Using a Mentoring Approach to Implement an Inpatient Glycemic Control Program in U.S. Hospitals

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Abstract

An inpatient glycemic control program is challenging, requires years of work, significant education and coordination of medical, nursing, dietary, and pharmacy staff, and support from administration and QA departments. We undertook a 2 year quality improvement project to assist 10 medical centers (academic and community) across the US to implement an inpatient glycemic control program through an expert mentorship model translating glycemic control concepts into practice.

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) 3 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 at progress measured at the completion of the project with an evaluation questionnaire.

As a result of our intervention, 6 institution's goals were completely or mostly satisfied, 3 partially and 1 marginally. Average scores for the intervention was 4/5 and its impact was 4/5. Additional, institution specific accomplishments are in Table 1.

An individualized, structured, performance improvement approach with expert faculty mentors can help facilitate change in an institution dedicated to implementing an in-patient glycemic control program.

Specific Accomplishments

Glucometrics and glucose measurements	Three hospitals developed a glucose metric system for data collection. One site redesigned nursing workflow to capture point of care glucose data at appropriate times.
Formulary simplification	One site reduced the number of insulin products on their hospital formulary to prevent look alike-sound alike insulin errors
DKA/hyperosmolar coma; Perinatal Insulin; Insulin pump	Two sites revised their protocols for DKA and hyperosmolar hyperglycemic state; two sites developed inpatient insulin pump order sets; one developed a perinatal insulin order set
Clinical Practice	Four sites implemented new clinical practices that included new ways of deploying pharmacists, nurses, and/or endocrinologists in the care of patients with diabetes, care rounds, and case conferences focused on the management of difficult patients
Carbohydrate counting	Two sites reported adding a carbohydrate controlled meal plan to their dietary order sets. One site developed a tool that automated the calculation of carbohydrates in the meal plan to assist providers in adjustment of the prandial insulin dose
Timely data availability	Several sties improved laboratory reporting to ensure that clinicians have the data they need to manage glycemia within the protocols.
Physician/Nursing/ Patient education	Three sites reported enhancing their diabetes educational programs for their staff and two reported revising their patient diabetes educational materials. At one site, case based education on DVDs were produced. CDE's brought these to the physician offices to assist the physicians with use of the programs. Nurse champions were identified and trained to provide patient education in survival skills. New training supplies and written materials developed.
Transitions	One site developed and implemented a protocol for transitioning patients from IV insulin to a basal, prandial, correctional subcutaneous insulin protocol for patients who have had cardiac surgery

The Problem

- **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.**
- **Despite recommendations and evidence supporting the benefits of inpatient glycemic control for enhancing patient safety and improving patient outcomes, the management of inpatient hyperglycemia remains poor and the use of sliding-scale insulin is pervasive.**
- **Improving inpatient glycemic control requires many years to implement required infrastructure, reeducate and coordinate medical, nursing, dietary and pharmacy staff, and needs support from risk management and hospital administration.**
- **This poster describes a two year effort assisting ten hospitals to implement a glycemic control program through the use of an external mentoring program**

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.

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 submitted applications detailing:

- The interdisciplinary team that would be responsible for the institution's performance improvement project
- 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
- Protocols and policies describing their current inpatient glycemic management practices
- A statement of goals and certification that their institution was willing to dedicate sufficient resources to support their participation in the initiative

Intervention:

Site Visits:

- One day site visit with a faculty team (MD and APDN) to meet with key personnel, identify deficiencies and barriers to change, set site specific goals and develop strategies and timelines for performance improvement

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.

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.

Results

Thirteen applications were received. Based on their organization resources, 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 locations and demographics of the 10 selected institutions are shown in Figure 1 and Table 1. The planned projects, accomplishments and program evaluations are shown in tables 2-5.

