Infection Control for the Surgeon

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Associate Hospital Epidemiologist
VCU Medical Center
Summer 2008
Hospital Acquired Infections

• 5-10% of patients admitted to acute care hospitals acquire infections
  – 2 million patients/year
  – ¼ of nosocomial infections occur in ICUs
  – 100,000 deaths/year
  – Attributable annual cost: $4.5 – $5.7 billion
    • Cost is largely borne by the healthcare facility not 3rd party payors
• 70% are due to antibiotic-resistant organisms
• Invasive devices are more important than underlying diseases in determining susceptibility to nosocomial infection

Status of Mandatory Reporting Legislation for Nosocomial Infections

Healthcare-Associated Reporting Laws and Regulations

Source: APIC, February 2008
2009: JCAHO NPSG GOAL 7

• Reduce the risk of health care-associated infections:
  – Meeting Hand Hygiene Guidelines
  – Sentinel Events Resulting from Infection
  – Preventing Multi-Drug Resistant Organism Infections
  – Preventing Central-Line Associated Blood Stream Infections
  – Preventing Surgical Site Infections

Shifting Vantage Points on Hospital Acquired Infections

Many infections are inevitable, although some can be prevented

Each infection is potentially preventable unless proven otherwise

The existence and dissemination of evidence based recommendations has been insufficient to ensure that evidence based infection prevention be practiced
How Active Resisters and Organizational Constipators Affect Health Care-Acquired Infection Prevention Efforts

• Qualitative study
• In-depth phone and in-person interviews conducted with 86 participants from 14 hospitals
  – Chief executive officers, chiefs of staff, hospital epidemiologists, infection control professionals, intensive care unit directors, nurse managers, and frontline physicians and nurses

How Active Resisters and Organizational Constipators Affect Health Care-Acquired Infection Prevention Efforts

• Study indentified pervasiveness of:
  – “Active resisters”—hospital personnel who vigorously and openly opposed various changes in IC practice
  – “Organizational constipators”- mid to high level executives who act as insidious barriers to change

• Active resisters and constipators were identified in all hospitals surveyed

Strategies for Reducing HAIs

• Enhanced transparency of reporting HAI rates
  – Feedback to management and frontline providers

• Implementation of multiple evidence based interventions- ‘bundles’ and IP best practices

• Evidence based policies

• Procedures with checklists
  – CVC insertion bundle

• Monitoring tools for compliance assessment and feedback
  – Feedback to management and frontline providers
Prevention of Nosocomial BSIs
Hopkins Model (Central Line Bundle)

• Creation of a central line insertion cart
• Use of a insertion checklist to ensure:
  – Hand hygiene prior to the procedure
  – Sterile gloves, gown, mask, cap, full-size drape
  – Chlorhexidine skin prep of the insertion site
  – Use of subclavian vein as the preferred site
• Bedside nurse empowered to stop the procedure if a step is missed
• Ask every day during rounds whether catheters can be removed

Practice Standardization Leads to Major Reduction in ICU CLABSIs


CLABSI Prevention

- Catheter-related bloodstream infections are expensive and result in significant morbidity and mortality
- Simple, inexpensive, and evidence-based interventions to reduce these infections are effective
- Broad use of these interventions could significantly reduce cost, morbidity and mortality
Chlorhexidine Impregnated Sponges

http://www.uwhealth.org/images/ewebeditpro/uploadimages/Piccbiopatchstat.jpg
Chlorhexidine Impregnated Sponges

• Randomized, blinded controlled trial conducted in 7 French ICUs
• Adults with arterial catheter, CVC or both for 48 hours or longer
• CHGIS vs standard dressings (controls) with scheduled change of unsoiled adherent dressings every 3 vs every 7 day
• Outcome CR-BSI and colonization rate between CHGIS vs controls at 3- vs 7-day dressing changes

Timsit JF et al. JAMA 2009 Mar 25;301(12):1231-41.
Chlorhexidine Impregnated Sponges

