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Navigating the Path to Reducing Surgical Site Infections

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| Learning Objectives

At the end of this session, participants should be able to...



1

Discuss current guidelines and evidence surrounding surgical site infection (SSI) prevention.

2

Identify appropriate individuals to engage in infection prevention (IP) efforts for SSI prevention.

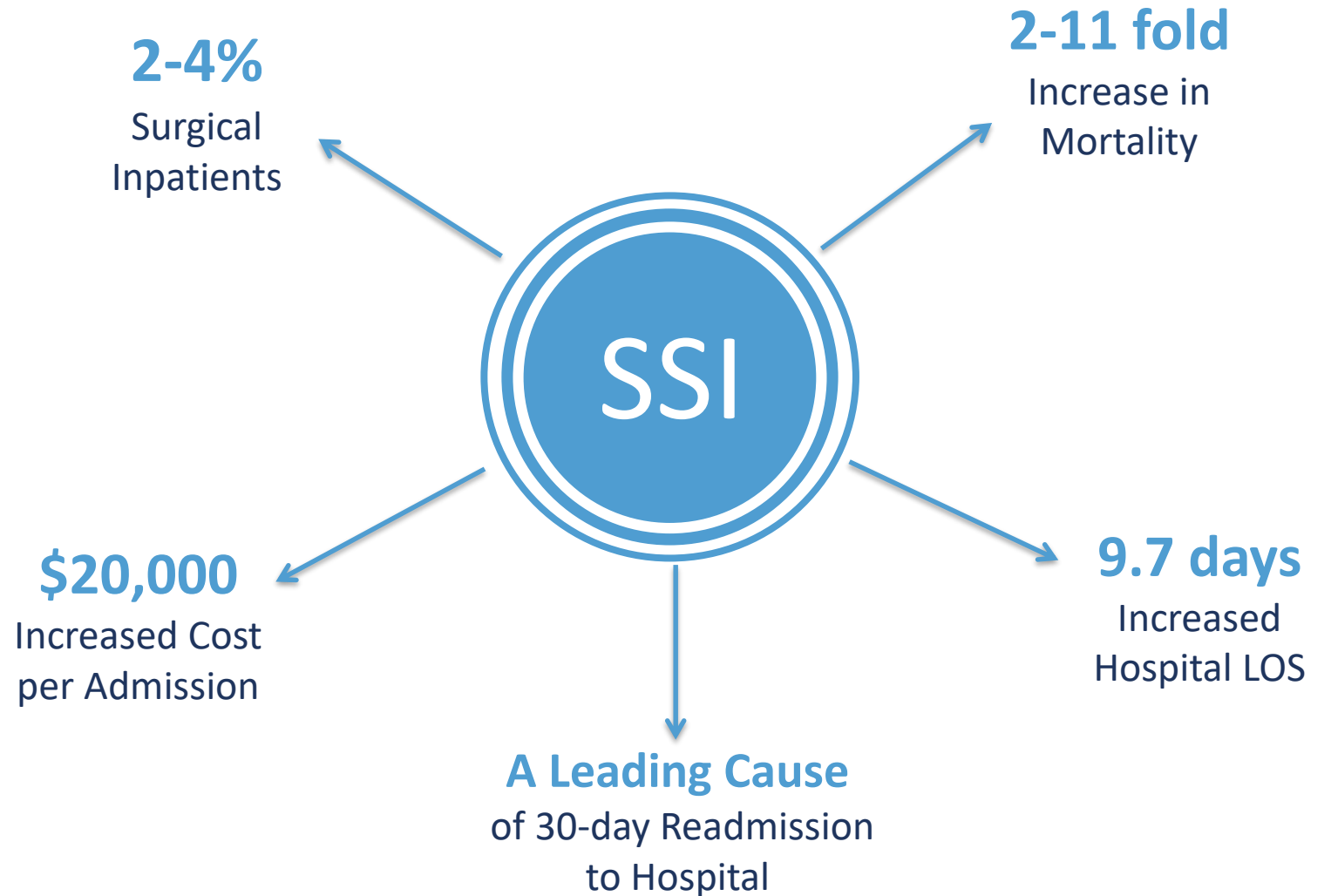
3

Describe strategies for implementation of SSI prevention in healthcare organizations.

| Surgical Site Infection (SSI) - The Current State

“SSI is among the most common preventable complication after surgery.”

