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CNISP·PCSIN

Canadian Nosocomial Infection Surveillance Program

2025 Surveillance Protocol for Methicillin-Resistant and Methicillin-Susceptible *Staphylococcus aureus* Bloodstream Infections in CNISP Hospitals

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BACKGROUND

Prior to 1995, national data describing the incidence and epidemiology of methicillin-resistant *Staphylococcus aureus* (MRSA) in Canada were not available. In 1995, national surveillance for MRSA was started in sentinel hospitals participating in the Canadian Nosocomial Infection Surveillance Program (CNISP) and has been ongoing. In 2018, surveillance for methicillin-susceptible *Staphylococcus aureus* (MSSA) bloodstream infections was added.

The Canadian Nosocomial Infection Surveillance Program (CNISP) is a collaborative effort between the Public Health Agency of Canada's Centre for Communicable Diseases and Infection Control (CCDIC) and the National Microbiology Laboratory (NML), the Association of Medical Microbiology and Infectious Disease (AMMI) Canada and sentinel hospitals across Canada.

Established in 1994, the objectives of CNISP are to provide rates and trends on healthcare-associated (nosocomial) infections at Canadian health care facilities thus enabling comparison of rates (benchmarks), and providing evidence-based data that can be used in the development of national guidelines on clinical issues related to healthcare-associated infections.

Data collected for the surveillance year 2025 will reflect all "newly-identified" methicillin-susceptible *Staphylococcus aureus* (MSSA) bloodstream infections acquired in the participating hospital (HA-YAF) and all MRSA bloodstream infections (BSIs) identified in participating CNISP hospitals.

OBJECTIVES

1. Describe MRSA and MSSA (HA-YAF) BSIs in Canadian acute-care hospitals, participating in CNISP;
2. Determine annual MSSA (HA-YAF) and/or MRSA bacteremia rates (as an indicator of the burden of disease) in Canadian hospitals, participating in CNISP;
3. Determine the proportion of hospital-acquired (nosocomial) S. *aureus* BSI that are MRSA
4. Characterize all bloodstream MRSA isolates, from CNISP hospitals, by antimicrobial susceptibility testing and molecular typing.

METHODS

Eligibility

Any participating CNISP hospital.

Patient population

Ongoing, prospective surveillance of MRSA and MSSA (HA-YAF) in admitted patients of all ages.

Surveillance period

The MRSA and MSSA (HA-YAF) surveillance period begins January 1st, 2024 and continues to December 31st, 2024.

Numerators

TABLE 1: CASE DEFINITION FOR MRSA AND MSSA (HA-YAF) USED FOR CASE CLASSIFICATION BY CNISP.

MSSA (HA-YAF)	MRSA
Isolation of *Staphylococcus aureus* from blood **AND** Patient must be admitted to the hospital **AND** Is a "newly identified *S. aureus* infection" at a CNISP hospital at the time of hospital admission or identified during hospitalization.	Isolation of *Staphylococcus aureus* from blood **AND** Resistance of isolate to oxacillin and/or laboratory confirmation of *mec* (phenotypic or genotypic) **AND** Patient must be admitted to the hospital **AND** Is a "newly identified MRSA infection" at a CNISP hospital at the time of hospital admission or identified during hospitalization.

Infection inclusion criteria

- MRSA or MSSA (HA-YAF) BSIs identified for the first time during this current hospital admission.
- MRSA or MSSA (HA-YAF) BSIs that have already been identified at your site or another CNISP site but are **new** infections.

  Criteria to determine NEW MRSA or MSSA (HA-YAF) BSI

  Once the patient has been identified with a MRSA or MSSA (HA-YAF) BSI, they will be classified as a new MRSA or MSSA (HA-YAF) if they meet the following criteria: > 14 days since previously treated MSSA or MRSA BSI and in the judgement of Infection Control physicians and practitioners represents a new infection

Infection exclusion criteria

- Emergency, clinic, or other outpatient cases who are **NOT admitted** to the hospital.

Case Classification

Once the patient has been identified with a MSSA or MRSA BSI, they will be classified as one of the following, based on the case criteria and the best clinical judgement of the healthcare and/or infection prevention and control practitioner (IPC):

- **1. Healthcare-associated your acute-care facility (HA-YAF)**, which includes **Newborn cases of HA-YAF**
- **2. Healthcare-associated any other healthcare exposure (HA-Other) - MRSA BSI only**
- **3. Community-associated (CA)** - **MRSA BSI only**

1a. HA-YAF case definition for a MSSA or MRSA BSI:

- Patient is on or beyond calendar day 3[1] of their hospitalization

OR

- Patient has been hospitalized in your facility in the last 7 days or up to 90 days[2] depending on the source of infection

OR

- Patient has had a healthcare exposure at your facility that would have resulted in this bacteremia (using best clinical judgement)

1b. HA-YAF Newborn (<28 days old) case definition for a MSSA or MRSA BSI

- The newborn is on or beyond calendar day 3[3] of their hospitalization
- The mother was **NOT** known to have MRSA on admission and there is no epidemiological reason to suspect that the mother was colonized prior to admission, even if the newborn is < 48 hours of age.
- In the case of a newborn transferred from another institution, MSSA or MRSA BSI may be classified as HA-YAF if the organism was **NOT** known to be present and there is no epidemiological reason to suspect that acquisition occurred prior to transfer

NOTE: *The following definitions apply to* ***MRSA*** *BSI only. As of January 1, 2020, we are* ***NOT*** *collecting data on MSSA BSI acquired through any other healthcare exposure or community acquired BSI*

2. HA-Other case definition for MRSA BSI:

- Any patient who has a bacteremia not acquired at your facility that is thought to be associated with any other healthcare exposure (e.g. another acute-care facility, long-term care, rehabilitation facility, clinic, ER visit or exposure to a medical device).

3. Community-associated (CA) case definition for MRSA BSI:

- No exposure to healthcare that would have resulted in this bacteremia (using best clinical judgment[4]) and does not meet the criteria for a healthcare-associated BSI.

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[1] *Calendar day 1 is the day of hospital admission*

[2] *For example, a MSSA/MRSA bacteremia from a surgical wound that occurs 3 weeks after a surgical procedure completed in your facility should be considered HA-YAF (up to 90 days after procedure if implant). A MSSA/MRSA bacteremic pneumonia occurring >7 days after discharge from your facility should not be considered HA-YAF. [Implant: A nonhuman-derived material, or tissue that is permanently placed in a patient during an operative procedure and is not routinely manipulated for diagnostic or therapeutic purposes](NHSN, 2008)*

[3] *Calendar day 1 is the day of hospital admission*

[4] *Consideration should be given to the frequency and nature of exposure to a medical device and/or procedure. For example, pediatric patients with clinic visits for otitis media, asthma, well-baby etc., may or may not be considered as HA while pediatric patients with clinic visits that involved invasive procedures or day surgery may be more likely to be considered HA. Adult patients attending dialysis, receiving chemotherapy, outpatient visits involving invasive procedures or day surgery may be more likely to be considered HA compared to adult patients with occasional outpatient or community health clinic visits.*

Denominators

To obtain the necessary denominator information for the calculation of national MSSA (HA-YAF) and/or MRSA bacteremia rates (number of patient admissions and patient days), each participating healthcare facility will complete a **denominator data collection form** on a **quarterly basis online** through CNPHI at www.cnphi-rcrsp.ca no later than the **end of the following quarter**. See the SUBMISSION TIMELINE for a quarterly submission dates.

