Project JOINTS: Pre-Operative Management to Prevent Surgical Site Infections after Orthopedic Surgery

July 9, 2013

A partnership of the Healthcare Association of New York State and the Greater New York Hospital Association
## Agenda

<table>
<thead>
<tr>
<th><strong>Topic</strong></th>
<th><strong>Speakers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Welcome and Introductions</td>
<td>Nancy Landor, Senior Project Manager, NYSPFP</td>
</tr>
<tr>
<td></td>
<td>Aka Kovacikova, Project Coordinator, Institute of Healthcare Improvement</td>
</tr>
<tr>
<td>II. Project JOINTS: Joining Organizations In Tackling SSIs</td>
<td>Deborah Yokoe, MD, MPH, Hospital Epidemiologist and Medical Director, Infection Control Dept. Brigham &amp; Women’s Hospital and Dana-Farber Cancer Institute</td>
</tr>
<tr>
<td></td>
<td>Lisa McDonald, BSN, RNFA, Canton Potsdam Hospital</td>
</tr>
<tr>
<td>III. Discussion, Questions and Answers</td>
<td>Facilitated by Wing Lee, Project Manager, NYSPFP</td>
</tr>
</tbody>
</table>
Project JOINTS: Joining Organizations In Tackling SSIs

Deborah Yokoe, MD, MPH
Lisa McDonald, BSN, RNFA
Our goals

- Offer implementation support to participants on the recommended interventions to reduce 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
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
Why focus on hip and knee arthroplasty?

- Over 1.1 million hip and knee arthroplasty procedures per year in the U.S.
- Knee arthroplasty surgical site infection (SSI) rates range from 0.68% to 1.60% and hip arthroplasty SSI rates range from 0.67% to 2.4% depending on patient risk. At these rates, between 6,000 and 20,000 SSIs occur annually.
- Estimated hospital costs alone: hip arthroplasty $100,000 and knee arthroplasty $60,000 with 22 day increase in length of stay
- Substantial impact on patients
• #1: Use an alcohol-containing antiseptic agent for preoperative skin preparation
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?
Cochrane Systematic Review 2009: Does Pre-Operative Skin Antisepsis Prevent SSI?

- CHG vs. PI (Berry 1982): Higher SSI rate with PI
- PI vs. iodophor-alcohol (2 studies): No significant difference
- Single vs. multiple-step application (4 studies): No significant difference
- Iodophor-impregnated drapes vs. regular drapes (4 studies): No significant difference
- **Conclusion**: Insufficient evidence to support recommending the use of one antiseptic agent over another
Effects of Preoperative Skin Preparation on Postoperative Wound Infection Rates: A Prospective Study of 3 Skin Preparation Protocols

Brian R. Swenson, MD, MS; Traci L. Hedrick, MD; Rosemarie Metzger, MD; Hugo Bonatti, MD; Timothy L. Pruett, MD; Robert G. Sawyer, MD

OBJECTIVE. To compare the effects of different skin preparation solutions on surgical-site infection rates.

DESIGN. Three skin preparations were compared by means of a sequential implementation design. Each agent was adopted as the preferred modality for a 6-month period for all general surgery cases. Period 1 used a povidone-iodine scrub-paint combination (Betadine) with an isopropyl alcohol application between these steps, period 2 used 2% chlorhexidine and 70% isopropyl alcohol (ChloraPrep), and period 3 used iodine povidacrylox in isopropyl alcohol (DuraPrep). Surgical-site infections were tracked for 30 days as part of ongoing data collection for the National Surgical Quality Improvement Project initiative. The primary outcome was the overall rate of surgical-site infection by 6-month period performed in an intent-to-treat manner.

SETTING. Single large academic medical center.

PATIENTS. All adult general surgery patients.

RESULTS. The study comprised 3,209 operations. The lowest infection rate was seen in period 3, with iodine povidacrylox in isopropyl alcohol as the preferred preparation method (3.9%, compared with 6.4% for period 1 and 7.1% for period 2; P = .002). In subgroup analysis, no difference in outcomes was seen between patients prepared with povidone-iodine scrub-paint and those prepared with iodine povidacrylox in isopropyl alcohol, but patients in both these groups had significantly lower surgical-site infection rates, compared with rates for patients prepared with 2% chlorhexidine and 70% isopropyl alcohol (4.8% vs 8.2%; P = .001).

