Organization: Montgomery General Hospital- Medstar Healthcare  
Solution Title: Improving Glycemic Control to Enhance Patient Outcomes

Program/Project Description: What was the problem to be solved? How was it identified? What baseline data existed? What were the goals—how would you know if you were successful?

During the summer of 2010 a small informal group of healthcare providers, comprised of pharmacy, laboratory and nursing, met to look at the status of inpatient glycemic control as a follow up to a 2008 gap analysis and order set revision. There was minimal resolution of the previously identified concerns. With the growing number of patients nationally admitted with alterations in their glycemic levels and comprising approximately 30% of the MGH population, it was decided to convene an interdisciplinary group to evaluate current glycemic control as compared to evidence-based practices, update the current program, implement required changes, monitor for improvement and make further revisions as indicated. Without clear national benchmarks for acceptable percentage of inpatient abnormal glucose values, the decision was made to base successful improvements around qualitative data related to stated or observed improvements in clinical practices and a quantitative data reduction in extreme glucose values at the time of discharge, ie less than 70 mg/dl and greater than 180 mg/dl.

Process: What methodology or process was used to develop the Solution?

The initial informal group, acting as the steering committee, realized there were both problem-focused and knowledge-focused triggers that were impacting glycemic control and would need to be addressed if patient outcomes were to improve. Although not a formal research project, the Iowa Model of Evidence Based Practice to Promote Quality Care was used as a tool to support the problem solving process. The decision was made to research the literature on process improvement initiatives that had succeeded in improving glycemic control and identify methodologies used to achieve the improvements. Simultaneously, the group proceeded in exploring the makeup of the interdisciplinary “glycemic control committee.” Early in the program development process, based on the presentation of patient data at MGH, it was decided to focus not only on patients admitted with known Diabetes Mellitus but to more globally look at all patients who experienced sustained abnormal glycemic values (hypoglycemia or hyperglycemia).

The first interdisciplinary meeting of the “glycemic control committee" consisted of laying the ground work for the program. A gap analysis was initiated where each interdisciplinary participant was encouraged to compile a list of concerns through collaboration with member of their specific departments and evaluate their current departmental practices. It was agreed that this gap analysis would serve to guide the development of goals, objective, drivers and provide structure when establishing action plans and evaluating improvement/ outcomes. Their action items would be prioritized and guide the focus for the monthly meeting.

An agenda template was created to ensure that each discipline would have time to report on concerns, improvements and status of any actions implemented at the monthly lunchtime meetings. Additionally, it was decided to utilize subcommittees or focus groups to address specific initiatives that may not involve all members of the committee. These subcommittee/ focus groups, also meeting monthly, would report at the general meeting on the status of their specific initiative, eliciting feedback and incorporating this feedback into the initiative. This allowed optimization of resource hours expended. Subcommittees were developed to address concerns over subcutaneous insulin orders, insulin infusion orders, inpatient use of insulin infusion pumps, data collection and
reporting processes, and educational platform related to roll out of clinical best practices, order set revision and interdisciplinary communication needs.

To develop momentum within the group, it was decided to address some of the interdisciplinary concerns that appeared as “low hanging fruit” first and report the action plans and improvements to the various departments. It was hoped this would encourage participation and support, and initiate increased awareness of hospital staff. Members were aware that this process improvement initiative would take at least a year to implement and would require commitment and ongoing tracking to ensure sustainability.

Supportive processes or methodologies utilized over this first year included assembly of relevant research and literature, critique of research currently in practice and outcomes of those studies, use of case studies from both literature as well as MGH inpatients, and pilot changes while tracking outcomes. The Iowa Model further supports the incorporation of the environment, staff, cost and patient/family when looking at process, structure and outcomes, stressing the need to continually “evaluate quality of care and new knowledge.”

**Solution:** *What Solution was developed? How was it implemented?*

The interdisciplinary group met on at least a monthly basis to address in priority order each action item identified by the gap analysis and provide potential solutions for resolution of the problem. Brainstorming among all members of the team provided the ability to see issues outside of the specific department that would impact success.

