Surgical Site Infection (SSI)

Surveillance Protocol: Saskatchewan

Saskatchewan Infection Prevention and Control Program

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Government of Saskatchewan
Ministry of Health

The Saskatchewan Infection Prevention and Control Program is a collaboration among Regional Health Authorities (RHAs), the Ministry of Health, and other stakeholders. Its mandate is to ensure that all participants are aware of leading infection control practices and emerging standards.

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Introduction

Surgical site infections (SSIs) are the third leading cause of healthcare-associated infections (HAIs) in Canadian hospitals, resulting in additional length of hospital stay, increase in readmission rates, morbidity, and mortality.[1, 2, 3] SSIs impose an enormous clinical and economic burden on both the healthcare system and the patients who incur them.[4] Studies have reported that for surgical site infections, the average cost per case ranges from $1,174 to $21,392, and the additional length of hospital stay ranges from 11 to 28 days, depending on the type of surgery.[5]

A strong surgical site infection surveillance program, coupled with prompt feedback of appropriate data to relevant stakeholders, has been shown to reduce SSI rates by 10 to 35 percent.[6] Elements of a strong SSI surveillance program include the use of standardized surveillance methodology and definitions, stratification of rates according to risk factors associated with SSI development, and prompt feedback of data to relevant stakeholders.[7]

The Saskatchewan SSI Surveillance Protocol is intended to:

- Provide Infection Control Professionals (ICPs) with step by step instructions on the collection and submission of data required for the Saskatchewan SSI Surveillance Program; and
- Provide ICPs with tools to promote standardization and consistency of data collection and reporting.

Objectives

The objectives of surveillance are to:

- Provide a standardized and validated approach to SSI surveillance;
- Determine baseline SSI rates for targeted surgical procedures performed in Saskatchewan;
- Facilitate investigation into trends or significant increases in SSI rates;
- Provide timely feedback of data to stakeholders so that interventions aimed at reducing SSIs can be implemented; and
- Assist in evaluating the effectiveness of the *Safer Healthcare Now!* SSI Prevention Bundle components.

Provincial Goal

- To reduce the number of preventable SSIs from clean surgeries (Class I and Class II wounds, see Table B-2) to zero* by March 2017.

*Every healthcare facility should be working toward a goal of zero healthcare-associated infections. Keeping in mind that not all HAIs are preventable, organizations should still strive for zero infections.[8]

Surveillance Approach

Surgical procedures will be introduced into the Saskatchewan SSI Surveillance Program in a staged approach.[9] Data will be collected for caesarean sections during the first year of the program. Regional Health Authorities (RHAs) will collect and submit data according to either the Light or Standard Surveillance protocol, as outlined in this document.[10]

Should I perform Light or Standard Surveillance?

Light Surveillance will be undertaken by RHAs that perform fewer than 100 per year of the procedure under surveillance. Standard Surveillance will be undertaken by RHAs that perform 100 or more of that procedure per year.

NOTE: The Saskatchewan Infection Prevention and Control Program provides an Excel spreadsheet indicating the number of caesarean sections each RHA performs per year. Please refer to this spreadsheet when determining the type of surveillance (Light or Standard) to be undertaken by your RHA.

SSI Protocol Instructions

1. Collect Denominator Data

All patients who undergo a targeted surgical procedure (Class I and Class II wounds only) in a Saskatchewan hospital are included in surveillance.

Exclusion Criteria:

- Class III and Class IV wounds.

What do I have to do for Light Surveillance?

- Collect the number of caesarean sections performed per month.

What do I have to do for Standard Surveillance?

- Collect the wound class, ASA score, and duration of procedure for each caesarean section performed per month.

Sources of denominator data:

- Electronic databases (e.g., CKM, Surgical Information System);
- Medical record systems; and
- Operating Room (OR) theatre records.

2. Collect Numerator Data / Case Finding

All patients who undergo a targeted surgical procedure (Class I and Class II wounds only) will be followed for signs and symptoms of an SSI from the time of their admission until discharge, on readmission, and up to 30 days (for caesarean sections) after their surgical procedure. Readmission and 30-day discharge requires post-discharge surveillance methods for identification of SSIs. The majority of SSIs are detected after discharge from the hospital; therefore, hospitals

are encouraged to incorporate post-discharge surveillance methods into their surveillance protocol. Post-discharge surveillance is captured minimally in the Mandatory category and, to a greater extent, in the Optional and Enhanced categories. Case finding methods are detailed in Table 1.

Mandatory: RHAs are required to use all of the case finding methods in the Mandatory category.

Optional and Enhanced: RHAs are encouraged to use any or all of the case finding methods in the Optional and Enhanced categories. This decision should be based upon availability of resources and access to various databases.

Table 1: Case Finding Methods

Mandatory	Optional	Enhanced
• Microbiology reports (Review inpatient AND outpatient reports) • Admission lists (Identify patients readmitted with an SSI) • SSI Case Report Form (Used to notify an ICP of an SSI that is identified in one RHA but attributed to a different RHA) [see Appendix A] • Bed lists (Identify patients with a longer than average* length of hospital stay) *3 days for caesarean sections	• Notification by Physician Offices, Public Health, Home Care, Surgical Unit, and/or Emergency Department through completion of the Post Surgical Follow-up Tool [see Appendix C] • Notification by Medical Records • Use of databases such as Sunrise Clinical Manager (ER visits), and Pharmaceutical Information Program (outpatient antibiotic utilization)	• Telephone surveillance [see Appendix D for telephone script] NOTE: Telephone surveillance is intended to identify possible SSIs. Confirmation of an SSI requires further investigation and follow-up with the patient's healthcare provider.

Once an SSI is suspected, the Regional ICP will review the case to determine if it meets the Centers for Disease Control and Prevention / National Healthcare Safety Network (CDC/NHSN) definition of a surgical site infection [see Table 2].

