTIHYPERGLYCEMIC-SOD/GLUC COTRANSPORT2(SGLT2) INH” or “ANTIHYPERGLYCEMIC-SGLT2 INHIBITOR-BIGUANIDE COMBS.” DPP-4 Inhibitors + SGLT2: ANTIHYPERGLY-SGLT-2: A medication order with a pharmaceutical class of “INHIB,DPP-4 INHIB, BIGUANIDE CB” or “ANTIHYPERGLYCEMIC, SGLT-2 AND DPP-4 INHIBITOR COMB” Thiazolidinedione: A medication order with a pharmaceutical class of “ANTIHYPERGLYCEMIC,THIAZOLIDINEDIONE(PPARG AGONIST);” “ANTIHYPERGLYCEMIC, THIAZOLIDINEDIONE-SULFONYLUREA;” or “ANTIHYPERGLYCEMIC, THIAZOLIDINEDIONE AND BIGUANIDE” Thiazolidinedione + DPP-4i: A medication order with a pharmaceutical class of “ANTIHYPERGLY,DPP-4 ENZYME INHIB.-THIAZOLIDINEDIONE”

	Insulins: A medication order with a pharmaceutical class of "INSULIN" Biguanide: A medication order with a pharmaceutical class of "ANTIHYPERGLYCEMIC, BIGUANIDE TYPE" or "ANTIHYPERGLYCEMIC, BIGUANIDE-DIETARY SUPPL. COMB." GLP-1: A medication order with RxNorm code 11991302, 1551291, 60548, or 475968 An order for **continuous glucose monitoring** with "insulin" included in the order name.
Confounders	Legal sex Age: • 18-34 • 35-49 • 50-59 • 60-64 • 65-69 • 70+ Last BMI category before follow-up period RUCA (Rural-Urban Commuting Area) classification **Social Vulnerability Index** quintile based on patient's most recent ZIP code Baseline HbA1c • 5.0-<5.2 • 5.2-<5.4 • 5.4-<5.6 • 5.6-<5.8 • 5.8-5.9

Table 1: Average HbA1c Before and After Monitoring Prescription by Monitor Type

Population	Avg Baseline A1c	Avg Follow-up A1c	Avg Delta
CGM	5.49	5.50	0.02
Strips	5.55	5.62	0.07
Control A1c	5.55	5.57	0.03
Overall	5.54	5.59	0.04