Manitoba
Health, Seniors and Active Living

Manitoba
Santé, Aînés et Vie active

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HEALTHCARE ASSOCIATED INFECTIONS MONITORING AND REPORTING
QUALITY AND PATIENT SAFETY COUNCIL

Background

Manitoba Health, Seniors and Active Living (MHSAL) Quality and Patient Safety Council (QPSC) has identified healthcare associated infection (HAI) reporting as an indicator as part of the larger new five year framework to enhance patient safety. One key objective of the framework is reporting publicly on patient safety indicators such as HAI reporting.

To achieve this objective, the Healthcare Associated Infection (HAI) Indicator Project Working Group (WG) was formed to develop standards and tools for HAI monitoring, data collection and reporting for acute and long-term care (LTC) adult and pediatric patients. This includes all regional health authorities (RHAs) and provincial health services organizations (PHSOs) providing care.

A charter was developed and supported by the MHSAL QPSC identifying the following goals:

- Align with the Canadian Patient Safety Institute National Infection Prevention and Control Action Plan goal to adopt a Pan Canadian set of case definitions for HAIs
- Adopt national standardized definitions and data collection methodology to perform HAI surveillance in acute and long-term care adult and pediatric settings, as appropriate
- Collaborate to create provincially standardized definitions and data collection methodology to perform HAI surveillance, as appropriate
- Perform an environmental scan of HAI surveillance and reporting processes in other organizations/jurisdictions
- Align with existing national resources/data bases and validated tools where possible.

Out of scope for the project included:

- Organizations that do not meet the above descriptions (i.e., community care)
- Additional resources and funding for Infection Prevention and Control (IP&C) to perform HAI surveillance
- Equipment acquisition
- Funding requests required to implement practices or processes
- Regional operations of IP&C
- Developing a communication strategy to inform relevant stakeholders, including the public, of the short and long-term goals
- Developing a provincial data collection tool
- Developing a staged implementation plan
- Developing a reporting process for the RHAs/PHSOs
- Communicable diseases requiring reporting according to the Public Health Act.

The following is the best practice document developed by the Healthcare Associated Infection (HAI) Indicator Project Working Group (WG). The content was reviewed and endorsed by the Quality and Patient Safety Council. This document provides information and guidance for the RHAs/PHSOs on the best practices to perform surveillance and reporting of HAIs in the facilities/organizations.

Introduction

HAIs are defined as infections that occur in association with, or related to, the provision of health care. Examples of HAIs include antimicrobial-resistant organisms (AROs), bloodstream infections (BSI), surgical site infections (SSI), urinary tract infections (UTI) and pneumonia related to the use of a ventilator. In recent years, novel and imported infectious diseases such as severe acute respiratory syndrome (SARS) and pandemic H1N1 influenza have also been transmitted within Canadian health care facilities/organizations, and are classified as HAIs.

HAIs remain an important patient safety and quality issue and are significant adverse outcomes of health care. HAIs are often associated with increased morbidity and mortality, contributing to approximately one-third of unexpected in-hospital deaths. It is estimated 5% to 10% of hospitalized patients acquire an infection after admission to hospital[1]. It has also been shown that patients with a HAI remain in hospital longer on average than patients without an infection. In both acute and LTC, HAIs and outbreaks result in significant costs to the health care organization. It is estimated up to 70% of HAIs are preventable[2].

Based on U.S. estimates of infection, the observed incidence of HAIs and the average number of hospital discharges, it is estimated 220,000 HAIs occur each year in Canada, contributing to more than 8,000 deaths[1]. Estimates of the rates of HAIs in long-term care homes range from 1.8 to 13.5 per 1,000 patient care days, comparable to that in the acute care setting[3].

HAIs have a significant impact on health care spending by prolonging hospital stay, necessitating readmissions, and requiring increased consumption of resources. Estimates suggest infections with AROs add between $40 and $52 million annually to hospitalization costs in Canada[1].

The collection, analysis and dissemination of surveillance data is an important strategy in limiting HAIs. IP&C surveillance programs are developed to routinely gather data on targeted infections of relevance within health care organizations. They also monitor the effectiveness of IP&C strategies in supporting the organization's goals and objectives as well as informing the organization's response to HAIs.

Definitions:

Acute care:

A facility where a variety of inpatient services are provided, which may include surgery and intensive care. For the purpose of this document, acute care includes ambulatory care settings such as hospital

emergency departments, and free-standing or facility-associated ambulatory (day) surgery and other invasive day procedures (endoscopy units, hemodialysis, ambulatory wound clinics).

Admission:
Any stay in hospital greater than 24 hours. This includes Emergency department stays greater than 24 continuous hours.

Antimicrobial Resistant Organism (ARO):
A microorganism that is of clinical or epidemiologic significance, and has developed resistance to the action of one or more antimicrobial agents. Examples are methicillin resistant *Staphylococcus aureus* (MRSA) and carbapenemase producing *Enterobacteriaceae* (CPE). Other microorganisms are included when antimicrobial-resistance is judged to be significant in a specific health care facility or patient population, at the discretion of the IP&C program or local, regional or national authorities. The types of organisms designated antimicrobial-resistant vary over time and place. Resistance is determined by laboratory testing and assigned based on the current criteria of the Clinical Laboratory Standards Institute (CLSI).

Attack Rate:
Proportion of an initially disease-free population that develops disease, becomes injured, or dies during a specified (usually limited) period of time.

