Combating Surgical Site Infections (SSIs) in Hip and Knee Arthroplasty

Objectives

• Describe the rational behind the three new elements for combating SSIs
• Define the elements and identify ways to assess current practices for each of the elements
• Examine how other hospitals have implemented the bundle elements in their facilities and identify ideas that can be applied at their organization
“Hip” News You “Knee-d” to Know…

- 327,000 total hip (THA) and 676,000 total knee (TKA) arthroplasties are performed annually in the US
- Projected increase of 572,000 THA (174%) and 3.48 million TKA (673%) through 2030
- Infection rates currently at 1.5% for THA and 1.2% for TKA


Why Do We Need to Improve?

- Surgical Site Infection is a significant factor for:
  - Patient morbidity
  - Surgical outcome
  - Total health care costs
  - Patient reported outcomes (PROMs)
- Approximate cost per SSI – $80K to $200K per incident
- Payers to deny reimbursement for HAI

Potential Costs Up To $690 Billion through the Year 2030 Just for SSI in TJR
SSI Impact on Patients and Families

- Multiple surgical procedures
- Prolonged and more frequent hospital stays
- Poorer outcomes
- Higher risk for re-infections
- Decreased quality of life
- Lost work productivity
- Temporary/permanent disability
- Economic burden to patients AND the System

Is your pain more or less than expected?
Debbie Yokoe, MD

Project “JOINTS”
Joining Organizations IN Tackling SSIs

• Initiative funded by the federal government (HHS) to spread the Enhanced SSI Prevention Bundle
• Aligns with Partnerships for Patients CMS initiative
• Designed to prevent SSI in patients undergoing hip and knee joint replacements
The JOINTS Bundle

• MRSA/MSSA Colonization Identification and Eradication Program
• Preoperative Skin Cleansing with Chlorhexidine
• Intra-op Alcohol Based Skin Preparation

Project JOINTS interventions

- New Practices:
  - Use an alcohol-containing antiseptic agent for preop skin prep
  - Preop bathing or showering with chlorhexidine gluconate (CHG) soap
  - *Staph aureus* screening and intranasal mupirocin and CHG bathing or showering to decolonize *Staph aureus* carriers

- Applicable SCIP practices:
  - Appropriate use of prophylactic antibiotics
  - Appropriate hair removal
#1: Use an alcohol-containing antiseptic agent for preoperative skin preparation

- Adequate preoperative skin preparation to prevent entry of skin flora into the surgical incision is an important basic infection prevention practice
- Requires use of an antiseptic agent with long-acting antimicrobial activity, such as chlorhexidine (CHG) or iodophors
- Does adding alcohol help?
Is one preoperative skin prep agent better than another?

- Povidone-iodine
- Iodophor plus alcohol
- Chlorhexidine gluconate plus alcohol

Cochrane Systematic Review 2009: Does Pre-Operative Skin Antisepsis Prevent SSI?

- **Conclusion**: Insufficient evidence to support recommending the use of one antiseptic agent over another
Comparison of 3 Skin Antisepsis Protocols

- Single institution sequential implementation study design involving 3,209 general surgery patients (Swenson ICHE 2009) comparing:
  1) Povidone-iodine scrub→alcohol→povidone iodine paint (“triple prep”)
  2) 2% chlorhexidine plus isopropyl alcohol
  3) Iodine povacrylex in isopropyl alcohol

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Povidone-Iodine vs. CHG-Alcohol vs. Iodine Povacrylex-Alcohol

Time Sequence Study

<table>
<thead>
<tr>
<th>SSI</th>
<th>No. SSI</th>
<th>Pov-iod/alcohol/ pov-iod</th>
<th>CHG-alcohol</th>
<th>Iodophor-alcohol</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>178</td>
<td>72 (4.8%)</td>
<td>68 (8.2%)</td>
<td>38 (4.8%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Superficial</td>
<td>120</td>
<td>49 (3.2%)</td>
<td>45 (5.4%)</td>
<td>26 (3.3%)</td>
<td>0.019</td>
</tr>
<tr>
<td>Deep</td>
<td>11</td>
<td>6 (0.4%)</td>
<td>4 (0.5%)</td>
<td>1 (0.1%)</td>
<td>0.49</td>
</tr>
<tr>
<td>Organ/space</td>
<td>49</td>
<td>18 (1.2%)</td>
<td>19 (2.3%)</td>
<td>12 (1.5%)</td>
<td>0.12</td>
</tr>
</tbody>
</table>
Povidone-iodine versus CHG + alcohol

- Randomized, multicenter study of 849 patients undergoing **clean-contaminated** surgery (Darouiche *NEJM* 2010).
  ✓ Povidone-iodine scrub and paint vs. CHG-alcohol scrub.

