

Canadian Nosocomial Infection Surveillance Program (CNISP)

2017 Surveillance Protocol for Methicillin-resistant *Staphylococcus aureus*

(MRSA) Infections in CNISP Hospitals

Revised January 23 2017

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Please enter/upload case forms to www.cnphi-rcrsp.ca

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INTRODUCTION

Prior to 1995, national data describing the incidence and epidemiology of 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.

The Canadian Nosocomial Infection Surveillance Program (CNISP) is a collaborative effort of the Canadian Hospital Epidemiology Committee (CHEC), a subcommittee of the Association of Medical Microbiologists and Infectious Disease (AMMI) and the Centre for Communicable Diseases and Infection Control (CCDIC) of the Public Health Agency of 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. As of January 2014, 57 sentinel CHEC sites (which may be networks of more than one hospital), with 8 stand-alone paediatric sites from 10 provinces and represented by 35 CHEC members participate in the CNISP network.

MRSA data collected for the surveillance year 2017 will reflect all "newly-identified" MRSA cases from the CHEC hospitals. Since 2016, MRSA colonizations are no longer being reported to CNISP.

OBJECTIVES

The objectives of this surveillance project are to:

1. describe infections associated with MRSA in Canadian acute-care hospitals, participating in CNISP;
2. determine the annual incidence of MRSA infections in Canadian hospitals, participating in CNISP;
3. determine annual MRSA bacteremia rates (as an indicator of the burden of disease and MRSA reservoir) in Canadian hospitals, participating in CNISP;
4. characterize all bloodstream MRSA isolates, and a subset of clinical MRSA isolates recovered from CNISP hospitals, by antibiogram, molecular typing, and SCC*mec* typing.

METHODOLOGY

a) Surveillance Period

The surveillance period is from January 1, 2017 to December 31, 2017.

b) MRSA infection surveillance inclusion criteria

Case definition:

- isolation of *Staphylococcus aureus* from any body site
AND
- resistance of isolate to oxacillin
AND
- patient must be admitted to the hospital¹
AND
- is a "newly identified MRSA infection" at a **CNISP hospital** at the time of hospital admission or identified during hospitalization.

This includes:

- MRSA infections identified for the first time during this current hospital admission.
- Infections that have been previously identified at other **non**-CNISP hospitals (since we want newly identified MRSA cases at CNISP hospitals).
- Infections that have already been identified at your site but are new infections. This can only be identified if the previously identified infection has another strain. This means the person was exposed again to MRSA and acquired another strain of it from another source (a new patient identifier is assigned only if confirmed with a different strain type).
- MRSA infection identified at a new (different) site in a patient with a MRSA infection identified in a previous surveillance (calendar) year²

AND

- meets the criteria for MRSA infection as determined using the January 2017 CDC/NHSN surveillance definitions³ for specific infections, and in accordance with the best judgment of the healthcare and/or IPC practitioner.

c) MRSA surveillance exclusion criteria

- MRSA infections previously identified at other CNISP hospitals.
- Emergency, clinic, or other outpatient cases who are **not admitted** to the hospital.
- Infections re-admitted with MRSA (unless it is a different strain or a new/different site of MRSA infection).

Healthcare-associated (HA) case definition for a MRSA clinical infection:

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

¹ includes ER and outpatients who tested positive for MRSA and then are subsequently admitted or are admitted but still in ER awaiting a bed on a ward.

² For example, patient identified in 2014 with a MRSA respiratory infection. Same patient admitted in 2017 and identified with SSI MRSA infection. The patient would be counted as a new infection in 2017

³ MRSA infection is determined using the 2017 CDC/NHSN surveillance definitions for specific infections, and in accordance with the best judgement of the healthcare and/or IPC practitioner. CDC/NHSN criteria for infection can be access at https://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf.

- Exposure to any healthcare setting (including long-term care, rehabilitation facilities or clinics) in the previous 12 months⁴.

OR

- Patient is on or beyond calendar day 3⁵ of their hospitalization.

Newborn healthcare-associated (HA) case definition for a MRSA clinical infection:

A MRSA case in a newborn may be considered as HA if:

- The newborn is on calendar day 3⁵ 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, MRSA may be classified as HA if the organism was **NOT** known to be present and there is no epidemiological reason to suspect that acquisition occurred prior to transfer.

Community-associated (CA) case definition for a MRSA clinical infection:

- MRSA identified on admission to hospital (Calendar Day 1 = day of hospital admission) and/or the day after admission (day 2).