Attribution:
Transmission for each case is assigned to a specific location (e.g., healthcare facility or community). If healthcare associated, the location of attribution must be assigned to a location where denominator data (i.e., patient days) can be collected.

Baseline:
The frequency of a particular disease usually present in a population. This is also considered the endemic level of disease. The baseline level is often regarded as the expected level of the disease, but is not necessarily the desired level.

Benchmark:
The reference standard against which performance or achievements can be assessed. A benchmark may refer to the performance achieved in the recent past by other comparable organizations, including your own.

Colonized/Colonization:
Presence of microorganism in or on a host with growth and multiplication but without tissue invasion or cellular injury, so there are no signs or symptoms of infection.

CDC:
Centers for Disease Control and Prevention.

CNISP:
Canadian Nosocomial Infection Surveillance Project.

Carbapenemase Producing *Enterobacteriaceae* (CPE):
Gram-negative bacteria in the family *Enterobacteriaceae* that produce a carbapenemase enzyme. Carbapenemase enzymes are beta-lactamases capable of hydrolyzing members of the carbapenem class of antibiotics and most other β-lactam antibiotics. Examples of carbapenemase enzymes of epidemiologic importance include the New-Delhi metallo-beta-lactamase (NDM) and *Klebsiella pneumoniae* carbapenemase (KPC) enzymes. Most CPE isolates demonstrate phenotypic resistance to carbapenems and therefore would also meet the definition of Carbapenem Resistant *Enterobacteriaceae* (CRE).

Denominator:
The lower portion of a fraction used to calculate a rate or ratio. The number of persons in the population during the observation period. Denominators should be limited to the "population at risk" (i.e., persons who have potential to develop the disease and be included in the numerator).

Endemic:
The amount of a particular disease or condition usually present in a population. This is also considered the baseline level of the disease. Refers to the usual prevalence of a disease or infectious agent in a population within a geographic area.

Epidemic:
Refers to an increase in the number of cases of a particular disease or condition above what is normally expected in the population of an area during a given time. Outbreak is similarly defined, but is used for events with a more limited geographic area.

Healthcare Associated Infection (HAI):
Infection transmitted within a health care setting (also referred to as nosocomial) during the provision of health care.

Health Care Organizations**:**
The organizational entity that is responsible for establishing and maintaining health care services provided by health care workers (HCWs) and other staff in one or more health care settings throughout the health care continuum.

Health Care Setting:
Any location where health care is provided, including emergency care, prehospital care, hospital, LTC, home care, ambulatory care and facilities and locations in the community where care is provided, (e.g., infirmaries in schools, patient or correctional facilities). Note: Some settings provide a variety of care (e.g. chronic care or ambulatory care provided in acute care, complex care provided in LTC, etc.).

Health Care Workers (HCWs):
Individuals who provide health care or support services such as nurses, physicians, dentists, nurse practitioners, paramedics and sometimes emergency first responders, allied health professionals, unregulated health care providers, students, volunteers and housekeeping staff.

Incidence:
The frequency with which an event occurs in a population over a defined time period.

Infection:
Microorganisms multiply within the body and cause a response from the host's immune defences. Infection may or may not lead to clinical disease.

Long-Term Care (LTC):
A facility that includes a variety of activities, types and levels of skilled nursing care for individuals requiring 24-hour surveillance, assistance, rehabilitation, restorative and/or medical care in a group setting that does not fall under the definition of acute care.

MRSA (Methicillin-Resistant *Staphylococcus aureus*):
Strains of *S. aureus* that are resistant to beta-lactam antimicrobials (penicillins, cephalosporins, carbapenems). Some of these strains may also be resistant to aminoglycosides, erythromycin, quinolones and other antibiotics.

National Healthcare Safety Network (NHSN) - Center for Disease Control (CDC):
A voluntary, secure, internet-based surveillance system that integrates and expands legacy patient and health care personnel safety surveillance systems managed by the Division of Healthcare Quality Promotion (DHQP) at CDC. NHSN-CDC also includes a component for hospitals to monitor adverse reactions and incidents associated with receipt of blood and blood products. NHSN-CDC infection rates may be used for benchmarking acute care nosocomial infection rates provided the same standardization definitions for infection are used. NHSN-CDC results are stratified by patient risk index. More information is available at: https://www.cdc.gov/nhsn/index.html

Numerator:
The upper portion of a fraction used to calculate a rate or ratio. In surveillance, it is usually the number of cases of a disease or adverse event being studied.

Outbreak:
An excess over the expected incidence of disease within a geographic area during a specified time period, synonymous with epidemic.

Outcome Surveillance:
Surveillance used to measure patient outcomes (changes in the patient's health status that can be attributed to preceding care and service). An example of outcome surveillance related to IP&C is surveillance of infection rates. Outcome surveillance reflects the effectiveness of the IP&C program in protecting patients, health care providers and visitors from HAIs.

Patient**:**
For the purpose of this document, the term "patient" will include those receiving health care, including patients, clients or residents.

Patient Days:
The days during which services are provided to an inpatient, according to census, on successive days. The day of admission is counted as an inpatient day but the day of separation is not an inpatient day. When the service recipient is admitted and separated (discharged or died) on the same day, one inpatient day is counted. The patient day is attributed to where the patient was at the time the census was taken.

Prevalence:
The proportion of persons in a population who have a particular disease or condition at a specified point in time (point prevalence) or over a specified period (period prevalence).

Process Surveillance:
Surveillance used to assess or measure patient processes (things done to or for a patient during their encounter with the health care system). An example of process surveillance related to IP&C is planned audits to verify that procedures and/or standards of practice are being followed.