• Use of CHGIS dressings with intravascular catheters in the intensive care unit reduced CR-BSIs even when background infection rates were low
  – 0.6/1000 DD vs 1.4/1000 DD
  • (HR 0.39 95%CI 0.17 vs 0.93)
• Reducing the frequency of changing from every 3 days to every 7 days appeared safe

Patient Skin Decolonization with Clorhexidine

- 4% chlorhexidine whole-body washing and *A. baumannii* skin colonization and infection among patients in a medical ICU
  - Daily whole-body disinfection with 4% CG significantly reduced *A. baumanii* colonization and infection
  - *A. baumanii*-BSIs decreased from:
    - 4.6 to 0.6 per 100 patients (*P* ≤ 0.001)

Head of Bed Elevation in VCU Medical ICU: Effect of Feedback

Percent Compliance

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q1-04</th>
<th>Q2-04</th>
<th>Q3-04</th>
<th>Q4-04</th>
<th>Q1-05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline; no feedback</td>
<td>26</td>
<td>79</td>
<td>96</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Performance feedback quarterly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Head of Bed Elevation in VCU Medical ICU: Effect of Feedback

% Compliance with HOB elevation

Pneumonia cases/1,000 ventilator-days

Baseline; no feedback
Performance feedback quarterly

Slide: courtesy of MB Edmond MD, MPH, MPA
Much Cleaner Cuts

PROBLEM: Infection related to surgery • PROPOSAL: Better use of antibiotics, don’t shave with razor prior to surgery, tighten control of blood sugar • POSSIBLE LIVES SAVED: 8,000

A hospital is a risky place for people who have had surgery. No matter how much antibacterial solution is painted on before the first cut, opening the body invites lurking microbes. Infections at the surgery site complicate an estimated 780,000 operations a year, or more than 1 in every 40 procedures. For abdominal surgery, the likelihood is as high as 1 in 5. And the complications are tough to treat. Infected patients are two to three times more likely to die and are hospitalized an average of seven days longer than uninfected patients who had the same operation.

Even before the 100K campaign got underway, IHI had been working with a group of 56 hospitals on strategies to lower the rate of surgical-site infections. Results of the yearlong effort, published last month in the American Journal of Surgery, showed a re-

SCIP
Surgical Care Improvement Project

• A national partnership of organizations to improve the safety of surgical care
• Goal: reduce surgical complications 25% by 2010
• Initiated in 2003 by CMS & CDC
  – Steering committee of 10 national organizations
  – >20 additional organizations provide technical expertise
• Strategy: Surgeons, anesthesiologists, periop nurses, pharmacists, infection control professionals, & hospital executives work together to improve surgical care
## SCIP Infection Prevention Measures

<table>
<thead>
<tr>
<th></th>
<th>Measure</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perioperative antibiotic prophylaxis</td>
<td>Antibiotic given within 1 hour prior to incision</td>
</tr>
<tr>
<td>2</td>
<td>Appropriate antibiotic selected</td>
<td>Appropriate antibiotic selected</td>
</tr>
<tr>
<td>3</td>
<td>Antibiotic discontinued within 24 hrs of surgery end time (48 hrs for cardiac surgery)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Glycemic control</td>
<td>Cardiac surgery patients with 6 AM glucose ≤ 200 mg/dL on postop day 1 &amp; 2</td>
</tr>
<tr>
<td>5</td>
<td>Appropriate hair removal</td>
<td>No hair removal, or hair removal with clippers or depilatory</td>
</tr>
<tr>
<td>6</td>
<td>Normothermia</td>
<td>Colorectal surgery patients with T ≥ 96.8°F within the first hour after leaving the OR</td>
</tr>
<tr>
<td>7</td>
<td>Perioperative β-blockers</td>
<td>Patients on a β-blocker prior to admission who received a β-blocker 24 hrs prior to incision through discharge from PACU</td>
</tr>
<tr>
<td>8</td>
<td>DVT prophylaxis</td>
<td>Patients with recommended DVT prophylaxis ordered during the admission</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Patients who received appropriate DVT prophylaxis within 24 hours prior to <em>Surgical Incision Time</em> to 24 hours after <em>Surgery End Time</em></td>
</tr>
</tbody>
</table>
Infection Rate


