Blood Glucose Meters NICE 2022, Diabetes Canada 2021, AACE 2021, ADA 2023

A Crawley BSP, B Robertson PharmD © www.RxFiles.ca/diabetes July 2024

✓✓An Advantage | ✓ Neutral | ✕ | ✕✕ A Disadvantage

	Meter All meters meet Health Canada, FDA, & International accuracy standards.[80,81]	Accuracy (esp. ability to detect ↓BG)	Blood (µL) Required	Re-Apply Blood?	Comments / Extra Features	App Available	Cost /100 strip
Capillary Meters	Medisure **Empower** 	✓ typically ± 0.6 mmol/L	0.5 µL	Cannot re-apply blood	• Illuminated. • Strip ejector. • Option for AST (forearm, upper arm, hand).	no app	**$89**
	Accu-Chek **Guide** 	✓✓ typically ± 0.3 mmol/L	0.6 µL	Cannot re-apply blood	• Strip ejector. • Option for AST (palm, forearm, upper arm).	**mySugr**	**$84**
	One Touch **Ultra 2** 	✓ typically ± 0.6 mmol/L	1.0 µL	Cannot re-apply blood	• Requires coding. • Option for AST (forearm or palm, but requires a special lancing device).	no app	**$85**
	One Touch **Verio Flex** 	✓✓ typically ± 0.3 mmol/L	0.4 µL	Cannot re-apply blood	• Colour bar classifies glucose level.	**OneTouch Reveal**	**$85**
	One Touch **Verio Reflect** 	✓ typically ± 0.6 mmol/L	0.4 µL	Cannot re-apply blood	• Colour bar / emoji classifies glucose level.	**OneTouch Reveal**	**$85**
	Contour **Next** 	✓✓ typically ± 0.3 mmol/L	0.6 µL	Can re-apply blood	• Option for AST (palm).	no app	**$84**
	Contour **Next EZ** 	✓✓ typically ± 0.3 mmol/L	0.6 µL	Can re-apply blood		no app	**$84**
	Contour **Next One** 	✓✓ typically ± 0.3 mmol/L	0.6 µL	Can re-apply blood	• Small size. • Option for AST (palm). uses colour light to classify glucose level	Contour Diabetes	**$84**
	Contour **Next Gen** 	✓✓ typically ± 0.3 mmol/L	0.6 µL	Can re-apply blood	• Option for AST (palm).	Contour Diabetes	**$84**
	Freestyle **Lite** 	✓ typically ± 0.6 mmol/L	**0.3 µL**	Can re-apply blood	• Option for AST (upper arm, forearm, hand, fingers, thigh, or calf).	no app	**$84**
	GE200 	✓✓ typically ± 0.3 mmol/L	0.75 µL	Cannot re-apply blood	• Option for AST (palm or forearm).	no app	**$65**
	Oracle EZ 	✓ typically ± 0.8 mmol/L	0.7 µL	Cannot re-apply blood	• Talking audio (French & English). • Option for AST (palm, forearm, upper arm, calf, or thigh).	no app	**$85**
	Spirit 	✓ typically ± 0.6 mmol/L	0.5 µL	Cannot re-apply blood	• Option for AST (palm or forearm).	no app	**$62**

	Meter	General Notes	Sensor	Alerts (app must be open to transmit)	Reader	Cost /30 days
Continuous Systems	**Libre 2** ☎✆ intermittent scan; age ≥4yrs 	Can falsely detect hypoglycemia.[84] Readings lag behind capillary measurements by 5-15 mins. Apps available. **DI**: Falsely ↑readings if on **Vitamin C** >500mg/d with Libre or if on **hydroxyurea** with Dexcom G6.[79]	14 day duration; on back of arm; about toonie-sized.	✓ Range 20ft. To interpret alert, must scan sensor.	$65 reader; can also use cellphone. Must scan **q8hrs**.	**$194**
	Libre 3 real-time; age ≥4yrs 		14 day duration; on back of arm; about nickel-sized.	✓✓ Sends **real-time** info to phone; range 20 ft.	No reader; must be near cellphone at all times to transmit.	**Not yet available in Canada**
	Dexcom G6 real-time; age ≥2yrs ☎✆  **G7**- new'23☎✆		10 day duration; on abdomen (≥2yrs) or back of arm (≥18yrs).	✓✓ Sends **real-time** info to phone/reader; range 20 ft.	Must be near reader (**$500**) or cellphone **q3hr**.	**$350-G6** **$250-G7**

Clinical Pearls

- There is no need to choose a meter with numerous features if the patient does not plan to use those features.
- If capillary testing >6 times per day, a continuous system can be more affordable than capillary testing.
- Testing has limited purpose if results are not used to adjust treatment.
- Continuous systems are preferred in **Type 1** diabetes (↑safety, ↓A1c).