CONCLUSIONS. Skin preparation solution is an important factor in the prevention of surgical-site infections. Iodophor-based compounds may be superior to chlorhexidine for this purpose in general surgery patients.
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 70% isopropyl alcohol
  3) Iodine povacrylex in isopropyl alcohol
# Povidone-Iodine vs. CHG-Alcohol vs. Iodine Povacrylex-Alcohol

## Time Sequence Study

<table>
<thead>
<tr>
<th>SSI</th>
<th>No. SSI</th>
<th>Povidone-iod/alcohol/pov-iod</th>
<th>CHG-alcohol 827</th>
<th>Iodoprophor-alcohol 794</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>
Chlorhexidine–Alcohol versus Povidone–Iodine for Surgical-Site Antisepsis

Rabih O. Darouiche, M.D., Matthew J. Wall, Jr., M.D., Kamal 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.
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.
<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 (0.52–1.80)</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>
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
Summary of Swenson and Darouiche results

Clean-contaminated procedures

<table>
<thead>
<tr>
<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>
</tr>
<tr>
<td>Darouiche (n=849)</td>
<td>16.1</td>
<td></td>
<td>9.5</td>
<td></td>
</tr>
</tbody>
</table>
• #2: Ask patients to bathe or shower with CHG soap at least 3 times before surgery
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
  – Garibaldi J Hosp Infect 1988,
  – Paulson AJIC 1993
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)
#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 soap 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 (Kluuytmans *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 *S. Aureus* Nasal Carriage?

- Systematic review (Ammerlaan HS, et al. *CID* 2009): 8 studies comparing mupirocin to placebo
  - Short-term nasal mupirocin (4-7 days) was an effective method for *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?

- Meta-analysis (*Kallen ICHE 2005*):
  - 3 randomized and 4 before-after trials
  - **Conclusion**: Mupirocin use was associated with a small reduction in SSI rates for non-general surgery (cardiothoracic, orthopedic, neurosurgery: 6.0% vs. 7.6%) but not for general surgery
Does Using Mupirocin Prevent SSIs?

- Systematic review (van Rijen JAC 2008): Included 4 randomized controlled studies
  - **Conclusion**: Mupirocin use was associated with a significant reduction in *S. aureus* postoperative infection rates among *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
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>Mupir + CHG</th>
<th>Placebo</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep surgical site</td>
<td>4 (0.9)</td>
<td>16 (4.4)</td>
<td>0.21 (0.07-0.62)</td>
</tr>
<tr>
<td>Superficial surgical site</td>
<td>7 (1.6)</td>
<td>13 (3.5)</td>
<td>0.45 (0.18-1.11)</td>
</tr>
</tbody>
</table>
## Decolonization for Orthopedic Surgery

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>Study Design</th>
<th>Decolonized Population</th>
<th>Decolonizing Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim, 2010</td>
<td>Observational</td>
<td>Only S. aureus colonized</td>
<td>Mupirocin and CHG</td>
</tr>
<tr>
<td>Price, 2008</td>
<td>Observational</td>
<td>Only S. aureus colonized</td>
<td>Mupirocin</td>
</tr>
<tr>
<td>Wilcox, 2003</td>
<td>Observational</td>
<td>All Patients</td>
<td>Mupirocin and Triclosan</td>
</tr>
<tr>
<td>Rao, 2008</td>
<td>Observational</td>
<td>Only S. aureus colonized</td>
<td>Mupirocin and CHG</td>
</tr>
<tr>
<td>Kalmeijer, 2002</td>
<td>RCT</td>
<td>All Patients</td>
<td>Mupirocin</td>
</tr>
</tbody>
</table>

This and next slide provided by Schweizer M, Perencevich E, Herwaldt L, Carson J, Kroeger J, Ward M
Decolonization for Orthopedic Surgery

- Price, 2008: 0.21 (0.01, 4.48)
- Kim, 2010: 0.41 (0.21, 0.80)
- Rao, 2008: 0.11 (0.01, 0.82)
- Kalmeijer, 2002 (RCT): 0.59 (0.19, 1.83)
- Overall: 0.40 (0.23, 0.69)

Protective against Gram+ SSI vs. Risk Factor for Gram+ SSI
Why Not Use Preoperative Mupirocin For All Orthopedic Patients?

