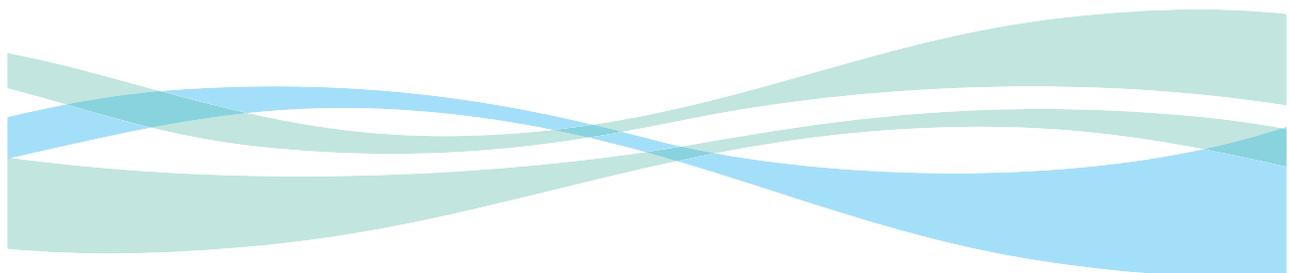


MANITOBA HEALTH, SENIORS AND ACTIVE LIVING

Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms



Manitoba Health, Seniors and Active Living (MHSAL) develops provincial infection prevention and control guidelines to provide evidence-based practice recommendations using documents developed at the national level such as - The Public Health Agency of Canada (PHAC), Canadian Agency for Drugs and Technologies in Health (CADTH) - and at the international level, such as the Centres for Disease Control and Prevention (CDC), Healthcare Infection Control Practice Advisory Committee (HICPAC) and World Health Organization (WHO) as well as other current literature.

The MHSAL Guidelines for Infection Prevention and Control of Antimicrobial-Resistant Organisms (AROs) replaces the Manitoba Guidelines for the Prevention and Control of Antibiotic- Resistant Organisms (AROs) (2007) and the Admission Screening Statement for Methicillin- Resistant *Staphylococcus aureus* (MRSA) and Vancomycin-Resistant Enterococci (VRE) for Acute Care Facilities and Surgical Centres (2007).

These guidelines have been developed by a working group of Infection Prevention and Control, Infectious Diseases, Occupational Health, Laboratory and Public Health Specialists with expertise in acute tertiary and community hospital care, long-term care and community based care.

Although not regulatory in scope, the intent of these guidelines is to assist in standardizing infection prevention and control practices throughout the province. Regional Health Authorities (RHAs) and other health care facilities/organizations are expected to develop policies and procedures based on these guidelines. Screening or placement of patients on additional precautions may be enhanced based on local epidemiological trends, outbreaks and available resources.

The purpose of the MHSAL Guidelines for the Prevention and Control of Antimicrobial-Resistant Organisms (AROs) is to provide a framework for development of policies and procedures to ensure that screening, prevention and control measures are effectively used.

The guiding principles used in developing these guidelines include:

1. Limiting transmission of antimicrobial-resistant organisms within all health care settings.
2. Minimizing development of infections with antimicrobial-resistant organisms in patients in all health care settings.
3. Promoting patient safety in all health care settings.
4. Achieving these goals in a fiscally responsible manner.
5. Providing evidence – based best practice recommendations.
6. Updating the antimicrobial-resistant organism guideline in a timely manner, as required.

This guideline, whenever possible, has been based on published research findings. Where there is insufficient published research, consensus by experts in the field has been used to provide recommendations for specific practices.

The information in this guideline was current at the time of publication. Scientific knowledge and technology are constantly evolving. This guideline will be a working document with updates and revisions when current scientific evidence and literature require changes.

Although the guidelines will be updated periodically, practitioners are responsible for ensuring the most recent knowledge is applied for each case.

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Abbreviations

ARO(s)	Antimicrobial-Resistant Organisms
CLSI	Clinical and Laboratory Standards Institute
CPE	Carbapenemase-Producing Enterobacteriaceae
CPO	Carbapenemase-Producing Organisms
CRE	Carbapenem-Resistant Enterobacteriaceae
DIN	Drug Identification Number
ESBL	Extended-Spectrum Beta-Lactamase
HAI(s)	Health Care-Associated infection(s)
HCW(s)	Health Care Worker(s)
IP&C	Infection Prevention and Control
ICP(s)	Infection Control Practitioner/Professional(s)
ICU(s)	Intensive Care Unit(s)
KPC	<i>Klebsiella pneumoniae</i> carbapenemase
LTC	Long-Term Care
MOH	Medical Officer of Health
MRSA	Methicillin-Resistant <i>Staphylococcus aureus</i>
MSSA	Methicillin-Susceptible <i>Staphylococcus aureus</i>
NDM-1	New Delhi metallo-beta-lactamase-1
OH	Occupational Health
OR	Operating Room
PHIA	Personal Health Information Act
RPAP	Routine Practices and Additional Precautions
VRE	Vancomycin-Resistant Enterococcus