AND

- Has no previous history of the organism.

AND

- Has no prior hospital, long-term care admission or other exposure to a healthcare setting (rehab, clinics)⁴ in the past 12 months¹.

AND

- Has no reported use of medical devices.

MRSA clinical infection

The MRSA infection would be considered HA if any elements of a CDC/NHSN site-specific infection criterion were first present on or after the 3rd calendar day of admission to the facility (the day of hospital admission is calendar day 1). The MRSA infection would be considered CA if any elements of a CDC/NHSN site-specific infection criterion were present before the day of admission, or on the first day of admission (day 1) and/or the day after admission (day 2) and are documented in the medical record.

⁴ Consideration should be given to the frequency and nature of exposure to a healthcare setting. For example, pediatric patients with clinic visits for otitis media, asthma, well-baby etc in the previous 12 months 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.

⁵ Calendar day 1 is the day of hospital admission.

Examples of application of HA & CA definitions for clinical isolates

2 days before admission	1 day before admission	Day 1 Day of hospital admission	Day 2	Day 3	Day 4	Day 5	Infection is....
localized swelling and tenderness on skin of forearm	Documented localized swelling and tenderness on skin of forearm (clinic or family physician visit)	Positive MRSA culture from skin abscess & documented localized swelling and tenderness at site	documented localized swelling and tenderness on skin of forearm Fever >38°C				CA
		Admitted to hospital because of congestive heart failure	No signs or symptoms	Fever >38°C, Productive cough Sputum sent for culture	Fever >38°C, Sputum culture positive for MRSA		HA
		Admitted to hospital because of congestive heart failure	No signs or symptoms	Fever >38°C Sputum sent for culture	No signs or symptoms Sputum culture positive for MRSA	Fever >38°C	HA

The January 2017 CDC/NHSN surveillance definitions for specific infections can be accessed at URL: https://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf

MRSA Bloodstream infection (bacteremia)

To be considered a MRSA bloodstream infection the patient must have MRSA cultured (lab-confirmed) from at least one blood culture

To classify the MRSA bloodstream infection as HA or CA, the following criteria taken from Friedman et al, Ann Intern Med 2002 will be used. The MRSA infection would be considered:

HA – your facility MRSA BSI: if the first positive blood culture for MRSA was obtained ≥ 48 hours after admission to your hospital

HA – MRSA BSI: if the first positive blood culture for MRSA was obtained ≥ 48 hours after hospital admission

OR

if the first positive blood culture for MRSA was obtained within 48 hours of admission, the patient meets one of the following criteria:

- (i) Healthcare exposure in the previous 90 days (such as receipt of IV medications, IV chemotherapy, hemodialysis, etc.);
- (ii) Was hospitalized in the previous 90 days; or
- (iii) Resides in a long-term care facility or nursing home.

CA – MRSA BSI: if the first positive blood culture for MRSA was obtained prior to hospital admission, or within 48 hours of admission, **AND** did not meet criteria for HA-BSI.

d) Data Collection

As initiated in 2013-2014, sites will continue to have the option of entering the case as a routine MRSA surveillance or can opt to complete the minimum data set (MDS) MRSA surveillance. Please note that whichever option is chosen that option must be used for the entire surveillance year.

Surveillance for MRSA is laboratory-based. Laboratory identification of MRSA is required for inclusion into the surveillance. There are two levels of surveillance that will be conducted:

1. Clinical Isolates (MRSA recovered through clinical investigation and associated with an infection, not including blood infections).
2. Blood Isolates (MRSA recovered through positive blood culture).

NOTE: A patient can only be counted **ONCE** per surveillance year and when possible, should default to the highest level (i.e. in descending order: blood culture isolate; other infection (not blood)). Data submitted to CNISP should be updated **when possible**. For example, if a patient initially identified as a skin/soft tissue infection subsequently develops an MRSA bacteremia this should be upgraded to a blood isolate or if using the MDS form reported to CNISP so the site of infection can be changed by Agency staff (noting that for calculating rates, the patient is counted only once).

In addition, if a patient is readmitted within the **SAME** surveillance year and is identified as an infection (bacteremia or other infection), do not enter them as a new infection unless you know the strain type is different from the previous admission in the same surveillance year.

If you are able to look back over several years and the patient has been reported as MRSA colonized and is currently admitted and identified as a MRSA infection (bacteremia or other) please enter as a **NEW** case (infection).

