



Surgical Site Infection (SSI) Case Studies

Teresa Horan, MPH

Gloria C. Morrell, RN, MSN, CIC

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Updated SSI Case Study Slide Numbers



- 13 – Corrected answer based on new Date of Event definition
- 19 – Corrected typographical error in Organ/Space SSI criterion
- 30 – Corrected answer based on new Date of Event definition
- 33 – Replaced “endoscope” with new term “scope”
- 48-50 – Revised case study and answer based on new 90-day surveillance rule
- 64 – Corrected last bulleted phrase

* There will be an “Updated Slide” note on each slide

Case 1

- A patient had bilateral knee prostheses (KPRO) implanted during a single trip to the OR.
 - Left KPRO incision at 0823 and closed at 0950
 - Right KPRO incision at 1003 and closed at 1133

Which statement is true?

1. One KPRO procedure should be reported with a combined duration of 2 hrs 57 min.
2. Two separate KPRO procedures should be reported, each with a duration of 2 hrs 57 min.
- ✓ 3. Two separate KPRO procedures should be reported: L KPRO with a duration of 1 hr 27 min and R KPRO with a duration of 1 hr 30 min

Case 1 - Rationale

- For bilateral operative procedures (e.g., KPRO), two separate Denominator for Procedure (CDC 57.121) records are completed. To document the duration of the procedure, indicate the incision time to closure time for each procedure separately or, alternatively, take the total time for both procedures and split it evenly between the two.

SSI Chapter : Denominator Data Reporting Instructions

Case 2

- 6/18: 45-year-old male had a colon resection (COLO)
6/22:
 - Patient's abdominal incision has purulent drainage from subcutaneous tissue 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

Case 2 - Rationale

- ✓ Infection occurs within 30 days after any NHSN operative procedure, including those coded as 'OTH'
- and*
- ✓ involves only skin and subcutaneous tissues 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. superficial incision that is deliberately opened by a surgeon and is culture-positive or not cultured
- and*
- patient has at least one of the following signs or symptoms: pain or tenderness; localized swelling; redness; or heat. A culture-negative finding does not meet this criterion.
- d. diagnosis of a superficial incisional SSI by a surgeon or attending physician.

SSI Chapter : Superficial incisional SSI definition

Case 3

- 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 complaints of acute incisional pain since day before. Surgeon opened the wound into the fascial level and sent drainage specimen for culture and sensitivities.
- On 5/1, culture results are positive for MRSA.

Is this an HAI?

- ✓ 1. Yes
2. No

What infection should be reported?

1. SSI-SIP
2. SSI-SIS
3. SSI-DIP
4. SSI-DIS
5. SSI-IAB

Case 3 – Answer

Deep Incisional SSI - Criterion b

- ✓ Infection occurs within 30 or 90 days after the NHSN operative procedure according to the list in Table 3
- and
- ✓ involves deep soft tissues of the incision (e.g., fascial and muscle layers)
- and
- patient has at least one of the following:
 - a. purulent drainage from the deep incision
 - ✓ b. a deep incision that spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured
- and
- patient has at least one of the following signs or symptoms: fever (>38°C); 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 invasive procedure, or by histopathologic examination or imaging test.
- d. diagnosis of a deep incisional SSI by a surgeon or attending physician.

SSI Chapter: Deep incisional SSI definition

Case 3

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If so, what is the date of event?

4/29, the date the last element used to meet the infection criterion occurred (i.e., date of deliberate wound opening and positive drainage specimen obtained)

Date of event	For an HAI (excludes VAE), the date of event is the date when the <u>last</u> element used to meet the CDC/NHSN site-specific infection criterion occurred. Synonyms: infection date, date of infection. (See Date of Onset for VAE reporting). Date of event must be within 30 days or 90 days of the date of procedure, depending on the operative procedure category (See Table 3; Chapter 9).
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SSI event form Table of Instructions

Case 4

- Patient has a total hip arthroplasty (HPRO) performed on 03/17 at Hospital A.
- Discharged from Hospital A on 3/19.
- Admitted to Hospital B on 3/25 with purulent drainage from the superficial incision.
- Further investigation concludes this is a superficial incisional SSI.

