ISQIC Surgical Site Infection Reduction Bundle Toolkit

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Contents

How to Use This Toolkit

Implementing a Surgical Site Infection (SSI) reduction protocol requires significant coordination between groups within a hospital. There are protocol components that must be completed by the patient prior to surgery, intraoperatively by members of the care team, and finally postoperatively from the time surgery ends until discharge. Many excellent resources have been created by groups across the country; therefore, this toolkit is meant to house many of those resources so you can easily see what each has to offer. Additionally, we've reached out to ISQIC hospitals for their experiences implementing interventions, bundles, and protocols to decrease SSI rates so we can all learn from each other the different ways to implement a project such as this.

We hope you will find the resources and case studies in this toolkit useful and that you can easily tailor the interventions to your institution's needs.

The following functions have been added to this pdf to make it easy to navigate:

1. This pdf is searchable so you can type a page number or word into the search box to be taken to places in the toolkit where that search item appears.
2. Clicking on any section header or sub-header in the Table of Contents will take you directly to that section.
3. Clicking on the ISQIC logo in the bottom right corner of each page will take you back to the Table of Contents.
4. Clicking on the reference to an appendix in the text will take you directly to that appendix.
5. You may double click any caption that says "Double click image to open attachment" and the attachment will open. To get back to the Toolkit, click on 'Close' in the file menu and you will be able to re-open the Toolkit. Adobe Reader is the preferred method for viewing attachments.

Feedback on This Toolkit

We hope this toolkit will assist your hospital in deciding how to implement the SSI bundle and which tools and interventions may be optimal in your local care context. We welcome all feedback so we can iteratively update the toolkit to highlight new interventions, clarify existing ones, and generally make the toolkit more user-friendly and helpful. Please send any questions, comments, or overviews of what your institution implemented to Lindsey Kreutzer (lkreutzer@isqic.org).

Implementing an SSI Bundle

Utilizing a systematic approach to decrease complication rates

Surgical site infection (SSI) is a complex problem with many different contributing factors that cross multiple phases of care. Therefore, utilizing a bundled set of best practices can be an effective means to decrease SSI rates.[1-3] For the year three Collaborative Quality Improvement Project, ISQIC will utilize the Mantyh protocol, a validated SSI protocol from Duke University shown to be effective in peer-reviewed journal publications. Implementing the bundle will allow ISQIC hospitals to provide best practice care to reduce SSI and ensure care is standardized across providers. For more information on the rationale for utilizing this specific bundle, see page 6 or click ***here***.

Assembling a multi-disciplinary team

Given that effective SSI reduction bundles cross multiple phases of care and require buy-in from a variety of groups, **it is imperative to form a multi-disciplinary team**. As you've learned through the ISQIC quality and process improvement curriculum, a project team with defined ownership, accountability, and role definitions is critical to success. Teams consist of sponsors, process and improvement leaders, and other members. For a reminder of their roles as defined in the ISQIC curriculum, click ***here.***

Team members are responsible for contributing to the project's direction and implementation; therefore, it is important to ensure teams represent multiple disciplines and include most, if not all, of the relevant stakeholders. In addition to your ISQIC team, you may want to consider inviting a representative from some or all of these cohorts, along with others based on your local care context: surgeons, anesthesiologists, OR managers, educators, in- and out-patient nurses, patient safety representatives, and pre-, intra-, and post-operative services representatives.

Challenges to buy-in

One of the most common questions the ISQIC Coordinating Center has received about the ISQIC SSI reduction bundle is whether there is literature to support each bundle component. The bundle has been shown to be effective at decreasing SSI rates *when all components are utilized together*; however, when components are used singularly or smaller groups in tandem they are less effective. Therefore, it is important to maintain that the literature supports the bundle overall. Publications supporting the bundle are included on page 6 (or click ***here***) and may be useful in presenting a case for buy-in at your institution.

The Mantyh Protocol

The Mantyh protocol was selected for use by the entire collaborative because it has been validated, shown to be effective, has a precedent for implementation at other institutions, and provides a cost-effective set of interventions. We recognize that hospital finances are complex but it is important to remind your hospital's leadership of the potential cost savings from decreased SSI rates, as outlined in the manuscript by Mantyh and colleagues referenced below.

Supporting Literature

Click on the publication title below to access the article providing support for the bundle. Please note that this is a selection of articles but is not all inclusive.

- The Preventive Surgical Site Infection Bundle in Colorectal Surgery An Effective Approach to Surgical Site Infection Reduction and Health Care Cost Savings
  Jeffrey E. Keenan, MD; Paul J. Speicher, MD; Julie K. M. Thacker, MD; MonicaWalter, DNP; Maragatha Kuchibhatla, PhD; Christopher R. Mantyh, MD

- Evidence for a Standardized Preadmission Showering Regimen to Achieve Maximal Antiseptic Skin Surface Concentrations of Chlorhexidine Gluconate, 4%, in Surgical Patients
  Charles E. Edmiston Jr, PhD; Cheong J. Lee, MD; Candace J. Krepel, MS; Maureen Spencer,MEd; David Leaper, MD; Kellie R. Brown, MD; Brian D. Lewis, MD; Peter J. Rossi, MD; Michael J. Malinowski, MD; Gary R. Seabrook, MD

- Impact of Non-rinse Skin Cleansing with Chlorhexidine Gluconate on Prevention of Healthcare-associated Infections and Colonization with Multi-resistant Organisms: a Systematic Review
  S. Karki, A.C. Cheng

- Combined Preoperative Mechanical Bowel Preparation With Oral Antibiotics Significantly Reduces Surgical Site Infection, Anastomotic Leak, and Ileus After Colorectal Surgery
  Ravi Pokala Kiran, MBBS, MS, FRCS, FACS, MSc (EBM), FASCRS, Alice C. A. Murray, BSc, MBBS, MRCS, Cody Chiuzan, PhD, David Estrada, MD, and Kenneth Forde, MD