Glossary of Terms

Additional Precautions	Additional measures implemented when Routine Practices alone may not interrupt transmission of an infectious agent. Used in addition to, not in place of, Routine Practices. Initiated based on condition/clinical presentation (syndrome) and on specific etiology (diagnosis).
Alcohol-Based Hand Rub (ABHR)	An alcohol containing (60-90%) preparation, liquid, gel or foam, designed for application to the hands to kill or reduce the growth of microorganisms. Such preparations contain one or more types of alcohol with emollients and other active ingredients.
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 of microorganisms included in this group are MRSA and 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 Infection Prevention & Control 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).
ARO Positive (MRSA, VISA/VRSA, CPE)	An individual from whom an ARO has been isolated.
ARO Suspect (MRSA, VISA/VRSA)	An individual who has been exposed to an ARO case and will require surveillance cultures (e.g. roommate, ward contact).
Cleaning	The physical removal of foreign material (e.g. dust or soil) and organic material (e.g. blood, secretions, excretions and microorganisms). Cleaning physically removes rather than kills microorganism. It is accomplished by using water and detergents in conjunction with mechanical action.
Cohort	Physically separating (e.g., in a separate room or ward) two or more patients exposed to, or infected with, the same microorganism from other patients who have not been exposed to, or infected with, that microorganism.
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.
Contact	An individual who was exposed to an ARO case and to whom transmission of the organism may have occurred.

Contact Exposure	Transmission where exposure occurs through direct physical contact between an infected source and a host or through the passive transfer of the infectious agent to a host through a contaminated intermediate object (fomite).
Contact Precautions	Precautions and practices that include single room or at least one metre between beds in multi-patient/resident rooms, with health care workers wearing gowns and gloves for interactions that involve contact with the infected individual or their environment.
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 <i>Klebsiella pneumoniae</i> carbapenemase (KPC) enzymes. Most CPE isolates demonstrate phenotypic resistance to carbapenems and would therefore also meet the definition of CRE.
Carbapenem-Resistant Enterobacteriaceae (CRE)	Gram-negative bacteria in the family Enterobacteriaceae that demonstrate phenotypic resistance to the carbapenem class of antibiotics (e.g. meropenem, imipenem). Phenotypic resistance to carbapenems may result from the production of a carbapenemase enzyme or from other mechanisms (e.g. permeability changes, efflux).
CPE Positive	An individual from whom a CPE has been isolated.
Carbapenemase-Producing Organisms (CPO)	Gram-negative bacteria that produce a carbapenemase enzyme. The term CPO includes Enterobacteriaceae that produce a carbapenemase (CPE), as well as other carbapenemase-producing non-Enterobacteriaceae such as <i>Pseudomonas aeruginosa</i> and <i>Acinetobacter baumannii</i> . Most CPO isolates demonstrate phenotypic resistance to carbapenems.
Decolonization	Topical and /or systemic antimicrobial treatment administered for the purpose of eradicating antimicrobial-resistant organism carriage from the skin, nose and other mucosal surfaces.
Dedicated Clean Person	A dedicated individual who does not wear personal protective equipment and who assists during a procedure but does not have contact with the patient or any contaminated items.
Deflagging	A system to remove ARO status (e.g. MRSA Suspect, MRSA Positive) from the health record.

Disinfectant	Product used on inanimate objects to reduce the quantity of microorganisms to an acceptable level. Hospital-grade disinfectants require a drug identification number (DIN) for sale in Canada.
Disinfection	The inactivation of disease producing microorganisms with the exception of bacterial spores. Hospital-grade disinfectants are used on inanimate objects and require a DIN for sale in Canada.
Drug Identification Number (DIN)	The number located on the label of the prescription and over-the-counter drug products that have been evaluated by the Therapeutic Products Directorate and approved for sale in Canada.
Extended Spectrum Beta-Lactamase (ESBL)	An enzyme produced by some species of enteric Gram-negative bacilli. ESBL enzymes have the ability to inactivate a wide range of beta-lactam antibiotics including penicillins and extended-spectrum cephalosporins(e.g. ceftriaxone and/or ceftazidime).
Exposure	Having contact with a microorganism or a person with an infectious disease in a manner such that transmission of the organism may occur.
Facility-Approved Disinfectant	A disinfectant cleaner that has been approved by the facility or organization. It must achieve manufacturer's recommended contact time on all surfaces to ensure appropriate disinfection. Contact time is the time the surfaces must continue to be wet with disinfectant.
Flagging	Terminology that is used in the patient's health record to alert health care providers to the patient's known or suspected ARO infection/colonization status (e.g. MRSA Positive, MRSA Suspect).
Hand Hygiene	A comprehensive term that applies to hand washing, hand antisepsis and actions taken to maintain healthy hands and fingernails.
Hand Washing	A process for the removal of visible soil/organic material and transient microorganisms from the hands by washing with soap and water.
Health Care-Associated Infection (HAI)	Infections that are transmitted within a health care setting during the provision of health care.
Health Care Facilities	Include but are not limited to acute care hospitals, emergency departments, rehabilitation hospitals, mental health care centres and long-term care facilities.

Health Care Setting	Any location where health care is provided, including emergency care, pre-hospital care, hospital, long-term care, home care, ambulatory care, cancer care and facilities and locations in the community where care is provided (e.g. infirmaries in schools, patient or correctional facilities). Some settings provide a variety of care(e.g. chronic care, mental health care, ambulatory care provided in acute care, surgical care, complex care provided in long-term care).
Health Care Setting-Prehospital	Acute emergency patient assessment and care delivered in a variety of settings (e.g. street, home, LTC, mental health) at the beginning of the continuum of care. Prehospital care workers may include paramedics, fire fighters, police and other emergency first responders.
Health Care Setting-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 or other invasive day procedures (e.g. endoscopy units, hemodialysis, ambulatory wound clinics).
Health Care Setting-Ambulatory Care	A location where health services are provided to patients who are not admitted to inpatient hospital units including, but not limited to outpatient diagnostic and treatment facilities (e.g. diagnostic imaging, phlebotomy sites, pulmonary function laboratories) community health centres/clinics, physician offices and offices of allied health professionals (e.g. physiotherapy).
Health Care Setting-Long-Term Care	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.
Health Care Setting-Home Care	Home care is the delivery of a wide range of health care and support services to patients in a variety of settings for health restoration, health promotion, health maintenance, respite, palliation and to prevent/delay admission to long term care. Home care is delivered where the patient resides (e.g. homes, retirement homes, group homes and hospices).
Health Care Worker	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.

