Patient Decolonization: The Impact on HAI’s
Disclosures

△ Consultant-Michigan Hospital Association Keystone Center
△ Subject matter expert for CAUTI, CALBSI, CDI, Sepsis, HAPI and culture of Safety for HIIN/CMS
△ Consultant and speaker bureau:
  △ Stryker Sage
  △ Potrero Medical
  △ Ondine Biomedical
  △ Baxter Healthcare
Session Objectives

- Identify modes of transmission for the spread of microorganism in the healthcare environment

- Evaluate key evidence-based care practices that can reduce bacterial load on the patient and/or prevent health care acquired infections.
Incidence, Mortality & Cost of MDRO’s in US & Canada

Canada 2014-2018
- MRSA BSI ↑ 59% from .66 to 1.05 per 10,000 pt days
- VRE BSI ↑ 143% from .14 to .34 per 10,000 pt days
- CRE remain low and stable
- Cost: Canada large teaching hospital 35 million a year
- 1 billion per year to health system
- 2018: 5400 deaths attributably to antibiotic resistance

US 2019
- 23,000 deaths associated with MDRO’s
- Between $1700 to $4600 per stay
- 2.39 billion in treatment costs
- Staff bacteremia's 2017
- 119,000 blood stream infections
- 20,000s death

Rate of improvement has slowed nationally

Morbidity and Mortality Weekly Report (MMWR), March 2019
Council of Canadian Academies
Independent Predictors of Acquiring an MDRO Infection

- Prolonged prior hospital or ICU stay
- Recent surgery or procedure
- Presence of invasive devices
- Recent exposure to antibiotics
MEET THE HOSPITAL STAPH

Employees must wash hands before returning to work.

STREP
MRSA

CONCEPT-MIKE ADAMS
ART-DAN BERGER
WWW.NATURALNEWS.COM
HAI in the ICU was the patients’ endogenous flora (40%-60%); cross-infection via the hands of health care personnel (HCP; 20%-40%); antibiotic-driven changes in flora (20%-25%); and other (including contamination of the environment; 20%). Weinstein RA.. Am J Med 1991;91(Suppl):179S-184S.
Reducing MDRO’s

- Hand Hygiene
- Decontamination of Environment
- Patient Decolonization
- Contact Precautions/Isolation
- Practice Device Bundles
- Antibiotic Stewardship

“Even if you are on the right track, you will get run over if you just sit there.”

Will Rogers
Reducing Bacterial Load on the Patient: A Horizontal Strategy
Traditional Bathing

Why are there so many bugs in here?

Soap and water basin bath was an independent predictor for the development of a CLABSI

Bath Basins: Potential Source of Infection

Large multi-center study evaluates presence of multi-drug resistant organisms

- Total hospitals: 88
- Total basins: 1,103

- Contaminated: 686 basins/88 hospitals (62%)
- Gram negative bacilli: 495 basins/86 hospitals (45%)
- Colonized w/ VRE: 385 basins/80 hospitals (35%)
- MRSA: 36 basins/28 hospitals (3%)

Mechanisms of Contamination

- Skin flora
- Multiple-use basins
  - Incontinence cleansing
  - Emesis
  - Product storage
- Bacterial biofilm from tap water


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Waterborne Infection

Hospital Tap Water

- Bacterial biofilm
- Most overlooked source for pathogens
- 29 studies demonstrate an association with HAIs and outbreaks

Transmission:

- Drinking
- Bathing
- Rinsing items
- Contaminated environmental surfaces

- Immunocompromised patients at greatest risk

https://www.pinterest.com/pin/332914597437828576/?l=t
### Pre-Operative for Reduction in SSI’s