- Combined Mechanical and Oral Antibiotic Bowel Preparation Reduces Incisional Surgical Site Infection and Anastomotic Leak Rates After Elective Colorectal Resection An Analysis of Colectomy-Targeted ACS NSQIP
  John E. Scarborough, MD, Christopher R. Mantyh, MD, PhD, Zhifei Sun, MD, and John Migaly, MD

- Oral Antibiotic Bowel Preparation Reduces Length of Stay and Readmissions after Colorectal Surgery
  Galina D Toneva, BS, Rhiannon J Deierhoi, MPH, Melanie Morris, MD, Joshua Richman, MD, PhD, Jamie A Cannon, MD, Laura K Altom, MD, MSPH, Mary T Hawn, MD, MPH, FACS

- Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery
  Dale W. Bratzler, E. Patchen Dellinger, Keith M. Olsen, Trish M. Perl, Paul G. Auwaerter,Maureen K. Bolon, Douglas N. Fish, Lena M. Napolitano, Robert G. Sawyer, Douglas Slain,James P. Steinberg, and Robert A. Weinstein

Protocol Overview

The following bundle should be implemented for all NSQIP elective open, laparoscopic, and robotic colectomy and proctectomy procedures (e.g. low anterior resection, abdominoperineal resection). Additional detail on the questions for abstraction can be found in the SSI Reduction Bundle Abstraction Guide available at isqicdata.org.

Preoperative (outpatient)

1. Oral antibiotics
2. Mechanical bowel preparation
3. Preoperative chlorhexidine skin cleansing day before surgery
4. Preoperative chlorhexidine skin cleansing day of surgery

Preoperative (inpatient)

5. Timely initial administration of appropriate SSI antibiotic prophylaxis
6. Same-day, preoperative, glycemic control for NSQIP-defined diabetics

Intraoperative (surgery)

7. OR traffic limited to essential personnel (policy-based component)
8. Surgical site hair clipping (no shaving) (policy-based component)
9. Proper wound classification(policy-based component)
10. Hand hygiene (policy-based component)
11. Timely intraoperative re-dosing of appropriate SSI antibiotic prophylaxis
12. Normothermia at surgery completion
13. Standardized intraoperative skin preparation with chlorhexidine and alcohol-based solution(s)
14. Wound protector utilization for all incisions
15. Utilization of a dedicated wound closure tray/instruments
16. Gown and glove change prior to wound closure
17. Re-draping prior to wound closure
18. Sterile occlusive incisional wound dressing placed in OR
19. Intraoperative glycemic control for NSQIP-defined diabetics

Postoperative (Inpatient)

20. Duration of SSI antibiotic prophylaxis is less than 24 hours
21. Removal of the original operating room incisional dressing on postoperative day 2
22. Daily chlorhexidine incision cleansing after dressing removal until discharge (but not to exceed postoperative day 7)

Resource Overview

If you are mainly interested in materials for a specific bundle component, please click on the material(s) listed under the component name to go directly to those pages in the toolkit. Additional references are located in the section on the Mantyh protocol and additional resources can be found in the ISQIC Case Studies section and in the appendices. Policy based bundle components are not included below.

Preoperative (outpatient)

1. Oral antibiotics
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    d. ISQIC Created Resource – Dictation Cues
2. Mechanical bowel preparation
    a. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    b. ISQIC Created resource - Pre-operative Bowel Prep Patient Education Handout Template
    c. ISQIC Created Resource – Dictation Cues
3. Preoperative chlorhexidine skin cleansing day before surgery
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Case Studies
    c. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    d. ISQIC Created Resource - Pre-operative Chlorhexidine Patient Education Handout Template
    e. ISQIC Created Resource – Dictation Cues
4. Preoperative chlorhexidine skin cleansing day of surgery
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Case Studies
    c. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    d. ISQIC Created Resource - Pre-operative Chlorhexidine Patient Education Handout Template
    e. ISQIC Created Resource – Dictation Cues

Preoperative (inpatient)

5. Timely initial administration of appropriate SSI antibiotic prophylaxis
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. ACS NSQIP – Best Practices Case Studies
    d. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    e. ISQIC Created Resource – Dictation Cues
6. Same-day, preoperative, glycemic control for NSQIP-defined diabetics
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. ACS NSQIP – Best Practices Case Studies
    d. ISQIC Created Resource – Dictation Cues

Intraoperative (surgery)

11. Timely intraoperative re-dosing of appropriate SSI antibiotic prophylaxis
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. ACS NSQIP – Best Practices Case Studies
    d. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    e. ISQIC Created Resource – Dictation Cues
12. Normothermia at surgery completion
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. ACS NSQIP – Best Practices Case Studies
    d. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    e. ISQIC Created Resource – Dictation Cues
13. Standardized intraoperative skin preparation with chlorhexidine and alcohol-based solution(s)
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Case Studies
    c. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    d. ISQIC Created Resource – Dictation Cues
14. Wound protector utilization for all incisions
    a. ISQIC Created Resource - Wound Protector Ordering Information
    b. ISQIC Created Resource – Dictation Cues
15. Utilization of a dedicated wound closure tray/instruments
    a. ACS NSQIP – Best Practices Case Studies
    b. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    c. ISQIC Created Resource – Dictation Cues
16. Gown and glove change prior to wound closure
    a. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    b. ACS NSQIP – Best Practices Case Studies
    c. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    d. ISQIC Created Resource – Dictation Cues
17. Re-draping prior to wound closure
    a. ACS NSQIP – Best Practices Case Studies
    b. ISQIC Created Resource – Dictation Cues
18. Sterile occlusive incisional wound dressing placed in OR
    a. ISQIC Created Resource – Dictation Cues
19. Intra-operative glycemic control for NSQIP-defined diabetics
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. ACS NSQIP – Best Practices Case Studies
    d. ISQIC Created Resource – Dictation Cues

Postoperative (Inpatient)