High-risk Patient	Patient at higher risk of acquiring infections, including oncology patients, neonates, dialysis patients, intensive care unit patients, burn patients and patients with open surgical wounds, or implanted indwelling devices such as central venous catheters.
Infected	An ARO positive individual who shows signs and symptoms of an infection caused by that organism.
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.
Infection Control Professional/ Practitioner	A health care professional (e.g. nurse, medical laboratory technologist) with responsibility for the functions of the Infection Prevention & Control Program. This individual, who must have specific IP&C training, is referred to as an infection control professional/practitioner or ICP.
Isolation	The physical separation of infected/colonized individuals from those uninfected for the period of communicability of a particular disease.
Methicillin-Resistant Staphylococcus aureus (MRSA)	Strains of <i>S. aureus</i> 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.
MRSA Positive	An individual from whom a MRSA has been isolated.
MRSA Suspect	An individual who has been exposed to an individual positive for MRSA and will require surveillance cultures (e.g. roommate, ward contact).
Occupational Health (OH)	For the purposes of this document this refers to the disciplines of Occupational Health Medicine and Nursing, Occupational Hygiene and Occupational Health and Safety.
Occupational Health Professional	Refers to medical staff (e.g. nurses, physicians) who care for the employees as their health relates to their job functions.
Occupational Health Work Practices	Occupational health work practices include those actions intended to decrease the risk of a health care worker's exposure to infection and disease or transmission of infection to patients or other health care workers.

Outbreak of an ARO	The occurrence of AROs at a frequency in excess of that which is normally expected. The number of cases identifying an ARO outbreak will vary with the type of ARO, size and type of population exposed, previous experience or lack of exposure to the disease, and time and place of occurrence. The identification of an ARO outbreak is relative to the usual frequency of the specific ARO in the same facility or area and in the same population during the same time frame.
Patient	The term “patient” will include those receiving health care, including patients, clients and residents.
Patient Care	Patient care activities categorized as direct contact or non-direct patient contact.
Patient Care (Direct)	Duties involving direct skin-to-skin contact with patients. For example, direct care may include activities such as giving the patient a bath, changing a dressing, giving an injection.
Patient Care (Non-Direct)	Duties not involving contact with patients or patient-related equipment or articles in the patient’s immediate environment. For example, non-direct care may include activities such as paperwork, attending/providing education, researching data or topics of interest as determined by the HCW manager.
Personal Protective Equipment (PPE)	One element in the Hierarchy of Controls. Personal protective equipment consists of gowns, gloves, masks, facial protection (e.g. masks and eye protection, face shields or masks with visor attachment) or respirators that can be used by a health care worker or other staff to provide a barrier that will prevent potential exposure to infectious microorganisms.
Point of Care	Refers to place where a patient receives health care from a HCW or other staff. Point of Care incorporates three elements being present at the same time: the patient, the HCW and an interaction that could result in a transmission of an infectious agent.
Pulse Field Gel Electrophoresis (PFGE)	Technique whereby electrophoretic current is pulsed through gel in different directions for different lengths of time facilitating the differential migration of large DNA fragments. It is used to identify similar strains of bacteria.

Routine Practices	A comprehensive set of infection prevention & control measures, that have been developed for use in the routine care of all patients at all times in all health care settings. Routine Practices aim to minimize or prevent HAIs in all individuals in the health care setting including patients, health care workers, other staff, visitors, contractors, etc.
Screening/ Surveillance Cultures	Cultures to identify an ARO in an individual with risk factors for acquisition of the organism.
Vancomycin Intermediate <i>Staphylococcus aureus</i> (VISA)	Vancomycin intermediate <i>S. aureus</i> (also referred to as GISA: glycopeptide-intermediate <i>S. aureus</i>). Intermediate resistance to vancomycin is defined according to CLSI breakpoints. Laboratory testing and interpretation criteria are subject to change. All VISA isolates should be saved and forwarded to Cadham Provincial Laboratory for confirmatory testing.
Vancomycin-Resistant <i>Staphylococcus aureus</i> (VRSA)	Vancomycin-resistant <i>S. aureus</i> . Resistance to vancomycin is defined according to CLSI breakpoints. All VRSA isolates should be saved and sent to Cadham Provincial Laboratory for confirmatory testing.
Vancomycin-Resistant Enterococci (VRE)	Enterococci that are resistant to vancomycin, the drug of choice for treating multi-drug resistant enterococci infections.
Work Modification/ Reassignment	Limitations on a HCW patient care assignment determined in consultation with their health care provider, occupational health professional and an infection control professional.
Work Restriction	Restrictions on a HCW's attendance to work or to certain areas/wards in the workplace, in consultation with their health care provider, occupational health professional and an infection control professional.