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC – Guideline for Prevention of Surgical Site Infections, 2017&lt;sup&gt;1&lt;/sup&gt;</td>
<td>• “Before surgery, patients should shower or bathe (full body) with soap (antimicrobial or non-antimicrobial) or an antiseptic agent on at least the night before the operative day” (Category IB-strong recommendation; accepted practice.)</td>
</tr>
<tr>
<td>SHEA/IDSA* – Strategies to Prevent Surgical Site Infections, 2014&lt;sup&gt;2&lt;/sup&gt;</td>
<td>• “Preoperative bathing with chlorhexidine-containing products” (Unresolved issue). To gain the maximum antiseptic effect of chlorhexidine, adequate levels of CHG must be achieved and maintained on the skin.</td>
</tr>
</tbody>
</table>
| AORN – Perioperative Standards and Recommended Practices, 2018<sup>3</sup> | • “The collective evidence supports that preoperative patient bathing may reduce the microbial flora on the patient’s skin before surgery.”  
• “The patient should be instructed to bathe or shower before surgery with either soap or a skin antiseptic on at least the night before or the day of surgery.”  
• Although many studies support the use of 2% CHG cloths for preoperative bathing, additional research is needed before a practice recommendation can be made.” |

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3. AORN. Guidelines for Perioperative Practice, Denver, Colorado: AORN, Inc : 2018
Pre-Op CHG bathing

- Review by Webster did not show a statistically significant reduction in SSI, the studies included were limited to use of 4% CHG\(^1\)
- Meta-analysis by Chlebicki, et al. did not find a significant reduction in SSI rates\(^2\)
  - Varying/lack of application protocols (multiple vs. single application) and CHG concentrations
- Additional studies specifically examining the effect of 2% CHG cloths demonstrate an appreciable impact on SSI\(^3\)\(^-\)\(^8\)
  - Recent systematic review that included studies with consistent bathing protocols of two preoperative baths, found that the use of 2% CHG cloths significantly reduced SSI risk\(^7\)
  - Low risk and low-cost intervention that has shown effective in reducing bacteria on the skin, a risk factor for SSI

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1. Webster J, Osborne S. The Cochrane Library 2012;
The Efficacy of Daily Bathing with Chlorhexidine for Reducing Healthcare-Associated Bloodstream Infections: A Meta-analysis

John C. O’Horo, MD; Germana L. M. Silva, MD; L. Silvia Munoz-Price, MD; Nasia Safdar, MD, PhD

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental</th>
<th>Control</th>
<th>Odds Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total</td>
<td>Weight</td>
<td>M-H, Random, 95% CI</td>
</tr>
<tr>
<td><strong>1.2.1 CHG Bathing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borer et al., 2007</td>
<td>2</td>
<td>1600</td>
<td>15</td>
<td>1923</td>
</tr>
<tr>
<td>Camus et al., 2005</td>
<td>6</td>
<td>1991</td>
<td>7</td>
<td>1981</td>
</tr>
<tr>
<td>Chima et al., 2009</td>
<td>14</td>
<td>15472</td>
<td>41</td>
<td>15225</td>
</tr>
<tr>
<td>Gould et al., 2007</td>
<td>171</td>
<td>6684</td>
<td>204</td>
<td>6899</td>
</tr>
<tr>
<td>Munoz-Price et al., 2009</td>
<td>29</td>
<td>7632</td>
<td>59</td>
<td>6210</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>33359</strong></td>
<td><strong>32216</strong></td>
<td><strong>49.3%</strong></td>
<td><strong>0.47 [0.31, 0.71]</strong></td>
</tr>
<tr>
<td><strong>Total events</strong></td>
<td>222</td>
<td>386</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterogeneity: Tau² = 0.12; Chi² = 11.07, df = 4 (P = 0.03); I² = 60%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: Z = 3.33 (P = 0.0004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **1.2.2 CHG Impregnated Cloths** |             |         |            |             |             |
|----------------------------------|--------------|---------|------------|------------|
| Bleasadale et al., 2007          | 9            | 2210    | 22         | 2119        | 8.2%         | 0.39 [0.18, 0.85] |
| Dixon and Carver, 2010           | 8            | 3148    | 27         | 3346        | 8.8%         | 0.31 [0.14, 0.66] |
| Evans et al., 2010               | 4            | 1785    | 15         | 1904        | 5.2%         | 0.28 [0.09, 0.85] |
| Holder and Zellinger, 2009       | 2            | 2000    | 12         | 3333        | 3.3%         | 0.28 [0.05, 1.24] |
| Montecalvo et al., 2010          | 27           | 13864   | 57         | 12603       | 12.8%        | 0.43 [0.27, 0.68] |
| Popovich et al., 2009            | 2            | 5610    | 19         | 6728        | 3.4%         | 0.13 [0.03, 0.54] |
| Popovich et al., 2010            | 17           | 5799    | 19         | 7366        | 8.8%         | 1.14 [0.59, 2.19] |
| **Subtotal (95% CI)**            | **34438**    | **37399** | **50.7%**  | **0.41 [0.23, 0.68]** |
| **Total events**                 | 69           | 171     |            |             |             |
| Heterogeneity: Tau² = 0.19; Chi² = 12.80, df = 6 (P = 0.05); I² = 53% |
| Test for overall effect: Z = 3.78 (P = 0.0002) |

