Preventing Surgical Site Infections: Are you ready for NPSG.07.05.01?

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Speaker Disclosures

- 3M
- AMN Healthcare
- The Compass Group
- BE Smith Consulting
- Johns Hopkins Hospital
- NCH Healthcare System

Objectives

1. Describe the 3 main concepts related to the Joint Commission’s 2011 NPSGs that will engage IPs and OR staff in effective SSI reduction strategies.

2. Examine the 2 main causes of intra-operative wound contamination.

3. Create process measures related to the 5 areas of opportunity for improvement to reduce the risk of SSIs.
Conduct risk assessments with the OR to determine process and outcome measurements.

Main Concepts:

1. **Educate**
   - Yourself
   - All Surgery Personnel (upon hire and annually)
   - Patients and Families

2. **Measure**
   - Conduct risk assessments with the OR to determine process and outcome measurements

3. **Communicate**

   [URL to Joint Commission Patient Safety Goals]

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**Five Focus Areas**

1. Aseptic Technique
2. Sterilization
3. ABX Prophylaxis
4. Hair Removal
5. Skin Antisepsis

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**1. Aseptic Technique**

Principles were developed to reduce the risk of wound contamination.
Defining the Risk of SSI

Risk of SSI = Dose of Bacterial Contamination \cdot Virulence \cdot Resistance of Host (patient)

Berry & Kohn’s, Operating Room Technique, 11th ed., p. 254

Causes of Wound Contamination

1. Exogenous sources
   - Cleanliness of environment, lack of proper airflow, shedding by the Surgical Team

2. Endogenous sources
   - Patient’s own skin/hair
   - Infection at a remote site

The Number One Source

People = Shedding

- 4000-10,000 particles per minute
  (Berry & Kohn’s, Operating Room Technique, 11th ed., p. 252)

Carried by wind currents to the sterile field which results in wound contamination.

1. Patient
2. Surgical Team
3. Ancillary Personnel
4. Sales Reps
5. Students
6. Passersby
Shedding plus Wind Currents

- Requires the control of:
  - Amount of Traffic
  - Traffic Patterns


Traffic Control

- Essential personnel only
- One foot (min) perimeter around sterile field
- Sterile fields should be a destination, not a thoroughfare
- Limit students and observers
  - The right of the student to learn vs. the right of the patient to receive safe patient care
  - Utilize alternative methods of communication

Kohut SSI Equation

\[
\text{People + Wind + (-) Aseptic Technique} \\
\text{ABX + Skin Prep} = \\
\text{Wound Contamination} = \\
\text{SSI}
\]
**Patient/Family Teaching Opportunities**

- Pre-op showering program
- At least 2 showers
- Hat and clean gown/linen for patient transport
- Nasal Decolonization


Webster, J. Osborne, S. Preoperative bathing or showering with skin antiseptics to prevent surgical site infection. Cochrane Database of Systemic Reviews 2007

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**S. aureus Nasal Carriage**

- Between 25-30% of all patients are colonized at any given time
- Another 60% carry it intermittently.
- Carriers are at higher risk
- *S. aureus* causes 25-35% of all HAIs


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**Nasal Decolonization**

- 26% of all surgical pts acquire some type of HAI during their postoperative course
- 85% of *S. aureus* infections were endogenous in SSI study populations
- MRSA SSI rates decreased from 0.23% to 0.09% (5,094 pts) with MRSA eradication program


Containment is the key

Surgical Team

- Hand Hygiene
- Proper aseptic technique
- Properly worn hats, masks, clean OR scrubs, jackets, minimal jewelry (AORN scrub attire)

Ban Skull Caps


Environment

- Room Requirements
  - Ventilation System
    - 15-25/hr, 3 fresh
  - Positive pressure
  - Temperature (68-73°F)
  - Humidity (40-60%)
- Room Cleaning
  - Between cases
  - Terminal cleaning
  - Types of construction materials
  - Clutter

AORN, Recommended Practices for Perioperative Nursing; Patient & Worker Safety. (2010 ed., p.239-242)
Aseptic Technique Process Measures

1. Hand Hygiene compliance
2. Hair containment
3. Proper OR attire
4. Traffic patterns
5. Cleanliness
   - Ventilation and environment documentation
   - Terminal clean, turn around

2. Sterilization

- Proper Management of Sterile Processing Departments
  - Technology
  - Workflow
  - Staff certification
- Proper Sterilization Processes
  - Focus area for The Joint Commission
  - Cleaning, sterilization, and storage

www.jointcommission.org

Immediate Use Sterilization (IUS)
(formerly known as Flashing)

Utilized for:
- Dropped instruments
- Poorly designed work processes
  - Lack of instrumentation
  - Surgeon scheduling

Results in contamination due to:
- Poor cleaning due to lack of time
- Methods of delivery to the sterile field
  - A closed container is best practice
  - TJC will be looking for them

IUS (Flash) Data

Calculation: \[ \frac{\text{# of IUS events}}{\text{# of cases/month}} \times 100 \]

