Public Health Agency of Canada | Agence de la santé publique du Canada

Canadian Nosocomial Infection Surveillance Program (CNISP)

SURVEILLANCE OF SURGICAL SITE INFECTIONS FOLLOWING ADULT CARDIAC SURGERY

Contact Information

Please direct all questions to:

Public Health Agency of Canada
CNISP Surveillance
E-mail: cnisp-pcsin@phac-aspc.gc.ca

Working Group

Maureen Buchanan-Chell, Jennifer Ellison, Charles Frenette, Sean Ling, Dominik Mertz (Chair), Robyn Mitchell*, Anada Silva*, Andrew Neitzel, Stephanie Smith, Jessica Sollereder, Alon Vaisman, Titus Wong

* Public Health Agency of Canada (PHAC)

Table of Contents

OBJECTIVES

- To pilot surveillance of complex[1] surgical site infections (SSIs) following adult cardiac surgery within the CNISP hospital network.
- To determine surveillance methods used to identify SSI following adult cardiac surgery within the CNISP hospital network.

METHODOLOGY

Eligibility

All hospitals that are part of the CNISP network and perform cardiac surgery among adults (≥ 18 years of age).

The following inclusion criteria apply to the **primary procedure**:

- Patient must be admitted to the hospital on or before the day of procedure
- Sternotomy including minimally invasive mini-sternotomy
- Coronary artery bypass graft (CABG), valve surgery (including those which involve aortic root surgery), or combined CABG/valve surgery

The following exclusion criteria apply to the **primary procedure**:

- Revisions/Reoperations
- Aortic root surgery without valve repair or replacement
- Cardiac surgery without sternotomy (e.g. mini-thoracotomy)
- Transplants
- Transarterial valve implantation (TAVI) without minimally invasive mini-sternotomy
- Procedures in patients < 18 years of age

Surveillance Period

Infections that develop within 90 days (3 months) of procedure will be included and reported retrospectively based on the date of procedure.

Numerators

The primary outcome measure is a healthcare associated complex[1] SSI at the sternal surgical site following cardiac surgery. Please complete a patient questionnaire (Appendix A) when an infection is identified. The definitions used to classify SSIs as deep incisional or organ space can be found in Appendix D. Superficial infections will NOT be included.

[1] Complex surgical site infections include deep and organ space infections.

Denominators

Each participating facility will submit the total number of eligible procedures (see above under eligibility). Please complete the quarterly denominator data form (Appendix B).

Data Submission

Please complete the annual cardiac surgery surveillance methods (Appendix C) for each participating hospital.

Please submit case and denominator data quarterly as follows:

- Cases identified from procedures performed from January 1st through March 31st: submit to CNISP by September 30th
- Cases identified from procedures performed from April 1st through June 30th: submit to CNISP by December 31st
- Cases identified from procedures performed from July 1st through September 30th: submit to CNISP by March 31st of the following year
- Cases identified from procedures performed from October 1st through December 31st: submit to CNISP by June 30th of the following year

Please enter all data into CNPHI via Web Data: www.cnphi-rcrsp.ca

Zero Report

For any quarter with no cases at your site, a zero report must be indicated on Appendix B (denominator data). If no cases are submitted and you are missing zero reports for a surveillance year, your hospital data will not be included in rates.

APPENDICES

Appendix A – Cardiac SSI Patient Questionnaire

1.	CHEC Site: _____
2.	Surveillance year: _____
3.	Unique Patient ID: _____ **YY** _____**(**e.g. 99Z22001) *(CHEC site #) (year) (case number)*
4.	Age in years: _____ years
5.	Sex: □ **Male** □ **Female**
6.	Weight: _____ kg
7.	Diabetic: □ **Yes** □ **No**
8.	Current Smoker: □ **Yes** □ **No**
9.	Procedure (please select **<u>one</u>** of the following): □ CABG □ Valve □ CABG + valve
10.	Did the patient undergo valve surgery for infective endocarditis (actively infected)? □ Yes □ No □ Unknown
11.	Date of admission: _____ / _____ / _____ DD MMM YYYY
12.	Date of procedure: _____ / _____ / _____ DD MMM YYYY
13.	Date infection was identified: _____ / _____ / _____ DD MMM YYYY
14.	Does this patient have or meet the criteria for (please check **<u>ONE</u>** the following): □ **DEEP incisional SSI**

