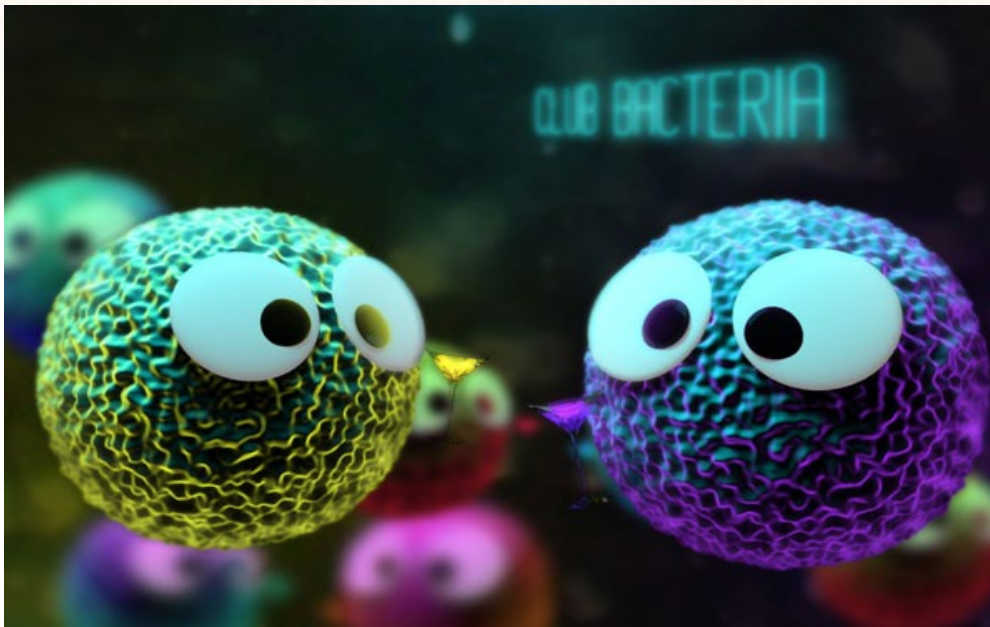


# Surgical Site Infection (SSI) Reduction Learning Module – Part II



*Created by MSQC for the purpose of initiating and maintaining Surgical Site Infection (SSI) Quality Improvement projects by hospitals in the Collaborative*



# Objectives

## Module I:

1. Define SSI
2. Conduct Data Drill Down
3. Develop SSI Reduction Team

## Module II:

4. Develop SSI Reduction Plan
5. Provide Resources for SSI Prevention

# Developing a SSI Reduction Plan

**Identify Risk Factors and determine which are modifiable**

**Utilize drill down data to identify priorities such as Procedure Type**

(examples: elective colorectal or emergent appendectomy) **&**

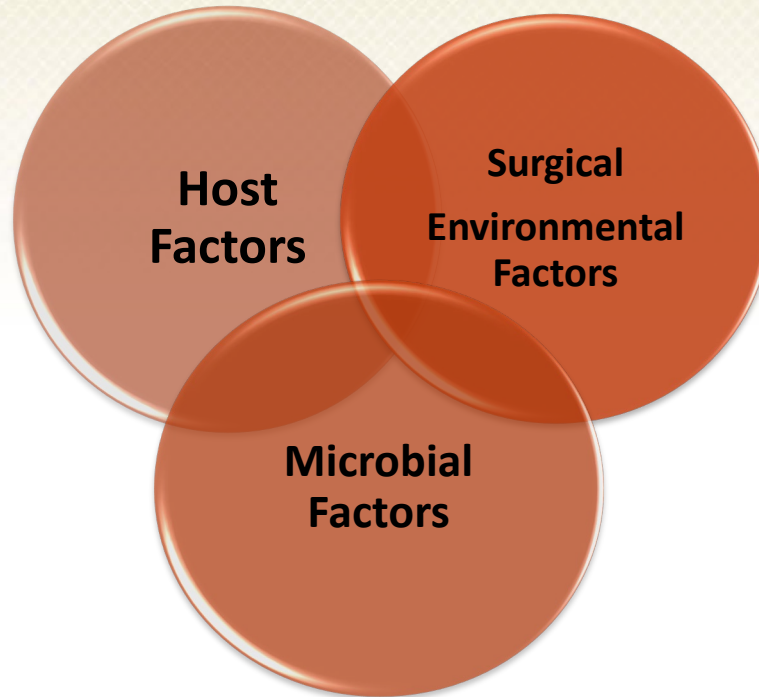
**Aspect of Care**

(examples: pre-habilitation or Intraoperative Care)

**Present findings to the SSI Team to target actions based on identified priorities**

# Risk Factors for SSI's

- Age
- Obesity
- Malnutrition
- Prolonged pre-operative stay
- Infection at distal sites
- Cancer
- Hyperglycemia
- Immune status
- ASA class
- Comorbidities
- Prior operations, revision vs. primary
- Smoking/Alcohol use



- Nasal/skin carriage
- Adherence
- Virulence
- Inoculum

- Wound classification
- Duration of surgery
- Urgency of surgery
- Procedure type
- Hair removal
- Intraoperative contamination (personnel, tools, equipment, supplies, traffic in the OR, closing procedure)
- Prophylactic antibiotics
- Surgical technique
- Surgeon volume
- Prior procedures
- Poor hemostasis
- Drains/foreign bodies
- Hypothermia
- Oxygenation
- Pre-operative screening for resistant organisms and decolonization

## Preoperative Phase

- Patient education
- Chlorhexidine shower
- Nutritional assessment
- Smoking cessation/"fast"
- Alcohol cessation
- Fluid management
- Glucose management (HA1c to <7%)\*
- Mechanical bowel prep with antibiotics (colectomy cases)
- Pre-warming of patients prior to surgery
- Hydration
- Identify/treat remote infections
- Pre-operative MRSA/MSSA screening & decolonization for selected procedures

**No single intervention will be sufficient to reduce SSI rates!**

## Intraoperative Phase

- Proper skin antiseptic and application
- Antimicrobial prophylaxis (Appropriate, weight based & re-dosing > 3-4 hours & for 1500cc blood loss)
- Fluid management
- Mechanical bowel prep with antibiotics (colectomy cases)
- Maintenance of normothermia
- Glucose management
- Minimally invasive
- Wound protector
- Blood loss management
- Minimize OR traffic
- Proper aseptic technique
- Maintain skin closure protocol
- Maintain level of administered oxygen (FIO2 80%)
- Never shave; use clippers if necessary

## Postoperative Phase

- Glucose management
- Dressing removal within 48 hours after surgery
- Control of postop nausea & vomiting (PONV)
- Pain management
- Early mobilization
- Early removal of urinary catheters
- Early removal of nasogastric tubes and wound drains
- Wound dressing protocols
- Maintain dry occlusive dressing
- Discontinue antimicrobial prophylaxis within 24 hours after surgery
- Patient education in wound care and signs/symptoms to report

# Colorectal Bundles

***“At present there is no consensus on what comprises the optimal colorectal surgical care bundle however, a systematic review suggests that a multidisciplinary approach, utilizing selective evidence-based core strategies along with adjunctive interventions that enhance wound defense mechanisms while limiting exogenous intraoperative contamination will result in a lowered risk of infection in the colorectal patient population.”***

*Charles E. Edmiston Jr., PhD CIC, Surgical Microbiology Research Laboratory, Medical College of Wisconsin, Milwaukee,*

## **Six modifiable process measures are independently associated with a reduced incidence of surgical site infection.**

After a comprehensive review of all MSQC colectomy data, we found that six different process measures (bundle elements) were independently associated with a reduced incidence of SSI.

