Provincial Surveillance Protocol for Methicillin-resistant *Staphylococcus aureus*

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Background

Provincial Infection Control Newfoundland Labrador (PIC-NL), established in 2007, is the provincially recognized source for best practices in infection prevention and control (IPAC). One of the key areas of practice for IPAC is surveillance for healthcare-associated infections (HAIs). PIC-NL launched a surveillance program for HAIs in 2009 and methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile* infections were identified for provincial reporting. PIC-NL provides a database for the storage of this data in the Regional Health Authorities (RHAs) that facilitates reporting to the province. Reports are provided to decision makers in the RHAs.

Methicillin-resistant *Staphylococcus aureus* surveillance

The presence of antibiotic-resistant organisms, especially methicillin resistant *Staphylococcus aureus* (MRSA), has become a significant and growing public health concern especially for consumers of health care. According to the Canadian Patient Safety Institute each year about 8,000 Canadians die from healthcare-associated infection; 220,000 others get infected.[1] Costs were estimated at $129 million for 2010, that is $12, 216 per infected MRSA patient per year.[1] From 1995-2007 in specific Canadian hospitals the overall incidence of MRSA infection and colonization increased from 0.65 to 11.04 cases per 10,000 patient-days; the infection rate during this period increased from 0.36 to 3.43 cases per 10,000 patient-days.[2] The morbidity and mortality rate associated with MRSA has been reported to be significantly higher than with methicillin-susceptible *Staphylococcus aureus.*[3] In addition to hospital acquired MRSA there is a mounting concern regarding the emergence of community-associated MRSA in patients with no apparent risk factors.[4,5] Surveillance for MRSA cases is considered a component of an infection control program.[6] In 2012 the Accreditation Canada Standards for Infection Prevention and Control require organizations to monitor trends in infections and to track safety indicators for healthcare-associated (nosocomial) infections: MRSA and *Clostridium difficile.*

Purpose:

The purpose of this protocol is to provide a consistent approach for surveillance of methicillin-resistant *Staphylococcus aureus* infections and colonizations in Newfoundland and Labrador.

Objectives:

1. To determine the incidence and trend of MRSA infections and colonizations in NL for acute care and long term care facilities

2. To identify MRSA cases occurring associated with health care (not hospitalized) and cases acquired in the community

Definitions:

MRSA case: Laboratory reported isolation of *Staphylococcus aureus* from any body site and resistance of the isolate to oxacillin.

MRSA infection: The organism is present in or on the body and is causing symptomatic illness.

MRSA colonization: The organism is present on the body but no cellular injury is occurring and there are no signs or symptoms of infection present.

The infection or colonization must be related to identification of *Staphylococcus aureus* from any body site and is a newly identified MRSA case.

Infected cases:

(i) Healthcare-associated – (hospitalized) case:
The infection was not present on admission with onset of symptoms ≥ 48 hours after admission to the acute care facility OR the infection was present at the time of admission but is related to a previous admission to the same facility within the last 12 months.

(ii) Healthcare-associated – (long term care) case:
The infection was not present on admission, with onset of symptoms ≥ 48 hours after admission to the long term care facility.

If the infection is identified in a resident who has transferred from acute care within the last 48 hours, the infection would be attributed to that acute care facility.

(iii) Healthcare-associated - Other:
A case that does not meet the definition for healthcare-associated (hospitalized), healthcare-associated (long term care) or community-associated infection.

(iv) Community-associated case:
A case must meet all of the following criteria:
- If admitted, MRSA identified <48 hours after hospital admission

- No previous history of MRSA
- No history of hospitalization, surgery or dialysis within 1 year of MRSA culture
- Not in residence at a long-term care facility within 1 year of MRSA culture
- No indwelling catheter or medical devices (e.g., Foley catheter, IV line, tracheotomy, feeding tube) within 1 year of MRSA culture

Colonized cases

(i) Healthcare-associated – (hospitalized) case:
A case in whom colonization was not present on admission who is identified as part of a screening endeavor ≥48 hours after admission to the acute care facility.

(ii) Healthcare-associated – long term care case:
A case in whom the colonization was not present on admission who is identified as part of a screening endeavor ≥48 hours after the admission to the long-term care facility.

(iii) Health care-associated - Other:
A case that is identified as part of a screening endeavor (e.g., admission screen) to a health care facility or long term care facility and the case does not meet the definition for healthcare-associated (hospitalized) or healthcare-associated (long term care) colonization.