	□ **ORGAN/SPACE SSI**
15.	What was the outcome 30 days post SSI identification? □ Patient discharged, please specify date: **_____ / _____ / _____** DD MMM YYYY □ Patient transferred alive, please specify date: **_____ / _____ / _____** DD MMM YYYY □ Patient still alive and in hospital □ Patient died, please specify date: **_____ / _____ / _____** DD MMM YYYY □ Unknown
16.	Did the patient have a sternal revision surgery/reoperation within 90 days following the date of procedure? □ Yes If yes, please indicate how many days following the date of procedure: _____ If yes, was the revision surgery/reoperation for management of a sternal surgical site infection? □ Yes □ No If not for the management of the sternal surgical site infection, what was the reason for revision surgery/reoperation?: _____ □ Unknown □ No □ Unknown
17.	Please indicate the organism(s) AND their susceptibility/resistance for any of the following antimicrobials/anti-fungals listed below: (R for resistant, S for susceptible, I for intermediate): Were organisms identified? □ Yes, please indicate below □ Specimen not collected □ Organism not identified, no growth Organism 1: _____ (please select one from the drop-down menu below) Organism 2: _____ (please select one from the drop-down menu below) Organism 3: _____ (please select one from the drop-down menu below) □ *Acinetobacter baumannii* □ Alpha-hemolytic *Streptococcus* □ *Candida albicans* □ *Candida* other □ Coagulase-negative staphylococci □ *Corynebacterium* species □ *Enterobacter* species □ *Enterococcus* species

□ *Escherichia coli*
□ *Klebsiella pneumoniae*
□ *Propionibacterium* species
□ *Pseudomonas aeruginosa*
□ *Staphylococcus aureus*
□ Other, specify: _____

Please specify the organism:	Organism 1:	Organism 2:	Organism 3:
Amikacin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Amphotericin B	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Ampicillin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Amoxicillin-clavulanic acid	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Caspofungin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Cefazolin (Ancef)	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Cephalexin (Keflex)	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Cefepime	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Cefotaxime	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Ceftriaxone	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Cefuroxime	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Ciprofloxacin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Clindamycin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Cloxacillin / Oxacillin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Ertapenem	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Erythromycin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Fluconazole	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Gentamicin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Imipenem	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Levofloxacin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Linezolid	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Meropenem	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Micafungin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Moxifloxacin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Penicillin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Piperacillin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Piperacillin-tazobactam	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Rifampin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
Ticarcillin-clavulanic acid	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**

	Trimethoprim-sulfamethoxazole	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
	Tobramycin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
	Vancomycin	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
	Voriconazole	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
	Other, specify: _____	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**
	Other, specify: _____	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**	□ **R** □ **I** □ **S**

Appendix B – Adult Cardiac SSI Denominator Form

Please submit denominator data quarterly to CNPHI: www.cnphi-rcrsp.ca

1. CHEC site #: _____

2. Surveillance year: _____

3. Surveillance period (e.g. January 1 – March 31): _____

4. Please provide the total number of procedures for the surveillance period specified above:

Procedure type	Number of procedures	Zero report
1. CABG		□ **Yes** □ **No**
2. Valve (Total – if unable to provide endocarditis vs. non-endocarditis)		□ **Yes** □ **No**
2a. Valve (for infective endocarditis (actively infected))		□ **Yes** □ **No**
2b. Valve (for reasons other than infective endocarditis (actively infected))		□ **Yes** □ **No**
3. CABG + Valve		□ **Yes** □ **No**
Total number of procedures (CABG, Valve, CABG + Valve) (**ONLY** if unable to provide above information on procedure type)		□ **Yes** □ **No**

Appendix C – Cardiac Surgery Surveillance Methods Questionnaire

1.	CHEC Site : _____
2.	Surveillance year: _____
3.	Please indicate which methods were used to identify complex sternal surgical site infection (check all that apply): □ review of clinical notes for in-patient stay (including re-operation records, readmissions) □ review of clinical notes from out-patient clinics (e.g. cardiac surgery office, emergency) when available □ calling the patients at/after 3 months □ (suspected) infections discussed/adjudicated with cardiac surgeon □ (suspected) infections reviewed with Infection Prevention and Control physician □ review of microbiology laboratory results □ review of diagnostic imaging results
4.	Are you able to identify the numerator of sternal SSIs as well as the denominator specifically for patients undergoing valve surgery for infective endocarditis (actively infected) □ Already reporting □ Can likely add in future years □ Impossible for us to add
5.	Please indicate how adult cardiac surgery denominators are determined at your site (check all that apply): □ Administrative database (i.e., CCI codes) □ Chart review □ Other, please specify: _____

Appendix D – Instructions on Completing Patient Questionnaire (Appendix A)

1. **CHEC Site**

   This will be the **3-character** alphanumeric number assigned to your institution. It will always begin with the two digit number assigned to your CHEC member e.g., 07, 15, and a letter assigned by the CHEC member for that specific institution e.g., A, B, C, etc. The CHEC site # for each institution should always be the same for all the CHEC/CNISP surveillance projects and will always have all three alphanumeric digits reported as the CHEC site #, e.g., 07A, 15A.