AHRQ, 2019



<https://www.hcup-us.ahrq.gov/reports/statbriefs/sb223-Ambulatory-Inpatient-Surgeries-2014.jsp>

<https://jamanetwork.com/journals/jama/fullarticle/2761780>

<https://psnet.ahrq.gov/primer/surgical-site-infections>

| Burden of Surgical Site Infection

- Infection of the incision, organ space or tract following surgery
- Surgical cases in the U.S. continue to rise (>80Million) leading to increased number of SSI
- **160,000-300,000** SSI Yearly in the U.S.
- SSI the most common HAI
- **2-11 X greater risk** of death in patients with SSI, 77% deaths directly attributable to SSI
- **60%** SSI estimated to be preventable revised 50% in 2017
- SSI account for **3.5-10 Billion** healthcare expenditures (2007)
- Cost can exceed **\$90,000** when SSI involves a prosthetic joint

Fundamental Elements of Accountability for Healthcare Associated Infection Prevention (IP)



Surveillance for Surgical Site Infection



Increase the efficiency of surveillance through utilization of automated data



Provide ongoing feedback of surgical site infection rates to surgical and perioperative personnel and leadership



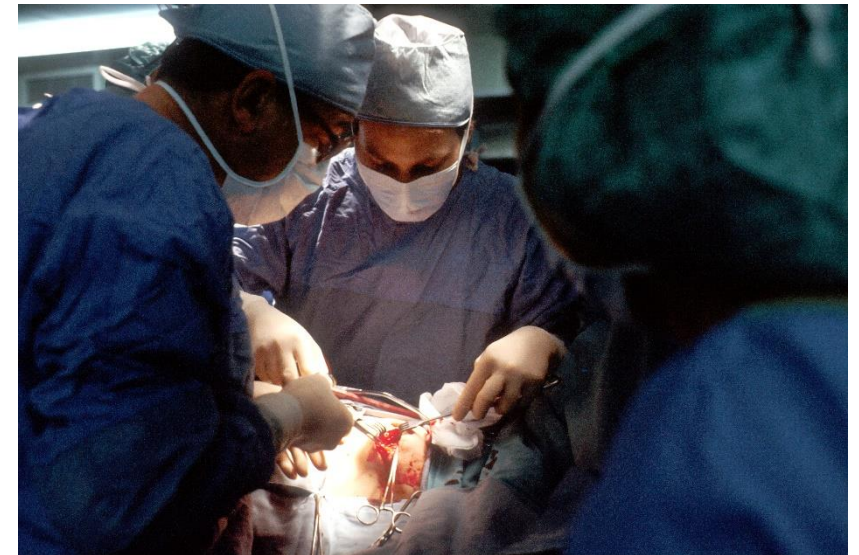
Measure and provide feedback to providers regarding rates of compliance with process measures



Educate surgeons and perioperative personnel about surgical site infection prevention



Educate families and patients about surgical site infection prevention



Surveillance



Public reporting of process, outcome and other quality improvement measures is now required



Standardized definitions for SSI



Provides data with comparisons for IP department to use in teaching and reporting



Reimbursements for treating SSIs are being reduced or denied.

| Assessment Question #1

Recommendations for appropriate individuals to engage in infection prevention efforts related to SSI prevention include which of the following:

- A. Surgeons
- B. Operating Room Staff
- C. Coders & Billing Teams
- D. Patient
- E. Family/Caregivers for the Patient