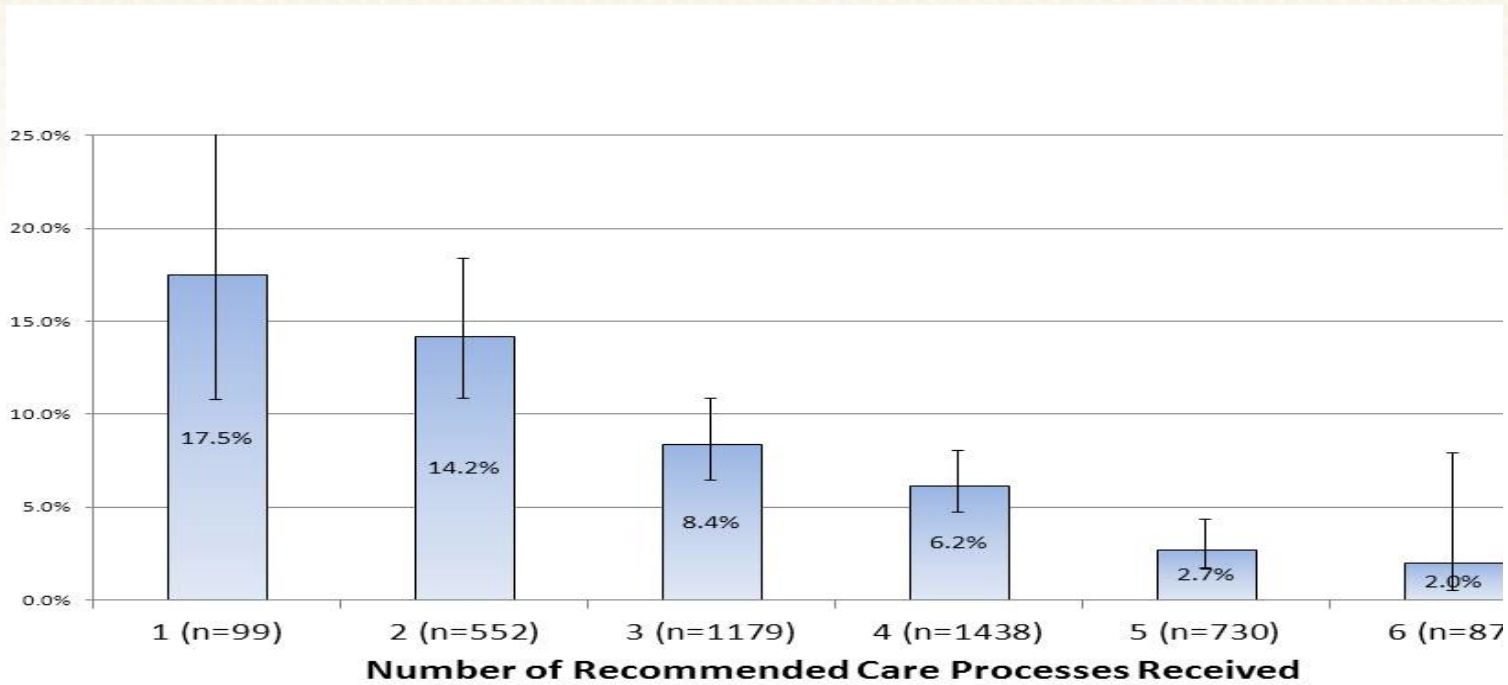
Figure 2: Surgical Site Infection Prevention Checklist

MSQC SSI Prevention Measures	
Appropriate (SCIP-2) selection of intravenous prophylactic antibiotics	✓
Postoperative normothermia (Temp >98.6F)	✓
Oral antibiotics with mechanical bowel prep	✓
Postoperative day 1 glucose less than or equal to 140 mg/dl	✓
Minimally invasive surgery	✓
Short operative duration (Incision to closure) <100 min	✓

Patients who received all 6 bundle elements had risk-adjusted SSI rates of 2.0% while patients who received only 1 bundle measure had SSI rates of 17.5% .

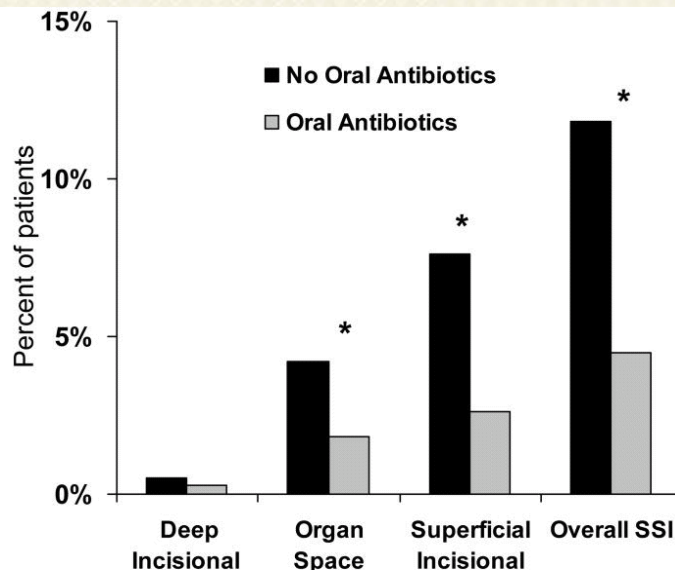
# MSQC Bundle Analysis

**Patients who received all 6 bundle elements had risk-adjusted SSI rates of 2.0% while patients who received only 1 bundle measure had SSI rates of 17.5% .**





