Population Health PERSPECTIVES

Closing care gaps in **diabetes management** through advanced data integration with continuous clucose monitors

Introduction

Diabetes is one of the most prevalent and the most costly chronic diseases in the United States.[1,2] An estimated 38.1 million adults (14.7% of all U.S. adults) had diabetes in 2021.[3] However, only 29.4 million (77.2%) of these people with diabetes received a diagnosis, indicating that 8.7 million adults with diabetes (22.8%) remained undiagnosed, and those individuals may not have received appropriate care for the disease.[3] Among diagnosed adults, prevalence is highest among American Indian and Alaska Native (13.6%), non-Hispanic Black (12.1%) and Hispanic patients (11.1%).[3] Furthermore, from 2017 to 2020, individuals who were non-Hispanic Black (hereafter, Black), non-Hispanic Asian (hereafter, Asian) and those who were Hispanic were up to twice as likely (4.7%, 5.4% and 4.4%, respectively) to be undiagnosed as were non-Hispanic White (hereafter, White) patients (2.7%).[3] The disease carries the risk of serious complications including metabolic, cardiovascular and renal disease, which underdiagnosis may exacerbate.[3]

Despite the high prevalence of diabetes, 47.4% of adult patients do not meet the general hemoglobin A_{1c} (HbA_{1c}) target of less than 7.0% that is recommended by the American Diabetes Association (ADA).[3,4] These substantial shortfalls and disparities demonstrate the need for improvement in diabetes care.

Treatment outcomes demonstrate need for change

Among adults with diabetes, Black and Hispanic individuals experience complications at higher rates than do White individuals.[5-7] For instance, among adults in the U.S. who have been diagnosed with diabetes, retinopathic complications impact Black Americans and Mexican Americans at rates higher than they do White Americans (38.8%, 34.0% and 26.4%, respectively).[6] One study, which included over 62,000 insured patients with diabetes, found that Black, Hispanic and Asian patients had increased rates of end-stage renal disease compared with White patients (Black, 6.8 patients/1,000 person-years; Hispanic, 4.5 patients/1,000 person-years; Asian, 4.6 patients/1,000 person years; White, 3.2 patients/1,000 person-years).[7] The study also showed that Black patients had a higher rate of nontraumatic lower limb amputations (4.7/1,000 person-years) compared with White patients (4.2/1,000 person-years).[7] According to the Centers for Disease Control and Prevention (CDC), increasing the rate at which patients self-monitor glucose levels constitutes a cost-effective method for improving diabetes management and preventing diabetes-related complications.[2] Use of continuous glucose monitors (CGMs) offers a potential path to heeding this guidance, improving the suboptimal outcomes seen in minority populations and reducing racial disparities in diabetes management.[8-11]

Advancements in care outpace adoption and access

Effectiveness of CGMs when accessible

Use of CGMs has been associated with decreased HbA_{1c} levels, lower rates of hospitalization and reduced healthcare utilization and costs.[8-11] CGMs provide more detailed data to patients and their healthcare providers than do traditional self-monitoring glucose meters. These data can be used to track patients' glucose levels more accurately, to improve patients' diets and to optimize insulin doses for the 8.4 million Americans who use insulin.[12,13] Moreover, in the *Standards of Care in Diabetes–2024*, the ADA recommends that diabetes devices be offered to all people with diabetes.[14]

Access gaps

Despite ADA guidance and the demonstrated clinical and economic benefits of CGM use, rates of CGM use remain low, especially among minority populations, and gaps to accessing CGMs persist.[11] The results of one study including 11,469 patients with type 1 diabetes (T1D) who completed one or more clinic encounters during the years 2017 to 2019 found that less than half (48%) were CGM users.[11] Insurance type and race/ethnicity were associated with disparities in utilization and outcomes. Rates of CGM utilization were much higher for patients with commercial insurance (57.2%) than for patients with public insurance (33.3%) such as Medicaid or Medicare.[11] A subgroup analysis for patients whose insurance status was available showed that those with commercial insurance had higher rates of CGM uptake and better clinical outcomes than did those with public insurance.[11] Further disparity was seen in this study when accounting for race/ethnicity; significantly greater CGM use was noted among White study participants (49.5%) com-

pared with Black (17.7%) and Hispanic participants (38.4%) ($P < .001$).[11]