If your **final year denominator** (patient admission and/or patient days) total changes from those submitted through the **quarterly submissions**, this final calendar year total denominator will be required to be submitted by March 31 of the following calendar year (e.g. for 2020, annual total denominator data would be due March 31, 2021).

If your hospital provides care to both adult and pediatric populations and is able to provide separate denominators for adult and pediatric patients, please **submit the adult and pediatric denominators separately** on a quarterly basis.

**Note: Pediatric cases are defined as less than 18 years (< 18 years) of age.*

Data Submission

Note: As of January 1, 2020, only MSSA BSI acquired in the participating hospital (HA-YAF) and all MRSA BSIs should be reported

Electronic data entry

All MRSA or MSSA (HA-YAF) BSI patient data (questionnaires and denominator forms) should be submitted to the Agency online through the Canadian Network for Public Health Intelligence (CNPHI) at www.cnphi-rcrsp.ca. When entering data into CNPHI, please ensure that the case is entered into the correct surveillance year based on the **date of positive culture**

Online uploader tool: Data can also be entered using the uploader tool available on CNPHI www.cnphi-rcrsp.ca under the 'Upload Data' tab (see image below).

Blood Culture Isolates

Surveillance for MRSA or MSSA (HA-YAF) BSI is **laboratory-based**. Laboratory identification of MRSA or MSSA (HA-YAF) BSI is required for inclusion into the surveillance. Each MRSA BSI identified throughout the surveillance year is to be submitted to the NML (all year round). All data must be collected using the questionnaire for a blood isolate (APPENDIX 3 - Patient Questionnaire for MSSA (HA-YAF) or MRSA Blood Isolate). Please complete the questionnaire for each MRSA or MSSA (HA-YAF) BSI case. Blood Isolates must be recovered through positive blood culture.

Note: the unique patient ID for the isolate must match the unique patient ID on the corresponding submitted MRSA questionnaire.

New Infections

As a patient may have **more than one MRSA or MSSA (HA-YAF) BSI** during the same calendar year, **NEW** infections are to be identified by entering as a new case and 'linking' to the patient's original MSSA (HA-YAF) or MRSA BSI by entering the original case ID at the end of the questionnaire. This linking should be done regardless of whether the infections are the same (e.g., MRSA and MRSA) or different (e.g., MSSA (HA-YAF) and MRSA).

In the case of a new MRSA BSI in the same patient with a previous MRSA BSI, please indicate the patient's previous

unique ID on the shipping form. As of January 1, 2019, MSSA BSIs are **NOT** sent to the NML. Note: one blood isolate is required for every eligible MRSA BSI case.

Surveillance Algorithms

The Appendix 1 – MSSA (HA-YAF) and MRSA Surveillance Algorithms have been provided to assist in surveillance activities.

Shipping Form (MRSA BSI only)

Each shipment of eligible MRSA blood isolates must be accompanied by a standardized shipping form. Please complete the MRSA standardized laboratory shipping form in APPENDIX 2 – MRSA BSI Standardized Laboratory Shipping Form. The form must be sent to **phac.nml.ARNI-RAIN.lnm.aspc@canada.ca** **AND** included in the shipment to the NML. At the NML, *spa* typing, antimicrobial susceptibility testing and the detection of *mec* and PVL by PCR will be conducted on all submitted isolates.

If your hospital is shipping MRSA and VRE isolates in the same batch, please indicate on the swabs/tubes which isolates are MRSA and which are VRE.

Send isolates to the following address:
Dr. George Golding **National Microbiology Laboratory** **Public Health Agency of Canada** **1015 Arlington St.** **Winnipeg, Manitoba** **R3E 3R2** **Tel: 204 784 8096** **Use FedEx billing number: 6327-8173-3**

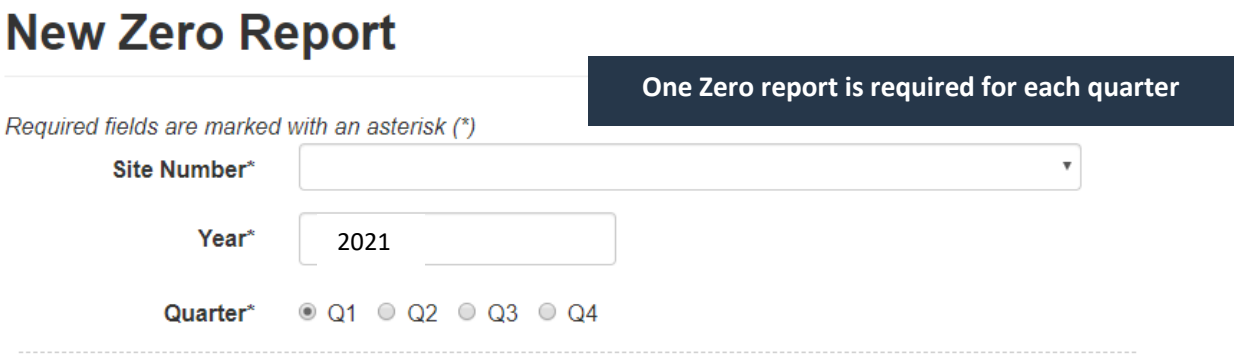
Submission Timeline

Submit MSSA (HA-YAF)/MRSA BSI data and MRSA BSI isolates according to the following timeline:

Numerator (cases) **Zero Report** (if no cases) **Denominator**	Data and isolates due by June 30th	Data and isolates due by September 30th	Data and isolates due by December 31st of following surveillance year	Data and isolates due by March 31st of following surveillance year

Zero Report

For any quarter with no cases at your site, a Zero Report must be made in the CNPHI MSSA-MRSA module so that quarters with zero counts can be differentiated from missing data. If no cases are submitted and you are missing zero reports for a surveillance year, your hospital data will not be included in the visual analytics.



ANALYSIS

Individual site-specific, regional and national rates (per 1,000 admissions and per 10,000 inpatient-days) will be calculated each year by Agency staff. Specifically, incidence rates of MRSA and MSSA (HA-YAF) bloodstream infections will be calculated. While individual site-specific rates will be kept confidential and may only be disclosed to the site's authorized contacts, regional and national rates will be reported via CNISP reports, presentations, publications, and published on the PHAC website.

