

Patient Handout

Blood Glucose Monitoring: Getting a Clear View of Your Diabetes

Prepared by Susan M. Renda, MS, CRNP, CDE

When you clean the windshield of your car, you can then get a clear view of where you are going. You are better able to see the road ahead and more likely to reach your destination without hitting any obstacles. In a similar way, checking your blood glucose levels helps give you a clear “view” of how well your diabetes is being controlled. Having blood glucose levels that are as close to normal as possible will not only help you feel better but also help you avoid complications from diabetes. Your health care provider can tell you what your *daily glucose goal* is and what your longer-term goal, or *A1C goal*, is. Your A1C is generally a measure of your blood glucose level over 3 months.

Glucose Monitoring Gives You Important Information

Checking your blood glucose levels gives you and your health care provider important information about many aspects of your diabetes care. For example, your blood glucose levels can tell you:

- How your diet, activities, and exercise plan affect your glucose levels.
- How illness or stress affects your glucose levels.
- Whether your glucose level is too high or too low.
- If your medication plan is working for you.
- If you have *type 1 diabetes*, whether you need to test your urine for ketones (when the body is not able to use glucose properly, it breaks down fat and makes a substance called ketones).

With this information, you and your health care provider can then make decisions about changes either in the types of medication you are taking or in the amount of medication you are taking.

Choosing the Right Glucose Meter

Many glucose meters are available, so it is important to choose the meter that is best for you. Check with your health care provider or diabetes educator. He or she can help you choose the right meter, show you how to use the meter correctly, and explain how to get a blood sample.

How to Get a Blood Sample

All meters require that you test a very small drop of blood on a test strip. It is important to look at the expiration date on your test strips and to know whether your meter requires *coding*. Coding is a method of programming your machine by inserting a chip from the bottle of strips into the meter or putting a number on the screen of the meter that matches the bottle of strips being used.

Here is how to get a blood sample:

- Wash your hands with soap and warm water.
- Use the lancing device that comes with the meter to make a small puncture in the pad of a finger.
- Place a drop of blood on the test strip according to the instructions for your meter.
- If you have difficulty getting enough blood for the strip, warm your hands by rubbing them together or hang them at your sides for a few minutes before testing.

Some meters allow *alternative site testing*, which means you can take a tiny drop of blood from another area of the body, such as the forearm. Alternative site testing is *not right for you* if:

- You are checking your glucose after a meal.
- You think your glucose level is low.
- You are having trouble recognizing when your glucose level is low.

In these cases, a blood sample taken from your fingertip is more accurate during such periods of rapid changes; for example, when blood glucose levels go up after meals or drop quickly.

Keep a Blood Glucose Diary

Keeping a blood glucose diary can help you and your health care provider track patterns in your glucose levels. A diary or log book may come with your meter or you may be able to get one from your diabetes educator. You can also keep your own

log by recording the *date*, the *time of day* you took the blood sample, the *result* of the test, and other information. This other information should include the *oral medications* you are taking, the *type and amount of insulin* you are taking, your *regular activities*, any *differences* in your activity or diet, and any *symptoms* you may have.

Examples of times to check your blood glucose include when you first wake up or when you have not eaten for several hours (this is your fasting glucose level), just before a meal, 2 hours after a meal (this is your postprandial glucose level), at bedtime, and in the middle of the night. You might also check your glucose before and after exercise.

Have discussions with your health care provider regarding *how many times* a day and at *what time* of day you should check your glucose. If you check your glucose level just once a day, it can be helpful to change the time each day to see what your glucose level is at varying times. If your fasting glucose level is always *at goal levels*, try checking it 2 hours after a meal or at bedtime. These measurements are especially important if your health care provider tells you that your A1C level is higher than what it should be.

Be a detective when it comes to your blood glucose. You want to find the times when your glucose level may be too low or too high. This information can help you and your health care provider make decisions about your medications, your diet, and your activities that will help you achieve the best possible control of your diabetes.

Below is an example of a patient log. Up to 1 week of blood glucose readings can be recorded.

