Blood Glucose Meters

Diabetes Canada 2021, ADA 2025, NICE 2022

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

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Meter All meters meet Health Canada, FDA, & International accuracy standards.[80,81]	Accuracy (esp. ability to detect ↓BG)	Blood (mcL) Required	Re-Apply Blood?	Comments / Extra Features	App Available	Cost /100 strip
Accu-Chek **Guide** 	✓✓ typically ± 0.3 mmol/L	0.6 mcL	Cannot re-apply blood	• Strip ejector. • Option for AST (palm, forearm, upper arm).	**mySugr**	**$89**
One Touch **Ultra 2** 	✓ typically ± 0.6 mmol/L	1 mcL	Cannot re-apply blood	• Requires coding. • Option for AST (forearm or palm, but requires a special lancing device).	no app	**$97**
One Touch **Verio Flex** 	✓✓ typically ± 0.3 mmol/L	0.4 mcL	Cannot re-apply blood	• Colour bar classifies glucose level.	**OneTouch Reveal**	**$97**
One Touch **Verio Reflect** 	✓ typically ± 0.6 mmol/L	0.4 mcL	Cannot re-apply blood	• Colour bar / emoji classifies glucose level.	**OneTouch Reveal**	**$97**
Contour **Next** 	✓✓ typically ± 0.3 mmol/L	0.6 mcL	Can re-apply blood	• Option for AST (palm).	no app	**$91**
Contour **Next EZ** 	✓✓ typically ± 0.3 mmol/L	0.6 mcL	Can re-apply blood	• No coding: fast 5 second countdown.	no app	**$91**
Contour **Next One** 	✓✓ typically ± 0.3 mmol/L	0.6 mcL	Can re-apply blood	• Small size. • Option for AST (palm). uses colour light to classify glucose level	Contour Diabetes	**$91**
Contour **Next Gen** 	✓✓ typically ± 0.3 mmol/L	0.6 mcL	Can re-apply blood	• Option for AST (palm).	Contour Diabetes	**$91**
Freestyle **Lite** 	✓ typically ± 0.6 mmol/L	**0.3** mcL	Can re-apply blood	• Option for AST (upper arm, forearm, hand, fingers, thigh, or calf).	no app	**$90**
GE200 	✓✓ typically ± 0.3 mmol/L	0.75 mcL	Cannot re-apply blood	• Option for AST (palm or forearm).	no app	**$69**
Oracle EZ 	✓ typically ± 0.8 mmol/L	0.7 mcL	Cannot re-apply blood	• Talking audio (French & English). • Option for AST (palm, forearm, upper arm, calf, or thigh).	no app	**$90**
Spirit 	✓ typically ± 0.6 mmol/L	0.5 mcL	Cannot re-apply blood	• Option for AST (palm or forearm).	no app	**$65**

Meter **CGM**= Continuous glucose monitoring	General Notes Apps available	Sensor	Alerts app must be open to transmit	Reader	Cost /30 days
Libre 2 ☎✆ **intermittent isCGM**; ≥4yr 	Can **falsely detect** ↓BG.[84] Readings **lag** ~5-15min **behind** capillary testing as continuous measures interstitial fluid glucose. **Lack of** clinical outcome evidence beyond surrogate glycemic differences in T2DM.[86] **D**: Falsely ↑readings if on **Vitamin C** >500mg/d with Libre or if on **hydroxyurea** with Dexcom.[79] Dexcom G6&7 and Libre 2&3 approved in pregnancy. Sensor accuracy: upper arm > abdomen?[expert]	14 day duration; on back of arm; about toonie-sized.	✓ To interpret alert, must scan sensor; range 20ft.	~$65 reader, can also **use cellphone**. Should scan **q8hr**.[ADA]	**$220**
Libre 3 **real-time CGM**; ≥4yr 		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 available in Canada Available USA
Dexcom G6 **real-time CGM**; ≥2yr ☎✆ 		10 day duration; on abdomen (≥2yr) or back of arm (≥18yr).	✓✓ Sends **real-time** info to phone/reader; range 20 ft.	~$500 reader, can also **use cellphone** & must be near **q3hr**.	**$350**
Dexcom G7 **real-time CGM**; ≥2yr ☎✆ 		10 day duration;[≥18yr 15 day FDA'25] on upper arm (2-6yr buttock option).	✓✓ Sends **real-time** info to phone/reader; range 20ft.	~$75 reader; can also **use cellphone** and must be near **q24hr**.	**$275**

Capillary meter coverage: **SK** Typically free with purchase of 100 strips. Sask Health: 200 strips/yr; 400/yr if at high hypoglycemia risk; 3,650/yr if on insulin (800/100d if **NIHB**).
Continuous systems coverage: ☎ **SK**: age ≥25 years or ≥65 years & diabetes managed with insulin.[April 2025] ✆ **NIHB**: any patient on insulin. **USA**: Medtronic, Eversense.
If using continuous, still need access to capillary: check accuracy of continuous system, back-up e.g. device stops working.[NICE,ADA] Discontinu Libre 1, Medisure **Empower**.

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 >6-8 times per day, a continuous system can be more affordable and convenient 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]

Type 2 Diabetes Mellitus	Diet-controlled	**No routine testing if targets met.** [NICE] May recommend testing if: • will result in a change in therapy or behaviour/ adherence to medications, diet, physical activity e.g. walk after meal ↓PPBG) managing, confirming, or preventing hypoglycemia (e.g. before driving or exercise) / acute illness, see RxFiles: SADMANS). Test with corticosteroid tx, see RxFiles: Insulin pg 52. If testing, capillary meters (finger prick) usually ↓ cost. Periodic continuous may be used for adjustments.[ADA]
	On meds other than insulin	
	On insulin	**May capillary test at least as often as taking insulin** (for safety and to help adjust insulin dose). **Evolving continuous systems recommendations/ evidence**.[4] Some recommend if on any insulin[ADA] vs some if unable to capillary test, recurrent/ severe/ unaware of hypoglycemia, or if capillary test ≥8x/d.[NICE] • **CGM or isCGM vs usual care/**SMBG (26 RCTs, 2783 pt, f/u ~8-12wk): ↓A1c ~0.2-3%, no difference in hypoglycemia but ↑AEs ~1.2 (e.g. sensor insertion, skin irritation, etc) & CGM ↓user satisfaction while isCGM ↑user satisfaction.[86 Seidu'24]
T1DM		**Continuous systems preferred** in T1DM (real-time CGM ↑evidence?).[DC] 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, any meter will do. Each meter has its pros and cons; see 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.

Blood Glucose Meters

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A1c=glycosylated hemoglobin **BG=**blood glucose **CGM=**continuous glucose monitoring **d=**day **DI=**drug interaction **esp=**especially **FDA=**approved Food & Drug Admin **hr=**hour(s)
isCGM=intermittently scanned continuous glucose monitoring system **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).

Discontinued:

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**

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.

Search Terms

ACCU-CHEK	56
ASCENSIA	56
DEXCOM	56
Diabetes	56
FREESTYLE	56
GE200	56
Glucose	56
Glucose Meters	56
Glucose Testing	56
Hypoglycemia	56
LIBRE	56
LITE	56
NEXT	56
ONE-TOUCH	56
ORACLE	56
Self-Monitoring of Blood Glucose	56
SMBG	56
SPIRIT	56
Type 1 Diabetes Mellitus	56
Type 2 Diabetes Mellitus	56
ULTRA	56
VERIO	56

References for Blood Glucose Meters

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