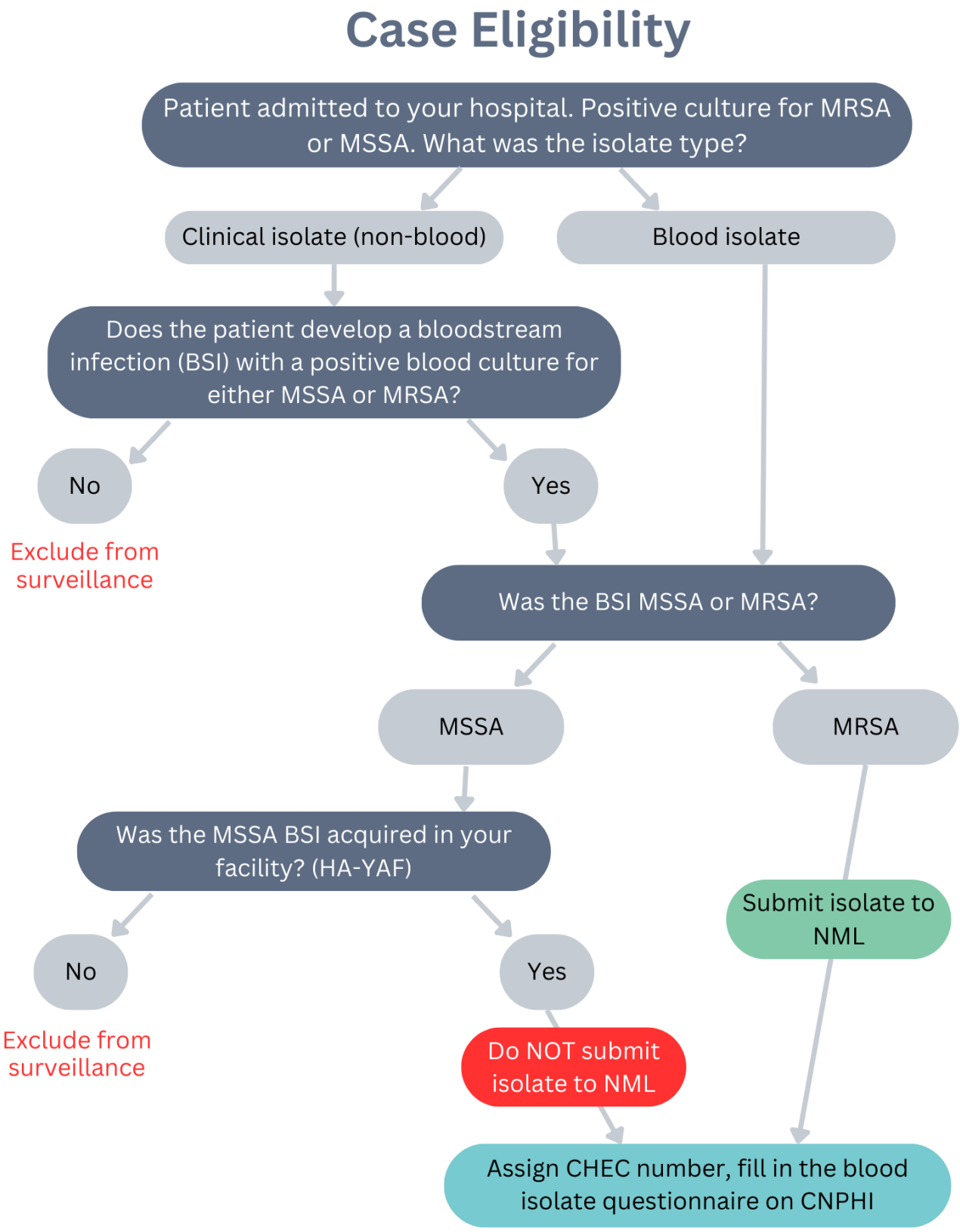
ETHICS

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.

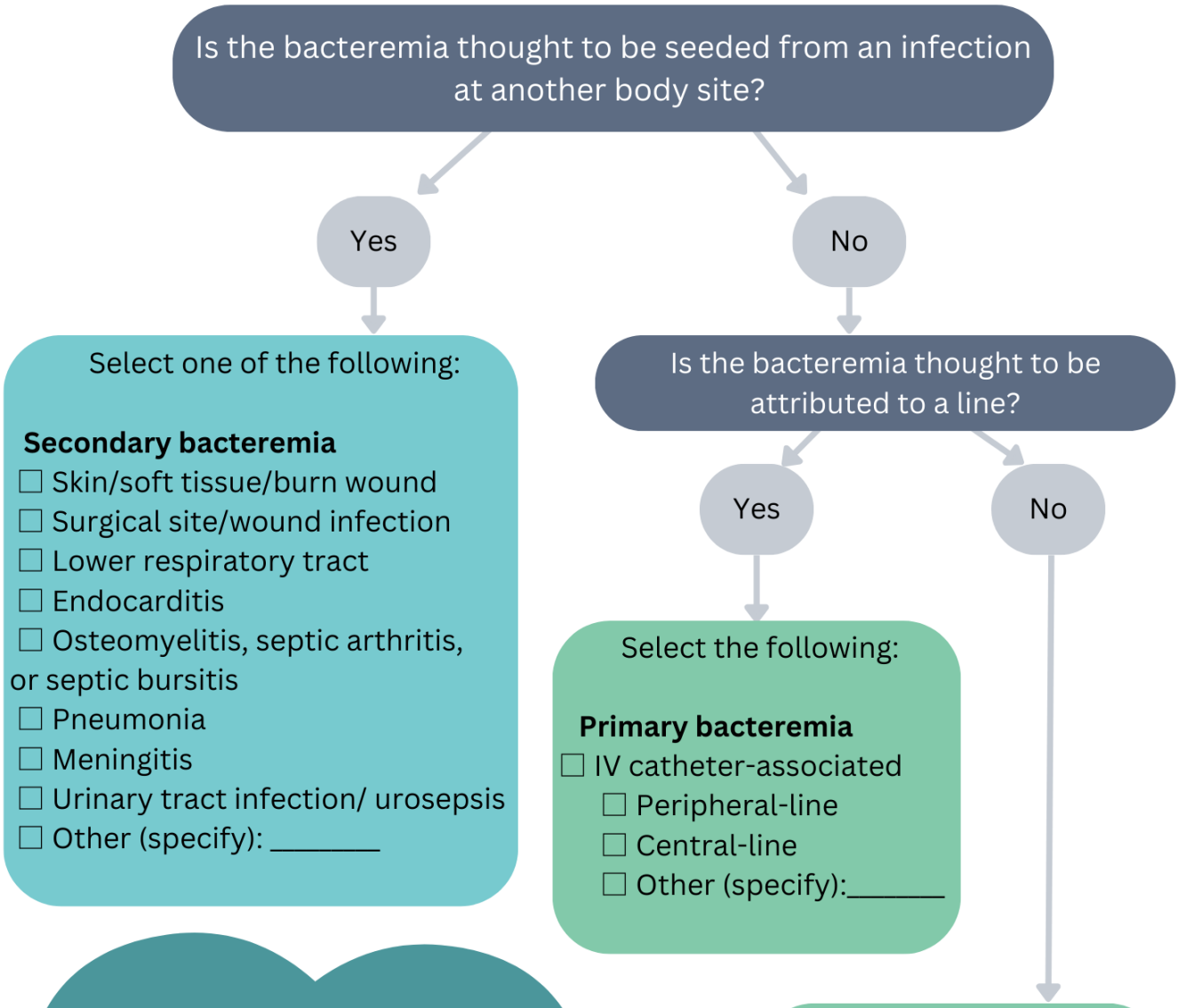
PRIVACY

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 – MSSA (HA-YAF) and MRSA Surveillance Algorithms