Rate:
An expression of the frequency with which an event occurs in a defined population per unit of time. In health care surveillance, it sometimes refers to proportions that are not true rates (e.g., attack rate or incidence density rate).

Surveillance:
The systematic ongoing collection, collation and analysis of data with timely dissemination of information to those who require it in order to take action.

Principles of Healthcare Associated Surveillance

An organizational priority must be an IP&C surveillance program that is active, ongoing, adequately resourced to monitor HAIs and meets applicable regulations, mandatory reporting requirements, evidence, and best practices. The surveillance program is developed based on the population(s) served, services provided, and previous surveillance data. Indicators and surveillance designs are based on the projected use of the data. The surveillance program is managed by appropriately trained IP&C staff who have dedicated time provided to carry out the program.

An effective surveillance program is essential to support appropriate IP&C interventions within organizations. The collection, analysis and dissemination of surveillance data has been shown to be effective in minimizing HAIs. The IP&C program must clearly define the surveillance indicators that will be collected, analyzed, benchmarked and reported, then verify the necessary actions to be taken based

on the information. The type and method of surveillance developed considers the types of infection most important to the health care setting, the care or services provided and the population served. The IP&C program must consider which infections are important sources of morbidity and mortality for patients, and collaborate with other key stakeholders to support the organization's required surveillance programs.

The goals of IP&C outcome surveillance are to identify clusters and outbreaks (i.e., increases above baseline), to compare infection rates to benchmarks to measure internal improvement over time and to assess the improvement following changes to practice. HAI indicators are provided to key individuals within or outside the organizations (e.g., Administration, Board of Directors, managers, MHSAL, public).

Outcome surveillance monitors definable events or outcomes (e.g., *C. difficile* infections) in a specific population. The outcome surveillance process consists of collecting data on individual cases to determine whether or not an HAI is present based on defined criteria. Surveillance must be targeted to the specific needs of the organization. Results should be accompanied by an appropriate action plan that will lead to quality improvement.

The IP&C surveillance process should incorporate the following elements into protocols and procedures:

- Specific, locally defined objectives for the surveillance, including identification and description of the problem or event to be studied
- Measureable outcome indicators to be tracked, including infection and colonization rates and associated mortality rates
- Recognized, standardized case definitions for infections (i.e., numerator)
- Identification and definition of the population at risk for the specific outcome (i.e., denominator)
- Selection of the appropriate methods of measurement, including statistical tools and adjustment for patient risk factors
- Identification and description of data sources and methods
- Benchmarks used for comparison
- Processes for analysis, including calculation of rates
- Interpretation of results
- Preparation and timely distribution of reports to appropriate groups for action
- Recommendations/strategies for identification and addressing deficiencies including targeted improvements

When planning outcome surveillance, a health care organization assesses the types of patients it serves, key medical interventions and procedures provided and the most likely types of infections. The assessment is used to establish priorities for the surveillance program. The most important infections, usually based on severity, are the priority for monitoring.

Considerations when choosing indicators for surveillance include:

- Reportable diseases – these are legislated requirements of all health care organizations
- Mandatory reporting - the health care organization may be mandated to monitor specific infections to comply with provincial reporting requirements
- Accreditation review – tracking and trending some infections may be a requirement of accreditation
- Designated AROs such as MRSA and CPE
- HAIs important to the organization's services and patients as determined by frequency, communicability, preventability and/or system impact (e.g., CDI, device-related infections, procedure-related infections, seasonal influenza, noroviruses, urinary tract infections and soft tissue infections); and
- Syndromic surveillance indicators - syndromic surveillance of respiratory infections and gastroenteritis is recommended for hospitals and LTC facilities in some provinces and has the added benefit of detecting important HAIs, such as CDI.

Methodology

The methodology outlined in this document was developed by the Healthcare Associated Infection (HAI) Indicator Project Working Group (WG). The methodology process was determined by the analysis of existing reporting of HAIs in other provinces and their methodology, as well as standardization and the use of nationally accepted HAI definitions, minimum data collection elements and benchmarks. This methodology will be reviewed on an ongoing basis as required by the project.

AROs and CDI reporting was required by all provinces that had a provincial HAI indicator reporting process in place. For reporting to MHSAL, ARO infections and colonizations as well as CDI will be the required HAI indicators to be reported, to be consistent with other provinces. CNISP surveillance definitions are to be used for ARO surveillance as outlined in MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms and the MHSAL CDI protocol. Rationale for using CNISP definitions is that this is a nationally recognized validated HAI surveillance system with comparable benchmarks.

HAI reporting for AROs and CDI in acute care and LTC should adhere to the methodology processes outlined below. Data regarding cases will be collected on an ongoing basis by Infection Control Professionals (ICPs) following the organization's surveillance policies and procedures, and managed by the respective RHA/PHSO. The surveillance processes of CNISP will be used for case, colonization and infection classification and attribution. Information may be obtained from a variety of sources outlined in the data collection section below. Please refer to Appendix I for the CNISP procedures/processes to follow. This will facilitate a standardized process for collecting and analyzing data and subsequent reporting to MHSAL.

Standardized, validated case definitions for surveillance are used to support comparisons with benchmarks. At the end of each fiscal quarter, CDI and ARO cases are aggregated by their RHA/PHSO and then the numerator data will be submitted to MHSAL Information Management and Analytics using data submission templates (refer to the Reporting to Manitoba Health Seniors and Active Living section).