Assessment Question #1 Correct Response

Recommendations for appropriate individuals to engage in infection prevention efforts related to SSI prevention include which of the following:

- A. Surgeons
- B. Operating Room Staff
- C. Coders & Billing Teams
- D. Patient
- E. Family/Caregivers for the Patient

NHSN Standard SSI Definition

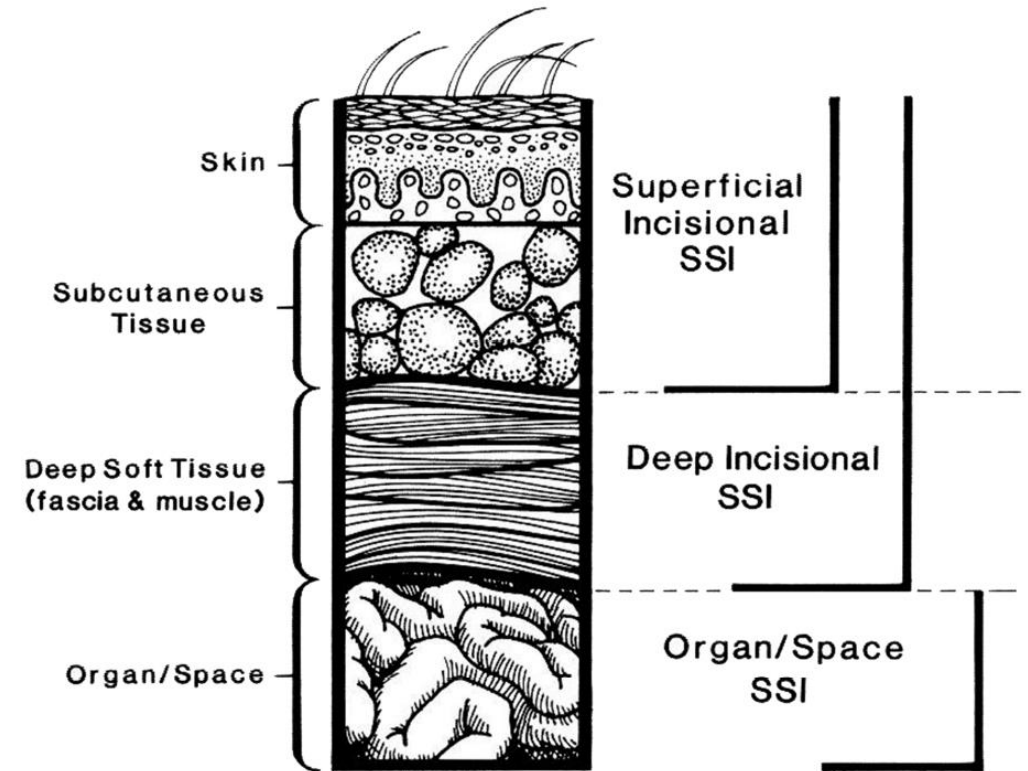


**Occurs with 30 days of procedure
(Some cases 90 days)**



At least 1 of the following:

- Diagnosis of SSI made by attending physician or surgeon
- Purulent drainage from incision site
- Appropriate organisms isolated from aseptic culture tissue or drainage from incision
- Deliberately opened by surgeon



Wound Classification and Risk



Wound Classification (determined by surgeon or operating room staff)

- Clean
- Clean-Contaminated
- Contaminated
- Dirty



Operative time duration



American Society of Anesthesiology (ASA) Score



Patient Specific Risks: Obesity, malnutrition, hyperglycemia, immunosuppression, existing infection, smoking, ischemia related to vascular disease



Surgical Risk Factors: Prolonged procedures, inadequacies of skin prep or surgical scrub



Physiological states that increase risk of SSI: Trauma, shock, blood transfusion, hypothermia, hypoxia, hyperglycemia