If you are able to look back over several years and the patient was reported as MRSA infected (e.g. respiratory) and is currently admitted and identified as a MRSA infection at a new (different) site (e.g. skin, soft tissue) please enter as a **NEW** case (infection).

If the patient is identified with an MRSA infection through a clinical isolate and subsequently develops a MRSA bacteremia during the same admission or as a readmission in the same surveillance year, please upgrade the clinical isolate to a blood isolate.

An algorithm (**Appendix 1**) has been provided to assist in surveillance activities.

(A) Clinical Isolates

Routine MRSA surveillance – Data collection

For each isolate recovered from clinical (non-screening, non-blood culture) specimens please complete the '**Patient Questionnaire Clinical Isolate Part A**' (Appendix 4) only.

OR

Minimum dataset (MDS) MRSA surveillance – Data collection

For each isolate recovered from clinical (non-screening, non-blood culture) specimens please complete the '**Patient Questionnaire for MDS**' (Appendix 5) only.

(C) Blood Culture Isolates

Routine MRSA surveillance – Data collection

For each MRSA bacteremia case, please complete the 'Patient Questionnaire Blood Isolate Part B' (Appendix 4) only.

OR

MDS MRSA surveillance – Data collection

For each MRSA bacteraemia case, please complete the 'Patient Questionnaire for MDS' (Appendix 5) only.

e) **Electronic data entry or submission (email or fax) to the Agency**

All MRSA infection patient questionnaire data should be submitted to the Agency by email or fax or 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.

f) **Denominator data**

To obtain the necessary denominator information for the calculation of national MRSA rates, each participating healthcare facility will complete a denominator (number of patient admissions and patient days) data collection form on a quarterly basis and submit to the Agency or submit online through CNPHI at www.cnphi-rcrsp.ca no later than the end of the following quarter.

A final 2016 calendar year total denominator will be required to be submitted by March 31 2017.

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. Pediatric cases are defined as less than 18 years of age.

g) **Laboratory surveillance**

The following isolates are eligible for CNISP MRSA Laboratory Surveillance: Type of Isolate*	Specimen obtained and sent to NML
MRSA Clinical Isolate from a site other than blood (e.g. skin/soft tissue) (<i>not screening</i>)	Between January 1 st and March 31 st annually
MRSA Blood Isolate	All year round
Necrotizing Fasciitis due to MRSA	All year round
Necrotizing Pneumonia due to MRSA	All year round

**For any eligible isolate, the hospital laboratory should be notified to retain the isolate for shipment to the NML.*

Clinical isolates from infections (other than blood and not including necrotizing fasciitis or pneumonia): Only one eligible MRSA clinical isolate is required to be sent to the NML for every eligible MRSA case regardless of the actual number of positive MRSA anatomical sites. Please ensure the site of infection is clearly indicated on the shipping form.

Necrotizing fasciitis due to MRSA: One isolate of MRSA associated with diagnosed necrotizing fasciitis is required for every eligible necrotizing fasciitis MRSA case. This isolate is required in addition to any other eligible MRSA clinical isolates. Please ensure "**NF**" is clearly indicated on the shipping form.

Necrotizing pneumonia due to MRSA: One isolate of MRSA associated with diagnosed necrotizing pneumonia is required for every eligible necrotizing pneumonia MRSA case. This isolate is required in addition to any other eligible MRSA clinical isolates. Please ensure “**NP**” is clearly indicated on the shipping form.

Blood Isolates: One blood isolate is required for every eligible MRSA bacteremia case. In the case of an upgraded MRSA clinical isolate case, the blood isolate is required in addition to any other previously sent MRSA clinical isolates. Please ensure that ‘**blood**’ is clearly indicated on the shipping form.

Mandatory Shipping Form: Each shipment of eligible MRSA isolates must be accompanied by a standardized shipping form. Please complete the template found in Appendix 4 and ensure it is included in the shipment.