Table 2: CDC/NHSN Definitions for Surgical Site Infections[11]

Superficial Incisional Surgical Site Infection
Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date) **AND** involves only skin and subcutaneous tissue of the incision **AND** patient has at least **ONE** (1) of the following: 1) Purulent drainage from the superficial incision 2) Organisms isolated from an aseptically-obtained culture of fluid or tissue from the superficial incision 3) Superficial incision that is deliberately opened by a surgeon, attending physician, or other designee** and is culture-positive or not cultured (NOTE: A culture-negative finding does not meet this criterion) **AND** patient has at least **ONE** (1) of the following signs or symptoms of infection: ▪ Pain or tenderness ▪ Localized swelling ▪ Redness ▪ Heat 4) Diagnosis of superficial incisional SSI by the surgeon, attending physician, or other designee**

**Designee may be interpreted to mean the surgeon(s), infectious disease physician, other physician on the case, emergency physician, or physician's designee (nurse practitioner or physician's assistant).

Deep Incisional Surgical Site Infection
Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date) **AND** involves deep soft tissues of the incision (e.g., fascial and muscle layers) **AND** patient has at least **ONE** (1) of the following: 1) Purulent drainage from the deep incision 2) A deep incision that spontaneously dehisces or is deliberately opened by a surgeon, attending physician, or other designee** and is culture-positive or is not cultured (NOTE: A culture-negative finding does not meet this criterion) **AND** patient has at least **ONE** (1) of the following signs or symptoms: ▪ Fever (> 38°C) ▪ Localized pain or tenderness 3) An abscess, or other evidence of infection involving the deep incision, that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test

Organ/Space Surgical Site Infection
Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date) **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** (1) of the following: 1) Purulent drainage from a drain that is placed into the organ/space 2) Organisms isolated from an aseptically-obtained culture of fluid or tissue in the organ/space 3) An abscess, or other evidence of infection involving the organ/space, that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test

Reporting Comments:

- Do not report a stitch abscess (minimal inflammation and discharge confined to the points of suture penetration) as an SSI.
- Do not report a localized stab wound or pin site infection as an SSI.
- Cellulitis (redness/warmth/swelling), by itself, does not meet the criteria for an SSI.
- The type of SSI (superficial incisional, deep incisional, or organ/space) reported should reflect the deepest tissue layer involved in the infection (e.g., report infection that involves the superficial and deep incisional sites as a deep incisional SSI.

3. Identification of a Surgical Site Infection

Once an SSI has been confirmed (i.e., met the criteria of an SSI using the CDC/NHSN definitions), the Regional ICP will:

- Complete an SSI Case Report Form, as per instructions [see Appendix A and Appendix B]; and
- Complete an SSI Report for Surgeons and send with the Memorandum for Surgeons [see Appendix E and Appendix F]. The surgeon must be notified as soon as possible after confirmation of a surgical site infection. The memorandum and report can be sent via e-mail, mail or fax.
- If an SSI has been identified, but the procedure was performed in another health region, complete an SSI Case Report Form and fax it to the hospital where the procedure was originally performed [see Appendix G for Regional Infection Prevention and Control Contact List].

MONTHLY RESPONSIBILITIES:

Infection Control Professional

- Complete an SSI Case Report Form for all confirmed SSIs
- Notify surgeon as soon as possible of all confirmed SSIs
- Email the following to the Infection Control Coordinator:
  - Number of surgical procedures (caesarean sections)
  - Number of SSIs (caesarean sections)

  NOTE: Provincial SSI Surveillance spreadsheet is not required for monthly data submission
- Timeline for monthly data submission: 45 days
- Submissions are due the 15th of each month (e.g., April data is due June 15)
- Regional ICPs are encouraged to distribute the monthly Provincial SSI Report to relevant stakeholders* within their organization; however, this may be left to the discretion of the regional ICP

  *Stakeholders include, but not limited to, RIPAC committee, Surgical/OR Services, Women's Health Unit, senior leadership, SSI Prevention Bundle Working Group, Public Health/Midwife group

Infection Control Coordinator

- Send a reminder e-mail to ICPs requesting monthly data submission (i.e., number of surgical procedures, number of SSIs)
- Prepare a monthly Provincial SSI Report and distribute to regional ICPs

4. Stratification using the NHSN SSI Risk Index

What is the NHSN SSI Risk Index?

- The NHSN SSI Risk Index is a score used to predict a surgical patient's risk of acquiring a surgical site infection.
- The Risk Index consists of three risk factors: wound class, ASA score, and duration of procedure [see Appendix B for definitions].
- The patient's SSI risk category is calculated based upon risk factors present at the time of the operation, and will range from 0 (lowest risk) to 3 (greatest risk) [see Table 3].

NOTE: There will be no NHSN Risk Index of 3 reported, as only Class I and II procedures are included in the Saskatchewan SSI Surveillance Protocol.

Table 3: Calculation of the NHSN SSI Risk Index[12]

Risk Factor	Score = 0 if:	Score = 1 if:
Wound Class	I (Clean) or II (Clean/Contaminated)	III (Contaminated) or IV (Dirty/Infected)
ASA Score	1 or 2	3, 4 or 5
Duration of Procedure	< 75th percentile* cut-off for that procedure	≥ 75th percentile* cut-off for that procedure
SSI Risk Index =	**Sum of scores**	

*The 75th percentile cut-off for caesarean sections is 56 minutes;[13] therefore, caesarean sections lasting < 56 minutes will score a 0 and those that last ≥ 56 minutes will score a 1.

What do I have to do for Light Surveillance?

- Not required to calculate an SSI Risk Index (may proceed to step 5).
- **RECOMMENDATION:** If an RHA is able to collect risk factor information (i.e., wound class, ASA score, and duration of procedure), they are asked to enter this information into the Infection Details portion of the Provincial SSI Surveillance spreadsheet (described below) which will calculate the SSI Risk Index for all eligible patients.

What do I have to do for Standard Surveillance?

- Enter risk factor information (i.e., wound class, ASA score, and duration of procedure) into the Infection Details portion of the Provincial SSI Surveillance spreadsheet.

NOTE: If any of wound class, ASA score, or duration of procedure is unavailable, an SSI Risk Index cannot be calculated and will appear as Insufficient Data in the Infection Details portion of the spreadsheet.

How do I collect the risk factor data required (wound class, ASA score, and length of operation) for risk stratification?