What should Hospital B do? Notify Hospital A about the SSI

What should Hospital A do? Report the SSI to NHSN

What if the infection became apparent 35 days after the procedure? Not an SSI; not reported

Case 4 - Rationale

- SSIs are always associated with a particular operative procedure (through linking) and with the facility in which that operation was performed; in this case, that was Hospital A
- Superficial incisions are followed for only 30 days

SSI Chapter: Requirements and Definitions sections

Home > Patient Safety Component > How To > Events > Link an Event to a Procedure

How to Link an Event to a Procedure

Before you can link an in-plan event to a procedure, the procedure must be entered or imported in NHSN first. In addition, the patient information on the event screen must match all of the patient information on the procedure record.

1. If you are entering an SSI:
After you have entered the date of event, click the "Link/Unlink to Procedure" button.

If you are entering an event other than an SSI:
After you have indicated that the event is a Post-procedure event, click the "Link/Unlink to Procedure" button.

Event Information @HELP

Event Type*: BSI - Bloodstream Infection Date of Event*: 09/12/2011

Post-procedure: Y-Yes

NHSN Procedure Code*: [dropdown]

ICD-9-CM Code*: [input]

Procedure Date*: [input] **Link/Unlink to Procedure** *Event is not Linked*

MDRO Infection Surveillance*: [dropdown]

Location*: [dropdown]

Date Admitted to Facility*: [input]

Help system -> Procedure-associated Module -> How to -> Events -> Link an event to a procedure

Case 5

- Patient admitted on 9/10 and underwent a hemi-colectomy. Wound class = 2.
- 9/13: Temp up to 38.7°C, abdominal pain. Ultrasonography shows abscess along the abdominal wall.
- 9/14: I&D of the abdominal wall abscess. Abscess specimen collected for culture. Antibiotics begun.
- 9/18: Discharged from hospital on oral antibiotics. Abscess culture positive for *E. coli*.

What type of SSI does this patient have?

1. SSI-SIP
2. SSI-DIP
3. SSI-IAB
4. SSI-GIT

Case 5 – Answer (1)

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- ✓ Infection occurs within 30 or 90 days after the NHSN operative procedure according to the list in Table 3
- and
- ✓ 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 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 invasive procedure, or by histopathologic examination or imaging test
 - d. diagnosis of an organ/space SSI by a surgeon or attending physician
- and
- ✓ meets at least one criterion of a specific organ/space infection site listed in Table 4.

Case 5 – Answer (2)

IAB Criterion 2:

Patient has abscess or other evidence of intraabdominal infection seen during an invasive procedure or histopathologic exam

Case 5 - Rationale

- 2 different criteria need to be met for Organ/Space SSI
 - SSI organ/space criteria AND
 - Those of the specific site of the organ/space operated on

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.
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SSI event form Table of Instructions

Case 5 - Rationale

- 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

Site Definitions Chapter

Case 5 (cont.)

- 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.

Case 6

- 1/22: Patient had an abdominal hysterectomy (HYST)
- 2/1: Pelvic pain; Temp 38.4°C
- 2/2: MRI reveals abscess in the deep pelvic tissue
- 2/3: Surgeon opened wound in the OR and drained abscess; specimen to lab for culture; notes 'infected hematoma'; antibiotics begun
- 2/5: Culture positive for *Pseudomonas aeruginosa*

What should be reported?

1. SSI – IAB
- 2 ✓ SSI – OREP
3. SSI - EMET

Why isn't this an SSI-IAB?

IAB – Intraabdominal, not specified elsewhere including gallbladder, bile ducts, liver (excluding viral hepatitis), spleen, pancreas, peritoneum, subphrenic or subdiaphragmatic space, or other intraabdominal tissue or area not specified elsewhere

Site Definitions Chapter

Case 6 - Rationale

OREP – Other infections of the male or female reproductive tract (epididymis, testes, prostate, vagina, ovaries, uterus, or other deep pelvic tissues, excluding endometritis or vaginal cuff infections)

...must meet at least 1 of the following:

- 2. Patient has an abscess or other evidence of infection of affected site seen during an invasive procedure or histopathologic examination.**

Site Definitions Chapter

Case 7

- 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."

Case 7

- Day 5: Entry in the chart: “Wound abscess lanced by the attending surgeon”. A wound specimen sent to lab for culture. Antibiotics begun.
- Day 7: Wound culture: MRSA
- Day 9: Improvement in wound condition. Discharged to Rehabilitation Center.

Case 7



- Does this patient have an SSI?
Yes, patient’s incision was red at time he was pulling the dressing off.
- What type? Superficial Incisional SSI
- What is the date of the infection?
Day 5; the date the last element used to meet the infection criterion occurred (i.e., date of deliberate wound opening and wound specimen obtained)

Case 8

A patient has a 2-vessel CABG performed using a saphenous vein, which was harvested via laparoscope, and an internal mammary artery. The ICD-9-CM procedure codes assigned by a Medical Records coder were 36.12 (CBGB) and 36.15 (CBGC).