Table 1. Who should test?[1-5,7,75-79]

T2DM	Diet-controlled	**No routine testing if targets met.** May recommend testing if: • will result in a change in therapy (e.g. drugs, diet) • will ↑ adherence to therapy • managing or preventing hypoglycemia (e.g. before driving or exercise) / in acute illness If testing, capillary meters (finger prick) usually ↓ cost.
	On meds other than insulin	
	On insulin	**May capillary test at least as often as taking insulin** (for safety & to help dose). Continuous systems provide minimal extra A1c/hypoglycemia benefit.[4] Consider a continuous system if unable to capillary test, or if recurrent/severe/unaware of hypoglycemia.[NICE'22]
T1DM		**Continuous systems preferred** in T1DM on basal-bolus therapy. If capillary testing, target ≥ QID.
Diabetes in Pregnancy		**Usually requires regular or continuous testing** to guide management. See also page 57. Adjust "time in range" for continuous systems (see online 💻 **Table 4**).

Table 2. Which meter is best for my patient?

For many patients, any meter will do. However, each meter has its pros and cons; see our colour comparison chart (left). **Some meters with unique or desirable features include:**

Low tech & low cost

GE200 

~25% lower cost than most other meters; strips very easy to insert.

Highest rated apps in the App Store

Accu-Chek Guide — mySugr

One Touch Verio Flex or **Verio Reflect** — OneTouch Reveal

Tiny blood sample

Freestyle Lite 

Useful if e.g. calluses make drawing blood difficult.

Visually impaired patient

Oracle EZ 

English & French talking feature.

Libre 1: a continuous system requiring intermittent scan q8hr; age ≥18yrs; 14 day duration sensor; NOT able to send alerts; same cost as Libre 2; reader available or can use cellphone to scan; finger poke required to make treatment decisions.
AST=alternate site testing. AST is available for many meters, but results lag behind capillary testing, and so AST is less useful if hypoglycemia concerns.
Capillary meter coverage in Saskatchewan: Typically available for free with purchase of 100 strips. Strips are covered by Sask Health at 200 strips per year; 400 per year if at high hypoglycemia risk; 3,650 per year if on insulin (800 strips per 100 days if NIHB).
Continuous meter coverage in Saskatchewan: ☎ **Sask Health**: age 4-17yrs & diabetes managed with insulin. ✆ **NIHB**: any patient on insulin.

Blood Glucose Meters

Acknowledgements: Written by Alex Crawley and Brooke Robertson in 2022. Ongoing edits provided by Alex Crawley. Previous versions of this chart were written by Taisa Trischuk, Loren Regier, and Christine Lee. Thanks to our reviewers: Henry Halapay, Monica Lawrence, Kerry Mansell, Lisa Rutherford, Loren Regier, Tahirih McAleer, Stephanie Zimmer, Margaret Jin, Donna Herbert, Debbie Bunka, Jessica Visentin, Arlene Kuntz.
Disclosures: No conflicts of interest are reported the authors.

A1c=glycosylated hemoglobin **BG=**blood glucose **CGM=**continuous glucose monitoring **d=**day **DI=**drug interaction **esp=**especially **FDA=**approved Food & Drug Admin **hr(s)=**hour(s) **min(s)=**minute(s) **QID=**four times per day **T1DM=**type 1 diabetes mellitus **T2DM=**type 2 diabetes mellitus **yr(s)=**year(s)

💻 Online Extras:

Table 3: Blood Glucose Meter Additional Pearls

- When cleaning the skin prior to a capillary test, soap and water is adequate.
- If using continuous systems, occasional capillary testing may still be required – for example, if results are rapidly changing or do not match how the patient is feeling.
- Continuous systems are useful to detect nighttime hypoglycemia and/or the Somogyi effect (hypoglycemia at night leading to rebound high blood glucose levels in the morning).
- Continuous systems have value in the peri-operative and post-operative environment (e.g. when deciding when to restart held medications).
- Watch for 'alert fatigue' and 'monitoring anxiety' with continuous systems. In patients who have well managed diabetes, a continuous system can sometimes create unnecessary stress and a hyper-awareness of blood glucose values. Alert settings may also need to be changed (e.g. in older adults) to reflect new time-in-range goals.
- For patients on an insulin pump, continuous systems allow improved monitoring. Automated insulin delivery systems are also being studied which can communicate with continuous monitoring in order to automatically adjust insulin doses. For a review of these new technologies, see Marks et al.[85] For Sask Health insulin pump criteria (2021), see this link.
- Rarely, the sensor of a continuous system will detach. Typically contacting the company will result in them sending a new sensor to the patient under warranty.
- For patients concerned with privacy, the **Dexcom G6** sensor can attach to the abdomen and feel more discreet than attaching to the back of the arm. Teaching video here.