These findings align with those of other studies that have shown differences in CGM use among racial/ethnic groups. In a retrospective cohort study of 1,258 adults with T1D who were followed from 2013 to 2020, investigators found that Black adults were less likely to use a CGM at the start of the study (7.9% vs. 30.3%; $P < .001$) and less likely to initiate CGM use during the study compared with non-Black adults (43.6% vs. 72.1%; $P < .001$).[15] Investigators speculated that lower CGM use among Black patients may be associated with a lower frequency of CGM discussion and prescription by their physicians.[15] Findings from a study that investigated 300 young adults with T1D who were 20 to 23 years old demonstrated substantially higher CGM use among White participants (71%) than Black (28%) and Hispanic (37%) participants ($P < .001$) **(Figure).**[16]

Barriers to equitable access identified

Such disparities and inadequacies in outcomes for patients translate to a high cost of care, which places a great burden on the U.S. healthcare system. In 2022, the total estimated cost of diabetes in the U.S. was $412.9 billion, including $306.6 billion (74%) toward direct healthcare and $106.3 billion (26%) representing loss of productivity from missed work, unemployment due to long-term disability and premature death.[17] High costs of diabetes care and data showing that patients are not meeting treatment goals underscore the need to optimize diabetes management by reducing existing disparities in care and improving access to new technologies.[3,4,11]

A Stanford University School of Medicine survey conducted among clinicians recruited through the T1D Exchange network demonstrated that CGM device cost (98.9%), supply cost (97.6%) and insurance coverage (98.8%) were the most commonly cited barriers to care perceived by physicians who were cautious about promoting CGM use. Among clinicians who were ready to promote CGM use, insurance coverage (76.2%), device cost (33.3%) and supply cost (31.0%) remained among the most highly cited perceived barriers.[18] Provider-level barriers such as these may compound other patient-associated factors and may lead to the low rates of CGM use seen among minority populations.

Inadequate uptake of CGMs and low rates of use among minority groups can be attributed to several patient-associated factors. Notably, socioeconomic factors (e.g., education and household income), insurance status and health literacy are major obstacles to accessing medical care and diabetes devices such as CGMs.[15] This is reflected in the high prevalence of diabetes and worse outcomes seen among those with less than a high school education and lower levels of income (less than 500% of the federal poverty level) than those with higher levels of education and income.[3,19] Inadequate patient education regarding how to self-manage diabetes was also found to be lacking among patients in minority populations, and it is considered to be a provider-level barrier for prescribing the use of diabetes technology.[15,16]

A major contributor to gaps in dissemination of CGMs may be directly attributable to healthcare providers. Outcomes of studies have indicated that physicians discuss diabetes technology less frequently with patients from minority

VIDEO INSIGHTS

Addressing disparities in diabetes care

To view the interviews with Estay Greene, Pharm.D., MBA; and Diana Isaacs, Pharm.D., BCPS, BCACP, BC-ADM, CDCES, FADCES, FCCP, as well as other videos, please scan the QR code.

racial and ethnic backgrounds.[15,20,21] Some patients have expressed interest in CGMs; however, physicians occasionally assume that the devices are too complex for patients to operate and discourage their use.[15] More open dialogue about the patient's interests and capabilities in regard to their diabetes management could help boost equitable access to diabetes technologies. Study results have shown that there were gaps in information shared with patients from minority ethnic backgrounds regarding potential benefits of diabetes technologies.[15,21] These patients described some interactions as being judgmental and a barrier to attending appointments and receiving proper care for diabetes.[15] Enhanced communication and education from providers about these technologies could empower members of underserved communities and assist patients in successfully managing their diabetes.

Interventions and policy changes to promote equity

CGMs are changing the landscape of diabetes management by giving patients and their healthcare providers a tool to more closely monitor and manage glycemic levels. Better management allows stakeholders to respond quickly to changes and avoid serious, preventable complications.[13] However, improved outcomes require policy changes by private insurance companies and government programs to ensure equitable CGM access.

