

## Canadian Nosocomial Infection Surveillance Program

## SURVEILLANCE OF SURGICAL SITES INFECTIONS FOLLOWING PEDIATRIC CARDIAC SURGERY

FINAL

December 11, 2018

**Working Group**: Bonita Lee (Chair), Joanne Langley, Marie-Astrid Lefebvre, Jeannette Comeau, Jenine Leal, Patricia Bedard, Allana Ivany (IPAC), Kanchana Amaratunga (PHAC), Kelly Choi (PHAC)

Contact: phac.cnisp-pcsin.aspc@canada.ca

## SURVEILLANCE OF SURGICAL SITES INFECTIONS FOLLOWING PEDIATRIC CARDIAC SURGERY

## I. OBJECTIVES

To establish ongoing surveillance of pediatric surgical site infections (SSIs) associated with cardiac surgery within the CNISP hospital network.

Specific objectives of this surveillance are:

- 1. To determine rates of healthcare-associated cardiac SSIs in children < 18 years of age across Canada
- 2. To identify risk factors for pediatric cardiac SSIs
- 3. To provide data for the development of guidelines on prevention and control of pediatric cardiac SSIs

#### II. METHODS

#### A. Surveillance design

Ongoing, prospective surveillance of SSI in children (< 18 years of age) following open-heart cardiac surgeries.

#### B. Inclusion & exclusion criteria

All hospitals that are part of the CNISP network and perform pediatric open heart cardiac surgeries.

Inclusions:

- Surgery performed at your CNISP site
- Surgeries where patient is on cadiopulmonary bypass
- SSI identified at your CNISP site (if SSI identified at your hospital but surgery performed at another CNISP site please report the SSI to that CNISP site)

Exclusion:

• Surgeries in which the patient died in the operating room or within 24 hours of surgery

#### C. <u>Surveillance period</u>

Infections that develop within 90 days (3 months) of surgery (or 30 days if classified as superficial SSI) will be included and reported retrospectively based on date of surgery.

## D. Numerator data

The primary outcome measure is a healthcare-associated SSI following open-heart surgery with cardiopulmonary bypass among pediatric patients, defined according to the National Health and Safety Network (NHSN) definitions (Appendix A) (See also inclusion and exclusion criteria).

#### E. Denominator data

Each participating hospital will submit the following denominator data (Appendix C):

- a) The number of open-heart surgeries with cardiopulmonary bypass
- b) The number of surgeries as above with delayed sternum closures by setting

As per NHSN guidelines, a single trip to the operating room, in which multiple procedures are performed, will be counted as a single contribution to denominator data combining the durations for both procedures based on the procedure start times and finish times for both procedures. Patients can potentially be included in the denominator data more than once during the surveillance period if they have multiple open heart surgeries involving separate trips to the operating room.

## F. Data collection and reporting

Patients less than 18 years of age with post open-heart cardiac surgery SSIs with cardiopulmonary bypass will be identified at each CNISP site through the most comprehensive method to detect procedures and SSI cases. This may include:

- Review of microbiology laboratory results
- Review of patient charts
- Review of physician notes
- Notifications by clinical personnel
- Review of internal patient safety data collection systems

Each time a cardiac SSI meeting criteria is identified a patient questionnaire will be completed (Appendix B). All completed forms will be emailed to CNISP at the email address below. Please keep copies for your records. If it is not possible to email data, please submit by fax or hard copy mail and notify CNISP by email that the forms have been sent by this route.

If the hospital identifying the infection is not the one where the surgery was performed, the hospital is asked to notify the hospital where the surgery was performed. If the hospital that has performed the surgery is a CNISP site, then the SSI should be reported to CNISP if they participate in this surveillance project.

If a second SSI develops following the same surgery, please complete another patient questionnaire and assign the same unique patient identifier number with a lower case letter (e.g., 07A18001**b**).

Please email patient questionnaires and denominator data to CNISP at <u>phac.cnisp-pcsin.aspc@canada.ca</u> by March 31<sup>st</sup> for previous year's data (e.g. 2019 data are due by March 31, 2020).

## Appendix A

## SURVEILLANCE FOR PEDIATRIC CARDIAC SSI

## Data Dictionary for Patient Questionnaire - definitions and notes

## 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. Unique patient identifier

Please assign a unique patient identifier as follows: CHEC site number, surveillance year then consecutive number (e.g., 07AYY001).