Isolates should be sent to the following address:	For questions regarding data collection, data submission forms, please contact:
<p>Dr. George Golding National Microbiology Laboratory Public Health Agency of Canada 1015 Arlington St. Winnipeg, Manitoba R3E 3R2 Tel: 204-789-2133</p> <p>Use FedEx billing number: 2299-8435-7</p>	<p>CNISP Surveillance Officer Healthcare-Associated Infections Section Public Health Agency of Canada 130 Colonnade Rd., PL 6503B Ottawa, Ontario K1A 0K9 E-mail: cnisp.pcsin@phac-aspc.gc.ca Fax: 613-946-0678</p>

At the NML, the strains will be confirmed as being MRSA using PCR. Susceptibility testing and molecular typing using pulsed-field gel electrophoresis (PFGE) will also be conducted on submitted isolates. A duplicate set of strains will be sent to Sunnybrook laboratory for additional testing which may include identification of the Panton-Valentine Leukocidin (PVL) toxin, and *Staphylococcal* chromosomal cassette *mec* (SCCmec) typing.

DATA 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:

- 1) incidence rates of MRSA infections
- 2) incidence rates of HA & CA- MRSA infections
- 3) incidence rates of HA & CA-MRSA bacteremia

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

While this surveillance project is observational and does not involve any alteration in patient care, ethics approval may be sought at some hospital sites. Surveillance for healthcare-associated infections is a routine component of quality assurance and patient care in Canadian healthcare institutions and

therefore informed consent is not required. A unique identifier linked to patient name will only identify patients at the local CHEC site and is not transmitted to the Public Health Agency of Canada. All data submitted to the Agency is kept strictly confidential.

Attached Appendices:

Appendix 1 Algorithm for 2016 MRSA Surveillance

Appendix 2 Sample Line List

Appendix 3 Mandatory Shipping Form

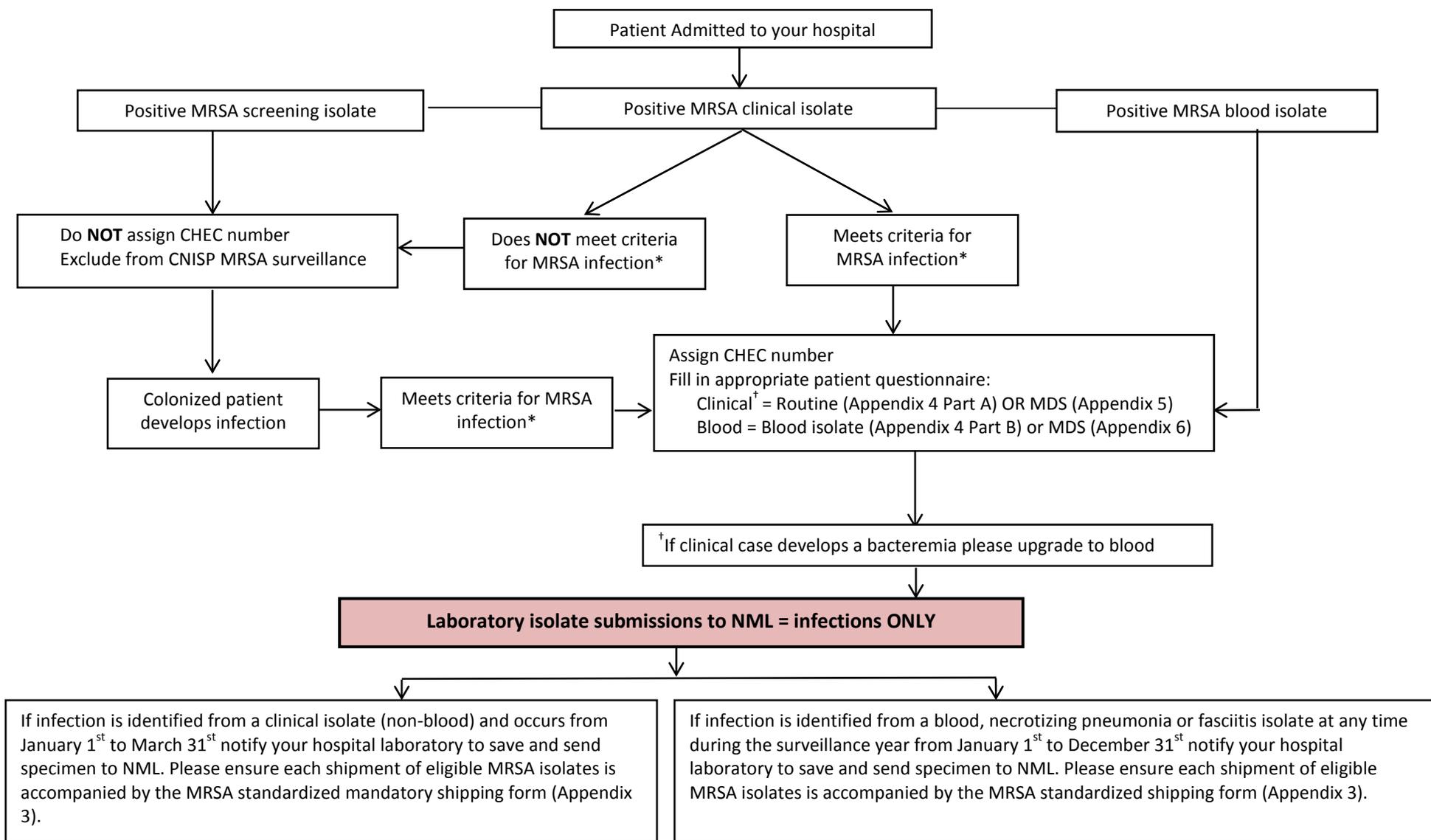
Appendix 4 Patient Questionnaire for Routine MRSA surveillance (A = clinical infection (non-blood) and B = bloodstream infections)

