Interior Health
INFECTION PREVENTION & CONTROL

IPAC SURGICAL SITE INFECTION (SSI) PROTOCOL

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Introduction

SSIs develop in 2-5% of all surgeries. Of the 1.3 M surgeries in Canada yearly, 26,000 to 65,000 patients acquire SSIs. SSIs are estimated to cost $350,000 to $1 million annually (CDN) and increase length of hospital stay by an average of 11 days. Patients with SSIs have a five times greater chance of re-admission and 60% more ICU time (1). Surveillance of surgical site infection (SSI) is one of the key activities in the monitoring and reduction of infection rate post surgeries.

Interior Health Infection Prevention and Control (IPAC) program collaborates with Interior Health Surgical Network to collect surveillance data, provide regular reports to stakeholders, and conduct investigations for increased SSI rate in acute care facilities in Interior Health for the following three categories of SSIs: prosthetic hip and knee joint infections post primary hip and knee arthroplasty, spinal implant infection, and SSIs post cardiac surgeries.

Standard approaches for data collection and reporting of SSIs are important to ensure the surveillance results are reliable and comparable. IPAC SSI surveillance program adapts CDC/NHSN case definitions (Appendix A). Case finding is triggered by microbiology culture results and operative electronic information, followed by standard process of case review, data entry and analysis. SSI reports generated from reconciled and validated data provide a measure of the burden of SSI, establishes benchmark SSI rates for internal and external comparison as indicated, identifies potential risk factors and assesses specific interventions.

Roles and Responsibilities

IPAC recommends SSI surveillance for certain surgical procedures and report framework, in consultation with surgical services, Surgical Network, Perioperative Committee, Quality and Patient Safety. The recommendations are approved and endorsed by the Health Authority Medical Advisory Committee (HAMAC).

The following table defines the roles and responsibility of IPAC SSI surveillance

SSI surveillance steps	Roles and responsibility	Time frame
SSI Case finding and investigation	Infection Preventionists (IP's) follow the SSI surveillance protocol and initiate the SSI case report form in the IPAC dashboard	Within a week of case finding
Data entry	IP's enter the data into IPAC dash board	• As soon as the case is identified • Finalize the data entry at the end of monitoring period based on the SSI type a) 30 days for superficial incisional SSI; b) 90 days for deep incisional and organ/space SSI.
SSI case review	IP's review the case with IPAC Epidemiologist and/or Medical Director or designate if needed after completing the SSI case investigation.	Within two weeks of the case identification.
Data compiling and analysis	IPAC epidemiologist	Within two weeks of the case review
Surveillance report review and finalization*	• IPAC epidemiologist draft report in consultation with IPs if indicated • Epidemiologist and IPAC medical director review the report	• Once every four weeks for period reports • Once every three months for quarterly reports • Once every six months for semi-annual reports • Once a year for annual reports
Approval of SSI surveillance report	IPAC Medical Director and IPAC Director	Prior to submission
Disseminating data and reports	• The data and reports are shared with IP's, epidemiologist and IPAC Medical Director • Approved formal reports are presented to the relevant stakeholders, surgical network, site Infection Control committees, site perioperative committee, and site Quality committee as indicated	Regularly (periodic, quarterly, semi-annually, and annually)
Data quality assurance	It is the responsibility of IPAC members involved in SSI surveillance to • Develop, review and update indicators including the precise methodology for data collection to ensure consistency • Periodically case review to ensure the accuracy of case finding and compliance to the surveillance protocol	Every 6 months

*Operational reports are created by local IP's may or may not consist of reconciled and validated data as they are often created with real-time data.

Protocol Revision History

Date of revision	Details

Section 1

Cardiac Surgical Site Infection Surveillance Protocol

BACKGROUND

Cardiac surgeries, or cardiovascular surgeries, are performed to treat coronary artery disease (CAD), valvular heart disease, and congenital heart disease. Interior Health (IH) Cardiac Surgery Service in Kelowna General Hospital (KGH) performs a variety of cardiac surgeries in adult including repairing of aorta, heart, valve replacement, Maze procedure (surgical ablation) for atrial fibrillation, and coronary artery bypass grafting (CABG). Cardiac surgery usually requires opening the chest via sternotomy. In CABG procedure, a donor vessel is used and harvested from the great saphenous vein in the leg or the radial artery in the arm.

Nearly 5% of patients post cardiac surgery experienced major infections (1). Surgical site infection (SSI) post cardiac surgeries include sternal wound infections, mediastinitis, donor site wound infection, osteomyelitis, bacteremia, myocarditis or pericarditis, endocarditis, arterial or venous infection, intra-abdominal and lung infection. Sternal wound infection, mediastinitis and donor site wound infection are most common SSIs post cardiac surgeries.

Deep sternal wound infections (DSWIs) and mediastinitis are two common severe SSI. DSWIs after sternotomy involve muscle, fascia bone (particularly the sternum, which has less blood supply and wire in place after cardiac surgery). Mediastinitis involves infection of the mediastinum (the chest cavity, which contains the heart, the thymus gland, some lymph nodes, and parts of the esophagus, aorta, thyroid, and parathyroid glands) with a mortality rate of 10% and 47% (2). The SSI incidence ranges from 0.25-5%, with higher incidence (2.5-7.5%) in heart transplantation or when cardiac assist devices are used. Bacteremia is common in patients with mediastinitis. It can have an early onset a few weeks to a month following surgery but can also be delayed for more than a month after index surgery (3).

Risk factors for DSWIs and mediastinitis include preoperative risk factors (diabetes, obesity, advanced age, prior cardiac surgery, underlying obstructive airways disease, left ventricular dysfunction, smoking, peripheral vascular disease, dialysis, and prolonged preoperative stay in hospital). Intraoperative risk factors include use of bilateral internal mammary artery (BIMA) grafts, prolonged duration of surgery, perfusion time and aortic cross clamp time, and re-operation. Postoperative risk factors include postoperative respiratory failure and prolonged ICU stay (3).

The most common microorganisms that cause DSWIs and mediastinitis less than 30 days after sternotomy are *Staphylococcus aureus* (MSSA and MRSA), coagulase-negative *Staphylococci* CONs), *Streptococci, Pseudomonas aeruginosa, Enterobacterales*, and *Cutibacterium acnes*. Occasionally, postoperative mediastinitis may be caused by unusual organisms such as fungi,

Legionella, *Mycoplasma hominis*, *Nocardia*, *Mycobacterium chimaera* and *Mycobacterium abscessus* (associated with contaminated heater-cooler devices used in bypass surgery) (4-7).

Patients often have fever, tachycardia, chest pain or sternal instability, signs of sternal wound infection and purulent discharge from the mediastinal area. Fever and systemic symptoms appear first in most patients. (3). Almost all patients with postoperative mediastinitis have leukocytosis and elevated inflammatory markers. Radiographic imaging supports the clinical diagnosis including plain radiography, CT, MRI or bone scan. Blood culture, wound swab, multiple deep tissues and aspirate cultures provide etiological diagnosis (5). Management of DSWIs and mediastinitis includes combination of antibiotic treatment and surgical debridement. Wound management with negative-pressure vacuum is often used in treating mediastinitis (2).

Donor site SSI is another common complication post CABG. Leg donor site SSI after saphenous vein graft (SVG) harvesting affects 3.0% of patients within a month of index surgery and is associated with higher re-admission rate and longer hospitalization (8). The risk factors include an open SVG harvest approach, obesity, and blood transfusion (8). Gram-positive bacteria including coagulase-negative *Staphylococcus* (CONs), *Staphylococcus aureus* (MSSA and MRSA), *Enterococcus spp.* are the most common etiologies, followed by *Enterobacterales* and *Pseudomonas aeruginosa*. The most common manifestations are warm incisional site, erythema, swelling, and increased discharge. Some patients may develop fever and systemic symptoms. Diagnosis is established clinically, based on the presence of lower extremity erythema and fever. Cultures of blood, skin biopsies, and lesion aspirates may be positive. Treatment strategies vary depending on the severity of SSI, includes antibiotic therapy, wound care and surgical source control (9).

Bloodstream infection (BSI) occurred in 3% of patients within 90 days of index CABG. Individuals with a BSI had a significantly increased risk of death, and the risk was highest among those with BSI due to gram-negative bacteria or *Staphylococcus aureus* (9).

A bundled approach is recommended for prevention of SSI post cardiac surgeries including preoperative screening for carriage of multi-resistant organisms, antimicrobial prophylaxis, preoperative skin preparation, accurate surgical technique and wound management (2,10,11).