Figure 1. Location of Selected Institutions

Table 1. Demographics of the Selected Institutions

Hospital	Location	Beds	Facility Type	Core Team	Computer Order Entry	Insulin Order Sets	Providers required to use insulin order sets	Access to Diabetes educator	Glucose Metrics Data Collection
1	Mid-West	436	Community/ Teaching	formed for initiative	yes	basal/bolus/ supplemental; IV insulin infusion	No	yes	no
2	West	465	Community/ Teaching	formed for initiative	no	basal/bolus/ supplemental; IV insulin infusion	No	yes	no
3	East	421	Community/ nonteaching	formed for initiative	no	basal/bolus/ supplemental; IV insulin infusion	No	yes	yes
4	West	378	Community/ nonteaching	In place	In process	basal/bolus/ supplemental; IV insulin infusion	Yes	yes	yes
5	East	350	Community/ nonteaching	formed for initiative	no	no basal/bolus. Supplemental only; IV insulin infusion	No	yes	yes
6	East	360	Community/ teaching	In place	yes	basal/bolus/ supplemental; IV insulin infusion	Yes	yes	yes
7	East	561	University/ teaching	In place	yes	no basal/bolus. Supplemental only; IV insulin infusion	IV insulin infusion	no	no
8	West	439	County /teaching	In place	no	no basal/bolus. Supplemental only; IV insulin infusion	IV insulin infusion	yes	no
9	East	242	Community/ nonteaching	In place	no answer	no basal. Bolus/ supplemental; IV insulin infusion	No	yes	yes
10	West	542	Community/ teaching	formed for initiative	yes	no basal/bolus. Supplemental only; IV insulin infusion	No	yes	no

Table 2 Performance Improvement Projects

Hospital	Project	Process Outcomes
1	Revise hypoglycemia protocol	Revised hypoglycemia protocol and embedded it into insulin order sets
2	Revise and implement physiologic insulin order sets	Revised and implemented physiologic insulin order sets
3	Revise and implement physiologic insulin order sets	Revised physiologic insulin order sets; pilot delayed due to competing interest with development of CPOE
4	Revise and implement physiologic insulin order sets	Revised and implemented physiologic insulin order sets and increased utilization by providers
5	Improve glycemic control in the ICU	Implemented glucose management system for customizing insulin infusion in ICU
6	Revise and implement physiologic insulin order sets	Revised and implemented physiologic insulin order sets
7	Develop and implement physiologic insulin order sets	Developed and piloted physiologic insulin order sets
8	Develop and implement physiologic insulin order sets	Developed and piloted physiologic insulin order sets
9	Develop and implement basal insulin order set	Developed and implemented basal insulin order set
10	Develop and implement physiologic insulin order set	Developed and implemented physiologic insulin order sets

Results cont.

Table 3. Participating Hospitals' Accomplishments

Glucometrics and glucose measurements	Three hospitals developed a glucose metric system for data collection. One site redesigned nursing workflow to capture point of care glucose data at appropriate times.
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Table 4. Participating Hospitals' Evaluation and the Impact of the Initiative

Intervention	Rating Average*
Faculty site visit	4.6
Faculty lectures during visit	4.7
Faculty consultation with interdisciplinary glycemic control team	4.2
Informal consultation with faculty after site visit	4.0
Website educational resources and tools	3.0
Web conferences and peer interaction	3.89
Impact	
Participation in the initiative served as a catalyst for changing how we manage inpatient glycemic control	3.9
The external recognition of being selected to participate in the initiative was important for building support for the project	4.4
Input from external faculty was important in persuading internal stakeholders to make changes	3.9
Hearing other sites discuss the problems and barriers they faced was useful	4.0
Having access to faculty was helpful when encountered problems and needed advice	4.1

* 1-not valuable 5-highly valuable

Results cont.

Web Conferences:

Each site participated in three web conferences from April 2011 to March 2012. Common implementation system barriers discussed during these conferences included lack of information technology (IT) support for ongoing data analysis to monitor performance; nursing workflow issues related to coordinating the timing of the patient's blood glucose check and insulin administration with delivery of the meal tray; competing priorities with the development of an electronic medical record; and resistance to mandatory use of insulin order sets.

Table 5. Extent to which Institution's goals were satisfied.

Answer Options	not at all	marginally	partially	mostly	completely
To what extend were your institution's goals for participating in this initiative satisfied?	0	1	3	4	2

Conclusions

- **Changing the culture of inpatient glucose management is a complex institutional challenge.**
- **Our initiative of expert mentors who performed site visits, analysis of institutional challenges and guided goal setting allowed hospitals to be successful in overcoming inertia and barriers to change.**
- **Every institution was successful in implementing improved practices whether it was order sets, data collection and reporting or organization of their teams.**
- **These changes to their institution will continue to promote their goals as well as provide the resources for the future.**

Limitations

- Only a limited numbers of hospitals applied to participate in the initiative and those hospitals self selected commitment to the project.
- Project's short time frame for evaluating clinical and economic outcomes.

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