1. Introduction

Three major factors have influenced the development of these guidelines:

- The transition of health care delivery from acute care hospitals to a variety of alternate settings (e.g. home care, ambulatory care, long-term care, group homes, short stay and day surgical centres). These guidelines address the continuum of health care delivery and provide a pragmatic and flexible approach in adapting recommendations to all health care settings, while adhering to classical principles of infection prevention and control practice.
- The continued transmission of antimicrobial-resistant organisms, a problem that is not unique to hospitals but rather affects the continuum of care. There is a consolidation of basic management approaches for all AROs with additional recommendations for specific pathogens.
- The limited availability of IP&C resources and the need to make the most efficient and effective use of those resources.

This guideline reaffirms Routine Practices as the foundation for preventing transmission of AROs in all health care settings. Routine Practices are described in the MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipclrpap.pdf>

Routine Practices must be applied to prevent transmission of microorganisms among all patients and health care personnel, regardless of the setting of care or proven or suspected diagnosis. Consistent observance of Routine Practices offers the greatest potential for preventing transmission of infectious agents. While specific AROs of current concern are addressed in this document, new AROs will continue to emerge and the basic practice for all of these will remain Routine Practices.

2. Background (Acquisition of AROs)

AROs are usually introduced into the health care setting by an infected or colonized individual. Alternatively they are acquired from food and water or other exposures in the environment or evolve from previously susceptible organisms colonizing or infecting individuals following antibiotic exposure. Transmission most frequently occurs via the hands of health care workers that become transiently colonized while delivering care to patients, when removing gloves, or when touching contaminated surfaces. Environmental contamination can also serve as a vehicle of transmission.

Some patient characteristics contribute to greater dispersal of AROs, including colonized or infected individuals with large, open, poorly healing wounds, profuse colonized tracheostomy secretions, uncontrolled fecal and urinary incontinence or extensive desquamating skin conditions.

The efficiency of MRSA transmission may be greater from individuals who have large colonized or infected wounds rather than with simple nasal colonization alone, because of the greater number of organisms present. Patients with respiratory infections, especially those with uncontrolled secretions, with wound or stoma drainage not contained and with urinary or fecal incontinence are more likely to disseminate Carbapenemase-Producing Enterobacteriaceae (CPE). Risk factors associated with acquiring AROs in the

hospital environment include the presence of invasive devices(e.g. urinary catheterization, gastrostomy tube, invasive vascular lines, tracheostomy tube) increased age, serious underlying medical conditions(e.g. renal insufficiency, dialysis, hematologic malignancies, immunosuppression, neutropenia) prolonged or previous hospitalization, intensive-care unit stays, abdominal or thoracic surgery, recurrent use of broad-spectrum antibiotics and possibly high patient to nurse ratios.

Colonization with AROs is not associated with excess morbidity or mortality. Infections caused by AROs are associated with prolonged hospital stay, increased mortality and excess costs. ARO outbreaks often result in adverse outcomes as antimicrobial treatment options are often limited. In the case of ARO outbreaks, prompt identification of the organism, isolation of cases and institution of specific infection prevention and control measures including screening of contacts should be implemented to limit transmission.

Community transmission of MRSA is increasingly documented in specific populations including athletes, military recruits, children, Pacific Islanders, Alaskan Natives, Native Americans, men who have sex with men, and prisoners. MRSA infections have been identified in First Nations communities in northern Manitoba manifesting primarily as severe skin and soft tissue infections.

In communities and facilities where AROs are endemic, it may no longer be possible to eliminate all cases, irrespective of the level of IP&C resources. As the numbers of colonized and infected individuals increase, there is increased difficulty in providing comprehensive Additional Precautions. There are problems identifying sources of outbreaks, and there is a perception among clinical colleagues that infection prevention and control efforts to control the spread are more disruptive than effective. Waiting 24-72 hours for results of screening cultures places further pressures on hospitals where patients are admitted and transferred quickly.

It remains important to control the spread of AROs within acute care facilities where the risk of infections with AROs is greatest. General infection prevention and control measures (e.g. Routine Practices) remain essential, including hand hygiene, appropriate equipment cleaning and decontamination of the environment. The addition of contact precautions and targeted interventions in selected high risk clinical areas (e.g. intensive care units, burn units, oncology units or orthopaedic/trauma units) may also be effective in preventing transmission of AROs.

There are important differences between acute care hospitals and long-term care (LTC) facilities with respect to IP&C recommendations. A long-term care facility is a resident's home and infection prevention and control precautions must be balanced with promoting an optimal, healthy lifestyle for the resident. Imposing precautions such as in acute care may interfere with social interaction and rehabilitative care and may result in isolation, depression, anger and even death. Thus, use of these practices should be limited to situations where transmission has been shown to be detrimental to other residents.

There are also differences between acute care hospitals and community-based health services. Home Care Programs need to balance infection prevention and control precautions with promoting optimal, healthy lifestyles for clients. Evidence to date does not indicate clients who are colonized or infected with these microorganisms pose a health risk to health care providers, or to other household contacts when Routine Practices especially good hand hygiene are consistently and properly applied. General household cleaning, laundry and hand washing are the essential infection prevention and control measures recommended for all patients at all times.

