



Reduction of Surgical Site Infections: Glucose Control Toolkit January 18, 2013



“Health Care Without Complications”



Glucose Control for Surgical Patients Toolkit

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January 2013

Acknowledgements

Special thanks to the following for sharing tools presented in this toolkit:

- **Legacy Health**
- **MultiCare Health System**
- **PeaceHealth Southwest Medical Center**
- **Skagit Valley Hospital**
- **Swedish Medical Center**
- **Virginia Mason Medical Center**
- **University of Washington Medical Center**

Recognition to the following organizations for collaboration and support for the implementation of glucose control in surgical patients:

- **Centers for Medicare& Medicaid Services (CMS)**
- **Northwest Organization of Nurse Executives (NWONE)**
- **Qualis Health**
- **Rural Healthcare Quality Network (RHQN)**
- **Strong for Surgery - Certain**
- **Surgical Care and Outcomes Assessment Program (SCOAP)**
- **Washington State Pharmacy Association (WSPA)**



Reduction of Surgical Site Infections: Glucose Control

Executive Summary

Patients want to know that when they have surgery, they will be safe from infection.

Surgical site infections (SSI) are the third most frequently reported health care-associated infection (HAI) with significant morbidity and mortality.³ Between 750,000 and 1 million surgical site infections occur in the United States each year, extending hospital stays by 3.7 million extra days and generating more than \$1.6 billion in excess hospital charges each year.⁸



Hospitals in Washington have reduced surgical site infections and yet infections still occur in 4 percent of patients following colorectal surgery.

- Science shows that mortality rates double in surgical patients with high glucose levels.⁴
- Thirty percent of patients that have high glucose are not diagnosed as diabetic.⁵
- Maintaining glucose control in patients having general surgery saves lives and reduces complications.⁵
- Patients having colorectal surgery are readmitted 12 percent of the time in the first 30 days.⁶

If you are having surgery, ask your surgeon for glucose control!

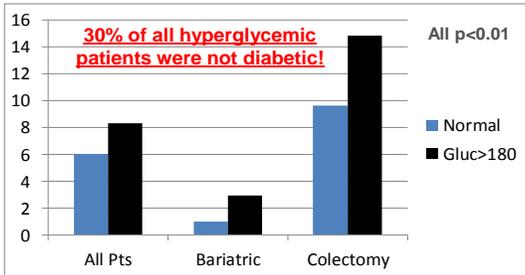
The high rate for both infection and related readmissions make reducing complications from colorectal and other surgeries a high priority to reduce harm, improve quality, and reduce costs.⁵

- In general surgery patients, the relative risk for “serious” postoperative infections (sepsis, pneumonia, and wound infection) increased 5.7 fold when any postoperative day one blood glucose was > 220 mg/dL.⁹

There is a solution. Research shows that giving insulin during the perioperative period has a significant impact on reducing post-operative infections and complications.⁹

Infection specialists are recommending that glucose monitoring be a routine part of the infection control efforts before and after surgery.⁹ Standardized processes are important to recognize blood glucose greater than 180 mg/dl and treat appropriately.⁹

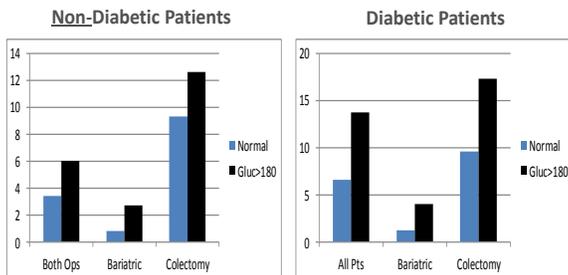
Hyperglycemia vs No Hyperglycemia All Patients



SCOAP data courtesy of Sung (Steve) Kwon

In Washington, infections increased by 30% in colectomy patients with glucose 180 mg/dl or higher.

