

Surgical Site Infection (SSI) Prevention Audit Tool for Acute Care

Instructions and Legend for Completing the SSI Prevention Audit Form

Purpose of the Audit Tool

The tool is designed for use in Acute Care, and was developed to allow organizations to assess the quality of their surgical site infection prevention practices and determine the areas requiring quality improvement(s). Details of evidence-based practice are available in the *Safer Healthcare Now! Getting Started Kit* (GSK, 2014) <http://www.patientsafetyinstitute.ca/en/toolsresources/pages/ssi-resources-getting-started-kit.aspx>.

Data Collection Methodology

- **Concurrent:** place the SSI audit form on the patient chart and complete each element over time up to the day of discharge.
- **Retrospective chart review** to collect data for clean and clean-contaminated patients discharged the previous day, week, or month.
- **Retrospective Case Study** – a retrospective review of all reported cases of confirmed surgical site infection.
- Collect information monthly or quarterly on all patients or a subset as recommended by your organization.

Sample Size and Selection:

- Sample size (n) should be based on the total population (N) at your facility. Select the population based on the area of interest as defined by your facility e.g. all surgeries, program specific, unit specific, surgical procedure-specific etc.
- Refer to the SSI GSK (p.62) for specific numbers
- **Note – this tool is not recommended for monitoring the prevention of surgical site infection in Emergency or Trauma patients**

Questions by Question explanation

- A. Type of Surgery** – indicate what type of surgery the patient underwent – select one only. If the type is not listed select ‘Other’.
- Response options include: Cardiac On Pump; Cardiac Off Pump; C-Section; General Surgery; Gynecology; Ophthalmology; Orthopedics; Thoracic; Vascular; or Other.
 - Select “other” for Head and Neck Surgery or if type of surgery is not listed.
- B. Surgical Class** - Indicate the category of surgery the patient underwent during this reporting period. If the patient underwent more than one surgery enter data for the first procedure only.
- NHSN Class I - **Clean** - An Uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered
 - NHSN Class II - **Clean Contaminated** - An operative wound in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions and without unusual contamination.
 - NHSN Class III - **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, non-purulent inflammation is encountered are included in this category.

- NHSN Class IV - **Infected/Dirty** - Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing post-operative infection were present in the operative field before the operation.
- Not Recorded – no documentation regarding NHSN Class

C. Pre-Op Shower or bath with soap or antiseptic agent? (SSI 9) - Based on the evidence clean and clean-contaminated surgical patients should shower or full bath or partial body wash pre-operatively with soap or antiseptic agent on at least the night before the operative day.

- **Soap:** (score as 1) bar/bath soap
- **Antiseptic Agent:** (score as 1) e.g. Chlorhexidine
- **Shower or Bath not required:** (score as 1) i.e. shower or bath is not required for the type of surgery e.g. ophthalmologic or oral
- **No shower or bath** (score as 0) – a shower or bath was required but the patient did not have either
- **Not Recorded** (score as 0) – no evidence of having a shower or bath recorded in the patient chart

D. Solution used for intra-operative intact skin cleansing? (SSI 10) - Based on available evidence, clean and clean-contaminated surgical patients with appropriate intra-op skin cleansing on intact skin. 2% Chlorhexidine in 70% alcohol antiseptic solution is the preferred agent unless contraindicated. Other alcohol-based solutions (povidone-iodine) are acceptable.

- **2% Chlorhexidine in 70% alcohol** (score as 1) – has been demonstrated to be more effective as a surgical skin preparation solution than other agents.
- **Chlorhexidine** (score as 0)
- **Povidone-iodine with alcohol** (score as 1)
- **Povidone-iodine** (score as 0)
- **Povidone-iodine for Head/Neck** (score as 1) – select this response option if povidone-iodine was used for skin cleansing for a Head and Neck surgery patient
- **Other** (score as 0) – other solution used
- **Contraindicated** (score as 1) - i.e. skin sensitivity, allergy, rash, or contact with the eye, inner ear, mucosa or meninges.
- **Not Applicable** (score as 0) - i.e. ophthalmologic or oral
- **Not Recorded** (score as 0) no evidence of intra-operative intact skin cleansing recorded in the patient chart

E. Prophylactic antibiotic administration (SSI 8)

- **Within 60 minutes before incision** (score as 1) administration of antibiotic was completed within 0 to 60 minutes prior to the first surgical incision time.
- **Within 120 minutes before incision for Vancomycin or Fluoroquinolones** (score as 1) which was administered over 120 minutes and completed within 0 to 60 minutes prior to the first surgical incision.
- **None of the above** (score as 0) – gave antibiotics but did not meet the timing requirements described above.
- **No antibiotics given** (score as 0)
- **Not recorded** (score as 0) - no documentation of prophylactic antibiotics recorded in the patient chart

- **Antibiotics not indicated** (score as 1) – some surgeries may not require prophylactic antibiotics according to your hospital’s policy. Antibiotic prophylaxis in clean surgeries is only indicated for cardiac, neurosurgery, vascular and sometimes thoracic depending on the intervention.