Surveillance of SSIs from cardiac procedures plays an important role for prevention and reduction of postoperative infection. IH Infection Prevention and Control (IPAC) performs surveillance on SSIs from patients receiving cardiac procedures in IH. IPAC follows NHSN definitions for SSI (12). Criteria for these types of infections are found in Appendix A, while Cardiac Surgical Site Infection Case Identification Chart may help in categorizing patient infections.

OBJECTIVES:

1. To determine SSI rates for cardiac surgeries performed in IH cardiac surgical service.
2. To provide periodic, quarterly, semi-annually and annual SSI incidence rates for cardiac procedures for trend analysis.
3. To investigate increased SSI rate following cardiac procedures.

SURVEILLANCE METHODS:

Patient Population:

All patients aged ≥18 years who undergo cardiac procedures in KGH cardiac surgical services.

Case definition:

Using CDC/NHSN SSI definitions, procedures are divided into three categories (Appendix A):

1. Superficial incisional SSI: two types of superficial incisional SSIs
    a. Superficial Incisional Primary (SIP): a superficial incisional SSI that is identified in the primary incision in a patient that had an operation with one or more incisions.
    b. Superficial Incisional Secondary (SIS): a superficial incisional SSI that is identified in the secondary incision in a patient that had an operation with more than one incision (for example, donor site incision)
2. Deep incisional SSI: two types of deep incisional SSIs
    a. Deep Incisional Primary (DIP): a deep incisional SSI that is identified in a primary incision in a patient that had an operation with one or more incisions.
    b. 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 (for example, donor site incision).
3. Organ/Space SSI

NOTE: Secondary bloodstream infection (BSI) Attribution Period for SSI: is a 17-day period that includes the date of SSI event, 3 days prior, and 13 days after (13).

Surveillance for cardiac surgical procedures will be performed until 90 days after the date of the surgical procedure (the surgery date is counted as day 1) even if the patient has been discharged. Organ/space infections and deep incisional infections affecting fascia and muscle tissue are monitored for 90 days of the index procedure, and superficial incisional infections are monitored only for 30 days after the surgery occurs.

Inclusion Criteria:

- Cardiac surgical procedures performed on patients ≥ 18 years in KGH cardiac surgical service (Table 1. Cardiac surgical procedures under surveillance)
  AND
- Clean, and clean-contaminated wound class procedures
  AND
- Primary procedure and reoperation

Table 1. Cardiac surgical procedures under surveillance

OR procedure code	Description of the procedure
CABG1	CABG X1
CABG2	CABG X2
CABG3	CABG X3
CABG4	CABG X4
CABG5	CABG X5
CABGR1	CABG W/ RADIAL ARTERY X 1
CABGR2	CABG W/RADIAL ARTERY X 2
CABGR3	CABG W/ RADIAL ARTERY X 3
CABGR4	CABG W/ RADIAL ARTERY X 4
CABGR5	CABG W/ RADIAL ARTERY X 5
CABGS1	CABG X 1 OPCAB1 OFF PUMP
CABGS2	CABG X 2 OPCAB2 OFF PUMP
CABGS3	CABG X 3 OPCAB3 OFF PUMP
CABGS4	CABG X 4 OPCAB4 OFF PUMP
CACOAR	AORTIC COARCTATION REPAIR
CAEXMYO	ATRIAL MYXOMA EXCISION
CASEPMY	SEPTAL MYOMECTOMY
CMAZE	MAZE PROCEDURE
CMAZEP	MAZE PROCEDURE PULMONARY VIEN ISOLATION/ABLATION
CPERLA	PERICARDECTOMY
CREPHEP	REPAIR OF HEART - PERICARDIUM
CTUMOR	CARDIAC TUMOR RESECTION
CVALA1	VALVE AORTIC REPLACEMENT

Exclusion criteria:

1. Dirty or infected wound class procedures
2. If during the postoperative period the original cardiac surgical site has an invasive manipulation for diagnostic or therapeutic purposes (*e.g.* needle aspiration, irrigation and debridement) and there is no evidence of an infection at that time, and if an SSI develops following this manipulation, the infection is not attributed to the operation. Invasive manipulation does not include wound packing or changing of wound packing materials as part of postoperative care (9).
3. Infection presents at time of index surgery.
4. Reoperations via same incision within 24 hours are excluded from the denominator; however, the initial procedure is still followed for the development of an SSI.
5. Surgeries in which the patient died in the operating room or within 24 hours of the index procedure.
6. Superficial SSIs occur beyond 30 days after index surgery (the surgery date is counted as day 1).
7. Deep or organ/space SSIs occur beyond 90 days after index surgery (the surgery date is counted as day 1)

Identifying SSIs:

Possible cases may be detected at these four points in time, but are not limited to:

- While admitted in an IH acute facility following a cardiac surgery;
- When seen in the emergency department or readmitted to an IH facility following discharge from the surgery stay;
- A physician reports following a cardiac procedure;
- Reported from other non-IH acute facilities

Case detection in IH can involve review of any of the following:

- Microbiology laboratory results;
- Patient charts (including: observation of the incision, physician record and pharmacy data);
- Re-operation records;
- Readmissions;
- Emergency visit records;
- Clinic visit records;
- Administrative discharge data review.
- Post-discharge surveillance

SSI case investigation procedure for IPs

Step	Action	
1	As soon as a case of SSI post cardiac procedure is identified, initiate the Cardiac SSI Case Reporting Form for Infection Control Practitioners in Dashboard	
2	Assess patient location at time of review (done as soon as possible after case identified)	
	if	then
	patient is admitted at Interior Health hospital or long term care facility	• Perform detailed chart review to determine if patient meets case definition and obtain other information required to complete the **Case information** section of the Reporting Form
	patient is not admitted to Interior Health Facility (including patients who were seen in ED and discharged)	• Complete the **Case information** section of the Reporting Form to be best of your ability • Only fill in the information you are able to obtain from Meditech or old charts
3	Complete the **Case assessment** section of the form. • Follow Cardiac Surgical Site Infection Case Identification Process Chart	
4	Enter and finalize the case into the case dashboard as soon as possible	
5	If the patient is diagnosed with a superficial incisional SSI, continue to monitor the case for 90 days and re-evaluate if deep incisional and/or organ/space infection suspected. Report case once, as deepest infection type noted	
6	Review case with Epidemiologist and/or Medical Director of IPAC or designate within two weeks of an SSI case identified	
7	Enter the data into IPAC dashboard	
8	Once the patient is off monitoring period, finalize data entry into IPAC dashboard and save SSI case report form	

Data entry
All SSIs meeting the CDC/NHSN SSI case definition (Appendix A) following a clean, or clean-contaminated cardiac surgical procedures are mandatory data entry into IPAC dashboard.

Denominator data
The number of cardiac procedures is obtained from Interior Health Surgical Service.

Rate calculation

Rates	Calculations
SSI rates (per 100 procedures)	(Number of SSIs/Number of procedures) x 100 procedures

Comparator rates:
The internal historical rates for cardiac SSI from the previous fiscal year(s) are comparators.

REPORTING AND COMMUNICATION
The SSI surveillance reports must be signed off by both IPAC epidemiologist and IPAC medical director using reconciled and validated data prior to submission. After approved by IPAC leadership, the final formal SSI surveillance reports are published and sent to relevant stakeholders including surgical services, surgical network, quality committees, MAC and HAMAC. Operational reports are created by local IPs may or may not consist of reconciled and validated data because they are often created with real-time data.