| **Total (95% CI)**               | **67775**    | **69617** | **100.0%** | **0.44 [0.33, 0.59]** |
| **Total events**                 | 251          | 557      |            |             |
| Heterogeneity: Tau² = 0.13; Chi² = 26.12, df = 11 (P = 0.006); I² = 58% |
| Test for overall effect: Z = 5.39 (P < 0.0001) |
| Test for subgroup differences: Chi² = 0.19, df = 1 (P = 0.66), I² = 0% |

Infect Control Hosp Epidemiol 2012;33(3):257-267
The Evidence: Impact of Antisepsis Bathing
Evaluate effect of daily bathing with CHG on acquisition of multidrug resistant organism’s (MDRO’s) and incidence of CLABSI

9ICU’s and Bone Marrow Transplant unit
Randomly assigned 7727 patient:
  a. No-rinse, Antisepsis washcloths
  b. Non-antimicrobial, no-rinse bath cloths

Results of 2% CHG bathing

Impact of Antisepsis Baths
Study to determine the best method for reducing spread of methicillin-resistant Staphylococcus aureus (MRSA) and MDROs

3 protocols tested:

a) Swab for MRSA on admission to ICU
   △ Isolate if positive
b) Swab for MRSA on admission to ICU
   △ Isolate if positive
   △ Nasal mucopiricin x 5 days
   △ Antisepsis bathing for entire ICU stay
c) No swab
   △ Nasal mucopiricin x 5 days
   △ Antisepsis bath for entire ICU stay

Results: No Swab Group
Universal Decolonization Demonstrated

Antisepsis vs. Routine Bathing to Prevent MDRO and CLABSI in General Medical and Surgical Units

- 53 hospitals in 14 states
- Compared routine bathing (non-medicated disposable cloth or showering) to decolonization with universal chlorhexidine and targeted nasal mupirocin in non-critical-care units.
- 12-month baseline period, 2 month phase and 21 month intervention

Decolonization with universal chlorhexidine bathing and targeted mupirocin for MRSA carriers did not significantly reduce multidrug-resistant organisms in non-critical-care patients.

Patients with medical devices had a 32% greater reduction in all cause bacteremia and a 37% greater reduction in MRSA or VRE clinical cultures compared with the routine care group.

Huang SS, et al. Lancet. 2019 March 23rd; 393
Differential Effects of Antisepsis Skin Cleansing Methods


Prospective, randomized 2-center study with blinded assessment.

To determine whether 3 different CHG skin cleansing methods yield similar residual CHG concentrations and bacterial densities on skin.

