Surgical Site Infection (SSI) Event

Settings: Surveillance of surgical patients will occur in any inpatient and/or outpatient setting where the selected NHSN operative procedure(s) are performed.

Requirements: Perform surveillance for SSI following the chosen NHSN operative procedure (s) category as directed.

- Collect SSI (numerator) and operative procedure category (denominator) data on all procedures included in the selected procedure categories for at least one month.
- A procedure must meet the NHSN definition of an operative procedure in order to be included in the surveillance.
- SSI monitoring requires active, patient-based, prospective surveillance. Post-discharge and ante-discharge surveillance methods should be used to detect SSIs following inpatient and outpatient operative procedures. These methods include:
    1. Direct examination of patients' wounds during follow-up visits to either surgery clinics or physicians' offices.
    2. Review of medical records or surgery clinic patient records.
    3. Surgeon surveys by mail or telephone
    4. Patient surveys by mail or telephone (though patients may have a difficult time assessing their infections).

Any combination of these methods is acceptable for use; however, CDC criteria for SSI must be used.
An SSI will be associated with a particular NHSN operative procedure and the facility in which that procedure was performed.

The International Classification of Diseases, 9th Revision Clinical Modifications (ICD-9-CM) codes which are defined by the ICD-9 Coordination and Maintenance Committee of the National Center for Health Statistics and the Centers for Medicare and Medicaid Services (CMS), are developed as a tool for classification of morbidity data. The wide use enables the grouping of surgery types for the purpose of determining SSI rates. ICD-9-CM codes are updated annually in October and NHSN operative procedure categories are subsequently updated and changes shared with NHSN users. **Form C** lists NHSN operative procedure category groupings by ICD-9-CM codes. Because ambulatory surgery centers and hospital outpatient surgery departments may not use ICD-9-CM procedure codes, **Form C** provides Current Procedural Terminology (CPT) code mapping for certain NHSN

operative procedure categories to assist users in determining the correct NHSN code to report for outpatient surgery cases. However, CPT codes do not take precedence over ICD-9-CM codes when determining the appropriate NHSN operative procedure category for inpatient surgery cases. **Form C** also includes a general description of the types of operations contained in the NHSN operative procedure categories.

Definitions:

1. **An NHSN operative procedure:** is a procedure
   a. that is performed on a patient who is an KNHSS inpatient or an KNHSS outpatient;

   <u>*and*</u>

   b. takes place during an operation (defined as a single trip to the operating room [OR] where at least one incision is made through the skin or mucous membrane, including laparoscopic approach, and the incision is primarily closed before the patient leaves the OR);

   <u>*and*</u>

   c. that is included in **Form C**

2. **Primary Closure:** is defined as closure of all tissue levels during the original surgery, regardless of the presence of wires, wicks, drains, or other devices or objects extruding through the incision. This category includes surgeries where the skin is closed by some means, including incisions that are described as being "loosely closed" at the skin level. Thus, if any portion of the incision is closed at the skin level, by any manner, a designation of primary closure should be assigned to the surgery.

3. **Non-primary Closure:** is defined as closure that is other than primary and includes surgeries in which the superficial layers are left completely open during the original surgery and therefore cannot be classified as having primary closure. For surgeries with non-primary closure, the deep tissue layers may be closed by some means (with the superficial layers left open), or the deep and superficial layers may both be left completely open. In such cases, any subsequent infection would not be considered an SSI, although it may be an HAI if it meets criteria for another specific infection site (e.g., skin or soft tissue infection).
   - An example of a surgery with non-primary closure would be a laparotomy in which the incision was closed to the level of the deep tissue layers, sometimes called "fascial layers" or "deep fascia," but the superficial layers are left open.
   - Another example would be an "open abdomen" case in which the abdomen is left completely open after the surgery. Wounds that are "closed secondarily" at some later date, or described as "healing by secondary intention" should also be classified as having non-primary closure. Wounds with non-primary closure may or may not be

described as "packed" with gauze or other material, and may or may not be covered with plastic, "wound vacs," or other synthetic devices or materials.

NOTE: Assign the surgical wound closure that applies when the patient leaves the OR from the principal operative procedure. This instruction should be followed in scenarios where a patient leaves the OR with non-primary closure, but returns to the OR for a subsequent procedure that results in primary closure of the procedure.

4. **Date of event**: For an SSI the date of event is the date when the last element used to meet the SSI infection criterion occurred. Synonym: infection date.