Prevent *S. aureus* SSIs for some patients

Mupirocin resistance

Costs
Staph aureus decolonization strategy

- Target patients known to be S. aureus nasal carriers (MSSA and MRSA)
  - Most likely to benefit from decolonization
  - Reduce the risk of promoting mupirocin resistance by focusing on this subgroup
**MRSA/MSSA Screening Workflow**

To ensure successful expansion: Lab requisitions should be completed by Surgeons’ offices and delivered to CPE prior to patients’ appointments, all Surgeons are encouraged to use electronic prescription system to initiate Mupirocin

<table>
<thead>
<tr>
<th>Surgeon’s Office</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surgeon</strong> Completes lab requisition for MRSSA/MSSA swab; delivers to Surgical Scheduler</td>
</tr>
<tr>
<td><strong>Surgical Scheduler</strong> Enters ESP for Joint Replacement or Cardiac Surgery; delivers lab requisition to CPE</td>
</tr>
<tr>
<td><strong>OR Scheduling</strong> Schedules Surgical Procedure and CPE Visit (8-30 Days Prior to Surgery Date)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre-Surgery Testing Center</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPE Phlebotomist</strong> Receives completed lab requisition from NP. Phlebotomist enters tests into TOS System, prints Labels, and labels all specimens with appropriate patient information</td>
</tr>
<tr>
<td><strong>CPE NP</strong> Swabs patients’ nares and hands specimen off to CPE Phlebotomist; enters “Mupirocin as needed” in patient’s PAML; dispenses education sheet to patient</td>
</tr>
<tr>
<td><strong>CPE Phlebotomist</strong> Sends labeled swabs with blood/urine specimens to lab (existing process)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Microbiology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microbiologist</strong> incubates and analyzes specimen; if positive, automatic e-mail generated to ordering physician (Surgeon) within 24 hours of receipt of specimen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surgeon’s Office</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surgeon</strong> Completes e-script for Mupirocin; contacts patient to start dose at least 5 days prior to procedure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preop Nurse (DOS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preop RN</strong> Updates patients’ PAML day of surgery to confirm Mupirocin intake (uses CPE NP’s note in PAML as reminder to ask patient)</td>
</tr>
</tbody>
</table>
Project JOINTS: Joining Organizations In Tackling SSIs

Lessons from the field
A picture is worth a thousand words…

• Give patients (and family) something they can hold in their hands
  – A checklist
  – Screening facts
  – Specific instructions for bathing (add dates) and reasons
  – Where to go, when to come, what to bring lists are helpful

• Pictures or actual bottles can help patients be confident in purchasing CHG
Knowledge is power

- Discuss why repeat pre-op CHG bathing/cleansing is important
- Discuss why you are screening and what the patient’s responsibility is if positive.
Identify the “positive” patients

- Screen and decolonize the patients who are positive for MSSA or MRSA
- Identify appropriate antibiotics prior to surgery
Build on what you know

- If you already have a process for MRSA screening, MSSA screening can easily be added on.
- Identify current education resources that are well received.
Connect to a story

- Find your own “Rosie”
- See example of a patient’s experience in the Wall Street Journal
Pre-op class time is magical

- Patient and family engagement
- Patient experience
- Expectations
- Education
- Discharge Planning
- Screening
Staff need education too

- CHG bathing tips
- Alcohol drying time
- Screening tips- questions from patients
- Plan for new staff
Testing is fun!

- One class
- Follow one patient
- ID one MD champion, test with his or her patients scheduled the week of April 1
- Map it out – make a flow map- test improvements on ONE step at a time
Best ways to connect

- [www.ihi.org/projectjoints](http://www.ihi.org/projectjoints) (website!)
- [projectjoints@ihi.org](mailto:projectjoints@ihi.org) (individual questions)
- [joints@ls.ihi.org](mailto:joints@ls.ihi.org) (questions for the other hospitals and how IHI shares call material)
WHERE DO WE START?

Gap analysis
- Where are we now?
- Where do we want to be?

Involved assessing our current process and building collaborative relationships within and beyond the hospital setting:

- Surgeons
- Hospital administration
- Nursing leadership
- Pre-op nurses
- OR and anesthesia staff
- Infection prevention specialist
- Ambulatory surgery director and staff
- Physician office staff
- Pharmacy
- Lab
Present to surgeons. Use what you have—we had a joint space infection a few months prior to joining this initiative. I spoke to that and presented this with the goal of preventing one infection. I knew that without their buy in this would go nowhere at our facility. Surgeon buy in facilitated hospital administration buy in, which facilitated pharmacy support.

If you are an infection prevention specialist, seek the help of a lead nurse in the OR to help with implementation of this project.