Some examples of concerns were 1) time between blood glucose testing and insulin administration, 2)”on demand” meal delivery process and effect on insulin administration, 3) abnormal discharge glucose values and impact on self care and potential readmission, 4) patient referral for follow up, and 5) interdisciplinary involvement in the plan of care.

Dietary was able to work with the inpatient psychiatric unit and emergency department to ensure they had appropriate and adequate patient snacks. This reduced the rebound hypoglycemia when treating hyperglycemia in the emergency department, as well as preventing unnecessary elevated glucose levels in the inpatient psychiatric unit. Dietary further supported a communication process when “on demand” trays were delivered, notifying the nurse so that finger stick glucose levels could coincide with insulin meal coverage.

Through the use of RALS finger stick glucose reporting process staff could collaborate with the medical staff when patient experienced sustained elevated glucose levels. Nursing units were also provided with tracking data related to glucose levels on discharge. HgbA1C levels are now drawn in house with same day availability in order to more easily identify patients in need of community support and needed dietary referral. Finger stick glucose testing point of care testing compliance has improved as a result of document reporting to managers, and staff reeducation when indicated.

All glycemic control order sets were reviewed and revised based on current literature and in collaboration with the MedStar Diabetes Institute and outside endocrinology consultation. A revised approach to acute care inpatient hypoglycemia treatment, subcutaneous insulin administration, insulin infusion and patient’s use of insulin pumps will roll out using an educational platform with revised order sets and clinical best practice tips in January 2011.

**Measurable Outcomes:** *What are the results of implementing the Solution? Provide qualitative and/or quantitative results to data. (Please include graphs, charts, or tools as attachments.)*
The interdisciplinary glycemic control action plan developed in response to the unit concerns/ gap analysis is reviewed in its entirety each quarter, to ensure patient needs remain the primary focus. This allows recognition of accomplishments as well as a refocus on the timeline of unresolved concerns.

Each department provides a status report monthly on the qualitative improvements to the committee based on observation and clinical outcomes. For example, when implementing appropriate snacks in the inpatient psychiatric unit, both dietary and the nursing unit provided a report. A check on the status of that improvement action was also addressed the next quarter to support sustainability.

A large amount of anecdotal data has been obtained from staff regarding existing challenges and increased awareness of best practices surrounding glycemic control. This quantitative data suggests change has been affected; additional quantitative measures were needed but not readily available. The review of monthly data initially focused on discharge glucose level and daily RALS reporting. A later addition was the hgbA1C status. Additionally, the glucose value on discharge was mapped based on the admitting glucose level. The goal in this report was to determine if the plan of care sustained or improvement in glucose level during the inpatient. These reports demonstrate the impact of the role of the certified diabetic educator during her short tenure during the summer months. The change in data supported the need for the Nurse Practitioner position. Furthermore, the low number of patients with reported hgb A1C levels during hospitalization prompted the laboratory to assume onsite hgb A1C testing to allow for more timely clinical decision support and improved discharge planning. Interpretation of these data tools allows the committee to refocus our efforts on the design, education and implementation efforts.

**Sustainability:** What measures are being taken to ensure that results can be sustained and spread? Committee meetings will continue monthly, with added subcommittee sessions are indicated. During the monthly meetings, patient glycemic value data will be reviewed, each department will continue to provide status updates related to actions implemented and new concerns, and the chart review of patient outliers for lessons learned will serve as a means for peer review. Data points on the discharge status of our patients will continue to be made available to post in departments and used to lead discussions around what is working and what are opportunities for improvement. The educational platform created for roll out in January 2011 on the revisions to glycemic care will become part of orientation for new associates and medical staff. Nurse Managers in collaboration with the laboratory will continue to track responsiveness to hypocritical glucose results, working with staff as indicated to improve performance. Other considerations include the possibility of posting glycemic data on the MGH intranet for easy visibility of all hospital associates. Also, as the hospital builds the Skylight televised educational service and the committee begins to address plan of care and discharge needs feedback from the Patient Family Advisory Council will be elicited to determine the best approach and message for our patients.