- For those RHAs already collecting data required for risk stratification, continue with current processes.
- For those RHAs that do not have a process in place, the risk factors can be obtained from the hospital's database (e.g., SIS, CKM). If this is not an option, consider other sources such as medical records or audit sheets.

5. Enter Data into Excel Workbook

The Saskatchewan Infection Prevention and Control Program provides a Provincial SSI Surveillance spreadsheet [see Appendix H] that allows ICPs to:

- Enter details of surgical site infections identified in a reporting period (Infection Details); and
- Calculate SSI rates/risk-stratified SSI rates for the same reporting period (SSI Rate Calculators).

Data entry into the spreadsheet may be done by batching the SSI Case Report Forms and entering them prior to quarterly submission, or as each SSI Case Report Form is completed. The Excel

workbook contains tabs labelled Q1 to Q4. The regional ICPs can enter data throughout the year using the same Excel workbook.

NOTE: Please ensure you are entering data into the correct quarterly tab.

6. Calculate SSI Rates

What do I have to do for Light Surveillance?

- Input the following into the SSI Rate Calculator – Light Surveillance [see Appendix H]:
  - the number patients who had a particular surgical procedure during a specific quarter; and
  - the number of SSIs that occurred following the same surgical procedure during the same quarter (this number will be the total number of SSIs entered into the Infection Details portion of the Provincial SSI Surveillance spreadsheet).
- The SSI Rate Calculator – Light Surveillance calculates the SSI rate as follows:

  $\frac{\text{\# surgical site infections}}{\text{\# procedures}} \times 100 = \text{\# SSIs per 100 procedures}$
- In addition to reporting SSI rates as above, RHAs doing Light Surveillance that are voluntarily collecting risk factor information will also report SSI rates as per Standard Surveillance protocol (see below for details).

What do I have to do for Standard Surveillance?

- Input the following into the SSI Rate Calculator – Standard Surveillance [see Appendix H]:
  - the number patients who had a particular surgical procedure of a particular risk index during a specific quarter; and
  - the number of SSIs that occurred following the same surgical procedure with the same risk index during the same quarter (collect this information by separately tallying the number of instances of each Risk Index (0 to 2, or insufficient data) from the Risk Index column of the Infection Details portion of the Provincial SSI Surveillance spreadsheet).
- The SSI Rate Calculator – Standard Surveillance calculates the SSI rate **for each** Risk Index separately (risk-stratified SSI rates). The following example is for Risk Index 1:

  $\frac{\text{\#SSIs for Risk Index 1}}{\text{\# procedures for Risk Index 1}} \times 100 = \text{\# SSIs for Risk Index 1 per 100 procedures}$

7. Submit Quarterly Data

What do I have to do for Light Surveillance?

- Each quarter, enter the details of SSIs into the Infection Details portion of the Provincial SSI Surveillance spreadsheet for that quarter. Also, enter data into the SSI Rate Calculator – Light Surveillance.
- In addition, RHAs conducting Light Surveillance that are voluntarily collecting risk factor information will also enter data (broken down by Risk Index) into the SSI Rate Calculator – Standard Surveillance.

NOTE: Even though RHAs conducting Light Surveillance may also be reporting risk-adjusted SSI rates, this information will not be reflected in the quarterly SSI reports; however, the risk-stratified SSI rates will be captured in the annual provincial aggregate data.

What do I have to do for Standard Surveillance?

- Each quarter, enter the details of SSIs into the Infection Details portion of the Provincial SSI Surveillance spreadsheet for that quarter. Also, enter data (broken down by Risk Index) into the SSI Rate Calculator – Standard Surveillance.

8. Share Information

- Once data has been analyzed, the Infection Control Coordinator (ICC) will prepare quarterly reports that will be shared with provincial leaders. The ICC will also send the quarterly reports to the ICPs.
- ICPs are encouraged to share this information with stakeholders within their respective health regions (e.g., by posting quarterly SSI reports on visibility walls).

Remember that the *"power of surveillance is in sharing findings with those who need to know and who can act on the findings to improve patient safety."* Recommended Best Practices for Surveillance AJIC 2007; 35: 427-440.

QUARTERLY RESPONSIBILITIES:

Infection Control Professional

- E-mail the following to the Infection Control Coordinator:
  - Provincial SSI Surveillance spreadsheet, with infection details, SSI rates and/or risk-stratified SSI rates
- Timeline for quarterly data submission:

Quarter	Reporting Period	Data to be submitted by:
First Quarter (Q1)	April 1 – June 30	August 31
Second Quarter (Q2)	July 1 – September 30	November 30
Third Quarter (Q3)	October 1 – December 31	February 28
Fourth Quarter (Q4)	January 1 – March 31	May 31

- Share quarterly Provincial SSI Reports with stakeholders within the organization

Infection Control Coordinator

- One week prior to end of reporting period, e-mail the ICPs:
  - Reminder for quarterly data submission
- Prepare wall walk charts for the Provincial Operational Wall
- E-mail quarterly Provincial SSI Reports to regional ICPs

9. Comparison to Benchmarks

It is recommended that hospitals compare their rates against benchmarks, both internal and external.[14]

- Comparison among RHAs
  - The Light and Standard Surveillance protocols use different methods to calculate SSI rates and adjust for risk factors. Therefore, it is only appropriate for RHAs that conduct Light Surveillance to compare themselves with other RHAs that conduct Light Surveillance.
- Rates from previous surveillance periods
  - RHAs may choose to compare their SSI rates to those calculated in previous surveillance periods (e.g., previous month, previous quarter, and previous year).
- Provincial aggregate rate
  - SSI rates from all RHAs will be pooled and hospital-specific data will be compared to the provincial aggregate data (this will not be possible until data has been collected for a year).

NOTE: Benchmarking should always be interpreted with caution, due to variability in sample size.

10. Investigation of Increased SSI Rates

- To be discussed in greater detail once data has been collected and baseline rates have been established.
- In the interim, RHAs are encouraged to investigate significant increases in SSI rates within their health region. A sample audit tool is provided [see Appendix I].