Method A- 2% CHG cloth
Method B- 4% CHG liquid poured onto non-medicated cloth
Method C-4% CHG liquid on cotton wash cloth
Nasal Decolonization

△ S. aureus colonization
  o Carriage is the most important independent risk factor for developing an SSI\(^2\)
  o Usually associated with the nares (~70%)
  o Other sites includes the skin, axilla, groin / perineal space
  o Carriers of high numbers of S. aureus have 3-6 times the risk of HAIs\(^1\)

△ Swabbing the nares identifies 80%-90% of MRSA carriers\(^2\)
△ Patients may have S. aureus on the skin and other sites and not in the nose
△ Decolonization of nasal and extranasal sites may reduce infection risk\(^4\)
  o ASHSP report - mupirocin should be used intranasally for all patients with documented colonization with Staph aureus (Strength of evidence for prophylaxis = A)\(^3\)

Nasal Decolonization for Reducing SSI’s

2014 SHEA/IDSA Practice Recommendation

△ If unacceptably high SSI rates exist for surgical populations despite implementation of the basic SSI prevention strategies, then applying standard infection control methods for outbreak investigation and management are recommended, including:

  o Screen surgical patients for S. aureus and decolonize preoperatively for high risk procedures, including some orthopedic and cardiac procedures

△ Routine preoperative decolonization with mupirocin without screening and targeted use is not currently recommended due to concerns about evolving resistance.

WHO 2017 Recommendations

△ Nasal decolonization with mupirocin for Cardio or Ortho surgeries: Patients with known nasal carriage of S. aureus should receive intranasal application of mupirocin ointment. (Strong recommendation)

△ Nasal decolonization with mupirocin for other surgeries: Use of nasal mupirocin ointment is suggested (Conditional recommendation)

AORN 2021 Recommendations

△ Create an interdisciplinary team to develop facility wide decolonization protocols
△ Use a risk based approach
△ Establish a preoperative S aureus decolonization program
  • Choose universal, targeted or blended

Nasal Decolonization Used-Surgery & ICU’s

△ Mupirocin—Most data on efficacy-eradicates

△ Concerns on widespread implementation
  • Antibiotic resistance identified in multiple studies & results in decolonization failure
  • In opposition to antimicrobial stewardship
  • Resulted in widespread adoption of the skin decolonization but not nasal

△ Other potential barriers
  • Unpleasant to use
  • Dosed 2x daily for 5 days to achieve log kill (compliance issues)

Septimus EJ. AJIC, 2019;A53-A57.
Frontiers in Nasal Decolonization

▲ Povidone Iodine-Studies show effective in combination with CHG prep for SSI

△ Activity against gram + & gram-
△ 5% and 10% solution
△ Effective within 1hr-lasts up to 12hrs-
  • time from application to surgery matters
△ Application each nostril for 30 sec (2 different parts) with 1 applicators each nostril and then repeated

Septimus EJ. AJIC, 2019;A53-A57
Frontiers in Nasal Decolonization

- Alcohol based nasal antiseptics-antimicrobial by denaturing proteins, fights against gram + and gram- including MDRO’s
  - More studies needed
  - 3x per day pre & post surgical till d/c (con’t 5-7 days) post d/c
  - Potential compliance issues

Septimus EJ. AJIC, 2019;A53-A57.
Frontiers in Nasal Decolonization

△ Photo dynamic therapy-use of laser to eliminate S aureus, gram +, gram- and viruses, and fungi
△ Combines light activated chemical & cool infrared red wavelength
  △ In human testing: eliminated nasal MRSA in < 10 min
  △ Published trial showing reduction in SSI/More studies needed
  △ One-time tx for surgical pre-op-5 min
  △ Sustain elimination for 3 days
  △ No adverse events reported

△ Vancouver General Experience over 10 years
  △ 78% reduction in SSI
  △ 53 fewer SSI per year
  △ 4.2 million per year in cost avoidance

Septimus EJ. AJIC, 2019;A53-A57.
and always remember, my child..... only dead fish go with the flow.
WHEN WOULD NOW BE A GOOD TIME TO DO THIS?