SSI Prevention is a Team Sport



Preoperative setting

- Surgeons office
- Good time to educate patient and family

Day of surgery

Intraoperative

Post operative

Surveillance

Preoperative



Encourage smoking cessation



Preoperative bathing



Encourage diabetes control for elective procedures



Education of patient and family on prevention of SSI











Anemia management



Understand patient home situation and needs post op

Infection Prevention Basics

-  **Use a checklist**
-  **Hand hygiene and scrub**
-  **Sterilization according to manufactures recommendations, minimize flash sterilization**
-  **Minimize OR traffic**
-  **Optimize air handling and door opening**
-  **OR cleaning and disinfection**
-  **Optimal room set up**
-  **Aseptic technique**

Antibiotic Prophylaxis



Correct antibiotic, dose, timing, and duration



Many suggest infusion of antibiotics prior to tourniquet inflation



Administer antibiotic prophylaxis according to evidence based standards and guidelines



Select antibiotic recommended for specific procedure and guidelines

- Use weight based dosing (unresolved)
- Redose antibiotic according to guidelines for long procedures (unresolved)



Begin administration within 1 hour before incision to maximize tissue concentration (2 hours for Vancomycin and fluoroquinolones)



Discontinue antibiotics within 24 hours after surgical procedure
In Clean and Clean Contaminated procedures do not administer prophylactic antibiotics after incision closed even with drain (strong rec)

Antiseptic Prophylaxis



Advise patients to shower or bathe (full body) with soap (antimicrobial or nonantimicrobial) or an antiseptic agent on at least the night before the operative day (Category 1B), the issue of timing and number of showers is unresolved at present



In OR, use alcohol containing perioperative skin preparatory agents if no contraindication exist (Category 1A)



Alcohol may be contraindicated for some procedures



Chlorhexidine alcohol containing products may have benefit over providone-iodine



Chlorhexidine alone has no benefit over providone-iodine

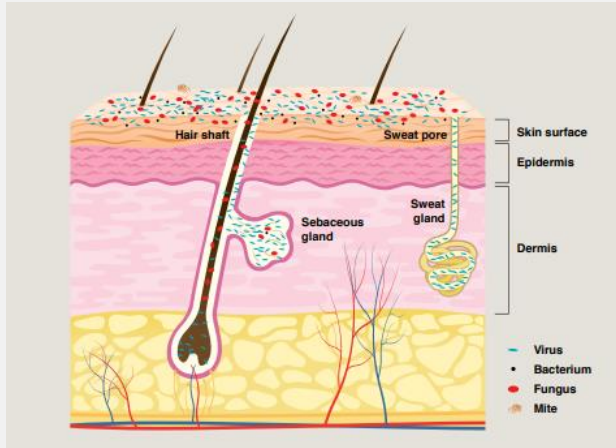


Application of a microbial sealant immediately after intraoperative skin preparation is not necessary for prevention of SSI



Consider intraoperative irrigation of deep or subcutaneous tissues with aqueous iodophor solution for prevention of SSI

Hair Removal



Do not remove hair at the operative site unless the presence of hair will interfere with the procedure



Do not use razors, If hair removal necessary use clippers or depilatory agent



Remove hair outside of the operating room to reduce risk of contamination

Source: Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017
Skin Preparation Image, [Surgical Skin Preparation Quality Improvement Guide](#).