Table 4. Diabetes Monitoring Targets for Continuous Systems.[AACE 2021]

	T1DM or T2DM	Older Adults / Frailty	T1DM in Pregnancy
Time in Range	>70% between 4-10 mmol/L	>50% between 4-10 mmol/L	>70% between 3.5-7.8 mmol/L
Time Below Range	<4% below 4 mmol/L <1% below 3 mmol/L	<1% below 4 mmol/L 0% below 3 mmol/L	<4% below 3.5 mmol/L <1% below 3 mmol/L
Time Above Range	<25% above 10 mmol/L <5% above 14 mmol/L	<10% above 14 mmol/L	<25% above 10 mmol/L

Table 5. How accurate are capillary blood glucose meters?

Below is collected accuracy data for common capillary blood glucose meters. Data collected from manufacturer instruction manuals. All blood glucose meters on the Canadian market meet ISO 15 international standards. Results are for measurements below 5.5 mmol/L;* in general meters are **more** accurate when measuring **higher** blood glucose readings. For our colour comparison chart, we gave two checks for accuracy if a meter consistently (i.e. >80% of the time) measured results within ± 0.28 mmol/L. (Note: 0.28 mmol/L was rounded to 0.3 mmol/L, and 0.56 mmol/L was rounded to 0.6 mmol/L, for the colour comparison chart).

	Accu-Chek	OneTouch			Contour				FreeStyle	General Electric	Oracle	Spirit	MediSure
	Guide	Ultra 2	Verio Flex	Verio Reflect	Next	Next Gen	Next EZ	Next One	Lite	GE200	Oracle	Spirit	Empower
Within +/- 0.28 mmol/L	94.1%	48.8%	82%	73.7%	92.8%	83.3%	91%	90.3%	70.1%	92.2%	-	55.4%	68.7%
Within +/- 0.56 mmol/L	100%	84.5%	98%	96.8%	99.4%	99%	100%	100%	95.5%	100%	-	88.2%	96.9%
Within +/- 0.83 mmol/L	100%	100%	100%	100%	100%	100%	100%	100%	99.5%	100%	100%	98.9%	100%

*One Touch Ultra 2 was tested for accuracy below 4.2 mmol/L (rather than 5.5 mmol/L).

Search Terms

ACCU-CHEK	60
ASCENSIA	60
DEXCOM	60
Diabetes	60
FREESTYLE	60
GE200	60
Glucose	60
Glucose Meters	60
Glucose Testing	60
Hypoglycemia	60
LIBRE	60
LITE	60
NEXT	60
ONE-TOUCH	60
ORACLE	60
Self-Monitoring of Blood Glucose	60
SMBG	60
SPIRIT	60
Type 1 Diabetes Mellitus	60
Type 2 Diabetes Mellitus	60
ULTRA	60
VERIO	60

