**Organization**
Greater Baltimore Medical Center

**Solution Title**
*Implementation of a Closing Process for Colorectal Surgeries Improves Surgical Site Infection Outcomes*

**Program/Project Description**
In late 2012, a multi-disciplinary Surgical Site Infection (SSI) Task Force set a goal of reducing the number of surgical site infections experienced by colorectal patients by 25%. A collaborative study by the Joint Commission Center for Transforming Healthcare and the American College of Surgeons found that successful SSI interventions had three essential elements: (1) the interventions were tailored to the institution; (2) the interventions were spread across the episode of care; and (3) the interventions included the standardization of as many processes as possible.

The Task Force identified that a consistent process for transitioning from closure of the fascia to closure of the skin was not standard among surgical technologists and surgeons in colorectal cases. Both clinical and executive leadership support was obtained for standardization of the colorectal closing process to include the following best practices:

1. Gown and glove change by the scrub team when completing fascia closure
2. Toweling off the incision to create an aseptic work area
3. Dual table set up to ensure spatial separation of clean and dirty instrumentation
4. Creation of a new “closing set” for use on the clean table to assist in fascia closure

The project scope includes the spread of the colorectal closing process to all colorectal and gynecological cases that involve bowel by the end of 2013.

**Process**
A closing set was designed by a clinical partner within GBMC’s General Operating Room. Surgeons and other members of the team participated in the process. A table was set up in the surgeon break room allowing visualization of the instruments to be included in the sets and a suggestion box for items that may need to be added. A poster board was on display to communicate process and outcome data from institutions where closing sets had been successfully implemented. Once the closing set was agreed upon, Central Sterile Processing was charged with creating the inventory to support each case to ensure that the closing set was available. Surgical Services leadership was charged with ensuring adequate numbers of tables/mayo stands. With the support of the Chief of Surgery, the colorectal team educated their peers and the surgeons of the change.

**Solution**
Using the Model for Improvement, a standard colorectal closing process was trialed with one surgeon and two surgical technologists for one month in the spring of 2013. Feedback was obtained and after minor changes to the sets/procedures, the closing process was spread to other surgeons in June 2013.
Central Sterile Processing assisted in building six closing sets and put them into circulation in June 2013. Feedback forms were provided to surgical team members, including surgeons. Based on this opportunity to provide feedback, changes to the instrument set continued through the summer of 2013. The colorectal team provided education on the new process to all the surgical services lines in August 2013 and shared preliminary outcome data.

**Measureable Outcomes**
Surgical Site Infection rates have been decreasing since the implementation of the closing set and standard process. Rates have been below the 10% target four of the last five months of data collection. For the six months preceding implementation of the closing process, the average rate of SSI was 15.1%. From April 2013 through September 2013, the average rate of SSI was 7.8%.

**SSI Improvement Collaborative**
Colons with Surgical Site Infection

A secondary measure of success has been the reduction in time necessary for breaking down the tables and for team change of gowns and gloves. Initially, implementation of the closing process added 10 minutes to the total time of the case. This process has been streamlined so that the average closure process time currently only adds five to six minutes. This has greatly improved surgeon satisfaction with the process change.
Sustainability
The surgical services clinical partner and the Colorectal Task Force developed audits to demonstrate use of the closing set and required process changes (dual table setup; glove and gown changes; toweling off of incision site). A surgical quality dashboard has been developed to share and display SSI and surgical quality measures. The dashboard includes the data on the closing process as well as other surgical quality metrics. GBMC’s department of Management Information Systems (MIS) will be developing a field in the patient’s electronic medical record to capture each step of the closing process. This will provide a mechanism to prompt the intra-operative team to implement the steps as well as a means to audit compliance.

Role of Collaboration and Leadership
Teamwork was paramount to the success of the implementation of the closing process. The GBMC colorectal team (RN’s, scrub technicians and colorectal surgeons) was surveyed pre-implementation and all team members were included and provided the opportunity to provide feedback to the process changes. The Surgical Site Infection Collaborative was supported by an executive sponsor, the Chief Medical Officer. The Chief of Surgery, who is a practicing colorectal surgeon, was actively engaged and assisted with troubleshooting barriers.

Innovation
This change represents a major change in culture for the GBMC surgical service line by having intra-operative team members drive the performance improvement work. While there was support and direction from leadership, the closing process implementation was initiated and implemented by the front-line personnel. This bottom-up approach fostered innovation, engagement and collaboration.

GBMC has approximately ten colorectal surgeons and each had unique instrumentation and processes for their cases. The wide variations in practice made this particularly challenging. The leadership exhibited by the intra-operative team and the involvement of the surgeons in the process changes led to barrier breakthroughs. While each surgeon had their own unique preferences, the team was able to influence standard work which has led to an improved safety environment and improved patient outcomes.