ANNUAL RESPONSIBILITIES:

Infection Control Professional

- Upon receipt of the e-mail from the Infection Control Coordinator with the Excel workbook, create an "SSI Surveillance" folder and save it in a location that is easily accessible. Remember that the folder should be located on your network drive so that it can be routinely backed up by your IT department.
- Share the annual Provincial SSI Report with stakeholders within the organization

Infection Control Coordinator

- <u>One day</u> prior to the start of Q1, e-mail the regional ICPs:
  - New Excel workbook to begin data input
- Prepare an annual Provincial SSI Report and e-mail to the regional ICPs

Prevention of SSIs

1. Safer Healthcare Now!

New and updated recommendations for the prevention of surgical site infections can be found in the *Safer Healthcare Now!* Getting Started Kit: Prevent Surgical Site Infections. The Getting Started Kit focuses on five major prevention strategies (Surgical Site Infection Prevention Bundle) to reduce the incidence of surgical site infections in adults.

Available at:
http://www.saferhealthcarenow.ca/EN/Interventions/SSI/Documents/SSI%20Getting%20Started%20Kit.pdf

The Saskatchewan Infection Prevention and Control Program is currently measuring and reporting on compliance with the five Surgical Site Infection Prevention Bundle components, including:

- Antibiotic prophylaxis
- Appropriate antiseptic skin preparation
- Appropriate hair removal
- Maintaining normothermia
- Appropriate glucose control

More information on the provincial reporting of SSI Prevention Bundle components can be found in the Provincial SSI Prevention Bundle Audit Guidelines (version 5, 20Jan2015).

2. Patient Education

Another key strategy to reduce surgical site infections is to provide patients, family, and/or caregivers with clear, consistent information on the risk of SSIs, what is being done to reduce them, how to manage surgical wounds after discharge, how to recognize an SSI, and whom to contact with concerns about wound healing. Because of the importance of educating patients on the prevention of SSIs, a Patient Fact Sheet, “Preventing Surgical Site Infections”, is available as a tool to use with the surveillance protocol [see Appendix J].

NOTE: It is strongly recommended that patients be provided with the Patient Fact Sheet and the Post Surgical Follow-up Tool. One option is to incorporate this material into the pre-operative information package that is provided to patients prior to surgery.

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Appendix A: SSI Case Report Form (Sample)

Saskatchewan Infection Prevention and Control Program

SSI Case Report Form

PATIENT INFORMATION	
Name (Last, First):	Unique Number:
Date of Birth (dd/mm/yyyy):	Gender: ☐ M ☐ F
Height: cm	Weight: kg
PROCEDURE DETAILS	
Hospital Name:	OR Theatre (optional):
Procedure Date(dd/mm/yyyy):	Surgeon:
Procedure Group: ☐ APPY ☐ COLO/BOWEL ☐ HPRO ☐ NEURO ☐ OTH: ☐ CABG ☐ CSEC ☐ HYST ☐ VASCULR ☐ CHOL ☐ HERN ☐ KPRO ☐ VENTRICULAR SHUNT	
Duration of Procedure: min	ASA Score: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ Unknown
Wound Class: ☐ Class I ☐ Class II	☐ Emergency ☐ Elective
Anesthesia Type: ☐ General ☐ Spinal	
OPTIONAL REPORTING	
Drain: ☐ Y ☐ N	Perioperative Transfusion: ☐ Y ☐ N
Dressing type used:	Date initial dressing removed: (dd/mm/yyyy)
Discharge home prior to removal: ☐ Y ☐ N	
BUNDLE COMPONENTS	
Appropriate Antibiotic Timing: ☐ Y ☐ N ☐ N/A	
Appropriate Antiseptic Skin Preparation: ☐ Y ☐ N	
Appropriate Hair Removal: ☐ Y ☐ N ☐ N/A	
Maintaining Normothermia: ☐ Y ☐ N	
Appropriate Glucose Control: ☐ Y ☐ N ☐ N/A	
INFECTION DETAILS	
When Infection Detected: ☐ During initial admission ☐ During readmission ☐ Post-discharge surveillance	Type of SSI: ☐ Superficial ☐ Deep ☐ Organ/Space
Date of symptom onset (if known): (dd/mm/yyyy)	Culture obtained: ☐ Y ☐ N
Date culture obtained: (dd/mm/yyyy)	Is the organism an ARO? ☐ Y ☐ N
Organism isolated:	Treatment (optional):
Notes/Comments:	
Reported by:	Date (dd/mm/yyyy):

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QUICK GUIDE FOR CDC/NHSN SURVEILLANCE DEFINITIONS

Indicate the criteria met for a surgical site infection by checking the appropriate boxes.

Superficial Incisional SSI ☐ Y ☐ N

Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date)
AND
involves only skin and subcutaneous tissue of the incision
AND
patient has at least **ONE** (1) of the following:

- ☐ 1) Purulent drainage from the superficial incision;
- ☐ 2) Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision;
- ☐ 3) Superficial incision that is deliberately opened by a surgeon, attending physician, or other designee** and is culture-positive or not cultured (Note: A culture-negative finding does not meet this criterion);
  AND
  patient has at least **ONE** (1) of the following signs or symptoms of infection:
  ☐ pain or tenderness ☐ localized swelling ☐ redness ☐ heat
- ☐ 4) Diagnosis of superficial SSI by surgeon, attending physician, or other designee.
  Diagnosed by:

**may be interpreted to mean the surgeon(s), infectious disease physician, other physician on the case, emergency physician, or physician's designee (nurse practitioner or physician's assistant).

Deep Incisional SSI ☐ Y ☐ N

Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date)
AND
involves deep soft tissues of the incision(e.g., fascial and muscle layers)
AND
patient has at least **ONE** (1) of the following:

- ☐ 1) Purulent drainage from the deep incision;
- ☐ 2) A deep incision that spontaneously dehisces or is deliberately opened by a surgeon, attending physician, or other designee** and is culture-positive or not cultured (NOTE: A culture-negative finding does not meet this criterion);
  AND
  patient has at least **ONE** (1) of the following signs or symptoms:
  ☐ fever >38°C ☐ localized pain or tenderness
- ☐ 3) An abscess or other evidence of infection involving the deep incision that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test.

Organ/Space SSI ☐ Y ☐ N

Infection occurs within 30 days (for caesarean sections) after the operative procedure (where day 1 = the procedure date)
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** (1) of the following:

- ☐ 1) Purulent drainage from a drain that is placed in the organ/space;
- ☐ 2) Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space;
- ☐ 3) An abscess or other evidence of infection involving the organ/space that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test.