20. Duration of SSI antibiotic prophylaxis is less than 24 hours
    a. Safer Healthcare Now! – Preventing SSI Getting Started Kit
    b. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    c. ACS NSQIP – Best Practices Case Studies
    d. ISQIC Created Resource – Dictation Cues

21. Removal of the original operating room incisional dressing on post-operative day 2
    a. ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections
    b. ACS NSQIP – Best Practices Case Studies
    c. Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI
    d. ISQIC Created Resource – Dictation Cues
22. Daily chlorhexidine incision cleansing after dressing removal until discharge
    a. ACS NSQIP – Best Practices Case Studies
    b. ISQIC Created Resource – Dictation Cues

Existing SSI Reduction Toolkits

The toolkits highlighted in this section have been reviewed thoroughly by the ISQIC Coordinating Center. The highest quality toolkits are highlighted in this section. We believe that they have the highest potential for effective use because they contain practical examples and suggestions that can be tailored to your local care environment. Additional SSI reduction-related toolkits in appendix 1 provide additional resources that may be relevant to your hospital.

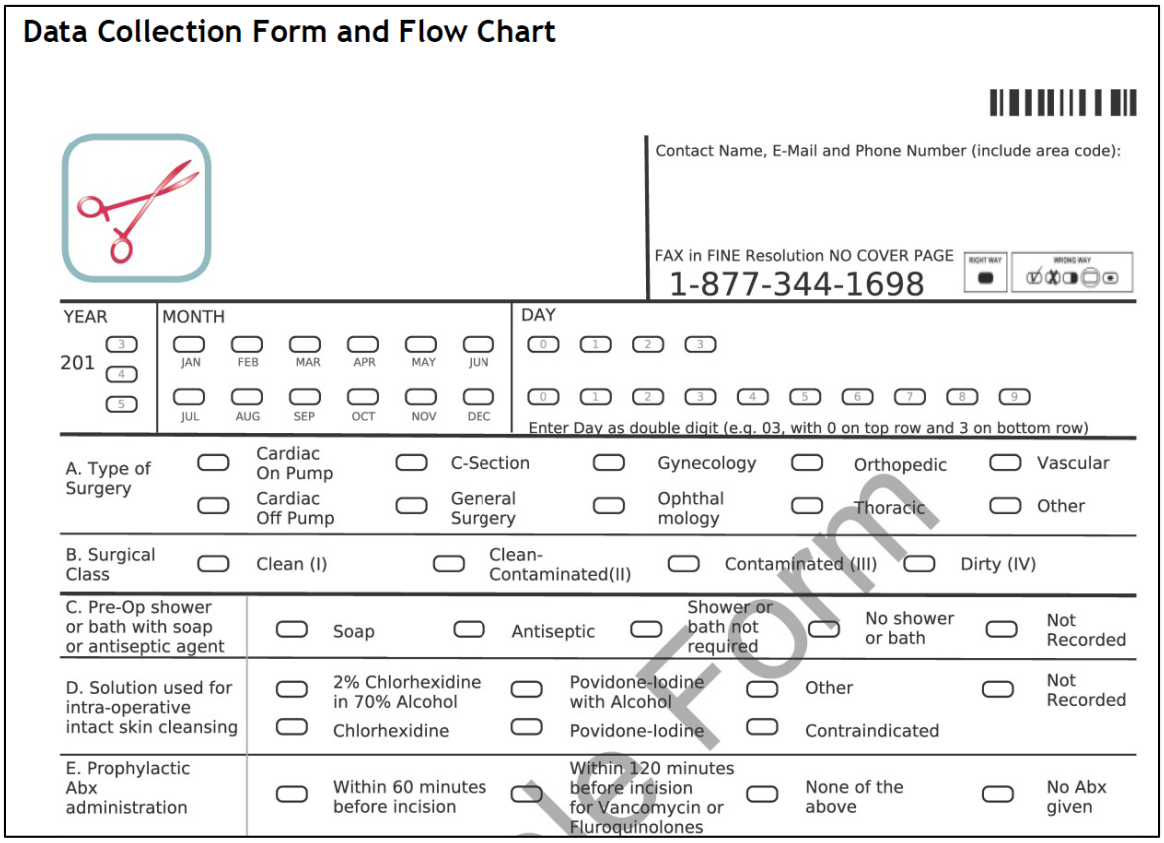
Safer Healthcare Now! – Preventing SSI Getting Started Kit

http://www.patientsafetyinstitute.ca/en/toolsResources/Documents/Interventions/Surgical%20Site%20Infection/SSI%20Getting%20Started%20Kit.pdf

The Getting Started Kit is an ideal resource for those people looking for an in-depth overview of SSIs and how to implement a bundle. The kit includes information on:

- Building buy-in
- Identifying evidence-based strategies for inclusion in the bundle
- Strategies for collecting data and measuring success.

Furthermore, the appendices provide concrete examples of data collection forms, measurement worksheets with corresponding run charts, and audit flow charts.



Data Collection Form and Flow Chart

Contact Name, E-Mail and Phone Number (include area code):

FAX in FINE Resolution NO COVER PAGE
1-877-344-1698

YEAR 201 3 4 5

MONTH: JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

DAY: 0 1 2 3 / 0 1 2 3 4 5 6 7 8 9

Enter Day as double digit (e.g. 03, with 0 on top row and 3 on bottom row)

A. Type of Surgery: Cardiac On Pump; Cardiac Off Pump; C-Section; General Surgery; Gynecology; Ophthalmology; Orthopedic; Thoracic; Vascular; Other

B. Surgical Class: Clean (I); Clean-Contaminated(II); Contaminated (III); Dirty (IV)

C. Pre-Op shower or bath with soap or antiseptic agent: Soap; Antiseptic; Shower or bath not required; No shower or bath; Not Recorded

D. Solution used for intra-operative intact skin cleansing: 2% Chlorhexidine in 70% Alcohol; Chlorhexidine; Povidone-Iodine with Alcohol; Povidone-Iodine; Other; Contraindicated; Not Recorded

E. Prophylactic Abx administration: Within 60 minutes before incision; Within 120 minutes before incision for Vancomycin or Fluroquinolones; None of the above; No Abx given

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ACS NSQIP – Best Practices Guidelines: Prevention of Surgical Site Infections

Access Best Practice Guidelines here

This best practices guide provides a simple background on SSI as well as strategies for prevention of SSI by phase of care (pre-, intra-, and post-operative). The guidelines further classify whether recommendations are patient- or provider-related. We recommend reviewing this guide if you are looking for practical action items and approaches, such as those included in the tables and appendices in the guideline material. Since this is a shorter guide it may be more useful to those who already have some knowledge about SSI reduction bundles and are looking for specific materials.

