

CANADIAN NOSOCOMIAL INFECTION SURVEILLANCE PROGRAM

2010 - MRSA SURVEILLANCE PROTOCOL

SURVEILLANCE for METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) In CNISP HEALTH CARE FACILITIES

Revised November 24, 2009



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CANADIAN NOSOCOMIAL INFECTION SURVEILLANCE PROGRAM — 2010 - MRSA SURVEILLANCE PROTOCOL — SURVEILLANCE for METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) In CNISP HEALTH CARE FACILITIES — Revised November 24, 2009

is available on Internet at the following address:

<http://www.phac-aspc.gc.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 2010, 52 sentinel CHEC sites (which may be networks of more than one hospital), with 8 stand alone paediatric sites from 9 provinces and represented by 32 CHEC members participate in the CNISP network.

CHEC members participate in CNISP by working on sub-committees that direct the development, implementation and analysis of surveillance projects in CNISP. CHEC hospitals will often have Infection Control Professionals (ICP) representatives sitting on these committees. CHEC members participate voluntarily in CNISP projects by collecting standardized, case-by-case, non-nominal data on hospitalized patients. The data is submitted to CNISP for compilation and analysis.

MRSA data collected for the calendar year 2010 will reflect all “newly-identified” MRSA cases from the CHEC hospitals. However, colonized MRSA cases that are identified in screening and prevalence surveys or during outbreak investigations are reported as aggregated data only. If these cases should develop an MRSA bacteremia, or another site of MRSA infection, cases will be updated from colonization to infection, but only be counted once where possible. The intent is for cases to be updated should the ICP become aware of a colonized case that has developed an MRSA infection; however, actively following colonized cases is not expected.

Objectives

The objectives of this surveillance project are to:

1. describe the burden of disease associated with MRSA in Canadian hospitals, participating in the CNISP
2. determine the annual incidence of MRSA in Canadian hospitals, participating in CNISP
3. determine 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 CHEC/CNISP hospitals, by antibiogram, molecular typing, and SCCmec typing.

Methodology

MRSA surveillance inclusion criteria

MRSA case definition:

- isolation of *Staphylococcus aureus* from any body site

AND

- resistance of isolate to oxacillin

AND

- patient must be admitted to the hospital

AND

- is a “newly identified MRSA case” at a CHEC facility at the time of hospital admission or identified during hospitalization.

This includes:

- MRSA cases identified for the first time during this hospital admission
- Cases that have been previously identified at other non-CHEC sites (since we want newly identified MRSA cases at CHEC sites)
- Cases that have already been identified at your site but are new cases. This can only be identified if the previously identified case 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 should be assigned only if it is an MRSA infection, identified as a clinical isolate or bacteraemia).

This DOES NOT include:

- MRSA cases previously identified at other CHEC sites (See Appendix 1 for list of CHEC sites)
- Emergency, clinic, or other outpatient cases
- Cases re-admitted with MRSA (unless it is a different strain)

Healthcare-associated case definition:

Once the patient has been identified with MRSA, they will be classified as healthcare-associated based on an assessment of the practitioner using the following criteria:

- length of time in hospital prior to MRSA identification (> 48 hours)
- knowledge of previous MRSA status
- date of admission
- length of stay in hospital
- prior hospitalization or other healthcare facility history (previously admitted in past 12 months)
- where patient admitted from (e.g., long-term care)

Newborn healthcare-associated case definition:

A MRSA case in a newborn may be considered as healthcare-associated if the mother was not known to be a case on admission and where 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 healthcare-associated 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 case definition:

Community-associated cases are defined as meeting all of the following criteria:

- (i) no previous known healthcare-associated MRSA
- (ii) MRSA identified ≤ 48 hours after hospital admission
- (iii) no hospitalization in the previous 12 months
- (iv) no surgery or dialysis in the previous 12 months
- (v) no residence in a long-term care facility in the previous 12 months
- (vi) no indwelling catheter or medical device (e.g. foley catheter, IV line, tracheostomy, feeding tube)

Data Collection

Surveillance for MRSA is laboratory-based. Upon laboratory identification of MRSA from an in-patient for the first time, the ICP is to be notified. There are three levels of surveillance that will be conducted, requiring different levels of data gathering.

In order to accomplish the objectives, without placing increased demands on hospital ICPs and hospital laboratories, the 3 levels of surveillance will require different levels of data gathering:

- (A) Screening specimens (MRSA recovered from nose, perineal, groin, axillary, or other screening sites: i.e., colonization)
- (B) Clinical Isolates (MRSA recovered through clinical investigation, not including blood infections)
- (C) Blood Isolates (MRSA recovered through positive blood culture)

NOTE: A patient can only be counted once, and when possible, should default to the highest level (i.e. in descending order: blood culture isolate; clinical isolate; screening isolate). Therefore, data submitted to CNISP should be updated, when possible, if an initially colonized patient subsequently develops an MRSA bacteraemia, or another site of MRSA infection (noting that for calculating rates, the patient is counted only once). An effort should be made to follow colonized patients during their initial hospitalization to determine if they subsequently develop an MRSA infection; there is no need to do this kind of follow-up afterwards. However, if it subsequently becomes apparent that an MRSA infection has occurred in a previously colonized patient, the database should be updated.

An algorithm (Appendix 2) has been provided to assist the ICP in surveillance activities.

(A) Screening Isolates

For cases identified by **MRSA screening** isolates, a line-list of cases identified will be recorded by the ICP along with the site of MRSA acquisition. The 'Screening Data Submission Form' (Appendix 3) will be used to submit the aggregate data (the total number of cases identified and the numbers attributed to each site of acquisition) on a quarterly bases indicating the surveillance period, and date of data submission. Count the number of new MRSA cases identified by screening specimens, and only note the site of acquisition – i.e. (i) healthcare-associated, your institution; (ii) healthcare-associated, another institution; (iii) healthcare-

associated, long-term care facility (LTCF); (iv) another healthcare exposure; (v) community-associated; (vi) unknown. Maintaining a line-list will assist the ICP in tracking the new MRSA cases. A sample line list is provided (Appendix 4) or one may be developed by the individual CHEC site. Note that the purpose of the line-list is for tracking MRSA by the ICPs, and **NOT** to be sent in to CNISP.