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Appendix B: Instructions for Completing SSI Case Report Form

Patient Information

Information in this section can be entered through free text or by clicking on the appropriate check box. The unique number is selected by ICPs to represent that patient (e.g., MRN). To maintain consistency, the definitions of height and weight have been included.

Height: The patient's most recent height documented in the medical record.[11]

Weight: The patient's most recent weight documented in the medical record prior to or otherwise closest to the procedure.[11]

Procedure Details

Information in this section can be entered through free text or by clicking on the appropriate check box (CSEC for caesarean section). If a procedure is performed, and it is not listed under the procedure groups, simply click OTH and type in the procedure name. The following definitions will assist you in entering the duration of procedure, ASA score, and wound class.

Duration of Procedure: The time in minutes between the operation start time and the operation end time as defined below:

- Operation start time: Time of skin incision;
- Operation end time: Time when all instrument and sponge counts are completed and verified as correct, all post-operative radiologic studies to be done in the OR are completed, all dressings and drains are secured, and the physicians/surgeons have completed all procedure-related activities on the patient.[12]

ASA score: The ASA classification system was developed by the American Society of Anesthesiology. It is an assessment made by an anesthesiologist based on a patient's pre-operative physical condition.

Table B-1: ASA Physical Status Classification System

Classification	Description
ASA 1	A normally healthy patient
ASA 2	A patient with mild systemic disease
ASA 3	A patient with severe systemic disease
ASA 4	A patient with severe systemic disease that is a constant threat to life
ASA 5	A moribund patient who is not expected to survive without the operation

Source: American Society of Anesthesiologists (ASA) website
[https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system – retrieved January 2015]

Wound Class: The surgical wound class predicts the risk of post-operative infection based on the degree of bacterial contamination of surgical wounds at the time of surgery [see Table B-2]. The wound class must be documented at the end of the surgical procedure in order to accurately reflect and capture the events that occurred during the surgery that may affect the wound class.

Table B-2: Surgical Wound Classification[15]

Classification	Description	Examples of Procedures
Class I: Clean Risk of infection: ≤ 2%	• Uninfected operative wound where respiratory, GI, genital, and urinary tracts aren't entered • Wounds are primarily closed, and a drain (if needed) is connected to a closed system • No inflammation is encountered	• Exploratory laparotomy • Eye surgery • Hernia repair • Mastectomy • Thyroidectomy • Total hip or knee replacement • Vascular/cardiovascular procedures
Class 2: Clean/Contaminated Risk of infection: 5-15%	• Operative wound that enters the respiratory, GI, genital, or urinary tract under controlled conditions • No major break in sterile technique • No spillage • No acute inflammation	• Caesarean section • Cholecystectomy (chronic inflammation) • Colectomy • Incidental or routine appendectomy • Small bowel resection • Transurethral resection of prostate (TURP) • Vaginal hysterectomy
Class III: Contaminated Risk of infection: > 15%	• Open, fresh, accidental wounds • Operations with major breaks in sterile technique (e.g., open cardiac massage) • Gross spillage from the GI tract • Acute, nonpurulent inflammation is encountered • Necrotic tissue without evidence of purulent drainage (e.g., dry gangrene)	• Bile spillage during cholecystectomy • Bowel resection for infarcted or necrotic bowel • Cholecystectomy or appendectomy for acute inflammation
Class IV: Dirty/Infected Risk of infection: > 30%	• Old traumatic wounds with retained devitalized tissue • Perforated viscera • Presence of purulence or abscess	• Incision and drainage (I&D) of abscess • Open fracture with prolonged time in the field before treatment • Perforated bowel repair • Perforated gastric ulcer • Ruptured appendectomy

Emergency: For caesarean sections, defined as a procedure for which a patient presents to Labour and Delivery while in labour or with ruptured membranes.

Elective: For caesarean sections, defined as a scheduled surgical procedure for which a patient is neither in labour nor has ruptured membranes.

Optional Reporting

Completion of this section is optional. Information will not be used for provincial reporting.

Bundle Components

Completion of this section will require access to the SIS or other OR database and/or review of the OR record. The questions listed align with the definitions provided in the Provincial SSI Prevention Bundle Audit Guidelines (version 5, 20Oct2015).

Appropriate Antibiotic Timing

☐ Y	Antibiotic was administered & completely absorbed within 0 - 60 min prior to surgical incision.
	For vancomycin and fluoroquinolones, antibiotic was started & infused over 120 minutes and completely absorbed within 0 - 60 min prior to surgical incision.
☐ N	Antibiotic not given, **OR** not given in appropriate timeframe (as described above) **OR** not recorded.
☐ N/A	Patient was already receiving an antibiotic for a pre-existing condition.

Appropriate Antiseptic Skin Preparation

☐ Y	2% chlorhexidine gluconate with 70% isopropyl alcohol (e.g. ChloraPrep) or iodine povacrylex with 74% isopropyl alcohol (e.g. DuraPrep) **AND** a non-emergent procedure **AND** a procedure not involving eye/ear/mouth/neural tissue.
	Povidone iodine or aqueous chlorhexidine gluconate **AND** an emergent procedure.
	Povidone iodine **AND** a procedure involving eye/ear/mouth/neural tissue.
☐ N	Not one of the "Y" scenarios above, **OR** not recorded.

Appropriate Hair Removal

☐ Y	No hair removed **OR** removed in-hospital with clippers or depilatory cream prior to surgical incision .
☐ N	Razor used in-hospital **OR** not recorded.
☐ N/A	Patient removed own hair prior to surgery.

Maintaining Normothermia

☐ Y	Patient's core temperature is 36.0°C to 38.0°C at end of surgery or upon arrival in PACU/recovery (first set of vitals).
☐ N	Patient's core temperature < 36.0°C or > 38.0°C at end of surgery or upon arrival in PACU/recovery **OR** not recorded.