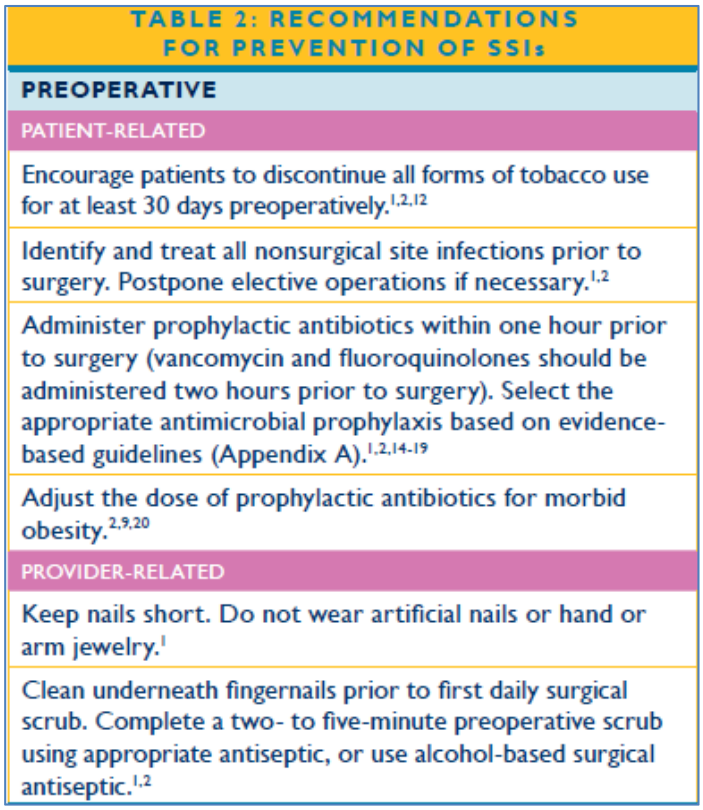

TABLE 2: RECOMMENDATIONS FOR PREVENTION OF SSIs

PREOPERATIVE
PATIENT-RELATED
Encourage patients to discontinue all forms of tobacco use for at least 30 days preoperatively.[1,2,12]
Identify and treat all nonsurgical site infections prior to surgery. Postpone elective operations if necessary.[1,2]
Administer prophylactic antibiotics within one hour prior to surgery (vancomycin and fluoroquinolones should be administered two hours prior to surgery). Select the appropriate antimicrobial prophylaxis based on evidence-based guidelines (Appendix A).[1,2,14-19]
Adjust the dose of prophylactic antibiotics for morbid obesity.[2,9,20]
PROVIDER-RELATED
Keep nails short. Do not wear artificial nails or hand or arm jewelry.[1]
Clean underneath fingernails prior to first daily surgical scrub. Complete a two- to five-minute preoperative scrub using appropriate antiseptic, or use alcohol-based surgical antiseptic.[1,2]

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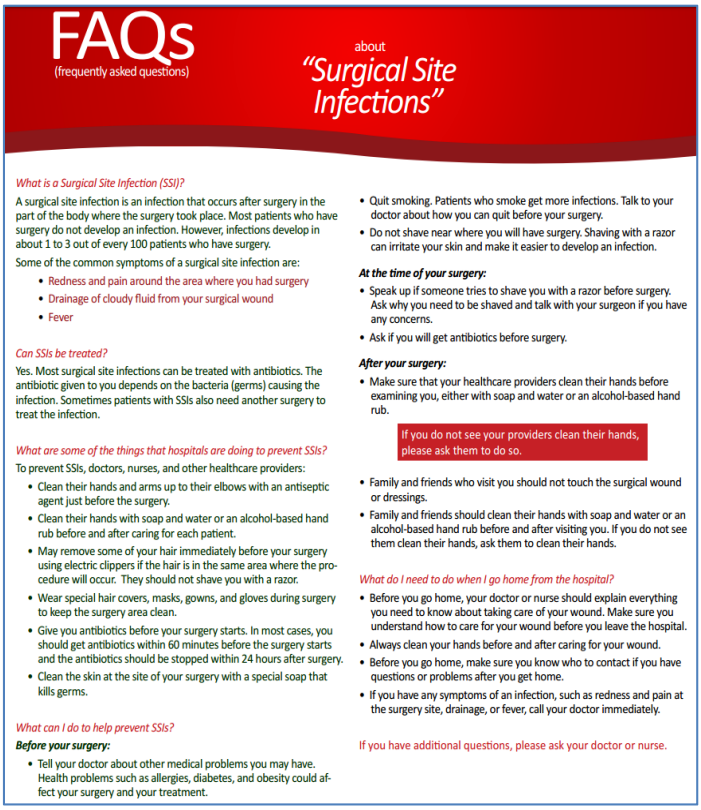

FAQs (frequently asked questions) about *"Surgical Site Infections"*

What is a Surgical Site Infection (SSI)?

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Most patients who have surgery do not develop an infection. However, infections develop in about 1 to 3 out of every 100 patients who have surgery.