Data from the surveillance period between Jan.1 and Mar. 31 will be submitted (Appendix 3)

- by April 15; data for April 1 to June 30 will be submitted
- by July 15; data for July 1 to Sept 30 will be submitted
- by Oct. 15; and data for Oct. 1 to Dec. 31 to be submitted
- by Jan.15 of the following year.

Each form (Appendix 3) sent in will also require CHEC site # for hospital site identification.

Rates will be calculated using these numbers and appropriate denominators.

B) Clinical Isolates

For each isolate recovered from clinical (non-screening, non-blood culture) specimens the 'Patient Questionnaire' (Appendix 5) **Part A only** will be completed, in order to determine numbers (rates), and simple clinical information (these are data that ICPs generally already obtain as part of routine MRSA hospital surveillance programs). The information collected by chart review will include patient demographic and clinical information.

Data elements will include:

- CHEC site number
- Unique identifier
- Date of birth
- Ethnicity
- Sex
- Date of admission
- Where MRSA was acquired (healthcare-associated or community)
- Date of positive clinical isolate culture
- Anatomical site of MRSA isolation
- Relation of MRSA to pneumonia
- If the patient has or meets criteria for a MRSA infection
- Whether the patient has a necrotizing pneumonia or necrotizing fasciitis due to MRSA

(C) Blood Culture Isolates

For each MRSA bacteraemia case, the patient questionnaire (Appendix 5) **Part B only** will be completed. The information collected by chart review will include patient's demographic and clinical information, along with additional information on outcome.

Data elements will include:

- CHEC site number
- Unique identifier
- Date of birth
- Sex
- Ethnicity
- Date of admission
- Where MRSA was acquired (healthcare-associated or community)
- Date the blood culture specimen was obtained
- Date of hospital or in-hospital death
- Whether any positive MRSA screening cultures were taken before the blood culture
- Anatomical location of previous screening cultures
- What service/unit the patient was on when MRSA bacteraemia was acquired
- The probable source of the MRSA bacteraemia
- Relation of MRSA bacteraemia to pneumonia
- Was the patient admitted to an Intensive Care Unit within 30 days following the positive blood culture
- What was the outcome at 30 days from date of positive blood culture

Electronic Data Entry

The WEBBS MRSA data entry system has been discontinued and replaced by CNPHI.

Please submit all screening aggregate data and individual case forms at www.cnphi-rcrsp.ca. For technical assistance, questions, or comments, please contact Katie Cassidy, using the information listed below.

Denominator data

To obtain the necessary denominator information for the calculation of national MRSA rates, each participating health care facility will complete a hospital profile on an annual basis and submit this information no later than April 30, 2011. In addition, to the total denominator numbers, pediatric denominator data are also required. Pediatric cases are defined as less than or equals to 18 years of age. Data collected on this profile will include:

- 1) total number of unique *Staphylococcus aureus* (*S. aureus*) isolates tested per year
- 2) total number of patient hospital admissions per year (separate line for pediatrics)
- 3) total number of inpatient-days per year (separate line for pediatrics)
- 4) total number of unique *S. aureus* blood culture isolates per year.

Surveillance Period

The 2010 MRSA surveillance period begins on January 01st and ends on December 31st, inclusive.

Laboratory surveillance:

The following isolates only are to be saved and sent to the NML in Winnipeg:

1. All MRSA clinical isolates (**NOT** screening isolate i.e. nose, perineal, groin, axillary, or other screening sites) from specimens obtained *January 1 – March 31, 2009*.
2. All MRSA blood culture isolates (1 per patient) for the surveillance year 2009.
3. All isolates from any patient with a diagnosis of necrotizing fasciitis or necrotizing pneumonia due to MRSA, for the surveillance year 2009.

The ICPs should notify their lab to save the above-mentioned specimens for the NML. ***Always notify the NML when specimens are being sent.***

(A) Summary of Laboratory Requirements

- The ICPs are requested to notify their Lab to retain one clinical isolate per questionnaire if:
 - the date of first positive culture is between January 1st – March 31st, 2010 (***question 8***)
 - there is a diagnosis of necrotizing fasciitis or necrotizing pneumonia due to MRSA (***questions 11 & 12***)
- Always label the samples using the appropriate suffix ending as defined below.
 - **CI** = Clinical Isolate
 - **NP** = Necrotizing Pneumonia
 - **NF** = Necrotizing Fasciitis

Contacts: Isolates should be sent to the following address:	For questions regarding data collection, data submission forms and questionnaires, please contact:
Dr. MICHAEL MULVEY National Microbiology Laboratory 1015 Arlington St. Winnipeg, Manitoba R3E 3R2 Tel: 204-789-2133 Use FedEx billing number: 2299-8435-7	KATIE CASSIDY CNISP Surveillance Officer Phone: 613-954-1718 — Fax: 613-946-0678 E-mail: katie_cassidy@phac-aspc.gc.ca Nosocomial & Occupational Infections Section 1408-100 Eglantine Driveway, P.L. 0601E2 Ottawa, Ontario K1A 0K9

Upon arrival to the NML, the cultures will be streaked for purity and stored. A duplicate set of strains will be sent to Sunnybrook lab for storage and additional testing. The strains will be confirmed as being MRSA using PCR to detect the *mecA* gene. Susceptibility testing and molecular typing using pulsed-field gel electrophoresis (PFGE) will also be conducted on submitted isolates. In certain cases, some strains will be further characterized using multi-locus sequence typing, identification of the Panton-Valentine Leukocidin (PVL) toxin, and *Staphylococcal* chromosomal cassette *mec* (SCCmec) typing.