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**Chlorhexidine–Alcohol versus Povidone–Iodine for Surgical-Site Antisepsis**

Rabib O. Darouiche, M.D., Matthew J. Wall, Jr., M.D., Kennal M. F. Itani, M.D., Mary F. Otterson, M.D., Alexandra L. Webb, M.D., Matthew M. Carrick, M.D., Harold J. Miller, M.D., Samir S. Awad, M.D., Cynthia T. Crosby, B.S., Michael C. Mosier, Ph.D., Atef AlSharif, M.D., and David H. Berger, M.D.

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<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Chlorhexidine–Alcohol (N=409)</th>
<th>Povidone–Iodine (N=440)</th>
<th>Relative Risk (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any surgical-site infection</td>
<td>39 (9.5)</td>
<td>71 (16.1)</td>
<td>0.59 (0.41–0.85)</td>
<td>0.004</td>
</tr>
<tr>
<td>Superficial incisional infection</td>
<td>17 (4.2)</td>
<td>38 (8.6)</td>
<td>0.48 (0.28–0.84)</td>
<td>0.008</td>
</tr>
<tr>
<td>Deep incisional infection</td>
<td>4 (1.0)</td>
<td>13 (3.0)</td>
<td>0.33 (0.11–1.01)</td>
<td>0.05</td>
</tr>
<tr>
<td>Organ-space infection</td>
<td>18 (4.4)</td>
<td>20 (4.5)</td>
<td>0.97 (0.32–1.80)</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>Sepsis from surgical-site infection</td>
<td>11 (2.7)</td>
<td>19 (4.3)</td>
<td>0.62 (0.30–1.29)</td>
<td>0.26</td>
</tr>
</tbody>
</table>
(Continued) Darouiche NEJM 2010

- Conclusion: SSI rates for patients prepped with CHG-alcohol were significantly lower compared with povidone-iodine
- Caveat:
  - No comparison with CHG without alcohol or iodophor-alcohol
  - Did not include clean procedures (e.g., cardiac or orthopedic surgery)

Summary of Swenson and Darouiche results
Clean-contaminated procedures

<table>
<thead>
<tr>
<th></th>
<th>SSI (%)</th>
<th>Pov Iod No Alcohol</th>
<th>Pov Iod + Alcohol</th>
<th>CHG + Alcohol</th>
<th>Iod Povacryl + Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swenson (n=1459)</td>
<td></td>
<td>8.7</td>
<td>10.7</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Darouiche (n=849)</td>
<td>16.1</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12/10/2013
Why consider preoperative CHG bathing or showering to prevent SSIs?

- Topical chlorhexidine significantly reduces bacterial counts on skin and has a residual antimicrobial effect
  - Impacts a broad range of potential pathogens
  - Low risk of skin reactions
- There is progressive reduction in counts when used serially up to 3 times preoperatively
  - Hayek *J Hosp Infect* 1987
  - Kaiser *Ann Thor Surg* 1988
  - Garibaldi *J Hosp Infect* 1988,
  - Paulson *AJIC* 1993

#2: Ask patients to bathe or shower with CHG soap at least 3 times before surgery
• Effectiveness of CHG washes depends mainly on the residual antimicrobial effect, which is increasingly effective the more consecutive days it is used.

• At least 3 consecutive washes are needed to keep skin flora lower than baseline through a 24-hour period.

Why is this recommendation controversial?

- Cochrane Systematic Review 2011: no clear evidence based on RCTs that preop bathing with CHG reduces the incidence of SSI.

- Studies had many limitations:
  - Variable SSI definitions and follow-up
  - No monitoring of compliance with CHG use
  - Most used only 1 or 2 applications of CHG soap

- May need repeated applications (i.e., showering with CHG at least 3 times prior to surgery)
Impact of CHG bathing on other hospital-acquired infections in ICUs

- 23% decrease in multidrug-resistant organisms acquisition (p=0.03)
- 31% decrease in primary BSI (p=0.006)
- 53% decrease in CLABSI (p=0.004)

Climo MW, et al. *NEJM* 2013;368:533
#3: Screen patients for *Staphylococcus aureus* (SA) carriage and decolonize SA carriers with 5 days of intranasal mupirocin and at least 3 days of CHG bathing prior to surgery

## Why Worry About *Staph Aureus* Nasal Carriage?

*Staphylococcus aureus* nasal colonization predisposes patients to invasive *S. aureus* infections

- Nasal carriage of *S. aureus* is associated with a relative risk of 7.1 for developing SSI (*Kluytmans J Infect Dis* 1995)
- Most cases of invasive *S. aureus* infection are due to endogenous strains (*Von Eiff NEJM 2001*, *Huang CID 2008*)
Does Using Mupirocin Eradicate \textit{S. Aureus} Nasal Carriage?