Appendix 5 Patient Questionnaire for MDS MRSA surveillance

Appendix 6 Data Dictionaries for Routine (clinical and blood)and MDS questionnaires

Appendix 7 Protocol Revision History

APPENDIX 1- 2016 CNISP MRSA SURVEILLANCE ALGORITHM



*MRSA clinical infection (non-blood) is determined using the April 2015 CDC/NHSN surveillance definitions for specific infections, MRSA BSI uses criteria taken from Friedman et al, Ann Intern Med 2002 and both are also in accordance with the best judgment of the healthcare and/or IPC practitioner. The January 2017 NHSN definitions/criteria can be accessed at URL: https://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosindef_current.pdf.

APPENDIX 2 - Sample line list

(Please do NOT submit this form to the Agency)

Patient name	Hospital ID #	CHEC ID # (for clinical or blood culture isolate)	CLINICAL ISOLATE			BLOOD CULTURE ISOLATE	
			Date when tested positive	Laboratory notification	Necrotizing pneumonia / fasciitis? <i>(notify laboratory)</i>	Date when blood culture was obtained	Notify the laboratory (NML)
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

**APPENDIX 4
PATIENT QUESTIONNAIRE – PART B
BLOOD ISOLATE**

INSTRUCTIONS

Please complete Part B for all new MRSA cases identified as a BLOOD ISOLATE.

- Please see data dictionary for explanations and notes (Appendix 6)

Summary of Laboratory Requirements

Please notify the hospital laboratory to retain one blood specimen per questionnaire

Label the isolate using the suffix ending “B”

Forward isolates (all year) to the NML using the information provided in Appendix 3

1. CHEC Site # _____

2. Unique Identifier Code _____ 17 _____
(CHEC site #) (surveillance year) (case #)

3. Date of birth ____ / ____ / ____
dd mmm yyyy

In the absence of the actual date, please indicate age in years, months or days

Age _____ years months days

4. Sex Male Female

5. Date of admission ____ / ____ / ____
dd mmm yyyy

6. Date first positive blood culture was obtained ____ / ____ / ____
dd mmm yyyy

7. What was the probable source/site of the MRSA bacteraemia? *Check one response only*

- IV catheter-associated
- Primary bacteraemia, (source unknown/can't determine)
- Skin/soft tissue/burn wound →if yes, is it a case of Necrotizing fasciitis? Yes No
- Surgical site/wound infection
- Lower respiratory¹¹ →if yes, is it a case of Necrotizing pneumonia? Yes No
- Endocarditis
- Osteomyelitis, septic arthritis, septic bursitis
- Pneumonia →if yes, is it a case of Necrotizing pneumonia? Yes No
- Meningitis
- Urinary tract infection/urosepsis
- Other, specify: _____

¹¹ Lower respiratory includes sputum, bronchial washes, ETT aspirates, pleural fluid or lung tissue or abscess and associated with pneumonia, lung abscess or empyema.

8. Where was this MRSA **bacteremia** (infection) acquired?¹² *Check one response only*

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

9. At the time the positive bloodstream culture was obtained, was the patient:

In an ICU¹³ or discharged from an ICU within 48 hours

AND

In (or had been in) the ICU for 48 hours or more?

- Yes
- No

10. Was the patient receiving haemodialysis at the time the positive blood culture was obtained?

- Yes
- No

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

- Yes
- No

12. 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

¹² HA – your facility MRSA BSI: if the first positive blood culture for MRSA was obtained ≥ 48 hours after admission to your hospital.