The following optimal IP&C measures should be maintained on an ongoing basis together with patient safety and quality assurance processes to prevent transmission of antimicrobial-resistant organisms:

- Development, implementation and maintenance of a comprehensive IP&C program that supports measures for the prevention or the transmission of AROs (e.g. surveillance, hand hygiene compliance monitoring, quality assurance processes).
- An organizational priority to maintain Routine Practices according to MHSAL *Routine Practices and Additional Precautions Preventing the Transmission of Infection in Health Care*, available at <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- The organization has a comprehensive hand hygiene strategy including:
 - Hand hygiene education for all staff.
 - Senior leader in the organization encouraging and supporting implementation of hand hygiene education and training for all staff.
 - Hand hygiene product availability for staff including alcohol-based hand rub at **point of care** and service delivery.
 - Hand hygiene practices audited with the results shared with staff and used to make improvements in hand hygiene practices.
 - Hand hygiene compliance meets existing guidelines and standards.
 - Communication of hand hygiene rates throughout the organization together with processes for improvement.
- Development and implementation of an antimicrobial stewardship program.
- Comprehensive environmental control program including:
 - Defined roles and responsibilities for cleaning and disinfecting the environment
 - Policies and procedures outlining:
 - How to clean specific areas (e.g. patient rooms, bathrooms, common areas)
 - Cleaning schedules, assigned responsibility and expectations for frequency of cleaning.
 - Choice of cleaners or disinfectants (e.g. hospital grade disinfectant with valid DIN), ensuring application of disinfectant follow manufacturer's recommendations.
 - Education for staff involved in cleaning/disinfection of equipment and the environment regarding cleaning policies and procedures as well as IP&C practices on an ongoing basis.
 - A quality assurance program for monitoring cleaning/disinfection of the environment with analysis and feedback to improve practice.

3. Epidemiology

Antimicrobial resistance is an increasing problem and challenge worldwide. Although AROs are generally no more virulent than sensitive bacterial strains, they may be more difficult to treat. Furthermore, once introduced into the acute care hospital environment, some AROs can be extremely difficult to eradicate. The major current AROs of concern in Canada include MRSA and CPE (carbapenemase-producing Enterobacteriaceae).

4. Antimicrobial Stewardship

There must be prudent use of antimicrobials within organizations to limit emergence for resistance. Every facility and regional health authority within the province must have an antimicrobial stewardship process in place to limit the emergence of antimicrobial resistance within their organization.

Antimicrobial stewardship is a key component of a multifaceted approach to preventing emergence of antimicrobial resistance.¹ **The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity, the selection of pathogenic organisms (such as *Clostridium difficile*), and the emergence of resistance.** Thus the appropriate use of antimicrobials is an essential part of patient safety and is a responsibility for all health care institutions across the continuum of care.^{2 3}

Resistant infections not only result in increased morbidity and mortality but also increase health care costs.³ A multifaceted approach is necessary to prevent, detect and control the emergence of antimicrobial-resistant organisms. This includes:

- Ensuring the availability of adequate and appropriate therapeutic agents
- Existence of diagnostic capacity to rapidly and reliably detect specific pathogens and their antimicrobial susceptibilities and
- Promotion of robust IP&C and antimicrobial stewardship programs.³

Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship were published by The Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA) in 2007. A policy statement on Antimicrobial Stewardship was published by SHEA and IDSA along with the Pediatric Infectious Diseases Society (PIDS) in 2012.

The following recommendations for institutional settings or organizations with infectious diseases support have been made. They should be tailored to other organizations using the same basic principles.

- 4.1 There should be a multidisciplinary antimicrobial stewardship team which would include an infectious diseases physician, clinical pharmacist with infectious diseases training, clinical microbiologist, information specialist, infection control professional and epidemiologist.
- 4.2 The program should be considered a medical staff function and should be directed by the infectious diseases physician or co-led by an infectious diseases physician and clinical pharmacist with infectious diseases training.
- 4.3 There must be support and collaboration of hospital administration and medical staff leadership.
- 4.4 Prospective audits of antimicrobial use should be performed with direct interaction and feedback to the prescriber.
- 4.5 Facility-specific antibiograms indicating the rates of relevant antibiotic susceptibilities to key pathogens should be periodically distributed.
- 4.6 Antimicrobial use data should be collected and readily available for both inpatient and outpatient settings.
- 4.7 Formulary restriction and preauthorization of specific antimicrobials should be considered.

- 4.8 Education should be developed and provided as an essential element of the antimicrobial stewardship program.
- 4.9 Multidisciplinary evidence-based practice guidelines incorporating local microbiology and resistance patterns should be developed.
- 4.10 The use of antimicrobial order forms should be considered. These can be an effective component of the antimicrobial stewardship program and can facilitate implementation of practice guidelines.
- 4.11 Empirical antimicrobial therapy should be streamlined or de-escalated on the basis of culture results and elimination of redundant combination therapy. This can effectively target the causative pathogen, resulting in decreased antimicrobial exposure and substantial cost savings.
- 4.12 Antimicrobial dosing based on individual patient characteristics, causative organism, site of infection as well as drug's pharmacokinetic and pharmacodynamic characteristics should be optimized.
- 4.13 A systematic plan for parental to oral conversion of antimicrobials should be included when the patient's condition allows. This can decrease length of hospital stay and health care costs.
- 4.14 Electronic health care information technology such as electronic medical records and clinical decision support if available should be utilized as these can improve antimicrobial decisions.
- 4.15 Computer based surveillance if available should be performed as it can facilitate good stewardship.
- 4.16 There should be surveillance and reporting by the microbiology laboratory of antimicrobial-resistant organisms.
- 4.17 Periodic distribution of specific antibiograms should be done indicating the rates of relevant antibiotic susceptibilities to key pathogens. This would include surveillance and reporting of antimicrobial-resistant organisms.
- 4.18 Patient-specific culture and susceptibility data must be provided by the clinical microbiology laboratory.