- Systematic review (Ammerlaan HS, et al. \textit{CID} 2009): 8 studies comparing mupirocin to placebo
  - Short-term nasal mupirocin (4-7 days) was an effective method for \textit{S. aureus} eradication
  - 90\% success at one week, 60\% at longer (14-365 days) follow-up
  - 1\% develop mupirocin resistance

Does Using Mupirocin Prevent SSIs?

- Systematic review (van Rijen JAC 2008):
  - Included 4 randomized controlled studies
  - \textbf{Conclusion}: Mupirocin use was associated with a significant reduction in \textit{S. aureus} postoperative infection rates among \textit{S. aureus} carriers (RR 0.55, 95\% CI 0.34-0.89)
Randomized, double-blinded, placebo-controlled multicenter study of 6,771 patients in the Netherlands (Bode NEJM 2010)

- Rapid screening for MSSA/MRSA on admission
- Carriers randomized to mupirocin/CHG soap vs. placebo/bland soap x 5 days

(Continued) Bode NEJM 2010

- Results: CHG bathing + mupirocin group had significantly lower SSI rates than the placebo group
- Conclusion: Preoperative identification of *S. aureus* carriers followed by 5 days of intranasal mupirocin plus CHG bathing reduced *S. aureus* SSIs by ~60%

<table>
<thead>
<tr>
<th>Localization of infection</th>
<th>Mupirocin + CHG</th>
<th>Placebo</th>
<th>Relative Risk (95% conf interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep SSI</td>
<td>4 (0.9)</td>
<td>16 (4.4)</td>
<td>0.21 (0.07-0.62)</td>
</tr>
<tr>
<td>Superficial SSI</td>
<td>7 (1.6)</td>
<td>13 (3.5)</td>
<td>0.45 (0.18-1.11)</td>
</tr>
</tbody>
</table>

Bode LGM, et al. NEJM 2010;362:9
Impact of nasal decolonization: Systematic review and meta-analysis

- Nasal decolonization was associated with lower risk of *S. aureus* SSI for cardiac and orthopedic surgery

<table>
<thead>
<tr>
<th></th>
<th>RR* Gram positive SSIs (95% CI)</th>
<th>RR* MRSA SSIs (95% CI)</th>
<th>RR* MSSA SSIs (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac surgery studies</td>
<td>0.46 (0.32 to 0.67)</td>
<td>0.69 (0.36 to 1.31)</td>
<td>0.46 (0.29 to 0.72)</td>
</tr>
<tr>
<td>Orthopedic surgery studies</td>
<td>0.32 (0.21 to 0.47)</td>
<td>0.16 (0.09 to 0.28)</td>
<td>0.58 (0.31 to 1.01)</td>
</tr>
<tr>
<td>All studies</td>
<td>0.41 (0.30 to 0.55)</td>
<td>0.30 (0.15 to 0.62)</td>
<td>0.50 (0.37 to 0.69)</td>
</tr>
</tbody>
</table>

*RR = Pooled relative risk  


Why Not Use Preoperative Mupirocin For All Orthopedic Patients?

Prevent *S. aureus* SSIs for some patients  
Mupirocin resistance Costs
Possible SA decolonization strategies

- Target procedures where *S. aureus* SSIs are common and potentially devastating
  - Orthopedic surgery involving implants
  - Cardiac surgery
- Consider screening these patients for *S. aureus* nasal carriage (MSSA and MRSA)
- Decolonize with intranasal mupirocin +/- CHG bathing
It’s a War Not Just One Battle

Anthony M. DiGioia III, MD
Tony@pfcusa.org
Pre-op Testing and Education

**S. aureus Screening**

- Nasal Swab Testing
- Negative for MRSA/MSSA no further action required
- Positive results - 16% overall (2% MRSA and 14% MSSA)
  - Topical mupirocin (5 days)
  - Chlorhexidine wash for patient use 5 days prior to surgery
  - 98.7% compliance
- Pre-op IV Vanco and Cefazolin or Clindamycin
Pre-op Testing and Education
Engage the Patient in Their Own Care

Home Skin Cleansing Program

- Chlorhexidine soap and cloths
- Wound care education emphasized in pre-op teaching and Journey to Wellness Guide

Day of Surgery

Chlorhexidine Skin Cleansing

Antibiotic Protocol (SCIP)
Intra-op

Alcohol Based Skin Prep

- Chlorhexidine Favored
  - Avoids iodine allergy
  - Superior bacterial reduction at surgical site
  - Reproducible/standardized skin preparation
- Superior to Traditional Povidone-Iodine Scrub

Intra-op

- Insertion of urinary catheter after spinal anesthesia
- Efficient OR Team (less OR time and traffic)
- Less Invasive Surgical techniques
  - Extensive use of pulsatile lavage ABX irrigation and used prior to insertion of every implant component
  - Drain exit site distant from incision and in “z” fashion
Post-op Care

