

**Cardiac Surgery Patients with Controlled 6 A.M.
Postoperative Blood Glucose for
Surgical Infection Prevention -
Achieving the Standard of Care**
**Tools and Resources for Hospital Performance Measurement
Improvement Activities**

Twenty-Third in a series of targeted quality improvement articles

April 11, 2008

Illinois Hospital Association

**Cardiac Surgery Patients with Controlled 6 A.M. Postoperative Blood
Glucose for Surgical Care Improvement Project (SCIP-Inf-4)
Achieving the Standard of Care
Tools and Resources for Hospital Performance Measurement Improvement
Activities**

Achieving the Highest Standard of Care

The postoperative blood glucose measure focuses on the monitoring and control of blood glucose levels in postoperative cardiac surgery patients. Illinois Hospital Association (IHA) Comparative Performance Measurement Initiative shows Illinois hospitals in the 2nd quarter of 2007 achieved 91% compliance with the surgical care improvement project (SCIP) infection prevention glucose monitoring measure. As this measure was only recently implemented by many hospitals, there is no national level data available at this time for comparison. The goal for Illinois hospitals is continuous care improvement and greater use of the evidence-base for the measures.

Controlled 6 A.M. Postoperative Blood Glucose Measure

Obtained primarily from the ingestion of food and beverage, blood glucose is a sugar that is carried in the blood stream and the body's main source of energy at the cellular level. In healthy states, the body auto-regulates the concentration of circulating blood sugar. A condition of hyperglycemia exists when patient have abnormally high levels of blood glucose. Numerous studies outlined in the Specifications Manual for National Hospital Quality Measures reported by Zerr, et al., Latham, and Van Den Berghe have shown that an abnormal increase in blood sugar have been associated with increased in-hospital morbidity, including surgical site infections, and mortality for multiple medical and surgical conditions. A recent and expanding evidence-base supports the monitoring for and control of hyperglycemia to minimize adverse outcomes for postoperative cardiac surgical patients.

Calculating the Measure's Performance. Cardiac surgery patients with controlled 6 A.M. postoperative blood glucose is reported as a percent, based on:

- Numerator includes the number of surgical patients with controlled 6 A.M. blood glucose (≤ 200 mg/dl) on Post-op Day (POD)1 and POD 2
- Denominator includes cardiac surgery patients with no prior evidence of infection. The surgical types include:
 - ICD-9-CM Principal Procedure Code listed Appendix A. Table 5.10, and
 - ICD-9-CM Principal Procedure Code listed Appendix A. Table 5.11.

Measures Specifications

The Specifications Manuals for National Hospital Quality Measures can be obtained from Quality-Net at www.qualitynet.org, select Hospitals-Inpatient (top menu bar) then Specifications (left menu bar). Choose the manual version appropriate to the data collection period (Version 2.3b covers October 1, 2007 through March 31, 2008 discharges).

Expanded Reporting Opportunities

There are several important changes with the reporting SCIP measures at the state, federal and accrediting organizations.

State. Hospitals are required to report the infection related measures for the Illinois Hospital Report Card Act (HRCA) using SCIP measures. Initially, Prospective Payment System (PPS) Illinois hospitals reported 3QT2007 SCIP-Inf-1,2,3 discharges. Then with 4QT2007, both PPS and non-PPS Illinois hospitals reported SCIP-Inf-1,2,3. Then with 4QT, reporting was expanded to include additional SCIP measures; SCIP-Inf -3a,3b, and SCIP-Inf-4 for the HRCA. Hospitals that did not provide the surgical services associated with these measures would be exempt from reporting. IDPH will make the available infection related data results to the public in 2008.

Federal. The Fiscal Year 2008 Medicare Outpatient PPS Final Rules expanded the number of inpatient measures for hospitals to report to the Hospital Quality Alliance (HQA) for the Annual Payment Update (APU) Program. Beginning with 1QT 2008 discharges, in addition to the existing APU measures, hospitals will be required to report SCIP-Inf-4, SCIP-Inf-6 (appropriate hair removal) to HQA in order to receive the full market basket update.

The Joint Commission. Beginning with 1QT 2008 discharges, The Joint Commission expanded the number of SCIP measures in the SCIP measurement set. The original Joint Commission SCIP measure set included SCIP-Inf-1,2,3; SCIP-VTE-1,2. The Joint Commission SCIP measure set was expanded to include SCIP-Inf-4,6, and SCIP-Card-2 (beta-blockers received). In addition, as SCIP-Inf-7 (normothermia) is pending National Quality Forum (NQF) review and endorsement, hospitals will not be required but may voluntarily report SCIP-Inf-7.