HA – MRSA BSI: if the first positive blood culture for MRSA was obtained ≥ 48 hours after hospital admission OR if the first positive blood culture for MRSA was obtained within 48 hours of admission, the patient meets one of the following criteria:

- (i) healthcare exposure in the previous 90 days (such as receipt of IV medications, IV chemotherapy, hemodialysis, etc);
- (ii) was hospitalized in the previous 90 days; or
- (iii) resides in a long-term care facility or nursing home.

CA – MRSA BSI: if the first positive blood culture for MRSA was obtained prior to hospital admission, or within 48 hours of admission, AND did not meet criteria for HA-BSI.

¹³ ICU includes medical, surgical combined medical-surgical, cardiovascular, coronary, neurosurgery, burn, or step-down unit.

16a. Outcome at 30 days from the date of first positive blood culture?

- Patient still in hospital (awaiting LTC¹⁷)
- 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 16b
- Patient died → indicate date of death ____/____/____
dd mmm yyyy

16b. If the patient was discharged and readmitted within 30 days following the first positive blood culture, was it because of a recurrent MRSA infection?

- No → go to question 17a
- Yes → indicate date of discharge for previous admission ____/____/____ → Go to question 16c
dd mmm yyyy

16c. If recurrent MRSA **infection** was the cause of readmission (Q16b = 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
- Lower Respiratory¹⁸
- IV catheter exit site
- Urine
- Other, specify _____

¹⁷ LTC = Long term care.

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 6
Data Dictionary - definitions and notes
PATIENT QUESTIONNAIRE FOR CLINICAL ISOLATE
Part A (Appendix 4)

1. Does this patient meet the criteria for a MRSA INFECTION?

MRSA infection is determined using the January 2017 CDC/NHSN surveillance definitions for specific infections, and in accordance with the best judgment of the healthcare and/or IPC practitioner. The NHSN definitions/criteria can be accessed at URL:

https://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosindef_current.pdf.

If the patient meets the criteria for infection please complete the remainder of this questionnaire.

If the case does **NOT** meet the criteria for infection, please do **NOT** complete this questionnaire.

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/CNISP member (e.g., 07, 15) and a letter assigned by the CHEC/CNISP 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).

3. Unique identifier code

This 8 character code should consist of the 3 character CHEC site # (e.g., 09A), the surveillance year the infection occurred in (e.g., 16), 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 09A-16-001. An example of the thirty-fifth case would be 09A-16-035, and so on.

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

4. Date of Birth

Please enter Day (06), Month (May) and Year (1973) in this order. If the date of birth is not available please enter the patient's Age (in years, months or days) at the time of positive culture.

5. Sex

Check male or female sex as appropriate.

6. Date of admission

Please indicate the date when the patient was admitted to the hospital. Please enter Day (06), Month (May) and Year (2017) in this order.

7. Date of patient’s first positive clinical MRSA culture:

For the current admission/infection, please indicate when the first clinical isolate that tested positive was obtained. Please enter Day (06), Month (May) and Year (2017) in this order.

8. At which site(s) has MRSA been isolated with a positive culture(s)?

Please indicate the type of specimen (positive non-bloodstream clinical culture) in which MRSA was detected. Please check all that apply.

If the response is Skin/soft tissue/burn, please indicate if it is a case of necrotizing fasciitis.

If the response is Lower respiratory, please indicate if it is a case of necrotizing pneumonia.

Other site is defined as non-blood specimens and includes aspirates (kidney, liver, peritoneal, CSF, etc.) and wound drainage tubes (e.g., Jackson-Pratt).

9. If the patient meets criteria for an MRSA infection, where was the MRSA infection acquired?

Please indicate whether the clinical infection was acquired in a healthcare setting or in the community according to the following definitions. If the site of acquisition cannot be determined, the MRSA case may be reported as “Unknown”.

The MRSA clinical infection would be considered HA if all elements of a CDC/NHSN site-specific infection criterion were present on or after the 3rd calendar day of admission to the facility (the day of hospital admission is calendar day 1). The MRSA infection would be considered CA if all elements of a CDC/NHSN site-specific infection criterion were present during the two calendar days before the day of admission, the first day of admission (day 1) and/or the day after admission (day 2) and are documented in the medical record.