F. Dose of Cefazolin used as prophylactic antibiotic (SSI 11)

- **Weight based dose for pediatric pt.** (score as 1) – Cefazolin dose for pediatric patient based on patient’s weight
- **<1g for any adult patient** (score as 0)
- **1 g (gram) <80 kg** (score as 1) –1g Cefazolin administered as the prophylactic antibiotic to patient less than 80 kg
- **1 g (gram) ≥80 kg** (score as 0) –1g Cefazolin administered as the prophylactic antibiotic to patient weighing 80 kg or more
- **2g (grams) <80 kg** (score as 1) – 2g Cefazolin administered as the prophylactic antibiotic to patient less than 80 kg
- **2 g (gram) 80-120 kg** (score as 1) –2g Cefazolin administered as the prophylactic antibiotic to patient weighing 80 to 120 kg
- **2 g (gram) >120 kg** (score as 1) –2g Cefazolin administered as the prophylactic antibiotic to patient weighing more than 120 kg
- **3 g (gram) <120 kg** (score as 0) – 3g Cefazolin administered as the prophylactic antibiotic to patient weighing less than 120 kg
- **3 g (gram) ≥120 kg** (score as 1) –3g Cefazolin administered as the prophylactic antibiotic to patient weighing 120 kg or more
- **>3g (grams)** (score as 0) – more than 3g of Cefazolin administered as the prophylactic antibiotic
- **Other antibiotic used** (score as 0) – any antibiotic other than Cefazolin was administered as the prophylactic antibiotic.
- **No antibiotics given** (score as 0) – Select this response if you responded “No antibiotics given” or “Antibiotics not indicated” in Row E above. (not in denominator)
- **Not recorded** (score as 0) – the type of prophylactic antibiotic given was not recorded in the patient chart.

G. Appropriate prophylactic antibiotic redosing according to guidelines (SSI 12)

- For appropriate prophylactic antibiotic redosing guidelines (see GSK p. 21-22).
- **No prophylactic antibiotic given** (score as 0) – prophylactic antibiotic was not administered prior to the first incision therefore even if an antibiotic was delivered during the surgery it would not be considered ‘redosing’.
- **Yes** (score as 1) – prophylactic antibiotic was given prior to the first incision and at least one other dose of the antibiotic was given during the surgery as per recommended guidelines (SSI GSK p. 21-22).
- **No** (score as 0) - prophylactic antibiotic was given prior to the first incision and despite the length of the surgery exceeded the recommended intraoperative prophylactic antibiotic redosing interval (see GSK Table 1. p. 22) No repeat dose of the antibiotic was given during the surgery.
- **Redosing was not required** (score as 1) - prophylactic antibiotic was given prior to the first incision but due to the length of the surgery being less than the intraoperative prophylactic antibiotic redosing interval no other dose of the antibiotic was required during the surgery . Redosing is not applicable for some antibiotics (see GSK Table 1. p. 22)

- **Not Recorded** (score as 0) - no documentation of prophylactic antibiotics redosing recorded in the patient chart

H. Discontinuation of prophylactic antibiotic (SSI 2)

- **Antibiotic not received after end of surgery** (score as 1) – no prophylactic antibiotics were administered at any time following the surgery.
- **Antibiotic discontinued within 24 hours of end of surgery** (score as 1) – prophylactic antibiotics were administered up to 24 hours following the end of surgery.
- **Antibiotic discontinued more than 24 hours after end of surgery** (score as 0) - prophylactic antibiotics were administered more than 24 hours following the end of surgery.
- **No antibiotics given** (score as 0)
- **Not Recorded** (score as 0) - no documentation of discontinuation of prophylactic antibiotics recorded in the patient chart