## A mechanical bowel prep followed by oral non absorbable antibiotics is associated with fewer wound infections



\* P < 0.05

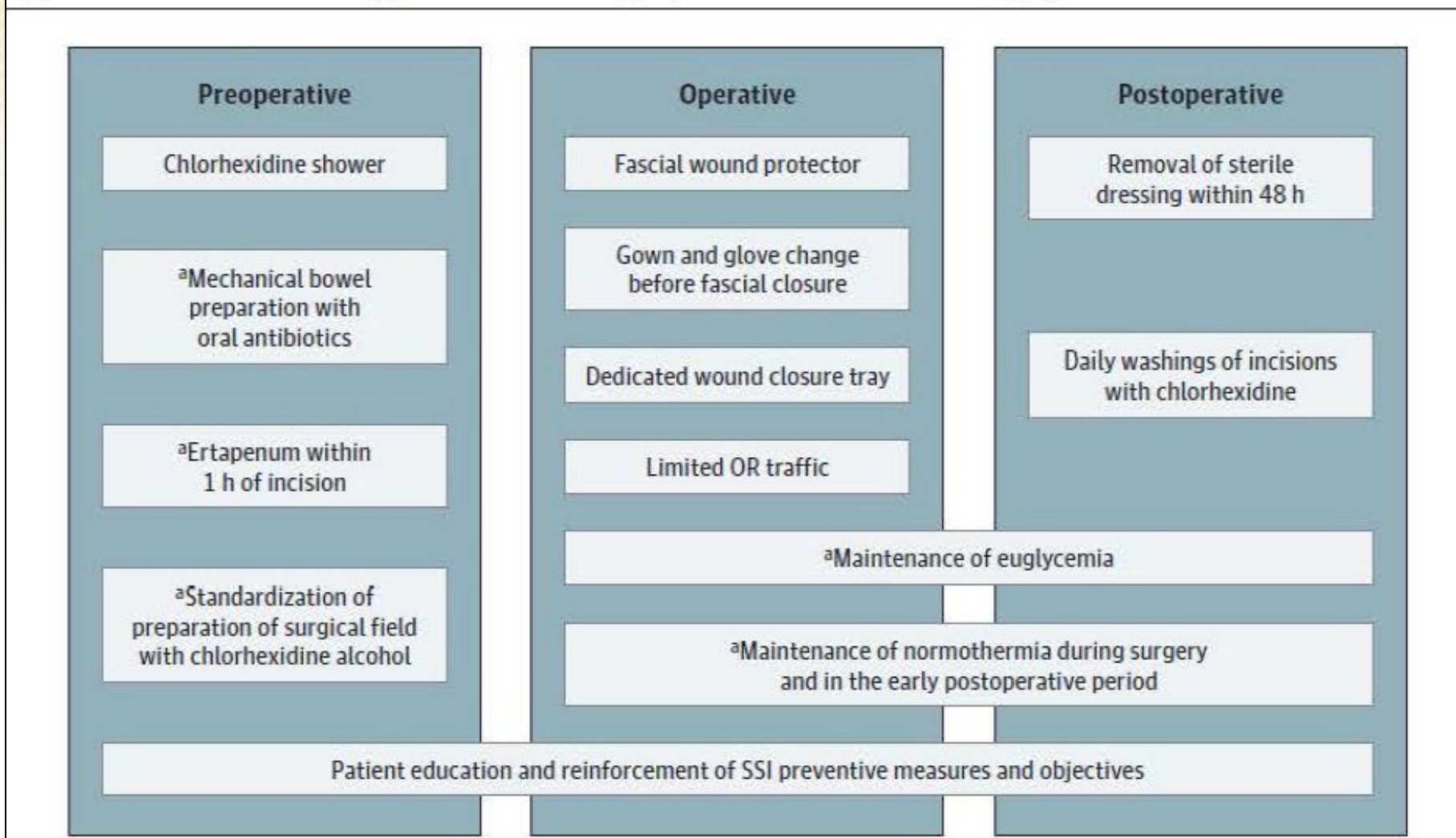
## Use of oral antibiotics was not associated with an increased risk of *Clostridium difficile* infection .

[Englesbe MJ, Brooks L, Kubus J, Luchtefeld M, Lynch J, Senagore A, Eggenberger JC, Velanovich V, Campbell DA Jr.](#) A statewide assessment of surgical site infection following colectomy: the role of oral antibiotics. *Ann Surg.* 2010 Sep;252(3):514-9; discussion 519-20. doi: 10.1097/SLA.0b013e3181f244f8.

[Krapohl GL, Phillips LR, Campbell DA Jr, Hendren S, Banerjee M, Metzger B, Morris AM.](#) Bowel preparation for colectomy and risk of *Clostridium difficile* infection. *Dis Colon Rectum.* 2011 Jul;54(7):810-7.

doi: 10.1007/DCR.0b013e3182125b55

Figure 1. The Preventive Surgical Site Infection (SSI) Bundle in Colorectal Surgery



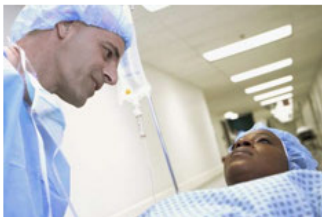
# Patient Education Example #1



Courtesy Meriter-UnityPoint Health

Although uncommon, infections sometimes happen after surgery, in the area of the body where the procedure took place. These are called surgical site infections, or SSIs.

You and your healthcare team can do many things before, during and after your surgery to make sure you have the best outcome possible. Ask your surgeon to check the items that are important for your type of procedure.



Courtesy Meriter-UnityPoint Health



Wisconsin Healthcare-Associated Infections Prevention Advisory Committee  
<http://www.dhs.wisconsin.gov/communicable/HAI/PDFs/2013HAICommittee.pdf>



Wisconsin Department of Health Services  
Division of Public Health



What I can do to prevent...

## Surgical Site Infections

...by working together with my healthcare team.



DPH photo

P-00695 (06/14)

<https://www.dhs.wisconsin.gov/publications/p0/p00695.pdf>

## Top 10 things my healthcare team can do to help prevent a surgical site infection

- Screen for staph bacteria.
- Provide chlorhexidine (CHG) soap or cloths to clean skin at home before surgery.
- Use clippers, not razors, if hair needs removing.
- Give antibiotics at the right time before surgery and again during surgery, depending on the procedure length.
- Adjust antibiotic amount according to weight, if necessary.
- Use an alcohol-based CHG skin prep in the operating room.
- Keep blood sugar levels below 200 mg/dl during and after surgery.
- Keep my body temperature and oxygen at recommended levels.
- Provide an oral CHG wash just before the procedure.
- Give clear instructions for home care and make sure I understand them.