Examples of application of HA and CA definitions

2 days before admission	1 day before admission	Day 1 Day of hospital admission	Day 2	Day 3	Day 4	Day 5	Infection is....
localized swelling and tenderness on skin of forearm	Documented localized swelling and tenderness on skin of forearm (clinic or family physician visit)	Positive MRSA culture from skin abscess and documented localized swelling and tenderness at site	Documented localized swelling and tenderness on skin of forearm Fever >38°C				CA
		Admitted to hospital because of congestive heart failure	No signs or symptoms	Fever >38°C Productive cough Sputum sent for culture	Fever >38°C Sputum culture positive for MRSA		HA
		Admitted to hospital because of congestive heart failure	No signs or symptoms	Fever >38°C Sputum sent for culture	No signs or symptoms Sputum culture positive for MRSA	Fever >38°C	HA

10. What was the outcome within the 30 days following the positive clinical (non-blood) culture?

Thirty days after the date of first positive clinical (non-blood) culture please select one of the options available. If the patient was discharged please indicate the date of discharge. If the patient died, please indicate the date of death.

PATIENT QUESTIONNAIRE for BLOOD ISOLATE
Part B (Appendix 4)

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/CNISP member (e.g., 07, 15) and a letter assigned by the CHEC/CNISP 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 8 character code should consist of the 3 character CHEC site # (e.g., 09A), the surveillance year the infection occurred in (e.g., 17), 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 09A-16-001. An example of the thirty-fifth case would be 09A-17-035, and so on.

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

3. Date of Birth

Please enter Day (06), Month (May) and Year (1973) in this order. If the date of birth is not available please enter the patient's Age (in years, months or days) at the time of positive culture.

4. Sex

Check male or female sex as appropriate.

5. 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.

6. 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 (2017) in this order.

7. What was the probable source of the MRSA bacteraemia?

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

8. Where was the MRSA bacteraemia acquired?

Please indicate whether the infection was acquired in a healthcare setting or in the community according to the following definitions. If the site of acquisition cannot be determined, the MRSA case may be reported as "Unknown".

MRSA Bloodstream infection (bacteremia)

To be considered a MRSA bloodstream infection the patient must have MRSA cultured (lab-confirmed) from at least one blood culture. To classify the MRSA bloodstream infection as HA or CA, the following criteria taken from Friedman et al, Ann Intern Med 2002 will be used.

The MRSA infection would be considered:

HA – your facility MRSA BSI: if the first positive blood culture for MRSA was obtained \geq 48 hours after admission to your hospital

HA – MRSA BSI: if the first positive blood culture for MRSA was obtained \geq 48 hours after hospital admission

OR

if the first positive blood culture for MRSA was obtained within 48 hours of admission and the patient meets one of the following criteria:

- (i) Healthcare exposure in the previous 90 days (such as receipt of IV medications, IV chemotherapy, hemodialysis, etc.);
- (ii) Was hospitalized in the previous 90 days; or
- (iii) Resides in a long-term care facility or nursing home.

CA – MRSA BSI: if the first positive blood culture for MRSA was obtained prior to hospital admission, or within 48 hours of admission **AND** did not meet criteria for HA-BSI.

9. At the time the positive bloodstream culture was obtained, was the patient:

Please indicate if at the time the blood specimen that tested positive for MRSA was obtained, the patient was in an ICU* or discharged from an ICU within 48 hours **AND** in (or had been in) the ICU for 48 hours or more.

The purpose of this question is to identify bloodstream infections attributable to the ICU.

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

10. Was the patient receiving haemodialysis at the time the positive blood culture was obtained?

Check the “Yes” box only if the patient was receiving haemodialysis.

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

Is the patient a KNOWN drug user?

12. 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.

13. 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 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.

14a. 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".

14b. If answered "No" to Q14a, 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.

15. 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 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, daptomycin, or linezolid).

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

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

16a. 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.

16b. 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 16c. If no, skip question 16c and go to question 17.

16c. If recurrent MRSA infection was the cause of readmission (Q16b = 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.

**PATIENT QUESTIONNAIRE FOR MINIMUM DATASET
(Appendix 5)**

1. Does this patient meet the criteria for a MRSA INFECTION?

MRSA infection is determined using the January 2017 CDC/NHSN surveillance definitions for specific infections, and in accordance with the best judgment of the healthcare and/or IPC practitioner.

The NHSN definitions/criteria can be accessed at URL:

https://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnoisninfdef_current.pdf

If the patient meets the criteria for infection please complete the remainder of this questionnaire.

If the case does **NOT** meet the criteria for infection, please do **NOT** complete this questionnaire.