I. Hair removal method? (SSI 4)

- SSI Faculty recommends no hair removal prior to surgery. If hair removal is necessary, clippers (not razors) should be used. Ideally, hair removal should occur outside of the OR theatre or procedure room, but inside of the operating room department, within two hours of surgery.
- **Hair removal not required** (score as 1) - hair should not be removed unless it interferes with the surgical procedure. Select this response option if there is no hair to remove or hair present but was not remove.
- **Clippers** (score as 1) – clipper use is sufficient for any body part but clippers should be used as close to the time of surgery as possible (within 2 hours is recommended)
- **Depilatory** (score as 1) - Depilatory creams are a potential option, but, have some disadvantages. They may require an allergy and irritant patch test 24 hours before the full application. Also, hair removal using a depilatory cream would have to be carried out in the patient’s own home due to reduced pre-admission time
- **Razor** (score as 0) - razor use is not appropriate for any operative site
- **Removal done at home** (score as 0) – hair removal is not recommended. Patients should be educated not to shave or use a depilatory agent in the vicinity of the surgical site before surgery. Incorporate this message into the printed preoperative patient information and surgeon’s office communication
- **Not Recorded** (score as 0) - no documentation of hair removal method recorded in the patient chart

J. Glucose was below 11.1 mmol/L on each of POD 0, 1, & 2 (SSI 5)

- Each patient should have a documented response for this indicator, however, for calculating the result **do not** include “Not at risk” patients in the denominator
- **Not at risk** – risk is defined as patients who are diabetic or have a pre-op HBA1C higher than 7% or a pre-op BG over 10mmol/L during their pre-op visit
- **Yes** (score as 1) – patient was at risk (i.e. diabetic or has a pre-op HBA1C higher than 7% or a pre-op BG over 10mmol/L during their pre-op visit) and the post-op glucose was below 11.1 mmol/L on each of post-op day 0, 1, & 2 (or to discharge if prior to POD2)
- **No** (score as 0) - patient was at risk (i.e. diabetic or has a pre-op HBA1C higher than 7% or a pre-op BG over 10mmol/L during their pre-op visit) and the post-op glucose was **not** below 11.1 mmol/L on each of post-op day 0, 1, & 2 (or to discharge if prior to POD2)

- **Glucose not done** (score as 0) – patient was at risk (i.e. diabetic or has a pre-op HBA1C higher than 7% or a pre-op BG over 10mmol/L during their pre-op visit) and the serum glucose was not measured post-operatively.
- **Not Recorded** (score as 0) - no documentation of post-op glucose levels recorded in the at risk patient chart

K. Temperature at end of surgery or on arrival in PACU was within range of 36.0-38.0 degrees C? (SSI 6)

- Safer Healthcare Now! SSI Faculty recommend that measures are taken to ensure that surgical patient's core temperatures remain between 36.0°C and 38.0°C pre-operatively, intra-operatively, and in PACU.
- **Yes** (score as 1) – the patient's temperature at the end of surgery or on arrival in PACU was within range of 36.0-38.0 degrees C
- **No** (score as 0) – the patient's temperature at the end of surgery or on arrival in PACU was not within range of 36.0-38.0 degrees C i.e. higher or lower
- **Induced Hypothermia** (score as 1) – Induced hypothermia has been used as an organ protective strategy since the beginning of cardiac surgery.
- **Not Recorded** (score as 0) – the patient's temperature at the end of surgery or on arrival in PACU was not recorded in the patient chart