Courtesy Moinlychke Health Care



Courtesy Meriter-UnityPoint Health

## Preventing surgical site infections



Courtesy Meriter-UnityPoint Health

### More information

**American College of Surgeons**  
<http://www.facs.org/patienteducation/surgery.html>

**Association for Professionals in Infection Control and Epidemiology**  
<http://consumers.site.apic.org/>

**Centers for Disease Control and Prevention**  
<http://www.cdc.gov/HAI/ssi/ssi.html>

**Institute for Healthcare Improvement**  
<http://www.ihl.org/Engage/Initiatives/Completed/ProjectJOINTS/Pages/default.aspx>

## Top 10 things I can do to help prevent a surgical site infection

- Use medicine for my nose before surgery if I test positive for staph bacteria.
- Take at least two showers with chlorhexidine (CHG) soap or use the CHG cloths at least twice before surgery, following all instructions.
- Do not shave around the surgical area for at least two days before surgery.
- Lose weight before surgery if I am overweight.
- Stop smoking before surgery and during my recovery.
- Ask my doctor about keeping my diabetes under control before, during and after surgery.
- Tell my doctor all the medicines (including vitamins) I take and how much caffeine and alcohol I use.
- Tell my doctor or nurse when I am in pain and take medicine as directed.
- Wash hands before changing dressings or touching the wound, keep my home clean, wear clean clothes, and keep pets away from the wound.
- Call my doctor if I have a fever, increased pain, drainage, redness or swelling around the incision.



DPH photo



DPH photo

# Patient Education Example #2

## 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.

Co-sponsored by:

Source for patients: [http://www.cdc.gov/HAI/pdfs/ssi/SSI\\_tagged.pdf](http://www.cdc.gov/HAI/pdfs/ssi/SSI_tagged.pdf)



**Blue Cross  
Blue Shield  
Blue Care Network**  
of Michigan

## Standardization of the Chlorhexidine Gluconate (CHG) Preadmission Shower Regimen

Include the following components in preadmission CHG shower regimens, as part of a comprehensive surgical site infection prevention program.

- 1 Use methods for reminding patients of the need to complete the shower regimens, using **electronic alert systems** (i.e., text messaging, emails, voicemails).
- 2 Emphasize the overall **benefits** of the preadmission antiseptic shower.
- 3 Provide both **oral and written instructions** to patients.
- 4 Define a **precise amount of CHG (mL)** used for each shower.
- 5 Tell patients to take a **60-second pause (time-out)** prior to rinsing.

Provided by:



**Quality Improvement Organizations**  
Sharing Knowledge. Improving Health Care.  
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[www.metastar.com/medicare](http://www.metastar.com/medicare)

- 6 Tell patients to **avoid application of lotions, creams, emollients, or perfumes** following CHG application. These products may mask or have an adverse pharmacologic effect on the antimicrobial activity of the CHG, and may also increase skin sensitivity.
- 7 Tell patients to **wear loose-fitting garments** following CHG application.
- 8 Tell patients to **rinse the CHG product immediately if significant burning or itching** occurs, and to report occurrence to their health care provider.
- 9 Tell patients to **keep CHG away from the eyes or ears**, and if exposed, rinse immediately.
- 10 **Provide the CHG product** to patients.
- 11 Include a **telephone number** for patients to call with questions or concerns.

Source:

Edmiston CE, Krepel CJ, Edmiston SE, Spencer M, Lee, CJ, Brown KR, Lewis BD, Rossi PR, Malinowski M, Seabrook GR. Empowering the Surgical Patient: A Randomized, Prospective Analysis of an Innovative Strategy for Improving Patient Compliance to the Preadmission Showering Protocol. In Press: J Am Coll Surgeons 2014

This material was prepared by MetaStar, the Medicare Quality Improvement Organization for Wisconsin, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy. 10SOW-WI-HAI-14-12.

# Chlorhexidine Showers

If patients are to use CHG prior to elective surgery –To maximize skin surface concentrations of CHG:

**Five separate components must be included:**

- A text or voicemail reminder to shower
- A standardized regimen – instructions
- Two Showers (Cleansings)– Night before/morning of Surgery
- A one minute time out before rinsing (4% only)
- A total volume of 4-ozs for each shower or 3 – 2% CHG cloths for each total body cleansing

***Remember: Patients may not realize the importance of showering, may forget, or think just one shower is sufficient***

***Edmiston and Spencer AORN 2014;100:590-602***

# Patient Education for Preoperative Cleansing

To access this template for free, visit <http://www.sageproducts.com/education/pdf/20786G.docx>

[Hospital Name]  
[This document should be customized to meet the needs of your facility, based on your patient preoperative skin preparation protocol.]

## Preparing the Skin Before Surgery

Preparing or "prepping" skin before surgery can reduce the risk of infection at the surgical site. To make the process easier, this facility has chosen disposable cloths moistened with a rinse-free, 2% Chlorhexidine Gluconate (CHG) antiseptic solution. The steps below outline the prepping process and should be carefully followed.

Prep the skin at the following time(s):

\_\_\_\_\_

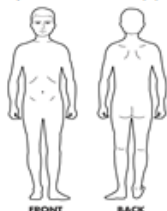
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Prep the circled area(s) only:



### Directions:

Once prepping with the 2% CHG cloths begins, do not shower, bathe or apply lotions, moisturizers or makeup. Water and ingredients commonly found in personal care products can reduce the antiseptic effects of CHG. Since CHG works best when left on the skin, do not rinse it off. If showering or bathing is desired, the water should be warm not HOT. Shower or bathe at least one hour before prepping skin for the first time. When applying CHG, your skin should be completely dry and cool. When applied to sensitive skin, CHG may cause skin irritation such as a temporary itching sensation and/or redness. Showering or shaving immediately before applying CHG may enhance this effect. Shaving should be suspended at least 2 days prior to surgery on all areas of the body, including the face, legs, underarms, etc. If itching or redness persists, rinse affected areas and discontinue use.

- ❑ To open the package(s): Holding top of package in one hand, lift flap on backside of package with other hand. Grasp flap at top and pull down to tear flap away and expose foam. Hold outside of package to present foam and cloths to prep table, avoiding contact between cloths and outside of package to reduce risk of cloth contamination.

[or, based on product configuration used:]

Using sterile scissors, cut off end seal of package. Transfer contents onto prep table, avoiding contact between cloths and outside of package to reduce risk of cloth contamination.



- ❑ Prepping the patient's skin: Prep the area(s) circled above. Avoid contact with eyes, ears and mouth. [Add prepping instructions here, based on facility protocol or individual patient needs.]
- ❑ Use all cloths in the package(s).
- ❑ Allow area to air dry for one minute. Do not rinse. It is normal for the skin to have a temporary "tacky" feel for several minutes after the antiseptic solution is applied.
- ❑ Place the Prep Check™ sticker(s) from the package on the bottom of this sheet as indicated.



Initials \_\_\_\_\_ Date \_\_\_\_\_

Initials \_\_\_\_\_ Date \_\_\_\_\_

20786G

## St. Luke Hospitals



### Preparing the Skin Before Surgery

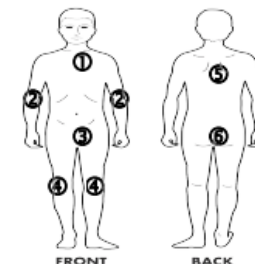
Preparing or "prepping" skin before surgery can reduce the risk of infection at the surgical site. To make the process easier, this facility has chosen disposable cloths moistened with a rinse-free 2% Chlorhexidine Gluconate antiseptic solution designed to reduce the bacteria on the skin. The steps below outline the prepping process and should be carefully followed.