It is not enough to do your best; you must know what to do, and THEN do your best.

~ W. Edwards Deming
Bugging Out
HAI prevention courses by Kathleen Vollman

https://www.medbridgeeducation.com/advancing-nursing

Kathleen Vollman MSN, RN, CCNS, FCCM, FCNS, FAAN
Clinical Nurse Specialist / Educator / Consultant
ADVANCING NURSING
kvollman@comcast.net
Northville, Michigan
www.vollman.com
Introduction to
Steriwave™ Nasal Photodisinfection

Jason Hickok, MBA, RN
VP, Clinical & Medical Affairs
Conflicts of Interest

• Employed by Ondine Biomedical
Life sciences company headquartered in Vancouver, Canada

Breakthrough photodisinfection-based therapies to **prevent** and **treat** a **broad spectrum of infections**

Lead product, Steriwave, **eliminates harmful nasal pathogens** that can lead to healthcare-associated infections (HAIs), Health Canada approved
S. aureus nasal carriage

a leading cause of HAIs

Common areas of S. aureus colonization

~30% of people are colonized in the nose

#1 cause of surgical site infections (SSIs)

#2 cause of HAIs overall

(Epidemiology MSSA & MRSA...)

(Lancet Infect Dis 2005; 5:751)
(Infect Contrl and Hosp Epi 2008; 29 (11):996)
(N Engl J Med 2014;370:1198)
Nasal carriage is **single most important determinant** of subsequent *S. aureus* infections

<table>
<thead>
<tr>
<th>General Population</th>
<th>S. Aureus Nasal Carriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nares</td>
<td>27%</td>
</tr>
<tr>
<td>Hand</td>
<td>27%</td>
</tr>
<tr>
<td>Perineum</td>
<td>22%</td>
</tr>
<tr>
<td>Forearm</td>
<td>20%</td>
</tr>
<tr>
<td>Pharynx</td>
<td>10-20%</td>
</tr>
<tr>
<td>Skin chest</td>
<td>15%</td>
</tr>
<tr>
<td>Skin abdomen</td>
<td>15%</td>
</tr>
<tr>
<td>Neck</td>
<td>10%</td>
</tr>
<tr>
<td>Ankle</td>
<td>10%</td>
</tr>
<tr>
<td>Axilla</td>
<td>8%</td>
</tr>
<tr>
<td>Vaginal</td>
<td>5%</td>
</tr>
</tbody>
</table>

MRSA Carriers

Need to include the nose when screening for MRSA. Identification rate by anatomic sites:

- **Testing site**
  - Nares only: 73%
  - Rectum only: 47%
  - Axilla only: 25%
  - Nares + Rectum: 91%
  - Nares + Axilla: 83%

Decolonization is an essential infection control strategy

- Reduces bioburden from surfaces of the body
- Reduces transmission of pathogens

80% of S. aureus HAIs are caused by the patient’s own bacteria

(Med Research Arch 2005; 5:751)

Skin Chlorhexidine gluconate (CHG)
Nares Antimicrobial ointment

(Med Research Arch 2023; vol 10 No 12)
Findings from other studies / meta-analyses:

- Decolonization is an intervention that can reduce rates of HAI (literature review: Septimus et al. Clin Microbiol Rev)

- Decolonization (nasal and prophylaxis against MRSA) showed protection against SSIs due to *S. aureus* (pooled relative risk from 17 studies: 0.39, 95% conf. interval 0.31 to 0.50) (meta-analysis: Schweizer et al. BMJ)

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**40%+ reduction in infection risk when implementing nose + skin decolonization in various patient populations**