- Handwashing
- Removal of drain and urinary catheter early POD #1
- IV ABX discontinuation
- Op Site dressing changes daily, prn for breakthrough drainage and after showers

Discharge and Education

- Ionic silver lined dressing applied at time of discharge
- Discharge wound care instructions (and starts at Pre-op Session):
  - During pre-op education
  - Community discharge classes POD #1
  - Oral and written instructions at time of discharge
Home Care

Incision Care

• Removal of ionic silver lined dressing 7 days after discharge
• No Dental procedures for 4-6 weeks post-op
• ABX prescribed for testing/procedures where bleeding may occur

Bone and Joint Center Outcomes

- High volume center in short time
- 1,600+ surgeries per year, only 2 OR’s a day and 3 FT surgeons
- Over 88% of patients are discharged to home…and with lowest length of stay
- Best outcomes as measured by readmission rates, transfusion rates, infection rates and SCIP compliance and functional outcomes
- Lowest cost per case (real costs)

BJC Annual Report and Outcomes: http://www.pfcc.org/annual-reports/
Improving Safety, Quality & Waste Reduction
Total Joint Replacement Care Experience

Surgical Care Improvement Project

- Antibiotics D/C within 24 hr of Surg
  - National Avg. 95%
  - State Avg. 96%
  - Bone and Joint Center 100%
- Antibiotics Given within 1 hr prior to surgery
  - National Avg. 100%
  - State Avg. 99%
  - Bone and Joint Center 98%
- Appropriate Antibiotic Selection
  - National Avg. 100%
  - State Avg. 98%
  - Bone and Joint Center 95%

Data for Jan 1 – Dec 31, 2012

Improving Safety, Quality & Waste Reduction
Total Joint Replacement Care Experience

<table>
<thead>
<tr>
<th></th>
<th>BJC</th>
<th>National Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TKA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average LOS</td>
<td>2.9 days</td>
<td>3.3 days</td>
</tr>
<tr>
<td>Infection Rates</td>
<td>0.7%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Mortality Rates</td>
<td>0.0%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Discharge Destination</td>
<td>88% Home</td>
<td></td>
</tr>
<tr>
<td><strong>THA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average LOS</td>
<td>2.7 days</td>
<td>4.2 days</td>
</tr>
<tr>
<td>Infection Rates</td>
<td>1.4%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Mortality Rates</td>
<td>0.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Discharge Destination</td>
<td>87% Home</td>
<td></td>
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</tbody>
</table>

Readmission Rate
Within 30 days  TKA = 2.5%  THA = 4.2%

This is Our Care Team

**Staff Contacts/Time Analysis (22 patients)**

<table>
<thead>
<tr>
<th>Staff Type</th>
<th>Avg Number of Visits</th>
<th>Avg Time per Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesiologist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiology</td>
<td></td>
<td></td>
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<tr>
<td>Chaplain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EKG Tech</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florist</td>
<td></td>
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<tr>
<td>HUC</td>
<td></td>
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</tr>
<tr>
<td>Intern</td>
<td></td>
<td></td>
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<tr>
<td>Liason</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masseuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing Student</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Care Technician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Supports Assistant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician's Assistant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Care Physician</td>
<td></td>
<td></td>
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<tr>
<td>Pharmacy</td>
<td></td>
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</tr>
<tr>
<td>Physical Therapy</td>
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</tr>
<tr>
<td>Physical Therapy Student</td>
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<tr>
<td>Respiratory</td>
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<td>Social</td>
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</tr>
<tr>
<td>Surgeon</td>
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<tr>
<td>Transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volunteer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Contacts/Patient:** 86/Day and 260/Hospital Stay

**ie Opportunities to Impact a Patient and Family Experience**
Hand washing - Top 5 Care Giver Groups That Interact with Patients

28 Staff Types
# of contacts = 4034

Top 5 Care Givers
# of contacts = 3221
Account for 81% of contacts

- Nurse 39%
- Patient Care Technician 26%
- PT and OT 6%
- Patient Support Assistant 5%
- PT Technician 5%
- Others 19% (23 Staff Types)

In Order for Us to Win the War…

The Patient and Family must be the focus and engaged in their own care…this is the only way for us to understand problems, develop and implement solutions in order to deliver real value.

Only six weeks after surgery, Scot enjoys a ride on his mountain bike.
What is Project JOINTS?

- An initiative funded by the federal government to give participants support from IHI in the form of in-person and virtual coaching on how to test, implement and spread the enhanced SSI prevention Bundle comprised of *three new Evidence-based Practices* as well as the two applicable Surgical Care Improvement Project (SCIP) practices.