What NHSN operative procedure code(s) should be entered into NHSN?

CBGB

Case 8 - Rationale

EXCEPTION: If a patient has both a CBGC and CBGB during the same trip to the OR, report only as a CBGB. Only report as a CBGC when there is a chest incision only. CBGB and CBGC are never reported for the same patient for the same trip to the OR. For bilateral operative procedures see #4 below.

SSI Chapter: Denominator Data Reporting Instructions

Case 8

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- Should you report that scope use was Yes or No?

Scope = Y, since the saphenous vein was endoscopically harvested.

Scope: Required. Check Y if the entire operative procedure was performed using an endoscope/laparoscope/robotic assist. Check N if the scope incision was extended to allow hand assistance or was fully converted to an open approach.

Note: For CBGB, if donor vessel was harvested using a scope, check Y.

SSI Chapter: Denominator for Procedure form Table of Instructions

Case 8

- If the patient develops both a leg donor site superficial incisional infection and a chest superficial incisional infection, do you count two infections or only one?
- If only one, which one?

Count 2 superficial incisional SSI:

- Chest incision as a primary site: SSI-SIP
- Leg incision as a secondary site: SSI-SIS

Case 8 - Rationale

- Because there is infection in the two different operative sites of the CBGB, two separate SSI must be reported.
- Each SSI is attributable to the same CBGB and must be linked to that procedure record in NHSN.

SSI Chapter: Numerator Reporting Instructions

Case 9

On 5/15 a 45-year-old female undergoes an abdominal hysterectomy (HYST) and colectomy (COLO) performed through the same incision.

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

Both HYST and COLO procedures are entered.

Case 9 - Rationale

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.

SSI Chapter: Denominator Reporting Instructions

Case 9

How are the durations for the individual procedures determined?

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

SSI Chapter, Denominator Data Reporting Instructions

Case 9 (cont.)

- 5/15: A 45-year-old female undergoes an abdominal hysterectomy (HYST) and colectomy (COLO) performed through the same incision.
- 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

Is this an SSI?

1. SSI-Deep
Incisional Primary
2. SSI-Deep
Incisional
Secondary
- ✓ 3. SSI Organ/Space,
specific site IAB
4. This is an IAB but
there is no SSI
infection

To which procedure is the SSI attributed?

- HYST
- **COLO**
- Both HYST and COLO

Case 9 - Rationale

- If a procedure from more than one NHSN operative procedure category 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 5) to select which operative procedure to report.

SSI Chapter: Numerator Data Reporting Instructions

Case 9 - Rationale

Table 5. NHSN Principal Operative Procedure Category Selection Lists

The following lists are derived from Table 1, NHSN Operative Procedure Categories. The categories with the highest risk of SSI are listed before those with lower risks.

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

Case 10

- 1/22: Patient had a total laparoscopic abdominal hysterectomy
- 2/1: Abdominal pain with purulent drainage in 2 of 3 trocar 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 10

Is this an SSI? **Yes**

What type? **DIP**

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

- ✓ ■ Infection occurs within 30 or 90 days after the NHSN operative according to the list in Table 3.

and

- ✓ ■ involves deep soft tissues of the incision (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
- b. a deep incision spontaneously dehisces...
- c. And abscess or other evidence of infection is found...
- d. diagnosis by surgeon or physician

SSI Chapter, Deep incisional SSI definition

How many SSIs should be reported?

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

Case 10 - Rationale

Following laparoscopic surgeries, if more than one of the incisions should become infected, only report as a single SSI. If one is superficial incisional and one is deep incisional, report only as a deep incisional SSI.

SSI Chapter: Numerator Reporting Instructions

Case 11



- ❑ 78 y.o. female had a hip prosthesis procedure (HPT) on February 4.
- ❑ On February 17, she had an infected decubitus ulcer on her sacrum.
- ❑ On March 6, blood cultures grew *Staph. aureus* and she was placed on antimicrobials for treatment of the bloodstream infection.
- ❑ On May 11, she experienced pain and heat in the hip joint; radiographic evidence on gallium scan shows an abscess at the hip prosthesis site; culture of hip was no growth.

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Should this be counted as an SSI?