Roles, Responsibilities & Reporting

Laboratory

Laboratory testing:

All specimens requiring testing for culture and sensitivity are processed through the microbiology laboratory of the acute care hospital facility in the Regional Health Authority (RHA).

- In the Labrador Grenfell Health Region the specimens showing methicillin *Staphylococcus aureus* resistance are sent from the microbiology laboratory at Captain William Jackman Memorial Hospital and the microbiology laboratory of the Labrador Health Centre to the Provincial Public Health Laboratory (PHL) for confirmatory testing
- At the Charles S. Curtis Memorial Hospital the specimens are processed on site
- In the Eastern Health, Central Health & Western Health Regions the testing of specimens for culture and sensitivity is done on site

Laboratory reporting:

- The Public Health Laboratory reports all positive samples for MRSA to the referring microbiology laboratory and to the Regional Medical Officer of Health (RMOH)
- The staff in the RHA microbiology laboratory report all confirmed cases of MRSA to the:
  - RMOH
  - Attending physician
  - Infection Control Practitioner (ICP) responsible for MRSA regional surveillance

Infection Prevention and Control

All laboratory identified cases of MRSA will be reviewed by an Infection Control Practitioner (ICP). The ICP will determine if the case meets the criteria in the definitions section. The ICP

will collaborate with the Communicable Disease Control Nurse (CDCN) to collect the data if necessary.

- A data collection form (Appendix A) can be used to collect the data
- Data will be entered into the HAI ACCESS® database or another database utilized by the RHA

Public Health reporting:
On a quarterly basis the RHA will submit a report to the RMOH and to the provincial office of Disease Control.

Medical Officer of Health

- Review the quarterly reports
- Determine any actions necessary as indicated by the incidence of MRSA

Provincial Epidemiologist

- Provide ongoing training and non-technical support to regional users
- Provide ad hoc orientation sessions for new HAI database users, as requested
- Compile regional MRSA reports into a quarterly, provincial HAI report
- Report to be provided to Provincial Infection Control Nurse Specialist for distribution to stakeholders
- Support regional PHIS representatives in data extract, analysis, and reporting from HAI database
- Provide surveillance advise and expertise, as needed

Public Health Information and Surveillance

- Provide ongoing training and non-technical support to regional users
- Provide ad hoc orientation sessions for new HAI database users, as requested
- Data extract, analysis, and reporting from HAI database

Provincial Infection Control Nurse Specialist

- Update the protocol for MRSA surveillance as necessary
- Provide input on the clinical requirements for the database
- Review the quarterly reports from the RHAs
- Coordinate the development of a quarterly provincial report
- Review the report with the Director of Disease Control

Ethics

Specific ethics approval is not required for surveillance for diseases of importance to public health; however, all data collected will be governed by the privacy policies within the Regional Health Authorities (RHAs) and the Provincial Department of Health and Community Services. The database will be the responsibility of the Regional Health Authority.

Data Analysis

The data will be used to meet the objectives. The province will collect aggregate data from each RHA and no facility will be defined nominally. Additionally RHAs will be able to use their own data as they feel appropriate and may want to collect additional data to support their internal Infection Control Programs.

MRSA case data

All MRSA infections and colonization will be identified and classified according to the definitions.

MRSA denominator data

Patient care days and resident care days will be used as denominator data to calculate the rates of MRSA infection and colonization in acute care facilities and long term care facilities respectively.

The RHAs will generate the following reports for the province on a quarterly basis:

- Rate of healthcare-associated – (hospitalized) MRSA infection incidence per 10,000 patient care days
- Rate of healthcare-associated – (hospitalized) MRSA colonization incidence per 10,000 patient care days
- Rate of healthcare-associated – long term care MRSA infection incidence per 10,000 resident care days
- Rate of healthcare-associated – long term care MRSA colonization incidence per 10,000 resident care days
- Number of cases of healthcare-associated MRSA infections: Other
- Number of cases of healthcare-associated MRSA colonizations: Other
- Number of community associated cases

References

1. Canadian Patient Safety Institute. Stop Infections Now Collaborative. Retrieved March 29, 2012 from http://www.saferhealthcarenow.ca/EN/events/VirtualPrograms/StopInfectionsNowCollaborative/Documents/SINC%20-%20Call%20to%20Action.pdf

2. Simor AE, Giblert NL, Gravel D, et al. (2010). Methicillin-resistant Staphylococcus aureus colonization of infection in Canada : National surveillance and changing epidemiology, 1995-2007. Infection Control and Hospital Epidemiology, 31, 348-356.