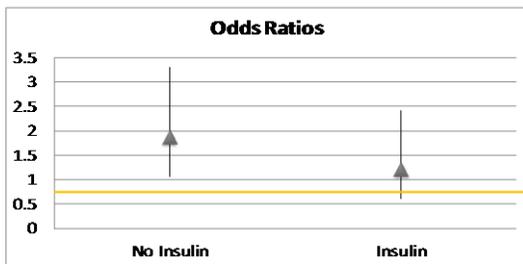
Hyperglycemia vs No Hyperglycemia



SCOAP data courtesy of Sung (Steve) Kwon

In Washington, 30 percent of patients with glucose greater than 180 were non-diabetic.

Mortality in Hyperglycemic Patients With and Without Use of Insulin



SCOAP data courtesy of Sung (Steve) Kwon

In Washington, mortality doubled in patients that did not receive insulin.

We can learn from Legacy Health and Providence Oregon who have been leaders and seen first-hand the benefits. Oregon has been at the forefront of glucose control in surgical patients with strong research and implementation.¹⁰ This is a collaborative effort with:

- Centers for Medicare & Medicare Services
- Northwest Organization of Nurse Executives
- Qualis Health
- Rural Healthcare Quality Network
- Strong for Surgery - Certain
- Surgical Care and Outcomes Assessment Program
- Washington State Pharmacy Association

This work is part of the Washington State Hospital Association program that is committed to reducing patient harm in hospitals by 40 percent and readmissions by 20 percent by December 2013. One of the ten strategies that are being used to achieve this goal is the reduction of surgical site infections. **Tools and resources to support this strategy are provided as links within the attached implementation plan.**



Key to Success

- Engage and educate clinicians on importance of managing glucose in both diabetic and non-diabetic patients having surgery.
- Start with one type of surgery such as colorectal and then spread to other surgeries.
- Ensure glucose is in good control prior to arrival for surgery. (Strong for Surgery)
- Implement policies, procedures, and order sets to identify and treat blood glucose levels greater than 180 mg/dl in the perioperative period.
- Monitor surgical site infection data and blood glucose data to evaluate compliance with these practices. Discuss in forums from board to unit based meetings.

For questions or comments contact Amber Theel, Director Patient Safety Washington State Hospital Association, at ambert@wsa.org or (206) 577-1820.

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Implementation

Below is an outline of the implementation steps. Many of the steps can be implemented at the same time. Tools and resources are linked throughout the document to assist with the implementation process.

Implementation Steps	Step 1: Engage <ul style="list-style-type: none">• Assemble steering team• Tell a story• Share data• Identify which surgical population will be the first implemented
	Step 2: Implement Policies, Procedures, and Order Sets <ul style="list-style-type: none">• Adopt policy, procedure, and order sets to identify and treat with insulin blood glucose greater than 180 mg/dl.• Support with glucose control prior to arrival for surgery. http://www.becertain.org/strong_for_surgery
	Step 3: Training and Education <ul style="list-style-type: none">• Educate staff and physicians.• Board members and c-suite leaders.
	Step 4: Evaluate Success: <ul style="list-style-type: none">• Monitor monthly colorectal and other surgical infection rates using the existing data your hospital reports to the Center for Disease Control and Prevention (CDC).• Collect and report blood glucose greater than 180 mg/dl anytime pre-operatively and during the first two days post-op.• Share data monthly with forums at all levels from the board to nursing units.
	Step 5: Hardwire <ul style="list-style-type: none">• Collect staff input to evaluate need for changes in the process.• Celebrate successes.• Spread to other surgeries.



Step 1: Engage

Assemble a Steering Team

The steering team will determine which surgery population(s) will have glucose control first implemented. They will develop policies, procedures and order sets. The team will include a physician champion, executive champion, nursing and/or pharmacy lead, and quality and/or infection preventionists.

The physician champion is essential for success in the implementation and should be a surgeon, hospitalist, anesthesiologist or Chief Medical Officer. The physician champion will assist with the interventions as well as communications with physician groups as needed.