5. **KNHSS Inpatient**: A patient whose date of admission to the healthcare facility and the date of discharge are different calendar days.

6. **KNHSS Outpatient**: A patient whose date of admission to the healthcare facility and date of discharge are the same calendar day.

7. **Operating Room (OR):** A patient care area that met the Facilities Guidelines Institute's (FGI) or American Institute of Architects' (AIA) criteria for an operating room when it was constructed or renovated. This may include an operating room, C-Section room, interventional radiology room, or a cardiac catheterization lab.

8. **ASA score**: Assessment by the anesthesiologist of the patient's preoperative physical condition using the American Society of Anesthesiologists' (ASA) Classification of Physical Status. Patient is assigned one of the following which may be used as one element of SSI risk adjustment:
   1. Normally healthy patient
   2. Patient with mild systemic disease
   3. Patient with severe systemic disease that is not incapacitating
   4. Patient with an incapacitating systemic disease that is a constant threat to life
   5. Moribund patient who is not expected to survive for 24 hours with or without the operation.

   NOTE: If coded as expired or as organ donor, report as ASA = 5.

9. **Duration of operative procedure**: The interval in hours and minutes between skin incision and primary skin closure. See also definition of primary closure and the Denominator Data reporting instructions.

10. **Emergency operative procedure**: A nonelective, unscheduled operative procedure. Emergency operative procedures are those that do not allow for the standard immediate preoperative preparation normally done within the facility for a scheduled operation (e.g., stable vital signs, adequate antiseptic skin preparation, colon decontamination in advance of colon surgery, etc.).

11. **General anesthesia**: The administration of drugs or gases that enter the general circulation and affect the central nervous system to render the patient pain free, amnesic, unconscious, and often paralyzed with relaxed muscles.

12. **Scope:** An instrument used to visualize the interior of a body cavity or organ. In the context of an NHSN operative procedure, use of a scope involves creation of several small incisions to perform or assist in the performance of an operation rather than use of a traditional larger incision (i.e., open approach). Robotic assistance is considered equivalent to use of a scope for KNHSS SSI surveillance. See also Instructions for Completion of Denominator for Procedure Form and both Numerator Data and Denominator Data reporting instructions.

13. **Trauma**: Blunt or penetrating injury.

14. **Wound class**: An assessment of the degree of contamination of a surgical wound at the time of the operation. Wound class should be assigned by a person involved in the surgical procedure, e.g., surgeon, circulating nurse, etc. The wound class system used in NHSN is an adaptation of the American College of Surgeons wound classification schema. Wounds are divided into four classes:

    Clean: An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tracts are not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow nonpenetrating (blunt) trauma should be included in this category if they meet the criteria.

    NOTE: The following NHSN operative procedure categories are NEVER considered to have a clean wound classification: APPY, BILI, CHOL, COLO, REC, SB, and VHYS.

    Clean-Contaminated: Operative wounds in which the respiratory, alimentary, genital*, or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.
    *Includes female and male reproductive tracts.

Contaminated: Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique (e.g., open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered are included in this category.

Dirty or Infected: Includes old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

Table 1. Surgical Site Infection Criteria

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*** 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. 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 the surgeon or attending physician or other designee (see reporting instructions). *http://www.cdc.gov/nhsn/XLS/ICD-9-cmCODEScurrent.xlsx
Comments	There are two specific types of superficial incisional SSIs: 1. Superficial Incisional Primary (SIP) – a superficial incisional SSI that is identified in the 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. Superficial Incisional Secondary (SIS) – a superficial 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 incision for CBGB).
REPORTING INSTRUCTIONS	• Do not report a stitch abscess (minimal inflammation and discharge confined to the points of suture penetration) as an infection. • Do not report a localized stab wound or pin site infection as SSI. While it would be considered either a skin (SKIN) or soft tissue (ST) infection, depending on its depth, it is not reportable under this module. • Diagnosis of "cellulitis", by itself, does not meet criterion d for superficial incisional SSI. • If the superficial incisional infection extends into the fascial and/or muscle layers, report as a deep incisional SSI only. • An infected circumcision site in newborns is classified as CIRC. Circumcision is not an NHSN operative procedure. CIRC is not reportable under this module. • An infected burn wound is classified as BURN and is not reportable under this module. • The term attending physician for the purposes of application of the NHSN SSI criteria may be interpreted to mean the surgeon(s), infectious disease, other physician on the case, emergency physician or physician's designee (nurse practitioner or physician's assistant).
	Deep incisional SSI Must meet the following criterion:
	Infection occurs within 30 or 90 days after the NHSN operative procedure according to the list in Table 2 ***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 that 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 or other designee (see reporting instruction).
Comments	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 incision for CBGB).
REPORTING INSTRUCTION	• Classify infection that involves both superficial and deep incisional sites as deep incisional SSI. • Classify infection that involves superficial incisional, deep incisional, and organ/space sites as deep incisional SSI. This is considered a complication of the incision. • The term attending physician for the purposes of application of the NHSN SSI criteria may be interpreted to mean the surgeon(s), infectious disease, other physician on the case, emergency physician or physician's designee (nurse practitioner or physician's assistant).
	Organ/Space SSI Must meet the following criterion:
	Infection occurs within 30 or 90 days after the NHSN operative procedure according to the list in Table 2 ***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 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 or other designee (see reporting instruction). ***and*** meets at least one criterion for a specific organ/space infection site listed in **Form E**.