- Two cohorts of 5 states with a 6 month intervention period. (May 2011-October 2012)
Project JOINTS

- Offer implementation support to participants on the recommended interventions to reduce prevent hip and knee SSIs
- Build a network of facilities that are working together toward the same aim – literally Joining Organizations IN Tackling SSIs
- Test IHI’s ability to spread evidence-based practice

Program Highlights

- 350 enrolled facilities in 10 states
- Calls with each state “node”
- Visits to 25 states
- Office hours for surgeons
- 38 exemplar/”mentor” hospitals
- “Rosie” video (patient story)
- Customized tip sheets and business case (hospitals, providers, patients), how-to guides, and other materials
- 32 mentions in the media – including the Wall Street Journal in March 2013
- Support from the American Academy of Orthopedic Surgeons and Award of Excellence at annual meeting
- 944 listserv messages
- 150 – 500 participants each call
SSI Prevention For Hip and Knee Arthroplasty

- **New Practices:**
  - Use of an alcohol-containing antiseptic agent for pre-op skin prep
  - Pre-op bathing or showering with chlorhexidine gluconate (CHG) soap for at least 3 days prior to surgery
  - *Staph aureus* screening and use of intranasal mupirocin and CHG bathing or showering to decolonize *staph aureus* carriers

- **Applicable SCIP practices:**
  - Appropriate use of prophylactic antibiotics
  - Appropriate hair removal

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**Use an alcohol-containing antiseptic agent for preoperative skin preparation**

**Behavioral Objective:** Change the operating room skin prep for hip and knee arthroplasty to a long-acting antiseptic agent in combination with alcohol.

**Assess your current process and potential barriers:**
- Identify surgeons currently using an alcohol-based skin prep to champion the change in practice with their peers.
- Determine the high-volume surgeons and focus your efforts on working with them.
- Conduct brief interviews with representative surgeons to identify any misconceptions or key barriers to using an alcohol-based skin prep.
- Provide a brief summary of the scientific evidence supporting change to an alcohol-containing skin prep to influence change of habit/tradition.
Changes in Practice

- Ensure the alcohol-based skin prep is applied correctly:
  - Skin prep should be completely dry prior to draping.
  - Cleanse the incision area for 30 seconds and then paint the rest of the extremity.
  - Consider use of a tinted CHG-alcohol prep (orange or teal) for greater visibility.
  - Avoid pooling of the skin prep.
- Incorporate alcohol-based skin prep into the individual surgeons’ preference cards as agreement is reached regarding use of alcohol-based skin prep

Ask patients to bathe or shower with chlorehexidine gluconate (CHG) for at least 3 days prior to surgery

**Behavioral Objective:** Provide patients with chlorhexidine soap, and have them use the soap in bathing or showering for at least three days before surgery.

**Assess your current process and potential barriers:**
- Assess where most preoperative assessments take place
- Assess current preoperative communication between the hospital OR department and the offices of orthopaedic surgeons inside and outside the hospital.
- Tailor the implementation process to your setting
- Develop a process flow diagram to define all components of the process
Key Concepts to Consider

- Patients must understand why CHG bathing is important
- Patients need to understand How to do CHG bathing
- Access to CHG for pre-op bathing
- How will we know if CHG baths were completed?

Lessons Learned

- Pre-Op class
  - Weekly, same time, same place
  - Discuss processes
  - Multidisciplinary
  - Education materials
  - (Screening for MSSA and MRSA)
- Education Material
  - What product to use, provide if possible
  - How to use CHG
- Measure: How many patients completed the 3 baths prior to surgery
  - How many patients completed the 3 baths prior to surgery
  - Checklists
  - Admit process/holding area
You can't see it, but you can clean it.

3 showers, 3 days, Fewer germs.

Ask your surgeon about the importance of showers to help prevent infections. All patients have bacteria on the skin, and most bacteria on the surface of skin will not harm you. To prevent bacteria from getting to the wound, soap will help reduce the amount of bacteria on your skin. In addition, the surgeon does his part by cleaning your skin just prior to making the incision.

- Please complete the preoperative showers using the antiseptic soap (Bactroban or Hibiclens) that the preadmission nurse in the hospital's office will provide you.
- You will use the provided soap for a total of three (3) showers or baths. (two days prior to your surgery and the morning of your surgery) Use the soap from the neck down using a clean washcloth. Rinse thoroughly after use.

- Do not use the soap on your face, including eyes, ears, nose, mouth or genital areas.
- Use your normal shampoo on your hair. Use normal soap on your face.
- Do not use your home soap after the antiseptic soap. Do not apply lotions.
- If you have an allergy to household or Mediterranean soap, please use an over the counter medicated soap such as Dial in either bar or liquid form.

Cleansing Procedure Prior to Surgery

Surgical site infections can be prevented. Ask your surgeon about the importance of showers to help prevent infections. Wash daily for 5 days before surgery.

