ABOUT THE AUTHORS

Sooyoun Shin, MD, FRCPC

Dr. Sooyoun Shin completed her medical degree and core internal medicine residency at the University of Toronto, where she served as the Chief Medical Resident at Women's College Hospital. She is currently completing her PGY 5 Adult Endocrinology residency at the University of Toronto. Dr. Shin has received multiple institutional awards for teaching and mentorship, including the F.M. Hill Mentoring Award. Clinically, she is committed to providing high-quality, patient-centred care in her role as a future endocrinologist, where she aims to pair evidence-driven, compassionate care with pragmatic education for frontline clinicians and patients.

Affiliations: *Division of Endocrinology & Metabolism, Department of Medicine, Temerty Faculty of Medicine, University of Toronto, Toronto, ON*

Jeremy Gilbert, MD, FRCPC

Dr. Jeremy Gilbert completed his medical degree, internal medicine training, and endocrinology residency at the University of Toronto. He is an associate professor at the University of Toronto. He is the former program director for adult endocrinology and metabolism at the University of Toronto. He has authored a chapter in the 2013 and 2018 Diabetes Canada Guidelines and is a member of the steering committee of the Diabetes Canada Guidelines. He is the national lead for dissemination and implementation for the Diabetes Canada Guidelines. He is on the executive and is a national editor for the Canadian Journal of Diabetes. He is the endocrinology section chair at the Royal College of Physicians and Surgeons of Canada. He is a passionate teacher and his academic interest in undergraduate, postgraduate, and continuing medical education in diabetes and endocrinology. He has received numerous awards for outstanding teaching including the 2021 Canadian Society of Endocrinology and Metabolism's Harvey Guyda Educator of the Year Award.

Affiliations: *Division of Endocrinology and Metabolism, Department of Medicine, Sunnybrook Health Sciences Centre and University of Toronto, Toronto, ON*

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Continuous Glucose Monitoring: A Practical Overview for Primary Care Providers in Canada

Sooyoun Shin, MD, FRCPC
Jeremy Gilbert, MD, FRCPC

Continuous glucose monitoring (CGM) is transforming diabetes care, yet its use in type 2 diabetes (T2DM) remains underutilized in primary care. Given that most individuals with diabetes in Canada have T2DM and are managed primarily by primary care providers, the ability to interpret and apply CGM data is essential. This review provides an overview of CGM technology, key metrics, benefits and limitations, and offers practical tips for implementation in primary care.

Background

In Canada, approximately one in seven adults is affected by diabetes, with type 2 diabetes mellitus (T2DM) accounting for 90–95% of all cases.[1] Studies have shown that that up to 70% of individuals living with T2DM receive their diabetes care exclusively from primary care providers.[2] These statistics underscore the pivotal role of primary care in the delivery of diabetes management in Canada.

Over the past decade, continuous glucose monitoring (CGM) has emerged as a transformative advancement in diabetes care. Originally developed for people living with type 1 diabetes (T1DM), CGM improves glycemic control and quality of life by increasing time in range (TIR), reducing rates of clinically significant hypoglycemia, and lowering HbA1c, independent of the mode of insulin delivery.[3-5] Evidence continues to emerge supporting the use of CGM in the care of people living with T2DM, making CGM an important tool for primary care providers who are often the first point of contact for diabetes care.

Understanding CGM and Key Metrics

CGM systems are broadly categorized as real-time CGM (rtCGM) or intermittently scanned CGM (isCGM). rtCGM devices, such as Dexcom G6/G7 and FreeStyle Libre 2/3 Plus, provide continuous glucose data and alerts, an advantage for individuals with hypoglycemia unawareness. In contrast, isCGM systems, such as FreeStyle Libre 1/2, require users to scan the sensor at least every 8 hours to access glucose readings.