Analysis and Evaluation

Each site will send the aggregated data electronically on a quarterly basis to the Nosocomial and Occupational Infections Section (NOI) of the Public Health Agency of Canada using the screening data submission form on CNPHI (Appendix 3).

For the clinical isolates and the blood culture isolates, the patient questionnaires (Appendix 5) will be completed at the CHEC sites and submitted monthly to the Nosocomial and Occupational Infections Section (NOI) of the Public Health Agency of Canada through CNPHI.

For each site, regionally and nationally, the following rates will be calculated each year:

- 1) MRSA as a percentage of all (non-duplicate) *S. aureus* isolates
- 2) incidence of MRSA cases per 1,000 admissions
- 3) incidence of MRSA per 10,000 inpatient-days
- 4) incidence of healthcare-associated MRSA per 1,000 admissions
- 5) incidence of healthcare-associated MRSA per 10,000 inpatient-days
- 6) MRSA bacteraemia rate (as a percent of *S. aureus* blood cultures)
- 7) MRSA bacteraemia rate per 1,000 admissions
- 8) proportion of MRSA bacteraemia that are healthcare-associated
- 9) healthcare-associated MRSA bacteraemia rates per 1,000 admissions

Regional and national rates only will be published. The incidence of MRSA among hospitalized patients, geographic trends and descriptive epidemiology of MRSA will be reported via CNISP reports, presentations and publications.

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 is kept strictly confidential.

Attached Appendices:

Appendix 1: List of CHEC sites

Appendix 2: Algorithm for 2010 MRSA Surveillance

Appendix 3: Screening Data Submission Form

Appendix 4: Sample Line List

Appendix 5: Patient Questionnaire

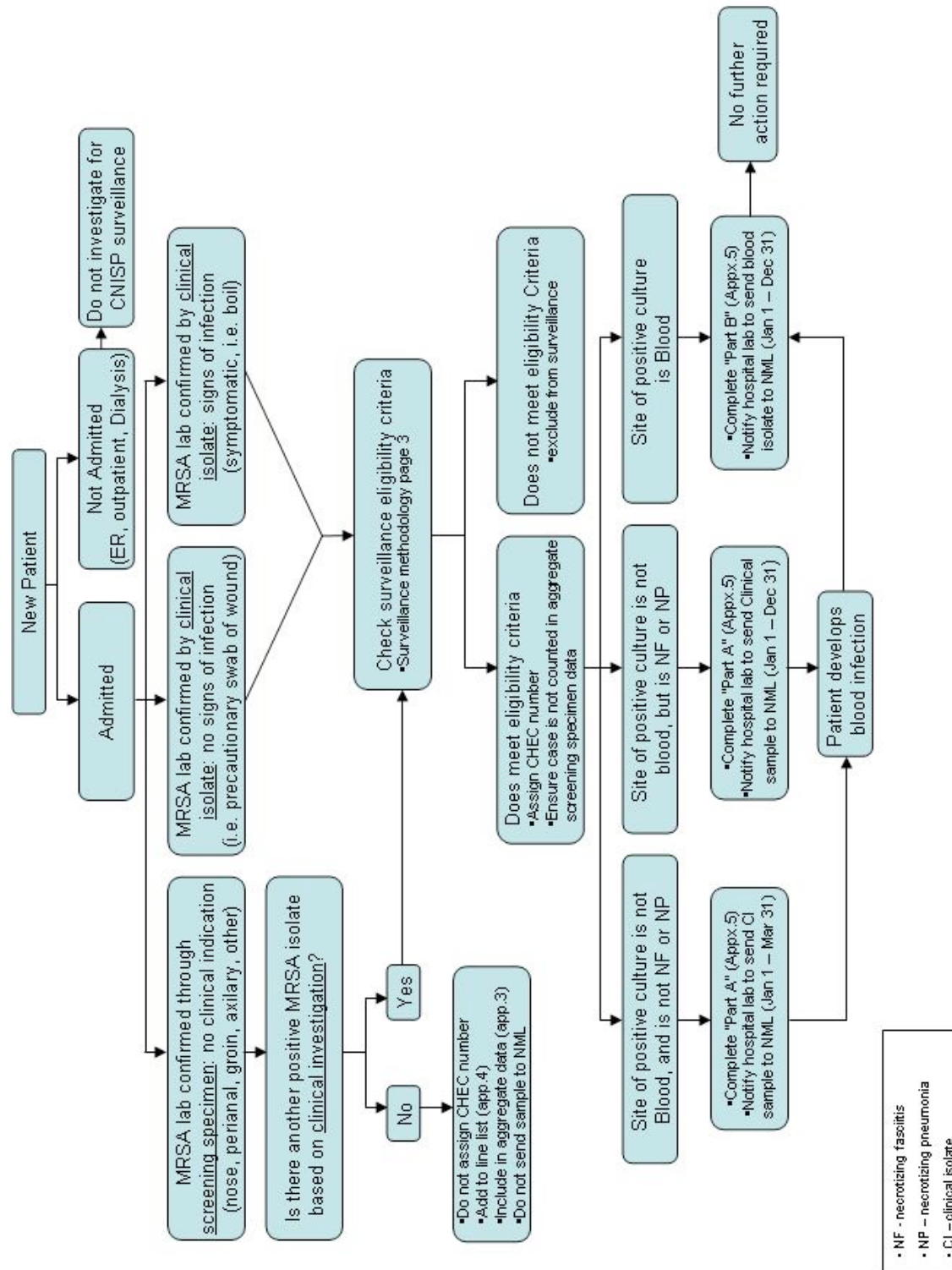
Appendix 6: Data Dictionary

Appendix 1**List of CHEC Sites**

	<i>Hospital</i>	<i>Province/Region</i>
1	Vancouver General Hospital	BRITISH COLUMBIA
2	Richmond General Hospital	
3	UBC Hospital	
4	Lion's Gate	
5	Powell River	
6	St. Mary's Hospital	
7	Squamish Hospital	
8	Royal Jubilee	
9	Children's and Women's Health Centre	
10	Victoria General Hospital	
11	Peter Lougheed Centre	ALBERTA
12	Rockyview General Hospital	
13	Foothills Hospital	
14	Alberta Children's Hospital	
15	University of Alberta Hospital	
16	Stollery Children's Hospital	
17	Health Sciences Centre	SASKATCHEWAN / MANITOBA
18	University of Manitoba, Pediatric Infectious Diseases	
19	Royal University Hospital	