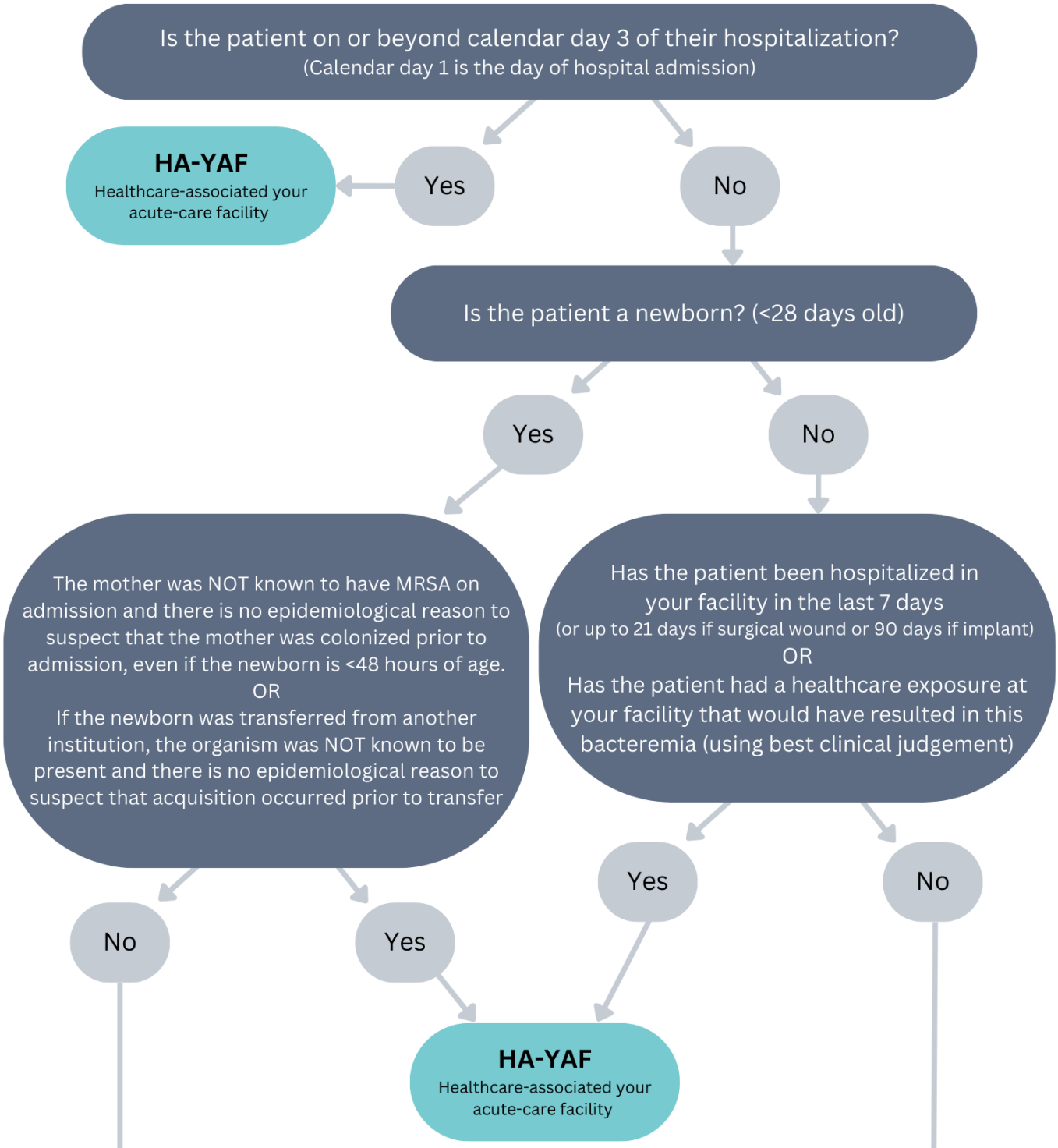
Probable origin of the bacteremia



PWID

The algorithm for determining the probable origin of infection remains unchanged, even if the patient is known to inject drugs. If the patient has an infection at another site, an option from the secondary bacteremia list should be selected. If BSI is not associated with an IV catheter, the choice should be "primary bacteremia source unknown/can't determine." Information regarding injection drug use is captured through a separate question.

MRSA & MSSA Bacteremia Acquisition



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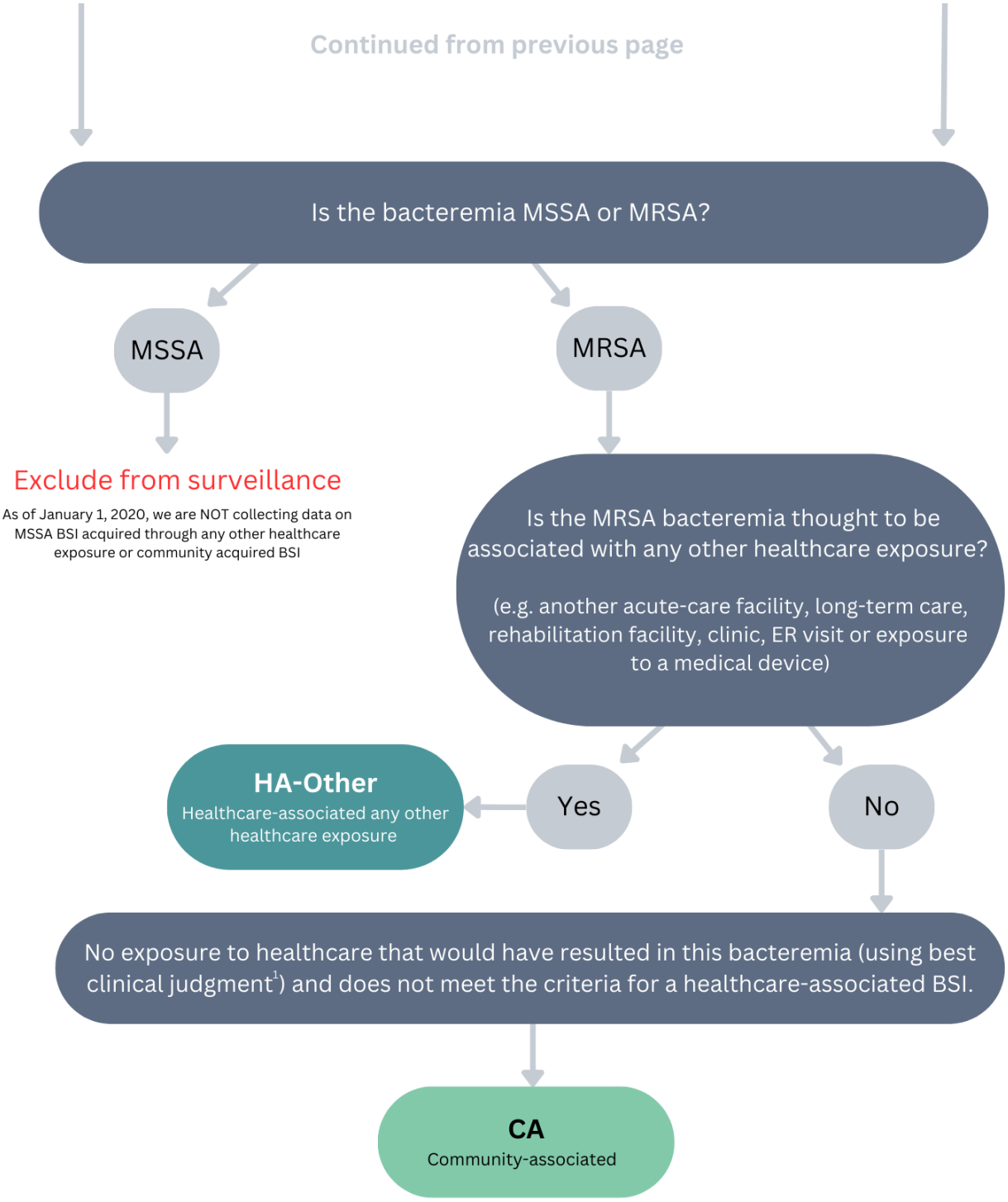