Aggregate total inpatient days (i.e., denominator) will be collected from the patient information systems by RHA/PHSO.

Principles of Data Collection

Data collection methods are in place to provide the surveillance program with reliable information on HAIs in the health care organization.

Important sources of infection data include:

- Laboratory reporting of all significant isolates or other positive results (e.g., serology). An accredited microbiology laboratory must provide results to IP&C staff in a convenient, accessible, timely manner to facilitate the identification of HAIs
- HAIs reported to the IP&C team by staff, HCWs or discharged patients
- Patient charts (current/archived)
- HCW notes in healthcare records
- Data and/or clinical indicators provided by other areas or departments for surveillance (e.g. access to computerized databases such as pharmacy data, operating room records)
- Pertinent admission data (e.g. patients admitted with communicable diseases, patients flagged with AROs, readmissions for post-surgical/post-procedural infections).

Surveillance Targets for MHSAL Patient Safety Indicators

Surveillance targets for reporting CDI and AROs includes MRSA colonizations, MRSA infections, VRE bloodstream infections, CPE colonizations and CPE infections. Information regarding appropriate admission screening measures is outlined in the MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms, available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/aro.pdf.

Inclusions for MHSAL reporting on identified targets:

- Patients admitted to an acute care or LTC facility in Manitoba
    - Admitted greater than or equal to 24 hours
    - Refer to MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms for information related to ARO screening and attribution. Available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/aro.pdf
- Patients admitted to the Emergency department awaiting placement (e.g. patients admitted to a service and waiting for a bed)
    - Admitted greater than or equal to 24 hours
    - Refer to MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms for information related to ARO screening and attribution. Available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/aro.pdf

Exclusions:

- Outpatient visits to acute care facilities
- Emergency room stays shorter than 24 hours

- Patients under one year of age are excluded from CDI surveillance. Asymptomatic carriage of *C. difficile* is very frequent while *C. difficile*-associated diarrheal illness is exceedingly rare under twelve months of age.

HAI Surveillance Definitions for MHSAL Reporting

Where specific MHSAL protocols exist that contain surveillance definitions (e.g., CDI Protocol), these definitions should be considered the primary surveillance definitions for the purposes of MHSAL reporting. Where no specific provincial protocol exists, the definitions within this document are to be considered the primary definitions.

The following definitions are to be used for HAI reporting to MHSAL which are based on the CNISP definitions:

- ARO
    - Provincial surveillance data elements for AROs will be determined by using the surveillance recommendations and HAI definitions in the MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/aro.pdf
- CDI
    - CDI cases for acute and LTC will be determined by using the HAI definitions in the MHSAL *Clostridioides difficile* Infection (CDI) Protocol available at: https://www.gov.mb.ca/health/publichealth/cdc/protocol/cdi.pdf . CDI definitions are based on CNISP definitions. CNISP definitions are revised on an ongoing basis. The process for communication of these revisions will need to be determined.
- Canadian Nosocomial Infection Surveillance Project (CNISP)
    - MHSAL definitions are based on CNISP definitions and surveillance. CNISP definitions are revised on an ongoing basis, and are used to define CASES of AROs and assign ARO attribution. CNISP definitions assist with determining whether an infection is healthcare associated. The process for communication of these revisions will need to be determined. Link to CNISP: http://www.phac-aspc.gc.ca/nois-sinp/survprog-eng.php
- National Healthcare Safety Network (NHSN-CDC)
    - NHSN-CDC definitions are used to determine if a case is an INFECTION in acute care settings. These definitions are revised on an ongoing basis. The process for communication of these revisions will need to be determined. Link to NHSN-CDC definitions: https://www.cdc.gov/nhsn/pdfs/pscmanual/17pscnosinfdef_current.pdf
- Pan Canadian Long Term Care Infection Definitions
    - Long Term Care Pan Canadian definitions of infection were recently published. These definitions are to be used to determine if case is an INFECTION in long-term care settings. Link to Pan Canadian Long Term Care Infection Definitions:
    - http://www.patientsafetyinstitute.ca/en/About/PatientSafetyForwardWith4/Documents/Canadian%20LTC%20Surveillance%20Definitions.pdf

Data Collection Elements for MHSAL Reporting

The following elements will be the minimum data collected by IP&C staff within the RHAs/PHSOs. This level of granularity of data will not usually be required to be submitted to MHSAL.

Data Collection Element	CDI	CPE-Col	CPE-Inf	MRSA-Col	MRSA-Inf	VRE-BSI
Name	X	X	X	X	X	X
Date of Birth	X	X	X	X	X	X
Gender	X	X	X	X	X	X
PHIN	X	X	X	X	X	X
Health Insurance number for non-Manitobans or military	X	X	X	X	X	X
Case Classification (based on MHSAL definitions)	X	X	X	X	X	X
New Case or Known Case			X		X	X
Infection	X		X		X	X
Colonization		X		X		
Facility Admission date	X	X	X	X	X	X
RHA/PHSO	X	X	X	X	X	X
Facility Name	X	X	X	X	X	X
Encounter Service/Program and Unit	X	X	X	X	X	X
Specimen Collection Date	X	X	X	X	X	X
Laboratory Name	X	X	X	X	X	X
Laboratory Accession Number	X	X	X	X	X	X
Specimen Site	X	X	X	X	X	X
Type of Specimen	X	X	X	X	X	X
Specimen Result	X	X	X	X	X	X
Reason for Testing	X	X	X	X	X	X
Healthcare and Travel Risk Factors		X	X			

Definitions for data elements:

Name:

- Name of the patient

Date of Birth:

- Date of birth of the patient

Gender:

- Gender of the patient

PHIN:

- Personal Health Identification Number

Case Classifications:

- See MHSAL Surveillance Definitions for MRSA, VRE and CPE. Available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/aro_definitions.pdf
- See MHSAL *Clostridioides difficile* Infection (CDI) Protocol available at: http://www.gov.mb.ca/health/publichealth/cdc/protocol/cdifficile.pdf.