### Prep the skin at the following time(s):

- If you wish to shower, bathe or shampoo your hair, do so several hours before you prep your skin the first time.
- Skin must be prepped on the **night before surgery** (approx. 7 p.m.) at your home. Skin must be prepped on the **morning of surgery**, also at home. Assistance may be required.

### Directions:

To open the packages: Remove the cellophane film and discard. Using scissors cut off end seal of all three packages.



### Prepping your skin the night before surgery:

- Do not shower, bathe or shampoo hair.
- Do not allow this product to come in contact with your eyes, ears, mouth and mucous membranes.
- Reaching into one of the three opened packages, remove two cloths at a time with the foam holder and place onto a clean table.
- Use one clean cloth to prep each area of the body in order as shown in steps 1 through 6. Wipe each area in a back-and-forth motion. Be sure to wipe each area thoroughly. Assistance may be required. Use all cloths in the packages.
- Do not rinse or apply any lotions, moisturizers or makeup after prepping.
- Discard cloths in trash can.
- Allow your skin to air dry. Dress in clean clothes/sleepwear.

### Prepping your skin on the morning of surgery:

- Do not shower, bathe or shampoo hair.
- Open a new package and follow the instructions listed above for the night before surgery.

1. Wipe your neck and chest.
2. Wipe both arms, starting each with the shoulder and ending at fingertips. Be sure to thoroughly wipe the arm pit areas.
3. Wipe your right and left hip followed by your groin. Be sure to wipe folds in the abdominal and groin areas.
4. Wipe both legs, starting at the thigh and ending at the toes. Be sure to thoroughly wipe behind your knees.
5. Wipe your back starting at the base of your neck and ending at your waist line. Cover as much area as possible. Assistance may be required.
6. Wipe the buttocks.

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Source: [sageproducts.com/product-preoperative-care/](http://www.sageproducts.com/product-preoperative-care/)



# O.R. Briefing/Debriefing

Use a checklist based on the World Health Organization (WHO) checklist to ensure compliance with best practices to improve surgical patient safety

Surgical Safety Checklist

World Health Organization  
A World Alliance for Safer Health Care

Patient Safety  
A World Alliance for Safer Health Care

**Before induction of anaesthesia**

**Before skin incision**

**Before patient leaves operating room**

(with at least nurse and anaesthetist)

**Has the patient confirmed his/her identity, site, procedure, and consent?**  
 Yes

**Is the site marked?**  
 Yes  
 Not applicable

**Is the anaesthesia machine and medication check complete?**  
 Yes

**Is the pulse oximeter on the patient and functioning?**  
 Yes

**Does the patient have a:**  
**Known allergy?**  
 No  
 Yes

**Difficult airway or aspiration risk?**  
 No  
 Yes, and equipment/assistance available

**Risk of >500ml blood loss (7ml/kg in children)?**  
 No  
 Yes, and two IVs/central access and fluids planned

(with nurse, anaesthetist and surgeon)

**Confirm all team members have introduced themselves by name and role.**

**Confirm the patient's name, procedure, and where the incision will be made.**

**Has antibiotic prophylaxis been given within the last 60 minutes?**  
 Yes  
 Not applicable

**Anticipated Critical Events**  
**To Surgeon:**  
 What are the critical or non-routine steps?  
 How long will the case take?  
 What is the anticipated blood loss?  
**To Anaesthetist:**  
 Are there any patient-specific concerns?  
**To Nursing Team:**  
 Has sterility (including indicator results) been confirmed?  
 Are there equipment issues or any concerns?

**Is essential imaging displayed?**  
 Yes  
 Not applicable

(with nurse, anaesthetist and surgeon)

**Nurse Verbally Confirms:**  
 The name of the procedure  
 Completion of instrument, sponge and needle counts  
 Specimen labelling (read specimen labels aloud, including patient name)  
 Whether there are any equipment problems to be addressed

**To Surgeon, Anaesthetist and Nurse:**  
 What are the key concerns for recovery and management of this patient?

- ✓ **Timing:** 1 hour prior to incision to maximize tissue concentration; 2 hours for Vancomycin & fluoroquinolones
- ✓ **Weight-based dosing** of preoperative antibiotic per AHSP/SHEA guidelines
- ✓ **Intra-operative re-dosing** antibiotic when:
  1. Procedure lasts longer than two half-lives of the drugs
  2. Procedure involves EBL>1500cc



Mangram, et al. Am J Inf Control. 1999. ACOG Practice Bulletin. No. 120. Obstet Gynecol. 2011. Bratzler, et al. Am J Health-System Pharm. 2013. Engelman, et al. Ann Thorac Surg. 2007 Van Shalkwyk, et al. JOGC. 2010. Bratzler, et al. Clinical Inf Diseases. 2004.

## ADULT DOSING AND REDOSING GUIDELINES FOR PROPHYLACTIC ANTIMICROBIALS DURING SURGERY<sup>a</sup>

ANTIMICROBIAL	PRE-OPERATIVE DOSE Pre-operative dose does not require adjustment for renal dysfunction	INTRAOPERATIVE RE-DOSING <sup>a</sup> Omit second re-dose in those with CrCL <50 mL/min or on hemodialysis	IV PUSH	INFUSION
Ampicillin	2 g	2 g every 2 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Ampicillin/sulbactam	3 g	3 g every 2 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Aztreonam	2 g	2 g every 4 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Cefazolin	2 g if <120kg, 3g if ≥120 kg	2 g (3g if ≥120 kg) every 4 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Cefuroxime	1.5 g	1.5 g every 4 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Cefoxitin	2 g	2 g every 2 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Cefepime	2 g	2 g every 4 hours for 2 re-doses	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Clindamycin	900 mg	900 mg every 6 hours for 2 re-doses	Not Recommended	30 min <sup>b</sup>
Daptomycin	6 mg/kg <sup>d</sup>	Not Recommended	2 min	30 min <sup>b</sup>
Piperacillin/tazobactam	4.5 gm	4.5 g every 2 hours for 2 re-doses	Not Recommended	30 min <sup>b</sup>
Metronidazole	500 mg	Not Recommended	Not Recommended	30 min <sup>b</sup>
Ceftriaxone	2 g	Not Recommended	3-5 min <sup>a</sup>	30 min <sup>b</sup>
Gentamicin	2 mg/kg <sup>c</sup>	2 mg/kg <sup>c</sup> every 8 hours for 2 doses	Not Recommended	30 min - 60 min
Vancomycin	1 g if <80kg, 1.5 g if ≥80 kg	1 g (1.5 g if ≥80 kg) every 8 hours for 2 doses	Not Recommended	60 - 120 min
Levofloxacin	500 mg	Not Recommended	Not Recommended	60 min <sup>b</sup>
Ciprofloxacin	400 mg	Not Recommended	Not Recommended	60 min <sup>b</sup>
Fluconazole	400 mg	Not Recommended	Not Recommended	120 min <sup>b</sup>

<sup>a</sup>Adapted from *Clinical Infectious Diseases* 2004;38:1706-15 and *Am J Health-Syst Pharm* 2013;70.