References for Blood Glucose Meters

1. Berard L, Siemens R, Woo V et al. *Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*: Monitoring Glycemic Control. Can J Diabetes. 2018;42(Suppl1):S47-S53.
2. CADTH Clinical Analysis- COMPUS Optimal Therapy Report: Systematic Review of Use of Blood Glucose Test Strips for the Management of Diabetes Mellitus. May 2009. https://www.cadth.ca/media/pdf/BGTS_SR_Report_of_Clinical_Outcomes.pdf
3. CADTH Optimal Therapy Newsletter: Self-Monitoring of Blood Glucose. Feb 2016. https://www.cadth.ca/sites/default/files/pdf/Tools/SMBG/OT_Newsletter_en.pdf
4. Tools for Practice #333. Come Spy with Me: Continuous glucose monitoring in diabetes. Available from https://gomainpro.ca/wp-content/uploads/tools-for-practice/1675379665_tfp333_glucosemonitoring.pdf
5. Diabetes Canada Clinical Practice Guidelines Expert Committee. *Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*. Can J Diabetes. 2018;42(Suppl 1):S1-S325.
6. Malanda UL, Welschen LM, Riphagen II, et al. Self-monitoring of blood glucose in patients with type 2 diabetes mellitus who are not using insulin. Cochrane Database Syst Rev. 2012 Jan 18;1:CD005060. {From this review, we conclude that when diabetes duration is over one year, the overall effect of self-monitoring of blood glucose on glycaemic control in patients with type 2 diabetes who are not using insulin is small up to six months after initiation and subsides after 12 months. Furthermore, based on a best-evidence synthesis, there is no evidence that SMBG affects patient satisfaction, general well-being or general health-related quality of life. More research is needed to explore the psychological impact of SMBG and its impact on diabetes specific quality of life and well-being, as well as the impact of SMBG on hypoglycaemia and diabetic complications.}
7. National Institute for Health and Care Excellence. Type 2 diabetes in adults: management (NICE guideline NG28). 2022. https://www.nice.org.uk/guidance/ng28
8.
9. Simon J, Gray A, Clarke P, et al; Diabetes Glycaemic Education and Monitoring Trial Group. Cost effectiveness of self-monitoring of blood glucose in patients with non-insulin treated type 2 diabetes: economic evaluation of data from the DiGEM trial. BMJ. 2008 May 24;336(7654):1177-80.
10. Young LA, Buse JB, Weaver MA, et al. Glucose Self-monitoring in Non-Insulin-Treated Patients With Type 2 Diabetes in Primary Care Settings: A Randomized Trial. JAMA Intern Med. 2017 Jul 1;177(7):920-929.
11. Xu Y, Tan DHY, Lee JY-C. Evaluating the impact of self-monitoring of blood glucose frequencies on glucose control in patients with type 2 diabetes who do not use insulin: a systematic review and meta-analysis. *Int J Clin Pract* 2019;73:e13357.
12. Yale JF, Paty B, Senior PA. *Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*: Hypoglycemia. Can J Diabetes. 2018;42(Suppl1):S104-S108.
13. Feig D, Berger H, Donovan L et al. *Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*: Diabetes and Pregnancy. Can J Diabetes. 2018;42(Suppl1):S255-S282.
14. Aakre KM, Watine J, Bunting PS, et al. Self-monitoring of blood glucose in patients with diabetes who do not use insulin—are guidelines evidence-based? Diabet Med 2012;29:1226–36.
15. Battelino T et al. Effect of continuous glucose monitoring on hypoglycemia in type 1 diabetes. Diabetes Care 2011; 34:795.
16. Bergenstal RM et al. Effectiveness of sensor-augmented insulinpump therapy in type 1 diabetes. N Engl J Med 2010; 363:311.
17. Blevins TC et al. Statement by the American Association of Clinical Endocrinologists Consensus Panel on Continuous Glucose Monitoring. Endocr Pract 2010; 16:730.
18. Butalia S. Rabi D. To test or not to test? Self-monitoring blood glucose in patients with type 2 diabetes managed without insulin. Open Medicine, North America, 4, may. 2010.
19. CADTH Rapid Response: Blood Glucose Monitors and Test Strips: A Review of the Comparative Clinical Evidence and Cost-Effectiveness. Apr 2011. Accessed at: http://www.cadth.ca/media/pdf/htis/april-_2011/L0256%20SMBG%20Test%20Strips%20and%20Monitors%20Final.pdf
20. Choi HYJ. Flash Continuous Glucose Monitoring (**FreeStyle Libre 14-Day System**) for Self-Management of Diabetes Mellitus. Am Fam Physician. 2021 Jun 1;103(11):688-690.
21. COMPUS Optimal Therapy Report: **Cost Effectiveness** of Blood Glucose Test Strips in the Management of Adult Patients with Diabetes Mellitus. May 2009. Accessed Feb 04, 2010 at http://www.cadth.ca/media/pdf/BGTS_Consolidated_Economic_Report.pdf
22. Cornish A, Chase HP. Navigating **Airport Security** with an Insulin Pump and/or Sensor. Diabetes Technol Ther. 2012 Nov;14(11):984-5.
23. Dimosthenopoulos C, Liatis S, Kourpas E, et al. The beneficial short-term effects of a **high-protein/low-carbohydrate diet on glycaemic control** assessed by continuous glucose monitoring in patients with type 1 diabetes. Diabetes Obes Metab. 2021 Mar 26. doi: 10.1111/dom.14390.

