



A Performance Improvement Approach to Glycemic Control in the Hospital: Process Outcomes

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The Challenge

Hyperglycemia affects between 22% and 38% of hospitalized patients.^{1,2} These includes those patients with diagnosed diabetes, undiagnosed diabetes, and those who suffer from stress-induced or steroid-induced hyperglycemia. Managing hyperglycemia in the hospital is complex and involves the participation of multiple stakeholders. Perhaps because of this complexity, many out-dated practices persist in hospitals. In particular, sliding-scale insulin administration is still widely used in American hospitals despite formal recommendations that this form of management no longer be used as the sole means of management.³

This initiative sought to assist hospitals seeking to improve glycemic control in their facilities by providing technical assistance from expert faculty to an interdisciplinary team that committed to implement a project within a quality improvement framework.

Participation was by application and support from the Chief Medical Office was required. Teams were allowed to define their own projects as long as they related to improving glycemic control in hospitalized patients. Teams typically included members of the medical staff, and from nursing, pharmacy, and dietary departments.

Intervention Components:

Site Visit: A faculty team consisting of a physician (inpatient endocrinologist or hospitalist) and a nurse with extensive experience with inpatient glycemic control traveled to each site. Onsite activities included a working meeting with the designated team to discuss the proposed project but often also included a presentation by the visiting faculty to larger groups in settings like Grand Rounds.

Web Conferences: Participating sites were divided into cohorts of 3-4 sites who were visited by the same faculty mentors. Each cohort participated in 3 Web Conferences over the course of the initiative.

WEB CONFERENCE 1:	Presentation of site projects
WEB CONFERENCE 2:	Progress of projects
WEB CONFERENCE 3:	Accomplishments and future plans

Faculty

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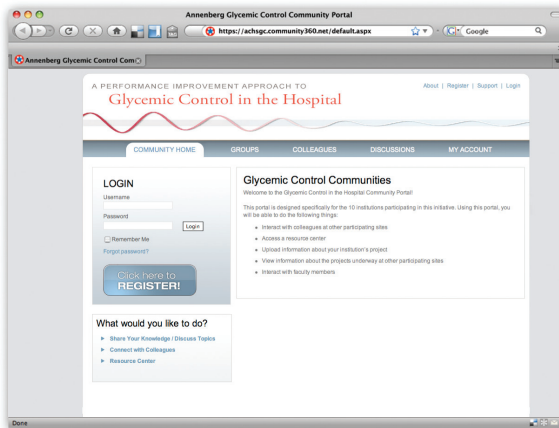
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Initiative Web Site

We created a resource Web site for the participants. The site had the following features:

- Password protected entry
- Resource Center
- Site profiles with project information, presentations, and other materials
- Faculty profiles and contact information
- Discussion board



Participating Institutions

Cape Regional Medical Center
Cape May Court House, NJ
Community Hospital
242 beds

Cooper University Hospital
Camden, NJ
University/Academic Hospital
600 beds

Deaconess Hospital
Evansville, IN
Community Hospital
323 beds

Doctors Medical Center
Modesto, CA
Community Hospital
465 beds
Eisenhower Medical Center
Rancho Mirage, CA

Community Hospital
542 beds
Munroe Regional Medical Center
Ocala, FL
Community Hospital
421 beds
Riverside County Regional Medical Center
Moreno Valley, CA

County Teaching Hospital
439 beds
Rogue Valley Medical Center
Medford, OR
Regional Community Hospital
378 beds
Roper Hospital
Charleston, SC

Community Hospital
368 beds
St. Vincent's Medical Center
Bridgeport, CT
Community Teaching and Referral Hospital
473 beds

Primary Projects Undertaken and Completed

	NUMBER OF INSTITUTIONS
Developed and implemented physiologic insulin administration order sets to replace current sliding-scale insulin management	6
Revised and relaunched an underperforming physiologic insulin administration order set	2
Improved IV insulin administration in the ICU	1
Improved the management of hypoglycemic events	1

Other Accomplishments

	NUMBER OF INSTITUTIONS
Established a permanent glycemic control committee within institutional committee structure	6
Rechartered or relaunched an existing glycemic control team	2
Implemented new patient care processes (ie care rounds, case conferences)	4
Revised dietary orders	2
Revised protocols for diabetic ketoacidosis and hyperosmolar hyperglycemic state	2
Revised an existing physiologic insulin administration order set	2
Developed obstetrical orders for gestational, Type 1 and Type 2 diabetes	1
Revised formulary to restrict the number of insulin formulations available	1
Developed a transition protocol from IV to physiologic subcutaneous insulin	1
Achieved Joint Commission specialty certification for inpatient diabetes	1

Conclusions

- All organizations were able to successfully plan and implement a project, although not all sites were able to demonstrate improvement during the 15-month project period
- All sites encountered significant barriers during implementation. Some were typical of the issues address (coordination of meal delivery with insulin administration) and others were less predictable (change in electronic health record vendor, threat of nursing strike). Building skills related to anticipating and responding to barriers is a key skill development issue for intraprofessional work teams
- Teams performed considerable work that was related to, but not necessarily part of their primary projects
- This intervention model was successful in developing capacity in terms of structure and process for ongoing improvement beyond the formal project

- 1 Umperiez GE, Isaacs SD, Bazargan N, et al. Hyperglycemia: an independent marker of in-hospital mortality in patients with undiagnosed diabetes. *J Clin Endocrinol Metab.* 2002;87:978-982.
- 2 American Diabetes Association. Economic costs of diabetes in the U.S. in 2007. *Diabetes Care.* 2008;31:596-615.
- 3 Moghissi ES, Korytkowski MT, DiNardo M. American Association of Clinical Endocrinologists and American Diabetes Association consensus statement on inpatient glycemic control. *Diabetes Care.* 2009 Jun;32(11):19-31.