New Case or Known Case:

- Identify New case or a Known case

Infection:

- Meets case definition for an infection based on the NHSN-CDC infection definitions for acute care and Pan Canadian infection definitions for long-term care

Colonization:

- Does not meet NHSN-CDC (acute care) or Pan Canadian (LTC) case definitions for infection

Facility Admission Date:

- Date patient was admitted to the facility

RHA/PHSO:

- Regional Health Authority or Provincial Health Service Organization

Facility Name:

- Name of the facility the specimen was collected in

Encounter Service and Unit:

- Where the patient is/was at the time of the infection/colonization (e.g., Medicine Unit 4)

Specimen Collection Date:

- Date the specimen was collected

Laboratory Name:

- Name of the laboratory the specimen was sent to (e.g., Cadham Provincial Laboratory)

Laboratory Accession Number:

- The number the specimen was assigned from the laboratory

Specimen Site:

- The site of the body the specimen was taken from (e.g., left upper arm)

Type of Specimen:

- What type of specimen was taken (e.g., blood)

Specimen Result:
- The laboratory result of the specimen (e.g., *C. difficile*)

Reason for Testing:
- Why the testing was done (e.g., admission screening, outbreak)

Health Care and Travel Risk Factors:
- See Admission Screening: MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms. Available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/aro.pdf

Data Analysis

Aggregate quarterly data is internally verified by the RHA/PHSO before submission to MHSAL. LTC and acute care areas aggregate data separately. At the end of each fiscal year or on request from MHSAL, all quarterly submitted data is reviewed by the RHA/PHSO and updated if there are any changes.

The rate of CDI and AROs are calculated using the following information:
- Total number of cases meeting the case definition within the reporting RHA/PHSO as numerators
- Divided by the total inpatient days during the same period as the denominators
- Then multiply by 10,000 as a rate per 10,000 inpatient days.

Healthcare associated infection (HAI) ARO cases are expressed as the number of new cases per **10,000** patient days.
Provincial and RHA/PHSO ARO rates will be calculated and reported quarterly and yearly by using the following formula:

HAI-MRSA colonization:
# of new HAI-MRSA colonizations in new MRSA cases that have been attributed to RHA/PHSO x 10,000
# of patient days in the RHA/PHSO

HAI-MRSA infection:
# of new HAI-MRSA infections (in new and known MRSA cases) that have been attributed to RHA/PHSO x 10,000
# of patient days in the RHA/PHSO

HAI-VRE bacteremia (all new VRE BSIs, in all patients even if previously VRE colonized or infected):
# of new HAI-VRE bacteremia cases that have been attributed to RHA/PHSO x 10,000
# of patient days in the RHA/PHSO

HAI-CPE colonization:
# of new HAI-CPE colonizations in new CPE cases that have been attributed to RHA/PHSO x 10,000
# of patient days in the RHA/PHSO

HAI-CPE infection:
# of new HAI-CPE infections (in new and known CPE cases) that have been attributed to RHA/PHSO x 10,000
# of patient days in the RHA/PHSO

HAI-CDI:
HAI-CDI rates are expressed as the number of new cases per 10,000 patient days.
Provincial and RHA/PHSO HAI-CDI rates will be calculated and reported quarterly and yearly by using the following formula.

HAI-CDI:
# of new HAI-CDI cases that have been attributed to RHA/PHSO x 10,000
# of patient days in the RHA/PHSO

Data Limitations

Although standard provincial surveillance protocols have been developed and are reviewed on an ongoing basis to reflect advances of scientific research and surveillance practice, there may be variations and interpretations in how the case definitions and inclusion/exclusion criteria are applied to determine the HAIs within the RHAs/PHSOs. IP&C practices can vary across RHAs/PHSOs, which can also affect the identification of HAIs.

ARO cases represent inpatients that were admitted to acute and LTC facilities and are newly identified with a HAI-ARO infection or colonization. MRSA bacteremias are included. Bacteremias are reported for VRE. Many factors can affect the rate of HAI-AROs, such as intensity of ARO screening performed by the facility, patient's exposure history to health care and antibiotics, transmission within health care related to HCW practice, difference in patient population characteristics, the admission of patients with higher likelihood of travel or other risk factors for ARO acquisition, environmental conditions and prevalence of specific AROs in the community. The rate of HAI-ARO is not adjusted for differences across the RHAs/PHSOs, therefore **comparison of the rates between RHAs/PHSOs is not recommended.**

Principles of Infection Prevention and Control Training

IP&C training in knowledge and practice for surveillance will follow the RHA/PHSO's processes. The process for training for revisions of definitions and reporting process needs to be determined.

- Standardized RHA/PHSO training tools and processes determined by the RHA/PHSO are recommended and should include practice scenarios for newly trained staff to familiarize themselves with the process.
- Training sessions must include:
    - Case definitions (infection; colonization);
    - Review of data collection methodology;
    - In-depth review of data collection tools;
    - Consistent data collection elements;
    - An opportunity to do surveillance with individuals who have participated in past surveillance;
    - Opportunity to perform analysis and prepare reports;
    - Follow-up with stakeholders and measure to evaluate and improve performance.