Some of the common symptoms of a surgical site infection are:

- Redness and pain around the area where you had surgery
- Drainage of cloudy fluid from your surgical wound
- Fever

Can SSIs be treated?

Yes. Most surgical site infections can be treated with antibiotics. The antibiotic given to you depends on the bacteria (germs) causing the infection. Sometimes patients with SSIs also need another surgery to treat the infection.

What are some of the things that hospitals are doing to prevent SSIs?

To prevent SSIs, doctors, nurses, and other healthcare providers:

- Clean their hands and arms up to their elbows with an antiseptic agent just before the surgery.
- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for each patient.
- May remove some of your hair immediately before your surgery using electric clippers if the hair is in the same area where the procedure will occur. They should not shave you with a razor.
- Wear special hair covers, masks, gowns, and gloves during surgery to keep the surgery area clean.
- Give you antibiotics before your surgery starts. In most cases, you should get antibiotics within 60 minutes before the surgery starts and the antibiotics should be stopped within 24 hours after surgery.
- Clean the skin at the site of your surgery with a special soap that kills germs.

What can I do to help prevent SSIs?

Before your surgery:

- Tell your doctor about other medical problems you may have. Health problems such as allergies, diabetes, and obesity could affect your surgery and your treatment.
- Quit smoking. Patients who smoke get more infections. Talk to your doctor about how you can quit before your surgery.
- Do not shave near where you will have surgery. Shaving with a razor can irritate your skin and make it easier to develop an infection.

At the time of your surgery:

- Speak up if someone tries to shave you with a razor before surgery. Ask why you need to be shaved and talk with your surgeon if you have any concerns.
- Ask if you will get antibiotics before surgery.

After your surgery:

- Make sure that your healthcare providers clean their hands before examining you, either with soap and water or an alcohol-based hand rub.

If you do not see your providers clean their hands, please ask them to do so.

- Family and friends who visit you should not touch the surgical wound or dressings.
- Family and friends should clean their hands with soap and water or an alcohol-based hand rub before and after visiting you. If you do not see them clean their hands, ask them to clean their hands.

What do I need to do when I go home from the hospital?

- Before you go home, your doctor or nurse should explain everything you need to know about taking care of your wound. Make sure you understand how to care for your wound before you leave the hospital.
- Always clean your hands before and after caring for your wound.
- Before you go home, make sure you know who to contact if you have questions or problems after you get home.
- If you have any symptoms of an infection, such as redness and pain at the surgery site, drainage, or fever, call your doctor immediately.

If you have additional questions, please ask your doctor or nurse.

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Existing SSI Case Studies

Similar to the previous section on existing toolkits, these case studies have been reviewed by the ISQIC Coordinating Center. We think these case studies can provide valuable examples of how other institutions have implemented SSI bundles and projects related to SSI reduction. We hope these case studies will highlight the lessons learned by other groups and provide more examples of how you can impact SSI rates at your institution utilizing a variety of approaches.

ACS NSQIP – Best Practices Case Studies

https://www.facs.org/~/media/files/quality%20programs/nsqip/nsqip%20best%20practice%20v_4.ashx

Pages 7-28 of this document focus on SSI but we suggest that you read the Mayo Clinic Rochester Methodist Hospital Case Study (pages 17-28). This particular case study is an excellent illustration of the project process, starting with identification of the local problem and a review of baseline data, followed by a section on implementing a QI activity based on the data, and finally results of the initiative and cost savings. Furthermore, since ACS NSQIP created this collection of case studies, the ACS NSQIP variables affected by the SSI intervention are clearly identified. We particularly like that this document includes an example of the cost savings calculation used to justify the intervention as well as tips for others tackling a similar quality improvement project.

TOTAL CASES		< == PROJECTED SSIS == >			
		Total	Superficial	Organ Space	Deep
2010 (Baseline)		250	132	118	0
2012		124	44	53	(27)
		126	88	65	(27)
			$2,000	$14,000	$12,000
			$176,000	910,000	($324,000)
					$762,000

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G. TIPS FOR OTHERS

- Set a shared goal
- Multidisciplinary approach is essential
- Reliable, timely, and actionable data is needed
- Not a one-size-fits-all process
- Look at the entire episode of care and optimize each element
- Understand the current practice
- Introduce elements of change and audit compliance
- Build improvements into the system to increase compliance

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Joint Commission Center for Transforming Health Care – Reducing Colorectal SSI

https://www.centerfortransforminghealthcare.org/assets/4/6/SSI_storyboard.pdf

This case study outlines a project undertaken at 7 hospitals to decrease the colorectal SSI rate at their institutions. The steps involved in the process are well laid out and the case study highlights the importance of data and sustainability to ensure success. Furthermore, the case study includes valuable concrete information such as targeted solutions for specific contributing factors and types of data collection.

Contributing Factors	Targeted Solutions
Preadmission, preoperative to intraoperative care processes	
All types of SSIs Inconsistent infection prevention practices (based on protocol or best practices) for surgery preparation.	• Standardize the preoperative skin cleansing orders for all colorectal patients. • Establish policy and protocol to standardize surgical preparation practices for use of the skin disinfection agent and who can perform the skin prep. • Hair removal takes place in the preoperative holding area (instead of in the OR).
Preoperative to intraoperative care processes	
All types of SSIs Inadequate administration of antibiotic(s) to patient.	• Establish weight-based antibiotic(s) dosing protocol for colorectal surgeries. • Program documentation software to automatically prompt intraoperative re-dosing of antibiotic(s) if surgery is longer than 3 or 4 hours (timing determined by the hospital). Build a real-time prompt into anesthesiology's documentation system to ensure compliance, to indicate the time that the first dose was administered, and to remind staff about re-dosing at the 3rd or 4th hour from incision time.
Preoperative, intraoperative to postoperative care processes	
All types of SSIs	
Patient's core temperature was not consistently maintained at the recommended range for optimal wound healing and infection prevention.	• Initiate preoperative warming interventions. • Establish protocol to standardize warming interventions in the OR.

