Surgical Site Infection (SSI) Criteria and Case Studies

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Case 1

- 6/18: 45-year-old male had a colon resection (COLO)
- 6/22:
  - Patient’s abdominal incision has purulent drainage and slight erythema and induration; incision is intact
  - Wound drainage specimen to lab for culture (6/24: Grew *Enterobacter* spp and *E. coli*)
  - Patient started on antibiotics
What should be reported to NHSN?

1. Nothing. The surgeon did not open the wound, so the criteria are not met.
2. Nothing. It is an SSI, but not an HAI.
3. **SSI – SIP**
4. SSI – DIP
A superficial incisional SSI must meet one of the following criteria:

Infection occurs within 30 days after the operative procedure and involves only skin and subcutaneous tissue of the incision and patient has at least one of the following:

a. purulent drainage from the superficial incision.
b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
c. at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
d. diagnosis of superficial incisional SSI by the surgeon or attending physician.
Case 2

- Patient is admitted to the hospital on 04/12 for elective surgery and active MRSA screening test is positive.
- On the same day, patient undergoes total abdominal hysterectomy (HYST).
- Postoperative course is unremarkable; patient discharged on 4/16.
- On 4/29, patient is readmitted with a fever and a red, angry wound that is opened into the fascial level by the surgeon and is cultured.
- On 5/1, culture results are positive for MRSA.
Case 2
What infection should be reported?

1. SSI-SIP
2. SSI-SIS
3. **SSI-DIP**
4. SSI-DIS
5. SSI-IAB
A deep incisional SSI must meet one of the following criteria:
Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure and involves deep soft tissues (e.g., fascial and muscle layers) of the incision and patient has at least one of the following:

- a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
- b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured and the patient has at least one of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
- c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination
- d. diagnosis of a deep incisional SSI by a surgeon or attending physician.
Case 2: Primary or Secondary Incision?

NOTE: There are two specific types of deep incisional SSIs:

1. **Deep Incisional Primary (DIP)** – a deep incisional SSI that is identified in a primary incision in a patient that has had an operation with one or more incisions (e.g., C-section incision or chest incision for CBGB)

2. **Deep Incisional Secondary (DIS)** – a deep incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB)
**Case 2**

If so, what is the date of onset?

4/29 or first symptom

<table>
<thead>
<tr>
<th>Race</th>
<th>Optional. Check all the boxes that apply to identify the patient’s race.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event type</td>
<td>Required. Enter SSI.</td>
</tr>
<tr>
<td>Date of event</td>
<td>Required. The date when the first clinical evidence of the SSI appeared or the date the specimen used to make or confirm the diagnosis was collected, whichever comes first. Enter date of this event using this format: MM/DD/YYYY.</td>
</tr>
<tr>
<td>NHSN procedure code</td>
<td>Required. Enter the appropriate NHSN procedure code. For detailed instructions on how to report NHSN operative procedures, see Chapter 9 of NHSN Patient Safety Component Manual. <strong>NOTE</strong>: An SSI cannot be “linked” to an operative procedure unless that procedure has already been added to NHSN. If the procedure was previously added, and the “Link to Procedure” button is clicked, the fields pertaining to the operation will be auto-entered by the computer.</td>
</tr>
<tr>
<td>Date of code</td>
<td>Required. Enter date in this format: MM/DD/YYYY.</td>
</tr>
</tbody>
</table>
Case 3

- A 66-year-old woman is admitted on 9/10 having recently noticed blood in her stools. Diagnostic investigation reveals a colon carcinoma.

- 9/10: Operation: hemicolecotomy.

- 9/13: Temp up to 38.7°C, abdominal pain. Ultrasonography shows abscess along the abdominal wall.
Case 3


- 9/18: Discharged from hospital on oral antibiotics. Abscess culture positive for *E. coli*.

- What type of HAI? **SSI-IAB**
An organ/space SSI must meet one of the following criteria:
Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure and infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure and patient has at least one of the following:
   a. purulent drainage from a drain that is placed through a stab wound into the organ/space
   b. organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
   c. an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
   d. diagnosis of an organ/space SSI by a surgeon or attending physician.

Specific type: IAB Criterion 2:
Patient has abscess or other evidence of intraabdominal infection seen during a surgical operation or histopathologic exam

Site Definitions Chapter (1/12), page 322
Case 3 - Rationale

- 2 different criteria need to be met for Organ Space SSI
  - SSI organ space criteria AND
  - Classification of specific site of organ space SSI, below:

| Event details: SSI Specify criteria used | Required. Check each of the elements of the definition that were used to identify the specific type of SSI. Specific Organ/space event types have their own unique criteria which must be met. They are found in Chapter 17 of the Patient Safety Component Manual: CDC/NHSN Surveillance Definition of Healthcare-Associated Infection and Criteria for Specific Types of Infections in the Acute Care Setting. |

Tables of Instructions (1/12), SSI event form, Table 12
Why not GIT as the specific site of SSI?
– The abscess is in the abdominal wall
– GIT focuses on organs of the GI tract
– Therefore, IAB is the appropriate choice site of SSI in this case
Case 3

Let’s change the scenario and say that at the time of the I & D, it was discovered that the patient had suffered an anastomotic leak from which the abscess developed.

Does this change your determination of an SSI - IAB?

No. Although an anastomotic leak can be a complication of surgery, the fact remains that this patient meets the criterion for an SSI. If the surgery had not been performed there would not have been an anastomotic leak.
Day 1: HPRO performed. Patient screened for MRSA upon admission to ICU per protocol.