2. **Surveillance year**

   Please specify the surveillance year (i.e. 2022).

3. **Unique identifier code**

   The 8 characters should consist of the 3 character CHEC site # (e.g., 99Z), the surveillance year (e.g., 22), and a consecutive number starting at 001 and continuing on with each additional case. An example of the first case in a hospital would be 99Z22001. An example of the thirty-fifth case would be 99Z22035, and so on.

4. **Age (years)**

   Please enter the patient's age in years.

5. **Sex**

   Check male or female

6. **Weight**

   Please enter patient's weight in kilograms.

7. **Diabetes**

   Either known type 1 or type 2 diabetes.

8. **Smoking:**

   Patient is currently smoking.

9. **Procedure**

Coronary artery bypass graft surgery (CABG) and/or valve surgery (open heart valve repair or replacement)

10. Valve surgery for infective endocarditis (actively infected)

Please indicate if the patient underwent valve surgery for infective endocarditis (actively infected)

11. Date of admission

Please indicate the date the patient was admitted to the hospital.

12. Date of procedure

Please indicate the date of procedure.

13. Date infection was identified

Please enter the date that the infection was identified. The date the infection was identified may be defined as the onset date of symptoms of infection, the date of positive culture or the date of diagnosis. The date must be within 90 days of surgery to qualify.

14. Category of SSI

Please select **ONE** of the following types of infection: ***deep incisional SSI*** or ***organ/space SSI*** **(See Appendix E).** Superficial incisional SSI are not included.

15. Outcome at 30 days

Please indicate the patient's outcome at 30 days following identification of the complex sternal SSI.

16. Revision surgery/reoperation within 90 days

Please indicate if the patient had a revision surgery/reoperation within 90 days of date of cardiac procedure.

17. Antibiogram results

Please indicate the organism(s) AND their susceptibility/resistance to the antibiotics tested.
(S = Susceptible, I = Intermediate or R = Resistant). Please list all microorganism(s) identified for the first infection as reported by the laboratory. If a specimen was not collected, please specify "specimen not collected'. If a specimen was collected but an organism was not identified, please specify "organism not identified, no growth".

Appendix E – Infection definitions and criteria

Complex surgical site infections

A deep incisional SSI must meet the following criterion:

Infection occurs within 90 days after the operative procedure (where day 1 = procedure date)

AND

involves deep soft tissues of the incision (e.g., facial and muscle layers)

AND

patient has at least **ONE** of the following:

a) Purulent drainage from the deep incision but not from the organ/space component of the surgical site.

b) Deep incision that spontaneously dehisces or is deliberately opened by the surgeon and is culture-positive or not cultured when the patient has at least one of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.

c) An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination.

An organ/space SSI must meet the following criterion:

Infection occurs within 90 days after the operative procedure (where day 1 = procedure date)

AND

infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure

AND

patient has at least **ONE** of the following:

a) Purulent drainage from a drain that is placed into the organ/space.

b) Organisms isolated from an aseptically obtained culture of fluid or tissue in the

organ/space.

c) An abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination.

AND

meets at least one criterion for a specific cardiac related organ/space infection site, including endocarditis, mediastinitis or myocarditis/pericarditis as defined in the CDC/ NHSN Surveillance Definitions for Specific Types of Infections.

Myocarditis or pericarditis must meet at least **one** of the following criteria:

a) patient has organism(s) identified from pericardial tissue or fluid by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).

b) patient has at least **two** of the following signs or symptoms:

- fever (>38.0°C), chest pain*, paradoxical pulse*, or increased heart size*
- **And at least one of the following:**
  - a. abnormal EKG consistent with myocarditis or pericarditis.
  - b. evidence of myocarditis or pericarditis on histologic exam of heart tissue.
  - c. 4-fold rise in paired sera from IgG antibody titer.
  - d. pericardial effusion identified by echocardiogram, CT scan, MRI, or angiography.