Date	Before Breakfast	After Breakfast	Before Lunch	After Lunch	Before Dinner	After Dinner	Bedtime	Comments
9/17	106				118		138	
9/18	112		130				198	Out to dinner with friends
9/19	141				89		126	Afternoon exercise class
9/20	109							
9/21								
9/22								
9/23								

Interpreting Your Blood Glucose Diary

Your health care provider will tell you what your blood glucose levels should be. Most importantly, you need to understand your own numbers and what your individual goals are. The following are some general examples of goals for blood glucose levels for people with diabetes.

- In the morning or before meals (fasting): 70–130 mg/dL
- After meals (postprandial): <140–180 mg/dL

It is important to realize, however, that various organizations have different goals and yours may differ as well. It is also a good idea to take the time to review your diary. Using different colored markers or colored pencils, circle the high numbers in one color and the low numbers in another. Try to identify any patterns. Are there more high numbers in the morning or after meals on a particular day? Patterns can show that changes need to be made in your treatment plan. Before making an increase or decrease in your medications, however, you should always check with your health care provider first.

The following are some examples of what patterns may show.

If glucose levels are high in the morning before eating (ie, high fasting glucose):

- you should eat fewer carbohydrates (eg, crackers or bread) before going to bed *or*
- you should increase your activity in the evening *or*
- you may need to increase your oral medications or your insulin dose.

Medications that often affect fasting blood glucose levels are metformin or long-acting insulin.

If glucose levels are often low in the morning before eating (ie, low fasting glucose):

- you should eat more carbohydrates before going to bed *or*
- if you exercise in the evening, you should eat a snack before going to bed *or*
- you may need to decrease the amount of oral medications you take or lower your insulin dose.

If glucose levels are often high after eating a meal (ie, high postprandial glucose):

- you should eat fewer carbohydrates with your meals *or*
- you may need to increase your oral medications or your insulin dose.

Medications that often affect postprandial blood glucose are oral medications (such as sulfonylureas [ie, glipizide,^a glimepiride,^b glyburide^{c,d}], exenatide,^e thiazolidinediones [ie, pioglitazone,^f rosiglitazone^g], meglitinides [ie, repaglinide^h], and α -glucosidase inhibitors [ie, acarbose,ⁱ miglitol^j]) or short- or rapid-acting insulins (ie, regular insulin, insulin aspart,^k insulin lispro,^l insulin glulisine^m).

By keeping a daily blood glucose diary, you can learn a lot about how certain foods, activities, illness, stress, or changes in medication affect your glucose levels. Bring your diary to your office visits and share the results with your health care provider or diabetes educator. The information in the diary will enable you and your health care provider to make decisions about your treatment plan that will help keep your diabetes in good control.

^aGlucotrol® is a registered trademark of Pfizer Inc., New York, New York.

^bAmaryl® is a registered trademark of The sanofi-aventis Group, Bridgewater, New Jersey.

^cGlynase® is a registered trademark of Pfizer Inc.

^dDiaBeta® is a registered trademark of Aventis Pharmaceuticals Inc., Bridgewater, New Jersey.

^eByetta® is a registered trademark of Amylin Pharmaceuticals, Inc., San Diego, California.

^fActos® is a registered trademark of Takeda Pharmaceuticals North America, Inc., Lincolnshire, Illinois.

^gAvandia® is a registered trademark of GlaxoSmithKline, Research Triangle Park, North Carolina.

^hPrandin® is a registered trademark of Novo Nordisk A/S, Bagsvaerd, Denmark.

ⁱPrecose® is a registered trademark of Bayer HealthCare, West Haven, Connecticut.

^jGlyset® is a registered trademark of Bayer HealthCare.

^kNovoLog® is a registered trademark of Novo Nordisk A/S.

^lHumalog® is a registered trademark of Eli Lilly and Company, Indianapolis, Indiana.

^mApidra® is a registered trademark of Aventis Pharmaceuticals Inc.

Insulin grants permission to reproduce this Patient Handout for the purpose of patient education. Visit www.InsulinJournal.com if you wish to download copies of this material.