Inter-rater Reliability Testing Requirements

Reliability among individuals who perform surveillance is often referred to as inter-rater reliability. Inter-rater reliability must be determined when there is more than one individual collecting data within the RHA/PHSO, to ensure consistency in data collection. Individuals review and document the same HAI event and inter-rater reliability is determined by comparing the extent of agreement or disagreement in their assessments or measurements.

Conduct inter-rater reliability testing annually for each individual who performs surveillance. Each RHA/PHSO will determine the process to be used to perform this annual testing.

Reporting of HAI AROs and CDI to Manitoba Health Seniors and Active Living

Reporting of HAI rates addresses public accountability and transparency of the RHAs/PHSOs to MHSAL. Public reporting of HAI rates is one of many interventions that will improve patient safety and reduce infections. Public reporting of HAI rates allows for greater public awareness and education on the importance of HAI surveillance in the prevention of infections. A national environmental scan determined public reporting of AROs and CDI was most common in other provinces. The significant morbidity and mortality associated with these infections is the rationale for public reporting.

There are other requirements for reporting to MHSAL according to the Public Health Act. These are not included within the scope of this reporting project.

Reporting Requirements

The following guidelines should be followed by RHAs/PHSOs to report statistically significant data to MHSAL.

- Each RHA/PHSO will perform HAI surveillance and analysis of rates as outlined in this reporting process.
- A staged pilot project of data collection by the RHAs/PHSOs may also be considered in discussion at Quality and Patient Safety Council. If this is considered, the processes for

developing standardized reporting templates, submitting data to MHSAL as well as the dates for public reporting will be determined. A smaller working group of members from the Healthcare Associated Infection (HAI) Indicator Project Working Group (WG) will work with MHSAL Information Management and Analytics to develop the reporting process.

- RHAs within the province are to report at the health authority level. PHSOs are to report at the organization level. Reporting to MHSAL does not replace local reporting.
- MHSAL will post HAI rates on its public website. This will include a narrative to assist the public in interpreting rates and measurements. The narrative will be developed and reviewed collaboratively by the individuals involved in the reporting process to ensure consistent and meaningful messaging. Organizations may choose their own methods to display their HAI results (e.g., graphs, charts).

This reporting process document has been developed to provide RHA/PHSO information and guidance on the best practice to perform HAI-ARO surveillance in their organization. Each RHA/PHSO is to develop a staged implementation plan identifying specific dates for completion to ensure the requirements in this document are met. This will be reported to Quality and Patient Safety Council on a regular basis to determine when reporting can begin.

The following steps should be considered in this implementation plan:

HAI Surveillance Data Collection

- Determine method and process of data collection (e.g., manually, electronic)
- Revise and/or develop data collection tools and instructions
- Trial use of tools, data entry and report generation

Training Program

- Review and revise training program for individuals who perform surveillance as required
- Identify individuals who perform surveillance to be trained or retrained
- Provide revised training
- Determine inter-rater reliability testing requirements

Analysis

- Revise and/or develop analysis to interpret data collected
- Include direction for the public to be able to interpret data. This includes explanation of the differences in ARO screening recommendations based on setting, which may impact numbers of positive cases identified

Reporting

- Revise and/or develop specific calculations for reporting
- Revise and/or develop internal reporting processes if needed
- Set targets and dates to meet provincial reporting
- Participate in provincial trial

Evaluation

- Ongoing evaluation continues during each stage of implementation to identify deficiencies and other issues to be addressed

Limitations

CNISP and NHSN-CDC definitions are revised yearly depending on updated literature and best practice evidence based guidelines. It is necessary to create and implement a process for updating provincial IP&C and other key stakeholders of the ongoing revisions and if required an educational component to ensure individuals performing the surveillance understand the revised definitions.

During the time of this project, health care transformation was occurring and a process could not be developed or completed. Before reporting begins, this process must be developed.

The infection rates posted on the MHSAL websites are best used to measure individual RHA/PHSO performance over time. They can be used to ask informed questions to healthcare organizations about their IP&C program. They are not intended to be a source for making decisions about health care nor to generalize about the quality of care provided by the organization.

Each RHA/PHSO is tasked to work towards standardization within their current resources. This may be difficult to achieve in some of their organizations.

In order to achieve consistent HAI surveillance processes for all personnel and practice settings, RHAs/PHSOs should work toward:

- Resources and trained personnel to monitor and measure, collect and enter data on HAI surveillance in all care settings. Inadequate training of individuals who perform surveillance will compromise the validity of results.
- Inter-rater reliability testing
- Standard electronic data collection instruments and a secure site for data collection and management

Benchmarks

Acute care in RHAs/PHSOs will compare their rates to CNISP and NHSN-CDC benchmarks. Benchmarks for LTC in RHAs/PHSOs will be determined provincially after evaluation of the initial year of data. Cases are expressed as the number of new cases per **10,000** patient days. HAI rates not meeting the benchmarks will need to be evaluated by RHA/PHSO IP&C to identify potential problems (including low rates that might suggest inadequate surveillance) and risk factors for infection. This will support implementing prevention and control measures to improve performance with subsequent documentation of reduction of HAI rates.

What will the health care system(s) do with this information?