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/CNISP member (e.g., 07, 15) and a letter assigned by the CHEC/CNISP 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).

3. Unique identifier code

This 8 character code should consist of the 3 character CHEC site # (e.g., 09A), the surveillance year the infection occurred in (e.g., 17), 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 09A-17-001. An example of the thirty-fifth case would be 09A-17-035, and so on.

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

4. Date of Birth

Please enter Day (06), Month (May) and Year (1973) in this order. If the date of birth is not available please enter the patient's Age (in years, months or days) at the time of positive culture.

5. Sex

Check male or female sex as appropriate.

6. Date of admission

Please indicate the date when the patient was admitted to the hospital. Please enter Day (06), Month (May) and Year (2017) in this order.

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

For the current admission, please indicate when the first culture that tested positive was obtained. Please enter Day (06), Month (May) and Year (2017) in this order.

8. Site of positive culture

For the current admission/infection, please indicate where (anatomical site) the first clinical or blood isolate that tested positive was sampled.

9. Where was the MRSA infection acquired?

Please indicate whether the infection was acquired in a healthcare setting or in the community according to the following definitions. If the site of acquisition cannot be determined, the MRSA case may be reported as unknown.

The MRSA clinical infection would be considered HA if all elements of a CDC/NHSN site-specific infection criterion were present on or after the 3rd calendar day of admission to the facility (the day of hospital admission is calendar day 1). The MRSA infection would be considered CA if all elements of a CDC/NHSN site-specific infection criterion were present during the two calendar days before the day of admission, the first day of admission (day 1) and/or the day after admission (day 2) and are documented in the medical record

Examples of application of HA & CA definitions

2 days before admission	1 day before admission	Day 1 Day of hospital admission	Day 2	Day 3	Day 4	Day 5	Infection is....
Localized swelling and tenderness on skin of forearm	Documented localized swelling and tenderness on skin of forearm (clinic or family physician visit)	Positive MRSA culture from skin abscess & documented localized swelling and tenderness at site	documented localized swelling and tenderness on skin of forearm Fever >38°C				CA
		Admitted to hospital because of congestive heart failure	No signs or symptoms	Fever >38°C, Productive cough Sputum sent for culture	Fever >38°C, Sputum culture positive for MRSA		HA
		Admitted to hospital because of congestive heart failure	No signs or symptoms	Fever >38°C Sputum sent for culture	No signs or symptoms Sputum culture positive for MRSA	Fever >38°C	HA

If the specimen was a blood sample, for the patient to be considered to have a MRSA bloodstream infection the patient must have MRSA cultured (lab-confirmed) from at least one blood culture

To classify the MRSA bloodstream infection as HA or CA, the following criteria taken from Friedman et al, Ann Intern Med 2002 will be used. The MRSA infection would be considered

HA – your facility MRSA BSI: if the first positive blood culture for MRSA was obtained \geq 48 hours after admission to your hospital

HA – MRSA BSI: if the first positive blood culture for MRSA was obtained ≥ 48 hours after hospital admission

OR

If the first positive blood culture for MRSA was obtained within 48 hours of admission, the patient meets one of the following criteria:

- (i) Healthcare exposure in the previous 90 days (such as receipt of IV medications, IV chemotherapy, hemodialysis, etc.);
- (ii) Was hospitalized in the previous 90 days; or
- (iii) Resides in a long-term care facility or nursing home.

CA – MRSA BSI: if the first positive blood culture for MRSA was obtained prior to hospital admission, or within 48 hours of admission, AND did not meet criteria for HA-BSI.

10. What was the outcome at 30 days from the date of first positive culture?

Thirty days after the date of first positive culture please select one of the options available. If the patient was discharged, please indicate the date of discharge. If the patient died, please indicate the date of death.

Appendix 7 - Revision History

October 30, 2014

Began making changes to homogenize CNISP protocol formatting.

November 12, 2014

Edited 'Unique identifier code' in the data dictionaries.

December 30 2014

2015 MRSA protocol

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 ICU²³ within 30 days after the first positive blood culture?

November 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

Sputum/lower respiratory changed to lower respiratory

Bone/osteomyelitis response added

Joint/septic arthritis response added

Q9 clarified

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

²³ ICU includes medical, surgical combined medical-surgical, cardiovascular, coronary, neurosurgery, burn, or step-down unit.
Revised January 23, 2017

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

Q16a 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

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

November 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).