

QUICK REFERENCE GUIDE TO DIABETES FOR HEALTH CARE PROVIDERS

A special project of the Michigan Diabetes Outreach Network

Chapter 11 Blood Glucose Monitoring

Monitoring glucose levels is a key component of managing diabetes. Both short-term and long-term monitoring exist to allow persons with diabetes to evaluate their individual response to therapy and assess whether glycemic targets are being met. Self-monitoring of blood glucose (SMBG) is a short-term method useful in preventing hypoglycemia and for making adjusting in medications, medical nutrition therapy (MNT) and physical activity. The frequency and timing of SMBG should be determined by individual needs and goals of each person with diabetes.

- For pregnant women using insulin, those with type 1 diabetes or use multiple insulin injections, SMBG should be carried out three or more times daily.
- For those using less frequent insulin injections or oral agents or MNT alone, SMBG is useful in achieving glycemic goals.
- Postprandial glucose may be targeted if long-term glycemic goals are not met despite reaching preprandial glucose goals.
- Persons with diabetes should be routinely evaluated to assess their technique and ability to use data to adjust therapy.

Long-term glycemic control is measured by an A1C test. The A1C test measures the average blood glucose control over the past 2-3 months; yet is reflected in a percentage. The new average glucose (eAG) is a method of reporting the A1C level in same units as a clients blood glucose monitor. This will help clients better understand their diabetes control. See table below for the correlation between A1C level, the new average glucose and the old mean plasma glucose.

A1C	eAG (Average Mean BG)
6%	126 mg/dl
7%	154 mg/dl
8%	183 mg/dl
9%	212 mg/dl
10%	240 mg/dl
11%	269 mg/dl
12%	298 mg/dl

One can convert A1C to eAG by the following equation: **eAG = (A1C X 28.7) – 46.7**

Long-term glycemic control should be checked routinely in all persons with diabetes:

- at least two times a year in those with stable glycemic control.
- quarterly in those whose therapy has changed or who are not meeting glycemic goals.

Blood glucose and A1C/eAG goals must be individualized based on age, ability to recognize hypoglycemia, history of hypoglycemia and self-management capabilities. This is especially important for children, adolescents, pregnant women and older adults. More stringent goals (A1C <6%) may further reduce complications at the cost of increased risk of hypoglycemia, especially in those with type 1 diabetes. Less stringent goals are indicated in those with severe or frequent hypoglycemia. See table below for target blood glucose and A1C goals for persons with diabetes.

Target Glycemic Goals for Persons with Diabetes

	Under age 6*	Age 6-12*	Age 13-19*	Adults *	Adults**
Before meals	100 – 180 mg/dl	< 180 mg/dl	90 – 130 mg/dl	70 – 130 mg/dl	< 110 mg/dl
Peak post meal	---	---	---	< 180 mg/dl	---
2 hours post meal				---	< 140 mg/dl
Bedtime	110 – 200 mg/dl	100 – 180 mg/dl	90 – 150 mg/dl	---	---
A1c	7.5 – 8.5%	< 8%	< 7.5 %	< 7.0 %	< 6.5 %

* **American Diabetes Association**

** **American Association of Clinical Endocrinologists**

References:

American Diabetes Association (2008). Clinical Practice Recommendations. *Diabetes Care*, Vol 31 (1).

American Association of Clinical Endocrinologist (AACE). Medical Guidelines for the Management of Diabetes Mellitus, *Endocr Pract.* 2002;8 (Suppl 1).

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