Note: Please do not include dashes as separators in between the sets of characters.

## 3. Date of Birth

Please enter Day (##), Month (May) and Year (2006) in this order.

## 4. Gender

Check male or female gender as appropriate.

## 5. Date SSI identified

Please enter the date that the SSI was identified Day (##), Month (May) and Year (2018). The date the infection was identified may be defined as the onset date of infection, the date of positive culture or the date of diagnosis.

## 6. Category of SSI

Please select <u>one</u> of the following types of infection: superficial incisional SSI, deep incisional SSI or organ/space SSI.

## A **<u>superficial incisional SSI</u>** must meet the following criterion:

Infection occurs within 30 days after the operative procedure and involves only skin and subcutaneous tissue of the incision and at least **ONE** of the following:

- a) Purulent drainage from the superficial incision.
- b) Organisms isolated from an aseptically-obtained culture of fluid or tissue from the superficial incision.c) At least **ONE** of the following signs or symptoms of infection:
  - Pain or tenderness, localized swelling, redness, or heat and the superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
  - Diagnosis of superficial incisional SSI by the surgeon or attending physician.

A **<u>deep incisional SSI</u>** must meet the following criterion:

Infection occurs within 90 days after the operative procedure and the infection appears to be related to the operative procedure **AND** involves deep soft tissues (e.g., facial and muscle layers) of the incision **AND** the 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 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.

d) Diagnosis of a deep incisional SSI by a surgeon or attending physician.

An organ/space SSI must meet the following criterion:

Infection occurs within 90 days after the operative procedure and the infection appears to be related to the operative procedure **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 through a stab wound 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.

<sup>1</sup>A nonhuman-derived object, material, or tissue that is permanently placed in a patient during an operative procedure and is not routinely manipulated for diagnostic or therapeutic purpose. Examples include: porcine or synthetic heart valves, mechanical heart, metal rods, mesh, sternal wires, screws, cements, and other devices).

## 7. Microbiology investigation

Please indicate the results of the microbiology investigation. If a specimen was not collected or the culture results were negative skip to question 11.

## 8. Site of positive culture

Please check if the site of positive culture was the incision (e.g. chest). If the site of positive culture was not the incision, then the 'Other' box should be checked along with the description of the specific site(s). 'Other' sites are defined as aspirates (bone, mediastinal, etc.), or wound drainage tubes (e.g., Jackson-Pratt chest incision etc.).

## 9. Pathogen(s) identified

Please check all pathogens isolated from the SSI as reported by the laboratory. If 'other' pathogen is checked, please specify the organism in the text field.

## 10. Antibiogram results

Please indicate the organism(s) susceptibility/resistance. (S = Susceptible, I = Intermediate or R = Resistant) to the antibiotics tested.

## 11. Date of surgery

Please enter Day (##), Month (May) and Year (2018) in this order.

## 12. Type of surgery

Please indicate the type(s) of surgery performed (i.e. repair of congenital defect) and check **ALL** the boxes that apply.

## 13. Delayed sternum closure

Please indicate if the surgery was with a delayed sternum closure (i.e. the skin incision was closed but the sternum was left open).

## 14. Location where sternum was closed

Please specify if the sternum was later closed in the ICU, in the operating room or other location.

## 15. Date when sternum was closed

For a delayed sternum closure, please enter Day (##), Month (May) and Year (2018) when sternum was closed.

## 16. Outcome 30 days after onset of infection

Please check whether the patient was alive in ICU, alive in hospital and out of ICU, discharged, deceased (in hospital) or unknown within 30 days of the onset of infection.

## 17. If deceased, relation to SSI

If you answered 'deceased' to the question 18 then this question **MUST** be answered. In relation to the patient's death, please check whether the SSI was direct cause, indirect (contributing), unrelated or you cannot determine. Please check only **ONE** response.