All CGM systems generate standardized data. Key CGM metrics include[6]:

- **Time in Range (TIR):** 3.9–10.0 mmol/L (goal ≥70%; though individual goals may apply for factors such as pregnancy, older age, or frequent hypoglycemia)
- **Time Below Range (TBR):** <4% below 3.9 mmol/L, <1% below 3.0 mmol/L
- **Time Above Range (TAR):** <25% above 10 mmol/L
- **Glucose Management Indicator:** An estimated HbA1c based on mean glucose
- **Glycemic variability:** Coefficient of variation <36%

In addition, an ambulatory glucose profile shows overall trends of glycemic control over a 24-hour period and can unmask patterns of hypoglycemia or hyperglycemic episodes that can be used to help guide therapeutic interventions.

Benefits of CGM in Primary Care

In Canada, CGM is commonly used in people living with T2DM receiving insulin therapy, but its use is expanding to broader populations, including those on non-insulin therapies or newly-diagnosed individuals not yet on therapy. CGM offers complementary insight to HbA1c and provides an alternative form of glucose monitoring from the traditional self-monitoring of blood glucose (SMBG) by providing real-time or scanned glucose data that supports better therapy titration, pattern recognition, and reduction of glycemic variability.

Meta-analyses of numerous randomized controlled trials have consistently demonstrated that CGM use in individuals with T2DM is associated with modest HbA1c reductions of 0.2–0.3%, improved TIR, and increased patient satisfaction.[7,8] Recent studies continue to expand the evidence base to individuals with T2DM on non-insulin therapy. For example, the IMMEDIATE study showed that providing isCGM (FreeStyle Libre) alongside diabetes education to individuals with T2DM not on insulin led to a 9.9% increase in TIR (equivalent to 2.4 additional hours per day), an 8.1% reduction in TAR (1.9 fewer hours), and a mean HbA1c reduction of 0.3% compared to diabetes education alone.[9] A large real-world study involving over 24,000 adults with T2DM reported a 1.6% greater reduction in HbA1c among those using a glucagon-like peptide-1 receptor agonist (GLP-1RA) combined with FreeStyle Libre compared to GLP-1RA alone.[11] Notably, nearly half of participants in both treatment arms were not using insulin, demonstrating that CGM benefits extend beyond individuals using insulin as their primary anti-glycemic therapy. Finally, CGM has also been shown to be both safe and effective in older adults. In the WISDM trial, adults aged ≥60 years with T1DM who used CGM experienced sustained improvements in TIR and HbA1c over 12 months, without an increased risk of hypoglycemia, providing reassurance for its use in older populations.[12]

Beyond glycemic endpoints, CGM can also drive meaningful behavioural and psychological changes. A systematic review of 54 qualitative studies identified recurring themes including greater confidence, increased awareness, improved self-management, reassurance, and a sense of control among people living with diabetes.[13] Interviews with Dexcom G6 users found that CGM "made the invisible visible," helping users better understand how their behaviour affects effects glucose levels and enabling improved lifestyle and medication decisions.[14]

Clinical guidelines are evolving to reflect this growing evidence. The 2021 Diabetes Canada guidelines recommend CGM for people with T1DM on multiple daily insulin injections or insulin pump therapy and considers its use for those with T2DM on basal-bolus insulin who are not meeting targets.[15] More recently, the 2025 American Diabetes Association guidelines recommend use of CGM for all youth and adults with diabetes on any insulin therapy and advise considering its use for those on non-insulin regimens.[16]

Potential Limitations

The main challenges and barriers associated with the use of CGM in people living with T2DM in Canada, especially for those not on insulin regimens, include high cost and limited coverage, device-related adverse effects, psychosocial and usability concerns, data overload, and factors affecting device accuracy.

Cost and coverage are the most significant barriers. Public funding for CGM in Canada varies by province and territory, with most jurisdictions restricting coverage to people with T1DM or those on intensive insulin regimens. Adults with T2DM who are not on insulin often face substantial out-of-pocket expenses unless they have private insurance, leading to inequitable access and lower uptake among those with lower socioeconomic status.