Determine if you have one surgeon who will be your lead doc for this. We all had many questions along the way—having one doc to go to help with the logistics, initial implementation and questions/issues along the way was key.
What we do at Canton-Potsdam Hospital is care for life, every day and in countless ways. We’re much more than a list of services and technologies. The real source of our strength is our people—a health care team passionate about patient care.
WHAT EXACTLY SHOULD OUR PROTOCOL BE?

Goal: All total joint patients (hip, knee, shoulder) will be tested for staph aureus and receive the following interventions:

1. C&S Staph aureus testing within 30 days of surgery for all total joint patients
2. Decolonizing of MRSA and MSSA patients preoperatively with five days of intranasal Mupirocin twice daily and three days of Sage Chlorhexidine prep cloths
3. Reliably giving the appropriate antibiotics to the patient before starting surgery
   - MRSA pre-op antibiotic (Vancomycin + Ancef) infused within 2 hours of incision
   - MSSA pre-op antibiotic (Ancef) infused within 1 hour of incision time
4. Clipping (rather than shaving) hair at the surgical site.
5. Preparing skin at the surgical site with an antiseptic solution that contains CHG + alcohol
**Physician’s Orders**

**Decolonization & Pre-op Antibiotics – Total Joint**

**MRSA Positive**

### Allergies

<table>
<thead>
<tr>
<th>Medication/Reaction/Side Effects</th>
<th>Medication/Reaction/Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Food:

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Authorization given for dispensing under non-proprietary name according to hospital formulary unless checked here.

#### Staph aureus screen pre-op all total joint patients.

**MRSA Positive**:

- CHG sponge prep wipes x 3 days pre-op
- Intranasal mupirocin ointment 0.25 GM BID to each nostril x 5 days pre-op

#### Pre-op antibiotic day of surgery:

**MRSA Positive** (give both)

- Vancomycin 15 mg/kg IV to a maximum dose of 1500 mg (less than or equal to 1250 mg IV infuse over 60 minutes, 1500 mg IV to infuse over 90 minutes)
- Cefazolin 2 GMS IV (regardless of weight)

#### Re-dosing of antibiotics during surgery:

If greater than 1000ml blood loss or 3.5 hours surgery duration, redose all patients (unless allergic) with Cefazolin 2GMS IV (regardless of weight)

### Additional Instructions

<table>
<thead>
<tr>
<th>Physician Name - Print and Sign</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PHYSICIAN’S ORDERS**

**Decolonization & Pre-op Antibiotics – Total Joint**

**MSSA POSITIVE**

### ALLERGIES

<table>
<thead>
<tr>
<th>Food</th>
<th>Medication/Reaction/Side Effects</th>
<th>Number</th>
<th>Medication/Reaction/Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Ordered Date and Time**
  - Staph aureus screen pre-op all total joint patients.
  - MSSA POSITIVE:
    - CHG Sage prep wipes x 3 days pre-op
    - Intranasal mupirocin ointment 0.25 GM BID to each nostril X 3 days pre-op
  - Pre-op antibiotic day of surgery:
    - MSSA POSITIVE:
      - Cefazolin 2 GMS IV (regardless of weight)
      - If allergic to cephalosporins or with anaphylaxis to PCN:
        - Vancomycin 15 mg/kg IV to a maximum dose of 1500mg (less than or equal to 1230mg IV infuse over 60 minutes, 1500mg IV to infuse over 90 minutes)
  - Re-dosing of antibiotics during surgery:
    - if greater than 1000ml blood loss or 3.5 hours surgery duration, re-dose all patients (unless allergic) with Cefazolin 2GMS IV (regardless of weight)

- **Authorization Given for Dispensing Under Non-Proprietary Name According to Hospital Formulary unless Checked Here**

- **Physician Name - Print and Sign**
  - Date:  
  - Time:  
**Physician's Orders**

Decolonization & Pre-op Antibiotics – Total Joint

<table>
<thead>
<tr>
<th>Allergies</th>
<th>Medication/Reaction/Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ordered</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph aureus screen pre-op all total joint patients.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Negative Staph Aures Screen:**
- CHG Sage prep wipes x 3 days pre-op

**Pre-op antibiotic day of surgery:**

**Negative Screen:**
- Cefazolin 2 GMS IV (regardless of weight)
- If allergic to cephalosporins or with anaphylaxis to PCN:
  - Vancomycin 15 mg/kg IV to a maximum dose of 1500 mg
    - (less than or equal to 1250 mg IV infuse over 60 minutes, 1500 mg IV to infuse over 90 minutes)

**Re-dosing of antibiotics during surgery:**
- If greater than 1000 ml blood loss or 3.5 hours surgery duration, redose all patients (unless allergic) with Cefazolin 2 GMS IV (regardless of weight)

Physician Name: Print and Sign

Date: 

Time: 

LOGISTICS—THE REALITY OF ROLLING THIS OUT

Where will the nasal staph aureus screen get done? PAT? MD office?