Downloaded from: Principles and Practice of Infectious Diseases
Meta-analyses:
Antibiotic Prophylaxis vs Placebo

Odds ratio for infection

- OR 0.35; TAH; 17 trials
- OR 0.35; TAH; 25 trials
- OR 0.30; biliary surgery; 42 trials
- OR 0.20; CT surgery; 28 trials

Effect of Appropriate Perioperative Antibiotic Prophylaxis at a 650-bed Tertiary Care Hospital

Process Indicators:
Timing of First Antibiotic Dose

Infusion should begin within 60 minutes of the incision

• Little controversy regarding this indicator

Process Indicators: Duration of Antimicrobial Prophylaxis

Prophylactic antimicrobials should be discontinued within 24 hrs after the end of surgery

• Areas of controversy:
  – ASHP recommends continuing prophylaxis for CT surgery procedures for up to 72 hrs after the operation; Society of Thoracic Surgeons recommends 48 hrs

The Timing of Surgical Antimicrobial Prophylaxis

- Objective: to determine the optimal timing of surgical antimicrobial prophylaxis
- Prospective observational cohort at Basel University Hospital
  - Consecutive series of 3836 surgical procedures
  - Multiple logistic regression analyses for the odds of SSI when the antimicrobial was administered <30 minutes prior to incision vs 59 to 30 minutes prior to incision

FIGURE 1. Risk-adjusted odds ratios and 95% confidence intervals for surgical site infection versus timing of antimicrobial prophylaxis divided into 3 time intervals. Association of timing of antibiotic prophylaxis and the odds of SSI obtained with multivariable logistic regression analysis.

Pathophysiology of Shaving & SSI

• Hair removal with a razor can disrupt skin integrity
• Microscopic exudative rashes and skin abrasions can occur during hair removal.
• These rashes and skin abrasions can provide a portal of entry for microorganisms
**Cochrane Database of Systematic Reviews: Preoperative Hair Removal and SSIs**

<table>
<thead>
<tr>
<th>Trial</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 trials compared hair removal with razor or depilatory cream vs no hair removal</td>
<td>No significant difference in SSI</td>
</tr>
<tr>
<td>3 trials compared hair removal with clippers vs shaving</td>
<td>Increased risk of SSI with Shaving (RR=2.02)</td>
</tr>
<tr>
<td>7 trials compared hair removal with shaving vs depilatory cream</td>
<td>Increased risk of SSI with Shaving (RR=1.54)</td>
</tr>
<tr>
<td>One trial each compared shaving the night before vs day of surgery, and clipping the day before vs day of surgery</td>
<td>No significant difference in SSI</td>
</tr>
</tbody>
</table>

Tanner et al. *Cochrane Database of Systematic Reviews* 2006, issue 3, Art No. CD004122
Cochrane Database of Systematic Reviews: Preoperative Hair Removal and SSIs

• If hair removal is necessary then clipping and depilatory creams result in fewer SSIs than shaving with a razor
• There is no difference in SSI if hair is removed one day prior or on the day of surgery

Tanner et al. Cochrane Database of Systematic Reviews 2006, issue 3, Art No. CD004122
Effect of Shaving in Spinal Surgery

789 patients randomized

371 patients shaved

4 patients (1.08%) developed SSI

418 patients not shaved

1 patient (0.24%) developed SSI

Perioperative Glucose Control

- Poor glucose control has been shown to be an *independent* risk factor for SSI in multiple studies
- Risk is increased due to vascular disease, neutrophil dysfunction, impairment of complement & antibodies
- Intervention: maintain glucose at 151-200 mg/dL via a continuous insulin infusion
Perioperative Glucose Control

- 141 diabetic patients undergoing CABG were randomized to tight glycemic control (125-200 mg/dL) with GIK or standard therapy (<250 mg/dL) using SQ SSI beginning before anesthesia & continuing for 12 hours after surgery.