24. Falk J, et al. Patterns, Policy and Appropriateness: A 12-Year Utilization Review of **Blood Glucose Test Strip Use** in Insulin Users. Can J Diabetes. 2017 Apr 11.
25. Farmer AJ, Perera R, Ward A, et al. **Meta-analysis** of individual patient data in randomised trials of self monitoring of blood glucose (**SMBG**) in people with non-insulin treated type 2 diabetes. BMJ. 2012 Feb 27;344:e486. {SMBG does not appreciably improve control in T2DM patients not on insulin. ↓A1C only marginally 8.3%⇨8.05%.}
Farmer AJ, Wade AN, French DP, et al; DiGEM Trial Group. Blood glucose self-**monitoring in type 2 diabetes**: a randomised controlled trial. Health Techno Assess. 2009 Feb;13(15):iii-iv, ix-xi, 1-50.
26. FDA Aug/10 and CDC have noted a progressive increase in the reports of bloodborne infection transmission over the past 10 to 15 years (**primarily hepatitis B virus**), resulting from shared use of fingerstick and point-of-care [POC] blood testing devices.
27. Franciosi M, Lucisano G, Pellegrini F, et al. ROSES Study Group. Role of **self-monitoring of blood glucose** and intensive education in patients with Type 2 diabetes not receiving insulin. A pilot randomized clinical trial. Diabet Med.2011Jul;28(7):789-96.
French DP, Wade AN, Yudkin P, Neil HA, Kinmonth AL, Farmer AJ. Self-monitoring of blood glucose changed non-insulin-treated Type 2 diabetes patients' **beliefs about diabetes and self-monitoring** in a randomized trial. Diabet Med. 2008 Oct;25(10):1218-28. {No change in diabetes-related health behaviours.}
28. Gellad WF, Zhao X, Thorpe CT, et al. Dual Use of Department of Veterans Affairs and Medicare Benefits and Use of **Test Strips** in Veterans With Type 2 Diabetes Mellitus. JAMA Intern Med. 2014 Nov 10.
29. Gillett M., Dallosso H. M., Dixon S., et al. Delivering the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes:cost effectiveness analysis.BMJ 2010;341:c4093
30. Gomes T, Martins D, Tadrous M, et al. Association of a **Blood Glucose Test Strip Quantity-Limit Policy** With Patient Outcomes: A Population-Based Study. JAMA Intern Med. 2016 Nov 7
31. Health Canada Mar/14: Informing Canadians that when Abbott FreeStyle glucose test strips are used with certain devices, there is a potential for users to receive a lower-than-actual blood sugar reading.
32. JDRF CGM Study Group. Continuous glucose monitoring and intensive treatment of type 1 diabetes. N Engl J Med 2008; 359:1464.
33. Karter AJ, Parker MM, Moffet HH, et al. Association of Real-time Continuous Glucose **Monitoring With Glycemic Control and Acute Metabolic Events** Among Patients With Insulin-Treated Diabetes. JAMA. 2021 Jun 2. doi: 10.1001/jama.2021.6530.
34. Kolb H, Kempf K, Martin S, Stumvoll M, Landgraf R. On **what evidence-base do we recommend** self-monitoring of blood glucose? Diabetes Res Clin Pract. 2010 Feb;87(2):150-156.
35. Lau, D. The Cost of Diabetes: A Game Changer. Canadian Journal of Diabetes, Mar '10.
36. Majumdar SR. Self-monitoring of blood glucose was not cost-effective in non-insulin-treated type 2 diabetes. ACP J Club. 2008 Nov-Dec;149(4):4-5.
37. Malanda UL, Bot SD, Kostense PJ, et al. Effects of **self-monitoring of glucose** on distress and self-efficacy in people with non-insulin-treated type 2 diabetes: a randomized controlled trial. Diabet Med. 2015 Jul 14.
38. Malanda UL, Welschen LM, Riphagen II, et al. Self-monitoring of blood glucose in patients with type 2 diabetes mellitus who are not using insulin. Cochrane Database Syst Rev. 2012 Jan 18;1:CD005060. {From this review, we conclude that when diabetes duration is over one year, the overall effect of self-monitoring of blood glucose on glycaemic control in patients with type 2 diabetes who are not using insulin is small up to six months after initiation and subsides after 12 months. Furthermore, based on a best-evidence synthesis, there is no evidence that SMBG affects patient satisfaction, general well-being or general health-related quality of life. More research is needed to explore the psychological impact of SMBG and its impact on diabetes specific quality of life and well-being, as well as the impact of SMBG on hypoglycaemia and diabetic complications.}
39. Mansell K, Blackburn D, Eurich D. Do postprandial glucose levels add important clinical information when fasting glucose levels are near normal in non-insulin-dependent patients with type 2 diabetes? CPJ 2010;142(6):298-302. Accessed on line Feb 11, 2010 at http://www.cpjournal.ca/perlserv/?request=get-document&doi=10.3821%2F1913-701X-142.6.298&ct=1
40. Martens T, Beck RW, Bailey R, et al; MOBILE Study Group. Effect of Continuous Glucose Monitoring on **Glycemic Control in Patients With Type 2 Diabetes** Treated With Basal Insulin: A Randomized Clinical Trial. JAMA. 2021 Jun 2. doi: 10.1001/jama.2021.7444.