Comments	Because an organ/space SSI involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure, the criterion for infection at these body sites must be met in addition to the organ/space SSI criteria. For example, an appendectomy with subsequent subdiaphragmatic abscess would be reported as an organ/space SSI at the intraabdominal specific site (SSI-IAB) when both organ/space SSI and IAB criteria are met. **Form E** list the specific sites that must be used to differentiate organ/space SSI. These criteria are in the Surveillance Definitions chapter.
REPORTING INSTRUCTIONS	• If a patient has an infection in the organ/space being operated on and the surgical incision was closed primarily, subsequent continuation of this infection type during the remainder of the surveillance period is considered an organ/space SSI, if organ/space SSI and site-specific infection criteria are met. Rationale: Risk of continuing or new infection is considered to be minimal when a surgeon elects to close a wound primarily. • Occasionally an organ/space infection drains through the incision and is considered a complication of the incision. Therefore, classify it as a deep incisional SSI. • Report mediastinitis following cardiac surgery that is accompanied by osteomyelitis as SSI-MED rather than SSI-BONE. • If meningitis (MEN) and a brain abscess (IC) are present together after operation, report as SSI-IC. • Report CSF shunt infection as SSI-MEN if it occurs within 90 days of placement; if later or after manipulation/access, it is considered CNS-MEN and is not reportable under this module. • Report spinal abscess with meningitis as SSI-MEN following spinal surgery. • The term attending physician for the purposes of application of the NHSN SSI criteria may be interpreted to mean the surgeon(s), infectious disease, other physician on the case, emergency physician or physician’s designee (nurse practitioner or physician’s assistant).

Table 2. Surveillance Period for Deep Incisional or Organ/Space SSI Following Selected NHSN Operative Procedure Categories

30-day Surveillance			
Code	**Operative Procedure**	**Code**	**Operative Procedure**
AAA	Abdominal aortic aneurysm repair	LAM	Laminectomy
AMP	Limb amputation	LTP	Liver transplant
APPY	Appendix surgery	NECK	Neck surgery
AVSD	Shunt for dialysis	NEPH	Kidney surgery
BILI	Bile duct, liver or pancreatic surgery	OVRY	Ovarian surgery
CEA	Carotid endarterectomy	PRST	Prostate surgery
CHOL	Gallbladder surgery	REC	Rectal surgery
COLO	Colon surgery	SB	Small bowel surgery
CSEC	Cesarean section	SPLE	Spleen surgery
GAST	Gastric surgery	THOR	Thoracic surgery
HTP	Heart transplant	THYR	Thyroid and/or parathyroid surgery
HYST	Abdominal hysterectomy	VHYS	Vaginal hysterectomy
KTP	Kidney transplant	XLAP	Exploratory Laparotomy
		OTH	Other operative procedures not included in the NHSN categories

90-day Surveillance	
Code	**Operative Procedure**
BRST	Breast surgery
CARD	Cardiac surgery
CBGB	Coronary artery bypass graft with both chest and donor site incisions
CBGC	Coronary artery bypass graft with chest incision only
CRAN	Craniotomy
FUSN	Spinal fusion
FX	Open reduction of fracture
HER	Herniorrhaphy
HPRO	Hip prosthesis
KPRO	Knee prosthesis
PACE	Pacemaker surgery
PVBY	Peripheral vascular bypass surgery
RFUSN	Refusion of spine
VSHN	Ventricular shunt

NOTE: Superficial incisional SSIs are only followed for a 30-day period for all procedure types.