Monitoring reported HAIs reduces the risk of adverse patient outcomes. As such, it is an important component of patient safety, and enhances an organization's performance improvement activities. The primary goal of public reporting is to increase the quality of health care processes and outcomes. RHA/PHSO IP&C must ensure their organization accurately collects and submits the HAI data required by MHSAL. When considered in combination with other outcome measures, the information gathered may assist facilities/organizations in evaluating the effectiveness of their IP&C and patient safety programs. Further improvements would then be made based on information gathered.

Appendix 1

MRSA and CPE Case, Colonization and Infection Attribution
For
Surveillance Purposes

Manitoba Health Seniors and Active Living (MHSAL) Healthcare Associated Infection (HAI) Indicator Project Working Group (WG) has adopted the surveillance processes of CNISP. The following are the CNISP procedures/processes to be followed for:

- **MRSA case, colonization and infection attribution**
- **CPE case, colonization and infection attribution**
- **Attribution for the purposes of MHSAL reporting: Determine if case is colonization or infection**
- **Attribute the colonization (#3 below) or infection (#4 below)**

1. Days used to count for attribution start at Admission. Admission is the day the patient is moved to an inpatient unit or is in ER > 24 hours who then is later admitted to an inpatient unit (whichever comes first).

2. The case (whether confirmed new **or a known case**) is reviewed to determine if the case is an infection or a colonization using the appropriate infection definitions.

3. If the case does not meet the infection definition (by meeting all required criteria), then the case is classified as a colonization.
    a. If the case is a colonization and the patient was not previously known to be positive, then attribution of the colonization is done using the published MHSAL definitions. **This case would be counted as a new colonized case of MRSA/CPE in surveillance statistics.**

    b. If the case is a colonization and the patient is already known to be positive, then nothing further is done for the positive specimen for surveillance purposes. **This case is not counted in the statistics.**
4. If the case is a new infection, attribution occurs using a different method than colonization.
    a. MRSA/CPE infection counts include all NEW infections in patients who were not known to be positive for MRSA/CPE as well as New infections in patients who were known to be positive for MRSA/CPE. This is how the CNISP benchmark is counted.
    b. Attribution categories for the infections attribution are different from colonization MRSA/ CPE attribution (see Appendix 1-A and 1-C, suggested spreadsheet columns in Appendix 1-B and algorithm in Appendix 1-D). **These cases would be counted as new infected cases of MRSA/CPE in surveillance statistics.**

5. Examples:

   Example #1: A new MRSA colonization in an admitted patient who had never tested positive for MRSA could have an overall MRSA attribution to a hospital where they stayed during the previous 12 months (using the MHSAL ARO definition attributions). Further attribution of the colonization does not occur. The MRSA colonization numbers submitted to MHSAL would include this patient.

   Example #2: A new MRSA infection in an admitted patient who had never tested positive for MRSA could have an overall MRSA attribution to a hospital where they stayed during the previous 12 months (using the MHSAL ARO definition attributions) but the infection could have an attribution to the community (using the infection attribution categories) if the patient was in their home (the community) in the past 5 days. The MRSA infection numbers submitted to MHSAL would not include this patient as the infection is attributed to the community and not to a healthcare facility in the region/PHSO.

   Example #3: A new MRSA infection in an admitted patient who had previously tested positive for MRSA would not get an overall MRSA attribution as their case of MRSA was previously counted in statistics (regional or facility specific) when they were first diagnosed. However, the infection could have an attribution to the hospital/personal care home (using the infection attribution categories) if the patient was in the hospital/personal care home in the last 3 days and they met the criteria outlined in the infection attribution categories. The MRSA infection numbers submitted to MHSAL would include this patient.

Appendix 1-A:

Attribution categories of an ARO infection based on specimen type/site of infection:

1. SSI:
    a. If implant placed during surgery: Any infection in that joint or deep tissue space within **90 days**[1] is an SSI **attributed back to the facility of surgery**; if superficial infection occurs within **30 days**, it is an SSI **attributed back to the facility of surgery**. If a superficial infection occurs after 30 days or a deep infection after 90 days, it does not meet SSI case definition.
    b. If no implant placed, any infection that occurs within **30 days** is an SSI **attributed back to the facility of surgery**. If infection occurs after 30 days, it does not meet SSI case definitions.
2. BSI:
    a. Primary: A positive BSI (with symptoms that meet criteria) that occurs within the first 2 days of an admission and the patient came from the community and **was not in a facility in the past 7 days** prior to admission, is **attributable to the community**. If patient was in a facility for **> 24 hours during the past 7 days** prior to admission, then the BSI is **attributable to that previous facility**. If the BSI develops **> 2 days after admission**, it is **attributable to the current facility**.
    b. Secondary: Use the same attribution as the originating infection (e.g. had a wound and then developed a BSI with the same microorganism; attribute the case of BSI to the same facility/community as the wound). This applies whether the first primary infection is a Wound, SSI, UTI or Skin infection. If the BSI develops from a SSI that meets criteria listed in #1, then the BSI can develop up to 30 days after hospitalization for a non-implant surgery or 90 days after hospitalization for an implant surgery.
3. UTI: A positive UTI (with symptoms that meet criteria) that occurs **within the first 2 days of an admission** and the patient came from the community and was not in a facility in the 2 days previous to admission, is **attributable to the community**. If patient was **in a facility for > 24 hours during the 2 days prior to admission**, then the UTI is **attributable to that previous facility**. If the UTI develops **> 2 days after admission**, it is **attributable to the current facility**.
4. Other Sterile Site infections: Same as UTI
5. Wound infections: Same as UTI
6. Skin/Soft Tissue infections: Same as UTI
7. Other non-sterile infections: Same as UTI
8. Tables to show these attributions as well as examples are available, upon request, from the WRHA Epidemiologist.