If done in PAT, do the majority of our patients go to PAT? If not, how are we going to address this? Pre-op RN’s need patient teaching materials, project joints information and how to collect specimens. Will they be the ones responsible for checking results/follow up actions for positive patients? How will this be flagged for the OR?

If done in the offices, who will actually do the swabbing? Is there a nurse in all of the offices? How will these cultures get to the hospital lab? Is there a courier?

Has the lab set up a pneumonic to order this test? Are we ready to process the specimens?

Does the MD office staff know the importance of needing to book patients with a two week lead time? Will all MD’s be willing to give two weeks lead time or will they add total joint patients one week out to “fill their block”?

Will the pre-op orders be standardized for all or different for each surgeon?

Will we use hibiclens showers pre-op or CHG Sage prep cloths? Chloroprep or Duraprep?

How will the patients who test positive get the mupirocin ointment? From the pharmacy or from the pre-op nurse? If from the pre-op nurse, will the patient make another trip back to the hospital to pick it up? Will insurance cover it or is the patient expected to pay for it? Will the hospital provide it?

How will we track our compliance with project joints initiatives and record results?
QUESTION? WHAT DOES THE TEAM NEED FROM OUR NURSING DIRECTORS?

ANSWER: TIME AND SUPPORT
LAB

Testing procedure for Staphylococcus aureus in the Laboratory:

1. A swab collected from the nares is submitted to the laboratory for culture.
2. At 24 hours, the culture plate is examined for S. aureus. The plate may be mixed with other organisms, therefore, suspect colonies are isolated and examined again at 48 hours.
3. At 72 hours, suspect colonies are screened using a Staph latex kit. Positive latex indicates S. aureus. The organism is then tested for Methicillin resistance or susceptibility as well as a gram positive susceptibility panel.
4. All final reports with a result of S. aureus (MRSA and MSSA) are called to the Pre-op nurse and documented in the LIS.
PRE ADMISSION TESTING

How we achieved 100% Success:

* Our Physicians are aware of the 2 week lead time and (mostly) try to accommodate.

* Our PAT scheduler is well-informed and knows the importance of appropriate timing for PAT visits and will notify the PAT RN if there is an issue.

* All patients scheduled for a Total Joint Replacement are expected to be seen in person for a PAT visit, at that time the PAT RN performs the nasal swab. (If there is not adequate time before the DOS, a rapid test is done while the patient waits)

* PAT RN’s are responsible for: checking results, ensuring patients are notified and come to the hospital to obtain the Bactroban ointment if needed. Keep in mind many patients need much reassurance and explanations regarding a positive result.

* Each situation is assessed individually, for example if a patient is not able to return to the hospital for the ointment, a more detailed teaching plan is reviewed at the PAT visit and a prescription would be called to their local pharmacy if needed.

* In the rare case a patient does not come for a PAT visit, arrangements are made with the surgeon or Primary Provider for nasal swab testing. This may involve educating the office staff as well as ensuring the lab used runs the correct tests.

* Porject JOINTS lead RN is always readily available for any questions or concerns.

* On the DOS the Pre-Op RN reviews the checklist brought in by the patient and the MD orders to ensure the appropriate antibiotic is started in a timely manner.
Pre-Operative Screening for *Staphylococcus aureus*

Bacteria are everywhere. *Staphylococcus aureus* (pronounced staff-ill-oh-KOK-us AW-ree-us) or “*Staph*” is a bacteria that lives on the skin and in the noses of many healthy people. Staph bacteria do not cause any problems for most people, but sometimes cause serious infections including surgical wound infections. Staph can be treated with antibiotics.

**Methicillin-Resistant Staphylococcus Aureus** or “MRSA” is a type of Staph that is resistant to some antibiotics that are commonly used to treat Staph infections.

**Why are we screening for Staph?** We will swab the inside of your nose to find out if you carry the bacteria. The swab is sent to the laboratory. It takes 3-4 days for the results to come back.

If your test is positive for staph, your doctor will order a nasal ointment to remove the bacteria from the nose and a skin wash to remove the bacteria from the skin. You will also receive an antibiotic on the day of your surgery. A positive screening test does not mean you have an infection and your surgery will not be cancelled or delayed.