Appropriate Glucose Control

☐ Y	Blood glucose reading closest to 6:00 AM for a diabetic patient on post-operative Day 1 or Days 1 & 2 (if in-hospital > 48h) is ≤ 10 mmol/L.
☐ N	Blood glucose reading closest to 6:00 AM for a diabetic patient on post-operative Day 1 or Days 1 & 2 (if in-hospital > 48h) is > 10 mmol/L.
☐ N/A	Patient is not diabetic OR patient has gestational diabetes.

Infection Details

Information in this section can be entered through free text or by clicking on the appropriate check box. Completion of this section will require access to microbiology reports, diagnostic imaging test results, and the patient chart. To maintain consistency with reporting, an explanation of when an infection was detected is provided below.

During initial admission: SSI was identified before the patient was discharged from the hospital following surgery.

During readmission: SSI was identified due to patient readmission to a hospital.

Post-discharge: SSI was identified by post-discharge surveillance. This includes SSIs identified in the Emergency Department where the patient was not readmitted to a hospital.

NOTE: If SSI was identified by post-discharge surveillance and the patient was readmitted to the hospital, check the readmission box.

Quick guide CDC/NHSN Definitions (page 2)

Indicate the criteria met for a surgical site infection by checking the appropriate box.

Appendix C: Post Surgical Follow-up Tool (Sample)

Addressograph

Saskatchewan Infection Prevention and Control Program

Post Surgical Follow-up Tool

Patient safety is an important priority for the Saskatchewan Infection Prevention and Control Program. The purpose of the Post Surgical Follow-up Tool is to better assist us in identifying symptoms that may develop following surgery in our hospitals. In the event that a patient experiences one or more of the symptoms indicated below, it is important that there is timely follow-up and appropriate treatment, if required.

Patients: Please take this form (do not complete yourself) to your doctor or healthcare provider if you develop **ONE or MORE** of the symptoms indicated below.

Healthcare Providers: If the patient presents with **ONE or MORE** of the symptoms below, please:

- Collect a swab for culture and sensitivity (C&S) before prescribing an antibiotic; and
- Complete this form and fax it to your Regional Infection Prevention and Control department at:

_____ or phone _____.

Please check (✓) **all** the symptoms that developed after surgery:

☐ Redness, heat, and/or swelling around the surgical site
☐ Pus from the surgical site
☐ Increased pain or tenderness at the surgical site
☐ Chills/fever with a temperature greater than 38°C or 100.4°F

Was a swab taken of the surgical site? ☐ YES ☐ NO

Was a course of antibiotics related to the surgical site prescribed by a healthcare provider?
☐ YES ☐ NO

Surgery Performed: _____

Hospital where surgery was performed: _____

This section to be completed by Infection Prevention and Control

Date follow-up completed (dd/mm/yyyy): _____
Meets CDC/NHSN criteria for a SSI: ☐ Yes ☐ No
Additional notes:

Date: _____ Infection Control Professional: _____
(dd/mm/yyyy)

25-March-2015

Appendix D: Post Surgical Telephone Surveillance Script (Sample)

Government of Saskatchewan

Saskatchewan Infection Prevention and Control Program

Post Surgical Telephone Surveillance Script

Instructions: The hospital will contact the patient between the hours of 8 a.m. and 4:30 p.m., or as otherwise outlined in regional policy. A phone call is made 30 days after surgery. Two attempts will be made to contact the patient and the date and time will be recorded in the chart below.

Patient Name:	Unique Number:
Phone Number:	Date of Surgery (dd/mm/yyyy):
Procedure:	Date Called (dd/mm/yyyy):
Call Duration (optional): _____ min.	☐ First Attempt: ☐ Second Attempt:

Purpose of Call: Recently you had surgery at _____ and we would like to know how you have been feeling since then. Do you have time to answer a few questions? The information you provide may help us to improve the quality of patient care in our hospital. Your answers will remain confidential.

SECTION A:	
Did your surgical site heal fully with no problems? Yes (End call) No (Continue with Section A)	☐ Yes ☐ No
Was there redness, heat and/or swelling around your surgical site?	☐ Yes ☐ No
Was there pus draining from your surgical site?	☐ Yes ☐ No
Did you experience increased pain or tenderness at your surgical site?	☐ Yes ☐ No
Did you have fever or chills?	☐ Yes ☐ No

SECTION B:	
Did you visit a clinic, doctor's office or emergency room due to any problems with your incision? If 'Yes', 1. What was the date of the visit? (dd/mm/yyyy) _____ 2. Who did you see? _____ 3. Were you prescribed an antibiotic? ☐ Yes ☐ No	☐ Yes ☐ No

SECTION C: Optional	
Were you given post-operative care instructions?	☐ Yes ☐ No
Did you have any additional comments or concerns about your patient care experience? If 'Yes', please describe:	☐ Yes ☐ No

☐ Further investigation required ☐ No further investigation required

25-March-2015

Appendix E: SSI Report for Surgeons (Sample)

Saskatchewan Infection Prevention and Control Program

SSI Report for Surgeons

PATIENT INFORMATION	
Name (Last, First):	Unique Number:
PROCEDURE DETAILS	
Procedure Date (dd/mm/yyyy):	
Procedure Name:	
INFECTION DETAILS	
Type of SSI ☐ Superficial ☐ Deep ☐ Organ/Space	Date culture obtained (dd/mm/yyyy): Organism isolated:
Notes/Comments:	
Reported by:	Date (dd/mm/yyyy):

Regional Infection Prevention and Control Contact Information:
Phone:
Fax:
E-mail:

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CDC/NHSN Definitions for Surgical Site Infection

