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

Canadian Nosocomial Infection Surveillance Program

Surveillance for Central Line Associated Blood Stream Infections (CLABSI) in Intensive Care Units (ICUs)

CLABSI Surveillance Protocol

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 Buchancan-Chell, Kris Cannon, Blanda Chow, Jeannette L. Comeau, Charles Frenette, Amir Hadzic, Lynn Johnston, Kevin Katz, Joanne M. Langley, Bonita E Lee, Santina Lee, Marie-Astrid Lefebvre, Cassandra Lybeck*, Allison McGeer, Dorothy Moore, Andrew Neitzel, Senthuri Paramalingam†, Jennifer Parsonage, Connie Patterson, Donna Penney†, Marissa Perrella, Michelle Science, Anada Silva* (Epi Lead), Stephanie W Smith, Jocelyn A Srigley, Kathy N Suh (Chair), Nisha Thampi, Reena Titoria, Jen Tomlinson, Joseph Vayalumkal, Katherine Wang

* Public Health Agency of Canada (PHAC)
† IPAC

Table of Contents

Contact Information *1*
Working Group *1*

OBJECTIVES **3**

METHODS **3**

ELIGIBILITY 3
PATIENT POPULATION 3
SURVEILLANCE PERIOD 4

NUMERATORS **4**

1. BSI case definition: *4*
2. CLABSI *4*
3. ICU-related CLABSI *5*
4. Relapse vs. new infection *5*
DENOMINATORS 5
1. CL-days (central line days) *5*
2. Patient-days *5*
DATA SUBMISSION 7
ZERO REPORT 7
RATE CALCULATIONS 8

ETHICS **8**

PRIVACY **8**

APPENDIX 1 - ALGORITHM **9**

APPENDIX 2 – PRIMARY VS. SECONDARY BSI ATTRIBUTION GUIDE **10**

APPENDIX 3- PATIENT QUESTIONNAIRE FOR CLABSI IN INTENSIVE CARE UNITS (ICUS) **11**

APPENDIX 4 – DATA DICTIONARY **16**

DEFINITIONS AND NOTES FOR PATIENT QUESTIONNAIRE 16

APPENDIX 5 – DATA UPLOADER ON CNPHI **19**

REFERENCES **20**

REVISION HISTORY **21**

OBJECTIVES

- Provide national benchmark rates that hospitals may use for internal and external comparison.

- A secondary objective is to reduce the rates of CLABSI in ICUs. The literature suggests that surveillance for BSIs and feedback to caregivers results in the reduction in infection rates. Routine standardized data collection on infection rates also permits individual centres to evaluate specific infection prevention and control interventions.

METHODS

Eligibility

1. Hospitals that are part of the CNISP network
2. Able to perform year-round surveillance for CLABSI in at least one of following ICU types: adult mixed, adult cardiovascular surgery, NICU or PICU (see patient population section for definitions)

ICU = nursing care area in an acute care hospital that provides intensive observation, diagnostic and supportive care to critically ill patients including, but not limited to, invasive intravascular hemodynamic monitoring, endotracheal intubation and mechanical ventilation. Stand-alone surgical, medical, trauma, neuro, Bone marrow transplant, step-down, intermediate care or telemetry units are excluded.

3. Able to collect and submit the following data on a quarterly basis:
   - ICU specific CL-days (central line days) and ICU specific patient-days for each participating ICU
   - For neonatal ICUs the ability to stratify CL days by birth weight group. Only level III and II/III NICUs are included

Since 2014 we no longer collect information on whether neonates have an umbilical catheter or another type of CVC. If a neonate has a UC this is identified as a CL.

CL = venous access device that terminates at or close to the heart or in one of the great vessels. The CDC/NHSN defines great vessels as: aorta, pulmonary artery, inferior and/or superior vena cava, brachiocephalic, internal jugular, subclavian, external iliac, common iliac, femoral veins, and umbilical artery and vein (1).

CLs include non-tunnelled (standard) CL, coated or not, peripherally inserted CL (PICC), tunnelled devices (e.g. Broviac, Hickman), tunnelled haemodialysis line, intra-cardiac catheters such as intra-atrial & and ventricular lines, dual function lines such as temperature/venous catheters e.g. Cool line catheters, Quattro catheters, introducers etc.), pulmonary artery catheters, umbilical artery and vein catheters and implanted catheters (including ports).

Other arterial catheters are NOT included. AV fistulas and or grafts, pacemaker leads and other non-infusion devices (ECMO, IABP and VAD) inserted into central blood vessels or the heart are NOT included

Patient population

All ICU patients in **at least ONE** of the following ICUs in the participating CNISP hospital:

1. Adult mixed ICUs =any adult ICU with a mix of patient types such as medical/surgical, surgical/trauma, burn/ trauma/medical/surgical, medical/neurosurgical, neurological/burn patients etc. as part of its ICU patient mix
2. Adult Cardiovascular surgery ICUs
3. NICU
4. PICU

Surveillance period

The CLABSI surveillance period will begin January 1st and continue to December 31st of a given surveillance year.

Numerators

Only Central line-associated BSIs related to an ICU admission are to be reported

1. BSI case definition:

The BSI is NOT related to an infection at another site (not a secondary BSI according to National Healthcare Safety Network (NHSN) definitions – please refer to APPENDIX 2-Primary vs. Secondary BSI Attribution Guide) and it meets one of the following criteria:

Criterion 1: Recognized pathogen cultured from at least one blood culture, unrelated to infection at another site (not a secondary BSI according to NHSN definitions).

OR

Criterion 2: At least one of: fever (>38°C core), chills, hypotension ; if aged < 1 year: fever (>38°C core), hypothermia (<36°C core), apnea, or bradycardia AND common skin contaminant cultured from ≥ 2 blood cultures drawn on separate occasions, or at different sites, unrelated to infection at another site (not a secondary BSI according to NHSN definitions).

Criterion elements must be met within a seven-day time period which includes three days before and three days after the collection date of the first positive blood culture.