20	St. Joseph's Health Care, London	ONTARIO
21	Children's Hospital of Western Ontario	
22	London Health Sciences Centre	
23	University Health Centre (all data until the end of 2005)	
24	Toronto General Hospital	
25	Toronto Western Hospital	
26	Princess Margaret Hospital	
27	Mount Sinai Hospital	
28	Sunnybrook Health Sciences Centre	
29	Kingston General Hospital	
30	Hamilton Health Sciences Centre, McMaster Site	
31	Hamilton Health Sciences Centre, Chedoke Site	
32	St. Joseph's Healthcare	
33	Hamilton Health Sciences Centre, Henderson Site	
34	Hamilton Health Sciences Centre, General Site	
35	Ottawa Hospital, Civic Site	
36	Ottawa Hospital, General Site	
37	Ottawa Hospital Heart Institute	
38	Children's Hospital of Eastern Ontario	
39	Hospital for Sick Children	
40	The Moncton Hospital	ATLANTIC
41	QEH Health Sciences Centre	
42	IWK Health Centre	
43	General Hospital and Miller Centre Sites	
44	Janeway Site	
45	St. Clare Site	
46	Montreal Children's Hospital	QUEBEC
47	Maisonnette-Rosemont Hospital	
48	SMBD – Jewish General Hospital, Montreal, QC	
49	Hôtel-Dieu de Québec du CHUQ	
50	CHUS Hopital Fleurimont, Sherbrooke	
51	Montreal General Hospital, QC	
52	Royal Victoria Hospital, QC	
53	Montreal Neurological Hospital, QC	
54	Montreal Chest Institute, QC	

Appendix 2 — Algorithm for 2010 MRSA Surveillance



Appendix 3 — Screening Data Submission Form 2010 Surveillance of Methicillin Resistant *Staphylococcus aureus* (MRSA) for Screening Isolates

Instructions:

Aggregate data (total number of cases identified and numbers attributed to each site of acquisition) submitted quarterly:

Surveillance period	Date of data submission
Jan. 01 st – Mar. 31 st , 2010	June 30 th , 2010
Apr. 01 st – June 30 th , 2010	Sept. 30 th , 2010
July 01 st – Mar. 30 th , 2010	Dec. 31 st , 2010
Oct. 01 st – Dec. 31 st , 2010	Mar. 31 st , 2011

Please see Appendix 6 Data Dictionary for definitions and notes.

To be Completed by CHEC Site:

- CHEC Site #: _____
- Surveillance Period: _____
- # of new MRSA colonized patients** identified in a screening specimen (nose, perineal, groin, axillary, or other screening sites) **during this surveillance period** (as reported in item 2 above) **by site of MRSA acquisition**

Site of MRSA acquisition	# of <u>new colonized MRSA patients</u> identified during this surveillance period
i) healthcare-associated, your acute care facility	
ii) healthcare-associated, another acute care facility	
iii) healthcare-associated, long-term care facility	
iv) another healthcare exposure	
v) *community-associated	
vi) unknown	

- Total # of New MRSA colonized patients identified during this surveillance period** [sum of i), ii), iii), iv), v) and vi) in question 3]. _____

* Community-associated cases are defined as meeting all of the following criteria:

- no previous known healthcare-associated MRSA
- MRSA identified ≤ 48 hours after hospital admission
- no hospitalization in the previous 12 months
- no surgery or dialysis in the previous 12 months
- no residence in a long-term care facility in the previous 12 months
- no indwelling catheter or medical device (eg. Foley catheter, IV line, tracheostomy, feeding tube)

Appendix 4 — Sample Line List

Patient Name	Hospital ID #	COLONIZATION		CHEC ID # (for Clinical or Blood Culture isolate)	CLINICAL ISOLATE			BLOOD CULTURE ISOLATE	
		Date when tested Positive	Where Acquired?		Date when tested Positive	Laboratory notification (✓)	Necrotizing Pneumonia / fasciitis? (Notify Lab)(✓)	Date when blood Culture was obtained	Notify the Lab (NML) (✓)
			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
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			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/> HA-MRSA <input type="checkbox"/> CA-MRSA <input type="checkbox"/> Unknown			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

Appendix 5A — Patient Questionnaire

2010 Surveillance of Methicillin Resistant *Staphylococcus aureus* (MRSA) for Cases Identified as Clinical Isolates or Blood Culture Isolates

Instructions:

- **Please complete Part A for all new MRSA cases identified as a Clinical Isolate.**
 - Please see Appendix 6 Data Dictionary for definitions and notes.
 - Terms identified by an asterisk (*) are defined at the end of the question
- **Summary of Laboratory Requirements**
 - Please Notify The Laboratory To Retain One Clinical Isolate Per Questionnaire if:
 - The date of first positive culture is between January 1st – March 31st, 2010 (Q 8)
 - There is a diagnosis of necrotizing fasciitis or necrotizing pneumonia due to MRSA (Q 11, 12)
 - Label the samples using the appropriate suffix ending
 - **CI** = Clinical Isolate
 - **NP** = Necrotizing Pneumonia
 - **NF** = Necrotizing Fasciitis

