Why the Accuracy of Your Patient’s Blood Glucose Meter Matters – More Than You Might Think

**KEY POINTS:**

- **By (1) detecting actual hypoglycemic events as they can be treated accurately and in a timely manner, and (2) helping to prevent hypoglycemia by delivering accurate blood glucose readings that provide the basis for patients to calculate and administer the appropriate insulin dose, blood glucose monitoring systems (BGMS) play a key role in reducing the impact of hypoglycemia.**

- **Accuracy of BGMS counts: in patients with Type 1 diabetes, a study shows when the margin of error of BGMS increases 2-fold, there is more than a 10-fold increase in the risk of missing hypoglycemic events.**

- **Despite accuracy standards for strip-based BGMS, important performance differences exist among commercially availableBGMS currently and previously approved by the FDA.**

Self-monitoring of blood glucose by patients with diabetes, especially those with an insulin injection therapy, is an important test for helping patients to manage their disease and minimize the risk of hypoglycemia. For example, the results obtained from a blood glucose monitoring system (BGMS) help guide patients in insulin dosing. However, poor performance in glucose test strips can lead to errors in diagnosis. If hypoglycemia is overestimated or underestimated, the correct action may not be taken. If hypoglycemia is overestimated, patients may receive unnecessary treatment; if hypoglycemia is underestimated, patients may be subject to severe adverse events, including hospitalization. It is critical to ensure that the performance of the glucose test strips is monitored and that abnormalities are detected in a timely manner.

**The average person with Type 1 diabetes experiences approximately 2 episodes of symptomatic hypoglycemia each week—a figure that has remained essentially unchanged for 20 years. More than three quarters of people with Type 2 diabetes have experienced self-treatment episodes, with 76% experiencing on episodes within the last month.**

In addition to the effects of diabetes outcomes in persons with diabetes, hypoglycemia is associated with substantial economic burden. One study estimating the annual direct and indirect cost of hypoglycemia due to BGMS errors showed that, on average, BGMS can help prevent nearly 300,000 and 600,000 hospital admissions to an emergency department in Type 1 diabetes patients and those with more than 10,000 errors. Hypoglycemia reduces the QALYs in Type 2 diabetes patients, with potential savings for the US health care system of more than $900 billion per year.

An analysis of the economic impact of hypoglycemia is a concern of patients with Type 2 diabetes mellitus (T2DM) from 2010 to 2030 will result in a mean cost for outpatient treatment at a hypoglycemic event at $38.4 and means of a patient with a hypoglycemic event treated in the emergency room and who admitted to an inpatient at more than $1,000.

Health authorities in the US, UK, and other countries recommend the current limits of accuracy for self-monitoring of blood glucose. The American Association of Clinical Endocrinologists (AACE), the American Diabetes Association (ADA), the American College of Physicians (ACP), the Endocrine Society (ES), and the American Ophthalmological Society currently recommend a mean absolute difference of 15% with no more than 20% for BGMS accuracy. It is critical to ensure that glucose meter devices meet these standards to help patients obtain accurate glucose readings, although it is rare that glucose meter does meet standards. This can lead to the patient's blood glucose meter performs worse than they might be in the future.

---

**References:**