References:

1. Fishman, Neil. Antimicrobial Stewardship. *Am J Med* 2006; 119: S53-S61.
2. Dellit TH, Owens RC, McGown JE, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship. *Clin Infect Dis* 2007; 44:159-177.
3. Society for Healthcare Epidemiology of America, Infectious Diseases Society of America and Pediatric Infectious Diseases Society. Policy Statement on Antimicrobial Stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS). *Infect Control Hosp Epidemiol* 2012; 33:1-14.
4. Barlam TF, Cosgrove SE, Abbo LM, et al. Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clin Infect Dis* 2016; e1-e27.

5. Routine Practices and Additional Precautions

Routine Practices are described in the MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at:

<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

This document describes and promotes the expected IP&C processes and practices of care to be used across the continuum of care in all health care settings in Manitoba. Included in this document are the principles necessary to prevent transmission of microorganisms from patient to patient, patient to HCW and HCW to patient across the continuum of care. Principles of transmission as well as Routine Practices and additional precautions are outlined for acute care, LTC, ambulatory care, prehospital care and home care settings.

6. ARO Management in Long-Term Care

There are important differences between acute care and long-term care facilities with respect to infection prevention and control recommendations. A long-term care facility is a patient's home and infection prevention and control precautions must be balanced with promoting an optimal, healthy lifestyle for the patient. Imposing precautions such as in acute care would interfere with social interaction and rehabilitative care and may result in isolation, depression, anger and even death.

Experience to date and results of epidemiological studies indicate that LTC facility patients who are colonized or infected with AROs do not endanger the health of long-term care facility workers or other patients **when Routine Practices, especially good hand hygiene are consistently and properly applied**. However, infected or colonized patients are a potential reservoir for introduction of these microorganisms into acute care hospitals, should they require acute care admission. ¹

Modifications for contact precautions and AROs for Long-Term Care are outlined on page 59 in MHSAL *Routine Practices and Additional Precautions Preventing the Transmission in Health Care* available at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>.

References:

1. Nova Scotia. Department of Health and Wellness. Best Practices for Reducing Transmission of Antibiotic Resistant Organisms (AROs) in Acute and Long-Term Care Settings, Home Care and Prehospital Care. March 2012.
Available from:
<http://ipc.gov.ns.ca/sites/default/files/BestPracticesGuidelineforAROsAcuteandLTCSettings.pdf>

Preventing ARO transmission in health care facilities requires the active participation and collaboration of health care professionals, patients, and the public. There are many strategies to help reduce the transmission of AROs. The focus of these guidelines is on preventing MRSA and CPE transmission; however, some of the recommendations may help to reduce the transmission of other AROs, including emerging AROs.

1. Methicillin-Resistant *Staphylococcus aureus* (MRSA) Guidelines for Health Care Settings

Staphylococcus aureus (*S. aureus*) is one of the most common causes of human infection. This bacteria colonizes the skin and is present in the anterior nares in about 25-30% of healthy people.¹ Colonization may also occur in the axillae, chronic or surgical wounds, decubitus ulcers, perineum, sputum, urine and invasive device sites such as intravascular catheters, gastrostomy and tracheostomy sites of hospitalized patients. *S. aureus* causes a wide variety of infections, ranging from localized skin lesions, such as impetigo, boils or wound infections, to severe invasive disease and toxin mediated diseases.

Methicillin-Resistant *Staphylococcus aureus* (MRSA) refers to strains of *S. aureus* that are resistant to methicillin, oxacillin, cloxacillin, and all β -lactam agents, including cephalosporins and carbapenems.² MRSA is typically resistant to many classes of antibiotics (e.g. aminoglycosides, erythromycin, quinolones).³ Infections caused by MRSA are not inherently more serious than infections caused by methicillin-sensitive strains of *S. aureus* (MSSA), but treatment options for the management of serious MRSA infections are limited.³ Most people with MRSA and MSSA are carriers or colonized, and do not have infection.

Rates of MRSA among clinical isolates of *S. aureus* vary from less than 1% in Norway and Sweden, 5%-10% in Canada, 25%-50% in the United States, to more than 50% in Hong Kong and Singapore.⁴ In 2013, Canadian facilities participating in the Canadian Nosocomial Infection Surveillance Program (CNISP) reported 8.14/1,000 patient admissions were colonized/infected with MRSA; 1.22/1,000 patient admissions had a health care-associated MRSA infection and 0.64/1,000 patient admissions had a community-associated MRSA infection.⁵

At least ten epidemic MRSA strains have been characterized (e.g. CMRSA1, CMRSA2) by PFGE. This nomenclature helps with the epidemiological tracking of strains that are causing outbreaks in Canada.

Strains of *S. aureus* that are intermediately (VISA) or completely resistant (VRSA) to vancomycin have been reported in North America, Europe and Asia, but are uncommon to date.

References:

1. Grundmann H, Aires-de-Sousa M, Boyce J, Tiemersa E. Emergence and Resurgence of Methicillin-Resistant *Staphylococcus aureus* as a Public Health Threat. *Lancet* 2006; 368; 9538:874-85.
2. Centers for Disease Control and Prevention. Laboratory Detection of: Oxacillin/Methicillin-resistant *Staphylococcus aureus*. 2010. Available at: http://www.cdc.gov/HAI/settings/lab/lab_mrsa.html
3. Public Health Agency of Canada. Surveillance for Methicillin-Resistant *Staphylococcus aureus* in Canadian Hospitals – A report Update from the Canadian Nosocomial Infection Surveillance Program. *Canada Communicable Disease Report CCDR* 2005; 31-03.