Day 2: Patient is very confused. Temperature normal. Wound condition good.

Day 3: Results of the admission screening cultures of the nose and groin are positive for MRSA. The following entry is found in the chart: “Patient removed the dressing several times. Recurrent confused condition. Wound edges very red and taut.”

Day 7: Wound culture: MRSA

Day 9: Improvement in wound condition. Discharged to Rehabilitation Center.
Case 4

- Does this patient have an SSI?
  Yes. Postoperative treatment or mistreatment of the wound does not negate the development of an SSI.

- What type?
  Superficial incisional SSI

- What is the date of the infection?
  Day 3; date of first signs of infection
75-year-old patient is admitted for bowel obstruction. On 5/15, is taken to OR and COLO and SB procedures are performed through a single incision.

If both of these procedures are in your Monthly Reporting Plan in May, which one do you enter into NHSN?

*Both COLO and SB procedures are entered.*
NOTES:

1. If procedures in more than one NHSN operative procedure category are performed during the same trip to the OR even if performed through the same incision, a Denominator for Procedure (CDC 57.121) record is reported for each NHSN operative procedure category being monitored. For example, if a CARD and CBGC are done through the same incision, a Denominator for Procedure record is reported for each.
Case 5

How are the durations for the individual procedures determined?

3. If more than one NHSN operative procedure category is performed through the same incision, record the combined duration of all procedures, which is the time from skin incision to primary closure.

SSI Chapter (1/12), Denominator Data Notes section
Case 5

- 5/19: Patient spikes temp to 38 C, has abdominal pain and emesis. Ultrasound shows fluid collection in abdominal cavity. Fluid specimen for culture is obtained by needle aspiration.

- 5/20: Culture positive for *E. faecium*, many neutrophils seen

Is this an HAI? Yes, SSI-IAB
To which procedure is the SSI attributed?

- Small bowel procedure, because it is higher on the *NHSN Principal Operative Procedure Selection List*
Case 5 - Rationale

If more than one NHSN operative procedure was done through a single incision, attempt to determine the procedure that is thought to be associated with the infection. If it is not clear (as is often the case when the infection is a superficial incisional SSI), or if the infection site being reported is not an SSI, use the NHSN Principal Operative Procedure Selection Lists (Table 3) to select which operative procedure to report.

### Table 3. NHSN Principal Operative Procedure Selection Lists

The following lists are derived from Table 1, NHSN Operative Procedure Categories. The operative procedures with the highest risk of surgical site infection are listed before those with a lower risk.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Code</th>
<th>Abdominal Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SB</td>
<td>Small bowel surgery</td>
</tr>
<tr>
<td>2</td>
<td>KTP</td>
<td>Kidney transplant</td>
</tr>
<tr>
<td>3</td>
<td>LTP</td>
<td>Liver transplant</td>
</tr>
<tr>
<td>4</td>
<td>BILI</td>
<td>Bile duct, liver or pancreatic surgery</td>
</tr>
<tr>
<td>5</td>
<td>REC</td>
<td>Rectal surgery</td>
</tr>
<tr>
<td>6</td>
<td>COLO</td>
<td>Colon surgery</td>
</tr>
<tr>
<td>7</td>
<td>GAST</td>
<td>Gastric surgery</td>
</tr>
<tr>
<td>8</td>
<td>CSEC</td>
<td>Cesarean section</td>
</tr>
<tr>
<td>9</td>
<td>SPLE</td>
<td>Spleen surgery</td>
</tr>
<tr>
<td>10</td>
<td>APPY</td>
<td>Appendix surgery</td>
</tr>
<tr>
<td>11</td>
<td>HYST</td>
<td>Abdominal hysterectomy</td>
</tr>
<tr>
<td>12</td>
<td>OVRY</td>
<td>Ovarian surgery</td>
</tr>
<tr>
<td>13</td>
<td>HER</td>
<td>Herniorrhaphy</td>
</tr>
<tr>
<td>14</td>
<td>CHOL</td>
<td>Gall bladder surgery</td>
</tr>
<tr>
<td>15</td>
<td>AAA</td>
<td>Abdominal aortic aneurysm repair</td>
</tr>
<tr>
<td>16</td>
<td>NEPH</td>
<td>Kidney surgery</td>
</tr>
<tr>
<td>17</td>
<td>XLAP</td>
<td>Laparotomy</td>
</tr>
</tbody>
</table>

SSI Chapter (1/12), Table 3
Case 6

1/22: Patient had a total laparoscopic abdominal hysterectomy

2/1: Abdominal pain with purulent drainage in 2 of 3 trochar sites; Temp 38.4 °C

2/3: Surgeon opened wounds in the ER and noted purulent material in the fascial layer; specimens to lab for culture; antibiotics begun

2/5: Cultures positive for *Pseudomonas aeruginosa*
Case 6

Is this an SSI? Yes

What type? DIP

A deep incisional SSI must meet one of the following criteria:

- Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure and
- involves deep soft tissues (e.g., fascial and muscle layers) of the incision and
- patient has at least one of the following:
  - a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
How many SSIs should be reported?

1. One
2. Two
3. Three
4. Four

Case 6 - Rationale

6. Following laparoscopic surgeries, if more than one of the incisions should become infected, only report as a single SSI.

SSI Chapter (1/12), Denominator Data Notes section