Cardiac Surgical Site Infection Case Reporting Form

Interior Health

Cardiac SSI Case Reporting Form
For Infection Preventionists

Place patient sticker here
Date:
IP name:

Case information:

Type of surgery	□ Valve replacement: □ aortic □ mitral □pulmonary □tricuspid □primary/□revision □ CABG: □ primary /□revision □ MAZE □ other: _____		
Surgery date			
Emergency Surgery	□ Yes □ No		
SSI onset date (use specimen date if unknown)			
Surgeon		Surgical assistant	
Prophylactic antibiotics	□ Cefazolin ____g □ Vancomycin ____g □ Other:_____		
Post-op antibiotics	□ Cefazolin ____g q__h □ Other:_____		□ <24 hrs □ 24-48 hrs □ >48 hrs
ASA score		Patient weight and/or BMI (if known)	
Surgical notes (if any issues or anomalies)	□ Topical antibiotics to surgical site :_____ □ Topical antiseptics to surgical site:_____ □ embedded antibiotic:_____ □ Duration of procedure:_____ □ Delayed sternum closure: □ Yes □ No □ Date when sternum was closed:_____ □ Location where sternum was closed: □ICU □OR □ other_____		
Operative specimens (if applicable)	Date:_____ # specimens collected:_____ # that grew:_____ #1: Type: □ OR bone/tissue □ OR swab □ site of culture:_____ Organism(s) grown:_____ #2: Type: □ OR bone/tissue □ OR swab □ site of culture:_____ Organism(s) grown:_____ #3: Type: □ OR bone/tissue □ OR swab □ site of culture:_____ Organism(s) grown:_____ #4: Type: □ OR bone/tissue □ OR swab □ site of culture:_____ Organism(s) grown:_____		

	#5: Type: □ OR bone/tissue □ OR swab □ site of culture:_____ Organism(s) grown:_____
Other specimens	Date:_____ Type: □ fluid □ abscess □ surface swab □ blood □ site of culture:_____ Organism(s) grown:_____ Date:_____ Type: □ fluid □ abscess □ surface swab □ blood □ site of culture:_____ Organism(s) grown:_____ Date:_____ Type: □ fluid □ abscess □ surface swab □ blood □ site of culture:_____ Organism(s) grown:_____ Date:_____ Type: □ fluid □ abscess □ surface swab □ blood □ site of culture:_____ Organism(s) grown:_____ Date:_____ Type: □ fluid □ abscess □ surface swab □ blood □ site of culture:_____ Organism(s) grown:_____
Patient medical history	□ MRSA □ Diabetes □ Obesity □ Chronic kidney disease □ Liver disease □ Immunosuppressive conditions or medications: □ Yes □ No □ Unknown □ Hemodialysis □ others:_____ □ Smoking
Chlorhexidine bath prior to surgery done	□ Yes □ No □ Unknown
Nasal decolonization done	□ Yes □ No □ Unknown
Hair removal method	□ Clippers □ Razor/shaving □ Unknown
Perioperative glucose control implemented	□ Yes □ No □ Unknown
Intraoperative normothermia implemented	□ Yes □ No □ Unknown
Supplemental oxygen in postoperative period implemented	□ Yes □ No □ Unknown
Blood transfusion occurred during the procedure	□ Yes □ No □ Unknown
Total bilirubin >1.0 mg/dL	□ Yes □ No □ Unknown
Preoperative albumin <3.5 mg/dL	□ Yes □ No □ Unknown

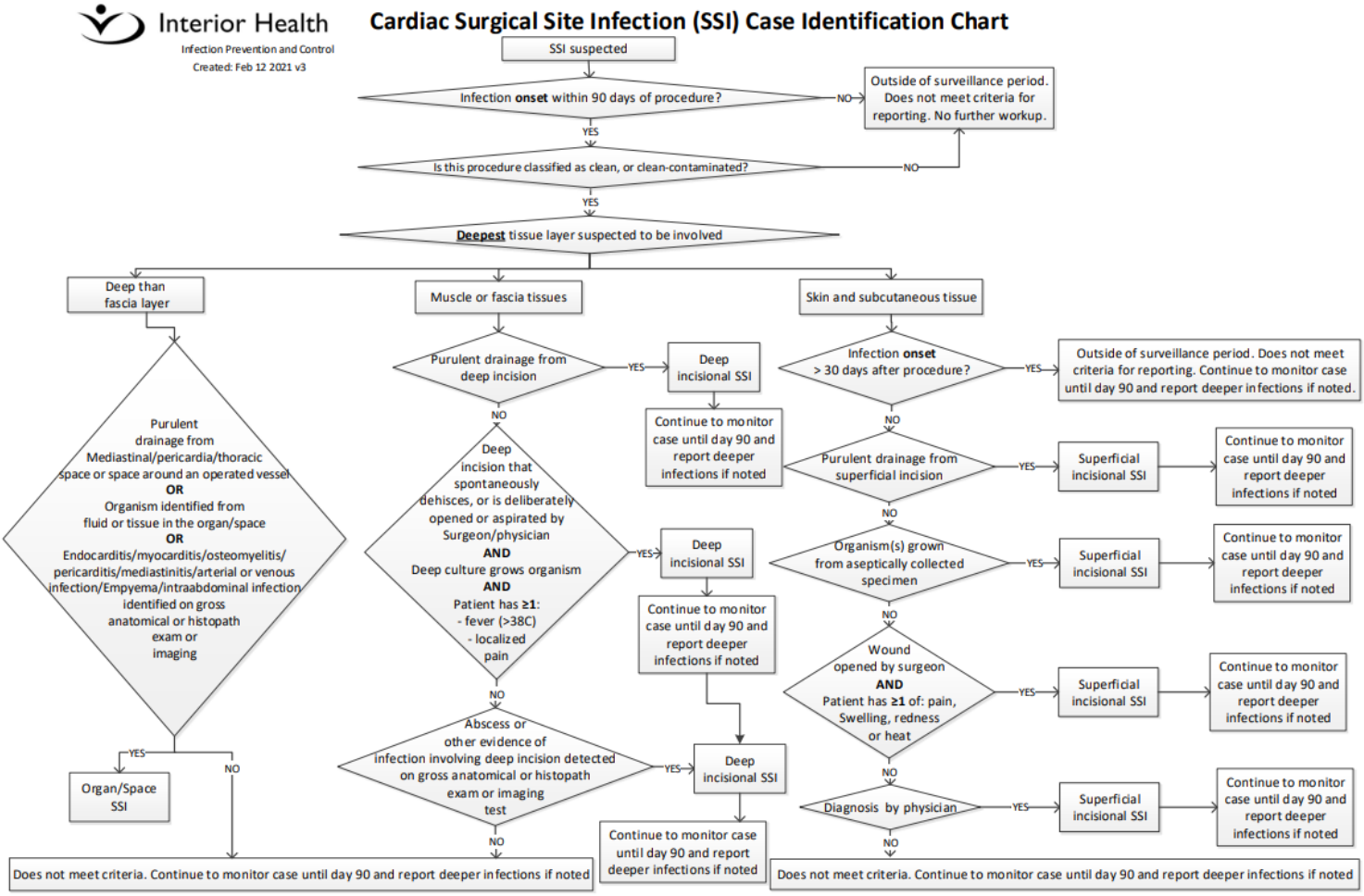
Details of SSI	
Cases Assessment:	
30 day surveillance (see SSI algorithm to categorize)	□ Superficial Incisional Primary (SIP) infection (skin/subcutaneous layer infected) □ Superficial Incisional Secondary (SIS) infection (skin/subcutaneous layer infected): Site_____
90 day surveillance (see SSI algorithm to categorize)	□ Deep Incisional Primary (DIP) infection (fascia/muscle layer infected) □ Deep incisional Secondary (DIS) infection (fascia/muscle layer infected): Site_____ □ Organ space (deep to fascia/muscle layer infected) Choose type: □ osteomyelitis □ mediastinitis □myocarditis □pericarditis □endocarditis □arterial or venous infection □others
Outcome 30 days within onset of infection (check ONLY one)	□ Alive in ICU □ Alive in hospital, out of ICU □ Discharged □ Deceased □ Unknown
If deceased, relation to SSI (Check ONLY one-as judged by reviewing physician(s)	□ Direct cause □ Indirect (contributing) □ Unrelated □ Cannot determine

ICP Checklist:

☐ Case entered in Dashboard
☐ Case reviewed with Case reviewed with Epidemiologist and/or IPAC Medical director or designate
☐ Case reviewed with Surgeon

Other case notes:

Cardiac Surgical Site Infection Case Identification Process Chart



Section 2

Prosthetic Joint Surgical Site Infection Surveillance Protocol

BACKGROUND

Joint replacements improve patient's quality of life, increasing their function and decreasing pain. Prosthetic joint infection (PJI) occurs in 1 to 2% of patients and is one of the most serious complications that can occur (1). Infection is suspected when patients develop a sinus tract, persistent wound drainage, or acute or chronic joint pain.

In patients with suspected infection, C-reactive protein (CRP) will typically be elevated. A diagnostic arthrocentesis should be performed in stable patients with elevated CRP in whom a painful prosthesis is noted. Synovial fluid should undergo total cell count and differential as well as culture for aerobic and anaerobic organisms. If patients who are febrile or unwell, blood cultures should be obtained, and surgical debridement is required for those who are unwell, or who have proven infection.

