



## Self-Monitoring of Blood Glucose

### Introduction

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**Self-monitoring blood glucose (SMBG)** is when a patient checks their own levels with a blood glucose meter.

Self-monitoring of blood glucose (SMBG) can be a useful tool in the management of diabetes mellitus. Patients with diabetes often measure their blood glucose to detect hypoglycemia and to adjust insulin dose as needed. Others utilize SMBG to help establish a profile of blood glucose levels and response to nutrition and pharmacotherapy..

In people with **type 1 diabetes**, the immune system mistakes the body's own healthy cells for foreign invaders.

The immune system attacks and destroys the insulin-producing beta cells in the pancreas. After these beta cells are destroyed, the body is unable to produce insulin.

Researchers don't know why the immune system sometimes attacks the body's own cells. It may have something to do with genetic and environmental factors, such as exposure to viruses.

People with **type 2 diabetes** have insulin resistance. The body still produces insulin, but it's unable to use it effectively.

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Researchers aren't sure why some people become insulin resistant and others don't, but several lifestyle factors may contribute, including being inactive and carrying excess weight.

Other genetic and environmental factors may also play a role.

For patients with type 1 diabetes mellitus, it is recommended that patients measure their blood glucose at least three times daily. The effectiveness of SMBG has been established for insulin-treated patients.

There is debate over optimal frequency and timing of SMBG for those with type 2 diabetes mellitus (T2DM)

Self-monitoring of blood glucose by persons with diabetes is an integral part of intensive glycemic treatment and is widely believed to improve the control of blood glucose levels and health outcomes.

### **Why Monitor the Blood glucose?**

Blood glucose levels change throughout the day in relation to meals, medications, and activity. Stress, pain, and illness can also cause blood glucose fluctuations. Checking the blood glucose at various times of the day can provide a snapshot view of what's happening. Assuring that the blood glucose is well controlled is critical in preventing diabetes-related complications.

The pre-prandial plasma glucose values range from 70 to 130 mg/dl, and peak postprandial levels are targeted at <180 mg/dl. The use of SMBG by a person with diabetes can be helpful in developing glucose profile also recognizes that there is increased risk for diabetes at a fasting plasma glucose of 100 to 125 mg/dl or a 2-hour postprandial glucose that is 140 to 199 mg/dl.

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It is advisable to have the patient record their SMBG values in a log book. Information about food intake, medication, and exercise can be important for interpreting the SMBG results. Keeping a log will also encourage the patient to acknowledge their SMBG and to contemplate the potential adjustments they can make with activity and nutrition.

### **Strip and Meter Handling for Self-Monitoring of Blood Glucose**

- Meter and test strips should be handled with clean, dry hands.
- Test strips are for single use and unique for each meter.
- Test strips must be kept in the original canister, as any moisture can affect the integrity of the strip, and the containers should be kept closed. Check for expiration date.
- Strips can be tested for accuracy with control solution provided initially with each meter and should be checked for expiration date. The control glucose range for the strips appears on the canister.
- Some meters require coding with each canister. Many of the newer meters do not require coding.
- The amount of blood required is usually very small. Many meters easily pull the blood drop into the end of the strip. Inadequate sample can be a source of error.
- Keep meter and supplies in a cool, dry area, not in the car or in sunlight.
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### Glucose meter kit



### Procedure for Self-Monitoring of Blood Glucose

- **Site preparation:** Clean area with warm, soapy water and dry.
- Lancet devices to obtain blood can vary and all use a lancet to prick the skin. Thin, sharp lancets are more comfortable. Lancets should not be reused or cleaned.
- Depth setting on the lancet device controls the penetration of the stick and can be adjusted for best comfort and size of blood sample. Most meters require very small samples—less than a small teardrop.
- Lancet should be applied firmly to the clean, dry finger, but not with force.
- Sides of the finger should be used, as there is less pain. Use of the third, fourth, and fifth digits may be preferable to spare index finger and thumb.
- Alternate test sites (upper arms) is approved for many meters. Fingertips or the outer palm are preferred and are more accurate.
- Obtainment of blood sample should be a gentle “milking” from the base of the finger to the lanced tip. Pressure directly on the site of lancing is not recommended.

## **Management of Self-Monitoring of Blood Glucose**

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Management of SMBG depends on the patient's level of diabetes education and/or a person's general ability to understand the necessary basic steps for SMBG.. Postprandial glucose levels (two hours after eating) provide information regarding the impact of food intake on blood sugar. Diet modification or medication (some orals or mealtime insulin) may be useful therapies.

the use of a preprandial and two-hour postprandial SMBG gives the patient immediate feedback on their food choices for that meal.