

# Steps to Improving Inpatient Blood Glucose Control

BY DONNA MARTIN, MS, RN,C, CDE

**R**esearch has repeatedly demonstrated that improving blood glucose control of hospitalized patients reduces morbidity and mortality. Achieving defined blood glucose targets can be challenging, frustrating and yet rewarding.

Inpatient hyperglycemia has been an accepted consequence of illness and hospitalization in the past. This is no longer acceptable! Research has repeatedly demonstrated that improving blood glucose control of hospitalized patients reduces morbidity and mortality. Based on the results of the various studies, the American College of Endocrinology (ACE) (Table 1) and the American Diabetes Association (ADA) (Table 2) have identified inpatient blood glucose target ranges.

Blood glucose control is being acknowledged as an important measure of quality and is getting the attention of regulatory, accrediting and reporting agencies as well as health care payers. Improving inpatient blood glucose control requires a multidisciplinary team approach to champion changes within an organization.

Elmhurst Memorial Hospital is a 427-bed, nonteaching, community hospital located in the western suburbs of Chicago. Inpatient blood glucose control became a focus after the target recommendations were published by the ACE<sup>1</sup> and the ADA,<sup>2</sup> coupled with the realization that we were not currently achieving these target goals. The path to improved inpatient blood glucose control at Elmhurst did not happen overnight. The steps occurred over the past several years and included persistent guiding and mentoring of the nursing staff and physicians that still continues today.

Initial identification of blood glucose control, partnered with the setting of a hospital-wide blood glucose target goal was the first step in our journey to improve blood glucose control. Once we identified our target blood glucose goal at 60 mg/dL to 180 mg/dL, we determined that obtaining timely data was a critical

**TABLE 1. ACE POSITION STATEMENT**

Upper Limits for Glycemic Targets		
Intensive Care Unit	Noncritical Care Units	
	Preprandial	Maximum
110 mg/dL	110 mg/dL	180 mg/dL

*Source: Diabetes Care. 2004;27:553-591.*

**TABLE 2. ADA CLINICAL PRACTICE RECOMMENDATIONS**

Diabetes Care in the Hospital		
Critically Ill Patients	Noncritically Ill Patients	
As close to 110 mg/dL as possible	Preprandial	Postprandial
	90 mg/dL	< 180 mg/dL
	to 130 mg/dL	

*Source: Diabetes Care. 2006;29:51*

component to our success. This initial goal was set based on the recommendations in Table 2, as a starting point. Partnering with our lab, a point-of-care testing coordinator allowed us to obtain hospital-wide blood glucose results at the end of each month. Monthly reports allow for tracking and trending of data monthly, quarterly and yearly.

Once metrics were defined and data collection started, it was important to include everyone that is involved in the patient's diabetes care. The distribution of a monthly *Diabetes Update* flyer provided outcome data that provided hospital-wide and unit-specific glucose results, while concurrently providing a mini-educational update (Figure 1). This information was posted on all of the nursing units for the physicians, nursing and ancillary staff to see their success for the previous month.

Clearly defining the roles and expectations of the various health care providers was a must to reduce confusion and

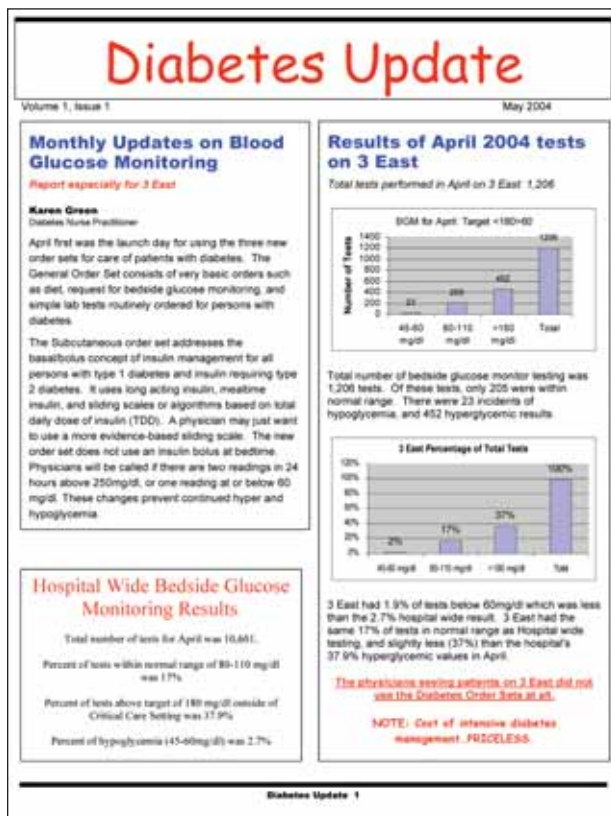


Figure 1. A monthly *Diabetes Update* flyer with outcome data provided hospital-wide and unit-specific glucose results, while concurrently providing a mini-educational update.

improve communication of blood glucose control. This step required patience, coaching and designated champions. Our physician champion, an endocrinologist, provided several educational programs for the medical staff to update them on new research findings and the new blood glucose targets.

