

Achieving Glycemic Control

Blood Glucose Monitoring and A1C Testing

Glucose monitoring regimens for diabetes vary depending on the type of diabetes, the type of treatment, and the goals for glucose control. As a health care provider, you have 2 techniques available to assess your patients' glycemic control: blood glucose monitoring (BGM) and hemoglobin A1C measurement.¹

- BGM observes capillary glucose concentrations and is used for day-to-day management.
- A1C testing measures chronic glycemia over several months.

Both methods of testing are necessary and provide different patient data elements to manage glycemic control.

General BGM Goals¹
Target blood glucose level before meals is 80-130 mg/dL.
Target blood glucose level 1 to 2 hours after the start of a meal is less than 180 mg/dL.

Blood Glucose Monitoring

BGM allows you to evaluate your patients' responses to therapy and determine whether their glycemic targets are being achieved. BGM results can help reduce the risk of hyper or hypoglycemia, aid in adjusting medications, medical nutrition therapy, and physical activity. The frequency and timing of BGM should be determined by the needs and goals of your patients.¹

A1C Goals¹:

The American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD) recommend A1C goals be between 7% and 8%. An A1C goal of <7% is suggested for most patients diagnosed with diabetes.

More stringent A1C goals (such as <6.5%) are recommended for selected patients, if this can be achieved without significant hypoglycemia or other adverse effects.

The ADA has General Recommendations for Self-Monitoring Blood Glucose (SMBG) which include:¹

- Ensure patients receive initial instruction and routine follow-up evaluation of SMBG to adjust therapy
- Test 3 or more times daily if patients use multiple insulin injections or insulin pump therapy
- Use SMBG as a guide for patients using less frequent insulin injections, noninsulin therapies or medical nutrition therapy
- SMBG may be appropriate to achieve postprandial glucose targets

Less strict blood glucose control, or an A1C <8%—or even higher in some circumstances—may be appropriate in people who have

- limited life-expectancy
- long-standing diabetes and difficulty attaining a lower goal
- severe hypoglycemia
- advanced diabetes complications such as chronic kidney disease, nerve problems, or cardiovascular disease

Patients will have different A1C goals depending on their diabetes history and their general health. Studies have shown that patients with diabetes can reduce the risk of diabetes complications by keeping A1C levels <7% and maintaining good blood glucose control. However, an A1C level that is safe for one patient may not be safe for another.

The Relationship Between A1C and Average Blood Glucose

The results of the A1C-Derived Average Glucose study (ADAG) have affirmed the existence of a linear relationship between A1C and average blood glucose levels. The ADA recommends the use of this term in diabetes management, estimated average glucose (eAG). Health care providers can report A1C results to patients using the same units (mg/dL or mmol/L) that patients see routinely in blood glucose measurements.¹

The Importance of Using Both Glycemic Testing Methods

Patients who meet their A1C goal, but not their daily blood glucose goal, are likely to have widely variable blood glucose levels. This may be dangerous for these patients because they are at increased risk of having a hypoglycemic incident that isn't identified. Therefore, it is just as important to monitor and control daily blood glucose levels as it is to monitor and control A1C in diabetes treatment.¹

Reference:

1. American Diabetes Association. Standards of medical care in diabetes—2016. *Diabetes Care*. 2016;39(suppl 1):S1-S112.

ADA General Recommendations for A1C Testing ¹	
CLINICAL ASSESSMENT	FREQUENCY
Patient meeting treatment goals and has stable glycemic control	Once every 6 months
Patient whose therapy has changed and is not meeting glycemic goals	Once every 3 months

Estimated Average Glucose (eAG) ¹		
A1C%	BG mg/dL	mmol/L
6	126	7.0
7	154	8.6
8	183	10.2
9	212	11.8
10	240	13.4
11	269	14.9
12	298	16.5

Formula for eAG (mg/dL) = 28.7 x A1C - 46.7
 Formula for eAG (mmol/L) = 1.5944 x A1C - 2.5944

A calculator for converting A1C results into eAG, in either mg/dL or mmol/L, is available at:

<http://professional.diabetes.org/eaga1c-conversion-calculator>