During surgery, 5 to 6 periprosthetic tissue specimens should be collected for culture. Patients are considered to have a PJI if a sinus tract communicating with the prosthesis is noted, or when purulence around the prosthesis, without another etiology, is noted. Additionally, if a virulent (*S. aureus,* Group A *Streptococcus*) organism grows in a single tissue or synovial fluid, the joint is considered infected. If 2 or more specimens yield the same indolent organism (e.g.: *Staphylococcus epidermidis*, other Coagulase negative staphylococci (CONs) or *Cutibacterium acnes*), this may also be considered evidence of a definitive infection, although the results must be examined in the context of the clinical presentation. If only 1 specimen yields an indolent organism, this may represent either contamination or infection and must be correlated very carefully with clinical findings. Surface swabs of surgical wounds are not reliable in diagnosing PJI, as they are frequently contaminated with skin and/or colonizing flora, and they should NOT generally be used to diagnosis PJI. Deep aspirates of abscesses or joint fluid performed by diagnostic imaging are considered sterile specimens and are much more useful in establishing diagnosis of PJI.

Prosthetic joint infections that occur 1 to 3 months after implantation are classified as "early" infections, whereas those that occur afterward are considered delayed. Early infection often presents with redness, swelling, pain, drainage and delayed wound healing, and occasionally with fever and chills. Delayed infections may be more indolent and present more subtlety.

Different treatment strategies may be considered depending on the timing of presentation. In those patients who present within 30 days, a debridement and retention strategy may be used, in which the prosthesis is retained, and the patient receives prolonged antibiotic treatment to try and salvage the joint. In patients who present later, the prosthesis is typically removed in either a 1 stage or 2 stage procedure, in combination with prolonged antibiotic therapy.

Because of the significant morbidity associated with PJI, IH Infection Prevention and Control (IPAC) performs surveillance on PJI in patients with primary hip and knee arthroplasties. Although organ/space periprosthetic joint infections are most serious, deep incisional infections affecting fascia and muscle tissue are also significant. IH IPAC follows NHSN definitions for SSI following arthroplasty procedures (2). Criteria for these types of infections are found in Appendix A, while Prosthetic Joint SSI case identification process chart may help in categorizing patient infections.

OBJECTIVES:

1. To determine SSI rates for prosthetic hip and knee infection after primary arthroplasty procedure performed in IH acute care facilities
2. To provide periodic, quarterly, semi-annually and annual SSI incidence rates for regional and facilities for trend analysis
3. To investigate increased SSI rate following primary hip and knee replacement procedures

SURVEILLANCE METHODS:

Patient Population:

All patients who undergo hip and knee arthroplasty procedures in IH acute facilities.

Case definition:

Using CDC/NHSN SSI definitions, SSI post arthroplasty procedure is divided into three categories (See Appendix A):

1. Superficial incisional SSI: two types of superficial incisional SSIs
    a. Superficial Incisional Primary (SIP): a superficial incisional SSI that is identified in the primary incision in a patient that had an operation with one or more incisions
    b. Superficial Incisional Secondary (SIS): a superficial incisional SSI that is identified in the secondary incision in a patient that had an operation with more than one incision (for example, donor site incision)
2. Deep incisional SSI: two types of deep incisional SSIs
    a. Deep Incisional Primary (DIP): a deep incisional SSI that is identified in a primary incision in a patient that had an operation with one or more incisions
    b. Deep Incisional Secondary (DIS): a deep incisional SSI that is identified in the secondary incision in a patient that had an operation with more than one incision (for example, donor site incision).
3. Organ/Space SSI

NOTE: Secondary BSI Attribution Period for SSI: The secondary BSI attribution period for SSI is a 17-day period that includes the date of SSI event, 3 days prior, and 13 days after (3).

Surveillance for primary hip and knee arthroplasty procedures will be performed until 90 days after the date of the surgical procedure (the surgery date is counted as day 1) even if the patient has been discharged. Organ/space infections and deep incisional infections affecting fascia and muscle tissue are monitored for 90 days of the index procedure, and superficial incisional infections are monitored only for 30 days after the surgery occurs.

Inclusion Criteria:

- Hip and knee arthroplasty procedures performed in IH acute facilities (Table 2. Orthopedical procedures under surveillance)

AND

- Clean, and clean-contaminated wound class procedures

AND

- Primary procedure

Table 2. Orthopedical procedures under surveillance

OR procedure code	Description of the procedure
ARPHIPB	ARTHROPLASTY HIP - TOTAL - BILATERAL
ARPHIPC	ARTHROPLASTY HIP - TOTAL (FOR FRACTURED HIP)
ARPHIPDA	TOTAL HIP ARTHROPLASTY - DIRECT ANTERIOR APPROACH
ARPHIPDS	ARTHROPLASTY HIP - DIRECT SUPERIOR APPROACH
ARPHIPE	ARTHROPLASTY HIP - TOTAL CEMENTED/HYBRID
ARPHIPF	ARTHROPLASTY HIP - TOTAL CEMENTED - MIS
ARPHIPG	ARTHROPLASTY HIP - TOTAL UNCEMENTED
ARPHIPH	ARTHROPLASTY HIP - TOTAL UNCEMENTED - MIS
ARPHIPI	ARTHROPLASTY HIP - TOTAL UNCEMENTED ANTERIOR
ARPHIPJ	ARTHROPLASTY HIP - TOTAL UNCEMENTED CONVERGE CUP
ARPHIPK	ARTHROPLASTY HIP - TOTAL UNCEMENTED TM CUP
ARPHIPL	ARTHROPLASTY HIP - TOTAL UNCEMENTED ACCOLADE STEM
ARPHIPM	ARTHROPLASTY HIP - TOTAL UNCEMENTED SUMMIT STEM
ARPHIPN	ARTHROPLASTY HIP - TOTAL UNCEMENTED TRILOCK STEM
ARPHIPO	ARTHROPLASTY HIP - TOTAL - UNCEMENTED - ALLOFIT
ARPHIPP	ARTHROPLASTY HIP - TOTAL UNCEMENTED - G7
ARPHIPZ	ARTHROPLASTY - TOTAL HIP
ARPKNEBIL	ARTHROPLASTY KNEE - TOTAL - BILATERAL
ARPKNEC	ARTHROPLASTY KNEE - TOTAL - CEMENTED/HYBRID
ARPKNED	ARTHROPLASTY KNEE - TOTAL - UNCEMENTED
ARPKNEE	ARTHROPLASTY KNEE - PATELLO-FEMORAL
ARPKNEZ	ARTHROPLASTY KNEE - TOTAL
ARPP1HIP	ARTHROPLASTY HIP NON STANDARD TOTAL ZIMMER
ARPP1KNE	ARTHROPLASTY KNEE NON STANDARD TOTAL ZIMMER
ARPP2HIP	ARTHROPLASTY HIP NON STANDARD TOTAL DEPUY
ARPP2KNE	ARTHROPLASTY KNEE NON STANDARD TOTAL DEPUY
ARPP4HIP	ARTHROPLASTY HIP NON STANDARD TOTAL STRYKER
ARPP4KNE	ARTHROPLASTY KNEE NON STANDARD TOTAL STRYKER
ARPP5HIP	ARTHROPLASTY HIP NON STANDARD TOTAL BIOMET
ARPP6HIP	ARTHROPLASTY HIP NON STANDARD TOTAL S&N

ARPP6KNE	ARTHROPLASTY KNEE NON STANDARD TOTAL S&N
ARPRP2KNE	ARTHROPLASTY KNEE NON STANDARD REVISION DEPUY
ARPRSP1HIP	ARTHROPLASTY HIP NON STANDARD RESURFACE ZIM.
ARPRSP1KNE	ARTHROPLASTY KNEE NON STANDARD RESURFACE ZIM.
ARPRSP2HIP	ARTHROPLASTY HIP NON STANDARD RESURFACE DEPUY
ARPRSP4HIP	ARTHROPLASTY HIP NON STANDARD RESURFACE S&N
ARPRSP5HIP	ARTHROPLASTY HIP NON STANDARD RESURFACE BIOMET
ARPUKNEB	ARTHROPLASTY KNEE - UNI - MEDIAL
ARPUKNEC	ARTHROPLASTY KNEE - UNI - LATERAL
ARPUKNEZ	ARTHROPLASTY KNEE - UNI

Exclusion criteria:

1. Dirty or infected wound class procedures
2. Revision
3. Index procedure in a non IH acute facilities
4. If during the postoperative period the original joint site has an invasive manipulation for diagnostic or therapeutic purposes (*e.g.* needle aspiration, irrigation and debridement) and there is no evidence of an infection at that time, and if an SSI develops following this manipulation, the infection is not attributed to the operation. Invasive manipulation does not include wound packing, or changing of wound packing materials as part of postoperative care (2
5. Infection presents at time of surgery
6. Surgeries in which the patient died in the operating room or within 24 hours of the index procedure
7. Superficial SSIs occur beyond 30 days after index surgery (the surgery date is counted as day 1)
8. Deep or organ/space SSIs occur beyond 90 days after index surgery (the surgery date is counted as day 1)

Identifying SSIs:

Possible cases may be detected at these four points in time, but are not limited to:

- While admitted in an IH acute facility following the procedure;
- When seen in the emergency department or readmitted to an IH facility following discharge from the surgery stay;
- A orthopedic surgeon reports following the procedures;
- Reported from other non-IH acute facilities

Case detection in IH can involve review of any of the following:

- Microbiology laboratory results;
- Patient charts (including: observation of the incision, physician record and pharmacy data);
- Re-operation records;
- Readmissions;
- Emergency visit records;
- Clinic visit records;
- Administrative discharge data review.

SSI case investigation procedure for IPs

Step	Action	
1	As soon as a case of prosthetic joint SSI is identified, initiate the Prosthetic Joint SSI Case Reporting Form for Infection Preventionists in IPAC Dashboard.	
2	Assess patient location at time of review (done as soon as possible after case identified)	
	if	then
	patient is admitted at Interior Health hospital or long term care facility	• Perform detailed chart review to determine if patient meets case definition and obtain other information required to complete the **Case information** section of the Reporting Form
	patient is not admitted to Interior Health Facility (including patients who were seen in ED and discharged)	• Complete the **Case information** section of the Reporting Form to be best of your ability • Only fill in the information you are able to obtain from Meditech or old charts
3	Complete the **Case assessment** section of the form. • Follow Prosthetic Joint Surgical Site Infection Case Identification Process Chart	
4	Enter the case into the dashboard as soon as possible.	
5	If the patient is diagnosed with a superficial incisional SSI, continue to monitor the case for 90 days and re-evaluate if deep incisional and/or organ/space infection suspected. Report case once, as deepest infection type noted.	
6	Review case with medical director of IPAC within two weeks of an SSI case identified.	
7	Once the patient is off monitoring period, finalize data entry into IPAC dashboard and save case report form.	

Data entry
All SSIs meeting the CDC/NHSN SSI case definition following a clean, or clean-contaminated orthopedic surgical procedures are mandatory data entry into IPAC dashboard.

Denominator data
The number of orthopedic procedures is obtained from Interior Health Surgical Service.

Rate calculation

Rates	Calculations
SSI rates (per 100 procedures)	(Number of SSIs/Number of procedures) x100 procedures

Comparator rates:
The internal historical rates for prosthetic hip and knee SSI after primary arthroplasty procedures from the previous fiscal year(s) are comparators. The prosthetic hip and knee SSI rate from clean procedures from CNISP or NSQIP can be used as an external comparator.

REPORTING AND COMMUNICATION
The SSI surveillance reports must be signed off by both IPAC epidemiologist and IPAC medical director using reconciled and validated data. After approved by IPAC Leadership the final formal SSI surveillance reports are published and sent to relevant stakeholders including surgical services, surgical network, quality committees, MAC and HAMAC.

Operational reports are created by local IPs may or may not consist of reconciled and validated data because they are often created with real-time data.

Prosthetic Joint Surgical Site Infection Case Reporting Form

Interior Health

PJI SSI Case Reporting Form
For Infection Preventionists

Place patient sticker here

Date:

IP name:

Case information:

Type of surgery	Total hip arthroplasty ☐ left / ☐ right Knee arthroplasty ☐ left / ☐ right ☐ total / ☐ uni		
Surgery date			
Emergency procedure	☐ Yes ☐ No		
SSI onset date (use specimen date if unknown)			
Surgeon		Surgical assistant	
Prophylactic antibiotics	☐ Cefazolin ___g ☐ Vancomycin ___g ☐ Other:_____		
Post-op antibiotics	☐ Cefazolin ___g q__h ☐ Other:_____	☐ <24 hrs ☐ 24-48 hrs ☐ >48 hrs	
ASA score		Patient weight and/or BMI (if known)	
Surgical notes (if any issues or anomalies)	☐ Topical antibiotics to surgical site :_____ ☐ Topical antiseptics to surgical site:_____ ☐ Antibiotic cement:_____ ☐ Other:_____		
Operative specimens (if applicable)	Date:_____ # specimens collected:_____ # that grew:_____ #1: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #2: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #3: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #4: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #5: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____		
Other specimens	Date:_____ Type: ☐ synovial fluid ☐ abscess ☐ surface swab ☐ blood Organism(s) grown:_____		

	Date:_____ Type: ☐ synovial fluid ☐ abscess ☐ surface swab ☐ blood Organism(s) grown:_____ Date:_____ Type: ☐ synovial fluid ☐ abscess ☐ surface swab ☐ blood Organism(s) grown:_____
Patient medical history	☐ MRSA ☐ Diabetes ☐ Obesity ☐ Chronic kidney disease ☐ Liver disease ☐ Immunosuppressive conditions or medications: ☐ Yes ☐ No ☐ Unknown ☐ Hemodialysis ☐ Smoking
Nasal decolonization done	☐ Yes ☐ No ☐ Unknown
Hair removal method	☐ Clippers ☐ Razor/shaving ☐ Unknown
Perioperative glucose control implemented	☐ Yes ☐ No ☐ Unknown
Intraoperative normothermia implemented	☐ Yes ☐ No ☐ Unknown
Supplemental oxygen in postoperative period implemented	☐ Yes ☐ No ☐ Unknown
Blood transfusion occurred during the procedure	☐ Yes ☐ No ☐ Unknown
Total bilirubin >1.0 mg/dL	☐ Yes ☐ No ☐ Unknown
Preoperative albumin <3.5 mg/dL	☐ Yes ☐ No ☐ Unknown
Details of SSI	

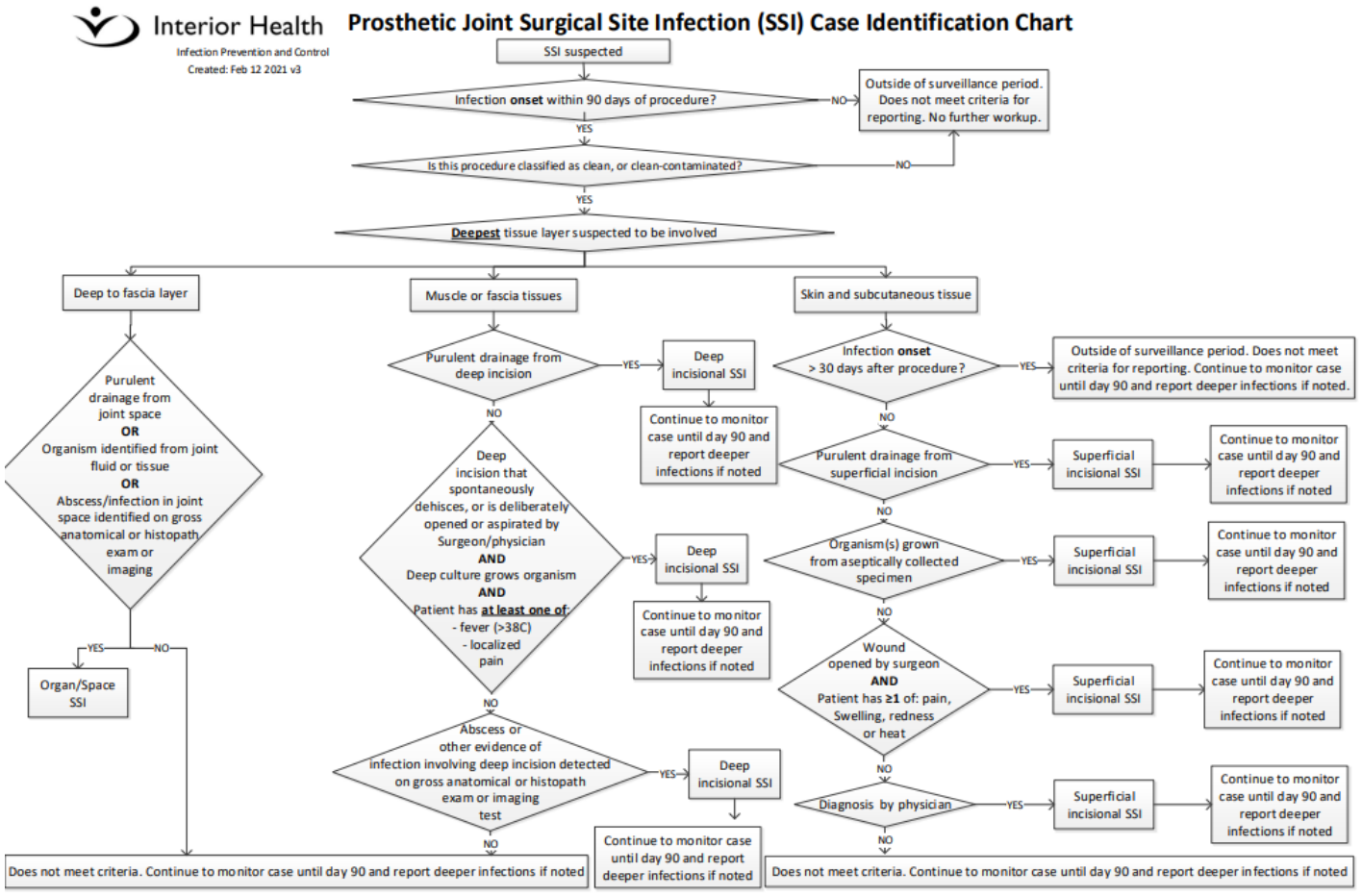
Cases Assessment:	
30 day surveillance (see SSI algorithm to categorize)	☐ Superficial incisional infection (skin/subcutaneous layer infected)
90 day surveillance (see SSI algorithm to categorize)	☐ Deep incisional infection (fascia/muscle layer infected) ☐ Organ space (deep to fascia/muscle layer infected) Choose type: ☐ osteomyelitis ☐ periprosthetic joint infection