41. Mcintosh B., Yu C., Lal A. et al. Efficacy of self-monitoring of blood glucose in patients with type 2 diabetes mellitus managed without insulin: a systematic review and meta-analysis. Open Medicine, North America, 4, may. 2010. Also article in CPJ, Sep 2010 @ http://www.cpjournal.ca/doi/pdf/10.3821/1913-701X-143.5.218; Commentary by Johnson in **CPJ, Sep 2010** @ http://www.cpjournal.ca/doi/pdf/10.3821/1913-701X-143.5.216.
42. Medical Letter. **Continuous Glucose Monitoring**. May 2, 2011.
43. O'Kane MJ, Bunting B, Copeland M, Coates VE; ESMON study group. **Efficacy of self monitoring** of blood glucose in patients with newly diagnosed type 2 diabetes (ESMON study): randomised controlled trial. BMJ. 2008;336(7654):1174-7.
44. O'Kane MJ, Pickup J. Self-monitoring of blood glucose in diabetes: **is it worth it**? Ann Clin Biochem. 2009 Jul;46(Pt 4):273-82.
45. Parkin CG, Hinnen D, Campbell RK, et al. Effective use of paired testing in type 2 diabetes: practical applications in clinical practice. Diabetes Educ. 2009 Nov-Dec;35(6):915-27.
46. Pickup John C, Freeman Suzanne C, Sutton Alex J. Glycaemic control in type 1 diabetes during real time **continuous glucose monitoring** compared with self monitoring of blood glucose: meta-analysis of randomised controlled trials using individual patient data. BMJ 2011;343:doi:10.1136/bmj.d3805 (7 July 2011)
47. Polonsky WH, Hessler D, Ruedy KJ, Beck RW; DIAMOND Study Group. The Impact of Continuous Glucose Monitoring on Markers of Quality of Life in Adults With Type 1 Diabetes: Further Findings From the DIAMOND Randomized Clinical Trial. Diabetes Care. 2017 Jun;40(6):736-741.
48. Rabi, D., Johnson, J., Edwards, J. Self-monitoring of blood glucose for individuals with type 2 diabetes not using insulin: Leaving no cornerstone unturned. Canadian Journal of Diabetes, March 2010.
49. Accessed June 24 2010 at: SMBG: Type 2 Diabetes and **Monitoring** your Blood Sugar –**Patient Pamphlet**. http://www.cadth.ca/media/pdf/smbg-nb_eng.pdf
50. Riveline JP, Schaepelynck P, et al. Assessment of patient-led or physician-driven continuous glucose monitoring in patients with poorly controlled type 1 diabetes using basal-bolus insulin regimens: a 1-year multicenter study.
51. Diabetes Care. 2012 May;35(5):965-71.
52. Robson J, Smithers H, Chowdhury T, et al. **Reduction in self-monitoring of blood glucose** in type 2 diabetes: an observational controlled study in east London. Br J Gen Pract. 2015 Apr; 65(633):e256-63.
53. Serwylo O, Friesen K, Falk J, et al. Opportunity Cost and Policy: A Utilization Review of **Self-Monitoring of Blood Glucose** in Manitoba, Canada. Clin Ther. 2016 Mar 2.
54. Simon J, Gray A, Clarke P, Wade A, Neil A, Farmer A; Diabetes Glycaemic Education and Monitoring Trial Group. Cost effectiveness of self monitoring of blood glucose in patients with non-insulin treated type 2 diabetes: economic evaluation of data from the DiGEM trial. BMJ. 2008 May 24;336(7654):1177-80.
55. Szmuilowicz ED, Aleppo G. **Interferent Effect of Hydroxyurea** on Continuous Glucose Monitoring. Diabetes Care. 2021 May;44(5):e89-e90.
56. Towfigh A, Romanova M, Weinreb JE, et al. Self-monitoring of blood glucose levels in patients with type 2 diabetes mellitus not taking insulin: a meta-analysis. Am J Manag Care. 2008 Jul;14(7):468-75.
57. Varanauskiene E. Can blood glucose self-monitoring improve **treatment outcomes** in type 2 diabetes? Diabetes Res Clin Pract. 2008 Dec 15;82 Suppl 2:S112-7.
58. Vigersky RA, Fonda SJ, et al. Short- and long-term effects of real-time continuous glucose monitoring in patients with type 2 diabetes. Diabetes Care. 2012 Jan;35(1):32-8.
59. Visser MM, Charleer S, Fieuws S, et al. Comparing **real-time and intermittently scanned continuous glucose monitoring** in adults with type 1 diabetes (ALERTT1): a 6-month, prospective, multicentre, randomised controlled trial. Lancet. 2021 Jun 12;397(10291):2275-2283.
60. Woo, V., Cheng, A., Hanna, A., et al. Self-monitoring of Blood Glucose in Individuals with Type 2 Diabetes Not Using Insulin: Commentary. Canadian Journal of Diabetes, March 2010. Accessed June 24 2010.
61. Young LA, Buse JB, Weaver MA, et al; Monitor Trial Group. **Glucose self-monitoring** in non–insulin-treated type 2 diabetes in primary care settings: a randomized trial [online June 10, 2017].JAMA Intern Med. doi:10.1001
62. Beck, R. W., Riddlesworth, T., Ruedy, K., Ahmann, A., Bergenstal, R., Haller, S., Kollman, C., Kruger, D., McGill, J. B., Polonsky, W., Toschi, E., Wolpert, H., Price, D., & DIAMOND Study Group (2017). Effect of Continuous Glucose Monitoring on Glycemic Control in Adults With Type 1 Diabetes Using Insulin Injections: The DIAMOND Randomized Clinical Trial. *JAMA*, *317*(4), 371–378. https://doi-org.cyber.usask.ca/10.1001/jama.2016.19975
63. Cengiz E, Tamborlane WV. A tale of two compartments: interstitial versus blood glucose monitoring. Diabetes technology & therapeutics. 2009 Jun 2;11(S1):S-11.