<sup>b</sup>Reconstituted dose injected directly into vein or via running IV fluids (only if IV piggyback not available).

<sup>c</sup>Intermittent IV infusion.

<sup>d</sup>Consider dosing gentamicin based on ideal body weight if patient is obese. Max dose 300mg.

<sup>e</sup>Daptomycin should be dosed on actual body weight except in patients with BMI ≥ 35 kg/m<sup>2</sup>, in which case adjusted body weight should be used.

# Glycemic Control

## Develop Glycemic Control Policy for Surgical Patients

### Pre-operative testing

**Diabetic Patients:** Hemoglobin A1C within 90 days of surgery date and blood sugar on day of surgery

**Non-Diabetic Patient Screening :** point of care glucose screening on day of surgery

**Exceptions** (types of surgery, BMI >30, etc.)

### Case postponement/cancellation

A1C, blood glucose level targets

**Design pre-operative process** for implementing procedure (PAT orders, notification of results to surgeon, PCP, anesthesia)

# Maintain Normothermia

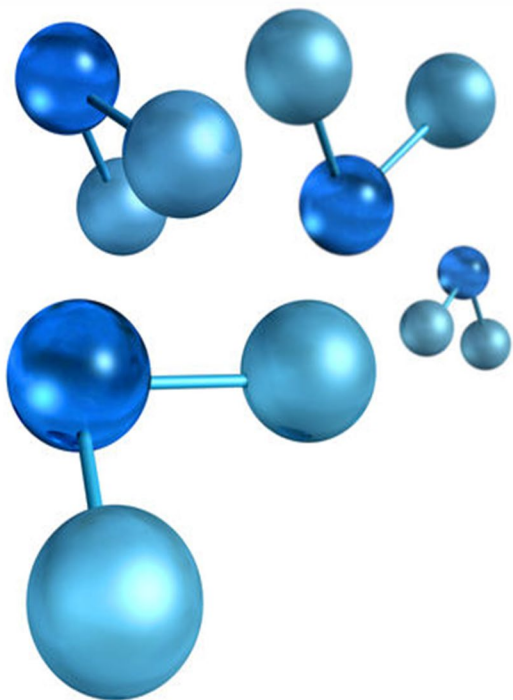
**Maintain normothermia (body temperature  $\geq 36^{\circ}\text{C}$  or  $96.8^{\circ}\text{F}$ ) preoperatively, intraoperatively and postoperatively**

## Hypothermia\*

- ✓ **May increase patient's susceptibility to perioperative wound infections by causing vasoconstriction with subsequent tissue hypoxia & impaired immunity**
- ✓ **Can increase blood loss and the need for transfusion during surgery**



# Optimize Tissue Oxygenation



“Low subcutaneous concentrations of oxygen at wound site impairs the antibacterial functions of neutrophils and promotes the development of wound infection”.

Most effective when combined with other strategies that improve oxygenation such as:

- Normothermia
- Appropriate fluid replacement.

# Minimizing Blood Transfusions

**Blood loss prevention** – avoid transfusion and reduce local bleeding

- Transfusions can increase infection risk due to immune suppressing effect
- Control of local bleeding post op (which can lead to increase in dead space and development of seroma and/or abscess)



# Wound Protector



- Reduces superficial surgical site infection
- 360° of wound protection
- Maximizes exposure, minimizes incision size
- Allows visualization of wound margins
- Frees up valuable hands during surgery

A meta-analysis of randomized clinical trials was conducted to evaluate whether wound protectors reduce the risk of surgical site infection (SSI) after gastrointestinal and biliary tract surgery.

**Conclusions:** Results suggest that wound protectors reduce rates of SSI after gastrointestinal and biliary surgery\*



# Closing Protocol for Type II Cases

- Steps for hemostasis, irrigation, etc. are completed with original instruments
- At time of fascia closure, remove all instruments used during the case
- If drains will be placed, do AFTER opening closing tray
- All staff change gloves
- Change gowns if soiled
- Closing pan opened
- New electro-cautery if needed for closure
- Re-block field with new towels

Mayo Clinic

wiseGEEK



Blue Cross  
Blue Shield  
Blue Care Network  
of Michigan

# Reduce Traffic in the OR

## WHY? Traffic increases SSI Opening OR door disrupts:

- heating, ventilation, air conditioning and critical environmental factors cannot be maintained
- pressurization, resulting in turbulent air flow that could increase airborne contaminants

**You cannot stop ALL of the traffic but do your best to *minimize* it.**

# Surgical Attire

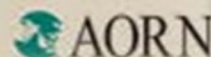
- Eliminate or cover cloth skull cap when in surgery
- Double gloving
- Change sterile gloves before closing
- Permit **ONLY** scrubs laundered by hospital



# What's Wrong with this Picture?



© AORN, Inc. 2009



Kerry Jones

# OR Environment

- Thorough cleaning and disinfection of perioperative areas is another important factor in your efforts to decrease SSI.
- A.O.R. N. has developed Perioperative Recommendations and cleaning checklists that can be used to evaluate your hospital's Policies and Procedures to evaluate if these are guidelines are adhered to.



# Environmental Cleaning in the OR

[Insert Facility Name Here]	
[Insert Other Information Here ]	
<b>Operating or Procedure Room Cleaning Checklist—Before First Case of the Day</b>	<b>Completed</b>
1. Remove unnecessary equipment.	
2. Damp dust from top to bottom:	
a. Overhead lights	
b. All reachable flat surfaces	
i. Furniture	
ii. Booms	
iii. Equipment	
iv. Countertops	
<b>Operating or Procedure Room Cleaning Checklist—End of Case (After the Patient Has Left the Area)</b>	<b>Completed</b>
1. Perform hand hygiene	
2. Don personal protective equipment (PPE)	
3. Collect linen	
4. Remove gross soil	
5. Remove large debris from floor	
6. Remove trash	
7. Clean and disinfect:	
a. Anesthesia cart and equipment (IV poles and pumps)	
b. Anesthesia machine	
c. Patient monitors	
d. OR beds	
e. Reusable table straps	
f. Bed attachments	
g. Positioning devices	
h. Patient transfer devices	
i. Overhead procedure lights	
j. Tables	
k. Mayo stands	
l. Mobile and fixed equipment	
i. Suction regulators	
ii. Medical gas regulators	
iii. Imaging monitors	