Diphtheroids (Corynebacterium spp. not C. diphtheria),., Bacillus spp (not B. anthracis), Propionibacterium spp., coagulase-negative staphylococci, (including S. epidermidis) viridans group streptococci, Aerococcus spp., Micrococcus spp and Rhodococcus spp

Diphtheroids, *Corynebacterium* spp., *Bacillus* spp, *Propionibacterium* spp., coagulase-negative staphylococci, (including *S. epidermidis*) viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp and *Rhodococcus* spp

Different sites may include peripheral veins, CVCs, or separate lumens of a multiumen catheter. Different times include 2 blood cultures collected on the same or consecutive calendar days via separate venipunctures or catheter entries. The collection date of the first positive blood culture is the date used to identify the date of positive culture. Two positive blood culture bottles filled at the same venipuncture or catheter entry constitute only one positive blood culture.

01-Jan-2019	02-Jan-2019	03-Jan-2019	04-Jan-2019	Date of positive blood culture = 03-Jan-2019
CL in place Fever > 38° C, core	CL in place	CL in place S. epidermidis (1 of 2 blood cultures)	CL in place S. epidermidis (1 of 2 blood cultures)	

2. CLABSI

A CLABSI must meet one of the following criteria:

Criterion 1: A laboratory-confirmed bloodstream infection (LCBSI) where a central line catheter (CL) or umbilical catheter (UC) was in place for >2 calendar days on the date of the positive blood culture, with day of device placement being Day 1.

OR

Criterion 2: A LCBSI where CL or UC was in place >2 calendar days and then removed on the day or one day before positive blood culture drawn.

NOTE: *If admitted or transferred into a facility with a CL/UC in place (e.g., tunnelled or implanted central line), day of first access is considered Day 1.*

3. ICU-related CLABSI

A CLABSI is related to an ICU is it meets one of the following criteria:

Criterion 1: CLABSI onset after two days of ICU stay

OR

Criterion 2: If the patient is discharged or transferred out of the ICU, the CLABSI would be attributable to the ICU if it occurred on the day of transfer or the next calendar day after transfer out.

NOTE: *If the patient is transferred into the ICU with the CL and the blood culture was positive on the day of transfer or the next calendar day then the CLABSI would be attributed to the unit where the line was inserted.*

Exclusions: Infection already present upon admission to ICU.

4. Relapse vs. new infection

Same microorganism (as best as can be determined by the data available – e.g. species, antibiotic sensitivity, etc.) isolated from a subsequent blood culture:

- If less than or **equal to 10 days** from a negative culture **OR less than or equal to 10 days** from completion of appropriate antibiotic therapy, consider as a relapse and **DO NOT REPORT**.
- If **greater than 10 days** from a negative culture (if culture was done) **AND greater than 10 days** from completion of appropriate antibiotic therapy, **REPORT as a NEW infection**

Denominators

1. CL-days (central line days)

Central lines that are removed and reinserted: If, after central line removal, the patient is without a central line for at least one full calendar day then the central line day count will start anew. If instead, a new central line is inserted before a full calendar day without a central line has passed, the central line day count will continue.

If a patient has more than one CL or UC at the same time, only **one CL-day** is counted.

a. All Adult ICUs and PICUs

b. Neonatal ICU

Neonatal ICU CLABSI rates will be stratified by 5 birth weight groups (≤ 750g, >750 -1000g, >1000-1500g, >1500-2500g, >2500g).

NOTE: *If a neonate has a UC it is counted as a CL.*

2. Patient-days

Patient days are not required for calculation of infection rates but are used for the calculation of central line utilization per ICU (see rate calculations).

a. All Adult ICUs and PICUs

b. Neonatal ICUs (NICU)

Where possible, please supply NICU patient-days stratified by 5 birth weight groups (< 750g, 750 -1000g, 1001-1500g, 1501-2500g, >2500g). For centres unable to supply NICU patient-days by birth weight group, please supply total NICU patient-days. CL utilization rates will be calculated for the NICU, but not stratified for birth weight.

Quarterly aggregate denominator data stratified by birth weight should be submitted through the denominator module on CNPHI.

Data Submission

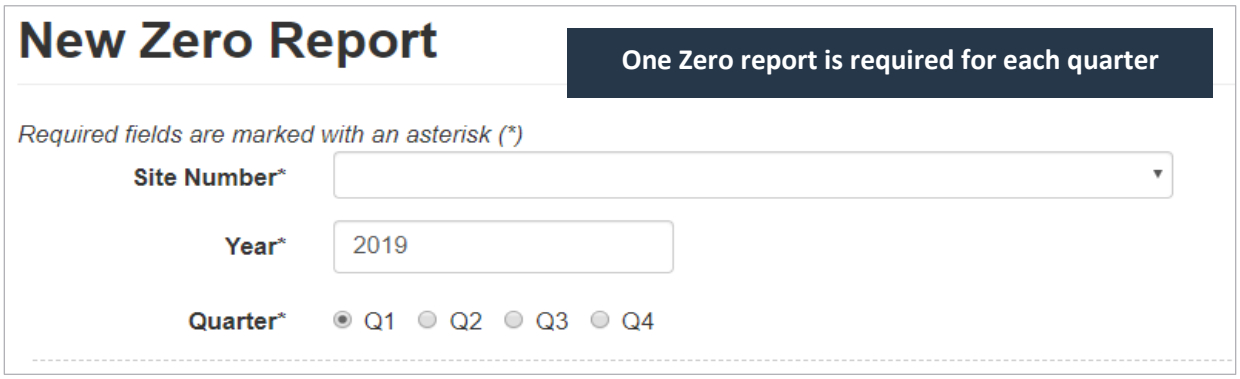
All patient questionnaire data are to be submitted online through the Canadian Network for Public Health Intelligence (CNPHI) at www.cnphi-rcrsp.ca . For technical assistance, questions or comments, please contact CNISP at cnisp.pcsin@phac-aspc.gc.ca

Cases are to be identified by a multiple-character number that includes the CHEC identification number (3-character alphanumeric number, e.g., 09A), the surveillance year (2019), and the CLABSI case sequential number (three-digit number starting from 001) and continuing on with each additional case. An example of the first case in an institution would be 09A-19-001. An example of the thirty-fifth case would be 09A-19-035, and so on.

As a patient may have more than one episode of CLABSI during the same ICU admission, sequential episodes are to be identified by entering as a new case and 'linking' to the patient's original CLABSI by entering the original case ID at the end of the questionnaire. Data can be entered case by case or by uploading files. Instructions on how to upload data to CNPHI can be found in APPENDIX 5 – DATA UPLOADER ON CNPHI.