Numerator Data: All patients having any of the procedures included in the selected NHSN operative procedure category(s) are monitored for signs of SSI. The Surgical Site Infection (SSI) form is completed for each such patient found to have an SSI.

REPORTING INSTRUCTIONS:

1. ***Attributing SSI to a Procedure when Several are Performed on Different Dates***: If a patient has several NHSN operative procedures performed on different dates prior to an infection, report the operative procedure code of the operation that was performed most closely in time prior to the infection date, unless there is evidence that the infection was associated with a different operation.
2. ***SSI after Laparoscopic Procedures***: Following a laparoscopic surgery, if more than one of the incisions should become infected, only report as a single SSI. If one incision meets criteria for a superficial incisional SSI and another meets criteria for a deep incisional SSI, count as only one deep incisional SSI.
3. ***SSI after Breast (BRST) Procedures with More than One Incision:***
   - A single breast operative procedure (BRST) with multiple incisions on a single breast that are not laparoscopic should be reported as only one operative procedure. If more than one of the incisions should become infected, only report as a single SSI.
   - A BRST procedure with a secondary incision for tissue harvest (e.g., Transverse Rectus Abdominis Myocutaneous [TRAM] flap) should be reported as only one operative procedure. If the secondary incision gets infected, report as either SIS or DIS as appropriate.

4. ***SSI after Procedures that Allow Secondary Incisions***: For procedures that allow for secondary incisions (i.e., BRST, CBGB, CEA, FUSN, REC, PVBY, RFUSN), the secondary incision site surveillance period will only be 30 days, as long as that site does not have retained implantable materials. For example, a saphenous vein harvest incision in a CBGB procedure is considered the secondary incision and is monitored for only 30 days after surgery for evidence of SSI, but the chest incision is monitored for 90 days.

5. ***SSI After Colostomy Reversal***: In a colostomy reversal (take down) procedure, if colostomy stoma site and abdominal operative incision(s) are primarily closed and one or more of the incisions becomes infected, report only as one incisional SSI. If the stoma site is closed at the fascial/muscle layer but not superfically (e.g., left to heal by secondary intention) and the abdominal operative incision(s) is primarily closed, this is still considered an NHSN operative procedure and therefore if an organ/space infection develops, it is considered an SSI. However, if the stoma site becomes infected, it is considered skin or soft tissue infection, not an SSI.

6. ***SSI Detected at Another Facility***: If an SSI is detected at a facility other than the one in which the operation was done, notify the infection control team of the index facility with enough detail so the infection can be reported. When reporting the SSI, the index facility should indicate that Detected = RO.

7. ***SSI Attribution after Surgical Procedure with More Than One Operative Procedure Category***: If more than one NHSN operative procedure category was performed through a single incision during a single trip to the operating room, attribute the SSI to 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, use the NHSN Principal Operative Procedure Category Selection Lists (Table 3) to select the operative procedure to which the SSI should be attributed.

8. ***SSI Following Manipulation of the Operative Site***: If during the post-operative period the surgical site has an invasive manipulation for diagnostic or therapeutic purposes (e.g., needle aspiration), and following this manipulation an SSI develops, the infection is not attributed to the operation.

9. When implanted material is left in place during an NHSN operative procedure with a 90-day surveillance period (e.g., KPRO, VSHN) and the implanted material or the area/structures contiguous with it are later manipulated for diagnostic or therapeutic purposes, organ/space infection can occur. In such a case, if organ/space infection develops during the 90-day surveillance period, the infection is not attributed to the operation in which the implant was inserted; instead it should be attributed to the latter procedure.

10. **Reporting Instructions for Specific Post-operative Infection Scenarios:**

    - Once a patient is discharged from the index hospital, if the incision opens due to fall or other reasons and there was no evidence of incisional infection at the time of its opening (as defined by lack of those symptoms that make up the SSI definition), then subsequent infection of the incision is not considered an SSI or an HAI for the index hospital (if the patient was in a rehab facility when this occurred, it would be an HAI for that facility). This implies a mechanical reason for dehiscence rather than an infectious reason.

    - Post-op patient is still hospitalized following surgery and his asymptomatic incision opens due to fall or other reasons (e.g., picking at it). If subsequent incisional infection develops, it is considered an HAI but not SSI.