**If my test is positive, what treatment will I receive?** If your test is positive for Staph, the pre-op nurse will call you to come back to her office to pick up the Bactroban ointment and Sage prep wipes, prescribed by your doctor. This ointment is supplied in one large tube or several individual application tubes. Both are effective.

- If you receive a single tube of mupirocin (Bactroban) from the pre-op nurse, place a small amount of ointment on a Q-tip (a pea sized amount) and put on the inside front part of each nostril.

- If you receive 10 individual small tubes of ointment, put half of the ointment from the tube into one nostril and the other half into the other nostril.

Gently press your nostrils together and release several times (for about a minute) to spread the ointment through your nostrils. Do this twice a day for five days before your surgery.

Remember to use the Sage prep wipes for two days before your surgery. These prep wipes will help to remove bacteria from your skin.

**If test positive, will I be treated differently while in the hospital?** If you test positive for Staph that is resistant to some specific antibiotics such as MRSA, you may be placed in a single room or on “Contact Precautions”. This means that your healthcare team will wear gloves and a gown over their clothing when taking care of you. This is done to prevent your healthcare team from spreading MRSA to other patients that they care for.

**How can you prevent infections after surgery?** The most important thing you can do is *wash your hands* regularly. You should wash your hands frequently with soap and water or use an alcohol-based hand sanitizer.

- Don’t shave near where you will have surgery. Shaving with a razor can irritate your skin and make it easier to develop an infection. Keep any wounds clean and change your bandages the way your healthcare provider taught you. Clean your hands before and after changing your bandages.
Patient Education

CHG: Bathing with Sage Chlorhexidine Gluconate Wipes

What are sage wipes?
Sage 2% chlorhexidine gluconate (CHG) wipes are anti-Septic (germ-killing) cloths used to wash the skin. The living skin is a constant source of germs. Sage CHG kills 99% of the germs on the skin to help to prevent germs from getting into an open wound or your bloodstream and causing serious infection.

When should you NOT use these wipes?
Do not use on children under two months of age.
Do not use these wipes if you:
- Have an allergy to CHG
- Currently have severe skin breakdown, rash or burns
- Are receiving radiation therapy
- Are receiving Thiotepa (chemotherapy drug)

When should you use these wipes?
Ideally, use the wipes following a normal bath or shower, but they may also be used instead of a bath or shower. It is important for you to use them before going to the operating room for your surgery.

How to use the wipes:
1. Wash your hands with warm soapy water or use hand sanitizer.
2. Wipe the cloths using a circular or back and forth motion over the surface to be cleaned. Wipe each area thoroughly but do not scrub. Do not use the cloths on your face, head or neck.
3. Use three packages (6 cloths) of CHG prep wipes:
   - Cloth 1: Wipe your chest and abdomen.
   - Cloth 2: Wipe both arms, starting with the shoulder and ending at finger tips. Then thoroughly wipe the arm pit areas.
   - Cloth 3: Wipe both legs, starting at the thigh and ending at the toes. Be sure to thoroughly wipe behind your knees.
   - Cloth 4: Wipe your back starting at the base of your neck to your waist line. Help may be required.
   - Cloth 5: Wipe your right and left hip followed by your groin. Be sure to wipe folds in the groin area, avoiding privates.
   - Cloth 6: Wipe the buttocks. Wash hands or use hand sanitizer.
4. Do not rinse or wipe off the skin after using the CHG wipes. Do not apply lotions, moisturizers or makeup. Let the skin air dry. Skin may feel sticky for a short time as it dries. Put on a clean hospital gown. Do not put any of your own clothing back on.

Home use before surgery:
Take an evening bath or shower and wait at least one hour, until skin is dry and cool, before using the CHG cloths. Cool and dry skin is less likely to get irritated from the chemicals. Do not shave your legs or your underarms before or after using this product. If you do experience redness or itching, rinse the area with cool water. Dress in clean sleepwear. Do not shower or bathe on the morning of surgery.
Decolonization Patient Checklist

**Bactroban/ Mupirocin Ointment Use:**
- To be administered for five days, twice a day
- Wash hands before and after use. Apply a pea sized drop directly into each nostril with q-tip. Use a new q-tip for each application of the medication.
- Press the sides of the nose together and gently massage after application for thirty seconds to spread the ointment throughout the inside of the nostrils.
- Discontinue usage of the medication and call your health care provider if severe reaction or local irritation occurs
- Avoid contact of the medication with the eyes