ICP Checklist:

☐ Case entered in Dashboard
☐ Case reviewed with Epidemiologist and/or IPAC Medical director or designate
☐ Case reviewed with Surgeon

Other case notes:

Prosthetic Joint Surgical Site Infection Case Identification Process Chart



Section 3

Spinal Implant Surgical Site Infection Surveillance Protocol

BACKGROUND

Spinal surgeries are procedures on the vertebral structures of the spine, includes the exploration or decompression of the spinal cord, the removal or resection of intervertebral discs, spinal fusion and repair of fractures of deformities. These procedures are used to treat back pain with neurological symptoms, degenerative disc changes and disc prolapse, spinal stenosis, degenerative or isthmic spondylolisthesis, spondylolysis, and deformity of spine (1). Some of these procedures insert hardware in the vertebral or discs spaces. Some procedures involve both primary and secondary incision sites. Spinal surgery can be done by either an orthopedic surgeon or neurosurgeon.

Surgical site infection (SSI) post spinal surgery occurs in 0.72 to 8.7% of patients (2) with a lower rate for laminectomy/discectomy and higher rate in patients who undergo spinal fusion procedures. SSI in revision post primary spinal fusion procedure was the highest rate reported (12. 2%) (3-4).

The risk factors for SSIs post spinal surgery include, elderly, smoking, malnutrition, diabetes, obesity, trauma, increased duration of procedure, ASA score>=3, surgical procedure approaches (back, abdominal and lateral approach), wound classification as dirty or contaminated, implanted instrument, previous surgery and prolonged hospital stay (5-8). SSIs can occur at the primary and/or the secondary incision sites post spinal procedures. A variety of SSIs post spinal surgery were documented in literature including vertebral osteomyelitis, discitis, spinal abscess, paraspinal abscess, Intracranial infection, superficial or deep incisional infections (9).

The common microorganisms causing SSIs from spinal surgery are *S. aureus*, *Cutibacterium acnes*, and Coagulase negative staphylococcus (CONs). CONs is often involved in SSIs associated with the use of spinal instrumentation. Gastrointestinal flora including *Enterococcus spp., Enterobacterales* and anaerobic bacteria infection occurs more commonly at the lumbosacral junction due to proximity to the perianal area (2).

Spinal implant infections within 3 months of primary procedure are classified as “early postoperative infection”, whereas those that occur after 3 months are considered “late postoperative infection. Late postoperative infections are often caused by more indolent bacteria such as *C. acnes* and CONs. SSI post spinal surgery is suspected if the incision site becomes red, hot and swollen, increased discharge and worsening pain 1-4 week after index procedure. Some patients may develop fever and constitutional symptoms (10-11).

Several laboratory tests help guide the diagnosis of postoperative infection including a complete blood count (CBC), erythrocyte sedimentation rate (ESR), and C-reative protein (CRP). Blood culture should be drawn if patients are febrile. Diagnostic imagines including plain radiographs, CT, MRI or bone scan are commonly used in detecting abscess, implant failure, osteomyelitis or discitis, deformities and help to make surgical treatment plan (10).

Diagnosis of SSI post spinal surgery are confirmed by positive cultures from deep tissue, disc, and bone specimens collected from Operation Room or CT guided biopsy. Superficial wound swabs are not reliable in diagnosing of SSIs, as they are frequently contaminated with skin and/or colonizing flora, and they should NOT generally be used to diagnosis postoperative spine infection. Ideally, culture specimens should be collected prior to antibiotic treatment if patient is stable (10).

Management of spinal implant infection includes surgical debridement and antibiotic therapy. For early postoperative infection, in cases where spinal implant is present, the current recommendation is not the remove the hardware to avoid destabilizing the spine. Bone graft that is loose at time of debridement should be removed, but any graft material that is adherent to bony structures should be left in place. For late postoperative infection hardware removal is more necessary. Depending on infection types and surgical treatment strategies, the length of antibiotic treatment is variable from a few days for superficial wound infection, 6 weeks for osteomyelitis and discitis without implant, to 3 month or longer for postoperative discitis/osteomyelitis with retaining implant. The antibiotics are tailored to culture results (10)

Surveillance on SSI from spinal procedures plays an important role for prevention and reduction of postoperative infection. IH Infection Prevention and Control (IPAC) performs surveillance on SSI from patients with spinal implant procedures. IH IPAC follows NHSN definitions for SSI from spinal implant procedures: organ/space infections and deep incisional infections affecting fascia and muscle tissue occur within 90 days of the index procedure. Monitoring for superficial incisional infections occurs for only 30 days after the surgery occurs. Criteria for these types of infections are found in Appendix A, while the Spinal Implant Surgical Site Infection Case Identification Processes Chart may help in categorizing patient infections.

OBJECTIVES:

1. To determine IH wide, regional and facility SSI rates for spinal implant procedures performed in IH
2. To provide periodic, quarterly, semi-annually and annual SSI incidence rates for spinal implant procedures for trend analysis
3. To investigate increased SSI rate following spinal implant procedures

SURVEILLANCE METHODS:

Patient Population:
All patients undergo spinal implant procedures in IH acute care facilities.

Case definition:
Using CDC/NHSN SSI definitions, SSI post spinal implant procedure are divided into three categories (See Appendix A for detail):

1. Superficial incisional SSI: two 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 had an operation with one or more incisions
    2) Superficial Incisional Secondary (SIS): a superficial incisional SSI that is identified in the secondary incision in a patient that had an operation with more than one incision (for example, donor site incision)
2. Deep incisional SSI: two 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 had an operation with one or more incisions
    2) Deep Incisional Secondary (DIS): a deep incisional SSI that is identified in the secondary incision in a patient that had an operation with more than one incision (for example, donor site incision)
3. Organ/Space SSI

NOTE: Secondary BSI Attribution Period for SSI: The secondary BSI attribution period for SSI is a 17-day period that

Includes the date of SSI event, 3 days prior, and 13 days after (12)

Surveillance for spinal implant procedures will be performed until 90 days after the date of the surgical procedure (the surgery date is counted as day 1).

