Canadian Nosocomial Infection Surveillance Program

2018 SURVEILLANCE OF SURGICAL SITES INFECTIONS FOLLOWING PEDIATRIC CARDIAC SURGERY

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FINAL

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

Contact:

Public Health Agency of Canada
CNISP Surveillance Fax : 613-946-0678
E-mail: cnisp.pcsin@phac-aspc.gc.ca
Mail: Public Health Agency of Canada
130 Colonnade Road, PL6504B
Ottawa, ON K1A 0K9

2018 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. Surveillance period

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 submit data to:
E-mail: cnisp.pcsin@phac-aspc.gc.ca

Public Health Agency of Canada
CNISP Surveillance Officer
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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

This number should never be longer than 8 characters. The 8 characters should consist of the 3 character CHEC site # (e.g., 09A), the year the procedure was done (e.g., 18), and a consecutive number starting at 001 and continuing on with each additional case. An example of the first case in an Institution would be 09A18001. An example of the thirty-fifth case would be 09A18035, and so on. Use the same number with a lower case letter at the end if >1 SSI occurs following the same surgery e.g., 07A18001**b**).

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 **one** of the following types of infection: superficial incisional SSI, deep incisional SSI or organ/space SSI.

A **superficial incisional SSI** 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 **deep incisional 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** 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.

[1]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 – 2018 PEDIATRIC CARDIAC SSI PATIENT QUESTIONNAIRE

1	CHEC Site: _____	
2	Unique Patient ID: _____ 18_____ *(CHEC site #) (year) (case number)*	
3	Date of birth:	_____ /_____ /_____ *D D M M M Y Y Y Y*
4	Gender:	☐ Male ☐ Female
5	Date SSI identified:	_____ /_____ /_____ *D D M M M Y Y Y Y*
6	Does this patient have or meet the criteria for (please check <u>one</u> the following): (Please see data dictionary for definitions)	☐ **SUPERFICIAL** incisional SSI ☐ **DEEP** incisional SSI ☐ **ORGAN/SPACE** SSI
7	Microbiology investigation	☐ Positive culture ☐ Negative culture (go to question 11) ☐ Not cultured (go to question 11)
8	Site of positive culture:	☐ Incision ☐ Other, please specify: _____
9	Pathogen(s) isolated: (Please check **all** that apply)	☐ *Staphylococcus aureus* 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: _____ Unique Patient ID: _____ 18 _____

10 Please indicate the organism(s) susceptibility/resistance for any of the following antimicrobials/anti-fungals listed below: (R for resistant, S for susceptible, I for intermediate)

	Genus species of Organism1:	Genus species of Organism 2:	Genus species of 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
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
Trimthoprim-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

	CHEC Site: _____ Unique Patient ID: _____ 18_____	
11	Date of surgery:	_____ /_____ /_____ DD MMM YYYY
12	Type of surgery: (Please check all that apply)	☐ Repair of congenital defect (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 ☐ Total anomalous pulmonary venous return (TAPVR) correction ☐ Hypoplastic left heart repair ☐ Other, specify: _____ ☐ Heart transplant ☐ Valve replacement ☐ AVR ☐ MVR
13	Delayed sternum closure	☐ Yes ☐ No (go to question 16)
14	Location where sternum was closed	☐ ICU ☐ OR ☐ Other: _____
15	Date when sternum was closed	_____ /_____ /_____ ☐ Not available DD MMM YYYY
16	Outcome 30 days within onset of infection (Check ONLY one)	☐ Alive in your ICU ☐ Alive in your hospital, out of ICU ☐ Discharged ☐ Deceased (in hospital) ☐ Unknown
17	If deceased, relation to SSI? (Check ONLY one – as judged by reviewing physician)	☐ Direct cause ☐ Indirect (contributing) ☐ Unrelated ☐ Cannot determine

Please send your completed form by March 31, 2019 by mail, fax or e-mail to:

Public Health Agency of Canada
CNISP Surveillance Officer
Fax : 613-946-0678
E-mail: cnisp.pcsin@phac-aspc.gc.ca
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Appendix C

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						

<u>Please send your completed form by March 31, 2019 by mail, fax or e-mail to:</u>

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