<table>
<thead>
<tr>
<th></th>
<th>SSI</th>
<th>GIK</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection (wound,</td>
<td>13%</td>
<td>0%</td>
<td>0.01</td>
</tr>
<tr>
<td>pneumonia)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-op LOS</td>
<td>9.2 days</td>
<td>6.5 days</td>
<td>0.001</td>
</tr>
<tr>
<td>Mortality</td>
<td>0%</td>
<td>0%</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Perioperative Glucose Control

- 2,467 diabetic patients undergoing cardiac surgery at a community hospital
  - 968 patients treated with sliding scale insulin (1987-91)
  - 1499 patients treated with CII to target glucose of 150-200 until POD 3 (1991-97)

<table>
<thead>
<tr>
<th></th>
<th>SSI</th>
<th>CII</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound infection</td>
<td>1.9%</td>
<td>0.8%</td>
<td>0.01</td>
</tr>
<tr>
<td>LOS</td>
<td>10.7 days</td>
<td>8.5 days</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Mortality</td>
<td>6.1%</td>
<td>3.0%</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Perioperative Glycemic Control

• Tight glycemic control of blood glucose improves overall outcomes for surgical patients with DM
• The best quality data currently available is in the CT surgical literature
• Data appear promising but quality studies in the non-cardiac surgical populations are not yet available
Physiologic Effects of Hypothermia

Anesthetic drugs, opioids, sedatives

↓

Impaired thermoregulatory control

Vasoconstriction

↓ Tissue oxygenation

↓ Production of superoxide radicals

↓ Collagen deposition

↓ Killing of pathogens by neutrophils

↑ Risk of SSI
Perioperative Normothermia

- Blinded, randomized trial of 421 patients undergoing clean surgery (breast, varicose vein or hernia) comparing routine preoperative care to systemic warming (forced air warming blanket 30 minutes preop) to local warming (30 minute preop warming of planned incision with a radiant dressing)

<table>
<thead>
<tr>
<th>Infection rate</th>
<th>Non-warmed</th>
<th>Local warming</th>
<th>Systemic warming</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14%</td>
<td>4%</td>
<td>6%</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Perioperative Normothermia

- Double-blinded, randomized trial of 200 patients undergoing colorectal surgery comparing routine intraoperative thermal care (34.5°C) to normothermia (36.5°C) using a forced air cover and heated fluids

<table>
<thead>
<tr>
<th></th>
<th>Hypothermia</th>
<th>Normothermia</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection rate</td>
<td>19%</td>
<td>6%</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Comparison of Different Regimens for Surgical Hand Preparation

- Prospective clinical trial comparing a traditional surgical scrub with chlorhexidine vs. a waterless hand rub

- Waterless hand rub:
  - Caused less skin damage (P=0.002)
  - Produced lower microbial counts postscrub at days 5 (P=0.002) & 19 (P=0.02)
  - Required less time (1.3 minutes vs. 2.4 minutes; P<0.0001)
  - Was preferred by surgical staff (P=0.001)
  - Was cheaper

Alcohol-based Hand Rub vs Traditional Scrub Prevention of Surgical Site Infection

• Prospective, randomized equivalence trial comparing the effectiveness of waterless, alcohol-based hand rub vs traditional scrub

• 4,387 consecutive patients who underwent clean and clean contaminated surgery

• Findings:
  – Alcohol hand rub was as effective as traditional scrub in preventing SSIs in a 30 day follow-up
  – Alcohol hand rub was better tolerated by surgical teams
  – Alcohol hand rub can be safely used as an alternative to traditional surgical hand-scrubbing

**S.aureus carriage in healthy populations**

- Cross sectional surveys
  - Nasal carriage 20%-55%
- Longitudinal studies
  - 10%-35% of healthy adults are persistent nasal carriers
  - 20%-75% of healthy adults are intermittent carriers