**Sage Prep Wipes:**
- Do for 2 days prior to surgery and the day of surgery at the hospital
- See attached Preparing Your Skin Before Surgery Instruction Sheet

<table>
<thead>
<tr>
<th>AM NASAL BACTROBAN</th>
<th>PM NASAL BACTROBAN</th>
<th>SAGE PREP WIPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ ✓</td>
<td>☐ ✓</td>
<td>☐</td>
</tr>
<tr>
<td>☐ ✓</td>
<td>☐ ✓</td>
<td>☐</td>
</tr>
<tr>
<td>☐ ✓</td>
<td>☐ ✓</td>
<td>☐</td>
</tr>
<tr>
<td>☐ ✓</td>
<td>☐ ✓</td>
<td>☐</td>
</tr>
<tr>
<td>☐ ✓</td>
<td>☐ ✓</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Please Bring This Checklist With You To The Hospital The Day Of Your Surgery.**
INFECTION PREVENTION SPECIALIST

Provide Historical SSI Data
Review the Literature
Review/Recommend Best Practices
Infection Prevention Committee (IPC) Support
Serve as an Interdisciplinary Liaison For:
- Pharmacy, OR/AMS, Lab, Nursing, QM
Ongoing MRSA/MSSA Education
Serve as a Resource
Report Progress to the IPC
**Project Joints  "One is Not Zero"**

*Return form to Lisa McDonald (OR)*

Surgical Procedure: __________________________

<table>
<thead>
<tr>
<th><strong>Checklist</strong></th>
<th><strong>Date</strong></th>
<th><strong>Signature</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph Aureus Nasal Screen (order as Staph aureus total joint screen)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Staph Aureus Results Checked:</strong> NEGATIVE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient received CHG Sage wipes (to use X 2 nights before surgery) and states understanding of product use and importance of compliance. <strong>Remind patient not to shave or take a shower the morning of surgery.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMB Surg: Patient confirms use of prep wipes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ancef  2 GMS IV given at __________(time)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloroprep X __ intraop with thirty second gentle friction scrub at incision site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery Start time __________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Surgical Procedure: ________________________________

<table>
<thead>
<tr>
<th>Checklist</th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph Aureus Nasal Screen (order as Staph aureus total joint screen)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Staph Aureus Results Checked:** MSSA POSITIVE

Patient received 2% Bactroban (bid X 5 days before surgery) and CHG Sage wipes (X 2 nights before surgery) and states understanding of product use and importance of compliance. Decolonization checklist given to patient. **Remind patient not to shave or take a shower the morning of surgery.**

<table>
<thead>
<tr>
<th>AMB Surg: Patient confirms use of bactroban and prep wipes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ancef 2 GMS IV given at __________(time)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Chloroprep X __ intraop with thirty second gentle friction scrub at incision site</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Surgery Start time __________</th>
</tr>
</thead>
</table>
**Staph Aureus Nasal Screen (order as Staph aureus total joint screen)**

**Staph Aureus Results Checked: MRSA POSITIVE**

Patient received 2% Bactroban (bid X 5 days before surgery) and CHG Sage wipes (X 2 nights before surgery) and states understanding of product use and importance of compliance. Decolonization checklist given to patient.

*Remind patient not to shave or take a shower the morning of surgery.*

Patient weight ____________

AMB Surg: Patient confirms use of prep wipes
Vancomycin ________ IV given at ___________ (time)

Ancef 2 GMS IV given at __________ (time)

Chloroprep X __ intraop with thirty second gentle friction scrub at incision site

Surgery Start time ____________
| NAME  | AGE | MR # | Surgeon | Diagnosis | Known MRSA | Pre-op Screen | C&S Results | Date of Surgery | Sage Wipes | Bactroban | Vanco | Ancef | Chloro Prep | Incision | Comments |
|-------|-----|------|---------|-----------|------------|--------------|-------------|----------------|-------------|------------|-------|-------|-------|--------|------------|----------|----------|
| 67    |     |      | Savage  | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 63    |     |      | Savage  | LTH       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.929 | X 2     | 1024     |
| 61    |     |      | Savage  | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 77    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 72    |     |      | Savage  | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 66    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 55    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 58    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 77    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 44    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 65    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 60    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
| 40    |     |      | Parrier | RTK       | Negative   | #6/20/2012X 2|             | 1/9/2012    | X 2         |            |       |     | GMS @ 0.775 | X 2     | 804      |
WHAT HAPPENED IN REAL TIME?