[1]Consideration should be given to the frequency and nature of exposure to a medical device and/or procedure. For example, pediatric patients with clinic visits for otitis media, asthma, well-baby etc., may or may not be considered as HA while pediatric patients with clinic visits that involved invasive procedures or day surgery may be more likely to be considered HA. Adult patients attending dialysis, receiving chemotherapy, outpatient visits involving invasive procedures or day surgery may be more likely to be considered HA compared to adult patients with occasional outpatient or community health clinic visits.

Appendix 2 – MRSA BSI Standardized Laboratory Shipping Form

Include the following form with the shipment **AND** email to the NML address provided.

If your hospital is shipping MRSA and VRE isolates in the same batch, please indicate on the swabs/tubes which isolates are MRSA and which are VRE.

Send MRSA blood isolates to:
Dr. George Golding
National Microbiology Laboratory
1015 Arlington St., Winnipeg, Manitoba R3E 3R2
Tel: 204 784 8096
Use FedEx billing number: 6327-8173-3

In addition, email the shipping form to
phac.nml.ARNI-RAIN.lnm.aspc@canada.ca

Please click on the icon below to access the excel shipping form:

CNISP Laboratry
Shipping Form MRS

Appendix 3 - Patient Questionnaire for MSSA (HA-YAF) or MRSA Blood Isolate

Please complete for all new MSSA (HA-YAF) and/or MRSA bloodstream infections. Please see Data dictionary in APPENDIX 4 - Data Dictionary for definitions and notes.

Laboratory requirements:

As of January 1, 2019, ONLY send MRSA BSI to NML

- Please notify the hospital laboratory to retain one blood specimen per MRSA BSI questionnaire (each new infection)
- Label the isolate as MRSA and if this is a new infection in a patient previously identified with a MRSA BSI in the same calendar year, please enter the previous (original) unique patient ID at the end of the questionnaire
- Forward MRSA BSI isolates (all year) to the NML using the standardized laboratory shipping form provided in APPENDIX 2 – MRSA BSI Standardized Laboratory Shipping Form.
- If your hospital is shipping MRSA and VRE isolates in the same batch, please indicate on the swabs/tubes which isolates are MRSA and which are VRE.

1.	Is this bloodstream infection laboratory confirmed as: □ **MSSA (*S. aureus)*** □ **MRSA**
2.	CHEC Site: _____
3.	Unique patient identifier (PID): _____ **YY** _____**(** e.g. 99Z24001) *(CHEC site #) (year) (case number)*
4.	Age in years, months or days: **Age** _____ □ Years □ **Months** □ **Days**
5.	Postal code (*first 3 digits):* _____
6.	Sex: □ **Male** □ **Female**
7.	Date of admission: _____ **/** _____ **/** _____ DD MMM YYYY
8.	Date first positive blood culture was obtained: _____ **/** _____ **/** _____ DD MMM YYYY

9.	Is the patient known to use or inject him/herself with IV drugs[5]? □ **Yes** □ **No** □ **Unknown**
10.	What is the probable origin of the bacteremia? *Check one response only*: **Primary bacteremia** □ IV catheter-associated □ Peripheral-line □ Central-line □ Other line (please specify):_____ □ Primary bacteremia, (source unknown/can't determine) **Secondary bacteremia** □ Skin/soft tissue/burn wound □ Surgical site/wound infection □ Lower respiratory[6] □ Endocarditis □ Osteomyelitis, septic arthritis, septic bursitis □ Pneumonia □ Meningitis □ Urinary tract infection/urosepsis □ Other site (please *specify):* _____
11.	Where was this bacteremia (infection) acquired? *Check one response only* □ Healthcare-associated – acquired in your acute facility (HA-YAF)[7]

[5] *This refers to current drug use within the last 6 months*

[6] *Lower respiratory includes sputum, bronchial washes, ETT aspirates, pleural fluid or lung tissue or abscess and associated with pneumonia, lung abscess or empyema.*

[7] *Patient is on or beyond calendar day 3 of their hospitalization (Calendar day 1 is the day of hospital admission) OR has been hospitalized in your facility in the last 7 days or up to 90 days depending on the source of infection (for example, a MSSA/MRSA bacteremia from a surgical wound that occurs 3 weeks after a surgical procedure completed in your facility should be considered HA-YAF (up to 90 days after procedure if implant). A MSSA/MRSA bacteremic pneumonia occurring >7 days after discharge from your facility should not be considered HA-YAF) OR has had a healthcare exposure at your facility that would have resulted in this bacteremia (using best clinical judgement)*

	□ Healthcare-associated – acquired from any other healthcare exposure (HA-Other)[8] □ Community-associated (CA)[9] □ Unknown	
12.	a. Was the patient previously known to have MRSA?[10] □ **No** □ **Yes → *if yes, go to 11b.**	b. If **YES,** where was the MRSA acquired?[11]: □ Healthcare-associated – acquired in your acute facility (HA-YAF)[12] □ Healthcare-associated – acquired from any other healthcare exposure (HA-Other)[13] □ Community-associated (CA)[14]

[8] Any patient who has a bacteremia not acquired at your facility that is thought to be associated with any other healthcare exposure (e.g. another acute-care facility, long-term care, rehabilitation facility, clinic, ER visit or exposure to a medical device).