## Appendix B – PEDIATRIC CARDIAC SSI PATIENT QUESTIONNAIRE

1	CHEC Site:					
2	Unique Patient ID: YY (e.g. 99A19001) (CHEC site #) (Surveillance year) (case number)					
3	Date of birth:	///				
4	Gender:	Male     Female				
5	Date SSI identified:	//				
6	Does this patient have or meet the criteria for (please check <u>one</u> the following):	<ul> <li>SUPERFICIAL incisional SSI</li> <li>DEEP incisional SSI</li> </ul>				
-	(Please see data dictionary for definitions)	ORGAN/SPACE SSI				
/		Positive culture				
		$\Box$ Negative culture (go to question 11)				
8	Site of positive culture:					
		$\Box$ Other, please specify:				
9	Pathogen(s) isolated:	□ Staphylococcus aureus				
	(Please check <b>all</b> that apply)	MRSA 🗆 Yes 🗆 No				
		Coagulase-negative staphylococci				
		Enterococcus species				
		VRE 🗆 Yes 🗆 No				
		□ Streptococci species, specify:				
		Enterobacter species				
		🗆 Klebsiella pneumoniae				
		🗆 Escherichia coli				
		🗆 Acinetobacter baumannii				
		🗆 Klebsiella oxytoca				
		Pseudomonas aeruginosa				
		Candida species				
		□ Other:				

	CHEC Site: Unio	que Patient ID:	YY					
	Please indicate the organism(s) suscentibility/resistance for any of the following antimicrobials/anti-fungals listed below:							
10	(R for resistant, S for susceptible, I for intermediate)							
_		Genus species of	Genus species of	Genus species of				
		Organism1:	Organism 2:	Organism 3:				
	Amikacin							
	Amphotericin B							
	Ampioteriellin							
	Ampicillin-clavulanic acid							
	Cashofungin							
	Cefazolin (Ancef)							
	Cephalexin (Keflex)							
1	Cefenime							
	Cefotaxime							
	Ceftriaxone							
	Cefuroxime							
	Ciprofloxacin							
	Clindamycin							
	Cloxacillin / Oxacillin							
	Ertapenem							
	Fluconazole							
	Gentamicin							
	Imipenem							
	Levofloxacin							
	Linezolid							
	Meropenem							
	Micafungin							
	Moxifloxacin							
	Penicillin							
	Piperacillin							
	Piperacillin-tazobactam							
	Rifampin							
	Ticarcillin-clavulanic acid							
	Trimthoprim-sulfamethoxazole							
	Tobramycin							
	Vancomycin							
	Voriconazole							
	Other, specify :							
	Other, specify :							

	CHEC Site: Unique Datient					
11	Date of surgery:	D:YY				
12	Type of surgery:	□ Repair of congenital defect (please check all that apply):				
	(Please check all that apply)	Ventricular septal defect (VSD)				
		□ Atrial septal defect (ASD)				
		Coarctation of the aorta				
		Tetralogy of Fallot (TOF)				
		Transposition of the great vessels				
		Truncus arteriosus				
		Tricuspid atresia				
		<ul> <li>Total anomalous pulmonary venous return (TAPVR) correction</li> </ul>				
		Hypoplastic left heart repair				
		Other, specify:				
		Heart transplant				
		Valve replacement				
		□ AVR				
13	Delayed sternum closure	□ Yes				
		□ No (go to question 16)				
14	Location where sternum was closed					
		□ Other:				
15	Date when sternum was closed	$-\underline{\qquad} / \underline{\qquad} / \underline{\qquad} / \underline{\qquad} / \underline{\qquad} \square \text{ Not available}$				
16	Outcome 30 days within onset of infection	□ Alive in your ICU				
	(Chack ONLY and)	□ Alive in your hospital, out of ICU				
	(check oner one)	Discharged				
		Deceased (in hospital)				
		Unknown				
17	If deceased, relation to SSI?	Direct cause				
	(Check ONLY one – as judged by reviewing	Indirect (contributing)				
	physician)	Unrelated				
		Cannot determine				

# <u>Please send your completed form by March 31<sup>st</sup> of the following surveillance year to: phac.cnisp-pcsin.aspc@canada.ca</u>



## Denominator data for Surveillance of Pediatric Cardiac SSI

CHEC Site Number: \_\_\_\_\_

Surveillance period (e.g. Jan 1, 2018 to Dec 31, 2018): \_\_\_\_\_

Please record the number of open heart procedures performed on all pediatric patient (<18 years) in your facility for the calendar year (e.g. January 1, 2018 to December 31, 2018):

	Sternum closed in OR at the time of initial surgery	Delayed sternum closure			Total	
		ICU	OR	Unknown	Total	
Total						

For the surveillance year specified above, were there zero (0) cases reported for your site?

□ Yes

□ No

<u>Please send your completed form by March 31<sup>st</sup> of the following surveillance year to:</u> phac.cnisp-pcsin.aspc@canada.ca Revision history

Dec 2018 -Removed surveillance year as protocol will no longer be updated annually