Inclusion Criteria:

- Primary spinal implant procedures (Table 3. Spinal procedures involved in implant under surveillance)

  AND
- Clean, and clean-contaminated wound class procedures

Table 1. Spinal procedures involved in implant under surveillance

OR procedure code	Description of the procedure
DECSLUS	DECOMPRESSION & STABILIZATION LUMBAR/SACRAL
DECSPIN	DECOMPRESSION INTERSPINOUS PROCESS - INSTRUMENTED
EXCDAC	DISCECTOMY/FUSION - ANTERIOR CERVICAL - ALLOGRAFT
EXCDFUAC	DISCECTOMY/FUSION - ANTERIOR CERVICAL - AUTOGRAFT
EXCDINLUM	DISCECTOMY/INSTRUMENTED FUSION - ANTERIOR LUMBAR
EXCDINTHO	DISCECTOMY/INSTRUMENTED FUSION - ANTERIOR THORACIC
FUSIBLUM	FUSION - INSTRUMENTED/INTERBODY - LUMBAR
FUSINAC	FUSION - INSTRUMENTED/DISCECTOMY - ANT CERVICAL
FUSINLUM	FUSION - INSTRUMENTED/DECOMPRESS - LUMBAR/THORACIC
FUSINM1	FUSION - INSTRUMENTED - FENESTRATED – LUMBAR
FUSINMIFEN	FUSION - INSTRUMENTED/MIS - FENESTRATED - LUMBAR
FUSINMILUM	FUSION - INSTRUMENTED/MIS - LUMBAR
FUSINMS	FUSION - DECOMPRESSION INSERT FLEX SPACER LUMBAR
FUSINPC	FUSION - INSTRUMENTED,PLATING - POSTERIOR CERVICAL
FUSINPCOCC	FUSION - INSTRUMENTED - POST - CERVICO-OCCIPITA
FUSLUM	FUSION - DECOMPRESSION - LUMBAR/THORACIC
FUSLUMIAP	FUSION - INSTRUMENTED - ANTERIOR, POST - LUMBAR
FUSTOEMIN	FUSION/ARTHRODESIS TOE MINIMALLY INVASIVE
ORIFINPC	ORIF/INSTRUMENTED FUSION - POSTERIOR CERVICAL (C1-
ORIFODAC	ORIF/FUSION ODONTOID - ANTERIOR CERVICAL
ORIFPC	ORIF/FUSION - BONE GRAFT - POSTERIOR CERVICAL
STALUM	DYNAMIC STABILIZATION - LUMBAR
STANNLUM	DYNAMIC STABILIZATION, NEURO NAVIGATOR - LUMBAR

Exclusion criteria:

1. Dirty or infected wound class procedures
2. Index Surgery performed in a non-IH facility
3. If during the postoperative period the original spinal implant surgical site has an invasive manipulation for diagnostic or therapeutic purposes (e.g. needle aspiration, irrigation and debridement) and there is no evidence of an infection at that time, and if an SSI develops following this manipulation, the infection is not attributed to the operation. Invasive manipulation does not include wound packing, or changing of wound packing materials as part of postoperative care (9)
4. Infection presents at time of surgery
5. Surgeries in which the patient died in the operating room or within 24 hours of the index procedure
6. Superficial SSIs occur beyond 30 days after index surgery (the surgery date is counted as day 1)
7. Deep or organ/space SSIs occur beyond 90 days after index surgery (the surgery date is counted as day 1)

Identifying SSIs:

Possible cases may be detected at these four points in time, but are not limited to:

- While admitted in an IH acute facility following a spinal implant surgery;
- When seen in the emergency department or readmitted to an IH facility following discharge from the surgery stay;
- Either neurosurgeon or orthopedic surgeon reports following spinal implant procedures;
- Reported from other non-IH acute facilities

Case detection in IH can involve review of any of the following:

- Microbiology laboratory results;
- Patient charts (including: observation of the incision, physician record and pharmacy data);
- Re-operation records;
- Readmissions;
- Emergency visit records;
- Clinic visit records;
- Administrative discharge data review

SSI case investigation procedure for IPs

Step	Action	
9	As soon as a case of SSI post spinal implant procedure is identified, initiate the Spinal Implant SSI Case Reporting Form for Infection Control Practitioners in IPAC Dashboard	
10	Assess patient location at time of review (done as soon as possible after case identified)	
	if	then
	patient is admitted at Interior Health hospital or long term care facility	• Perform detailed chart review to determine if patient meets case definition and obtain other information required to complete the **Case information** section of the Reporting Form
	patient is not admitted to Interior Health Facility (including patients who were seen in ED and discharged)	• Complete the **Case information** section of the Reporting Form to be best of your ability • Only fill in the information you are able to obtain from Meditech or old charts
11	Complete the **Case assessment** section of the form. • Follow Spinal Implant Infection Case Identification Process Chart	
12	Enter and finalize the case into the case dashboard as soon as possible.	
13	If the patient is diagnosed with a superficial incisional SSI, continue to monitor the case for 90 days and re-evaluate if deep incisional and/or organ/space infection suspected. Report case once, as deepest infection type noted.	
14	Review case with medical director of IPAC before the end of the month that a case is identified.	
15	Enter the data into IPAC dashboard	
16	Once the patient is off monitoring period, finalize data entry into IPAC dashboard and save SSI case report form	

Data entry
All SSIs meeting the CDC/NHSN SSI case definition following a clean or clean-contaminated spinal implant procedures are mandatory data entry into IPAC dashboard.

Denominator data
The number of spinal implant procedures is obtained from Interior Health Surgical Service.

Rate calculation

Rates	Calculations
SSI rates (per 100 procedures)	(Number of SSIs/Number of procedures) x100 procedures

Comparator rates:
The historical rates for regional and site-specific rates from the previous fiscal year(s) are comparators.

REPORTING AND COMMUNICATION
The SSI surveillance reports must be signed off by both IPAC epidemiologist and IPAC medical director using reconciled and validated data. After approved by IPAC leadership, the final formal SSI surveillance reports are published and sent to relevant stakeholders including surgical services, surgical network, quality committees, MAC and HAMAC.

Operational reports are created by local IPs may or may not consist of reconciled and validated data because they are often created with real-time data.

Spinal Implant Surgical Site Infection Case Reporting Form

Interior Health

Spinal Implant SSI Case Reporting Form
For Infection Preventionists

Place patient sticker here

Date:

IP name:

Case information:

Type of spinal surgery	☐ Cervical: ☐ primary /☐revision ☐Thoracic: ☐ primary/☐ revision ☐ Lumbar: ☐ primary / ☐ revision		
Surgery date			
Emergency Surgery	☐ Yes ☐ No		
SSI onset date (use specimen date if unknown)			
Surgeon		Surgical assistant	
Prophylactic antibiotics	☐ Cefazolin ___g ☐ Vancomycin ___g ☐ Other:_____		
Post-op antibiotics	☐ Cefazolin ___g q__h ☐ Other:_____	☐ <24 hrs ☐ 24-48 hrs ☐ >48 hrs	
ASA score		Patient weight and/or BMI (if known)	
Surgical notes (if any issues or anomalies)	☐ Topical antibiotics to surgical site :_____ ☐ Topical antiseptics to surgical site:_____ ☐ embedded antibiotic:_____ ☐ Duration of procedure:_____		
Operative specimens (if applicable)	Date:_____ # specimens collected:_____ # that grew:_____ #1: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #2: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #3: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #4: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____ #5: Type: ☐ OR bone/tissue ☐ OR swab Organism(s) grown:_____		

Other specimens	Date:_____ Type: ☐ fluid ☐ abscess ☐ surface swab ☐ blood ☐ site of culture:_____ Organism(s) grown:_____ Date:_____ Type: ☐ fluid ☐ abscess ☐ surface swab ☐ blood ☐ site of culture:_____ Organism(s) grown:_____ Date:_____ Type: ☐ fluid ☐ abscess ☐ surface swab ☐ blood ☐ site of culture:_____ Organism(s) grown:_____
Patient medical history	☐ MRSA ☐ Diabetes ☐ Obesity ☐ Chronic kidney disease ☐ Liver disease ☐ Immunosuppressive conditions or medications:_____ ☐ Smoking
Chlorhexidine bath prior to surgery done	☐ Yes ☐ No ☐ Unknown
Nasal decolonization done	☐ Yes ☐ No ☐ Unknown
Hair removal method	☐ Clippers ☐ Razor/shaving ☐ Unknown
Perioperative glucose control implemented	☐ Yes ☐ No ☐ Unknown
Intraoperative normothermia implemented	☐ Yes ☐ No ☐ Unknown
Supplemental oxygen in postoperative period implemented	☐ Yes ☐ No ☐ Unknown
Blood transfusion occurred during the procedure	☐ Yes ☐ No ☐ Unknown
Preoperative albumin <3.5 mg/dL	☐ Yes ☐ No ☐ Unknown
Total bilirubin >1.0 mg/dL	☐ Yes ☐ No ☐ Unknown
Details of SSI (more space on reverse if needed)	
Details of SSI (continued)	