Zero Report

For any quarter with no cases at your site, a Zero Report must be made in the CNPHI CLABSI module so that quarters with zero counts can be differentiated from missing data.



Numerator (cases)	Data due by June 30th	Data due by Sep 30th	Data due by Dec 31st	Data due by Mar 31st of following surveillance year
Zero Report (if no cases)				
Denominators (CL-days & Patient-days)				

If you have any questions please do not hesitate to contact us cnisp-pcsin@phac-aspc.gc.ca

Rate Calculations

Preliminary calendar year rates (Jan-Jun) will be calculated by October for the current surveillance and full calendar year rates finalized by October of the following calendar year.

Overall, for each ICU and by criterion 1 & 2:

Infection rate $$CLABSI\ rate = \frac{Number\ of\ CLABSI}{Number\ of\ CL\ days} \times 1{,}000$$

Device utilization rate $$CL\ utilization\ rate = \frac{Number\ of\ CL\ days}{Number\ of\ patient\ days}$$

For each type of ICU (depending on data collected):

- Data (numerators and denominators) from participating centres will be pooled to determine CLABSI rates.
- Individual rates for participating centres will be used to calculate median, percentile, and mean infection and device utilization rates.

Neonatal ICU:

- CLABSI rates will be calculated for birth weight groups.
- Device utilization rates by birth weight group will be calculated for those centres submitting patient-days stratified by birth weight group. For those able to only submit total neonatal ICU patient days, individual device utilization rates will be calculated for the total neonatal ICU population.
- Device utilization rates will be calculated for birth weight groups and for the total neonatal ICU population.

ETHICS

This surveillance project is observational and does not involve any alteration in patient care. Surveillance for healthcare associated infections is a routine component of quality assurance and patient care in Canadian healthcare institutions and therefore informed consent will not be required. All data submitted to the Public Health Agency of Canada are kept strictly confidential. Each questionnaire will be identified by a unique number and no personal identifiers will be transmitted to the Public Health Agency of Canada. This unique number will be linked to the patient's name or hospital number only at the local CHEC site and will be kept strictly confidential under secure conditions.

PRIVACY

There is current demand for public disclosure of hospital-associated infections. Any data released by CNISP will be in summary format and will not identify individual hospitals. Hospital administrators should be made aware that national reporting of aggregate data will occur.

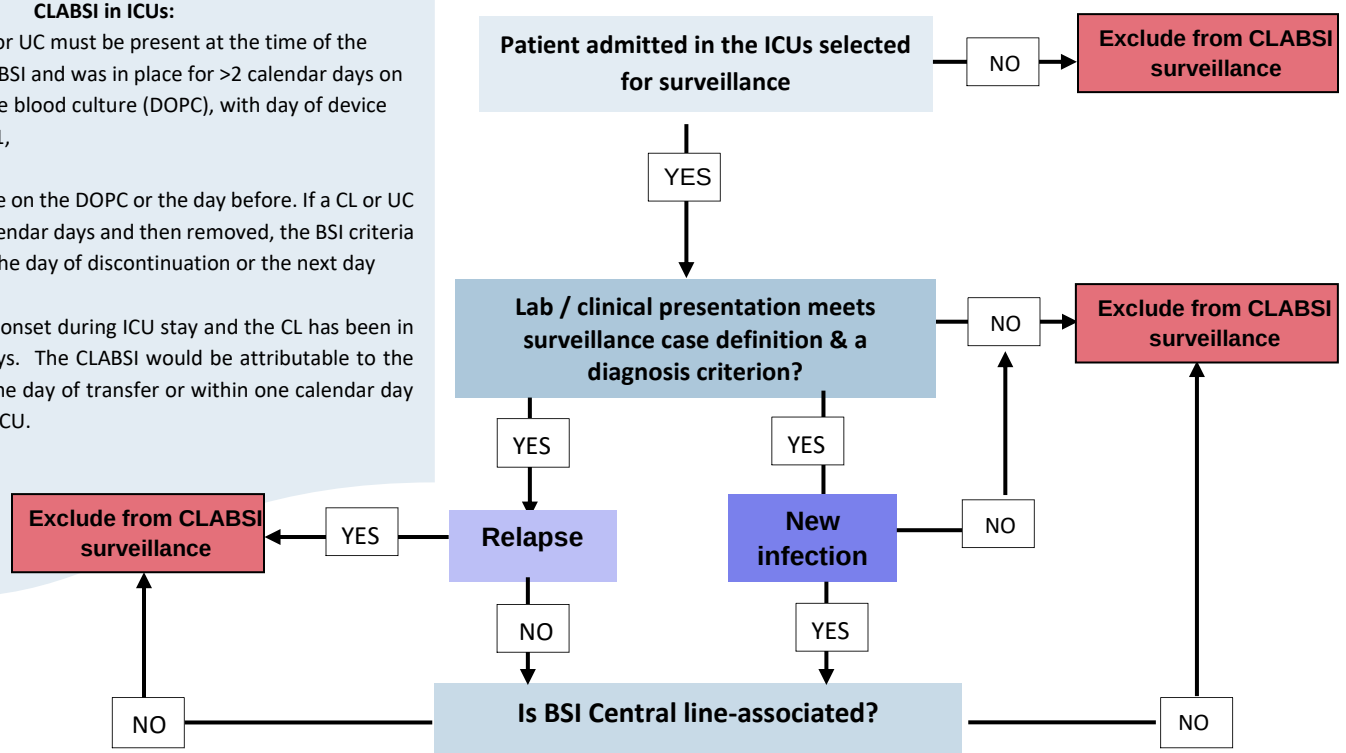
Appendix 1 - Algorithm

ALGORITHM FOR CNISP Central Line Associated Bloodstream Infections (CLABSI) SURVEILLANCE
ONLY CLABSIs related to an ICU admission are to be reported

CLABSI in ICUs:

Case Definition: A CL or UC must be present at the time of the laboratory-confirmed BSI and was in place for >2 calendar days on the date of the positive blood culture (DOPC), with day of device placement being Day 1,
AND
A CL or UC was in place on the DOPC or the day before. If a CL or UC was in place for >2 calendar days and then removed, the BSI criteria must be fully met on the day of discontinuation or the next day

ICU – related: CLABSI onset during ICU stay and the CL has been in place > 2 calendar days. The CLABSI would be attributable to the ICU if it occurred on the day of transfer or within one calendar day of transfer out of the ICU.