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Study Design</th>
<th>Patient Pop.</th>
<th>Sample Size</th>
<th>Treatment</th>
<th>Infection Rate Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bode et al. NEJM</td>
<td>2010</td>
<td>DB-RCT*</td>
<td>Surgical</td>
<td>6,771</td>
<td>Mupirocin/CHG soap vs. placebo/bland soap</td>
<td>56% P=0.008</td>
</tr>
<tr>
<td>Huang et al. NEJM</td>
<td>2013</td>
<td>Cluster randomized</td>
<td>ICU</td>
<td>74,256</td>
<td>Universal decolonization with mupirocin + CHG skin</td>
<td>44% P&lt;0.001</td>
</tr>
<tr>
<td>Bryce et al. J Hosp Infect</td>
<td>2014</td>
<td>Historical control</td>
<td>Surgical</td>
<td>3,068</td>
<td>Universal decolonization with nasal photodisinfection + CHG skin</td>
<td>42% P=0.0004</td>
</tr>
<tr>
<td>Schweizer et al. JAMA</td>
<td>2015</td>
<td>Quasi-experimental, Pragmatic</td>
<td>Surgical</td>
<td>42,534</td>
<td>Targeted decolonization with mupirocin + CHG</td>
<td>42% P=0.02</td>
</tr>
<tr>
<td>Huang et al. Lancet</td>
<td>2019</td>
<td>Cluster randomized</td>
<td>Non-CCU</td>
<td>528,983</td>
<td>Routine care vs. CHG + mupirocin</td>
<td>31% and 37%</td>
</tr>
</tbody>
</table>

*Randomized, double-blinded, placebo-controlled multicenter study*
## Compliance Drives Outcomes

Nasal and skin decolonization among cardiac and ortho patients

### Table: Compliance Drives Outcomes

<table>
<thead>
<tr>
<th>Subgroup: By Bundle Adherence (skin and nasal decolonization)</th>
<th>No. of Procedures during Intervention</th>
<th>Rate Ratio (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Adherent</td>
<td>5,321 ........ 39%</td>
<td>0.26 (0.10, 0.69)</td>
<td>0.007</td>
</tr>
<tr>
<td>Partially or Not Adherent</td>
<td>8,995 ........ 61%</td>
<td>0.80 (0.49, 1.31)</td>
<td>0.37</td>
</tr>
</tbody>
</table>

“The complex S. aureus SSI rates decreased significantly among patients in the fully adherent group compared with the preintervention period (RR, 0.26 [95%CI,0.10-0.69]), but rates did not decrease significantly in the partially adherent or nonadherent group (RR, 0.80 [95% CI, 0.49-1.31]).”

*JAMA, 2015, 313(21):2162-71.*
Danger of overusing antibiotics

Resistance developing with typical nasal decolonization

- Applied twice daily for 5 days (10 treatments total)
- Bacteria becoming resistant

We need a new alternative!

(Infect Control Hosp Epidemiol 2003; 24:342)
Easy, **Safe and Painless**

Fast-Acting 2-step Treatment

1. **Swab blue liquid inside nose**
   Blue liquid selectively attaches to germs

2. **Insert light tips and start light source...** 2-minute countdown
   Non-thermal red light activates the photosensitive liquid

3. **Repeat**
   Pathogens physically destroyed in moments
Kills

> 99.99%

Immediate, broad-spectrum efficacy

No resistance

Single application, lasts 48 hours

High compliance

Treatment-related side effects

- Runny nose
- Sneeze
- Nose irritation
Publications demonstrated impact

1. **Initial study**

   - Nasal (Steriwave) + Skin (CHG) decolonization in pre-op
   - 42% reduction in SSIs
   - 94% compliance during study
   - Further infection reduction since
   - Expanded treatment to additional surgeries
   - 70,000+ patients safely treated
   - 0 adverse events reported
SSI Rate Impact

2.7% Historical (2007-2011)
1.6% 1st Year (QIP result)
0.44% Current (2018)

42% reduction Presented at 2013 ICPIC
84% total reduction
Publications demonstrated impact

10-year study of QI initiatives to reduce SSIs in spinal surgeries

- Nasal (Steriwave) + Skin (CHG) decolonization in pre-op
- Applied to all elective and emergent spine cases
- SSI rate fell from 7.3% to 2% as a direct result
- Greatest reduction of all interventions