- Apply
- Lather
- Rinse
- REPEAT
- REPEAT
- REPEAT
Surgical Site Infections and Pre-Operative Skin Preparation for Joint Replacement Surgery: What You Can Do

Before surgery, your body needs to be thoroughly cleaned with a special soap. This is because all humans have bacteria and germs that live on their skin. These bacteria normally help us by digesting dead skin cells, and other materials found on our bodies, clothing, and furniture. When you have surgery, these bacteria can sometimes cause an infection. You will receive a special soap from your doctor or nurse called Hibiclens (Chlorhexidine Gluconate solution 4%). This soap must be used for these showers prior to your surgery. If you have questions after reading this information, please call 303-825-6214 to speak with a nurse.

**CAUTION:** DO NOT USE HIBICLENS (Chlorhexidine Gluconate 4%) ON YOUR HEAD OR FACE. AVOID CONTACT WITH YOUR EYES. If contact occurs, flush eyes thoroughly with water. DO NOT USE IF YOU ARE ALLERGIC TO CHLORHEXIDINE GLUCONATE OR ANY INACTIVE INGREDIENTS IN THIS SOAP. AVOID USE IN THE GENITAL AREA, AS IRRITATION MAY RESULT. USE YOUR REGULAR SOAP IN THAT AREA.

Special Instructions

**DO NOT SHAVE THE SURGICAL AREA:** Your nurse will use clippers to remove hair, if needed, at the surgical site. Using a razor to remove your hair before surgery can cause infections because it can leave small cuts on the skin.

The nursing staff at East Morgan County Hospital wishes you a speedy recovery. We thank you for choosing East Morgan County Hospital for your surgical needs. If you have questions after reading this information, please call 303-825-6214 to speak with a nurse.

The First Shower

**Two Days Before Surgery:** Take a shower and wash your entire body, including your hair and scalp in the following manner:

- Wash your hair using normal shampoo. Make sure you rinse the shampoo from your hair and body. Wash your face with your regular soap or cleanser.
- Use a fresh, clean washcloth and the remaining 1/3 of the Hibiclens Soap, wash from your neck down. This is very important.
- Rinse your body thoroughly. This is very important.
- Dries with freshly washed clothes.
- Do not use lotions, perfumes, or creams after this shower.

**The Second Shower:** Take a shower and wash your entire body, including your hair and scalp in the following manner:

- Wash your hair using normal shampoo. Make sure you rinse the shampoo from your hair and body. Wash your face with your regular soap or cleanser.
- Use a fresh, clean washcloth and the remaining 1/3 of the Hibiclens Soap, wash from your neck down. This is very important.
- Rinse your body thoroughly. This is very important.
- Dries with freshly washed clothes.
- Do not use lotions, perfumes, or creams after this shower.

**The Final Shower:** Take a shower in the following manner:

- Wash your hair using normal shampoo. Make sure you rinse the shampoo from your hair and body. Wash your face with your regular soap or cleanser.
- Use a fresh, clean washcloth and the remaining 1/3 of the Hibiclens Soap, wash from your neck down. This is very important.
- Rinse your body thoroughly. This is very important.
- Dries with freshly washed clothes.
- Do not use lotions, perfumes, or creams after this shower.

Preparing Your Skin Before Surgery

Preparation of skin before surgery can reduce the risk of infection at the surgical site. This facility, along with your physicians, recommend Hibiclens, a non-stick, chlorhexidine gluconate solution, designed to reduce the risk of infection. This skin cleaning is to be done twice a day prior to surgery and up to 2 days after surgery. An additional package will be given to you in the pre-operative area on the day of surgery. If possible, please have someone with you on the day of surgery to help you.

Preparing your skin before surgery:

Shower, bathe, and change your clothes at least two hours before surgery. This allows your pores to close before using this product. Do not shave a day before surgery or on the day of surgery. Petrolatum jam will protect the hair roots. Do not apply lip balm or makeup.

1. **Skin preparation:** At the end of the day before surgery, use the Hibiclens solution to thoroughly wash the surgical site.
2. **Hair removal:** Use clippers to remove hair from the surgical site.
3. **Shampooing:** Use a normal shampoo to wash your hair. Rinse thoroughly.
4. **Washing:** Use a fresh, clean washcloth to wash your body. Rinse thoroughly.
5. **Drying:** Dry your body thoroughly. Use a clean towel to dry your body.
6. **Clothing:** Change into clean, freshly laundered clothes.
7. **Perfumes:** Do not use perfumes, lotions, or creams.