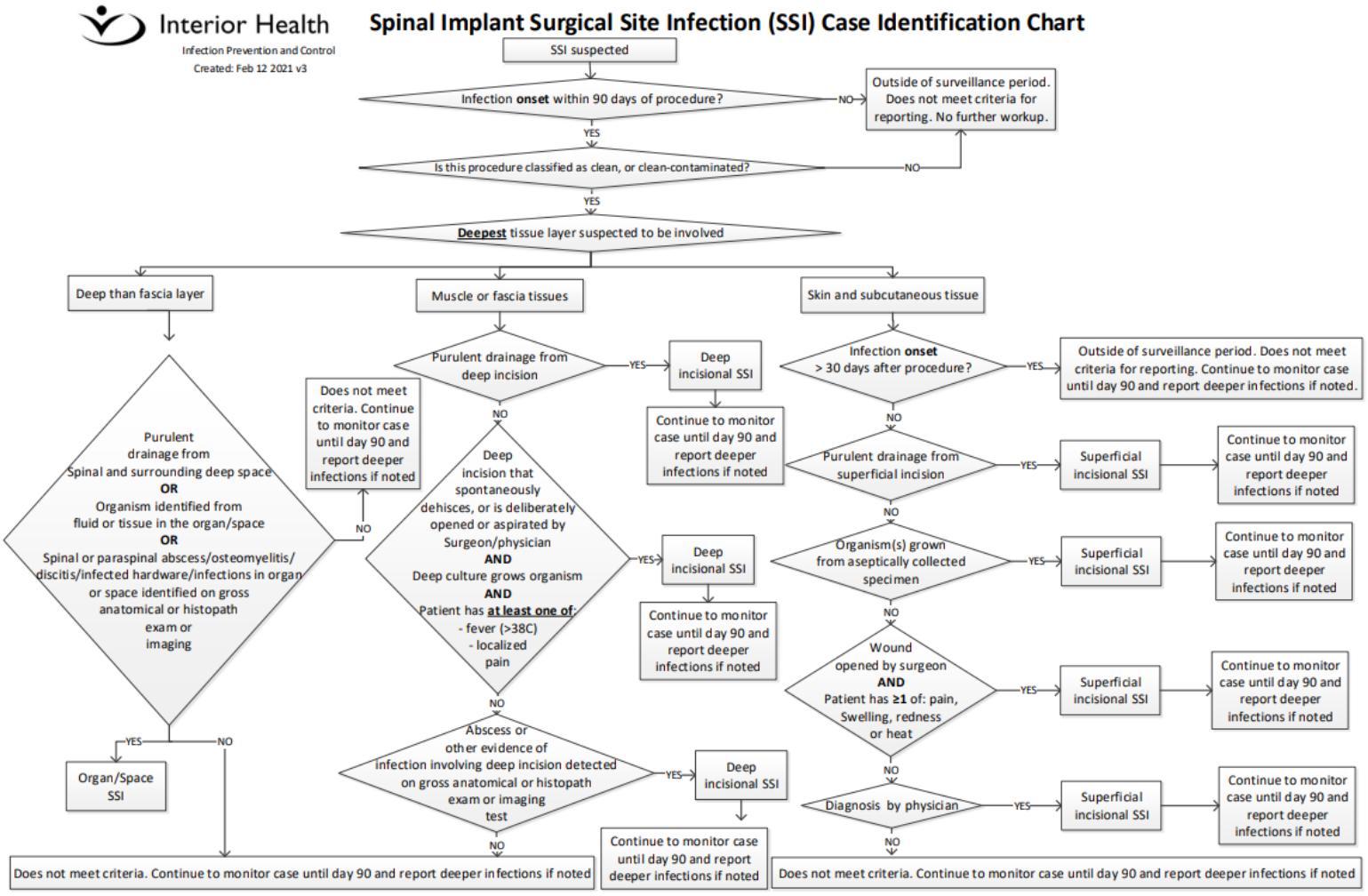
Cases Assessment:	
30 day surveillance (see SSI algorithm to categorize)	☐ Superficial Incisional Primary (SIP) infection (skin/subcutaneous layer infected) ☐ Superficial Incisional Secondary (SIS) infection (skin/subcutaneous layer infected): Site_____
90 day surveillance (see SSI algorithm to categorize)	☐ Deep Incisional Primary (DIP) infection (fascia/muscle layer infected) ☐ Deep incisional Secondary (DIS) infection (fascia/muscle layer infected) Site_____ ☐ Organ space (deep to fascia/muscle layer infected) Choose type: ☐ osteomyelitis ☐ discitis ☐intracranial infection ☐spinal or para spinal abscess/infection ☐others

ICP Checklist:

☐ Case entered in Dashboard
☐ Case reviewed with Epidemiologist and/or IPAC Medical director or designate
☐ Case reviewed with Surgeon

Other case notes:

Spinal Implant Surgical Site Infection Case Identification Chart



Appendix A: Surgical Site Infection (SSI) Case Definition

Surgical Site Infection (SSI) criteria:

Superficial incisional SSI:

- Date of event occurs within 30 days after the surgery (where day 1 = surgery date)

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
   OR
b. Organism(s) identified from an aseptically-obtained specimen from the superficial incision or subcutaneous tissue by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment
   OR
c. Superficial incision that is deliberately opened by a surgeon, physician or physician designee and culture or non-culture based testing of the superficial incision or subcutaneous tissue is not performed AND patient has at least one of the following signs or symptoms: localized pain or tenderness; localized swelling; erythema; or heat
   OR
d. Diagnosis of a superficial incisional SSI by a physician

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

a. 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
b. 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 (for example, donor site incision

The following do not qualify as criteria for meeting the NHSN definition of superficial incisional SSI:

1) Diagnosis/treatment of cellulitis (redness/warmth/swelling), by itself, does not meet criterion “d” for superficial incisional SSI. Conversely, an incision that is draining or that has organisms identified by culture or non-culture based testing is not considered a cellulitis
2) A stitch abscess alone (minimal inflammation and discharge confined to the points of suture penetration)
3) A laparoscopic trocar site is considered a surgical incision and not a stab wound
4) A localized stab wound or pin site infection is not considered an SSI; depending on the depth, these infections might be considered either a skin (SKIN) or soft tissue (ST) infection

Deep incisional SSI:

- Date of event occurs within 90 days after the surgery (where day 1 = surgery date)

AND

- Involves deep soft tissues of the incision (for example, 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 or aspirated by a physician
    AND
    organism(s) identified from the deep soft tissues of the incision by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment or culture or nonculture based microbiologic testing method is not performed. A culture or non-culture based test from the deep soft tissues of the incision that has a negative finding does not meet this criterion
    AND
    Patient has at least one of the following signs or symptoms: fever (>38°C); localized pain or tenderness
  - **c.** An abscess or other evidence of infection involving the deep incision that is detected on gross anatomical or histopathologic exam, or imaging test

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

1) Deep Incisional Primary (DIP) – a deep incisional SSI that is identified in a primary incision in a patient that has had an operation with one or more incisions (for example 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 (for example, donor site incision)

Organ/Space SSI:

- Date of event occurs within 90 days after the surgery (where day 1 = surgery date)

AND

- involves any part of the body deeper than the fascial/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 (for example, closed suction drainage system, open drain, T-tube drain, CT-guided drainage)
    OR
  - **b.** Organism(s) identified from fluid or tissue in the organ/space by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment
    OR
  - **c.** An abscess or other evidence of infection involving the organ/space that is detected on gross anatomical or histopathologic exam, or imaging test evidence suggestive of infection

AND

- Meets at least one diagnosis for a specific organ/space infection site

NOTE: Secondary BSI Attribution Period for SSI: The secondary BSI attribution period for SSI is a 17-day Period that includes the date of SSI event, 3 days prior, and 13 days after.

References:

Protocol Revision History:

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Appendix A SSI Case Definition:

1. CDC/NHSN Surgical Site Infection Event (SSI) January 2021
2. CDC/NHSN Surveillance Definitions for Specific Types of Infections January 2021
3. CDC/NHSN Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central Line Associated Bloodstream Infection) January 2021

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