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## Using a mentoring approach to implement an inpatient glycemetic control program in United States hospitals



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### ABSTRACT

**Background:** establishing an inpatient glycemetic control program is challenging, requires years of work, significant education and coordination of medical, nursing, dietary, and pharmacy staff, and support from administration and Performance Improvement departments. We undertook a 2 year quality improvement project assisting 10 medical centers (academic and community) across the US to implement inpatient glycemetic control programs. **Methods:** the project was comprised of 3 interventions. (1) One day site visit with a faculty team (MD and CDE) to meet with key personnel, identify deficiencies and barriers to change, set site specific goals and develop strategies and timelines for performance improvement. (2) Three webinar follow-up sessions. (3) Web site for educational resources. Updates, challenges, and accomplishments for each site were reviewed at the time of each webinar and progress measured at the completion of the project with an evaluation questionnaire. **Results:** as a result of our intervention, institutions revised and simplified formularies and insulin order sets (with CHO counting options); implemented glucometrics and CDE monitoring of inpatient glucoses (assisting providers with orders); added new protocols for DKA and perinatal treatment; and implemented nursing, physician and patient education initiatives. Changes were institution specific, fitting the local needs and cultures. As to the extent to which Institution's goals were satisfied: 2 reported "completely", 4 "mostly", 3 "partially," and 1 "marginally". Institutions continue to move toward fulfilling their goals. **Conclusions:** an individualized, structured, performance improvement approach with expert faculty mentors can help facilitate change in an institution dedicated to implementing an inpatient glycemetic control program.

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### 1. Introduction

Hyperglycemia in hospitalized patients with or without diabetes has been linked to adverse outcomes including infections,

prolonged hospital length of stay, and increased mortality, costs and risk of postoperative complications.<sup>1–13</sup> While overly stringent control is discouraged by guidelines, uncontrolled hyperglycemia remains a recognized quality and safety issue.<sup>14,15</sup> Based on studies in both medical and surgical patients which show improved outcomes, clinical practice guidelines recommend the use of physiological insulin regimens for the management of inpatient hyperglycemia.<sup>14,15</sup>

Despite these recommendations and increasing evidence supporting the benefits of inpatient glycemetic control for enhancing patient safety and improving patient outcomes, the management of inpatient hyperglycemia remains poor and the use of sliding-

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scale insulin is pervasive.<sup>16</sup> Planning and implementing a physiologically based glycemic management program is difficult. Barriers include healthcare professionals' over reliance on sliding-scale insulin and lack of knowledge about diabetes management and the principles of insulin therapy,<sup>17,18</sup> fear of hypoglycemia, and clinical inertia (failure to advance therapy when targets are not being met).<sup>19,20</sup> Improving glycemic control in hospitals requires continuous quality improvement over many years to break through these barriers, with significant reeducation and coordination of medical, nursing, dietary and pharmacy staff, and support from risk management and hospital administration. To facilitate advances in the nascent field of inpatient glucose management, a performance improvement initiative was developed to assist healthcare organizations in translating glycemic control concepts into action. This paper describes a two year effort assisting ten hospitals to implement a glycemic control program through the use of an external mentoring program.

## 2. Methods

The Annenberg Center for Health Sciences at Eisenhower Medical Center recruited an interdisciplinary faculty of seven diabetes experts who helped plan the performance improvement initiative and worked directly with the sites as faculty mentors. The faculty included two inpatient endocrinologists, two hospitalists with expertise in inpatient glycemic control, and three advanced practice diabetes specialty nurses (APDN) with expertise in implementing inpatient glycemic control programs.

### 2.1. Site recruitment and selection

A project description and application instructions were sent to the Chief Medical Officers at hospitals across the United States. Interested hospitals were required to submit an application with the following information:

1. An identified interdisciplinary team that would be responsible for the institution's performance improvement project.
2. Details of the organization's current resources for supporting inpatient glycemic control such as point-of-care-testing equipment, computerized provider order entry (CPOE), and personnel such as diabetes educators.
3. Protocols and policies describing their current inpatient glycemic management practices.
4. Certification that their institution was willing to dedicate sufficient resources to support their participation in the initiative.
5. A statement of institutional goals for participating in the performance improvement initiative.

### 2.2. Intervention

The intervention was comprised of three specific components: a site visit, web conferences and a project website.

### 2.3. Site visits

A faculty team (physician and APDN) made an initial day long visit to each site. The visit objectives were to assess each site's current inpatient glycemic control practices; to translate best practices for inpatient glycemic control based on both the American Diabetes Association inpatient recommendations and expert opinion; and to initiate the mentoring process at each site. The typical agenda included:

1. Meeting with the inpatient glycemic control committee to
  - examine all aspects of current state of inpatient diabetes management,
  - identify areas for change and improvement in their inpatient glycemic management,
  - identify institutional barriers to change,
  - plan strategies for overcoming institutional barriers, and
  - develop goals and objectives and timeline for their performance improvement project
2. Meet with various teams involved in diabetes management.
3. Observe current practice.
4. Faculty lecture (large and small groups) to the hospital staff on inpatient glycemic control strategies.

### 2.4. Web conferences

As follow-up to the initial site visit, three web conferences were held. The objectives were to facilitate interaction among the participating sites, to enhance project implementation, and to provide faculty feedback.

### 2.5. Web site

The password protected site contained the following features: faculty profiles with contact information; site profiles, a resource center with relevant literature and protocols addressing glycemic control; faculty presentation slides; posting of presentations from web conferences; and a discussion board which provided each site with an opportunity to initiate or participate in a discussion thread related to the initiative.

### 2.6. Data collection

Demographics and baseline glucose management status were obtained on the initial application. At each web conference and at the conclusion of the project, each site submitted updates on the status of their stated goals. On project completion (10–12 months after the site visit), all institutions completed the Glycemic Control-Performance Improvement Approach Questionnaire.

## 3. Results

### 3.1. Sites

Thirteen applications were received and reviewed by the faculty group. Based on their current organization resources, existing insulin order sets, and feasibility of their individual hospital goals for participation, 10 medical centers were accepted for participation. The institutions not chosen either already had advanced diabetes management programs in place or did not have sufficient resources to move forward. The demographics of the selected 10 sites are shown in [Table 1](#).

All of the participating sites had insulin infusion protocols in place in their intensive care units; four lacked basal/bolus insulin order sets; one had a sliding scale order form without an option to order basal insulin; one lacked access to a diabetes educator; and insulin order sets were mandatory at four of the sites. Basal/bolus order sets that were not mandatory were rarely utilized.

Five sites established new interdisciplinary glycemic control teams in order to participate in the performance improvement initiative. Of the five that had a glycemic control team in place prior to the initiative, one team was re-launched with a new charter and personnel changes, another established team changed structure and organization, and three remaining sites reported

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