64. Castellana, M., Parisi, C., Di Molfetta, S., Di Gioia, L., Natalicchio, A., Perrini, S., Cignarelli, A., Laviola, L., & Giorgino, F. (2020). Efficacy and safety of flash glucose monitoring in patients with type 1 and type 2 diabetes: a systematic review and meta-analysis. *BMJ open diabetes research & care*, *8*(1), e001092. https://doi-org.cyber.usask.ca/10.1136/bmjdrc-2019-001092
65. Cheng, A. Y., Feig, D. S., Ho, J., & Siemens, R. (2021). *Blood Glucose Monitoring in Adults and Children with Diabetes: Update 2021*. Retrieved from Diabetes Canada: https://guidelines.diabetes.ca/cpg/chapter-9-2021-update#sec5
66. Haak, T., Hanaire, H., Ajjan, R., Hermanns, N., Riveline, J. P., & Rayman, G. (2017). Flash Glucose-Sensing Technology as a Replacement for Blood Glucose Monitoring for the Management of Insulin-Treated Type 2 Diabetes: a Multicenter, Open-Label Randomized Controlled Trial. *Diabetes therapy : research, treatment and education of diabetes and related disorders*, *8*(1), 55–73. https://doi.org/10.1007/s13300-016-0223-6
67. Hásková, A., Radovnická, L., Petruželková, L., Parkin, C. G., Grunberger, G., Horová, E., Navrátilová, V., Kádě, O., Matoulek, M., Prázný, M., & Šoupal, J. (2020). Real-time CGM Is Superior to Flash Glucose Monitoring for Glucose Control in Type 1 Diabetes: The CORRIDA Randomized Controlled Trial. *Diabetes care*, *43*(11), 2744–2750. https://doi-org.cyber.usask.ca/10.2337/dc20-0112
68. Heinemann, L., Freckmann, G., Ehrmann, D., Faber-Heinemann, G., Guerra, S., Waldenmaier, D., & Hermanns, N. (2018). Real-time continuous glucose monitoring in adults with type 1 diabetes and impaired hypoglycaemia awareness or severe hypoglycaemia treated with multiple daily insulin injections (HypoDE): a multicentre, randomised controlled trial. *Lancet (London, England)*, *391*(10128), 1367–1377.
69. Ontario Health (Quality) (2019). Flash Glucose Monitoring System for People with Type 1 or Type 2 Diabetes: A Health Technology Assessment. *Ontario health technology assessment series*, *19*(8), 1–108.
70. Reddy, M., Jugnee, N., Anantharaja, S., & Oliver, N. (2018). Switching from Flash Glucose Monitoring to Continuous Glucose Monitoring on Hypoglycemia in Adults with Type 1 Diabetes at High Hypoglycemia Risk: The Extension Phase of the I HART CGM Study. *Diabetes technology & therapeutics*, *20*(11), 751–757. https://doi-org.cyber.usask.ca/10.1089/dia.2018.0252
71. eddy, M., Jugnee, N., El Laboudi, A., Spanudakis, E., Anantharaja, S., & Oliver, N. (2018). A randomized controlled pilot study of continuous glucose monitoring and flash glucose monitoring in people with Type 1 diabetes and impaired awareness of hypoglycaemia. *Diabetic medicine : a journal of the British Diabetic Association*, *35*(4), 483–490. https://doi-org.cyber.usask.ca/10.1111/dme.13561
72. *Saskatchewan Formulary*. (2023). Retrieved from Government of Saskatchewan - Ministry of Health: https://formulary.drugplan.ehealthsask.ca/SearchFormulary
73. Subramonian, A., & Grobelna, A. (2022, September). *Real-Time Continuous Glucose Monitoring for People Living With Type 2 Diabetes*. Retrieved from CADTH: https://www.cadth.ca/sites/default/files/pdf/htis/2022/RC1443%20rtCGM%20for%20T2D%20Final.pdf
74. Vigersky, R. A., Fonda, S. J., Chellappa, M., Walker, M. S., & Ehrhardt, N. M. (2012). Short- and long-term effects of real-time continuous glucose monitoring in patients with type 2 diabetes. *Diabetes care*, *35*(1), 32–38.