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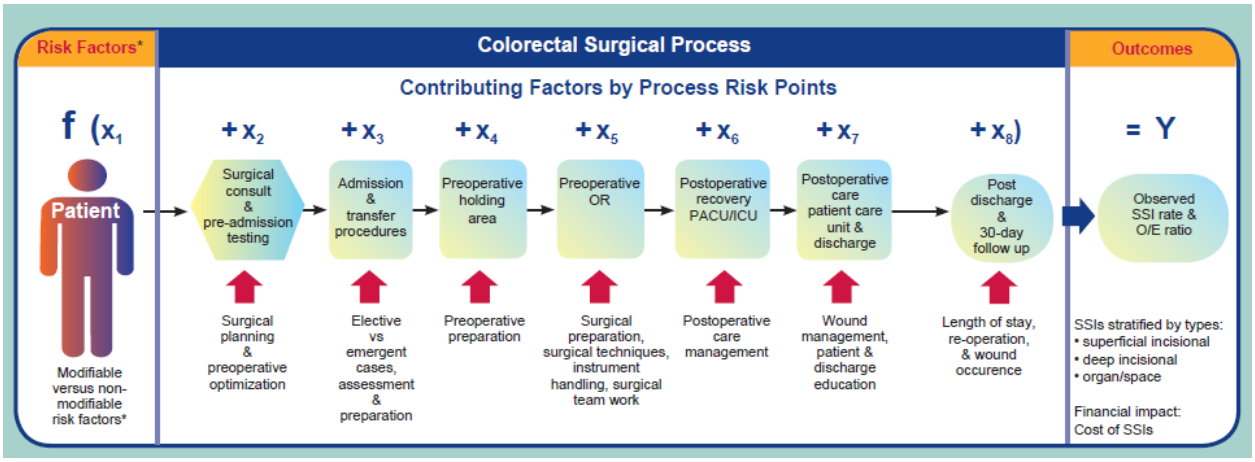

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ISQIC- Created Resources

The resources listed below were created by the ISQIC Coordinating Center to assist your hospital in implementing the SSI Reduction Bundle. Click on the bulleted name of an item to open the item as a PDF. You can also access the resources in Word or PowerPoint format at isqicdata.org within the ISQIC Documents tab.

- Introduction to the SSI Reduction Bundle Letter Template
  Briefly introduces surgeons and staff to the SSI Reduction Bundle.

- Introduction to the SSI Reduction Bundle PowerPoint Template
  This presentation can be utilized to introduce the bundle to staff and surgeons at your hospital to assist you in obtaining buy-in.

- Wound Protector Ordering Information
  Includes information on multiple sizes.

- Pre-operative Chlorhexidine Patient Education Handout Template
  Template for handout on preoperative washing with chlorhexidine that can be distributed at the pre-op clinic visit. This template applies to showers but your institution may use different modes for having patients get chlorhexidine on their bodies the day before surgery so you should modify the template as needed.

- Pre-operative Bowel Prep Patient Education Handout Template
  Template for handout on bowel prep that can be distributed at the pre-op clinic visit. There are many types of bowel prep available and patient instructions differ from product to product; therefore, the template should be updated accordingly. This template is for large volume PEG and may need to be modified if different products are chosen.

- Dictation Cues
  Cues that a surgeon can utilize to dictate information related to the bundle into their operative note. This is intended to assist hospitals that have not been able to develop a robust infrastructure to collect the data for the SCR to abstract.

ISQIC Hospital Case Studies

Northwestern Medicine Delnor Hospital

Project Overview

Delnor Hospital's project began with a meeting of the Northwestern Medicine Hospital Surgical Collaborative, at which all 5 hospitals in the Northwestern Medicine system decided that they would focus on SSI related to bowel resection. The system created an evidence-based SSI reduction bundle for bowel resection with 17 elements. The elements of the bundle are as follows:

1. Metronidazole 1000 mg PO at 12:00, 1800, 2300
2. Neomycin 1000 mg PO at 1200, 1800, 2300
3. Polyethylene glycol 4L started by 1600
4. Chlorhexidine wipes at home night before surgery
5. Chlorhexidine wipes am of surgery (Delnor decided to do them in pre-op/holding area instead of patient doing them at home)
6. SCIP compliant antibiotic chemoprophylaxis
7. OR traffic limited to essential personnel
8. Surgical site hair clipping (hair removal performed with clippers)
9. Proper skin preparation (2% chlorhexidine/70% isopropyl alcohol skin preparation, allowed to dry 3 minutes prior to draping or betadine/ray-tek/loban over abdomen if any stoma in field)
10. Wound protector for all incisions
11. Dedicated wound closure tray, gown/glove change, re-draping (Delnor decided to separate the closure instruments at the start of the case and put them on a separate mayo stand instead of a dedicated tray, and instead of re-draping they opted for applying fresh towels around incision prior to closure.)
12. Sterile occlusive dressing x 48 hours
13. Intra-operative normothermia (≥ 36◦C)
14. Intra-operative euglycemia for diabetics (< 200 mg/dl)
15. 23 hours of SSSI prophylaxis (antibiotics discontinued before 24 hours)
16. Removal of occlusive dressing within 48 hours
17. Daily wound wipe (chlorhexidine cloths) once dressing is removed for one week

Implementation

Delnor Hospital implemented the bundle April 1, 2016. As of September 14, 2016, 36 colon operations were performed, of which adherence data was abstracted for 25 cases.

For those 25 they are 100% compliant on accuchecks pre and during, acceptable antibiotic and given correctly, pacu temp being within parameters, separate closure tray/instruments used, using correct prep and letting it dry 3 minutes.