[9] No exposure to healthcare that would have resulted in this bacteremia (using best clinical judgement) and does not meet the criteria for a healthcare-associated BSI. For example, pediatric patients with clinic visits for otitis media, asthma, well-baby etc., may or may not be considered as HA while pediatric patients with clinic visits that involved invasive procedures or day surgery may be more likely to be considered HA. Adult patients attending dialysis, receiving chemotherapy, outpatient visits involving invasive procedures or day surgery may be more likely to be considered HA compared to adult patients with occasional outpatient or community health clinic visits

[10] MRSA identified through screening on admission does not apply – the MRSA must have been identified through a clinical (wound, surgical site, respiratory, bone, blood etc.) specimen. Colonizations identified through clinical specimens are acceptable

[11] Please use the first known instance of MRSA (infection or colonization) in this patient to determine where acquired. This will depend on how far your hospital is able to look back. E.g if MRSA colonization from a clinical specimen was first identified in 2015, then a respiratory MRSA infection in 2016 – use the MRSA colonization identified in 2015 to determine where-acquired

[12] Patient is on or beyond calendar day 3 of their hospitalization (Calendar day 1 is the day of hospital admission) OR has been hospitalized in your facility in the last 7 days or up to 90 days depending on the source of infection (for example, a MSSA/MRSA bacteremia from a surgical wound that occurs 3 weeks after a surgical procedure completed in your facility should be considered HA-YAF (up to 90 days after procedure if implant). A MSSA/MRSA bacteremic pneumonia occurring >7 days after discharge from your facility should not be considered HA-YAF) OR has had a healthcare exposure at your facility that would have resulted in this bacteremia (using best clinical judgement)

[13] Any patient who has a bacteremia not acquired at your facility that is thought to be associated with any other healthcare exposure (e.g. another acute-care facility, long-term care, rehabilitation facility, clinic, ER visit or exposure to a medical device).

[14] No exposure to healthcare that would have resulted in this bacteremia (using best clinical judgement) and does not meet the criteria for a healthcare-associated BSI. For example, pediatric patients with clinic visits for otitis media, asthma, well-baby etc., may or may not be considered as HA while pediatric patients with clinic visits that involved invasive procedures or day surgery may be more likely to be considered HA. Adult patients attending dialysis, receiving chemotherapy, outpatient

		□ Unknown
13.	Was patient receiving hemodialysis at the time the positive blood culture was obtained? □ **Yes** □ **No**	
14.	**After the blood culture was obtained**, but **BEFORE** the results were available, please indicate which antibiotics the patient received. *Check ALL that apply:* □ Vancomycin □ Linezolid □ Daptomycin □ Clindamycin □ Trimethoprim-sulfamethoxazole □ Cloxacillin □ Cefazolin □ Ceftriaxone □ Other: _____ □ No Antibiotics	
15.	In the **24 hours** following the **day the MSSA or MRSA was identified/reported**, please indicate which antibiotic(s) the patient had received. *Check ALL that apply:* □ Vancomycin □ Linezolid □ Daptomycin □ Clindamycin □ Trimethoprim-sulfamethoxazole □ Cloxacillin □ Cefazolin □ Ceftriaxone □ Other: _____ □ No Antibiotics	
16.	a. Was the patient in ICU[11] when the positive blood cultures were obtained? □ **No → *if no, go to Q16b** □ **Yes → *if yes, go to Q17**	b. Was the patient admitted or transferred to an ICU within 30 days after the first positive blood culture

visits involving invasive procedures or day surgery may be more likely to be considered HA compared to adult patients with occasional outpatient or community health clinic visits

		□ **Yes, indicate date of admission to the ICU:** _____ / _____ / _____ DD MMM YYYY □ **No** □ **Unknown**
17.	Within the 30 days[15] following the first positive blood culture, did the patient have: (a) **Persistent bacteremia** (*Blood cultures continue to be* MSSA *or MRSA positive for 7 or more days following the start of appropriate antibiotic therapy[16], without any interim negative blood cultures.* □ **Yes** □ **No** □ **Unknown** **OR** (b) **Recurrent bacteremia** (*Recurrence of bacteremia =* MSSA *or MRSA positive blood culture(s) 14 days or more after documented negative blood cultures)* □ **Yes** □ **No** □ **Unknown**	
18.	a. What was the outcome at 30 days from the date of first positive blood culture? □ Patient still in hospital (awaiting LTC[17]) □ Patient still in hospital (acute care) □ Patient discharged alive, **NO** readmission: ➔ **Indicate date of discharge:** _____ / _____ / _____ DD MMM YYYY □ Patient discharged alive **and** readmitted ➔ ***Go to question 18b** □ Patient died ➔ **Indicate date of death:** _____ / _____ / _____ DD MMM YYYY • If patient died, please indicate the relationship of MRSA/MSSA BSI to the death: ☐ MRSA/MSSA BSI was the cause of death ☐ MRSA/MSSA BSI contributed to death	

[15] *Do NOT include if >30 days.*

[16] *Appropriate antibiotics for the treatment of MRSA bacteremia include: vancomycin, daptomcyin, or linezolid*

[17] *LTC = Long term care.*

	☐ Death is unrelated to MRSA/MSSA BSI ☐ Causality between MRSA/MSSA BSI and death cannot be determined ☐ Unknown
	b. If the patient **was discharged and readmitted within 30 days following the first positive blood culture**, was it because of a recurrent MSSA or MRSA BSI? ☐ No ➔ ***Go to question 19** ☐ Yes ➔ **Indicate date of discharge for previous admission, then *Go to question 18c:** **_____ / _____ / _____** DD MMM YYYY
	c. If recurrent MSSA or MRSA **BSI** was the cause of readmission *(Q18b = yes)*, indicate the site of positive culture for the recurrent infection: ☐ IV catheter-associated ☐ Primary bacteremia, (source unknown/can't determine) ☐ Surgical site / wound infection ☐ Skin/soft tissue / burn wound ➔ ***if yes, is it a case of Necrotizing fasciitis?** ☐ **Yes** ☐ **No** ☐ Lower Respiratory[18] ☐ IV catheter exit site ☐ Urine ☐ Other, *specify* _____
19.	Is this a **NEW** infection in a patient previously identified with a MSSA or MRSA BSI in this surveillance year? ☐ **No** ☐ **Yes** ➔ **please enter the original/previous unique patient identifier:** **_____ YY _____(**e.g. 99Z23001) *(CHEC site #) (year) (case number)*

[18] *Lower respiratory includes sputum, bronchial washes, ETT aspirates, pleural fluid or lung tissue or abscess and associated with pneumonia, lung abscess or empyema.*

Appendix 4 - Data Dictionary

Definitions and notes for Patient Questionnaire (REFER TO APPENDIX 3 - Patient Questionnaire for MSSA (HA-YAF) or MRSA Blood Isolate)

1. **Is this bloodstream infection laboratory confirmed as MSSA (*S. aureus)* or MRSA?**

   Please check only one response: MSSA or MRSA

2. **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., 99, 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., 99Z.

3. **Unique patient identifier (PID)**

   This 8-character code should consist of the 3 character CHEC site # (e.g., 99Z, the surveillance year the infection occurred in (e.g., 21), 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 99Z21001. An example of the thirty-fifth case would be 99Z21035, and so on.

Note: Always label the laboratory isolate with this unique ID number.

4. **Age in years, months or days**

   Age (in years, months or days) at the time of positive culture.

5. **Postal code**

   Please enter the first 3 digits of the patient's residential postal code.

6. **Sex**

   Check male or female

7. **Date of admission**

   Please indicate the date when the patient was admitted to the hospital. Please enter Day (08), Month (May)

and Year (1973) in this order.