75. Grunberger G, Sherr J, Allende M, Blevins T, Bode B, Handelsman Y, Hellman R, Lajara R, Roberts VL, Rodbard D, Stec C. American Association of Clinical Endocrinology clinical practice guideline: the use of advanced technology in the management of persons with diabetes mellitus. Endocrine practice. 2021 Jun 1;27(6):505-37.
76. National Institute for Health and Care Excellence. Type 1 diabetes in adults: diagnosis and management (NICE guideline NG17). 2022. https://www.nice.org.uk/guidance/ng17
77. National Institute for Health and Care Excellence. Diabetes (type 1 and type 2) in children and young people: diagnosis and management (NICE guideline NG18). 2022. https://www.nice.org.uk/guidance/ng18
78. O'Kane MJ, Bunting B, Copeland M, et al; ESMON study group. Efficacy of self monitoring of blood glucose in patients with newly diagnosed type 2 diabetes (ESMON study): randomised controlled trial. BMJ. 2008;336(7654):1174-7.
79. American Diabetes Association Professional Practice Committee, American Diabetes Association Professional Practice Committee:. 7. Diabetes technology: standards of medical care in diabetes—2022. Diabetes Care. 2022 Jan;45(Supplement_1):S97-112.
80. U.S. Food and Drug Administration. Self-Monitoring Blood Glucose Test Systems for Over-the-Counter Use. Guidance for Industry and Food and Drug Administration Staff, September 2020. Accessed 18 October 2021. Available from https://www.fda.gov/regulatory-information/search-fda-guidance-documents/self-monitoring-blood-glucose-test-systems-over-counter-use
81. International Standards Organization. ISO 15197:2013 [Internet]. In vitro diagnostic test systems – requirements for blood glucose monitoring systems for self-testing in managing diabetes mellitus. Accessed 18 October 2020. Available from https://www.iso.org/standard/54976.html
82. Beck RW, Riddlesworth TD, Ruedy K, Ahmann A, Haller S, Kruger D, McGill JB, Polonsky W, Price D, Aronoff S, Aronson R. Continuous glucose monitoring versus usual care in patients with type 2 diabetes receiving multiple daily insulin injections: a randomized trial. Annals of internal medicine. 2017 Sep 19;167(6):365-74.
83. Parkin CG, Hinnen D, Campbell RK, Geil P, Tetrick DL, Polonsky WH. Effective use of paired testing in type 2 diabetes: practical applications in clinical practice. Diabetes Educ. 2009 Nov-Dec;35(6):915-27.
84. Marks BE, Williams KM, Sherwood JS, Putman MS. Practical aspects of diabetes technology use: Continuous glucose monitors, insulin pumps, and automated insulin delivery systems. Journal of Clinical & Translational Endocrinology. 2022 Mar 1;27:100282.
85. Marks BE, Williams KM, Sherwood JS, Putman MS. Practical aspects of diabetes technology use: Continuous glucose monitors, insulin pumps, and automated insulin delivery systems. Journal of Clinical & Translational Endocrinology. 2022 Mar 1;27:100282.

Other References:

ADA- American Diabetes Association Professional Practice Committee; 7. Diabetes Technology: **Standards of Medical Care in Diabetes**—2022. Diabetes Care 1 January 2022; 45 (Supplement_1): S97–112. https://doi.org/10.2337/dc22-S007
Harris SB, Bari B, Gilbert J. **Continuous glucose monitoring**. CMAJ. 2023 Nov 14;195(44):E1509
Sly B, Taylor J**. Blood glucose monitoring devices**: current considerations. Aust Prescr 2023;46:54–59.
Visser MM, Charleer S, Fieuws S, et al. Effect of **switching from intermittently scanned to real-time continuous glucose monitoring** in adults with type 1 diabetes: 24-month results from the randomised ALERTT1 trial. Lancet Diabetes Endocrinol. 2023 Feb;11(2):96-108.