Sterilization Process Measures

1. Sterilization Records for all processes
2. Cleaning Procedures
3. Proper Storage
4. IUS Sterilization

3. Antibiotic Prophylaxis
   - SCIP Measures - INF 1.2.3 and NPSG.07.05.01 (#7)
   - Goal >95%
     - Challenge the organization to 100%
     - RCA or Med Error if missed
   - Proper dosage for obese population (BMI >30)
     - (Surg 1989;106:750)
   - Redosing q 3 hours  (Ann Surg 2009; 250:10)

Antibiotic Prophylaxis Process Measures

1. SCIP measures
2. Dosing for BMI
3. Redosing

4. Hair Removal

1. SCIP measure deleted in April 2011

2. NPSG.07.05.01 (#8)
   Goal
   - Minimize as much as possible
   - Clippers only

3. Not addressed: Location of hair removal

Hair Removal Literature

1999 HICPAC Guideline
   - 999;116:759-63.
   - 21. Gregor B, Berry MJ. Surgical infections after prophylactic antibiotic versus no
   - 22. Hamilton MM, Goldstone BM, Lane J. Prophylactic use of clippers for surgical
   - 23. O'Brien WM, MacCallum J, McKinnon DG. Prophylactic use of clippers for surgical
   - 25. Seropian RS, Reynolds BM. Wound infections after pre-operative depilatory versus

One more just in case............
   - Celik S, E. Kara, A. Deep shaving the incision site increase the infection rate after spinal surgery. Spine
Hair Removal Process Measures

1. NPSG.07.05.01 (#8)
2. Location of hair removal

5. Skin Antiseptics
   The attributes of an appropriate surgical skin antiseptic require:
   • The ability to significantly reduce microorganisms (2 log dry sites, 3 log wet sites)
   • Provide broad spectrum activity
   • Be fast acting
   • Have a persistent effect
   All products with FDA approval meet this criteria


Other Skin Antiseptics Considerations

1. Procedure (length, incision site)
2. Application Methodology
   • Scrubbing vs. Painting
3. Challenges to the prep area
   • blood, saline, friction
4. Patient Safety
**Current Recommendations**

- CDC SSI guideline states to “use an appropriate antiseptic”
- SHEA Compendium - "Optimal preparation and disinfection of the operative site" 
- AORN compares products but does not provide specific product recommendations
- NFQ 2011 recommendation: "use solutions that contain isopropyl alcohol as skin antiseptic preparation until other alternatives have been proven as safe and effective, and allow appropriate drying time per product guidelines.


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**Surgical Skin Antisepsis Research**

- Limited research is available that compares commonly used skin antiseptic agents with SSI outcomes
- The majority of the literature compares microbial counts
- Much more work must be done to create a body of evidence to guide practice

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**Current Research**


   - Microbial culture study of 150 patients
   - Compared 3 methods
     - Iodophor Scrub/Paint vs. Chloraprep® vs. Duraprep™
   - Result
     - Microbial counts were less using Chloraprep®
     - SSI Outcome was no SSIs in any of the groups
Current Research


- SSI Outcome study of 3209 general surgery patients
- Compared 3 methods
  - Iodophor Scrub/ETOH/Paint vs. ChloraPrep® vs. DuraPrep™
- Result
  - SSI Outcomes: A statistical difference with lower SSI rates using iodine based products.

Current Research


- Microbial culture study of 849 patients
- Compared 2 methods
  - Iodophor Scrub/Paint vs. Chlorhexidine-alcohol
- Result
  - Significantly lower SSI rates with Chlorhexidine-alcohol prep for superficial and deep incisional wounds (16.5% to 9.5%)

Clear as Mud........
Alcohol

Isopropyl Alcohol
Created by the fermentation process of Clostridium Acetobutylicum

Mechanism of actions:
- Denatures (kills) proteins
  - Bactericidal
  - Fungicidal
- Does not kill spores*
- Virucidal**


Product Application Methodology

- Follow manufacturer’s directions
- Utilize proper aseptic technique during application & gloves to contain shedding
Skin Antisepsis Process Measures

1. Monitoring application methodology
2. Observing aseptic technique during application
3. Utilization of safety precautions

Facilitating Process Improvements

Create relationships with the Operating Room Personnel:

- Learn how they do their work
- You can be their advocates
  - attire, cleanliness, policies, product selections

Example: waterless surgical hand scrubs
- educate, standardize, ritualize
- Need alcohol and an antimicrobial

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1. Educate- about SSI prevention strategies
   - CBT’s, staff mtgs, etc.

2. Measure
   - Make regular observations of aseptic technique
   - Utilize data to implement change

3. Communicate
   - Provide the data to the HCP
Process Improvements

- Choose process measures together
- It's about partnering not policing
- Provide data on an ongoing basis
- Create interest, stay focused

Summary

- SSIs are preventable and there is much work to be done
- NPSG.07.05.01 will help get us there
  1. Educate
  2. Measure
  3. Communicate

Questions?

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