The Measures Comparison Cart, a reference guide displaying the measures, activation dates, reporting entities, and APU requirements for calendar year 2008 is available at Quality Net web site. Go to: www.qnet.org, select Inpatient-hospital (top menu bar), RHQDAPU (left menu bar) then Measure Comparisons, select Inpatient Hospital Quality Measures Calendar Year 2008 Discharges (top screen).

Successful Quality Improvement and Compliance Experiences Shared by Illinois Hospitals

The experiences and successes for achieving compliance with controlled 6 A.M. blood glucose measure are presented below. The Illinois Hospital Association appreciates the efforts of these hospitals in sharing their experiences with others and also the sharing of contact names at each hospital for follow up questions or discussions.

Some common and unique success factors or strategies include:

- physician champions
- multidisciplinary team effort
- continuous review performance measure data identify opportunities
- use pathways, care maps, and protocols

Controlled Post-operative Blood Glucose - Achieving the Standard of Care

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St. John's Hospital, Springfield, Illinois

St. John's Hospital in Springfield, Illinois is a 500 bed teaching hospital and one of eight in the Hospital Sisters Health System (HSHS) in Illinois. Staff report greater participation of physicians, surgeons and residents has contributed significantly to ongoing improvements with the SCIP measures and care processes. With support of administration, a multidisciplinary team came together 1-2 years ago to address SCIP improvement efforts. The addition of a physician champion, Carl Arentzen, MD, a cardiothoracic surgeon, as well as an anesthesiologist physician helped drive the improvement activities, states Leeann Cook, BSN, Facilitator-Quality Improvement.

Before joining the care team, Dr. Arentzen was a visible supporter of SCIP and directed numerous educational in-services in the patient care units and cardiopulmonary step-down and recovery areas regarding SCIP and the importance of glucose monitoring and control in the cardiac surgery population, says Jennifer Donnelly, RN, BSN Director of Nursing, Prairie Heart Institute at St. John's Hospital.

The hospital implemented an IV insulin protocol several years ago and the evidence base shows that controlling blood sugars in post-op cardiac patients was associated with decrease infection rates, says Ms. Cook. The monitoring the heart patients' serum glucose is a routine part of their care reflected in their Open Heart Care Maps, states Ms. Donnelly. Care maps are similar to pathways, are evidence based and reflect the best practice guidelines, and identify expected course of treatment and outcomes for most patients.

The IV protocol is quality driven and physician driven – and the CV Quality committee comprised of cardiologists and cardiothoracic surgeons frequently reviews the protocol for appropriateness and effectiveness. CV Quality and CV Surgery committees have helped to guide the team's improvement efforts. The SCIP data are routinely reported and reviewed at the monthly committee meetings, reports Ms. Cook. By reviewing the few non-compliant cases, “we determined most of these cases fall out post-op day 2 (POD2) – the time when patients are improving and moving out of the high intensity critical care area to other patient care areas”.

We are achieving our post-op glucose goals on POD1, however we realize we have different challenges on POD2 when patients are transitioning out of the critical care and yet require ongoing insulin management, states Ms. Donnelly.

Currently, the CV Quality committee members are examining the IV protocol on POD2, when patients are being transferred from critical care areas – how to best transition patients that may still be receiving IV insulin therapy.

Currently, St. John's is engaged in a massive education program for physicians about SCIP and the performance measures. The program includes the use of flyers, education packet SCIP measures to all the surgeons, digital signage board that flashes information physician lounge, physician portal in hospital web site. Physician participation in the SCIP meetings allows for review of performance measure and non compliance and

discussion of OFIs, or opportunities for improvements the physicians department heads will take back to the areas and discuss with other department physicians. Contact: Jennifer Donnelly, RN, BSN Director of Nursing Prairie Heart Institute, St. John's Hospital at: Jennifer.Donnelly@st-johns.org.

St. Elizabeth's Hospital, Belleville, Illinois

St. Elizabeth's Hospital is a 500 bed community hospital located in Belleville, Illinois and is one of 8 in the Hospital Sisters Health System (HSBS) in Illinois. "Keeping abreast of evidence based literature and practice approximately 5 years ago, the critical care RNs learned how glucose control was linked to a decrease in patient mortality, infection rates and lengths of stay," states Terry Brown RN MSN, Director of Critical Care Services. The RNs began examining their own care processes particularly with the Coronary Artery Bypass Graft (CABG) patients.