Preparing Your Skin Before Surgery:

1. **Shower:** Take a warm shower before surgery.
2. **Soap:** Use soap to wash your body. Rinse thoroughly.
3. **Washcloth:** Use a fresh, clean washcloth to wash your body. Rinse thoroughly.
4. **Towel:** Dry your body thoroughly. Use a clean towel to dry your body.
5. **Clothing:** Change into clean, freshly laundered clothes.
6. **Perfumes:** Do not use perfumes, lotions, or creams.
Screen patients and Decolonize SA carriers w/5 days intranasal mupirocin & 3 days CHG

Behavioral Objective: Screen all patients for Staphylococcus aureus prior to surgery, allowing enough time for those who screen positive to be decolonized with five days of intranasal mupirocin.

Assess your current process and potential barriers:
- Assess where most preoperative assessments take place
- Tailor the intervention to the setting in which preoperative assessment is done
- Work with Lab to assure screening includes both MRSA and MSSA
- Develop a process to assure info on screening and decolonization is available at the time of surgery
- Develop a process flow diagram to define components of the process

Key Concepts to Consider
- Assess your current process and potential barriers
- Tailor the intervention to the setting in which the preoperative assessment is done
- Work with your laboratory
  - to ensure screening includes MSSA and MRSA and notification process
  - Understand culture/PCR process, possibilities and barriers
  - (PDSA) follow one class – thru notification process
Key Concepts to Consider

- Develop a process to ensure information on screening and decolonization is available prior to the time of surgery
  - (PDSA) follow one class – thru notification process
  - Test processes to provide mupirocin prescription
  - How do you assess compliance?
- Develop a process flow diagram
  - Define components (from your tests)

Lessons Learned

- Incorporate screening for SA and prescribing mupirocin into surgeons’ preoperative assessment orders
- Build on established preop assessment processes that require patient follow-up/treatment before surgery, such as positive urinalysis/urine culture requiring antibiotic treatment
- If PCR testing is available, assess the feasibility of providing screening results and prescription if needed, at the preop visit
- Create a flag system to be used during surgery for patients testing positive for MRSA to ensure Vancomycin is used preop
PRE-OPERATIVE INSTRUCTIONS FOR PATIENTS TO ERADICATE STAPHYLOCOCCUS AUREUS COLONIZATION

WHY ARE WE CONCERNED ABOUT STAPH AUREUS BACTERIA?

- Staphylococcus aureus (or Staph aureus) is a bacteria that frequently resides on the skin and in the nasal passages. Post-operative infections are commonly caused by this bacteria, and are especially serious when caused by a type of Staph called Methicillin Resistant (MRSA).
- In an effort to reduce your risk of a post-operative infection, you will be screened for the MRSA bacteria.
- In addition, whether you are positive or negative for MRSA, you will be asked to follow the protocol outlined below that will help decrease the concentration of Staph bacteria that is present on your body, and will help reduce the risk of post-operative infection.

HOW IS THE STAPH AUREUS SCREENING DONE?

- Your nose (opening of nostrils) will be thoroughly swabbed with a Q-tip type swab. This will be done at the time your surgery is scheduled. We will notify you if you test positive for Staph aureus.

WHAT IS THE PROTOCOL FOR STAPH DECOLONIZATION THAT PATIENTS UNDERGOING JOINT REPLACEMENT SURGERY WHO TEST POSITIVE NEED TO FOLLOW?

- This involves placing an anti-Staph antibiotic ointment called Bactroban in your nose twice daily, starting 5 days prior to the day of your surgery. Apply a pea-sized amount of ointment to the interior of each nostril and massage gently for one minute. A prescription for this ointment will be called to your pharmacy.
- Shower daily with Hibiclens starting 5 days before your surgery.
- The night before and the morning of your surgery shower with Hibiclens. After each of these showers gently wash your hair or face for 10 minutes with the sponge side of your scrubber, then rinse well and soap off.

WHAT OTHER MEASURES WILL HELP TO PREVENT INFECTION?

- Even before the 5 days leading up to your surgery, personal hygiene is extremely important. Make sure you take daily showers with antibacterial soap, such as Dial. Make sure you wear clean clothes daily, have clean sheets and towels and wash your hands frequently.

HOW IMPORTANT IS THIS?

- Staph infection can be very serious, especially those that are the Methicillin Resistant strain. Studies have shown that...

Keeping you safe for surgery

Staphylococcal aureus or “Staph” is a germ that lives on the skin and in the nose of almost everyone. Your skin protects from those germs. When you have surgery, we will be cutting your skin. Sometimes germs can get into those cuts and cause infection.

How do we screen for Staph?

We will wash your nose to see if you have Staph. The test will take 3-4 days for us to know.

A positive test does not mean you have an infection. Your surgery will not be canceled or delayed.

If my test is positive, what happens?

If your test is positive, Monica Jarrell, NP will call you and tell you to get Bactroban at your pharmacy. The medicine comes in a tube or a small packet. It is the same medicine that will kill the germs. They just look different:

- If you get a big tube of Bactroban, place enough medicine to cover the top of a cotton swab. Place the cotton swab inside your nose. Then repeatly to the other side of your nose.
- If you get individual tubes, put half the tube on a cotton swab and put the medicine in one side of your nose. Then the other half in the other side of your nose.