* With no other recognized cause

Other related infection criteria

Endocarditis of a natural or prosthetic heart valve must meet at least one of the following criteria:

1. Organism(s) identified from cardiac vegetation*†, embolized vegetation (for example, solid-organ abscess) documented as originating from cardiac source, or intracardiac abscess by a culture or nonculture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing ASC/AST).
2. Organism(s) seen on histopathologic examination of cardiac vegetation*, embolized vegetation, for example, solid organ abscess, documented as originating from cardiac source, or intracardiac abscess.
3. Endocarditis seen on histopathologic examination of cardiac vegetation* or intracardiac abscess.
4. At least **one** of the following echocardiographic evidence of endocarditis*‡:

i. vegetation on cardiac valve or supporting structures
ii. intracardiac abscess
iii. new partial dehiscence of prosthetic valve

And at least **one** of the following:

a. typical infectious endocarditis organism(s) (specifically, Viridans group streptococci, *Streptococcus bovis*, *Haemophilus* spp., *Actinobacillus actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, *Kingella* spp., Staphylococcus aureus, Enterococcus spp.) identified from ≥2 matching blood collections drawn on separate occasions with no more than 1 calendar day between specimens by a culture or non-

culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing ASC/AST).

b. Coxiella burnetii identified by anti-phase I IgG antibody titer >1:800 or identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).

5. At least **three** of the following (Note: Meaning one element from i, ii, iii, or iv and only one condition within each element can be used.)

i. prior endocarditis, prosthetic valve, uncorrected congenital heart disease, history of rheumatic
heart disease, hypertrophic obstructive cardiomyopathy, or known IV drug use.§

ii. fever (>38.0°C)

iii. vascular phenomena: major arterial emboli (specifically, embolic stroke, renal infarct, splenic infarct or abscess, digital ischemic/gangrene from embolic source), septic pulmonary infarcts, mycotic aneurysm (documented by imaging, seen in surgery, or described in gross pathological specimen), intracranial hemorrhage, conjunctival hemorrhages, or Janeway's lesions documented.

iv. immunologic phenomena: glomuleronephritis (documented in chart, or white cell or red blood cell casts on urinalysis), Osler's nodes, Roth's spots, or positive rheumatoid factor.

And at least **one** of the following:

a. typical infectious endocarditis organism(s) (specifically, Viridans group streptococci, Streptococcus bovis, Haemophilus spp., Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, Kingella spp., Staphylococcus aureus, Enterococcus spp.) identified from ≥2 matching blood collections drawn on separate occasions with no more than 1 calendar day between specimens by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing ASC/AST).

b. Coxiella burnetii identified by anti-phase I IgG antibody titer >1:800 or identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).

6. At least **one** of the following*‡:

i. vegetation on cardiac valve or supporting structures seen on echocardiogram

ii. intracardiac abscess seen on echocardiogram

iii. new partial dehiscence of prosthetic valve seen on echocardiogram

And at least **three** of the following (Note: Meaning one element from a, b, c, d, or e and only one condition within each element can be used.):

a. prior endocarditis, prosthetic valve, uncorrected congenital heart disease, history of rheumatic heart disease, hypertrophic obstructive cardiomyopathy, or known IV drug use.§

b. fever (>38.0°C)

c. vascular phenomena: major arterial emboli (specifically, embolic stroke, renal infarct, splenic infarct or abscess, digital ischemic/gangrene from embolic source), septic pulmonary infarcts, mycotic aneurysm (documented by imaging, seen in surgery, or described in gross pathological specimen), intracranial hemorrhage, conjunctival hemorrhages, or Janeway's lesions documented.
d. immunologic phenomena: glomuleronephritis (documented in chart, or white cell or red blood cell casts on urinalysis), Osler's nodes, Roth's spots, or positive rheumatoid factor.
e. identification of organism(s) from the blood by at least **one** of the following methods:

- recognized pathogen(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- same common commensal organism(s) identified from ≥2 blood collections drawn on separate occasions on the same or consecutive days by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).

7. All of the following criteria (Note: Meaning one element from a, b, c, d, or e and only one condition within each element can be used.):

a. prior endocarditis, prosthetic valve, uncorrected congenital heart disease, history of rheumatic heart disease, hypertrophic obstructive cardiomyopathy, or known IV drug use.§
b. fever (>38.0°C)
c. vascular phenomena: major arterial emboli (specifically, embolic stroke, renal infarct, splenic infarct or abscess, digital ischemic/gangrene from embolic source), septic pulmonary infarcts, mycotic aneurysm (documented by imaging, seen in surgery, or described in gross pathological specimen), intracranial hemorrhage, conjunctival hemorrhages, or Janeway's lesions documented.
d. immunologic phenomena: glomuleronephritis (documented in chart, or white cell or red blood cell casts on urinalysis), Osler's nodes, Roth's spots, or positive rheumatoid factor.
e. identification of organism(s) from the blood by at least one of the following methods:

- recognized pathogen(s) identified from blood by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
- same common commensal organism(s) identified from ≥2 blood collections drawn on separate occasions on the same or consecutive days by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).