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Assessment Question #2

Current guidelines regarding surgical site infection (SSI) prevention include which of the following:

- A. If presence of hair will interfere with procedure, it is appropriate to use clippers or depilatory cream to remove hair.
- B. Patients should shower or bathe the night before a surgery with soap or antiseptic agent
- C. Administration of antibiotic should begin within one hour prior to incision (2 hours with vancomycin or fluoroquinolones).
- D. All of the above

Assessment Question #2 Correct Response

Current guidelines regarding surgical site infection (SSI) prevention include which of the following :

- A. If presence of hair will interfere with procedure, it is appropriate to use clippers or depilatory cream to remove hair.
- B. Patients should shower or bathe the night before a surgery with soap or antiseptic agent
- C. Administration of antibiotic should begin within one hour prior to incision (2 hours with vancomycin or fluoroquinolones).
- D. **All of the above**









- 1** Control blood glucose in the perioperative time frame
- 2** Maintain blood glucose of 200 mg/dL or less (Category 1A)
- 3** Intensive postoperative glucose control has not been shown to reduce the risk of SSI and may lead to adverse events
- 4** Hemoglobin A1C goals preop (unresolved Issue)

Source: Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

Image: <https://www.vecteezy.com/free-vector/diabetes>

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Normothermia

-  **Maintain normothermia: Temperature of 35.5 degrees Celcius or more (Category 1A)**
-  **Even mild degrees of hypothermia can increase SSI risk**
-  **Hypothermia may directly impair neutrophile function**
-  **Hypothermia leads to tissue subcutaneous vasoconstriction and subsequent tissue hypoperfusion**
-  **Hypothermia leads to increased bleeding**
-  **Studies have shown preoperative and intraoperative warming benefits to reduce SSI as well as reduce intraoperative blood loss**

Source: Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

Supplemental Oxygen



Optimize tissue oxygenation by administering supplemental oxygen during and immediately following surgical procedures involving mechanical ventilation



Meta-analysis of studies concluded that perioperative supplemental oxygen led to relative risk reduction of 25% for SSI

Source: Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017

Image: <https://images.app.goo.gl/zWAt7S7RcWJVfGBw8>

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Special Approaches for Preventing SSI but Additional Studies Needed

- 1** Consider screening for *Staphylococcus aureus* screening to identify patients colonized or infected the preoperative screening in some high risk procedures such as orthopedic or cardiothoracic procedures
- 2** Consider decolonization
- 3** No standardized approach
- 4** Consider intranasal mupirocin

Source: Infection Control and Hospital Epidemiology, June 2014, Vol. 35, No. 6

Wound Protector



Use impervious plastic wound protectors for gastrointestinal and biliary tract surgery



There is a trend or greater protective affect using a dual ring protector compared with a single ring protector



Incise Drapes



Do not routinely use antiseptic drapes as a strategy to prevent surgical site infection



The use of plastic adhesive drapes with or without antimicrobial properties is not necessary for the prevention of SSI



Additional Considerations

- 1** Consider the use of triclosan-coated sutures to prevent SSI (Category II weak rec)
- 2** Do not apply antimicrobial agents (ointments, solutions, powders) to the surgical incision for prevention of SSI (Category 1B)
- 3** Antimicrobial Dressings (No current recommendation, Unresolved issue)
- 4** Transfusion of blood products should not be withheld from surgical patients as a means to prevent SSI

Assessment Question #3

Strategies for implementation of SSI prevention initiatives include which of the following:

- A. It is not necessary to engage your surgeons at the beginning of the initiative.
- B. Establishing a clear understanding of the definition of SSI is important.
- C. A surveillance program is nice to have, but not needed to understand and communicate opportunities for improvement.
- D. A and C
- E. All of the Above

Assessment Question #3 Correct Response

Strategies for implementation of SSI prevention initiatives include which of the following:

- A. It is not necessary to engage your surgeons at the beginning of the initiative.
- B. Establishing a clear understanding of the definition of SSI is important.**
- C. A surveillance program is nice to have, but not needed to understand and communicate opportunities for improvement.
- D. A and C
- E. All of the Above

References

1. <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb223-Ambulatory-Inpatient-Surgeries-2014.jsp>
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3. <https://psnet.ahrq.gov/primer/surgical-site-infections>
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11. Wound Protector Image: <https://www.karger.com/Article/Pdf/343540>

Thank you...

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Questions: Please contact the Clinical Research & Education Team

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