4. Johnston BL, Bryce E. Hospital Infection Control Strategies for Vancomycin-Resistant Enterococcus, Methicillin-Resistant *Staphylococcus aureus* and *Clostridium difficile*. CMAJ 2009; 180(6): 627-631.
5. Public Health Agency of Canada. Antimicrobial-Resistant Organism (ARO) Surveillance. Surveillance Report for Data from January 1, 2007 to September 30, 2013. April 2014.

1.1 Identification/Notification of MRSA

Policies must be in place for reporting of MRSA Positive patients with appropriate diagnostic criteria and laboratory resources to support these policies. When a patient is identified as MRSA Positive there must be clearly assigned responsibility for the following activities.

- Notification of the unit on which the patient resides.
- Notification of IP&C and, if applicable, Health Information.
- Implementation of contact precautions.
- Identification on the patient record of the MRSA status and the contact precautions required.
- Providing the MRSA Positive patient, family members and visitors verbal instructions and a Patient Fact Sheet (refer to Appendix A) regarding MRSA and contact precautions.
- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Source Control, page 56: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.2 Admission Screening

Recommendations for Acute Care:

- Screen a patient who has been admitted to or directly transferred from a health care facility including personal care homes within or outside Canada within the previous 6 months, where they were admitted for more than 24 continuous hours.
 - Patient with exposure outside of Canada must be isolated pending results of screening tests.
 - Patient who has received hemodialysis in another province/country must be isolated pending results of screening tests. There is no need for isolation if current screening results obtained within 7 days of admission to the site are negative.
- Screen a patient when the Inter-facility Transfer/Referral Form indicates admission screening is to be done.
- Screen a patient who was once MRSA Positive and whose positive status is currently unknown.
 - Patient must be isolated pending results of screening tests.
- Screen a patient identified as MRSA Positive in the flagging system.
- Screen a patient who is identified as a MRSA contact.
- Screen a patient identified as MRSA Suspect in the flagging system.
- Screen a patient who is either starting dialysis, new to the dialysis unit or returning to the unit after receiving dialysis in another unit.
- Screen a patient residing in a correction setting or in a communal living setting (e.g. group home)

Recommendations for Long-Term Care:

- No admission screening recommended. Do not screen a long-term care patient upon admission/transfer or return to their personal care home/long-term care facility.

1.3 Surveillance Cultures to be Performed to Identify MRSA

- Anterior nares (both nares with one swab).
- Open wounds/lesions/incisions/invasive device insertion sites (e.g. central lines).
 - Do not culture the site of closed wounds/lesions/incisions/invasive device insertion sites.
- Refer to Appendix B: Guidelines for Specimen Collection.

1.4 Refusal of Screening

- If a patient/family refuses MRSA screening, explain the procedure and rationale for the screening and any testing to the patient/family again.
- If the patient/family still refuses screening, notify IP&C and where achievable, place the patient on contact precautions for the duration of the admission.

1.5 Flagging/Deflagging of Patient Record

- A patient identification system (chart flagging) must be developed by IP&C together with Health Information to support rapid identification of MRSA status on future admissions or interactions with another health care facility.
- For a patient who meets the criteria of 1.14 there should be procedures/processes in place to deflag the patient record.

1.6 Patient Accommodation and Placement

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Patient Accommodation and Placement, page 56: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Patient undergoing MRSA decolonization should be in a single room.

1.7 Personal Protective Equipment (PPE)

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Personal Protective Equipment, page 57: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.8 Non-Critical Patient Care Equipment

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Cleaning and Disinfection of Non-Critical Patient Care Equipment, page 57-58: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.9 Waste, Laundry, Dishes and Cutlery

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Waste, Laundry, Dishes and Cutlery, page 58: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.10 Laboratory Specimens

- Use equipment for collection of specimens which is dedicated to the specific patient.
- Do not take phlebotomy trays into the room.
- Take all required equipment into the room at the start of the procedure.
- Deposit the specimens into an impervious, sealable bag immediately following removal from the patient room, ensuring the outside of the bag does not become contaminated.

1.11 Environmental Control/Housekeeping

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Cleaning of the Patient Environment, page 58: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Facility-approved disinfectant must be used according to the manufacturer's instructions including recommended contact time on all surfaces to ensure proper disinfection.
- During an outbreak more extensive and frequent cleaning with a facility-approved disinfectant may be required. Any changes to routine cleaning practice will be recommended by the outbreak management team. Please see Appendix D: Steps for Outbreak Management.

1.12 Patient Health Record

- Written records should not go into the room of a patient on contact precautions.
- If the health record is required to accompany the patient for tests or treatments, place in a protective cover (e.g. plastic bag) to prevent contamination. Otherwise, have a dedicated staff person carry the chart ensuring that they and the chart do not become contaminated.
- If the outside of the health record becomes contaminated, clean and disinfect with facility-approved disinfectant.
- Mobile computers or e-records that cannot be cleaned and disinfected should not go into the room of a patient on contact precautions unless it is protected by a cover that is either disposable or can be disinfected. After coming out of the room, the cover should be removed and disposed of or disinfected.

1.13 Personal Documents (e.g. Power of Attorney, Paneling Papers, Advanced Care Directive)

- There are no special precautions for documents that will not go into the patient health record.
- Documents retained as part of the patient health record should be handled in the following manner:
 - Prior to signing, wipe the table on which the document is to be signed using a facility-approved disinfectant.
 - Assist the patient to perform hand hygiene with alcohol-based hand rub prior to signing/handling the document.
 - Wipe the pen with a facility-approved disinfectant after signing.