8. Date first positive blood culture was obtained:

For the current admission, please indicate when the first blood isolate that tested positive was sampled. Please enter Day (08), Month (May) and Year (2021) in this order

9. Is the patient known to use or inject him/herself with IV drugs?

Is the patient a KNOWN current drug user? Has used within the past six months

10. What was the probable originof the bacteremia?

What infection most likely gave rise to the MSSA or MRSA bacteremia? Choose from the list provided or specify if not included in the list. Please select only **ONE** response.

Please refer to Appendix 1 – MSSA (HA-YAF) and MRSA Surveillance Algorithms for more details.

Please refer to the National Healthcare Safety Network document for complete definitions https://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf (CDC, January 2022).

Note: Even if the patient is known to use or inject drugs, determining probable origin of infection remains the same. If the patient has another infection at another site, select an option from the secondary bacteremia list. If the BSI is not IV-catheter associated, the last choice would be primary bacteremia source unknown/can't determine. There is a separate question to collect information on injection drug use.

11. Where was this bacteremia (infection) acquired?

Please indicate whether the BSI was acquired in a healthcare setting or in the community according to the following definitions. If the site of acquisition cannot be determined, the site of acquisition may be reported as "Unknown". Check only ONE response

Please refer to Appendix 1 – MSSA (HA-YAF) and MRSA Surveillance Algorithms for more details. Definitions can also be found in the Case Classification section of the protocol.

12. Previous MRSA

a. Was the patient previously known to have MRSA?

Please indicate yes or no if this patient was previously known to have MRSA. However, MRSA identified through screening on admission does **NOT** apply. The MRSA must have been identified through a clinical (wound, surgical site, respiratory, bone, blood etc.) specimen. Colonizations identified through clinical specimens are acceptable. If the patient was previously known to have MRSA please answer Q11b.

b. If yes, where was the MRSA acquired?

Healthcare-associated (acquired in your facility)
Healthcare- associated (acquired from any other healthcare facility or exposure)
Community- associated
Unknown

Please select one response from the list and refer to the definitions outlined in question 9. Please use the first known instance of MRSA (infection or colonization) in this patient to determine where acquired. This will depend on how far your hospital is able to look back. For example if a MRSA colonization from a clinical specimen was first identified in 2015, then a respiratory MRSA infection in 2016 – use the MRSA colonization identified in 2015 to determine where-acquired.

13. Was the patient receiving hemodialysis at the time the positive blood culture was obtained?

Check the "Yes" box only if the patient was receiving hemodialysis.

14. After the blood culture was obtained, but BEFORE the results were available, please indicate which antibiotics the patient received

During the time between blood sampling and results of the laboratory test, if the patient was administered antibiotics please select the antibiotic(s) from the list. If the patient was not administered antibiotics during this time, please select the 'No Antibiotics' response.

15. In the 24 hours following the day the MRSA was identified/reported, please indicate which antibiotics the patient had received

Twenty-four (24) hours following the diagnosis of MSSA or MRSA bacteraemia, if the patient was administered antibiotics please select the antibiotic(s) from the list. If the patient was not administered antibiotics during this time, please select the 'No Antibiotics' response.

16. Intensive Care United (ICU)*

a. Please indicate if the patient was already in an ICU* when the positive blood cultures for MRSA were obtained by checking either "Yes", or "No".
b. If answered "No" to Q16a, please indicate if the patient was admitted to the ICU* from a non-ICU ward within 30 days of the date of positive culture.

** Intensive care unit (ICU) includes: medical, surgical combined medical-surgical, cardiovascular, coronary, neurosurgery, burn or step-down unit.*

17. Within the 30-days following the first MRSA positive blood culture, did the patient have:
Please indicate "Yes", "No" or "Unknown" for the following**:**

a. Persistent bacteremia. Persistent bacteremia means that the blood cultures continue to be positive with MSSA or MRSA for 7 or more days following the start of appropriate antibiotic therapy, without any interim negative blood cultures. (Appropriate antibiotics for the treatment of MRSA bacteremia include: vancomycin, daptomcyin, or linezolid).

b. **Recurrent bacteremia**. MSSA or MRSA positive blood culture(s) for 14 days after documented negative blood cultures.

Note: If the 'persistent' or recurrent bacteremia occurs > 30 days after the first MSSA or MRSA blood culture, do NOT include.

18. **30-day outcome**

a. **Outcome at 30 days from the date of first positive blood culture**

Thirty days after the date of first positive blood culture, please select one of the options available. Please indicate the date if the patient was discharged and *not* readmitted or if the patient died.

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

b. **If the patient was discharged and readmitted within the 30 days following the first positive blood culture, was it because of a recurrent MRSA infection?**

Please indicate "Yes" or "No". If yes, please indicate the date of discharge for the previous admission and continue to question 18c. If no, skip question 18c and go to question 19.

c. **If recurrent MRSA infection was the cause of readmission (Q18b = yes), indicate the site of positive culture for the recurrent infection**

Please indicate the anatomic site from which the positive culture for this recurrent MRSA infection was isolated.

19. **Is this a NEW infection in a patient previously identified with a MSSA or MRSA BSI in this surveillance year?**

Please indicate whether this is a new infection in a patient previously identified with a MSSA or MRSA BSI in this surveillance year by checking yes or no.

If yes, please enter the original/previous unique ID that was assigned to the previous/original infection

Appendix 5 – Data Uploader on CNPHI

CNPHI – UPLOAD DATA FILES

How to submit data using the uploader on CNPHI

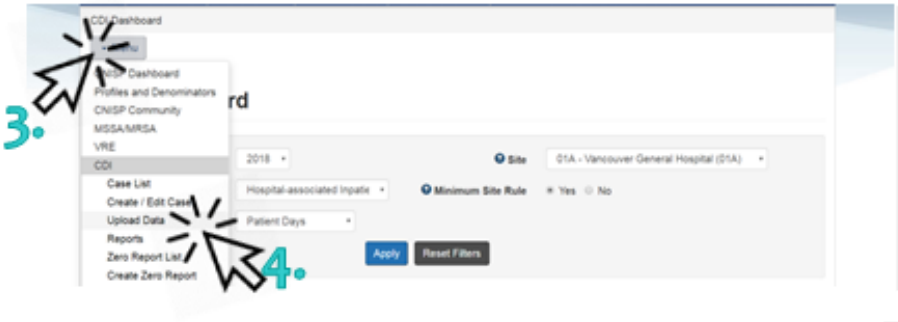
Step 1.

Surveillance

Canadian Nosocomial Infection Surveillance Program

Step 2.

Choose an application



Step 3.

Menu

Step 4.

Upload Data

***Select surveillance year**

***Choose your file**

Step 5.