1. Yes, this is an SSI.
- ✓ 2. No, this is not an SSI.



Case 11 - Rationale

- Infection occurred >90 days after the HPRO operation was performed, therefore it cannot be called an SSI
 - HPRO – February 4
 - Infection – May 11

Site Definitions Chapter

Case 12

- ❑ A male patient underwent a KPRO in April 2010.
- ❑ In October 2010, the prosthesis was removed due to an unresolved infection in the joint space with MRSA. A spacer was placed and a replacement procedure was scheduled for the following February 2011.
- ❑ The replacement KPRO was completed in February 2011 and, within 3 weeks after discharge, he developed osteomyelitis with MRSA near the attachment site.

How should this osteomyelitis be reported?

1. SSI linked to the April 2010 operative procedure
2. SSI linked to the October 2010 operative procedure
- 3 ✓ SSI linked to the February 2011 operative procedure
4. Does not meet the criteria for SSI

Case 13 - Rationale

If a patient has several NHSN operative procedures prior to an infection, report the operative procedure code of the operation that was performed most closely in time prior to the infection date.

SSI Chapter : Numerator Data Reporting Instructions

Case 13

Patient had an OREF (**O**pen **R**eduction **E**xternal **F**ixation) of the L. tibia (FX, ICD-9-CM 79.26) on Nov 12. His course was uneventful and he was discharged on Nov 20. He was readmitted on Dec 3 with purulent drainage growing MRSA from the proximal pin site, which is not contiguous with the incision, and with a matching positive blood culture.



What should be reported?

1. SSI-SIP and secondary BSI
2. Primary BSI
3. SSI-SIP only
- ✓ 4. None of the above



Case 13 - Rationale

- The infection is at the pin site and not the incision, therefore it cannot be an SSI-SIP.
- The positive blood culture may make you suspect osteomyelitis, but the organ/space SSI criteria are not met.
- The pin site infection and BSI occurred more than 2 calendar days after discharge, therefore they cannot be associated with the hospital stay (i.e., not HAI).

Case 14

A female patient underwent a KPRO operation on December 22, 2010. She returned to her surgeon on January 31, 2011 with purulent drainage from the superficial incision, which had started 2 days prior.



How should this infection be reported?

1. SSI - SIP
2. SSI - DIP
3. SSI - Organ Space
4. Not reported; does not meet criteria for SSI



Rationale: Onset of infection was >30 days postop, therefore cannot be called an SSI-SIP

Case 15

- ❑ A spinal fusion (FUSN) patient was seen in the ER 11 days postop with a large cellulitis, a pain level 10/10, swelling, tenderness, and redness.
- ❑ He was admitted for treatment with antibiotics. He had leukocytosis and an elevated CRP (199).
- ❑ Serous drainage from the incision was no growth.

Is this superficial incisional or deep incisional SSI?

1. Superficial incisional SSI
2. Deep incisional SSI
3. ✓ Neither; the surveillance criteria for SSI are not met

SI-SSI criteria not met

Criterion	Surgical Site Infection (SSI)
	Superficial incisional SSI
	Must meet the following criterion:
	Infection occurs within 30 days after any NHSN operative procedure, including those coded as 'OTH' *
	and
	patient has at least one of the following:
	<input checked="" type="checkbox"/> a. purulent drainage from the superficial incision.
	<input checked="" type="checkbox"/> 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 are deliberately opened by surgeon, and are culture-positive or not cultured. A culture negative finding does not meet this criterion.
	<input checked="" type="checkbox"/> d. diagnosis of superficial incisional SSI by the surgeon or attending physician.
	* http://www.cdc.gov/nhsn/XLS/ICD-9-cmCODEScurrent.xlsx

SSI Chapter : Superficial incisional SSI definition

Case 16

- ❑ On 1/6, patient underwent a colon resection; perforation of the bowel was identified, repaired and the abdominal incision was closed primarily. A colostomy was formed at that time.

- ❑ On 1/23, the patient experienced purulent drainage from the abdominal incision extending to the fascial layer. An aseptic specimen was obtained during a follow-up visit that day with her surgeon, which grew *Escherichia coli*.

Is this infection reportable as an NHSN SSI procedure?

1. No, this is not considered an NHSN procedure
2. Yes, as a superficial incisional SSI at the primary incision
- ✓ 3. Yes, as a deep incisional SSI at the primary incision
4. No, because both sites are not infected; this infection is not reportable.

Case 16 - Rationale

- One outcome of the surgery was that the colostomy was created.
- Although the colostomy is open, the primary incision is closed.
- Therefore, this surgery is reportable in NHSN as COLO.

Great Job!!!



<http://www.cdc.gov/nhsn>
Email: nhsn@cdc.gov