Part A – Complete For New 2010 MRSA Cases Identified as a CLINICAL ISOLATE

1	CHEC Site #			
2	Unique Identifier Code: (must include site #, year and three digit consecutive code, eg. 07A09001)	<div style="text-align: center;"> <div style="display: inline-block; width: 20%; text-align: center;">10</div> <div style="display: inline-block; width: 20%; text-align: center;">(CHEC site #)</div> <div style="display: inline-block; width: 20%; text-align: center;">(year)</div> <div style="display: inline-block; width: 20%; text-align: center;">(case number)</div> </div>		
3	Date of birth: In the absence of the actual date, please indicate age in years, months or days	<div style="text-align: center;"> <div style="display: inline-block; width: 20%;">DD</div> <div style="display: inline-block; width: 20%;">/</div> <div style="display: inline-block; width: 20%;">MMM</div> <div style="display: inline-block; width: 20%;">/</div> <div style="display: inline-block; width: 20%;">YYYY</div> </div>	<div style="text-align: center;"> <div style="display: inline-block; width: 20%;">Age</div> </div>	<input type="checkbox"/> years <input type="checkbox"/> months <input type="checkbox"/> days
4	Sex:	<input type="checkbox"/> Male <input type="checkbox"/> Female		
5	Date of admission:	<div style="text-align: center;"> <div style="display: inline-block; width: 20%;">DD</div> <div style="display: inline-block; width: 20%;">/</div> <div style="display: inline-block; width: 20%;">MMM</div> <div style="display: inline-block; width: 20%;">/</div> <div style="display: inline-block; width: 20%;">YYYY</div> </div>		
6	Where was the MRSA acquired? Check one response only <small>* No previous known healthcare-associated MRSA; MRSA identified ≤ 48 hours after hospital admission; no hospitalization in the previous 12 months; no surgery or dialysis in the previous 12 months; no residence in a long-term care facility in the previous 12 months; no indwelling catheter or medical device (eg. Foley catheter, IV line, tracheostomy, feeding tube).</small>	<input type="checkbox"/> Healthcare-associated, your acute care facility <input type="checkbox"/> Healthcare-associated, another acute care facility <input type="checkbox"/> Healthcare-associated, long-term care facility <input type="checkbox"/> Another healthcare exposure <input type="checkbox"/> Community-associated* <input type="checkbox"/> Unknown		

7	Date of patient's first positive clinical MRSA culture:	<div style="display: flex; justify-content: space-around; align-items: center;"> <div>____ /</div> <div>____ /</div> <div>____</div> </div> <div style="display: flex; justify-content: space-around; align-items: center; font-size: small;"> <div>DD</div> <div>MMM</div> <div>YYYY</div> </div>	
8a	At which site(s) has MRSA been isolated with a positive culture(s)? Check all that apply	<input type="checkbox"/> Skin/soft tissue/burn <input type="checkbox"/> Surgical site/wound <input type="checkbox"/> Sputum/lower respiratory <input type="checkbox"/> Urine <input type="checkbox"/> Other (please specify) _____	
8b	<i>If MRSA was isolated from sputum/lower respiratory site</i> Was there also concurrent* or recent** laboratory-confirmed*** Influenza? <small>* Patient had simultaneous Influenza and MRSA infections and Influenza symptoms had been present for <7 days prior to detection of MRSA</small> <small>** Patient had recovered from influenza infection within the previous seven days</small> <small>*** Any test the laboratory reports as positive for influenza A or B</small>	<input type="checkbox"/> No <input type="checkbox"/> Yes, recent <input type="checkbox"/> Yes, concurrent <input type="checkbox"/> Unknown	
9	Does this patient meet the criteria for a MRSA infection?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10	Does this patient have necrotizing pneumonia due to MRSA?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	Does this patient have necrotizing fasciitis due to MRSA?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	For paediatric cases only (< 18 years of age): Is the patient Aboriginal?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	If yes <input type="checkbox"/> Inuit <input type="checkbox"/> Métis <input type="checkbox"/> First Nation <input type="checkbox"/> Unknown

Appendix 5B — Complete for New 2010 MRSA Cases Identified as a BLOOD CULTURE ISOLATE

Instructions:

- **Please complete Part B for all new MRSA cases identified as a Blood Culture Isolate.**
 - Please see Appendix 6 Data Dictionary for definitions and notes.
 - Terms identified by an asterisk (*) are defined at the end of the question
- **Please Notify The Laboratory To Retain One Blood Isolate Per Questionnaire**
 - Label the isolate using the suffix ending “B”, and
 - Forward isolates in a timely manner to the NML using the information provided on page 6

1	CHEC Site #			
2	Unique Identifier Code: (must include site #, year and three digit consecutive code, eg. 07A09001)	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">10</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">10</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">10</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">10</div> </div> <div style="display: flex; justify-content: space-between; font-size: small;"> (CHEC site #) (year) (case number) </div>		
3	Date of birth: In the absence of the actual date, please indicate age in years, months or days	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">DD</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">MMM</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">YYYY</div> </div>	<div style="border-bottom: 1px solid black; width: 20%; text-align: center;">Age</div>	<input type="checkbox"/> years <input type="checkbox"/> months <input type="checkbox"/> days
4	Sex:	<input type="checkbox"/> Male <input type="checkbox"/> Female		
5	Date of admission:	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">DD</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">MMM</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">YYYY</div> </div>		
6	Date first positive blood culture was obtained:	<div style="display: flex; justify-content: space-around;"> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">DD</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">MMM</div> <div style="border-bottom: 1px solid black; width: 20%; text-align: center;">YYYY</div> </div>		
7	What was the place of onset of the MRSA bloodstream infection? Check one response only <small>* No previous known healthcare-associated MRSA; MRSA identified ≤ 48 hours after hospital admission; no hospitalization in the previous 12 months; no surgery or dialysis in the previous 12 months; no residence in a long-term care facility in the previous 12 months; no indwelling catheter or medical device (eg. Foley catheter, IV line, tracheostomy, feeding tube).</small>	<input type="checkbox"/> Healthcare-associated, your acute care facility <input type="checkbox"/> Healthcare-associated, another acute care facility <input type="checkbox"/> Healthcare-associated, long-term care facility <input type="checkbox"/> Another healthcare exposure <input type="checkbox"/> Community-associated* <input type="checkbox"/> Unknown		
8	What was the probable source of the MRSA bacteraemia? Check one response only	<input type="checkbox"/> Primary bacteraemia, IV catheter-associated <input type="checkbox"/> Skin/soft tissue/burn wound <input type="checkbox"/> Necrotizing fasciitis <input type="checkbox"/> Surgical site/wound infection <input type="checkbox"/> Endocarditis <input type="checkbox"/> Osteomyelitis, septic arthritis, septic bursitis <input type="checkbox"/> Pneumonia <input type="checkbox"/> Necrotizing pneumonia <input type="checkbox"/> Meningitis <input type="checkbox"/> Urinary tract infection/urosepsis <input type="checkbox"/> Other, please specify: _____ <input type="checkbox"/> Unknown / cannot determine		