Vandenberg et al. J Lab Clin Med 1999;133:525-34
## Correlation of *S. aureus* nasal carriage and *S. aureus* SSI

<table>
<thead>
<tr>
<th>Nasal <em>S. aureus</em> carriage CFUs (n)</th>
<th>Patients (N)</th>
<th>Infections rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>345</td>
<td>8</td>
</tr>
<tr>
<td>$10^1$ to $10^3$</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>$10^3$ to $10^5$</td>
<td>28</td>
<td>11</td>
</tr>
<tr>
<td>$10^5$ to $10^6$</td>
<td>26</td>
<td>19</td>
</tr>
<tr>
<td>$&gt; 10^6$</td>
<td>38</td>
<td>29</td>
</tr>
</tbody>
</table>

## Intranasal Mupirocin to prevent *S. aureus* SSI

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mupirocin Group</th>
<th>Placebo group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>S. aureus</em> carriers</td>
<td><em>S. aureus</em> carriers</td>
</tr>
<tr>
<td></td>
<td>N=444</td>
<td>N=447</td>
</tr>
<tr>
<td>Nosocomial infection</td>
<td>57/444 (12.8)</td>
<td>72/447 (16.1)</td>
</tr>
<tr>
<td>Nosocomial <em>S. aureus</em> infection</td>
<td>17/430 (4.0)</td>
<td>34/439 (11.6)</td>
</tr>
<tr>
<td>SSI</td>
<td>44/444 (9.9)</td>
<td>52/447 (11.6)</td>
</tr>
<tr>
<td><em>S. aureus</em> SSI</td>
<td>16/32 (3.7)</td>
<td>26/439 (5.9)</td>
</tr>
</tbody>
</table>

Randomized, placebo controlled trial of placebo vs intranasal mupirocin ointment in 4030 patients undergoing general, gynecologic, neurologic or cardiothoracic surgeries

VCUMC Approach to MRSA Active Surveillance – select patient populations

• High risk surgeries
  – Cardiothoracic surgery
    • CABG
    • Valve replacements
  – Neurosurgeries
    • Craniotomies
    • Spinal fusion
  – Orthopedic surgery
    • Joint replacement

• Outbreak situations
  – For epidemiologic surveillance and source/cross transmission control
Rapid Detection of MRSA

• The BD GeneOhm™ MRSA Assay
  – Qualitative *in vitro* diagnostic test for the direct detection of methicillin-resistant *Staphylococcus aureus* (MRSA) from a nasal specimen.

• Results available in less than 2 hours, directly from a nasal swab specimen

• No culture step required
Highly Effective Regimen for Decolonization of Methicillin-Resistant Staphylococcus aureus Carriers

- Prospective cohort study with a mean follow-up period of 36 months
- 62 patients
  - Decolonization treatment was performed
  - At least 6 body sites were screened for MRSA (including by use of rectal swabs) before the start of treatment.

Highly Effective Regimen for Decolonization of Methicillin-Resistant *Staphylococcus aureus* Carriers

- Standardized decolonization treatment
  - Mupirocin nasal ointment
  - Chlorhexidine mouth rinse
  - Full-body wash with chlorhexidine soap for 5 days.
  - Intestinal and urinary-tract colonization treated with oral vancomycin and cotrimoxazole
  - Vaginal colonization treated with povidone-iodine or with chlorhexidine ovula

Highly Effective Regimen for Decolonization of Methicillin-Resistant *Staphylococcus aureus* Carriers

Decolonization successful in 54 (87%) of patients

Figure 2. Number of decolonization courses needed for successful methicillin-resistant *Staphylococcus aureus* (MRSA) eradication

Double Gloving

• American College of Surgeons
  – The ACS recommends the universal adoption of the double glove (or underglove) technique in order to reduce body fluid exposure caused by glove tears and sharps
  • In certain delicate operations, and in situations where it may compromise the safe conduct of the operation or safety of the patient, the surgeon may decide to forgo this safety measure

http://www.facs.org/fellows_info/statements/st-58.html
Double Gloving: Facts

• Glove barrier perforation rates
  – 61% for thoracic surgeons and 40% for scrub personnel
  – Double gloving reduces the risk BBF exposure as much as 87%