Infection Type	Criteria	Comments
Superficial	**One of the following:** •Purulent drainage from the superficial incision •Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision •Superficial incision is deliberately opened by a surgeon, attending physician or other designee and is culture-positive or not cultured (Note: A culture-negative finding does not meet this criterion) AND patient has at least one sign or symptom of infection •Pain or tenderness at site •Localized swelling •Redness •Heat •Diagnosis of superficial SSI by surgeon, attending physician, or other designee	Infection occurs within 30 days (for caesarean sections) after the operative procedure and involves only skin and subcutaneous tissue of the incision
Deep	**One of the following:** •Purulent drainage from the deep incision •A deep incision that spontaneously dehisces or is deliberately opened by a surgeon, attending physician or other designee and is culture-positive or not cultured (Note: A culture-negative finding does not meet this criterion) AND patient has at least one sign or symptom of infection •Fever > 38°C •Localized pain or tenderness •An abscess or other evidence of infection involving the deep incision that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test	Infection occurs within 30 days (for caesarean sections) after the operative procedure and involves deep soft tissues of the incision (e.g., fascial and muscle layers)
Organ/Space	**One of the following:** •Purulent drainage from a drain that is placed in the organ/space •Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space •An abscess or other evidence of infection involving the organ/space that is detected on direct examination, during an invasive procedure, or by histopathologic examination or imaging test	Infection occurs within 30 days (for caesarean sections) after the operative procedure and involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure

National Healthcare Safety Network, "Procedure-associated Module SSI," (Atlanta, GA: Centers for Disease Control and Prevention, January 2015). [http://www.cdc.g/nhsn/pdfs/pscmanual/9pscssicurrent.pdf – retrieved January 2015]

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Appendix F: Memorandum for Surgeons (Sample)

Government of Saskatchewan

Saskatchewan Infection Prevention and Control Program
Memorandum for Surgeons

To: Dr. _____

From: _____, Infection Prevention and Control Department

Date: _____
(dd/mm/yyyy)

Subject: Notification of Surgical Site Infection

Please find, enclosed for your review, a report detailing a surgical site infection (SSI) identified in a patient under your care. As part of a provincial quality improvement process, the Saskatchewan Infection Prevention and Control Program has initiated these real-time reports in an effort to notify surgeons of an SSI as soon as it is identified. The criteria used by the Infection Control Professional (ICP) to identify an SSI are based on definitions developed by the Centers for Disease Control and Prevention / National Healthcare Safety Network. These definitions are provided on the second page of the SSI Report for Surgeons.

Should you require further information on this case, you may contact your Regional ICP and request the SSI Case Report Form. The contact information for your Regional ICP is included on the front page of the SSI Report for Surgeons.

We would like to thank you for taking the time to review this report and for working with us to reach our provincial goal of reducing preventable SSIs (Class I and Class II wounds) to zero by March 2017.

25-March-2015

Appendix G: Regional Infection Prevention and Control Contact List

Cypress Swift Current Saskatchewan Phone: 778-5141 Fax: 778-5282	Prince Albert Parkland Victoria Union Hospital Phone: 765-6127 Fax: 765-6093
Five Hills Moose Jaw Union Hospital Phone: 694-0342 Fax: 694-0283	Regina Qu'Appelle General Hospital Phone: 766-3428 Fax: 766-3361
Heartland Rosetown Saskatchewan Phone: 882-4111 ext. 2325 Fax: 882-1389	Saskatoon Royal University Hospital Phone: 655-1780 Fax: 655-0609
Kelsey Trail Nipawin, Saskatchewan Phone: 862-1095 Fax: 862-9310	Saskatoon City Hospital Phone: 655-8284 Fax: 655-7554
Mamawetan Churchill River LaRonge Saskatchewan Phone: 425-8522 Fax: 425-8550	Saskatoon St. Paul's Hospital Phone: 655-5668 Fax: 655-6142
Prairie North North Battleford Saskatchewan Phone: 446-6046 Fax: 446-6976	Sun Country Wawota Saskatchewan Phone: 739-5212 Fax: 739-5211
Prairie North Lloydminster Saskatchewan Phone: 820-6041 Fax: 820-6124	Sunrise Yorkton Regional Health Centre Phone: 786-0698 Fax: 786-0699

Appendix H: Provincial SSI Surveillance Spreadsheet (Sample)

Provincial SSI Surveillance

Case Finding Methods (check all that apply): Mandatory ☐ Enhanced ☐ Optional ☐

RHA: ICP: Date: (dd/mm/yyyy) Procedure Name:

Infection Details

	Patient Information								Procedure Details							Bundle Components					Infection Details							
SSI No.	Unique Number	DOB dd	DOB mm	DOB yyy	Age	Height (cm)	Weight (kg)	BMI	Procedure Date dd	Procedure Date mm	Procedure Date yyy	Duration (min)	ASA Score	Wound Class	Risk Index	Emergency or Elective	Appropriate Antibiotic Prophylaxis	Appropriate Antiseptic Skin Preparation	Appropriate Hair Removal	Maintaining Normothermia	Appropriate Glucose Control	When Infection Detected	Type of SSI	Date of symptom onset/culture obtained dd	Date of symptom onset/culture obtained mm	Date of symptom onset/culture obtained yyy	Days between procedure date and symptom onset/culture obtained	Organism Isolated #1	Organism Isolated #2	Organism Isolated #3
1					--			--							insuff. data												--			
2					--			--							insuff. data												--			
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SSI Rate Calculator - Standard Surveillance

Risk Index	# of Procedures	# of SSIs	SSI Rate (#SSIs/100 procedures)
0			--
1			--
2			--
Insufficient data			--
Total	0	0	

SSI Rate Calculator - Light Surveillance

# of Procedures	# of SSIs	SSI Rate (#SSIs/100 procedures)
		--

Appendix I: Infection Prevention and Control OR Audit Checklist (Sample)

Date of audit: **Time:** **OR#**
Audit completed by:

OR/Patient Standards	Compliant: YES	Compliant: NO	N/A	Description/Comments
OR Environment:				
OR appears clean dust free, uncluttered				
OR facility in good repair e.g., no holes in walls, floors, ceilings				
Solid ceiling – no tiles				
Doors closed, traffic in and out of room kept to minimum during case				# door openings/hour
Number of personnel in room kept to a minimum				# personnel in room during case
Environmental Cleaning in the OR:				
Environmental cleaning between cases is performed – directionally from top to bottom, from clean to dirty				
End of procedure cleaning is performed including: waste disposal, horizontal surfaces, suction containers, linen removal, etc				
There is a terminal cleaning (end of the day's schedule) procedure in place				
There is a procedure in place for weekly and monthly cleaning as per ORNAC standards				
Anesthesiology carts are cleaned at least daily				
Ventilation and Temperature:				
Positive pressure is maintained in the OR theatre with respect to corridors and adjacent areas				
At least 20 air changes per hour are maintained in operating rooms, of which at least 6 are fresh air, as per CSA standards				
Temperature is monitored and maintained at 20-24°C				
Humidity is monitored and is maintained at 30-60%				
Perioperative Patient Care:				
Prophylactic antibiotic given within 60 minutes prior to incision				
Hair removal: performed before entering OR room				
Skin prep: ⇨ CHG with alcohol or Iodine povacrylex with alcohol				