Upload Epi Data

Revision History

Date	Revisions Made
Oct 30, 2014	Changes made to homogenize CNISP protocol formatting
Nov 12, 2014	'Unique identifier code' edited in the data dictionaries
Dec 30, 2014	• Q14 revised to better identify whether patient was in ICU at time of positive MRSA culture or if not then was the patient transferred into an ICU within 30 days of the positive culture. • 14a. Was the patient in ICU when the positive blood cultures for MRSA were obtained? • 14b. Was the patient admitted or transferred to an ICU[19] within 30 days after the first positive blood culture?
Nov 2, 2015	**2016 MRSA protocol** • The reporting of MRSA colonizations (clinical and screening) to CNISP has been stopped. CNISP hospitals no longer will submit any colonization (clinical and screening) data to CNISP. All sections of the 2015 MRSA surveillance protocol relating to colonization (screening and clinical) data have been removed. • Objectives clarified • Case definition – admission to hospital and exclusion criteria clarified. • Examples of application of HA & CA definitions for clinical isolates clarified. **Clinical questionnaire** • Q8 – Responses: o Sputum/lower respiratory changed to lower respiratory o Bone/osteomyelitis response added o Joint/septic arthritis response added • Q9 clarified • Q10 Outcome responses revised to: o Patient still in hospital (awaiting LTC) o Patient still in hospital (acute care) o Patient discharged alive, indicate date of discharge o Patient died, indicate date of death o Unknown **Blood questionnaire** • Q7 – Responses: Sputum/lower respiratory changed to lower respiratory • Q15: Clarified that if persistent or recurrent bacteremia is identified >30 days after first positive blood culture do NOT include o Q16a Outcome responses revised to: o Patient still in hospital (awaiting LTC) o Patient still in hospital (acute care) o Patient discharged alive, indicate date of discharge

[19] ICU includes medical, surgical combined medical-surgical, cardiovascular, coronary, neurosurgery, burn, or step-down unit.

	○ Patient died, indicate date of death ○ Unknown • Q17a, 17b and 17c removed as data no longer relevant to surveillance **MDS questionnaire** • Q8 – Responses • Sputum/lower respiratory changed to lower respiratory • Bone/osteomyelitis response added • Joint/septic arthritis response added • Q10 Outcome responses revised to: • Patient still in hospital (awaiting LTC) • Patient still in hospital (acute care) • Patient discharged alive, indicate date of discharge • Patient died, indicate date of death • Unknown
Nov 7, 2016	Case definition clarified: • The following added to inclusion criteria: MRSA infection identified at a new site/source in a patient identified with a MRSA infection in a previous surveillance (calendar) year • The following added to exclusion criteria: Infections re-admitted with MRSA (unless it is a different strain or a new/different site of MRSA infection).
Dec 18, 2017	Collection of MRSA clinical infections stopped and only data on bacteremias will be collected. A review of the data indicated MRSA clinical infections have remained relatively constant in relation to the proportion of those that are SKST, respiratory, SSI etc. In addition, MRSA BSI molecular data mirror that seen in clinical specimens. As a result, it was decided to collect only data on **ALL NEW** MRSA BSIs and add the collection of **ALL NEW** MSSA BSIs. Please see surveillance definitions for HA, HA-YAF and CA .
Jan 18, 2018	• Q10b clarified – If the patient was previously known to have MRSA – where was it acquired (e.g., HA-YAF, HA-OTHER, CA)? Please use the first known instance of MRSA (infection or colonization) in this patient to determine where acquired. This will depend on how far your hospital is able to look back. For example if a MRSA colonization from a clinical specimen was first identified in 2015, then a respiratory MRSA infection in 2016 – use the MRSA colonization identified in 2015 to determine where-acquired. **Healthcare-associated and community-associated definitions updated.** • Previously read as 'Adult patients attending dialysis, receiving chemotherapy, outpatient visits involving invasive procedures or day surgery may be more likely to be considered HA compared to adult patients with occasional outpatient or community health clinic visits. • Now reads 'Any patient who has a bacteremia not acquired at your facility that is thought to be associated with any other healthcare exposure (e.g. another acute-care facility, long term care, rehabilitation facility, clinic, ER visit or exposure to a medical device).' • This would capture those patients whose only healthcare exposure was a previous

	admission at your hospital or another hospital greater than 90 days before their current admission – using your best clinical judgement this patient's MRSA or MSSA BSI may be considered as CA or HA-OTHER
Jan 29, 2018	**Healthcare-associated and community-associated definitions revised due to feedback** • **HA-YAF:** Have added 'Has had a healthcare exposure at your facility that would have resulted in this bacteremia (using best clinical judgment)'. This is intended to capture those patients who in the clinician's best judgment could only have contracted the MSSA/MRSA at their hospital even though may have been admitted <3 calendar days or had been hospitalized in your facility >90 days ago (depending on the source of infection) • **HA-OHE:** Reworded to try and ensure that this MSSA/MRSA BSI is NOT attributed to your facility • **CA:** Reworded to allow discretion by the clinician who in using their best judgment attributes this MSSA/MRSA BSI to the community
Oct 17, 2018	• Removed Date of Birth (DOB) as an option – now only option is to give actual age in years, months or days • Added Postal code (first 3 letters) (not mandatory) in order to try and see where patients are coming from when they get admitted to a CNISP hospital • From the question 'What was the probable source/site of the bacteremia? Check one response only' removed the option 'if yes, is it a case of necrotizing pneumonia? □ Yes □ No' if they check Lower respiratory • Q12 removed as repetitive – Q17 generally asks the same question with a different time frame. Question was: At the time the positive bloodstream culture was obtained, was the patient: In an ICU or discharged from an ICU within 48 hours AND In (or had been in) the ICU for 48 hours or more? □ Yes □ No
Dec 18, 2018	A decision was made at the annual CNISP meeting (Nov 2018) to • Not submit any MSSA BSI isolates to the NML starting January 1 2019 • Review all the data (epi & lab) on MSSA BSI submitted in 2018 - i.e. observe any difference in the number of MSSA isolates sent in by month, hospital type (adult vs mixed vs peds), molecular characterization, AMR • Make a decision based on the 2018 data on whether we restart submission of MSSA isolates in 2020 and if yes, what should the time frame for submission of isolates be (e.g. 2 months, 3 months, winter, summer? etc)? All references in the 2019 protocol relating to submitting MSSA BSI isolates to the NML have been removed
Nov 21, 2019	A decision was made at the annual CNISP meeting (Oct 2019) to • Only collect data on MSSA BSI that are identified in the participating hospital (nosocomial) • Q13 Is the patient known to use or inject him/herself with IV drugs? • A time frame was defined – only current drug use (used drugs within the past six months) is relevant
Sep, 2020	• A new question added: During this admission or in the 14 days prior to this admission, did this patient test COVID-19 positive for the first time?

November 2021	Clarified Q16b - Was the patient admitted or transferred to an ICU within 30 days after the first positive blood culture No other changes to 2022 protocol
November 2022	Added attributable mortality Removed question # 20 relating to COVID – 'During this admission or in the 14 days prior to this admission, did this patient test COVID-19 positive for the first time?" No other changes to 2023 protocol
November 2023	Added clarification for isolate submission to NML: 'If your hospital is shipping MRSA and VRE isolates in the same batch, please indicate on the swabs/tubes which isolates are MRSA and which are VRE.'
November 2024	Added definition for newborn: <28 days Added definition for implant in footnote (Page 5) Moved Injection drug use question above source/origin of infection in questionnaire. Changed wording from site/source of infection to origin of infection and separated response options into two categories (primary vs secondary bacteremia). Added clarification in the data dictionary for origin of infection and link to NHSN. Added new algorithms in Appendix 1.