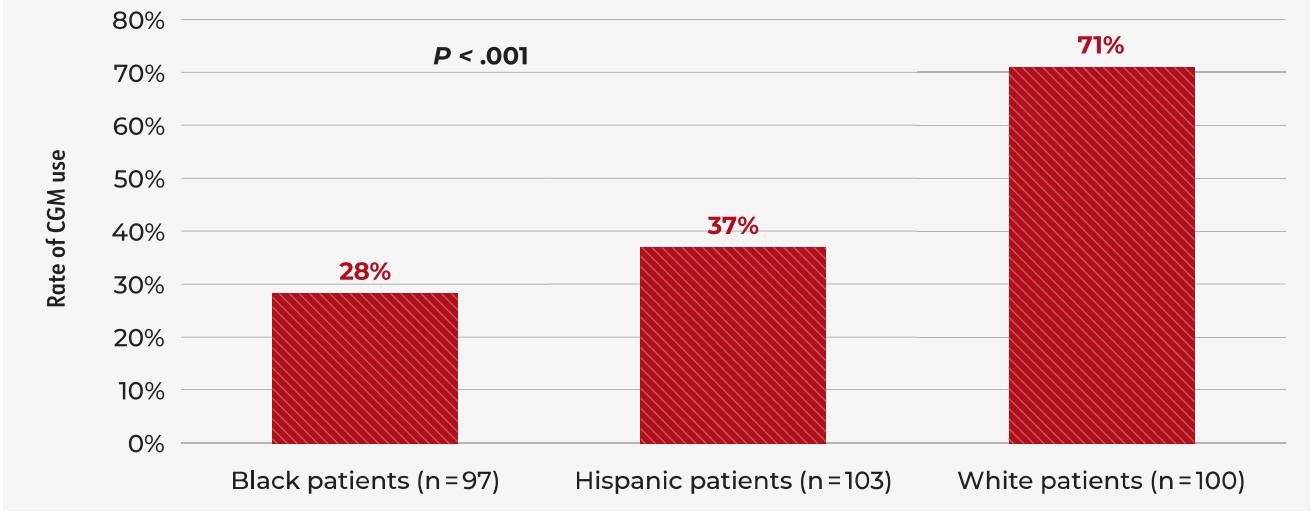
In a study of 3,036 patients with T1D or type 2 diabetes (T2D), CGMs were dispensed to 591 of 628 patients (94.1%) who received a CGM prescription through their regional Medicaid plan at little or no cost and with no restrictions.[22] Study results demonstrated no significant differences in uptake by race/ethnicity, suggesting that elimination of cost and policy barriers may help to reduce disparities in CGM use.[22]

Recently, there has been progress in coverage expansion for CGMs. On April 16, 2023, the Centers for Medicare & Medicaid Services (CMS) expanded CGM access to include patients using any insulin regimen or those who have a history of problematic hypoglycemia.[23,24] CMS removed previous restrictions, thereby improving the accessibility of CGM devices for patients who are not receiving insulin treatment or who do not meet the previous requirement of daily insulin administration.[24] Broadening access to CGMs marks a significant step toward optimizing glycemic management, expanding diabetes goal performance metrics and fostering improved outcomes for individuals with diabetes. Policy changes by private insurance companies to ease or diminish restrictions and expansion of coverage by government programs both can broaden access to CGMs.

Patient education is critical but underutilized

Healthcare providers have a unique opportunity to educate patients about the benefits of CGM use in diabetes management.[20] In order to reduce disparities in care and boost equity, participation in diabetes self-management education and support (DSMES) programs should be encouraged.

FIGURE. CGM use among young adults with T1D by race/ethnicity (N = 300)[16]



CGM, continuous glucose monitor; T1D, type 1 diabetes.

DSMES should be customized and implemented to fit the needs of individuals as recommended by the ADA.[25] DSMES is an essential component of comprehensive diabetes medical care and is critical at diagnosis, when complicating factors develop, when transitions in life and care occur and when patients are not meeting treatment goals.[26] In patients with T2D, the addition of DSMES has been shown to reduce HbA_{1c} levels by an average of 0.45% to 0.57%, reduce onset or worsening of diabetes-related complications and to reduce mortality compared with typical care (medication or lifestyle therapy) alone.[26]

However, current utilization is low; data from the CDC show that only 6.8% of privately insured patients with T2D participated in DSMES within a year of diagnosis.[27] The CMS reports similar statistics; only 5% of Medicare patients with diabetes participated in DSMES one year after diagnosis.[26,28] DSMES has been shown to improve health outcomes and reduce healthcare costs.[29,30] This tool may help attenuate the heavy economic burden of diabetes, which accounted for approximately 25% of all U.S. healthcare spending in 2022.[17]

Conclusion

Disparities due to racial/ethnic bias, insurance coverage and healthcare literacy—linked to provider bias, income and patient education, respectively—serve as barriers to equitable diabetes care and access to CGMs.[11,15,20,21,27,28] Data show that members of minority populations, those with lower socioeconomic status and those without private insurance are disproportionately affected by diabetes and have lower rates of CGM use.[3,11] Greater importance must be placed on patient education programs, and expansion of the programs is necessary. Clinical practice guidelines endorse the use of CGMs, and the CMS recently expanded coverage. However, further action must be taken to inform patients and to increase adoption and dissemination of new diabetes care technology. These actions must result from changes in provider perspectives and both commercial and government health insurance policies.[14,23,24]

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