They plan to improve on wound protector (3/25 didn't use), gown and glove change (4/25 didn't change), oral antibiotics (2/25 didn't do), bowel prep (1/25 didn't do), CHG baths am and night before (1/25 didn't do) and dc antibiotics by 24 hours (1/25). Additionally, redraping of incision prior to closure didn't happen 7/25 times, 4 times the wrong dressing was used, 10/25 times the dressing hasn't been removed at 48 hours and 19/25 times no chg bath after dressing removal.

Lessons Learned and Recommendations from Delnor Hospital

- *Make sure you have the buy-in from everyone and that the surgeon leading the team can speak to the 'why' of the bundle.*
  We have 3 surgery groups that perform elective colectomies here at Delnor and all 3 groups were invited to be at the meetings. We have a relatively low number of elective colectomies that are done here (63 for 2015) and only have 4 that have come back with an SSI. Our surgeon leading the team was able to explain that having such a small number of cases means that even one case of SSI will have a large impact on the infection rates.

- *We realized that surgeons and nursing have different expectations, so we had representation across the table for this team.*
  One mistake we made was we didn't include our Professional development team (nursing educators) in the early on stages and actually added them after we had education for the nursing units already completed. They would have been helpful to have at the table from the beginning.

Materials Available in this Toolkit

Click on the bulleted phrase to open the item

- Patient/family education regarding the Chlorhexidine cloths they will be using at home to clean their incisions after discharge
- Elective Bowel Resection Checklist for case auditing
- SBAR communication to staff regarding the elective colectomy bundle
- Delnor Hospital's project plan

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Project Overview

- According to NSQIP data, in early 2013 the SSI rate among 81 colon procedures (01/01/12 – 12/31/12) was 30.9%.
- Our QI Initiative began on 06/16/13 and was limited to elective colectomy procedures for control purposes.
- In effort to improve surgical care we set a goal to decrease the SSI rate by at least 50% within 12 months.
- After performing a Literature Search of minimally 18 peer-reviewed articles and reviewing Standards of Practice, we began a Process Improvement Charter to collaborate efforts to reduce our SSI.
- A Colorectal SSI Reduction BUNDLE Plan was drafted that consisted of detailed activities in 4 distinct areas: Preop, Intraop, Postop, and Post-hospital.
- We ensured interdisciplinary consultation and collaboratively defined practice changes.
- We developed communication tools, educated colleagues regarding practice changes, and marketed the project launch date throughout perioperative services.
- Compliance to the care bundle was tracked and audited using the Cerner SharePoint site and monthly metrics were reviewed with the stakeholders/process owners.
- At 8 months we had a real time SSI rate of 12% among 41 Colon procedures – a decrease > 50% in our Colon SSI rate.
- Our SSI rate continued to decrease to 5.49% (ACS NSQIP Semiannual Report – July 2015)
- But our progress has slipped very slightly to 6.45% (6 events out of 93 cases), as shown by our most recent ACS NSQIP Semiannual Report (January 2016).
- We recognize that in order to achieve sustainability we must have ongoing evaluation, monitoring, and process modification when and where appropriate.
- We have just recently refocused our efforts in these areas with new energy.

What's Next

- Our lead colon surgeon is championing the ERACS (Early Recovery After Colon Surgery) Program which launched at the beginning of March (2016).
- The primary aim of ERACS is to decrease Length of Stay for Colorectal Surgery patients.
- This launch provided an excellent platform to revisit our Colorectal SSI Reduction BUNDLE with re-education of staff in the OR directed specifically at proper utilization of Bowel Technique and coordination among all four perioperative domains regarding updates to the BUNDLE Checklist and data collection.

Goal

- Achieve a 5% Colorectal SSI rate decrease by June 30, 2016, as reflected in the January 2017 ACS NSQIP Semiannual Report.
- Reduce Colorectal LOS from 18% to 12% by June 30, 2016, as reflected in the January 2017 ACS NSQIP Semiannual Report

Materials Available in this Toolkit

Click on the bulleted phrase to open the item

- SSI Prevention PowerPoint
- Surgical Site Infection Reduction Bundle: Colorectal Surgery
- 12 Warning Signs Patient Handout
- Colorectal Bundle Form
- ERACS: Enhanced Recovery After Colon Surgery Algorithm

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3. Keenan JE, Speicher PJ, Thacker JK, Walter M, Kuchibhatla M, Mantyh CR. The preventive surgical site infection bundle in colorectal surgery: an effective approach to surgical site infection reduction and health care cost savings. *JAMA surgery.* 2014;149(10):1045-1052.

Appendix

1. Additional Toolkits

a) Johnson & Johnson Health Care Systems, Inc. – Provider Resource on SSI
http://www.theinternalroadmap.com/_data/default-resource_file/0/302/018313-140714-709770-provider-resources-brochure-v2.pdf

This toolkit is organized by phase of care (pre-, intra-, and post- operative) and provides significant detail on the components within each phase. Additionally, measures are listed for each bundle component that can help achieve compliance with best practice care. These practical bullets are likely the most useful part of the toolkit.

b) Centers for Disease Control and Prevention – SSI Toolkit
http://www.cdc.gov/HAI/pdfs/toolkits/SSI_toolkit021710SIBT_revised.pdf

The CDC toolkit is presented as a slide deck and includes facts and figures ideally suited for presentations to increase buy-in for your SSI bundle.

c) Johns Hopkins Medicine – SSI Prevention Toolkit
https://armstrongresearch.hopkinsmedicine.org/csts/ssi/resources.aspx

The Johns Hopkins Medicine toolkit includes useful appendices such as fact sheets, guidelines, a presentation, and a quiz. Additionally, the site includes access to educational sessions (slides and audio).

d) Centers for Medicare and Medicaid Services – SSI Toolkit
http://www.mnreducinghais.org/documents/SSI_Toolkit_QIOs.doc

This resource is best utilized for the example materials including checklists and conversation templates.

e) Minnesota Hospital Association – Road Map to a Comprehensive SSI Prevention Program
http://www.health.state.mn.us/divs/idepc/dtopics/hai/ssi/toolkit/roadmap.pdf