"Our critical care nurses recognized an opportunity to do something better," says Lana Peters, Director of Clinical Performance Improvement. "They started researching what they could do differently and took some chances to make some changes ...and they had great physician support too. Many of our physicians support an evidenced-based approach to medicine ...and they were really on board with this project."

A multidisciplinary team that included the critical care charge nurse, staff nurses, physician champions and representatives from pharmacy and respiratory therapy was assembled to tackle this project. The team used a step-by-step approach to examine their current processes for caring for cardiac surgery patients, and where they wanted to be. They examined recommended guidelines, attended seminars, conducted extensive research, analyzed their hospital data and identified process issues that led to the team developing a new protocol for monitoring blood glucose and managing IV insulin administration in the critical care setting.

"Our cardiothoracic surgeon and team were also instrumental in developing the protocol and fine tuning it to the cardiac population," states Shelley Harris RN BSN, Nurse Manager for the CCU. Daily dialog among these staff regarding individual patients and the protocol implementation was a combined effort, the communication and cooperation was important to our success.

"Once we implemented the IV protocols," says Jeremy Harbison RN, Staff Nurse CCU, "on average within 4 to 6 hours the patient's hyperglycemic status was corrected to be within the targeted normal range for blood glucose....a significant improvement over the sliding scale methods used in the past. These new glycemic control protocols drastically cut the glucose levels down and kept it within the range the hospital team had established."

"Better glycemic control is contributing to better patient outcomes," shares Harbison. "With our open heart patient population, generally we found when patients were maintained in the more normal glucose range these patients had on average shorter

lengths of stay in the critical care and in the hospital. We have found keeping their glucose in check has gotten them out of the hospital a lot quicker.”

The improvement efforts initially focused on just the CABG patients; however the IV protocol was expanded for use with all appropriate patients in the critical care areas. Now, in the last 12 to 18 months, a new Inpatient Glycemic Management team was assembled to spread these improvements efforts outside the critical care areas to other inpatient care units throughout the hospital... “As we believe it was the right thing to do for patients and it is evidenced based.” Contact: Lana Peters, Director Performance Improvement at lpeters@sebh.org.

Surgical Infection Prevention Measures Web Based Resources

See Appendix I. for additional web based resources for controlled 6 A.M. postoperative blood glucose. For additional information about controlled 6 A.M. postoperative blood glucose, SCIP or AMI, HF, PN Measure Sets, or to comment on this series, please contact Tim Philipp, Director, Quality Improvement at tphilipp@ihastaff.org.

APPENDIX I. for Surgical Infection Prevention Web Based Resources

This document outlines web resources addressing clinical guidelines, educational materials, evidenced-based materials, and intervention tools specific to controlled 6 A.M. postoperative blood glucose. To access these resources, click on or enter the web address and follow the additional steps.

Educational Tools. The presentation slides SCIP Update July 2007 prepared by Dr. Dale Bratzler, Hospital Interventions QIOSC provides a comprehensive overview SCIP project and measures are at: <http://www.medqic.org/>, select Hospital (top menu bar) then SCIP (right menu bar) then Other Resources (box upper right corner), scroll to the title(s) of interest.

Clinical Tools. A Glucose Management Protocol Order Set along with related protocols for diabetes, IV Insulin are available at: : <http://www.medqic.org/>, select Hospital (top menu bar) then SCIP (right menu bar) then Tools (box upper right corner), scroll to the title(s) of interest.

Clinical Guidelines. A summary article of the American College of Cardiology and American Heart Association 2004 guideline update for coronary artery bypass graph surgery is available at: <http://www.medqic.org/>, select Hospital (top menu bar) then SCIP (right menu bar) then Literature (box upper right corner), scroll to the title(s) of interest.

Frequently Asked Questions – (FAQs)

FAQs often reflect the insights and concerns of hospital staff involved in clinical care and data collection. Aside from answering your specific questions, reviewing *FAQs* is an important educational tool for novice & expert.

To access Frequently Asked Questions, go to: <http://www.medqic.org/>, select Home (top menu bar) then FAQ (bottom of the right menu bar). For Topic, select on bottom right either *Hospital-SCIP Measures* or *Hospital-SCIP Interventions*, enter your *keyword*. Use of different “key words” (glucose, sugar,) will increase your returns (with some duplication).