    - Post-op patient sustains an injury to the incision area but incision does not open. Later, incisional infection develops; this is considered an SSI.

- Post-op patient has an intact incision or status of incision is unknown (e.g., dressing never changed so no one has seen the incision), or it is noted that patient showered/bathed “too early” post-op, or it is noted that the patient was incontinent and incision was or may have been contaminated, or patient got intact incision dirty, then subsequent incisional infection is considered an SSI.

- Post-op patient has skin condition (e.g., dermatitis, blister, impetigo) near intact incision, and then subsequently develops incisional infection within the follow-up surveillance period; this is an SSI.

- Patient has remote site infection, either prior to or after an operation, or has a manipulation that “seeds” operative site (e.g., dental work), and later develops deep incisional or organ/space infection; this is an SSI if it occurs in the follow up surveillance period.

Table 3. NHSN Principal Operative Procedure Category Selection Lists

The following lists are derived from the operative procedures listed in **Form C**. 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	Herniorrhaphy
14	NEPH	Kidney surgery
15	VHYS	Vaginal Hysterectomy
16	SPLE	Spleen surgery
17	CHOL	Gall bladder surgery
18	OVRY	Ovarian surgery
Priority	**Code**	**Thoracic Operations**
1	HTP	Heart transplant
2	CBGB	Coronary artery bypass graft with donor incision(s)
3	CBGC	Coronary artery bypass graft, chest incision only
4	CARD	Cardiac surgery
5	THOR	Thoracic surgery
Priority	**Code**	**Neurosurgical (Spine) Operations**
1	RFUSN	Refusion of spine
2	CRAN	Craniotomy
3	FUSN	Spinal fusion
4	LAM	Laminectomy
Priority	**Code**	**Neurosurgical (Brain) Operations**
1	VSHN	Ventricular shunt
2	RFUSN	Refusion of spine
3	CRAN	Craniotomy
4	FUSN	Spinal fusion
5	LAM	Laminectomy
Priority	**Code**	**Neck Operations**
1	NECK	Neck surgery
2	THYR	Thyroid and or parathyroid surgery

Denominator Data: For all patients having any of the procedures included in the NHSN Operative Procedure category(s) selected for surveillance during the month, complete the Denominator for Procedure form. The data are collected individually for each operative procedure performed during the month of surveillance.

REPORTING INSTRUCTIONS:

1. **Different Operative Procedure Categories Performed During Same Trip to the OR:** If procedures in more than one NHSN operative procedure category are performed during the same trip to the operating room through the same or different incisions, a Denominator for Procedure form 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 form is reported for each. In another example, if following a motor vehicle accident, a patient has an open reduction of fracture (FX) and splenectomy (SPLE) performed during the same trip to the operating room and both procedure categories are being monitored, complete a Denominator for Procedure form for each.

   EXCEPTION: If a patient has both a CBGC and CBGB during the same trip to the operating room, 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 operating room. The time from chest incision to chest primary closure is reported as the duration of the procedure.

2. **Duration of the Procedure when More than One Category of NHSN Operative Procedure is Done Through the Same Incision:** If more than one NHSN operative procedure category is performed through the same incision during the same trip to the operating room, record the combined duration of all procedures, which is the time from skin incision to primary closure. For example, if a CBGC and a CARD are performed on a patient during the same trip to the operating room, the time from skin incision to primary closure is reported for both operative procedures.

3. **Same Operative Procedure Category but Different ICD-9-CM Codes During Same Trip to the OR**: If procedures of different ICD-9-CM codes from the same NHSN operative procedure category are performed through the same incision, record only one procedure for that category. For example, a facility is performing surveillance for CARD procedures. A patient undergoes a replacement of both the mitral and tricuspid valves (35.23 and 35.27, both CARD) during the same trip to the operating room. Complete one CARD Denominator for Procedure form because ICD-9-CM codes 35.23 and 35.27 fall in the same operative procedure category [CARD] (see **Form C**).

4. **Bilateral Procedures:** For operative procedures that can be performed bilaterally during same trip to operating room (e.g., KPRO), two separate Denominator for Procedure forms are completed. To document the duration of the procedures, 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.