9	<p><i>If the probable source of the MRSA bacteraemia (question 8) was pneumonia or necrotizing pneumonia:</i></p> <p>Was there also concurrent* or recent** laboratory-confirmed*** Influenza?</p> <p>* Patient had simultaneous Influenza and MRSA infections and that Influenza symptoms had been present for <7 days prior to detection</p> <p>** Patient had recovered from influenza infection within the previous seven days</p> <p>*** Any test the laboratory reports as positive for influenza A or B</p>	<input type="checkbox"/> No <input type="checkbox"/> Yes, recent <input type="checkbox"/> Yes, concurrent <input type="checkbox"/> Unknown	
10a	<p>At the time the positive bloodstream culture was obtained, was the patient:</p> <ul style="list-style-type: none"> In an ICU* <u>or</u> discharged from an ICU* within 48 hours <p>AND</p> <ul style="list-style-type: none"> In (or had been in) the ICU* for 48 hours or more? <p>* Includes medical, surgical combined medical-surgical, cardiovascular, coronary, neurosurgery, burn, or step-down unit</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10b	<p>Was the patient receiving haemodialysis at the time the positive blood culture was obtained?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
11	<p>Is the patient known to use or inject him/herself with IV drugs?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
12	<p>For paediatric cases only (< 18 years of age): Is the patient Aboriginal?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	If yes <input type="checkbox"/> Inuit <input type="checkbox"/> Métis <input type="checkbox"/> First Nation <input type="checkbox"/> Unknown
13	<p>In the 24 hours prior to the day the positive blood culture was obtained, please indicate which antibiotics the patient had received: <i>Check all that apply</i></p>	<input type="checkbox"/> Vancomycin <input type="checkbox"/> Linezolid <input type="checkbox"/> Daptomycin <input type="checkbox"/> Tigecycline <input type="checkbox"/> Ceftobiprole <input type="checkbox"/> Other _____ <input type="checkbox"/> No Antibiotics	
14	<p>In the 24 hours following the day the MRSA was identified/reported, please indicate which antibiotics the patient had received: <i>Check all that apply</i></p>	<input type="checkbox"/> Vancomycin <input type="checkbox"/> Linezolid <input type="checkbox"/> Daptomycin <input type="checkbox"/> Tigecycline <input type="checkbox"/> Ceftobiprole <input type="checkbox"/> Other _____ <input type="checkbox"/> No Antibiotics	
15	<p>Was the patient admitted to an ICU* within 30 days after the first positive blood culture?</p> <p>* Includes medical, surgical combined medical-surgical, cardiovascular, coronary, neurosurgery, burn, or step-down unit</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	

16a	Outcome at 30 days after the first positive blood culture:	<input type="checkbox"/> Patient still in hospital Go to question 17a	<input type="checkbox"/> Patient discharged Specify date below <input type="checkbox"/> Patient died Specify date below Date of discharge or death: ____ / ____ / ____ DD MMM YYYY
16b	If the patient was discharged within the 30 days and readmitted, was the patient readmitted because of a recurrent MRSA infection?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
17a	Did the patient have any positive non-bloodstream MRSA cultures taken > 48 hours before the first positive blood culture?	<input type="checkbox"/> Yes (<i>Continue to question 17b</i>) <input type="checkbox"/> No (<i>End of questionnaire</i>)	
17b	<i>If YES to question 17a</i> Date the specimen was obtained of this patient's first positive MRSA non-bloodstream culture?	____ / ____ / ____ DD MMM YYYY	
17c	Please specify where the first positive non-bloodstream specimen(s) had been obtained: <i>Check all that apply</i>	<input type="checkbox"/> nose <input type="checkbox"/> perianal, rectal or perineal <input type="checkbox"/> surgical site / wound infection <input type="checkbox"/> skin / soft tissue / burn wound <input type="checkbox"/> IV catheter exit site <input type="checkbox"/> sputum / other lower respiratory <input type="checkbox"/> urine <input type="checkbox"/> Other, please specify: _____ <input type="checkbox"/> unknown / cannot determine	
17d	At the time the first positive non-bloodstream culture(s) had been obtained, did the patient meet the criteria for a MRSA infection?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
17e	Where was the (non-bloodstream) MRSA acquired? Check one response only <small>* No previous known healthcare-associated MRSA; MRSA identified ≤ 48 hours after hospital admission; no hospitalization in the previous 12 months; no surgery or dialysis in the previous 12 months; no residence in a long-term care facility in the previous 12 months; no indwelling catheter or medical device (eg. Foley catheter, IV line, tracheostomy, feeding tube).</small>	<input type="checkbox"/> Healthcare-associated, your acute care facility <input type="checkbox"/> Healthcare-associated, another acute care facility <input type="checkbox"/> Healthcare-associated, long-term care facility <input type="checkbox"/> Another healthcare exposure <input type="checkbox"/> Community-associated* <input type="checkbox"/> Unknown	

Appendix 6 — Data Dictionary - definitions and notes SCREENING DATA SUBMISSION FORM

The numbers (1 - 4) in the following instructions correspond with the numbers of the questions on the Screening Data Submission Form for Screening Isolates - Appendix 3.