Surgeons ordered joint protocol for all patients
All patients consented to testing
Pre-op nurses successfully collected nasal swabs, diligently checked results and provided patient education to MSSA and MRSA positive patients. All positive patients completed decolonization
All patients were given correct antibiotic at the correct time on day of surgery
All patients received the appropriate surgical skin prep
## OUR RESULTS

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
<th>Known MRSA</th>
<th>MRSA</th>
<th>MSSA</th>
<th>Total MRSA &amp; MSSA</th>
<th>Captured with nasal screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>110</td>
<td>2 = 2%</td>
<td>3 = 3%</td>
<td>16 = 15%</td>
<td>21 = 21%</td>
<td>19%</td>
</tr>
<tr>
<td>2012</td>
<td>146</td>
<td>0 = 0%</td>
<td>2 = 1.4%</td>
<td>19 = 13%</td>
<td>21 = 14.4%</td>
<td>14.4%</td>
</tr>
<tr>
<td>2013</td>
<td>70</td>
<td>4 = 5%</td>
<td>18 = 26%</td>
<td>22 = 31%</td>
<td></td>
<td>26%</td>
</tr>
</tbody>
</table>

Captured with nasal screen = 19% for 2011, 26% for 2012, and 26% for 2013.
<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
<th>Infections</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>4%</td>
<td>5/123</td>
<td>Superficial SSI’s (4 out of 5 were SA)</td>
</tr>
<tr>
<td>2008</td>
<td>2.3%</td>
<td>3/129</td>
<td>One Organ space MRSA</td>
</tr>
<tr>
<td>2009</td>
<td>2.0%</td>
<td>3/150</td>
<td>One Organ space SA</td>
</tr>
<tr>
<td>2010</td>
<td>0.7%</td>
<td>1/135</td>
<td>Bipolar (partial) hip Superficial SA</td>
</tr>
<tr>
<td>2011</td>
<td>0.7%</td>
<td>1/150</td>
<td>Serratia Marcescens</td>
</tr>
<tr>
<td>2012</td>
<td>0.7%</td>
<td>1/146</td>
<td>Bipolar (partial) hip Organ space SA</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td>(1) superficial Staph epi SSI (pt non-compliant w/ Sage wipes)</td>
</tr>
</tbody>
</table>

No reportable SA SSI’s on elective total joint replacements to report since beginning Project JOINTS.

One late onset SA infection in 2013 – presented in ER eleven months after date of surgery after uneventful postoperative course.
We do realize that this is fantastic and an awesome achievement but realistically not sustainable over the long term. Some patients realistically will get infections. We can’t make everyone the perfect candidate or give them the best tissue. Total joint replacement is an invaluable procedure to millions of people, allowing them to regain quality of life by effectively reducing the pain and disability associated with arthritis. What we must do, as providers, is to stay current on research and be diligent in every aspect of this procedure to make total joint replacement surgery as safe as it can be for patients across the country. We need to educate our patients on how important infection control is and how it is related to their most optimal recovery. This means sharing our knowledge in an effort to give our patients the best care that we know how to give. Our team is very thankful for all of the help and support that we were given in achieving this goal and are excited to help spread our knowledge beyond the walls of Canton Potsdam Hospital.
SUCCESS

Approximately two hundred hospitals participated in cohort one. We were one of six hospitals to achieve exemplar status with all three initiatives. Exemplar hospitals were the leaders in implementing and consistently practicing the bundle initiatives. We chose to implement all of the Project JOINTs initiatives as our standard joint protocol after the trial period. Our team networked with other hospitals, helping to guide the implementation of these initiatives in other rural hospitals. We are happy to offer our support to you and we wish you the same success!

The exemplar designation highlights CPH’s dedication to providing safe, quality care to our patients and community, centered on evidence-based research and practices.

Please feel free to contact us with any questions:

Lisa McDonald, RNFA
Canton Potsdam Hospital
50 Leroy Street
Potsdam, NY 13676
ltmcdonald@cphospital.org
315-261-5970
315-262-5020

Dr. A. Martin Clark, CPH Chief of Surgery
St. Lawrence Orthopedics
49 Lawrence Avenue
Potsdam, NY 13676
drmartyclark@yahoo.com
315-265-0394
Hospital Discussion and Questions

Questions
Next Steps

- Upcoming Webinars:
  - Wednesday, September 18, 7:00 – 8:00a.m.

- Milestones for September
  - Started implementation of selected pre-operative screening and post–operative improvement opportunities to reduce harm for surgical patients