**Role of Collaboration and Leadership:** What role did teamwork and collaboration play in the Solution? What partners and participants were involved? Was the organization’s leadership engaged and did they share the vision for success? How was leadership support demonstrated?

The steering committee was comprised of a pharmacist, laboratory supervisor, dietician, nurse educator, informatics nurse and nursing director. The larger interdisciplinary committee included the steering committee plus representatives for each nursing unit including management and bedside providers, case management, patient safety officer, community health representative, hospitalists, Medstar Diabetes institute representative and upper management at MGH. Information Technology plays an ad hoc role. The nursing director, acting in the role of executive sponsor, provided status reports to the upper management team. It was quickly realized that “improving glycemic control” would be an ongoing challenge requiring extensive dedication from each department with a desire to engage in collaborative problem solving to achieve improvements.
When asked to address the role of collaboration and teamwork in the success of this committee, it can best be defined by the statement of its members: "This committee work has allowed me to develop a greater understanding of the bigger picture associated with glycemic control. Through our cooperative efforts, each of us with differing responsibilities, have gained knowledge in how our piece fits together in improving glycemic control. We have developed an understanding of processes in place in other departments and how our department’s role impacts those processes. Dependent on each other’s feedback to ensure we meet glycemic goals, we have a high level of mutual and individual accountability, respect, truly sharing the committee responsibilities."

MGH has implemented a vision on healthcare delivery based on Collins principles of Good to Great which centers on people, performance, systemness, and innovation, with emphasis on keeping the "Patient First". This vision supports the implementation of best practices in patient care. It is felt that by establishing clear expectations, providing follow up and ongoing feedback, employees will have the support system in place to respond and embrace change. Focusing on coaching, counseling, role modeling skills and use of emotional intelligence approaches to interactions, a platform is established for a consistent approach when reinforcing positive behaviors and correcting ineffective behaviors. The nursing philosophy centered Swanson’s caring model of knowing, being with, doing for, enabling and maintain belief in patients, family and staff provides additional framework at the bedside and supports a collaborative governance approach to staff involvement in assessment, planning and implementation of change, in this case, associated with improved glycemic control.

Members of the upper management team, VP of Medical affairs and VP of Quality, Safety and Compliance have participated in meetings. Upper management has acknowledged the efforts and success of this committee in departmental, hospital and corporate meeting. The committee presented patient outcome data that supported the need for an onsite daily glycemic expert to consult on those patients with sustained abnormal glucose value. Despite the current economic turmoil, a position has been approved for a Nurse Practitioner. Further support is demonstrated in the request by upper management to present this project as a poster program at a state wide patient safety meeting.

**Innovation:** *What makes this Solution innovative? What are its unique attributes?*

This interdisciplinary group was dedicated to improving patient outcomes related to glycemic control without the benefit of specialized credentialing in glycemic management and without a certified diabetic resource or endocrinologist. Conferences were attended, best practices identified in the literature, bedside providers and medical professionals input encouraged and extensive interdisciplinary communication with a focus on resolution of barriers to improved glycemic control. This interdisciplinary group was successful in raising awareness hospital wide for improved glycemic control through the desire to improve patient care, engage in the unknown, ultimately stretching beyond their individual and group expertise and responsibilities. The accomplishments may not be clearly measurable and the group continues to deal with challenges. As a result of this pursuit for excellence, MGH has received clinical practice and resource support from the MedStar Diabetes Institute, upper management has approved recruitment of a diabetes expert at the NP level, and a MGH pharmacist has served as the primary resource and team lead on the system wide redesign of insulin order sets and treatment plans. The process for improving glycemic control is not complete. This interdisciplinary group was able to improve patient care and safety by their dedication to the patients through problem solving, utilizing available resources and extensive collaborative teamwork.