1. **CHEC Site #:** = Three-character alphanumeric number assigned to your institution that will always begin with the two-digit number assigned to the CHEC member (e.g. 07, 15), followed by the alphabetical letter assigned by the CHEC member for that specific institution (e.g. A, B, C, etc.).

N.B.: 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. **Surveillance period** = Period of time of the surveillance data that you are submitting, that will include a 3 month period and submitted 4 times a year as indicated in the submission form.

3. **Site of MRSA acquisition:**

All new colonized MRSA cases identified by a screening isolate will be reported by the classification, as to whether they are healthcare-associated to your acute care facility, to another acute care facility, to a long-term care facility, to another healthcare exposure or whether they are community-associated. If none of the above can be determined, the MRSA case may be determined as unknown.

Example:

- i) healthcare-associated, your acute care facility = 10 new MRSA cases identified during this surveillance period, and so on.

Another healthcare exposure = outpatient clinics, community health centres, out-patient dialysis, walk-in clinics, medical offices, dental clinics.

4. **Total # of newly colonized MRSA Cases:** = Sum of all newly identified (via screening) MRSA cases listed in (i), (ii), (iii), (iv), and (v) of *question 3*.

Patient Questionnaire

Part A – Clinical Isolate

(for new MRSA cases that are not screening isolates and not blood cultures)

The numbers (1-12) in the following instructions correspond with the questions in Part A.

Positive MRSA culture = *S. aureus* with oxacillin MIC ≥ 4 mg/ml, growing on oxacillin screen plate and the presence of PBP2a detected by latex agglutination test.

1. CHEC Site #:

Three-character alphanumeric number assigned to your institution that will always begin with the two-digit number assigned to the CHEC (e.g. 07, 15), followed by the alphabetical letter assigned by the CHEC (e.g. A, B, C, etc.)

N.B.: 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:

Eight-character number that includes the CHEC identification number (3-character alphanumeric number), the year the MRSA case occurred in (Last 2 digits only), and the MRSA case sequential number (starting from 001)

Example:

The first case in an institution with CHEC ID 09A in 2010 will have **09A10001** as unique identifier, whereas the 36th and 276th cases will carry **09A10036t5** & **09A10276**, respectively.

N.B.: (a) Always label the lab isolate with this ID number.

(b) If this is a new clinical isolate (from previously colonized patient included on the aggregate screening form), assign a new unique identifier and remove from the screening form data, when possible. A reasonable effort should be made to ensure double counting of patients is avoided, but this may not be possible in all cases. **Infection supersedes colonization.**

3. Date of Birth:

Please enter Day (##), Month (e.g., May) and Year (2009) in this order, OR indicate age in days, months, or years.

4. Sex:

Check male or female gender as appropriate.

5. Date of Admission:

Please enter Day (##), Month (e.g., May) and Year (e.g., 2010) in this order of the date of admission to hospital as an inpatient.

6. Where was the MRSA (organism) acquired?

Was the MRSA organism acquired in a healthcare setting or in the community? Check the appropriate answer from the provided list.

The practitioner's assessment determines where the onset of MRSA infection occurred. This assessment will be based on:

- length of time in hospital prior to MRSA identification (> 48 hours)
- knowledge of previous MRSA status
- date of admission
- length of stay in hospital
- prior hospitalization history (previously admitted in past 12 months)
- from where the patient has been admitted

Newborn healthcare-associated case definition:

A MRSA case in a newborn may be considered as healthcare-associated if the mother was not known to be a case on admission and where 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 healthcare-associated if the organism was not known to be present and there is no epidemiological reason to suspect that acquisition occurred prior to transfer.

Community case definition:

No established health-care associated risk factors, and:

- (i) no previous known healthcare-associated MRSA
- (ii) MRSA identified \leq 48 hours after hospital admission
- (iii) no hospitalization in the previous 12 months
- (iv) no surgery or dialysis in the previous 12 months
- (v) no residence in a long-term care facility in the previous 12 months
- (vi) no indwelling catheter or medical device (eg. Foley catheter, IV line, tracheostomy, feeding tube)

7. Date of this patient's positive clinical MRSA culture:

Enter Day (##) Month (e.g., May) and Year (2010) for newly diagnosed MRSA cases only.

Note: This date is meant to reflect the first clinical culture, not the first screening culture.

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

Type of specimen in which MRSA was detected (positive non-bloodstream clinical culture).

Check the appropriate box(es) from the list provided or specify if not included in the list.

- The box "OTHER" is defined as non-blood specimens and includes aspirates (kidney, liver, joint, peritoneal, CSF, etc.), wound drainage tubes (e.g., Jackson-Pratt).

8b. Was there also concurrent or recent laboratory-confirmed Influenza?

Was the patient also diagnosed (laboratory-confirmed), simultaneously or recently, with Influenza?

Laboratory-confirmed definition = Any test the lab reports as positive for influenza A / B

Concurrent Influenza infection = The patient has simultaneously Influenza and MRSA infections and Influenza (A / B) symptoms have been present for less than seven days prior to detection.

Recent influenza infection = The infection occurred within the previous seven days.

9. Does this patient meet criteria for a MRSA infection:

The culture was obtained because a physician ordered the culture as a result of some clinical indication or suspicion of infection. Along with the new MRSA identified by the clinical isolate, the MRSA infection will be determined by the manifestations of signs and symptoms associated with a MRSA infection.

10. Does this patient have a 'necrotizing pneumonia' due to MRSA:

To identify whether the patient has a necrotizing pneumonia due to MRSA as diagnosed by a physician.

11. Does this patient have a 'necrotizing fasciitis' due to MRSA:

To identify whether the patient has a necrotizing fasciitis due to MRSA as diagnosed by a physician.

12. Aboriginal (for paediatric cases, < 18 yrs of age):

Please check YES only if the patient is of Inuit, First Nations, Métis, or Aboriginal of unknown origin.