Criteria for diagnosis of CLABSI

1) *Recognized pathogen cultured from one or more blood cultures, unrelated to infection at another site*

OR

2) *At least one of: fever (>38°C), chills, hypotension (if aged < 1 year: fever, hypothermia (<36 °C), apnea, or bradycardia)*

AND

Common skin contaminant cultured from ≥ 2 blood cultures drawn on separate occasions unrelated to infection at another site.*

Criterion elements must be met within a seven-day time period which includes three days before and three days after the collection date of the first positive blood culture.

RELAPSE

Same microorganism (using available data – e.g. species, antibiotic sensitivity, etc.) isolated from a subsequent blood culture; if ≤10 days from a negative culture **OR** ≤10 days from completion of appropriate antibiotic therapy, it is a relapse.
Do **NOT** complete another questionnaire.

NEW INFECTION

Same microorganism (using available data) isolated from a subsequent blood culture; if more than 10 days from a negative culture (if culture was done) AND more than 10 days from completion of appropriate antibiotic therapy, it is a **NEW** infection.
Complete another questionnaire.

* Diphtheroids (Corynebacterium spp. not C. diphtheria), Diphtheroids, Corynebacterium spp., Bacillus spp (not B. anthracis), *Propionibacterium* spp., coagulase-negative staphylococci, (including *S. epidermidis*) viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp and *Rhodococcus* spp

Appendix 2 – Primary vs. Secondary BSI Attribution Guide

CNISP Central Line Associated Bloodstream Infections (CLABSI) Surveillance – Algorithm for determining bloodstream infection attribution.
Adapted from the NHSN CLABSI Device-associated Module Chapter 4 – Appendix B (Figure 1B)

Definitions

Infection Window Period (IWP): The seven-day period in which all criterion elements must be met which includes three days before and three days after the date of the first positive blood culture.

Repeat infection timeframe (RIT): 14-day timeframe during which no new infections of the same type are reported. The date of event (DOE) is day 1 of the 14-day RIT.

Secondary BSI Attribution Period (SBAP): The period in which a blood specimen must be collected for a secondary BSI to be attributed to a primary site of infection.

This period includes the Infection Window Period (IWP) combined with the Repeat Infection Timeframe (RIT). It is 14-17 days in length depending upon the date of event.

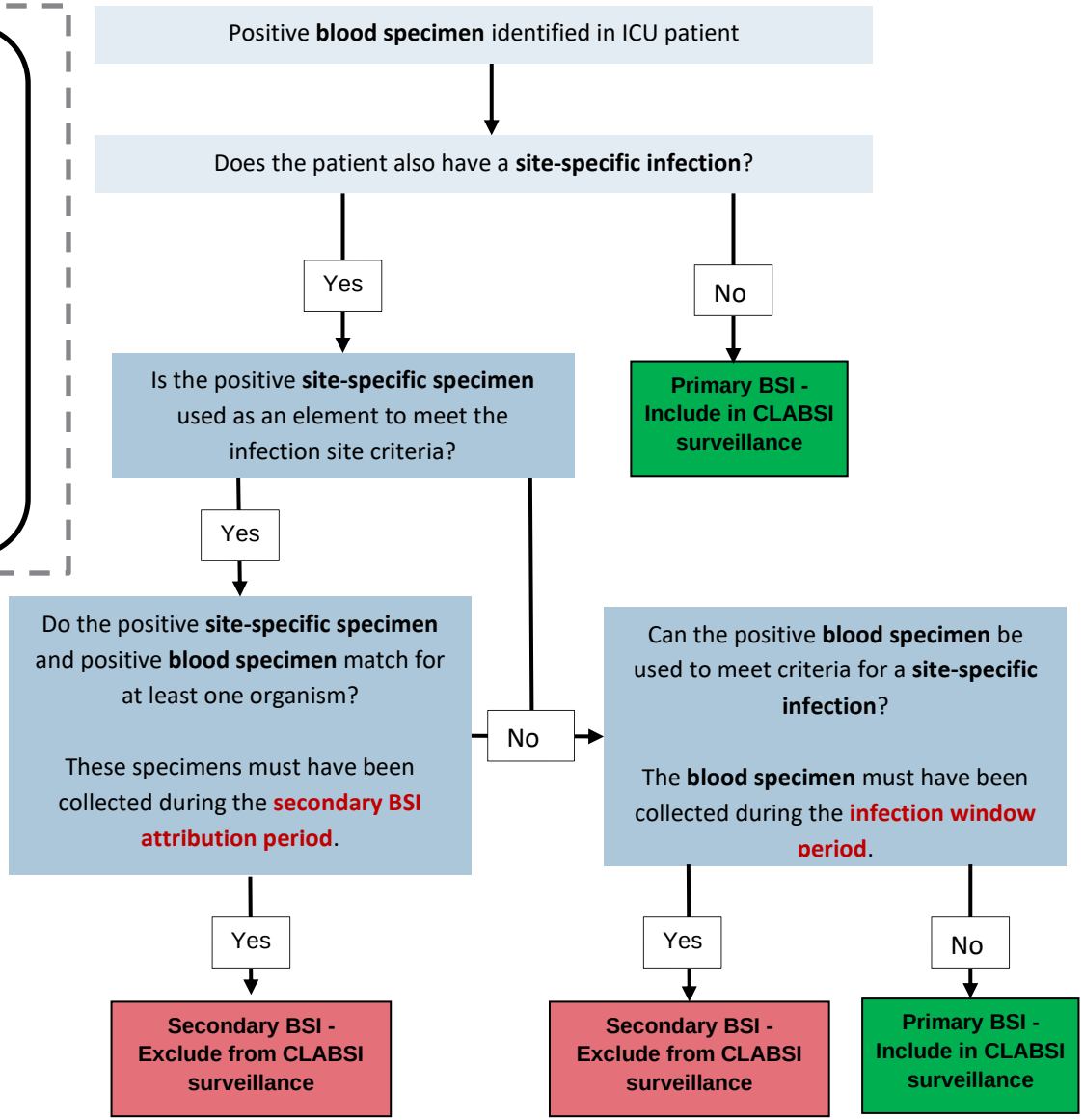
Example

Hospital Day = (HD)