5. **More Than One Operative Procedure Through Same Incision Within 24 Hours**: If a patient goes to the operating room more than once during the same admission and another procedure of the same or different NHSN procedure category is performed through the same incision within 24 hours of the end of the original operative incision, report only one Denominator for Procedure form for the original procedure, combining the durations for both procedures. For example, a patient has a CBGB lasting 4 hours. He returns to the OR six hours later to correct a bleeding vessel (OTH). The surgeon reopens the initial incision, makes the repairs, and recloses in 1.5 hours. Record the operative procedure as one CBGB and the duration of operation as 5 hour 30 minutes. If the wound class has changed, report the higher wound class. If the ASA class has changed, report the higher ASA class. Do not report an 'OTH' record.

6. **Patient Expires in the OR**: If a patient expires in the operating room, do not complete a Denominator for Procedure form. This operative procedure is excluded from the denominator.

7. **Laparoscopic Hernia Repairs**. Laparoscopic hernia repairs are considered one procedure, regardless of the number of hernias that are repaired in that trip to the operating room. In most cases there will be only one incision time documented for this procedure. If more than one time is documented, report the total of the durations.

8. **Open Hernia Repairs**: Open (i.e., non-laparoscopic) hernia repairs are reported as one procedure for each hernia repaired via a separate incision, i.e., if two incisions are made to repair two defects, then two procedures will be reported. It is anticipated that separate incision times will be recorded for these procedures. If not, take the total time for both procedures and split it evenly between the two procedures.

9. **Laparoscopic Hysterectomy** – HYST or VHYS: When assigning the correct ICD-9-CM hysterectomy procedure code, a trained coder must determine what structures were detached and how they were detached based on the medical record documentation. The code assignment is based on the surgical technique or approach used for the detachment of those structures, not on the location of where the structures were physically removed from the patient's body. Therefore, a total laparoscopic HYST procedure will have detachment of the entire uterus and cervix from the surrounding supporting structures via the laparoscopic

technique. A laparoscopically-assisted VHYS involves detachment of the uterus and upper supporting structures via laparoscope but the lower supporting structures and cervix are detached via vaginal incision.

10. **A Single NHSN Operative Procedure With Multiple Incisions**: Some operative procedures have more than one incision (e.g., CBGB; CEA; colostomy reversals (COLO); FUSN or RFUSN with anterior and posterior approaches; PVBY; single breast (BRST) procedure with multiple open or laparoscopic incisions; BRST with Transverse Rectus Abdominis Myocutaneous [TRAM] flap). Complete only one Denominator for Procedure form for such procedures as long as any of the incisions is primarily closed. Record the duration as time from skin incision to closure of the primary incision. See Numerator Data Reporting Instructions for how to report SSI.

11. **Incidental Appendectomy**: An incidental appendectomy is not reported as a separate appendectomy (APPY) procedure.

12. **XLAP**: For an exploratory laparotomy that results in a procedure from another category being performed, do not report XLAP; instead report only the other procedure. For example, for an exploratory laparotomy that results in a hemicolectomy (COLO), report only a COLO.

Data analysis:

1. **The Standardized Infection Ratio (SIR)** is calculated by dividing the number of observed infections by the number of expected infections. The number of expected infections, in the context of statistical prediction, will be calculated using SSI probabilities estimated from multivariate logistic regression models constructed from KNHSS data during a baseline time period, which represents a standard population's SSI experience.

NOTE: The SIR will be calculated only if the number of expected HAIs (numExp) is ≥ 1.

$$SIR = \frac{\text{Observed } \mathbf{(O)} \text{ HAIs}}{\text{Expected } \mathbf{(E)} \text{ HAIs}}$$

2. **SSI rates per 100 operative procedures are calculated by dividing the number of SSIs by the number of specific operative procedures and multiplying the results by 100**.
    - SSI will be included in the numerator of a rate based on the date of procedure, not the date of event.
    - Using the advanced analysis feature of the KNHSS application, SSI rate calculations can be performed separately for the different types of operative procedures and stratified by the basic risk index.

The basic SSI risk index assigns surgical patients into categories based on the presence of three major risk factors:

1. Operation lasting more than the duration cut point, where the duration cut point is the approximate 75th percentile of the duration of surgery in minutes for the operative procedure.
2. Contaminated (Class III) or Dirty/infected (Class IV) wound class.
3. ASA score of 3, 4, or 5.

The patient's SSI risk category is simply the sum of the number of these factors present at the time of the operation.

Calculating SSI rates with this option provides less risk adjustment than is afforded by the multivariate logistic regression model used in the calculation of the SIR.

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