	iv. Radiology equipment	
	v. Electrosurgical units	
	vi. Microscopes	
	vii. Robots	
	viii. Lasers	
	8. Floors and walls if soiled or potentially soiled (splash, splatter or spray)	
	9. Remove PPE	
	10. Perform hand hygiene	
<b>Operating or Procedure Room Cleaning Checklist—Terminal Cleaning</b>		<b>Completed</b>
1. All floors-wet vacuum or a single-use mop		
2. Anesthesia carts and equipment		
3. Anesthesia machines		
4. Patient monitors		
5. OR beds		
6. Reusable table straps		
7. OR bed attachments		
8. Positioning devices		
9. Patient transfer devices		
10. Overhead procedure lights		
11. Tables and Mayo stands		
12. Mobile and fixed equipment		
13. Storage cabinets, supply carts, and furniture		
14. Light switches		
15. Door handles and push plates		
16. Telephones and mobile communication devices		
17. Computer accessories		
18. Chairs, stools, and step stools		
19. Trash and linen receptacles		
<b>Pre- and Postoperative Areas Cleaning Checklist—Patient Discharge</b>		<b>Completed</b>
1. Patient monitors		
2. Patient beds		
3. Over-bed tables		
4. Television remote		
5. Call lights		
6. Mobile and fixed equipment		
a. Suction equipment		
b. Medical gas regulators		
c. Imaging monitors		
d. Radiology equipment		



# Environmental Cleaning in the OR (cont.)

e. Warming equipment	
7. Floors and wall if soiled or potentially soiled (eg, splash, splatter, or spray).	
8. Patient transport vehicles including the straps, handles, side rails, and attachments should be cleaned and disinfected after each patient use.	

Pre- and Postoperative Areas Cleaning Checklist—Terminal Cleaning	Completed
1. All floors-wet vacuum or a single-use mop	
2. Patient monitors	
3. Patient beds	
4. Over-bed table	
5. Television remote controls	
6. Call lights	
7. Mobile and fixed equipment	
8. Storage cabinets, supply carts, and furniture	
9. Light switches	
10. Door handles and push plates	
11. Telephones and mobile communication devices	
12. Computer accessories	
13. Chairs and stools	
14. Trash and linen receptacles	



# OR Observations

Assessing practices related to SSI Prevention will help identify breeches & opportunities for improvement through education.

- ✓ Time out (Briefing/Debriefing)
- ✓ Aseptic technique maintained
- ✓ Adherence to skin prep procedure
- ✓ OR traffic minimized
- ✓ Adherence to closing procedure
- ✓ Room temperature
- ✓ Cleaning procedures





## One of the criteria for identifying an SSI includes:

“Organisms isolated from an aseptic culture of the incisional fluid or tissue”

- **PROPER TECHNIQUE** for obtaining a specimen is *crucial* to avoid false negative or positive results. Current best practice calls for the Levine technique as described in the Wound Culture Protocol (see next slide).
- **Please Note:** Culture wound prior to initiation of antibiotics if signs or symptoms of infection are present. If Culture and Sensitivity (C&S) is obtained after antibiotics have been started, list the antibiotic(s) on the laboratory C&S request.

# Obtaining a Wound Culture

## Procedure

1. Wash hands, apply gloves, remove soiled dressing and place in biohazard bag.
2. Cleanse wound by removing excess debris from the wound base by irrigating with normal saline. Thoroughly flush wound.
3. Gently wipe excess saline with a sterile gauze pad
4. Remove soiled gloves and cleanse with hand sanitizer
5. Apply sterile gloves
6. Moisten the culture swab with the 0.9% sodium chloride (a moist swab provides more accurate results than a dry swab).
7. Identify a small area (1 cm) of clean viable tissue and rotate the swab on it for 5 seconds while applying enough pressure to produce exudate. Avoid necrotic tissue and wound edges. A wound culture must be taken from clean tissue because pus or necrotic tissue will not provide an accurate profile of the microflora contained within the tissue.
8. Insert swab into the sterile container.
9. Redress the wound and perform hand hygiene.
10. Assess the patient and ensure that any wound pain has been managed. (This is done initially and again during the process.)
11. Complete the lab slip and/or electronic document, including wound site, time the specimen was collected, and any antimicrobials the patient is receiving.
12. Send the specimen to the lab immediately (within 1 hour) to keep the specimen stable. If specimen must be stored, refrigerate immediately after specimen collection.

**Sources:** Cross, HH, Obtaining a wound swab culture specimen, [Nursing](#). 2014 Jul;44(7):68-9

F.A. Davis Company, Wilkinson & Van Leuven/Procedure Checklists for Fundamentals of Nursing.

# MISSION: IMPOSSIBLE?



**SURGICAL**  
*Initiatives*

**ANESTHESIA**  
*Initiatives*

**HOSPITAL**  
*Initiatives*

# Lower SSI Rates

# Enhanced Recovery Program

## ERP can result in the Prevention of post op:

- Pneumonia (\$40,184)
- Wound infection (\$20,785)
- Sepsis (\$38,900)

## **THIS IS ACCOMPLISHED THROUGH:**

### Optimal Preparation for Surgery:

- Smoking cessation
- Incentive spirometry
- Progressive ambulation
- Nutrition
- Glycemic Control
- Alcohol cessation
- Exercise