[1] Note: For regional epidemiologic purposes, WRHA uses 1 year instead of 90 days for orthopedic SSI surveillance, as it started during the timeframe when the CDC was using that as the endpoint for their SSI surveillance rather than 90 days. For this project, WRHA will report 90 day outcomes.

Appendix 1-B:

Only healthcare associated infections attributed to facilities within each region/PHSO are aggregated for submission to MHSAL (acute care and LTC aggregated separately). To assist with determining which cases based on attribution should be included in the MHSAL data submission and which should only be collected as part of general IP&C surveillance and case management but not submitted, the following information should be considered:

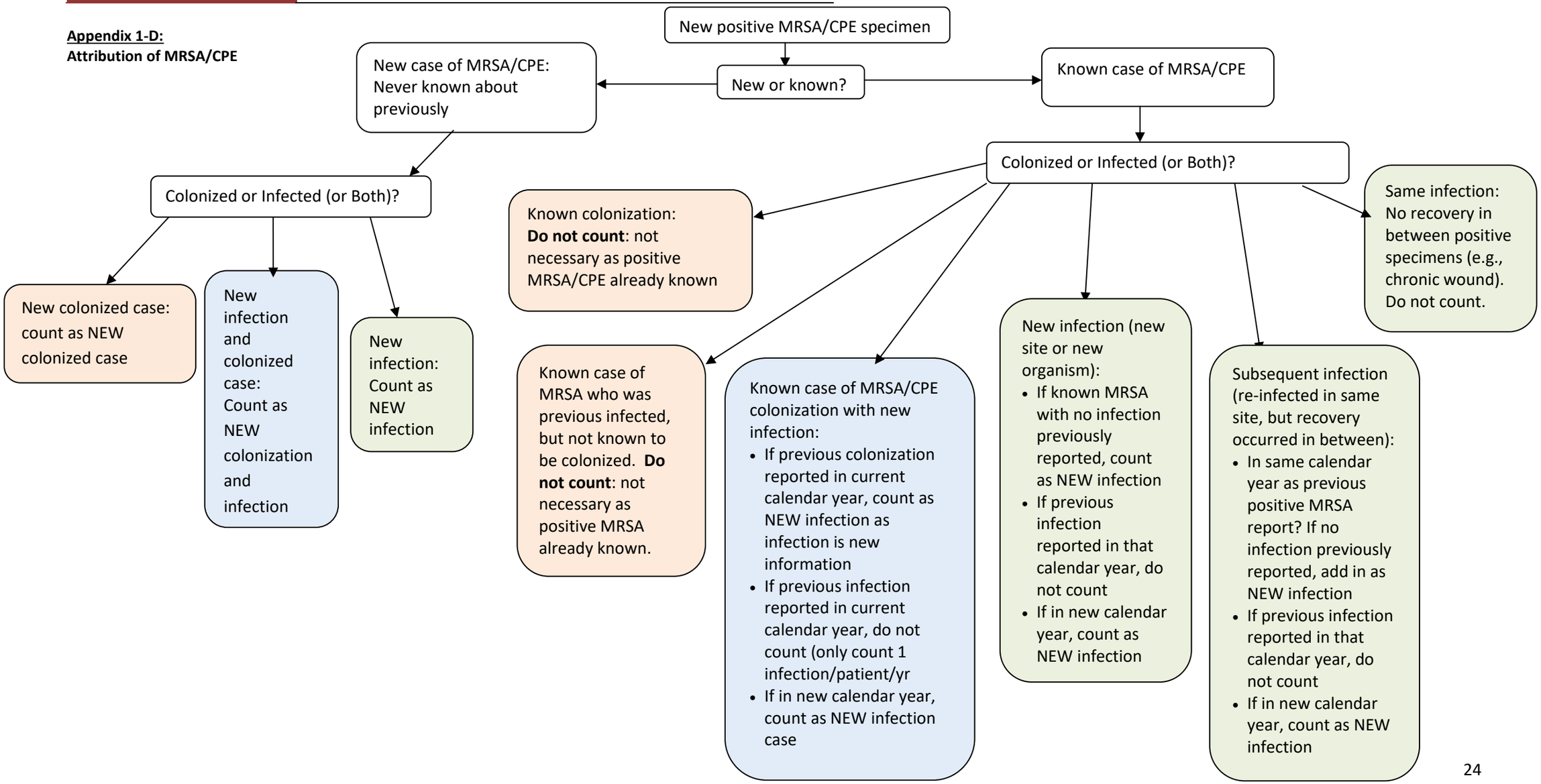
- Type of ARO
- Confirmed New or Known case
- Colonization: Yes or No
- Colonization Attributable to Facility/Community. Refer to MHSAL ARO definitions.
- Infection: Yes or No
- Infection Attributable to Facility/Community. Use infection attribution categories outlined in Appendix 1-A
- Admitted: Yes or No
  (surveillance data can be collected on non-admitted patients; however, as these cases do not meet MHSAL case definitions, they should not be counted in either regional or MHSAL statistics)
- Case included in MHSAL data submission: Yes or No

Appendix 1-C

Data will be reported as *C. difficile* infections and VRE new blood stream infections.

MRSA and CPE data will be reported in three categories: cases of new colonizations (new cases of MRSA never been reported previously), cases of new infections (in new and known cases of MRSA) and both (new cases of MRSA never been reported previously).

Appendix 1-D:
Attribution of MRSA/CPE



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