The diabetes educators taught the staff nurses to look at blood glucose trends, notify the physician of patients with blood glucoses >180 mg/dL, and suggest the use of insulin order sets. It was also necessary to educate them on the basal/bolus concept, allowing the nurses to be knowledgeable advocates for their patients' diabetes management. This was done through educational programs as well as providing each nurse with a pocket guide.

### BARRIERS TO IMPROVING CONTROL

Several barriers contributed to the challenges of improving blood glucose control. Physician, nurse and patient fear of hypoglycemia was a significant issue and repeated effective use of the hospital order sets demonstrated that blood glucose could be lowered safely and

## RN Scripting

### Initial conversation

Elmhurst Memorial Hospital is committed to the goal of blood sugars < 180 mg/dl. Your patient's blood sugars have been:

(pick one: consistently, greater than, between) \_\_\_\_\_

(pick one if appropriate: due to steroids, surgery, stress).

Please consider using the subq insulin order set to help with your patient diabetes management and ordering.

- Blood glucose monitoring AC & HS (If not already ordered)
- Lantus 10 units daily (If patient is on IV steroids or blood sugars are > 180 mg/dl)
- A Humalog correction scale (Regular insulin is best used for TPN and tube feedings)

Figure 2. Additional tools and processes have been created to assist the staff nurses when discussing blood glucose control with physicians.

effectively. Other issues that impact blood glucose control include IVs, tube feedings, total parenteral nutrition, NPO status, steroids, surgery and diagnostic tests. Coordination of blood glucose testing, meals and insulin was identified as another issue that contributed to erratic diabetes control. We began tackling these barriers, one or two at a time, and began to see improvements.

As our blood glucose levels improved, more specific blood glucose target goals were set. All critical care units had a goal that  $\geq 70\%$  of blood glucose values would be between 60 mg/dL and 150 mg/dL, and the remainder of inpatient units would have  $\geq 70\%$  blood glucose values between 60 mg/dL and 150 mg/dL. Although this was not where we wanted our blood glucose goal to be, we realized the value in setting achievable goals and taking baby steps. As we achieved each of our goals, we celebrated with the nursing staff and continued to raise the bar for lowering the blood glucose target goal.

### REVISE, REFINE ORDER SET

Another step included providing the physicians and nursing staff with tools to overcome barriers and assist with improving blood glucose control. This involved the revision and refinement of our basic diabetes order set and subcutaneous insulin order set, along with the creation and implementation of an IV insulin order set, IV transition order set and an insulin pump order set. Each of these order sets was designed to avoid homemade orders, providing a mechanism to quickly and safely lower blood glucose levels.

Hospital-wide blood glucose results were slowly improving, but even with all of the above implemented steps, we still wanted to do better. Fortunately, hospital administration was aware of the attention inpatient blood glucose control was receiving, and they supported

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the creation of a new role, an inpatient Diabetes Nurse Clinician-Consultant. The responsibilities of this new role include the daily review of blood glucose values for every patient with diabetes, attend inpatient care rounds on all nursing units, follow up and monitor patients with hyperglycemia and provide support and recommendations to improve individual patient blood glucoses throughout the hospital.

Additional tools and processes have been created to further assist the staff nurses when discussing blood glucose control with physicians (Figure 2). Order sets are placed on the chart at the time of admission and scripting has provided a consistent method to encourage that the various order sets be utilized, thereby improving blood glucose control.

Intense education has been provided to physicians and staff during the past 9 months, and our most recent step included the development of an Inpatient Blood Glucose Team. This team consists of well-respected physicians, diabetes educators, administration, pharmacy, nurse managers, quality resource management and advance practice nurses. This team is charged with being the driving force to continue the improvement of blood glucose values in the future.

Where do we go from here? Our next steps will include additional education, tracking blood glucose data by individual physicians, continue to raise awareness of blood glucose control hospital-wide and unit-specific tracking of diabetes order sets and insulin usage. The path may not be straight, but we will be setting our sights at the end of the road.

### LESSONS LEARNED

- Administrative support and a physician champion are a necessity.
- Share outcomes with everyone involved in a timely manner.
- Patience and perseverance, as improved inpatient blood glucose control does not happen overnight.
- Celebrate successes.
- Educate, reeducate and reeducate again! ■

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1. Management of diabetes and hyperglycemia in hospitals. *Diabetes Care*. 2004;27:553-591.  
2. American Diabetes Association Clinical Practice Recommendations. *Diabetes Care*. 2004;29:S1-S29.