3. Cosgrove SE, Sakoulas G, Perencevich EN, Schwaber MJ, Karchmer AW, & Carmeli Y. (2003). Comparison of mortality associated with methicillin-resistant and methicillin-susceptible *Staphylococcus aureus* bacteremia: A meta-analysis. Clinical Infectious Diseases, 36, 53-59.

4. Boucher HW & Corey GR. (2008). Epidemiology of methicillin-resistant Stahpylococcus aureus. Clinical Infectious Diseases, 46, S344-349.

5. Bader M. (2006). Staphylococcus aureus bacteremia in older adults: Predictors of 7-day mortality and infection with a methicillin-resistant strain. Infection Control and Hospital Epidemiology, 27, 1219-1225.

6. Zoutman DE, Ford BD, Bryce E, Gourdeau M, Hebert G, Henderson E, Paton S. (2003). The state of infection surveillance and control in Canadian acute care hospitals. AJIC, 31, 266 -273.

Appendix A: MRSA Data Collection Form

1	MCP number	
2	Chart # (if applicable) out-of-province number	
3	a) Type of Care (Acute, LTC, Other)	
	b) Facility (Name)	
4	Patient Care Unit in Facility or *if RHA requires CA-MRSA follow-up – community of residence	
5	Type of patient/resident care unit	□ Surgical Unit □ Critical Care Unit □ Medical Unit □ Obstetrical Unit □ Combined (med/surg) Unit □ Other; specify _____
6	Date of birth	_____/_____/_____ DD MMM YYYY (Month=e.g. May)
7	Date of admission	_____/_____/_____ DD MMM YYYY
8	Sex	□ Male □ Female
9	What was the date of the MRSA culture?	_____/_____/_____ DD MMM YYYY
10	*Why was the culture done? (Check one answer only, the primary reason)	□ Admission screen □ Clinical isolate □ Contact screening □ Other screening _____
11	Where was the MRSA acquired? (Check one answer only)	□ Same as treatment facility (# 3a & 3b) – nosocomial □ If not acquired in the same facility as #3b □ Another acute care (AC) in region _____ □ Another LTC in region _____ □ Healthcare-associated: Other □ Community associated □ An exposure outside the region_____

12	At which site has MRSA been isolated (positive culture obtained)?Check **all** that apply	
	Site of positive culture	**Infected or colonized**
	□ Blood	□ Infected
	□ Surgical wound	□ Infected □ Colonized
	□ Sputum/Respiratory	□ Infected □ Colonized
	□ Urine	□ Infected □ Colonized
	□ Rectum/Peri-anal/Perineum	□ Infected □ Colonized
	□ Nose	□ Colonized
	□ Other: _____	□ Infected □ Colonized
13	*Is the patient epidemiologically linked to others within your institution?	□ No □ Yes

14	*Sustained or recurrent infection	□ No □ Yes
15	*Other positives on unit at same time? #	□ No □ Yes # ___
16	*Ethnicity	

* Items collected at the request of the RHA, not all RHAs may require this information.

Comment:_____

Appendix B: Data Dictionary

MRSA Form Data Dictionary		
* = items collected at the request of the RHA		
1	Patient Unique Number MCP Number	Medical Care Plan number as it appears in meditech or on patient's chart.
2	Chart # (if applicable)	Chart number for those facilities that use chart number as a patient identifier or for out-of-province patients.
3a	Type of Care (Acute, LTC, Other)	Placement of the patient at the time of the positive culture; identify if it was acute care, long-term care, or other. Other =living in the community or living in a personal care home at the time of the positive culture.
3b	Facility Name	If applicable, identify the name of the acute care facility or the long term care facility where the patient resided when the positive culture was identified. These facilities can be identified from the drop down tab.
4	Patient/Resident Care Unit in Facility or *Community of Residence	Name of patient/resident care unit of the facility in Question 3b. For example if Unit 4S is identified everyone entering data must use the same code for the unit. (Unit 4S is not Unit4-S or Unit4s). *If the patient is identified as a community case of MRSA and the RHA is collecting information on community cases then the community where the person usually resides can be placed here.
5	Type of Patient Care Unit	If the patient was in hospital when laboratory confirmation was known, indicate the type of service provided on that unit: surgical, medical, critical care, etc. The ICP should use best judgment to determine the unit associated with the transmission.
6	Date of Birth	Patient's date of birth (DD-MMM-YYYY) as it appears in meditech or on patient's chart. (Month-e.g., May)
7	Date of Admission	Date of admission to healthcare facility (DD/MMM/YYYY) as it appears in meditech or on patient's chart. (Month-e.g., May)
8	Sex	Check male, female as appropriate.
9	What was the date of the MRSA culture?	Collection date of the first known MRSA positive culture (DD-MMM-YYYY). (Month-e.g., May)
10	*Why was the first culture done?	*If required by RHA. Check the appropriate response • Admission screening – This culture was done as part of a protocol on admission that requires patients to be screened for MRSA • Clinical isolate – This culture was a result of some clinical indication or suspicion of infection • Contact screen – The screening was done due to the patient/resident being in the room, ward or unit of a recently identified positive case • Other screening endeavour – This culture was taken in the course of working-up an outbreak or cluster, prevalence screen or other screening for