The senior executive should be a vice president or higher level who will support staff and physicians during implementation. Other key individuals to engage are the following:

Nursing and/or Pharmacy Leader

- Supports initiative
- Manages resources
- Assures results are shared with staff
- Assigns project leaders to interventions
- Assists in scheduling executive walk rounds

Quality Leader and Infection Preventionists

- Coordinates executive education
- Verifies results are reviewed in a timely manner
- Monitors progress
- Helps to disseminate results and share stories

Tell a Story

Make the problem real by telling a story of a patient who developed a surgical site infection in your hospital and had a high glucose or tell a story of a patient that had a high glucose that was treated and did not get an infection. If you use the second type of story, be sure to include the good work of nursing in managing the insulin.



Share Data

- Post a graph with the number of people who developed a SSI each quarter and year to date.
- Post a trend line so nurses and physicians can see at a glance your SSI rate and how it is changing over time.
 - These reports are distributed to hospitals quarterly from the Washington State Hospital Association.

➤ Post the number of days (weeks or months) since your last SSI.

- Use formal and informal opportunities to talk about the intervention and about unit specific infection rates.
- Make a point of recognizing providers who appropriately follow the protocol.
- Invite your hospital infection control professional or epidemiologist to become an active part of your clinical area's improvement team and draw on their expertise to help with your specific challenges.
- Share data at unit level and all the way up to board meetings.

➤ For questions related to your data, contact Amber Theel at (206) 577-1920.

The steering team will emphasize benchmarking your performance against similar clinical areas to assist in meeting your goal of zero preventable hospital acquired complications.

Feedback is the key to maintaining engagement and achieving results. Use the opportunity calculator provided below to turn your data into a story. The calculator helps you provide leaders and staff the number of patients that are affected as well as the hospital days and dollars associated with surgical site infections.



Opportunity Calculator

Use baseline data on colorectal SSI rates in your clinical area to calculate opportunity to improve the number of preventable SSI, preventable deaths, excess hospital days and costs per year. Share this information openly with your colleagues.

- **Preventable SSIs Per Year**

SSI Rate/100 procedures x Total Number of Procedures = Preventable SSI (PSSI) ⁸

- **Preventable Deaths Per Year**

5 percent mortality non-emergent colon surgeries⁴

PSSI x 0.5= Preventable Deaths Non-Emergent

16 percent mortality on emergent or high risk colon surgeries⁴

PSSI x .16= Preventable Deaths Emergent

- **Preventable Hospital Days**

On average patients that develop a colon SSI stay in the hospital for an additional 11 days. ³ PSSI x 11 = Preventable Hospital Days

- **Preventable Costs Per Year**

The average cost of each colorectal SSI is \$8,000.00.¹

PSSI x \$8,000.00 = Preventable Costs

*PSSI = Preventable Surgical Site Infections

Actual estimates of mortality, LOS and costs of care vary by clinical area but these estimates are consistent with those published in the literature.^{1,3,4} Share this information openly with your colleagues and senior leadership.

Identify Which Surgical Population Will be the First to be Implemented

The steering team will determine which surgery population(s) will have glucose control first implemented. This toolkit focuses on colons but facilities should prioritize based on their data analysis and what makes sense for their surgical population.

Step 2: Implement Policies, Procedures, and Order Sets

Adopt Policy, Procedure, and Order Sets

Here are sample policies, procedures, and order sets that are being used in hospitals or are referenced in key articles on glucose control. Infusion is shown to be the most effective treatment. Some hospitals begin with basal bolus. Both are supported in this collaborative.