Best Practice Answers

A. Type of Surgery	<input type="checkbox"/> Cardiac On Pump	<input type="checkbox"/> C-Section	<input type="checkbox"/> Gynecology	<input type="checkbox"/> Orthopedic	<input type="checkbox"/> Vascular
	<input type="checkbox"/> Cardiac Off Pump	<input type="checkbox"/> General Surgery	<input type="checkbox"/> Ophthalmology	<input type="checkbox"/> Thoracic	<input type="checkbox"/> Other
B. Surgical Class	<input type="checkbox"/> Clean (I)	<input type="checkbox"/> Clean-Contaminated(II)	<input type="checkbox"/> Contaminated (III)	<input type="checkbox"/> Dirty (IV)	<input type="checkbox"/> Not Recorded
C. Pre-Op shower or bath with soap or antiseptic agent	<input checked="" type="checkbox"/> Soap	<input checked="" type="checkbox"/> Antiseptic	<input checked="" type="checkbox"/> Shower or bath not required	<input type="checkbox"/> No shower or bath	<input type="checkbox"/> Not Recorded
D. Solution used for intra-operative intact skin cleansing	<input checked="" type="checkbox"/> 2% Chlorhexidine in 70% Alcohol	<input checked="" type="checkbox"/> Povidone-Iodine with Alcohol	<input checked="" type="checkbox"/> Povidone-Iodine for Head & Neck	<input checked="" type="checkbox"/> Contraindicated	<input type="checkbox"/> Not Recorded
	<input type="checkbox"/> Chlorhexidine	<input type="checkbox"/> Povidone-Iodine	<input type="checkbox"/> Other	<input type="checkbox"/> Not Applicable	
E. Prophylactic Abx administration	<input checked="" type="checkbox"/> Within 60 minutes before incision	<input type="checkbox"/> None of the above	<input checked="" type="checkbox"/> Antibiotics not indicated		
	<input checked="" type="checkbox"/> Within 120 minutes before incision for Vancomycin or Fluoroquinolones	<input type="checkbox"/> No Abx given	<input type="checkbox"/> Not Recorded		
F. Dose of Cefazolin used as prophylactic Abx (Adults only)	<input checked="" type="checkbox"/> Weight based dose for pediatric pt	<input type="checkbox"/> < 1g for any adult pt	<input type="checkbox"/> Other Abx used		
	<input checked="" type="checkbox"/> 1g <80kg	<input type="checkbox"/> 1g >=80kg	<input checked="" type="checkbox"/> 2g <80kg	<input checked="" type="checkbox"/> 2g 80-120kg	<input checked="" type="checkbox"/> 2g >120kg
	<input type="checkbox"/> 3g <120kg	<input checked="" type="checkbox"/> 3g >=120kg	<input type="checkbox"/> >3g	<input type="checkbox"/> No Abx given	<input type="checkbox"/> Not Recorded
G. Appropriate prophylactic Abx redosing according to guidelines	<input type="checkbox"/> No prophylactic antibiotic given	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Redosing not required	<input type="checkbox"/> Not Recorded
H. Discontinuation of prophylactic Abx	<input checked="" type="checkbox"/> Abx not received after end of surgery	<input checked="" type="checkbox"/> Abx discontinued within 24 hrs of end of surgery	<input type="checkbox"/> Abx discontinued more than 24 hrs after end of surgery	<input type="checkbox"/> No Abx given	<input type="checkbox"/> Not Recorded
I. Hair removal method	<input checked="" type="checkbox"/> Hair removal not req'd	<input checked="" type="checkbox"/> Clippers	<input checked="" type="checkbox"/> Depilatory	<input type="checkbox"/> Razor	<input type="checkbox"/> Removal done at home
J. Glucose was below 11.1 mmol/L on each of POD 0, 1, & 2	<input type="checkbox"/> Not at risk	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Glucose not done	<input type="checkbox"/> Not Recorded
K. Temp at end of surgery or on arrival in PACU was within range of 36.0-38.0 C	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Induced hypothermia	<input type="checkbox"/> Not recorded	

Green bubble = best practice
Blue bubble = only in the score

Surgical Site Infection Pre-operative (Pre-op) Score (SSI 14)

Step 1 – Calculate the **patient-level** SSI Pre-operative (Pre-op) Score

The **patient-level SSI Pre-operative (Pre-op) Score** is calculated by adding the best practice elements on the audit form (questions C, D, and I). This corresponds to SHN measure SSI 14.

You get 1 point for meeting the best practice criteria for each indicator (question)

- C. Pre-op shower or bath with soap or antiseptic agent. = **Soap OR Antiseptic Agent OR Shower or Bath Not Required**
- D. Solution used for intra-operative intact skin cleansing. = **2% Chlorhexidine in 70% alcohol OR Povidone-iodine with alcohol OR Povidone-iodine for Head/Neck OR Contraindicated**
- I. Hair Removal Method. = **No hair removal OR Clippers OR Depilatory**

If **all three** SSI Pre-operative (Pre-op) indicators are met as described above, the patient's **SSI Pre-operative (Pre-op) Score = 3 (100%)**

Step 2 – Calculate the **overall** SSI Pre-operative (Pre-op) Score

Sum the total number of patients for whom all three SSI Pre-operative (Pre-op) indicators were met on admission in the patient sample, and divide by the total number of patients in the patient sample (e.g. 6 of 10 patient received a perfect score of 3; Score = 6/10 = 60%)

Surgical Site Infection Perioperative Score (SSI 15)

Step 1 – Calculate the **patient-level** SSI Perioperative Score

The **patient-level SSI Perioperative Score** is calculated by adding the best practice elements on the audit form (questions E, F, G, and K). This corresponds to SHN measure SSI 15.