Infection window period (IWP)
Date of event (DOE)
Repeat infection timeframe (RIT)
Secondary BSI Attribution Period (SBAP)

HD	RIT	IWP	UTI SBAP
1			
2			
3			
4 DOE	1	**Urine culture:** >100,000 CFU/ ml *E. coli*	
5	2	Fever > 38.0 C	
6	3	Fever > 38.0 C	
7	4		
8	5		
9	6		
10	7	**Blood culture:** *E. coli*	
11	8		
12	9	**Urine culture:** >100,000 CFU/ ml *S. aureus*	
13	10		
14	11		
15	12		
16	13		
17	14		
		UTI: *E. coli, S. aureus* **Secondary BSI:** *E. coli* **Date of Event: HD 4**	

Determination:
Secondary BSI, exclude from CLABSI surveillance



Appendix 3- Patient Questionnaire for CLABSI in Intensive Care Units (ICUs)

1.	CHEC Site: _____
2.	Unique patient identifier (PID) _____ YY _____(e.g. 99Z24001) *(CHEC site #) (year) (case number)*
3.	Does this patient meet the criteria for a CLABSI? If yes, please identify which criteria the CLABSI meets. Note: **Only** CLABSIs related to an ICU admission are to be reported Please check **ONE** of the following two options: ☐ Criterion 1 Recognised pathogen cultured from one or more blood cultures, unrelated to infection at another site (not a secondary BSI according to NHSN definitions) ☐ Criterion 2 At least one of: fever (>38°C), chills, hypotension (if aged < 1 year: fever, hypothermia (<36°C), apnea, or bradycardia) **AND** Common skin contaminant[1] cultured from ≥ 2 blood cultures drawn on separate occasions unrelated to infection at another site (not a secondary BSI according to NHSN definitions)
4.	Age in years, months or days Age _____ ☐ Years ☐ Months ☐ Days
5.	Postal code (first 3 digits) _____
6.	Sex ☐ Male ☐ Female ☐ Unknown
7.	*NICU only : Birth weight refers to weight at time of birth & should **NOT** be changed when the infant gains weight Birth weight* (grams) _____ Gestational Age* (weeks) _____
8.	Date of admission to hospital **_____ / _____ / _____** DD MMM YYYY
9.	Date of admission to ICU **_____ / _____ / _____** DD MMM YYYY
10.	Date of patient's first positive blood culture for this infection _____ / _____ / _____ DD MMM YYYY

[1] Diphtheroids (Corynebacterium spp. not C. diphtheria),Diphtheroids, Corynebacterium spp., Bacillus spp (not B. anthracis), *Propionibacterium* spp., coagulase-negative staphylococci, (including *S. epidermidis*) viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp and *Rhodococcus* spp

11. a. Microorganism(s) isolated, please check all that apply:

☐ Acinetobacter
☐ Bacillus
☐ Candida albicans
☐ Candida other
☐ Citrobacter
☐ MRSA
☐ Escherichia coli
☐ Enterobacter
☐ Enterococcus (vancomycin susceptible)
☐ Fungi other, specify
☐ Klebsiella
☐ Coagulase negative staphylococcus (CONS)
☐ S. aureus (MSSA)
☐ Pseudomonas
☐ Serratia
☐ Stenotrophomonas
☐ Streptococcus
☐ VRE
☐ Other, specify: _____
☐ Other, specify: _____

b. Antibiogram results

	Gram negative microorganisms									
	Acinetobacter	**Citrobacter**	**Klebsiella**	**Pseudomonas**	**Serratia**	**Stenotrophomonas**	**E. coli**	**Enterobacter**	**Other _____**	**Other _____**
Antibiotic	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**
Amikacin										
Ampicillin										
Cefazolin										
Cefepime										
Ceftriaxone										
Ciprofloxacin										
Colistin										
Ertapenem										
Gentamycin										
Imipenem										
Levofloxacin										
Meropenem										
Piperacillin										
Piperacillin-tazobactam										
Ticarcillin-clavulanic acid										
Tobramycin										
Trimethoprim-sulfamethoxazole										
Other _____										
Other _____										

	Gram positive organisms							
	Bacillus	**Coagulase negative staphylococcus (CONS)**	**Enterococcus**	**MRSA**	**S. aureus (MSSA)**	**Streptococcus**	**Other _____**	**Other _____**
Antibiotic	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**
Ampicillin								
Cefazolin								
Cefepime								
Ceftriaxone								
Clindamycin								
Cloxacillin/Oxacillin								
Ertapenem								
Imipenem								
Levofloxacin								
Linezolid								
Meropenem								
Penicillin								
Piperacillin								
Piperacillin-tazobactam								
Ticarcillin-clavulanic acid								
Trimethoprim-sulfamethoxazole								
Vancomycin								
Other _____								
Other _____								
Other _____								

Anti-fungal	**Fungi**				
	Candida albicans	**Candida other**	**Fungi other_____**	**Fungi other _____**	**Fungi other _____**
	Susceptibility	**Susceptibility**	**Susceptibility**	**Susceptibility**	**Susceptibility**
Amphotericin B					
Caspofungin					
Fluconazole					
Micafungin					
Voriconazole					
Other _____					
Other _____					
Other _____					

12.	Type of ICU where BSI was acquired: (Check one only)[2] ☐ Adult Mixed[3] ☐ Adult Cardiovascular Surgery ☐ Pediatric (PICU) ☐ Neonatal (NICU)
13.	What was the outcome of this patient 30 days after positive culture? (Check one response only) ☐ Patient survived, discharged or transferred Date of discharge/transfer _____ (DD/MMM//YYYY) ☐ Patient alive, still in hospital (out of ICU) ☐ Patient alive, still in ICU ☐ Patient died, date of death _____ (DD/MMM//YYYY) ☐ Unknown
14.	If the patient died within 30 days after positive culture, please indicate the relationship of the CLABSI to the death. □ CLABSI was the cause of death □ Death is unrelated to CLABSI □ CLABSI contributed to death □ Causality between CLABSI and death cannot be determined
15.	Did the patient have multiple central lines inserted at the time of infection? ☐ Yes If yes, how many: _____ ☐ No ☐ Unknown
16.	Is this case linked to another case?