• Double gloving has disadvantages such as decreased tactile sensation
  • Example: neurosurgery where delicate manipulation of instruments and tissues is required

• Despite a large body of data documenting the benefits of double gloving, this technique has not received wide acceptance by surgeons.

http://www.facs.org/fellows_info/statements/st-58.html
Incidence of Glove Perforations in GI Surgery and the Protective Effect of Double Gloves: A Prospective, Randomized Control Study

- 566 pairs of gloves tested

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Single glove</th>
<th>Double glove</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of glove perforations</td>
<td>53/306 (17%)</td>
<td>6/260 (2%)</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Rate of surgeon blood contamination of hands</td>
<td>15/115 (13%)</td>
<td>2/98 (2%)</td>
<td>&lt;0.005</td>
</tr>
</tbody>
</table>

Glove Perforation in Orthopedic and Trauma Surgery

<table>
<thead>
<tr>
<th>1769 Gloves from 349 Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perforations/Gloves</strong></td>
</tr>
<tr>
<td>Single Gloves</td>
</tr>
<tr>
<td>Indicator Gloves</td>
</tr>
<tr>
<td>Combination Gloves</td>
</tr>
</tbody>
</table>

- Orthopedic surgeons randomized to either single gloves of their preference, double indicator gloves, or a combination of two regular surgical gloves

* P>0.05 , †P <0.001

How Often Does Glove Perforation Occur in Surgery?

Double gloving to reduce surgical cross-infection

<table>
<thead>
<tr>
<th>14 trials of double gloving</th>
<th>• More perforations to the single glove than the innermost of the double gloves (OR 4.10, 95% CI 3.30 to 5.09)</th>
</tr>
</thead>
</table>
| 8 trials of indicator gloves | • Fewer perforations detected with single gloves compared with indicator gloves (OR 0.10, 95% CI 0.06 to 0.16)  
• Fewer perforations detected with standard double glove compared with indicator gloves (OR 0.08, 95% CI 0.04 to 0.17) |

J Tanner, H Parkinson Cochrane Database of Systematic Reviews 2008 Issue 2
Double gloving to reduce surgical cross-infection

- There is no direct evidence that additional glove protection worn by the surgical team reduces surgical site infections in patients.
- **The addition of a second pair of surgical gloves significantly reduces perforations to innermost gloves.**
- Perforation indicator systems results in significantly more innermost glove perforations being detected during surgery.

J Tanner, H Parkinson. *Cochrane Database of Systematic Reviews* 2008 Issue 2
# Surgical Glove Perforation and SSI

<table>
<thead>
<tr>
<th>Overall SSI Rate 4.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSI Risk- Glove perforation W/O antimicrobial prophylaxis</td>
</tr>
<tr>
<td>OR 4.2</td>
</tr>
<tr>
<td>95% CI 1.7-10.8</td>
</tr>
<tr>
<td>P=0.003</td>
</tr>
</tbody>
</table>

Prospective, observational cohort of 4147 visceral, vascular or trauma surgeries

Multivariate logistic regression analysis employed

Misteli et al, Archives of Surgery. 2009; 144 (6): 553-558
The Neutral Zone

- The ACS recommends the use of HFT as an adjunctive safety measure to reduce sharps injuries during surgery except in situations where it may compromise the safe conduct of the operation, in which case a partial HFT can be used.

http://www.facs.org/fellows_info/statements/st-58.html
The Neutral Zone

• HFT and Sharps Neutral Zone
  – No direct handing of instruments from scrub person to surgeon and back

• Partial HFT
  – Sharps are directly handed by the scrub person to the surgeon, but then returned to the scrub person via a neutral zone

http://www.facs.org/fellows_info/statements/st-58.html
Effectiveness of the Hands Free Technique in Reducing Operating Theatre Injuries