Adapted from APIC OR Observation Checklist[8] and IPAC-Canada Audit Toolkit.[16]

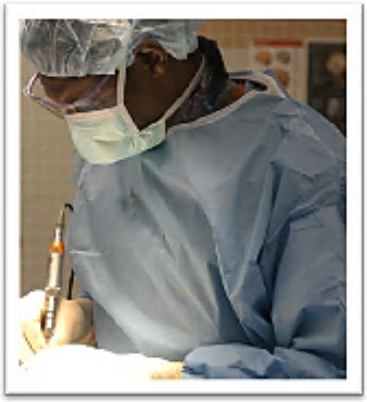
OR/Patient Standards	Compliant: YES	Compliant: NO	N/A	Description/Comments
Attire:				
Only those in appropriate attire enter semirestricted and restricted areas				
Dress code is followed				
⇨ No rings. Other jewelry (watches, earrings, bracelets, necklaces, piercing) should be removed or totally confined within scrub attire				
⇨ Shirts tucked in				
Staff have unpolished , natural nails that rae less than (1/4 inch) long				
Surgical mask is worn so that it fully covers the mouth and nose, is tied over top of the cap, and is adjusted for proper fit				
Surgical mask is worn during procedures and/or in the presence of open sterile supplies/instruments				
Eye protection or face shield is used during surgical procedures				
Surgical cap/hood covers all hair (including facial hair)				
Sterile surgical gowns that provide effective barriers when wet (i.e. constructed of materials that are impervious				
Sterile Field:				
Scrubbed persons maintain sterility of sterile gown, gloves, and supplies				
Sterile drapes between the patient and the sterile field are used				
Sterile field is constantly monitored				
Scrubbed hands remain above waist				
Items/devices dropped below level of the OR table are considered contaminated				
All personnel moving in/around sterile field do so in a manner to maintain sterility – e.g., ⇨ Staff do not turn back to sterile field ⇨ Separation of sterile team from non-sterile team maintained ⇨ Unscrubbed personnel do not pass between two sterile fields				
Sterile items are opened as close to possible to the surgical time				

Adapted from APIC OR Observation Checklist[8] and IPAC-Canada Audit Toolkit.[16]

Appendix J: Fact Sheet for Patients

Preventing Surgical Site Infections

Fact Sheet for Patients



Surgical site infections can be prevented if care is taken before, during, and after surgery.

This fact sheet provides you with tips to help prevent a surgical site infection. If you have additional questions, please ask your healthcare provider.

What is a surgical site infection (SSI)?

A surgical site infection occurs when harmful bacteria (germs) enter the body through the surgical site (any cut the surgeon makes in the skin to perform the surgery). Most patients who have surgery do not develop an infection. However, infections can develop in about 1 to 3 percent of patients who have surgery.

What are the risk factors for an SSI?

The risk of developing an SSI is higher if you:

- Are an older adult
- Have a weakened immune system or other serious health problem such as diabetes
- Are malnourished
- Are overweight
- Smoke
- Already have a skin infection somewhere on your body

What are the signs and symptoms of an SSI?

- Redness, heat, and/or swelling around the surgical site
- Pus from the surgical site
- Increased pain or tenderness at the surgical site
- Chills/fever with a temperature greater than 38°C or 100.4°F

If you experience any of the symptoms listed above, call your healthcare provider.

Bring the Post Surgical Follow-up Tool with you to your appointment, if one is scheduled.

Saskatchewan Infection Prevention and Control Program February 2015

What can I do to prevent an SSI?

Before your surgery:

- Tell your surgeon if any skin infection, rash or sores develop before your surgery.
- Do not shave or wax near the surgical site for one week before your surgery. This can irritate your skin and make it easier to develop an infection.
- If you have diabetes, ensure your blood glucose (sugar) levels are controlled 48 hours before and after your surgery.
- Stop smoking at least 24 hours before your surgery.
- Take a bath or shower the night before your surgery or follow the directions given by your healthcare provider.

After discharge from the hospital:

- Ask your healthcare provider to explain everything you need to know about taking care of your surgical site. **Ask for clarification if you are unsure or don't remember.**
- Make sure you know **whom to contact, and what number to call,** if you have any questions or problems after you get home. If you are unsure or don't remember, call HealthLine at 811 and they can further assist you.
- Wash your hands thoroughly with soap and water before and after caring for your surgical site.
- Avoid tight clothing that may rub and irritate your surgical site.
- Do not allow visitors to touch your surgical site.
- Pets may be comforting, but may also be curious about your surgical site. Do not allow your pet to lick or touch your surgical site.

What are healthcare providers doing to prevent SSIs?

Healthcare providers:

- May give you antibiotics before your surgery starts
- If necessary, remove hair around your surgical site with clippers – they should not shave you with a razor
- Wear special hair covers, masks, gowns, and gloves during surgery to keep the surgery area clean
- Clean the skin at your surgical site with a special soap that kills bacteria (germs)
- Keep you warm during surgery
- Monitor your glucose (sugar) levels during and after surgery if you are diabetic
- Clean their hands with soap and water or an alcohol-based hand rub before and after caring for you

Additional Online Resources

Centers for Disease Control and Prevention
http://www.cdc.gov/HAI/pdfs/ssi/SSI_tagged.pdf

Ontario Hospital Association
http://www.oha.com/CurrentIssues/keyinitiatives/PatientSafety/Documents/8c%20SSI_fs_patients_families_MOHLTC.pdf

Safer Healthcare Now! Prevent Surgical Site Infections Getting Started Kit
http://www.saferhealthcarenow.ca/EN/Interventions/SSI/Documents/SSI%20Getting%20Started%20Kit.pdf

Saskatchewan Infection Prevention and Control Program February 2015