You get 1 point for meeting the best practice criteria for each indicator (question):

- E. Prophylactic Abx administration. = **Within 60 minutes before incision OR Within 120 minutes before incision for Vancomycin or Fluoroquinolones OR Antibiotics not indicated**
- F. Dose of Cefazolin used as Prophylactic Abx. = **Weight based dose for paediatric patient OR 1g - less than 80kg OR 2g - less than 80kg OR 2g - 80 to 120 kg OR 2g - 120kg or more OR 3g - 120kg or more**
- G. Appropriate Prophylactic Antibiotic Redosing according to guidelines. = **Yes OR Redosing not required**
- K. Temperature at end of surgery or on arrival in PACU was within the range of 36.0 - 38.0 degrees C. = **Yes OR Induced Hypothermia**

If **all four** SSI Perioperative indicators are met as described above, the patient's **SSI Perioperative Score = 4 (100%)**

Step 2 – Calculate the **overall** SSI Perioperative Score

Sum the total number of patients for whom all four SSI Perioperative indicators were met on admission in the patient sample, and divide by the total number of patients in the patient sample (e.g. 6 of 10 patient received a perfect score of 4; Score = 6/10 = 60%)

Surgical Site Infection Postoperative (Post-op) Score (SSI 16)

Step 1 – Calculate the **patient-level** SSI Postoperative (Post-op) Score

The **patient-level SSI Postoperative (Post-op) Score** is calculated by adding the best practice elements on the audit form (questions H and J). This corresponds to SHN measure SSI 16.

You get 1 point for meeting the best practice criteria for each indicator (question):

- H. Discontinuation of Prophylactic Abx. = **ABX not received after end of surgery OR ABX discontinued within 24 hours of end of surgery**
- J. Glucose was below 11.1 mmol/L on each of POD 0, 1 and 2. = **Yes OR Not at risk**

If **both** SSI Postoperative (Post-op) indicators are met as described above, the patient's **SSI Postoperative (Post-op) Score = 2 (100%)**

Step 2 – Calculate the **overall** SSI Postoperative (Post-op) Score

Sum the total number of patients for whom both SSI Postoperative (Post-op) indicators were met on admission in the patient sample, and divide by the total number of patients in the patient sample (e.g. 6 of 10 patient received a perfect score of 2; Score = 6/10 = 60%)

Surgical Site Infection Score (SSI 17)

Step 1 – Calculate the **patient-level** SSI Score

The **patient-level SSI Score** is calculated by adding the best practice elements on the audit form (questions C, D, E, F, G, H, I, J, and K). This corresponds to SHN measure SSI 17.

You get 1 point for meeting the best practice criteria for each indicator (question):

- C. Pre-op shower or bath with soap or antiseptic agent. = **Soap OR Antiseptic Agent OR Shower or Bath Not Required**
- D. Solution used for intra-operative intact skin cleansing. = **2% Chlorhexidine in 70% alcohol OR Povidone-iodine with alcohol OR Povidone-iodine for Head/Neck OR Contraindicated**
- E. Prophylactic Abx administration. = **Within 60 minutes before incision OR Within 120 minutes before incision for Vancomycin or Fluoroquinolones OR Antibiotics not indicated**
- F. Dose of Cefazolin used as Prophylactic Abx. = **Weight based dose for paediatric patient OR 1g - less than 80kg OR 2g - less than 80kg OR 2g - 80 to 120 kg OR 2g - 120kg or more OR 3g - 120kg or more**
- G. Appropriate Prophylactic Antibiotic Redosing according to guidelines. = **Yes OR Redosing not required**
- H. Discontinuation of Prophylactic Abx. = **ABX not received after end of surgery OR ABX discontinued within 24 hours of end of surgery**
- I. Hair Removal Method. = **No hair removal OR Clippers OR Depilatory**
- J. Glucose was below 11.1 mmol/L on each of POD 0, 1 and 2. = **Yes OR Not at risk**
- K. Temperature at end of surgery or on arrival in PACU was within the range of 36.0 - 38.0 degrees C. = **Yes OR Induced Hypothermia**

If **all nine** SSI indicators are met as described above, the patient's **SSI Score = 9 (100%)**

Step 2 – Calculate the **overall** SSI Score

Sum the total number of patients for whom all nine SSI indicators were met on admission in the patient sample, and divide by the total number of patients in the patient sample (e.g. 6 of 10 patient received a perfect score of 9; Score = $6/10 = 60\%$)