<table>
<thead>
<tr>
<th>Hands free Technique</th>
<th>Event rate</th>
<th>Rate ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used</td>
<td>2.1% (33/1545)</td>
<td>0.41 (0.49-1.98)</td>
</tr>
<tr>
<td>Not used</td>
<td>5.1% (110/2153)</td>
<td>1.0 reference</td>
</tr>
</tbody>
</table>

• Prospective evaluation of the hands-free technique in reducing the incidence of percutaneous injuries, contaminations, and glove tears.
• Circulating nurses recorded the proportion of use of the hands-free technique during each operation

*Occup Environ Med* 2002; 59: 703-707
Blunt Tip Suture Needles

- **Suture needle injuries pose the greatest risk of sharps injury to the surgeon and scrub personnel**
- **The ACS recommends the universal adoption of blunt tip suture needles for the closure of fascia and muscle in order to reduce needle-stick injuries in surgeons and OR personnel**

http://www.facs.org/fellows_info/statements/st-58.html
Blunt Tip Suture Needles

- The ACS recommends the universal adoption of blunt tip suture needles for the closure of fascia and muscle in order to reduce needle-stick injuries in surgeons and OR personnel
  - A new generation of blunt suture needles is now on the market with a slightly more tapered tip profile that may provide for easier suturing

http://www.facs.org/fellows_info/statements/st-58.html
Glove Perforation During Hip Arthroplasty

- Prospective randomized trial comparing the incidence of surgical glove perforation by standard surgical needle vs. taperpoint needle

Glove Perforation During Hip Arthroplasty

![Bar graph showing the number of gloves studied and the number of perforations detected for Taperpoint Needle and Standard Needle.]

- **Number of Gloves Studied**: 76
- **Number of Perforations Detected**: Taperpoint Needle: 76, Standard Needle: 13

Statistical significance: $P = 0.049$

Bare Below the Elbows for Inpatient Care

• Mandate across UK hospitals
• Recommended practice at VCUMC
• Ensure good hand and wrist washing

short sleeves, no wrist watch, no jewelry avoidance of ties when carrying out clinical activity
An In vitro Model of Lab Coats in the Transmission of Nosocomial Pathogens

• **MRSA**, **VRE** and pan-resistant *Acinetobacter (PRA)* serially diluted and inoculated onto swatches of a clean laboratory coat

• Sanitized pigskin samples were then rubbed across the inoculated swatches

• The pigskin was inoculated on selective media to determine if the MDR organism could be re-isolated

An In vitro Model of Lab Coats in the Transmission of Nosocomial Pathogens

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<th>Dilution of organisms with Growth on Pig Skin</th>
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<td>MRSA</td>
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An In vitro Model of Lab Coats in the Transmission of Nosocomial Pathogens

- Pathogens can be transferred from lab coat to skin in vitro
- Lab coats represent a potential transmission risk
- Our study supports the British ban on lab coats in the healthcare setting
- VCU now recommends that HCWs not wear lab coats or neckties and adhere to “bare below the elbows” in the inpatient setting
- Further research is needed to determine the impact of “bare below the elbows.”

Three easy steps to prevent infection:

1. Bare below the elbows
   - No lab coats
   - No neck ties
   - No long sleeves
   - No wristwatch or bracelets

2. Wash up
   - Wash hands with soap & water or use alcohol foam before & after patient contact

3. Wipe down
   - Wipe down your stethoscope with an antiseptic wipe or alcohol pad after each use
Conclusion

• Significant paradigm shift in HAI prevention
• Many infections are indeed preventable
• System level changes involving the measurement and feedback of adherence to IC measures are needed to implement risk reduction strategies consistently
• SSIs can likely be reduced by proper use of intranasal mupirocin, chlorhexidine showers and the correct preoperative antibiotic
• Measures such as double gloving, blunt suture needles and HFT will likely reduce exposure to BBF
• ‘Bare Below the Elbows’ for inpatient care is recommended by the IC Committee