Surgical Site Infection Reduction - a 10 year Quality Improvement Journey

Dr. Supriya Singh\(^1,2\), Dr. Dan Banaszek\(^1,2\), Dr. Titus Wong\(^3\), Dr. Christian Di Paola\(^2\), Dr. Tamir Ailon\(^1,2\), Dr. Raphaele Charest-Morin\(^1,2\), Dr. Nicolas Dea\(^1,2\), Dr. Marcel Dvorak\(^1,2\), Dr. Charles Fisher\(^1,2\), Dr. Brian Kwon\(^1,2\), Dr. Scott Paquette\(^1,2\), Dr. John Street\(^1,2\)

\(^1\)Vancouver Spine Surgery Institute, Vancouver, British Columbia, Canada. \(^2\)University of British Columbia, Vancouver, British Columbia, Canada.

Objectives

In 2007, the spine surgical site infection (sSSI) rate at our Canadian quaternary referral center was 8.1%. As a result, a multidisciplinary team was created to identify and initiate quality improvement (QI) strategies to reduce this unacceptably high sSSI rate. This abstract outlines the institutional and divisional QI strategies that have been central to our ongoing efforts to reduce the incidence of sSSI.

Abstract presented at 2020 Canadian Spine Society 20\(^{th}\) Annual Scientific Conference
Vancouver General Spine Program

significant impact on SSIs

Abstract presented at 2020 Canadian Spine Society 20th Annual Scientific Conference
<table>
<thead>
<tr>
<th>Variable - Inpatients only class</th>
<th>No Steriwave</th>
<th>Steriwave</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of procedures</td>
<td>383</td>
<td>475</td>
<td></td>
</tr>
<tr>
<td>Antibiotics pre- incision compliance</td>
<td>100%</td>
<td>99.2%</td>
<td>0.072</td>
</tr>
<tr>
<td><strong>Antibiotics 72hr-30 days post surgery</strong></td>
<td><strong>17.6%</strong></td>
<td><strong>6.7%</strong></td>
<td><strong>&lt;0.001</strong></td>
</tr>
<tr>
<td>Mean length of stay (days)</td>
<td>14.12 ± 17.56</td>
<td>5.59 ± 9.30</td>
<td><strong>&lt;0.001</strong></td>
</tr>
<tr>
<td>Return to ED</td>
<td>7%</td>
<td>6.7%</td>
<td>0.857</td>
</tr>
<tr>
<td>Return to OR</td>
<td>6.5%</td>
<td>4.4%</td>
<td>0.173</td>
</tr>
<tr>
<td>Readmission</td>
<td>4.7%</td>
<td>2.5%</td>
<td>0.085</td>
</tr>
</tbody>
</table>

Steriwave pre-surgical implementation for spine surgery

Abstract presented at 2023 Canadian Spine Society 23rd Annual Scientific Conference
Minimal impact on nursing workflow

- Performed in preop (holding area)
- Portable (moves easily via hospital roll stand)
- Can be applied by an RN or LPN
- Eliminates patient compliance issues (seen with mupirocin)
- Only 5-7 minutes (~2 mins direct nursing time)

Because nurses feel empowered to stop SSIs, they take ownership of the process (>94% compliance)
Steriwave™ Nasal Photodisinfection

Better *Technology*
Better *Compliance*
Better *Outcomes*
Better *Care*

Thank you for joining us.
Evaluation of microbiological changes before and after Steriwave

Finding:

• Microbiological spectrum of SSIs was similar pre and post implementation

Abstract presented at 2020 Canadian Spine Society 20th Annual Scientific Conference
Recognized importance of nasal disinfection

RECOMMENDED

Doing nasal disinfection... for patients undergoing surgery,

... to prevent surgical site infections caused by S. aureus,

... for all patients in ICU and at high risk to prevent HAI,

... as a source control strategy to kill germs and prevent infections.