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<table>
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<tr>
<th>Topic/ Component</th>
<th>Task Progress &amp; Review</th>
<th>Person Responsible</th>
<th>Deadline</th>
<th>Status / Follow Up</th>
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<tr>
<td>Revision of Glycemic Team</td>
<td>Addition of Resource Management, Unit based nursing staff</td>
<td>Dillon</td>
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<td>Program Revision- Key Elements and Resource Support</td>
<td>Instructional Materials to include Diabetes programs from PESI on insulin dosing, diabetes updates,</td>
<td>Dillon</td>
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<td>Acute Care Improvements- nursing</td>
<td>Nursing support for regimen. Scripting for discussion with physicians. Insulin Infusion CCA/IMC.</td>
<td>Grose/Staff Nurse Reps</td>
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<td>Tracking and Trending- mapping improvements</td>
<td>Daily RALS report response – physician/nursing support Glucometer reporting and CAP requirement compliance and staff remediation/correction Chart Audits/ RCA’s associated with sustained abnormal glucose values during hospitalization/ at discharge and reportable events.</td>
<td>Finnegan/ Massey/Dillon/ Bazemore</td>
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<td>Pharmaceutical Adjustments Weight Based Dosing Insulin Infusion</td>
<td>Guidelines for basal/bolus/correctional insulin Insulin Infusion order revision (based on medstar pilot) Pharmacy support / recommendation to physicians</td>
<td>Bazemore</td>
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<td>Dietary Considerations</td>
<td>Meal Delivery HS Snacks Carbohydrate Intake/ insulin calculation</td>
<td>Kuong/Ortiz</td>
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<td>Patient Education</td>
<td>Information used in initial presentation. Round participation r/t patient identification. Follow up needs post discharge</td>
<td>Saladini/Curran/</td>
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<td>Physician Support</td>
<td>Relay info r/t best practices/ orders/ responses</td>
<td>Dihn/ Leonard</td>
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<td>Discharge Planning-LOS &amp; readmissions</td>
<td>Interdisciplinary rounds addressing response to treatment, status of BS &amp; projected needs at discharge</td>
<td>Carder/Dillon/ Massey</td>
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Glucose Comparison by Date Period
Montgomery General

* The counts for this report include values that were determined to be above the maximum or below the minimum detectable range of the device or collection method. These values are not included in the mean, median, or standard deviation calculations.
**Goal**

To improve short and long-term outcomes associated with glycemic control for our patients.

### Primary Drivers

- Adequate knowledge of current best practices
- Plan of care from admission to discharge is appropriate and complies with best practices
- Interdisciplinary communication and agreement of Plan of Care
- Implementation of POC with feedback and revision as needed
- Glycemic Control (i.e., reduction of hyper and hypoglycemia)

### Secondary Drivers

- Identifying at risk population upon admission and throughout hospitalization
- Compliance with policies, procedures, and protocols
- Communication of abnormal values and corrective actions per established protocol
- Appropriate insulin dosing: basal, bolus, correctional, and insulin infusion
- Appropriate coordination of finger sticks, meal consumption, and insulin administration
- Patient understanding and compliance
- Develop a plan to anticipate outpatient needs: referrals, consults, equipment, etc.

### Structure for Glycemic Control Committee Planning

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<tr>
<th>Goal</th>
<th>Action Steps</th>
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<tr>
<td><strong>Establish interdisciplinary team</strong></td>
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<td><strong>Evaluate current inhouse practices including: 1) med/surg 2) MNC and 3) periop</strong></td>
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<td><strong>Develop order sets in compliance with best practices</strong></td>
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<td><strong>Provide physician, staff and patient education</strong></td>
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<td><strong>Develop a plan to anticipate outpatient needs: discharge plans, community resources etc.</strong></td>
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<td><strong>Develop process to enforce CAP compliance</strong></td>
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<tr>
<td><strong>Evaluate dietary selections and meal process</strong></td>
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<tr>
<td><strong>Carry out RCA and provide recommendations for identified patients</strong></td>
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