### Advances in Anesthesia Management

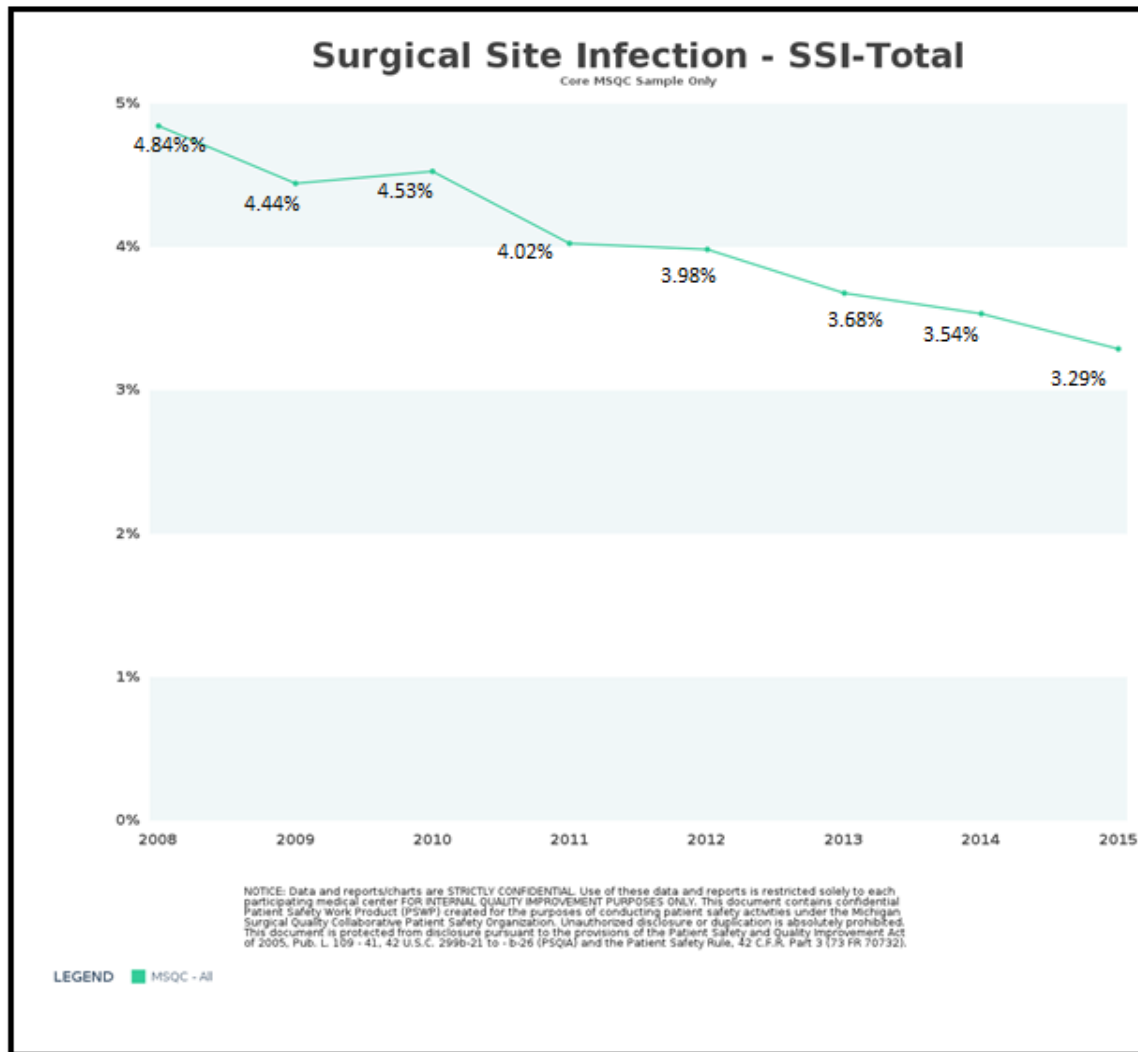
### Specific Quality Improvement protocols



# Monitoring Your Progress

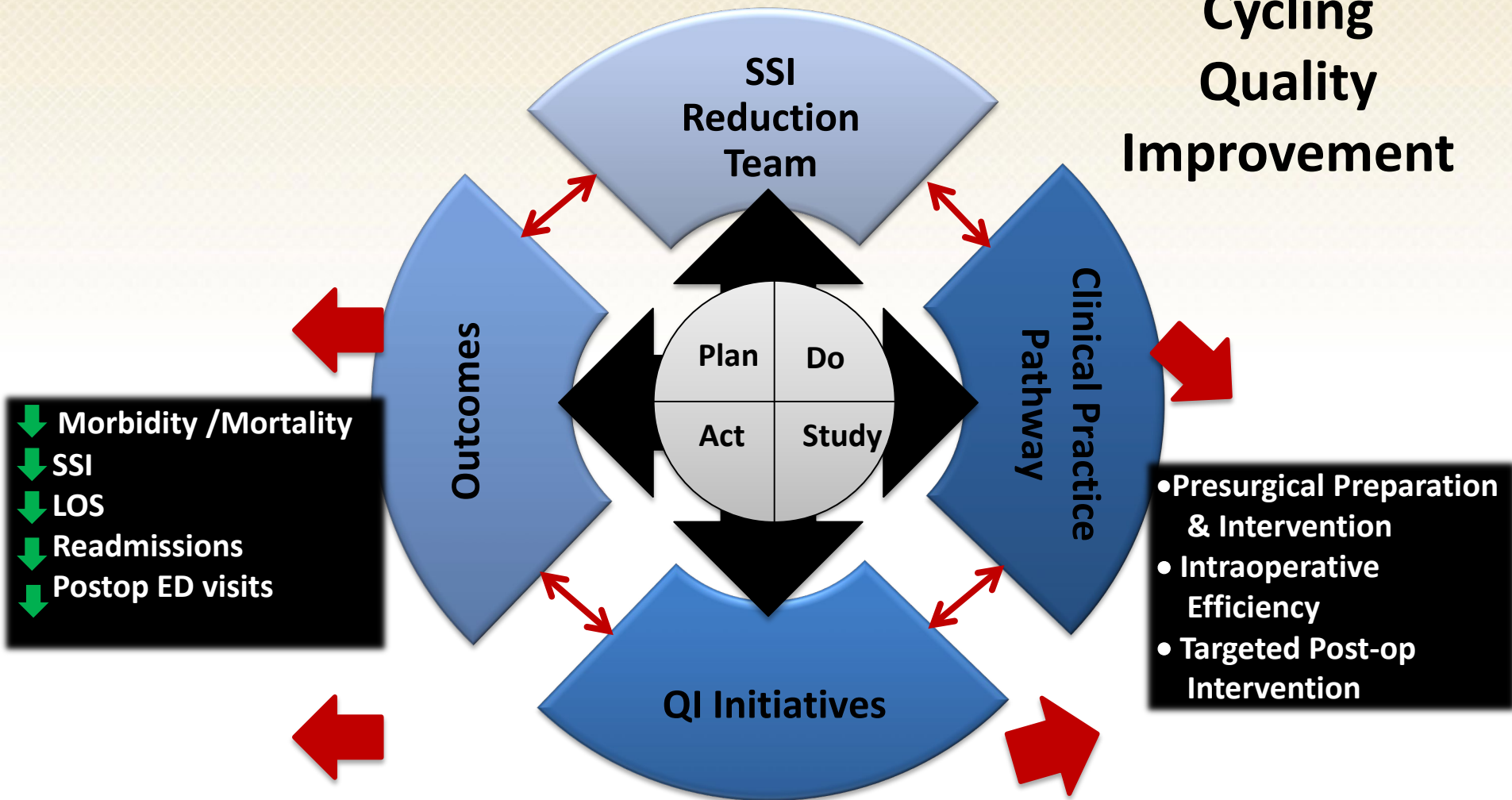
- **Not all patients included in your QI will be tracked through MSQC, due to sampling methodology.**
- **Identify alternative ways to monitor outcomes: excel spreadsheet, additional 30-day follow up information)**
- **Provide outcome data to:**
  - SSI Team**
  - Physician and Nursing QI committees**
  - Hospital Leadership**

# MSQC Composite SSI Trend & Rates



# Evaluate Progress

## Cycling Quality Improvement



***Our goal is that this guide will serve as a resource to help you decrease SSI for your patients and improve their surgical outcomes.***

*Change is a process,  
not an event*