The Road Map includes specific actions and audit questions for each component of their SSI bundle. It is a useful set of concrete materials that could be very helpful for a hospital trying to decide what actions to take.

f) US Department of Health & Human Services, Partnership for Patients – Implementation Guide to SSI and Safe Surgery
http://web.mhanet.com/ssi_change_package_508.pdf

This guide is most valuable for the resources and links. Additionally, there are examples of order sets and educational handouts included in the guide. Starting on page 12 there is a table that outlines the primary, secondary, and tertiary drivers associated with the aim of reducing SSI.

g) American Health Research & Educational Trust – Surgical Site Infections Change Package: 2016 Update.
http://www.hret-hen.org/topics/ssi/HRETHEN_ChangePackage_SSI.pdf

This change package includes strategies, action items, and concepts to implement SSI reduction interventions. Page 5 includes an overview of primary and secondary drivers along with change ideas for implementing bundle components. They also have an SSI Top Ten Checklist to identify process changes that are in place, not done, or that will be adopted. The checklist can be accessed **here**.

2. Frequently Asked Questions

Q: What product should be used in the event of a Chlorhexidine allergy?
A: In the event of a Chlorhexidine allergy, one should use Betadine prep. If there is also an allergy to Betadine prep, utilize 3% Chloroxylenol (PCMX) and scrub brushes.

Q: For the SCIP compliant antibiotic measure, please provide a list of antibiotics that are appropriate to use.
A: The Centers for Medicare and Medicaid have advised that the SCIP infection prevention measures have been retired, and thus the corresponding antibiotics lists were removed from the current specifications manuals. Your institution may already have an approved antibiotic list that is SCIP compliant. The 2013 multi-society surgical antibiotic prophylaxis guidelines are an excellent resource to determine appropriate antibiotics usage for your institution. We suggest reaching out to the Pharmacy at your institution for further information.

Q: Is it possible to survey the hospitals and find out who in the OR is documenting the "clean closure" protocol? Is it done by surgeons in the op reports, or by nursing in the OR record?
A: Documentation of the clean closure protocol can be accomplished by any means you see fit. Some institutions are changing intraoperative nursing documentation to better integrate to better integrate this process into routine work-flow. Some institutions may not find the time/energy necessary to change the EMR for this and may simply request surgeons to routinely note this in their dictations. Other institutions have developed paper tracking forms to accompany each patient. It is up to you and your assessment of your institution's capabilities and volumes. There is no *right* answer, just what works for your group.

Q: If colectomies are done with a small extraction site and the use of a wound protector, is it necessary to use the clean closure protocol? Our surgeons are not using it for laparoscopic/hand assist cases because the incisions are so small, and our infections are not happening at that site. Please advise.
A: Undoubtedly, wound infection rates are lower with laparoscopic surgery, but for the sake of standardization we'd suggest separate closing instruments are used for the skin closure. Plus, conversion rates for laparoscopic colectomy are not trivial, so one never know when one would need to convert to a laparotomy and have the clean instruments available. Once your team becomes accustomed to sequestering closing instruments (or having a separate tray) the process of using clean instruments is not terribly cumbersome.

Q: At the May 2016 conference, we were told by the guest speaker that there was a wound protector/drape large enough to accommodate laparotomy cases….can you get us that information?
A: Yes. The 3M 1075/76 Steri-Drape will fit most laparotomy wounds. For very large laparotomy wounds it can be moved around the incision. It is affordable, at a cost of approximately $6 USD.

Q: Regarding occlusive wound dressing, our practice here is to remove the dressing POD 2 if it's a simple occlusive tegaderm/opsite…however, wound vacs stay on for 5 days. Is that the practice for most hospitals, and if so, shall we exclude wound vacs for this variable?
A: It depends on the VAC you are using. The Acelity (former KCI) Prevena is a wound vac that goes on the outside of a closed wound. This is considered an occlusive dressing. A wound vac that is placed inside an open would be considered an open wound in terms of data recording.

Q: How do most hospitals plan on finding documentation that "OR traffic is kept to a minimum"? If your OR environmental policy states that OR traffic is kept to a minimum, would that be considered enough to answer YES to this variable?
A: Correct. This is a "policy" type bundle element, not a measured metric.

Q: Antibiotic prophylaxis administered one hour of incision…does that mean started or completed before incision?
A: Perioperative SSI prophylactic IV antibiotics must be started and finished within 60 minutes PRIOR to incision for most antibiotics.

For instance, an IV antibiotic that is "pushed" in entirety right before incision would be fine. Similarly, an IV piggyback that takes 15 minutes to run would be fine, provided it is completed in the 60 minute timeframe.

There are two exceptions: Vancomycin and some fluoroquinolones can require longer infusion times. In these rare situations, the drip can be started 120 minutes in advance, but should be completed within 60 minutes prior to making incision. The 2013 AHSA multi-society guideline article, which is attached to this bundle, provides specific dosing and timing strategies for an array of approved antibiotics.

Q: If a case is laparoscopic, the port sites are usually dressed with mastisol/steri strips….is the occlusive dressing needed on port sites?
A: For sake of standardization, we recommend that all incisions are dressed using occlusive dressings. Uniform policy makes it easier to implement, simplifies data collection, and eliminates decision making.

Q: What is the evidence for using occlusive dressing instead of permeable dressing?
A: Occlusive dressing for 48 hours is included in the Duke Mantyh et al. protocol. We are seeking to use affordable, simple, and standardized dressings for the sake of standardization and to best replicate the Mantyh protocol and their subsequent decrease in SSI rates.

3. Additional Resources

a) CDC - SSI Resource Page
http://www.cdc.gov/HAI/ssi/ssi.html

b) CMS – SSI Resource Page
https://partnershipforpatients.cms.gov/p4p_resources/tsp-surgicalsiteinfections/toolsurgicalsiteinfections.html

ISQIC Surgical Site Infection Reduction Bundle Toolkit