Meta-analyses report that CGM use is associated with higher rates of local skin reactions compared to SMBG, including irritation, dermatitis, sensor adhesion difficulties, and, rarely, site infections.[7] These complications may lead to premature sensor removal or discontinuation of CGM. Strategies to mitigate these effects include cleansing the skin with alcohol, ensuring the site is completely dry prior to sensor placement, applying a topical corticosteroid (e.g., fluticasone) before insertion, and using barrier films or adhesives to improve sensor adhesion and reduce irritation.[17]

Alert fatigue generated by frequent or false alarms from rtCGM devices can cause distress and reduce user satisfaction.[13] This may be mitigated by individualizing alarm thresholds in collaboration with healthcare providers. Additionally, the visible nature of CGM devices can contribute to stigma or self-consciousness, particularly among younger adults or those with active lifestyles.[18] Increasing public awareness and involving media representation of diabetes technologies may help reduce this stigma over time.

CGM accuracy can be affected by certain medications or clinical conditions. High doses of vitamin C and acetylsalicylic acid (ASA) have been shown to interfere with FreeStyle Libre 1 readings,[19] while Dexcom sensors may be affected by hydroxyurea or high doses of acetaminophen,[20] necessitating caution in patients using these medications. Furthermore, MRI and CT imaging compatibility varies among CGM devices, often requiring sensor removal or replacement following imaging to ensure continued accuracy.[19] Users and healthcare providers should consult product

monographs and manufacturer guidance to avoid potential device damage or inaccurate readings. Although newer models such as Dexcom G7 and FreeStyle Libre 3 Plus have shown improved accuracy compared to older models, CGM performance can still decline during glucose extremes (severe hypoglycemia or hyperglycemia) or when physical pressure is applied to the sensor site, underscoring the need to confirm suspicious readings with fingerstick glucose measurements.

Practical Considerations

To effectively implement CGM in primary care, providers can take several practical steps.

First, identify suitable patients. CGM is particularly beneficial for people with diabetes who are on insulin or other therapies associated with hypoglycemia risk (e.g., sulfonylureas), those experiencing recurrent hypoglycemia or marked glycemic variability, and newly-diagnosed patients with diabetes where early insights may support education and behavioural change. CGM is also valuable for those on non-insulin regimens who are struggling to meet glycemic targets. Consider offering a CGM trial in collaboration with support from a local diabetes educator or pharmacist.

Second, become familiar with interpreting the ambulatory glucose profile reports that can be generated using the manufacturer platforms (e.g., Dexcom Clarity, LibreView), sensor readers, or associated smartphone applications. A step-by-step guide to assist in interpreting the ambulatory glucose profile data is as follows:

1. Assess for data sufficiency: aim for 10–15 days of wear with at least 70% data capture.
2. Review standardized metrics: focus on TIR, TAR, TBR, mean glucose, and glucose variability.
3. Examine the 24-hour ambulatory glucose profile: assess for trends of hypoglycemia or hyperglycemic episodes where treatment adjustments could be made.

Third, address access barriers early. Inquire about public and private coverage options and assist patients in applying for provincial or manufacturer-based support programs.

Finally, engage patients in shared review of CGM data. Identify patterns, link them to lifestyle or medication timing, and reinforce goals such as improving TIR, and minimizing hypo- or hyperglycemia episodes, and reducing glycemic variability.

Conclusion

CGM is a transformative advancement in diabetes management within primary care. By providing detailed, real-time insights into glycemic patterns beyond traditional measures such as HbA1c and SMBG, CGM empowers both people living with diabetes and clinicians to make more informed, personalized treatment decisions. This patient-centred technology not only supports improved clinical outcomes but also fosters positive behavioural changes and enhances patient engagement and confidence in self-management. With appropriate education, workflow adaptation, and patient support, CGM has the potential to significantly enhance the quality of diabetes care, ultimately improving health outcomes and quality of life for people living with diabetes.

Correspondence

Jeremy Gilbert, MD, FRCPC
Email: jeremy.gilbert@sunnybrook.ca

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