Footnotes

* Cardiac vegetation can be found on a cardiac valve, pacemaker/defibrillator lead or ventricular assist device (VAD) components within the heart.
† The following can also meet the definition of a "cardiac vegetation":

• Positive culture from a cardiac valve, pacemaker/defibrillator lead or ventricular assist device (VAD) components within the heart.
‡ Which if equivocal is supported by clinical correlation (specifically, physician documentation of antimicrobial treatment for endocarditis).
§ May be documented outside of the infection window period or SSI surveillance period.

Mediastinitis must meet at least <u>one</u> of the following criteria:

1. Patient has organism(s) identified from mediastinal tissue or fluid by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment, for example, not Active Surveillance Culture/Testing (ASC/AST).
2. Patient has evidence of mediastinitis on gross anatomic or histopathologic exam.
3. Patient has at least one of the following signs or symptoms: fever (>38.0°C), chest pain*, or sternal instability. *

And at least **<u>one</u>** of the following:

a. purulent drainage from mediastinal area
b. mediastinal widening on imaging test

Appendix F – Instructions on Completing Denominator Form (Appendix B)

1. CHEC Site

This will be the **3-character** alphanumeric number assigned to your institution. It will always begin with the two digit number assigned to your CHEC member e.g., 07, 15, and a letter assigned by the CHEC member for that specific institution e.g., A, B, C, etc. The CHEC site # for each institution should always be the same for all the CHEC/CNISP surveillance projects and will always have all three alphanumeric digits reported as the CHEC site #, e.g., 07A, 15A.

2. Surveillance year

Please specify the surveillance year (i.e. 2022).

3. Surveillance period

Please specify one of the following surveillance periods:

- January 1st - March 31st
- April 1st - June 30th
- July 1st - September 30th
- October 1st - December 31st

4. Total number of procedures

Please specify the total number of procedures for each procedure type. Indicate whether your site had zero cases of cardiac SSI for each corresponding procedure type for the specified surveillance period. If you are unable to stratify by procedure type, please provide the total number of CABG, valve, and CABG/valve procedures.

Appendix G – Instructions on Completing Methods Questionnaire (Appendix C)

1. CHEC Site

This will be the **3-character** alphanumeric number assigned to your institution. It will always begin with the two digit number assigned to your CHEC member e.g., 07, 15, and a letter assigned by the CHEC member for that specific institution e.g., A, B, C, etc. The CHEC site # for each institution should always be the same for all the CHEC/CNISP surveillance projects and will always have all three alphanumeric digits reported as the CHEC site #, e.g., 07A, 15A.

2. Surveillance year

Please specify the surveillance year (i.e. 2022).

3. Method of identifying complex sternal surgical site infection

Please indicate steps that are included in the routine surveillance of sternal surgical site infections after cardiac surgery at your center.

4. Valve surgery among those with infective endocarditis (actively infected)

Please indicate whether your site's adult cardiac SSI surveillance can identify numerator and denominators specific to patients undergoing valve surgery for infective endocarditis (actively infected).

5. Adult cardiac surgery denominators

Please indicate the method used to identify adult cardiac surgery procedures at your site.

REVISION HISTORY

December 2019	First draft of protocol completed
February 2020	Revised draft sent to the WG
April 2022	Protocol finalized and CNPHI web data forms created
November 2023	Clarification added to inclusion criteria – include valve surgeries which also include aortic root surgeries Question removed - Surgical wound category (clean/contaminated) Question added - Did the patient undergo valve surgery for infective endocarditis (actively infected)? Question added - Did the patient have a revision surgery within 90 days post-op? If so how many days post-op? If yes, was revision surgery/reoperation for management of a sternal surgical site infection? Methods question added - How were cardiac surgery denominators determined at your site? Methods question added - Are you able to identify the numerator of sternal SSIs as well as the denominator specifically for patients undergoing valve surgery for infective endocarditis (actively infected) Valve denominators stratified to collect endocarditis vs. non-endocarditis procedures, if available