Gently rotate your nose together and release for about a minute to get the medicine all over the inside of your nose. Do this once in the morning and one at night for 5 days.

If I have Staph, will I be treated differently in the hospital?

If you have a type of Staph called MRSA, you will be in a single room on “Contact Precautions.” This means your doctors and nurses will wear gloves and gowns when taking care of you. We do this to make sure we do not spread MRSA to another patient we are seeing for.
HELPING TO REDUCE THE RISK OF SURGICAL SITE INFECTION

What’s in My Nose?

S. aureus Screening in Surgical Patients
Instructions for Patient

Staphylococcus is a family of bacteria commonly found on the skin and other warm, moist areas of all people. There are many kinds of “staph” bacteria, but the one that causes the most problems is called Staphylococcus aureus.

- This germ is one of the leading causes of infections after many surgeries.
- About 1 in 4-5 people commonly have this germ in the mucous membranes of their nose where it usually causes no problems.
- Studies have shown that people who carry the bacteria in their nose (the anterior nares) are more than twice as likely to have wound infections after surgery.

S. aureus Screening: At your pre-op appointment, a staff member will culture your nose

Because we want to do everything we can to prevent anyone from getting an infection, we test patients scheduled for elective surgery to see if they carry S. aureus in their nose.

You may have heard of the antibiotic resistant Staph aureus called methicillin resistant Staphylococcus aureus or MRSA. We look for this as well as methicillin sensitive Staph aureus (MSSA).

Nose Culture
- A “O”p will be rubbed against the inside of your nose — it will tickle, but not hurt.
- The culture will take 2 days to try to grow the bacteria.
- About 1 in 5 patients will have a positive culture.
- If the culture is positive, your doctor’s office will:
  o Call you and prescribe an ointment called mupirocin or nustim
  o You will need to apply it to both nostrils twice a day for 5 days.
  o If signs of infection arise or the date of the surgery is < 5 days, then the therapy would be continued post-op to complete a 5-day course.

Use this only if directed

Bactroban Medication Use
If you receive a call from Michele Jarem, NP asking you have Staph, please complete this form. Please bring this with you the morning of surgery.

- Wash your hands before you use your medicine.
- Put the medicine in your nose, twice a day for 5 days with a cotton swab.
- Apply enough medication to cover the the white part of the q-tip and place directly into one side of your nose.
- Reposition the q-tip if needed to cover the white part of the q-tip and place directly into the other side of your nose.
- Press together the sides of your nose together and softly rub them to spread the medicine around inside.
- Stop the medicine and call your primary care doctor if you have a strong reaction or severe irritation.

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To pre-op staff: If found, please send to Morgan Silberman in Infection Prevention at 26727

(Exempla Lutheran Medical Center, Wheat Ridge, Colorado, USA)
Resources – www.ihi.org/projectjoints

Exemplar Hospitals

Exemplar Hospitals have volunteered to offer tips related to implementation of evidence-based practices to prevent SSIs after hip and knee replacement surgery. Click on the name of each hospital for details and contact information.

Preoperative Bathing or Showering for at Least Three Days

- Baptist Health Medical Center - Little Rock, AR
- Canton Potsdam Hospital - Potsdam, NY
- Colorado Plains Medical Center - Fort Morgan, CO
- D’Youville Baltimore Medical Center - Baltimore, MD
- Huntington Hospital - Huntington, NY
- Legacy Good Samaritan Medical Center - Portland, OR
- Mercy Medical Center - Rogers, AR
- North Coast Medical Center - Springfield, OR
- Okanogan General Hospital - Omak, WA
- Portage Health - Hancock, MI
- Saint Mary's Medical Center - Loretto, PA
- St. Mary's Hospital and Medical Center - Grand Junction, CO
- St. Vincent Infirmary Medical Center - Little Rock, AR
- Salinas Memorial Hospital - Bnton, AR
- Sky Ridge Medical Center - Lone Tree, CO
- University of Tennessee Medical Center - Knoxville, TN
- William Beaumont Medical Center - McAllen, TX

Staph aureus Screening and Decolonization

- Baptist Health Medical Center - Little Rock, AR
- Ballan Hospital - Green Bay, WI
- Canton Potsdam Hospital - Potsdam, NY
- Colorado Plains Medical Center - Fort Morgan, CO
- Roswell Park North Shore LIJ Health System - New York, NY
Surgery Data Tracker

Resources for you

- Call series
- How-to Guide
- Business case
- Patient instruction sheets and checklists
- Protocols for staff
- Evidence 1-pager
- Over 30 exemplars
- Listserv