[2] Please ensure that the type of ICU where the BSI was acquired (e.g., Adult Mixed ICU) you are submitting the case for, matches the type of ICU you will be submitting denominator data for in this quarter using the 'core quarterly denominator data submission form'. Since 2018, for adult ICUs, only cases identified in Adult mixed ICUs or Adult cardiovascular surgery ICUs are to be submitted to CNISP CLABSI surveillance

[3] Adult mixed ICUs include any adult ICU with a mix of patient types such as medical/surgical, surgical/trauma, burn/trauma/medical/surgical, medical/neurosurgical, neurological/burn etc. as part of its ICU patient mix

	Unique identifier of linked case: _____ for patients with more than one episode of CLABSI during the same ICU admission

Appendix 4 – Data Dictionary

Definitions and notes for Patient Questionnaire

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 identifier code**

   This number should never be longer than 8 characters. The 8 characters should consist of the 3 character CHEC site # (e.g., 09A), the surveillance year the infection occurred in (e.g., 19), 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 09A19001. An example of the thirty-fifth case would be 09A19035, and so on.

3. **Does this patient meet the criteria for a CLABSI?**

   If yes, please identify which criteria the CLABSI meets.

   Note: **Only** CLABSIs related to an ICU admission are to be reported

   Criterion 1: Recognised pathogen cultured from one or more blood cultures, unrelated to infection at another site (not a secondary BSI according to NHSN definitions)

   OR

   Criterion 2: At least one of: fever (>38°C), chills, hypotension (if aged < 1 year: fever, hypothermia (<36°C), apnea, or bradycardia)

   AND Common skin contaminant[4] cultured from ≥ 2 blood cultures drawn on separate occasions unrelated to infection at another site (not a secondary BSI according to NHSN definitions)

4. **Age**

   Please enter the patient's age (in years, months or days) at the time of positive culture.

5. **Postal code**

   Please enter the first three characters of the patient's postal code

6. **Sex**

   Check male or female

7. NICU Only:

   Birth weight

   Please provide the weight of the infant at birth in grams. This refers to the weight of the infant **at the time of birth** and should **NOT** be changed as the infant gains weight. For example, if a neonate weighs 1006 grams at birth but remains in the NICU for two months and has a body weight of 1650 grams when it develops a CLABSI, the recorded birth weight should still be 1006 grams on the patient questionnaire.

   Gestational Age

   Please provide gestational age in weeks.

[4] Diphtheroids (Corynebacterium spp. not C. diphtheria),Diphtheroids, Corynebacterium spp., Bacillus spp (not B. anthracis), *Propionibacterium* spp., coagulase-negative staphylococci, (including *S. epidermidis*) viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp and *Rhodococcus* spp

8. Date of admission to hospital

Please indicate the date when the patient was admitted to the hospital. Please enter Day (26), Month (May) and Year (2019) in this order. Please write out the month (e.g. Jan, Mar, Aug etc.).

9. Date of admission to ICU

Please indicate the date when the patient was admitted to the intensive care unit (ICU). Please enter Day (26), Month (May) and Year (2019) in this order. Please write out the month (e.g. Jan, Mar, Aug etc.).

10. Date of patient's first positive blood culture for this admission

For the current admission, please indicate when the first positive blood culture was obtained. Please enter Day (26), Month (May) and Year (2019) in this order. Please write out the month (e.g. Jan, Mar, Aug etc.).

11. Microorganism(s) isolated

a. Please select all microorganisms isolated for the BSI as reported by the laboratory.

Microorganism	**Definition**
Acinetobacter spp	Includes any Acinetobacter (A.) species or species not identified
Bacillus spp	Includes any Bacillus species or species not identified
Candida albicans	Includes Candida albicans
Candida spp (other)	Includes any other Candida species (not albicans) or species not identified
Citrobacter spp	Includes any Citrobacter (C.) species or species not identified
Coagulase negative staphylococcus (CONS)	Includes all species of CONS (e.g., S. epidermidis, capitis, warnerii, hominis) and CONS species not identified
Escherichia coli	Includes Escherichia (E.) coli
Enterobacter spp	Includes any Enterobacter (E.) species or species not identified
Enterococcus spp	Includes any vancomycin-susceptible enterococcus species or species not identified
Fungi	Includes non-candidal fungi and fungal species not identified
Klebsiella spp	Includes any Klebsiella (K.) species or species not identified
Staphylococcus aureus methicillin resistant (MRSA)	Includes only MRSA
Staphylococcus aureus	Includes only *Staphylococcus aureus* (MSSA)
Pseudomonas spp	Includes any Pseudomonas (P.) species or species not identified
Serratia spp	Includes any Serratia (S.) species or species not identified
Stenotrophomonas spp	Includes any Stenotrophomonas (S.) species or species not identified
Streptococcus spp	Includes alpha hemolytic streptococci, beta hemolytic streptococci, viridans streptococcus group, streptococcus parasanguinous, avium, bovis, constellatus, mitis, milleri, pyogenes and other species not identified
Vancomycin-resistant enterococci	Includes vancomycin-resistant E. faecalis, faecium, gallinarum or VRE not speciated
Other, specify	Includes any microorganism(s) not included in the drop down list

b. Antibiogram results

Please indicate the microorganism(s) susceptibility/resistance. (S = Susceptible, I = Intermediate or R = Resistant) to the antibiotics tested. For example if MRSA was the microorganism identified and was subsequently tested to determine its susceptibility to vancomycin, if resistant you would enter the following into the table (See row highlighted in green)

12. Type of ICU where BSI acquired

Please check the box that identifies the type of ICU where the BSI was acquired. Please ensure that the type of ICU where the BSI was acquired (e.g. adult mixed ICU) that you are submitting for the case **matches** the type of ICU on the core quarterly (CL-days) denominator form. Started in 2018, for adult ICUs, only cases identified in Adult mixed[5] ICUs or Adult cardiovascular surgery ICUs are to be submitted to CNISP CLABSI surveillance

13. Outcome 30 days after date of first positive culture

Thirty days after the date of first positive culture please select only one of the options available. For responses requiring a date (date of discharge, transfer or death), please enter Day (26), Month (May) and Year (2019), in this order. Please write out the month (e.g. Jan, Mar, Aug etc.).