[Sample Policy and Procedure Glucose Control Harborview Pre-Surgical Diabetic Orders](#)

[Harborview Standard Dose Insulin Infusion Orders](#)
[Harborview Insulin Guidelines for NPO Inpatients Prior to Procedure](#)
[PeaceHealth Southwest Anesthesia Pre-Op Orders](#)
[PeaceHealth Southwest Anesthesia Post-Op Phase 1 Orders](#)
[PeaceHealth Southwest Colorectal Surgery Pre-Op Orders](#)
[PeaceHealth Southwest Colorectal Surgery Post-Op Orders](#)
[PeaceHealth Southwest Protocol Inpatient Glycemic Control Team](#)
[SkagitValley Non-DKA Insulin Infusion Orders](#)
[SkagitValley SQ Insulin Protocol](#)
[LegacyHealth Anesthesia EHR Order Set: Managing Glucose](#)
[RABBIT2 Trial-Basal Bolus vs. SSI](#)

Support with Glucose Control Prior to Arrival for Surgery

Help to address the patient's care at the clinics prior to surgery will be available through the Strong for Surgery Program at: http://www.becertain.org/strong_for_surgery

Step 3: Training and Education

Staff

Pharmacy and department staff should be educated on the surgical glucose control toolkit. A clinical presentation, sample nursing module and policy and procedures are attached.

[Surgical Glucose Control – Clinical Presentation](#)
[Sample Learning Module for Staff](#)
[SSI Reduction Safety Action Bundle](#)

Physicians

The biggest barrier to compliance with evidence-based practice is not that providers disagree with the evidence, but rather that providers don't know the evidence exists or don't know what they should be doing. To educate providers about the evidence-based practices refer to the following documents:

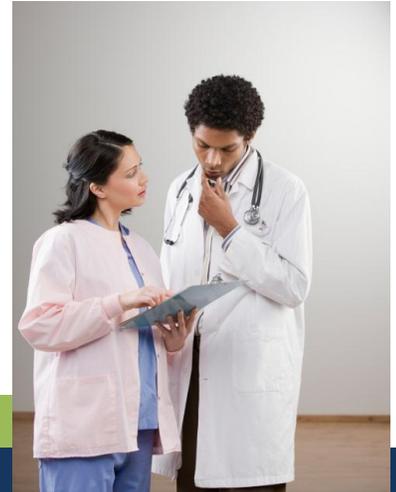
[Surgical Glucose Control – Clinical Presentation](#)

[RABBIT2 Trial-Basal Bolus vs. SSI](#)

Board Members and C-Suite Leaders

Using comparative data to identify problem areas and/or opportunities for improvement is a high priority for the board. Introduce the board member to this new process using the Surgical Glucose - Board Presentation. Provide data to the board to show the progress and outcome of the surgical glucose implementation.

[Surgical Glucose Control – Board Presentation](#)
[Sample Site Surgical Infection Report](#)



Step 4: Evaluate Success

Monitor Colorectal and Other Surgical Infection Rates

Monitor monthly colorectal and other surgical infection rates using the existing data your hospital reports to the CDC. WSHA will provide monthly reports to hospitals showing their trended data in formats that can be used for staff, committees, leaders and boards. This data can be used to benchmark with others and determine the priority for this work.

Collect and Report Blood Glucose Data

Hospitals will collect and report any blood glucose greater than 180 mg/dl for patients pre-operatively and during the first two days post-op in colorectal surgery and other targeted surgeries. Some hospitals are already collecting this data through the Surgical Care Assessment and Outcomes Program (SCOAP). <http://www.scoap.org/>

Continue to Share Data

SSI rates and blood glucose data should be shared monthly with the steering team and with forums at all levels from the board to nursing units.

Step 5: Hardwire

Collect Staff Input to Evaluate Need for Changes in Processes or Forms to Maintain Success

Leaders can support staff by rounding during implementation to find out what is working and what is not. Collecting and acting on staff input to evolve the process ensures quality care to the patient and efficient flow for staff.

Celebrate Successes

In addition to celebrating successes at the staff and unit level, share your stories with the Washington State Hospital Association. Sharing best practices across our state benefits all Washington patients.

Spread to Other Surgeries

After the initial implementation determine the next priority for this work. Ensure all surgical patients can benefit from this strategy.

We recognize that this process represents a lot of new material. Yet most of it is intuitive and self-explanatory. Many of the questions you have can be answered in the toolkit. You can send additional questions by email to ambert@wsa.org.