Part B – Blood Culture Isolate

(for new MRSA infections only)

The numbers (1-17) in the following instructions correspond with the questions in Part B.

Positive MRSA culture = *S. aureus* with oxacillin MIC ≥ 4 mg/ml, growing on oxacillin screen plate and the presence of PBP2a detected by latex agglutination test.

1. CHEC Site #:

Three-character alphanumeric number assigned to your institution that will always begin with the two-digit number assigned to the CHEC Site (e.g. 07, 15), followed by the alphabetical letter assigned by the CHEC Site (e.g. A, B, C, etc.)

N.B.: 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:

Eight-character number that includes the CHEC identification number (3-character alphanumeric number), the year the MRSA case occurred in (last 2 digits only), and the MRSA case sequential number (starting from 001)

Example:

The first case in an institution with CHEC ID 09A in 2010 will have **09A10001** as unique identifier, whereas the 35th and 276th cases will carry **09A10035** & **09A10276**, respectively.

N.B.: (a) Always label the lab isolate with this ID number.

(b) If this is a new blood isolate (from previously colonized patient included on the aggregate screening form), assign a new unique identifier and remove from the screening form data, when possible. A reasonable effort should be made to ensure double counting of patients is avoided, but this may not be possible in all cases. **Infection supersedes colonization.**

(c) If this is a new blood isolate (from a previously counted patient with a positive clinical isolate), use the same unique identifier on both Form A and Form B. This will prevent the patient from being double counted.

3. Date of Birth:

Enter Day (##), Month (e.g., May) and Year (2009) in this order.

4. Sex:

Check male or female gender as appropriate.

5. Date of Admission:

Enter date as in **question 3**.

6. Date first positive blood culture was obtained:

Enter date as in question 3 for a newly diagnosed MRSA blood infection only.

7. What was the place of onset of the MRSA bloodstream infection?

Where did the MRSA bloodstream infection onset occur? Was it in a healthcare setting or in the community? Check the appropriate answer.

The practitioner's assessment determines where the onset of MRSA bloodstream infection occurred. This assessment will be based on:

- length of time in hospital prior to MRSA identification (> 48 hours)
- knowledge of previous MRSA status
- date of admission
- length of stay in hospital
- prior hospitalization history (previously admitted in past 12 months)
- from where the patient has been admitted

8. 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.

9. Was there also concurrent or recent laboratory-confirmed Influenza?

If the probable source of the MRSA bacteraemia (question 8) was pneumonia or necrotizing pneumonia, was the patient recently or concurrently diagnosed (laboratory-confirmed) with Influenza?

Laboratory-confirmed definition = Any test the lab reports as positive for influenza A / B

Concurrent Influenza infection = The patient has simultaneously Influenza and MRSA infections and Influenza (A / B) symptoms have been present for less than seven days prior to detection.

Recent influenza infection = The infection occurred within the previous seven days.

10a. At the time the positive bloodstream culture was obtained, was the patient both in an ICU* or discharged from an ICU* within 48 hours AND in (or had been in) the ICU* for 48 hours or more?

Check the “YES” box only if at the time the blood specimen that tested positive for MRSA was obtained, the patient was in any of the ICU (listed below) for 48 hours or more AND was either still in the ICU or had been discharged from the ICU within 48 hours.

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

Note: ICU (Intensive Care Unit) includes the following units:

- medical
- surgical
- combined medico-surgical
- cardiovascular
- coronary
- neurosurgery
- burn, or “step-down”

10b. 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. Aboriginal (for paediatric cases only, i.e. less than 18 years old):

Check the “YES” box only if the patient is an Aboriginal and proceed also to identify the group with which s/he identifies (i.e. Inuit, First Nations, Métis, or of unknown origin).

13. In the 24 hours prior to the day the positive blood culture was obtained, please indicate which antibiotics the patient had received:

24 hours before the blood specimen that tested positive was collected, was the patient administered any of the listed or other antibiotic(s)?

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

24 hours following the diagnosis of MRSA bacteraemia, was the patient administered any of the listed or other antibiotic(s)?

- 15. Was the patient admitted in an ICU within 30 days after the first positive blood culture,:**
Check the “YES” box only if the patient was admitted in any ICU as defined in *question 9*.
- 16a. Outcome at 30 days after the first positive blood culture (as in question 6):**
Check whether the patient was discharged alive, alive and in hospital, or died within 30 days of the date of the first positive blood culture.
- 16b. If the patient was discharged within the 30 days and readmitted, was the patient readmitted because of a recurrent MRSA infection?**
Was the patient readmitted as a result of recurrent MRSA infection within 30 days of the initial discharge?
- 17a. Did the patient have any positive non-bloodstream MRSA cultures taken > 48 hours before the first positive blood culture?**
More than 48 hours before the first positive blood culture, did any non-bloodstream isolate (both screening and clinical) from this patient test positive for MRSA?
- 17b. Date the specimen was obtained of this patient’s first positive MRSA non-bloodstream culture?**
Date (*as in question 3*) the non-bloodstream specimen that tested positive was collected?
This can include screening isolates.
- 17c. Please specify where the first positive non-bloodstream specimen(s) had been obtained:**
If any non-bloodstream MRSA culture taken more than 48 hours before the first positive blood culture tested positive for MRSA, specify its source.
Check the appropriate box(es) from the list provided or specify if not included in the list.
- The box “OTHER” is defined as non-blood specimens and includes aspirates (kidney, liver, joint, peritoneal, CSF, etc.), wound drainage tubes (e.g., Jackson-Pratt).
- 17d. At the time the first positive non-bloodstream culture(s) had been obtained, did the patient meet the criteria for a MRSA infection?**
At the time the non-bloodstream specimen tested positive for MRSA, did the condition of the patient meet the criteria for MRSA infection?
- 17e. Where was the (non-bloodstream) MRSA acquired?**
Physical place where the non-bloodstream MRSA specimen was acquired? Was it in a healthcare setting (specify which one from the list) or in the community?