		MRSA. This culture would not have been done routinely.
11	Where was the MRSA acquired?	**This question is really important for the generation of the rate of infection for RHAs using the HAI database.** • Same as treatment facility – This applies to a MRSA infection or colonization which has been acquired in the treatment facility identified **in #3a & 3b.** • If it is not the same facility **as 3a & 3b** identify the type of care and the facility (which to the best knowledge of the Infection Control Practitioner) • Healthcare-associated: Other – this refers to cases who do not fit the criteria for healthcare associated hospitalized or healthcare associated long term care • Community associated – this applies to cases who meet the criteria • An exposure outside the region – this would be a case which was identified in another RHA or outside the province
12	At which site has MRSA been isolated (positive culture obtained)?	Check the boxes in the culture positive column for each site that MRSA has been isolated.In the second column identify whether the positive culture represented an infection or colonization. • MRSA infection is determined by the presence of signs and symptoms associated with MRSA infections • MRSA colonization is the presence of MRSA on the skin, soft tissue, nose or other site which is not associated with clinical signs and symptoms of infection • If the person is found to be colonized from one site and infected at another site, the person would be considered an infected case
13	*Is the patient epidemiologically linked to others within your institution	Epidemiological link: This refers to MRSA thought to be epidemiologically linked to another person with MRSA in your facility through (e.g., common exposures, shared rooms, contact with implicated healthcare worker, and contact with another person with MRSA). Using your “best judgment” identify whether an epidemiological link has been established between this person and any other known MRSA case in your facility. Check yes or no. • If yes is checked, please specify the facility name/unit.
14	*Sustained or recurrent infection	**Sustained MRSA infection** – MRSA infection which has been treated but the signs and symptoms continue despite treatment and the case returns for reevaluation and retreatment less than 2 months from the previous isolate

		Recurrent MRSA infection – A new infection in a case that has been adequately treated with complete recovery from the signs and symptoms of the previous infection which occurs 2 or more months from the previous infection
15	*Other positive cases on unit at the same time?	Identify if there are other cases known to be MRSA positive are on the unit where this new case was identified. If yes, indicate how many others positive cases.
16	*Ethnicity	An ethnic quality or affiliation resulting from racial or cultural ties.
* = Items requested to be collected by RHA		

Appendix C: Sample Public Health Reporting Form for MRSA

Region: _____

Date: _____

1. Numerator Data

Table 1: Number of MRSA infections & colonizations for each Acute Care Facility

Facility	**Number of MRSA infections**	**Number of MRSA colonizations**
Acute Care Facility 1		
Acute Care Facility 2		
Total		

Table 2: Number of MRSA Infections & Colonization for each Long Term Care Facility

Facility	**Number of MRSA infections**	**Number of MRSA colonizations**
Long Term Care Facility 1		
Long Term Care Facility 2		
Total		

2. Denominator Data

Table 3. Number of Patient Care Days for each Acute Care Facility

Facility	**Patient Care Days**
Acute Care Facility 1	
Acute Care Facility 2	
Total	

Table 4. Number of Resident Care Days for each Long Term Care Facility

Facility	**Resident Care Days**
Long Term Care Facility 1	
Long Term Care Facility 2	
Total	

3. Number of cases of community-associated MRSA infections

Table 5. Number of cases of Community associated MRSA infections

RHA	Number of Cases