

Choose Your Meter Wisely.

These days, there is lots of emphasis on accuracy, particularly when it comes to continuous glucose monitors (and their ability to match blood glucose values) and insulin pumps (and their ability to deliver doses with extreme precision). But let's not forget about that trusty, dusty blood glucose meter that has been a staple of diabetes management.

Why is meter accuracy so important? For those who take rapid-acting insulin to cover meals and "correct" out-of-range blood sugar readings, accurate readings are necessary for determining the right dose. Inaccurate readings can lead to over- or under-dosing, which can produce dangerously high or low blood sugar results. An inaccurate meter can also cause a person to treat hypoglycemia inappropriately (if the meter reads too low) or miss the need for treatment (if the meter reads too high). And finally, with so many people using CGM systems, proper calibration is a must. The more accurate the fingerstick readings, the better the CGM will perform.

Of course, no meter will provide accurate results if the user fails to use proper technique. That means:

- ✓ Making sure the finger (or other test area) is clean
- ✓ Using the test strips prior to their expiration date
- ✓ Keep the strips sealed in their bottle to prevent exposure to light and humidity
- ✓ Applying enough blood to fill the test strip completely.
- ✓ Never exposing the strips to extreme hot or cold temperatures.
- ✓ Coding the meter (if required)

One of the more important things you can do to ensure accurate results is to choose the right meter. Blood glucose meters vary widely in terms of accuracy. Accuracy is determined by comparing measurements obtained in a laboratory to the results obtained at the same time on the blood glucose meter. For example, if the lab generates a value of 100 mg/dl while the meter generates a reading of 110 mg/dl, there is a 10% difference between the results. If the lab result is 200 and the meter reading is 150, there is a 25% difference.

Our team believes that meters should be within 10% of lab values (or within 10 mg/dl of lab values when in a low range) to be considered sufficiently accurate. The more often a meter falls within 10% (or 10 points) of the lab value, the more reliable it will be.

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Almost all meter manufacturers document their meter's performance in the "specifications" section of the user guide. The chart below contains the accuracy figures for an assortment of commercially-available blood glucose meters, listed in order of how often they generate readings that are within 10% of lab values. Interestingly, "alternate site" monitoring tends to produce significantly less accurate results than fingerstick monitoring. This is likely due to the "lag time" inherent in alternate site testing – similar to that seen with CGM.

Manufacturer	Meter Brand(s)	BG <75 mg/dl			BG ≥75 mg/dl			
		How often within 15 mg/dl of lab value?	How often within 10 mg/dl of lab value?	How often within 5 mg/dl of lab value?	How often within 20% of lab value?	How often within 15% of lab value?	How often within 10% of lab value?	How often within 5% of lab value?
Bayer/Ascensia	Contour Next Link*	100%	100%	100%	100%	99%	99%	80%
Labstyle Innovations	Dario*	100%	100%	81%	99%	99%	97%	86%
Roche	Accu-Chek Mobile**	98%	98%	75%	100%	100%	97%	67%
Bayer/Ascensia	Contour Next USB*	100%	100%	100%	99%	98%	96%	78%
Bayer/Ascensia	Contour Next EZ*	100%	100%	86%	100%	99%	96%	77%
Abbott	Freestyle Lite*	100%	100%	73%	99%	99%	95%	68%
Roche	Accu-Chek Nano*	100%	100%	90%	100%	100%	95%	70%
Livongo Health	Livongo*	100%	100%	67%	100%	99%	94%	73%
Abbott	Freestyle Freedom Lite*	100%	100%	67%	100%	99%	94%	68%
AgaMatrix	Wavesense Presto, Target Up&Up, Kroger Basic, CVS Basic*	100%	96%	64%	100%	97%	93%	57%
AgaMatrix	iBG Star*	100%	100%	65%	100%	99%	92%	68%
Abbott	Freestyle Insulinx*	100%	92%	85%	98%	98%	90%	54%
Roche	Accu-Chek Compact Plus*	100%	100%	84%	100%	97%	90%	57%
Arkray	Reli-On Prime*	100%	n/a	n/a	99%	96%	90%	57%
Lifescan	One Touch Verio*	100%	90%	51%	100%	98%	89%	62%
Arkray	Reli-On Micro*	100%	100%	100%	100%	98%	89%	53%

Roche	Accu-Chek Aviva, Accu-Chek Connect Accu-Chek Expert (plus strips)*	100%	100%	85%	99%	98%	88%	58%
Acon Laboratories	On Call Express*	100%	100%	73%	100%	99%	88%	54%
AgaMatrix	BG Star**	100%	93	83%	99%	96%	87%	62%
Arkray	Reli-On Confirm*	100%	67%	33%	100%	97%	86%	56%

		BG <75 mg/dl			BG ≥75 mg/dl			
Manufacturer	Meter Brand(s)	How often within 15 mg/dl of lab value?	How often within 10 mg/dl of lab value?	How often within 5 mg/dl of lab value?	How often within 20% of lab value?	How often within 15% of lab value?	How often within 10% of lab value?	How often within 5% of lab value?
AgaMatrix	Wavesense Jazz, GoodSense Premium, Kroger Premium, Target Premium**	100%	75%	39%	99%	94%	78%	45%
Lifescan	One Touch Verio Pro**	93%	63%	20%	98%	90%	70%	38%
Lifescan	One Touch Ultra, One Touch Ultra Mini*	100%	85%	49%	96%	88%	68%	38%
Bayer/Ascensia	Contour**	100%	84%	61%	96%	88%	63%	31%

ALTERNATE SITE (arm) CHECKING								
Abbott	Freestyle Lite*	n/a	n/a	n/a	95%	91%	79%	51%

Roche	Accu-Chek Aviva (plus strips)*	100%	83%	50%	99%	91%	70%	43%
AgaMatrix	iBG Star*	100%	100%	57%	96%	86%	69%	42%

TALKING METERS								
Omnis Health	Embrace*	100%	89%	68%	100%	99%	90%	56%
Diagnostic Services Inc	Prodigy Auto Code*	100%	85%	48%	99%	96%	74%	40%
Diabetic Supply of Suncoast	Advocate Redi-Code	n/a	n/a	n/a	n/a	n/a	n/a	n/a

n/a = data not available

* Source: Package insert, User guide, and/or company website

** Source: Freckmann G, et al. System Accuracy Evaluation of 43 Blood Glucose Monitoring Systems for Self-Monitoring of Blood Glucose according to DIN EN ISO 15197. J Diab Sci and Tech. vol 6, issue 5, Sept 2012, 1060-71.