14. Relationship of CLABSI to death

Please indicate if the CLABSI was the cause of death (i.e. the patient had no other condition that would have cause death during the admission); CLABSI contributed to death (i.e. the CLABSI exacerbated an existing condition that led to the patient's death), CLABSI was unrelated to death or unable to determine the causality between CLABSI and death.

15. Multiple central lines inserted at time of infection

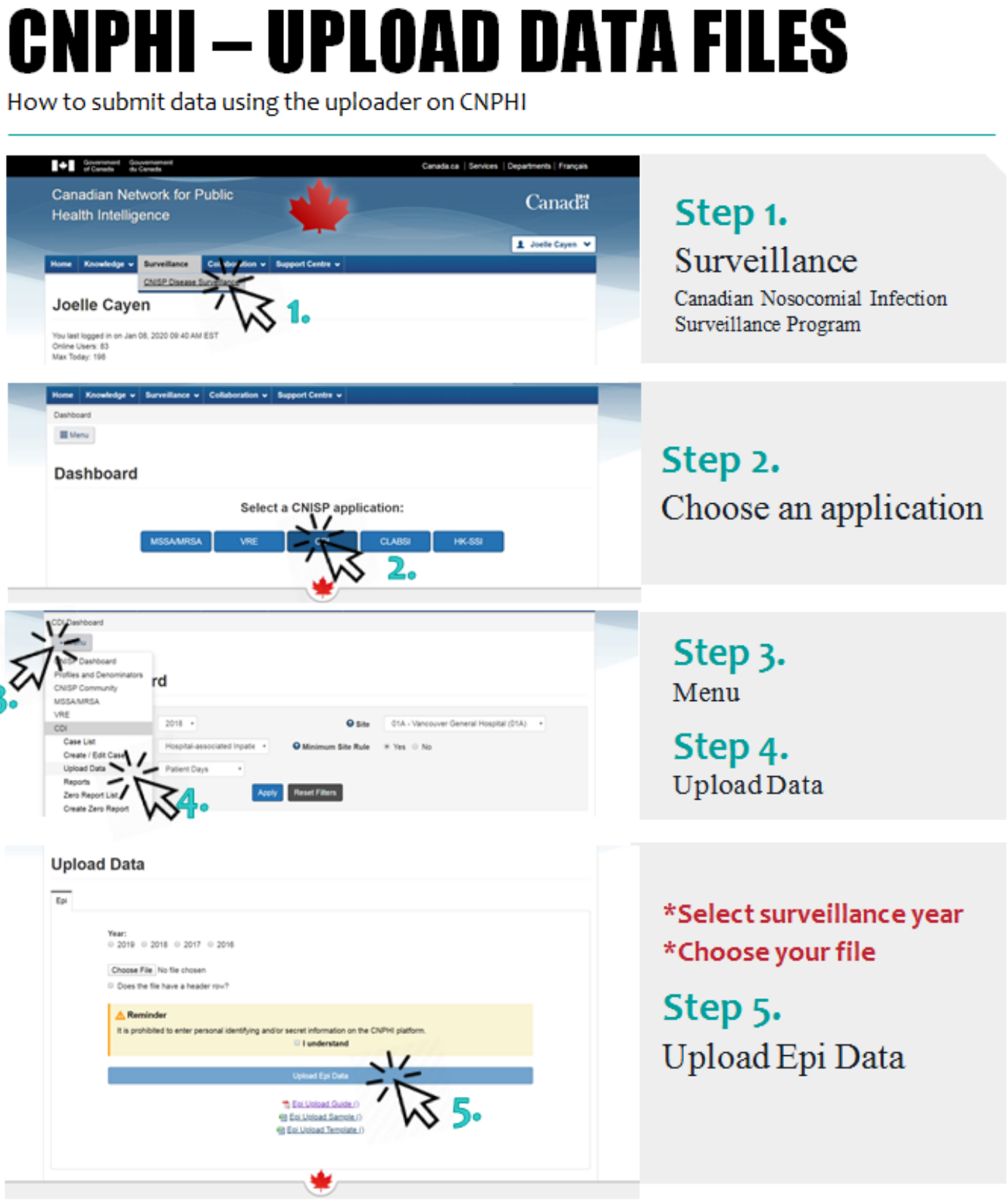
Please indicate if the patient had multiple central lines inserted at the time of infection. CLs include non-tunnelled (standard) CL, coated or not, peripherally inserted CL (PICC), tunnelled devices (e.g. Broviac, Hickman), tunnelled haemodialysis line, intra-cardiac catheters such as intra-atrial & and ventricular lines, dual function lines such as temperature/venous catheters e.g. Cool line catheters, Quattro catheters, introducers etc.), pulmonary artery catheters, umbilical artery and vein catheters and implanted catheters (including ports).

16. Original unique patient ID

For patients with more than one episode of CLABSI during the same ICU admission, please provide the unique ID for any previous episodes of CLABSI

[5] Adult mixed ICUs include any adult ICU with a mix of patient types such as medical/surgical, surgical/trauma, burn/trauma/medical/surgical, medical/neurosurgical, neurological/burn etc. as part of its ICU patient mix

Appendix 5 – Data Uploader on CNPHI



References

CDC. Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central Line Associated Bloodstream Infection). BSI: Device-associated Module. January 2020
https://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf

Revision History

Date	Revisions Made
June 2014	Incorrect dates in questionnaire & unique ID – all changed to 2014 – now Final v2
January 2015	1. BSI case definition revised - the sentence in criterion 2 '…or signs of infection of insertion site or catheter tunnel… 'Removed as it is not in the NHSN definition and may lead to overestimation. Criterion 2 now reads as 'At least one of: fever (>38°C), chills, hypotension (if aged < 1 year: fever, hypothermia (<36°C), apnea, or bradycardia) AND common skin contaminant cultured from ≥ 2 blood cultures drawn on separate occasions and positive laboratory results are unrelated to infection at another site' Previously it read as…. At least one of: fever (>38°C core), chills, hypotension (if aged < 1 yr: fever (>38°C core), hypothermia (<36°C core, apnea, or bradycardia) or signs of infection of insertion site or catheter tunnel AND common skin contaminant cultured from □ 2 blood cultures drawn on separate occasions and positive laboratory results are unrelated to infection at another site. 2. Question 10a = Addition of antibiogram results to microorganism(s) identified in order to capture susceptibility/resistance patterns
November 2015	Footnote 2, p.3 - CVC devices revised to include intra-cardiac catheters such as intra-arterial &and ventricular lines, dual function lines such as temperature/venous catheters e.g. Cool line catheters, Quattro catheters, introducers etc.) Footnote3, p. 3 – Clarification regarding umbilical catheters (UCs) – if a neonate has only a UC this is considered a CVC. BSI case definition – p.4 – An additional reminder that the CLABSI cannot be related to an infection at another site. The following statement was added - The BSI is NOT related to an infection at another site. CVC-associated BSI – p.4 – Clarification regarding if classified as CVC-associated if CVC removed. Now reads as '. If a CVC or UC was in place for >2 calendar days and then removed, the BSI criteria must be fully met on the day of discontinuation or the next day.' ICU-related BSI – p.4 – Clarification regarding attribution of CLABSI to the ICU. Now reads as 'CLABSI onset during ICU stay and the CVC has been in place > 2 calendar days. The CLABSI would be attributable to the ICU if it occurred on the day of transfer or the next calendar day after transfer out of the ICU.' Footnote 5 – p.4 – Clarification regarding criterion 2 ;;;'blood drawn on separate occasions' The footnote now reads 'Different times include 2 blood cultures collected on the same or consecutive calendar day via separate venipunctures or catheter entries.' Denominators

	p 6 – An explanation regarding the removal and reinsertion of central lines and whether they would be included in the count of CVC-days. The following statement taken from the NHSN was added. 'Central lines that are removed and reinserted: If, after central line removal, the patient is without a central line for at least one full calendar day (NOT to be read as 24 hours), then the central line day count will start anew. If instead, a new central line is inserted before a full calendar day without a central line has passed, the central line day count will continue' Microorganisms p.11 – Some microorganisms were duplicated in order to account for more than one species – e.g. Candida other; CONS; More ' other, specify were added to capture organisms not listed. CROs removed from list of options – as these are captured in the existing microorganisms list and resistance will be captured in the antibiogram tables. Antibiogram tables p. 11-13 – Will ensure that CNPHI is able to capture multiple entries of the same organisms e.g. CONS, candida etc. ; Trimethoprim-sulfamethoxazole added to list of antibiotics Algorithm – p. 22 updated
November 2016	Name of surveillance changed to Central line associated bloodstream infections (CLABSI) –all references to CVC-BSI in protocol changed to CLABSI or CL (Central line) p.4 Clarification of relapse vs new infection is < or = not just < Same microorganism (as best as can be determined by the data available – e.g. species, antibiotic sensitivity, etc.) isolated from a subsequent blood culture: ○ If less than or equal to 10 days from a negative culture OR less than or equal to 10 days from completion of appropriate antibiotic therapy, consider as a relapse and DO NOT REPORT. ○ If greater than 10 days from a negative culture (if culture was done) AND greater than 10 days from completion of appropriate antibiotic therapy, REPORT as a NEW infection
December 2017	For adult ICUs, only cases identified in an Adult mixed ICU or Adult Cardiovascular surgery ICU are to be submitted to CNISP CLABSI surveillance. All other Adult ICUs such as stand-alone Medical, surgical, neuro, trauma are excluded due to the very low numbers of these types of ICU participating in previous surveillance years.
October 2018	Added Postal code (first 3 digits) as a variable Removed Date of Birth (many hospitals can no longer provide this level of information) and kept only Age in years, months or days Added explanation regarding importance of entering data into 'zero reports' on CNPHI if hospital has no CLABSI cases

December 2018	Modified the wording for some of the CLABSI definitions in order to make the definitions more clear for those identifying ICU related CLABSIs - there is no change to the meaning just clarifying for the user – see changes for 2019 highlighted in yellow 1. BSI case definition: The BSI is NOT related to an infection at another site and it meets one of the following criteria. Criterion 1: Recognized pathogen cultured from at least one blood culture, unrelated to infection at another site. OR Criterion 2: At least one of: fever (>38°C core), chills, hypotension ; if aged < 1 year: fever (>38°C core), hypothermia (<36°C core), apnea or bradycardia AND common skin contaminant[5] cultured from ⍰ 2 blood cultures drawn on separate occasions, or at different sites[6], unrelated to infection at another site. 2. CLABSI A laboratory-confirmed bloodstream infection (LCBSI) where a central line catheter (CL) or umbilical catheter (UC) was in place for >2 calendar days on the date of the positive blood culture, with day of device placement being Day 1[7]. OR A LCBSI where CL or UC was in place >2 calendar days and then removed on the day or one day before positive blood culture drawn. 3. ICU-related LCBSI CLABSI onset after two days of ICU stay. OR If the patient is discharged or transferred out of the ICU, the CLABSI would be attributable to the ICU if it occurred on the day of transfer or the next calendar day after transfer out. Note: If the patient is transferred into the ICU with the CL and the blood culture was positive on the day of transfer or the next calendar day then the CLABSI would be attributed to the unit where the line was inserted.
November 2019	Updated formatting Removed examples previously in Appendices 3 and 4
September 2020	No substantive changes. Minor working updates to intro. Added COVID-19 question to questionnaire Corrected number of the dictionary
September 2021	No substantive changes.
October 2022	Added question: Relationship of CLABSI to death (attributable mortality) Clarified that NHSN criteria should be used to ensure secondary BSIs are not included in CNISP CLABSI surveillance:

	"The BSI is NOT related to an infection at another site **(not a secondary BSI according to National Healthcare Safety Network (NHSN) definitions –** please refer to APPENDIX 2-Primary vs. Secondary BSI Attribution Guide**)**" Removed COVID-19 question
November 2023	FR translation updated from "Infections du système sanguin associées aux cathéters centraux" à "Bactériémies nosocomiales sur cathéters centraux aux soins intensifs (BACC-USI)" Added question: Did the patient have multiple central lines inserted at the time of infection?
November 2024	No substantive changes.