Related Tools and Resources
PPT - attached; Report out of trial (April/May 2013)
PPT- attached; GBMC’s GOR education (August 2013) for all surgical service lines (created by colorectal team members)
PPT- attached; Surgical Site Infection Outcome Measure

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SSI Improvement Collaborative
Colons with Surgical Site Infection

Trial of CR closing process with one surgeon
Spread to other colorectal surgeons and GYN cases involving bowel

Goal SSI rate of 10%, set utilizing NSQIP comparison data
IMPLEMENTATION OF A CLOSING SET
IN COLORECTAL PROCEDURES
Background

• The Joint Commission Center for Transforming Healthcare & The American College of Surgeons Collaborated with 7 leading hospitals with a goal of reducing SSI’s in Colorectal Procedures
BACKGROUND

• They identified 34 correlating variables that increase SSI

• Over a 2 year period Colorectal SSI rate across participating hospitals dropped from 15.77% to 10.7%

(McKenna, Quast, & Jun, 2013)
What They Learned

• Patient mix and risk factors are different so interventions must be institution specific
• Facilities influence personnel processes and traditions both known and unrecognized
• There is no magic bullet so implement a bundle which contains interventions across the episode of care
• Standardize as many processes as possible
GBMC HAS BEEN TRIALING A BUNDLE

WHAT WE LEARNED

• GBMC’s bundle targeted each phase of surgical care, however the following barriers were noted intra-operatively:

➤ Lack of vigilant guarding of the surgical field
➤ Inconsistencies in set up of sterile field
➤ Cross contamination of Instruments
During this time the hospital organized several collaborative initiatives one of which has also been looking at SSI in colorectal procedures

This team has found:

- Variations in prep- addressed through validation and standardization of prep with all RN’s
- Poor hand hygiene- addressed through standardizing expectations of opportunities to perform hand hygiene (currently auditing process)
- Inconsistencies in sterile technique-To be addressed
What Can We Do Now?

• To address the intra-operative need of standardizing sterile technique we are referring back to the Joint Commission and American College of Surgeons critical quality diagram and making the following recommendation to implement a closing process
WHAT IS A CLOSING TRAY

• Closing Instruments - New tray of clean instruments to be used after anastomosis.
• Clean bovie, suction, towels, & light handles will also be used at this time.

Intraoperative Elements

• “Closing” Process
  ▪ At the time of fascia closure
    ▪ All staff change gloves
    ▪ Gowns, if soiled
    ▪ Field re-blocked with sterile towels
    ▪ Instruments used during case removed and “closing tray” brought onto the field
What is a Closing Process?

- All staff change gloves
- Gowns
- Field re-blocked with sterile towels
- Instruments used during case REMOVED and a CLOSING TRAY that is set up on a separate table is brought to the field
WILL OPERATIVE TIME INCREASE DUE TO CHANGES?

• Maybe
• People will adapt
• Mayo clinics data
Operative Time – Has it increased due to our changes? “NO”

- Analysis of Operative time – 2010 to Dec 2011
- All CPT-4 Codes in project
- No obvious differences in operative times

Median Operative Duration - 2010 & 2011
From Operation Begin to Operation End

Year and Month
WHAT’S NEXT?

• Small test of change with one surgeon on Monday 4.8.13; if it works we will ask others to test

• We are asking for frequent feedback and communication

• Surgeons, Nurses, Techs, RNFA’s, PA’s, please provide input on the closing set below:
  – Do you want anything added or taken away?
  – Do you have any ideas about this process?
THANK YOU & PLEASE PROVIDE FEEDBACK
References


Colorectal Closing Protocol

What We Need To Do Anytime We Enter Bowel

3 Steps To Drive Down Infections

- Set Up Two Tables
- Count and Clean
- All Team Members Change
Purpose of the Protocol

• Standardization of procedure helps promote optimal post-operative patient outcome

• Closure set addresses the intra-operative portion of the colorectal bundle
Closing step #1: Set Up Two Tables

Operative table: Primary table used for the bowel resection

Closure table: Used for fascia closure
Closure Table is for both Laparoscopic and Open Colon Resections

- Minor pack
- Suction tip
- *Closure set
- Closing suture
- 1 pack of towels
- 2 gowns/ gloves
- * 8 closure sets are now available in sterile processing
STEP # 2

Count and Clean
Closing Step # 2:

**Circulator & Scrub**
- Perform complete cavity count include all sponges & instruments
- Assure no counted items remain at the field

**Surgeon & Assistant**
- Irrigate wound if needed
- Remove all used supplies, leaving drape in place
- Remove light handles
- Prepare to don new gown and gloves
STEP # 3

ALL TEAM MEMBERS CHANGE

PROCEED WITH CLOSING
Closing Step #3:

**Scrub**
- Change gown and gloves
- Bring closing table to the field
- Re-gown & glove surgeon and assistant

**Surgeon & Assist**
- Place new towels to re-drape surgical field
- Place new bovie and suction
- Replace light handles
- Close the wound
Colorectal Intra-op Bundle Reminders
(Actiion Occurred - Intra Op/OR Suite)

- Recommended Prophylactic Antibiotic given prior to incision per protocol (SCIP/CORE MEASURE)

- Re-dose if surgery last more than 3 hrs

- Surgical Site prepped w/Chlorhexidine prep ~ 3min. minimum dry time
Bundle Components

- Warm irrigation utilized
- Clean and dirty instruments isolated using two separate Mayo stands
- At the appropriate time a final skin count is performed by the circulator and scrub accounting for closure set instruments
- Gloves and gown changed by team after intra-abdominal work completed
Bundle Components

- Closing set utilized
- Subcutaneous irrigation of operative site completed
- Sterile dressing applied to operative sites(s)