1.14 Duration of Additional Precautions

Contact precautions can be discontinued once the following requirements are met:

- Three consecutive sets of negative screening MRSA cultures (nares, wounds as well as previously positive sites) at least one week apart. Refer to Appendix C for Guidelines for Specimen Collection.
- If a patient is infected/colonized at one or more wound sites (e.g. surgical site, catheter/device exit site) the wound site(s) are healed (i.e. MRSA positive wound site is healed or removed device site); AND the patient has had 3 consecutive negative nares screening cultures, the patient is presumed to no longer be colonized with MRSA. There are no further screening specimens at the wound site required.
- When taking cultures to determine if the patient has become negative for MRSA, ensure the patient has not received antimicrobials that may affect MRSA growth during the 48 hours prior to each culture (e.g. lead to false negative screen for MRSA). Wait 48 hours after completion of potentially effective antimicrobials before initial or repeat screening.
- If any culture in the three consecutive sets is positive, discontinue subsequent cultures, maintain contact precautions and wait at least one month before starting the next set of 3 consecutive cultures to determine if negative.
- In selected circumstances as determined by IP&C, discontinuation of contact precautions may be considered even if the above conditions are not met.

1.15 Handling of Deceased Bodies

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Handling of Deceased Bodies, page 58 <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.16 Treatment or Decolonization

- Do not routinely decolonize for MRSA. This has limited efficacy and may promote further antimicrobial resistance. Decolonization may be considered in selected patients, only under the guidance of an Infectious Diseases Specialist.
- Treatment of infections is at the discretion of the attending physician, in consultation with an Infectious Diseases Specialist, as appropriate.

1.17 Subsequent Cultures for Persistent Carriage

- Routine screening is not recommended for a MRSA Positive patient who remains in hospital. The patient should be assessed on a case-by-case basis, in consultation with IP&C to determine when subsequent cultures are indicated.
- Obtain cultures only when indicated for clinical management (e.g. respiratory infection, infected wound)

1.18 Management of MRSA Positive Patient When they Leave their Room

- Whenever possible, the patient must remain in their room at all times.
- For selected patients following a risk assessment of their cognitive ability and hygiene, and if they are continent or have no draining wounds, consideration may be made for them to leave their room.
- If the patient is transferred, the referring ward or clinic must notify in advance the receiving department of the contact precautions required.
- During out of room procedures, a health care worker in contact with the patient must maintain contact precautions. A dedicated clean person may be used to minimize environmental contamination.

Precautions for the Patient when Transported

- Patient to perform hand hygiene on leaving room.
- No gloves or isolation gown required by the patient.
- Patient to wear clean clothes, housecoat or cover gown.
- All wounds must be covered.
- If the patient must be transferred in a bed, wheelchair or other equipment that resides in the patient room, the external frequently touched surfaces (e.g. handles, bed rails) must be cleaned with a facility-approved disinfectant prior to leaving the room. The patient and transfer equipment (e.g. wheelchair, bed) should be covered with a clean sheet.
- If the patient is transferred using a clean transport stretcher or wheelchair, the stretcher or wheelchair does not need to be cleaned prior to transport but must be cleaned with a facility-approved disinfectant after returning the patient to the room.

Health Care Worker Precautions for Transport

- Follow contact precautions to enter room and exit room.
- Remove PPE before leaving room.
- Hand hygiene after removal of PPE and before leaving room.
- Apply clean gloves and gown outside the room for the transport.

Visitor Precautions for Transporting the Patient

- Hand hygiene before leaving the room.
- Visitors are not required to wear gloves and gown outside the room.

1.19 Management of MRSA Positive Patient in the Operating Room

- The patient can be scheduled on the usual OR slate and does not need to be scheduled for a particular time of day.
- Transport the patient according to Section 1.18 Management of MRSA Positive Patient When they Leave their Room.
- During the procedure a health care worker who is in contact with the patient must maintain contact precautions. A dedicated clean person may need to be present to minimize environmental contamination.
- The patient health record and other necessary specific procedure forms may be taken into the OR.

They should be kept on a designated table in a low traffic corner of the theatre that does not have contact with the health care worker who has patient contact.

- Recover the patient in the Post Anaesthetic Care Unit on contact precautions. If the patient is unable to be recovered in the Post Anaesthetic Care Unit, rescheduling of patients may be required to recover them in the theatre on contact precautions.
- After the case, standard OR cleaning procedures are sufficient to clean the theatre.

1.20 Management of Neonate Born to MRSA Positive Mother

Infant is Rooming in with Mother

- Implement contact precautions for care of the mother and infant with the following modifications:
 - Assisting the mother with the infant (e.g. breastfeeding, holding infant), gloves/gowns do not need to be changed when moving between mom and infant. Perform hand hygiene and change gloves/gowns as required to prevent cross contamination from one body site to another (especially prior to performing health care procedures and assessment such as post partum checks).
 - Infant is identified as MRSA Suspect. Upon discharge the infant will be flagged as MRSA Suspect.

Infant Admitted to Level II or Level III Nursery

- Infant is flagged as MRSA Suspect.
- Routine Practices are followed in the nursery. If a known MRSA positive mother visits their infant in the nursery, they should perform hand hygiene on entry and wear a clean cover gown.
- Screening cultures should be obtained from the newborn 48 or more hours after birth, preferably between 48 and 72 hours. Refer to Section 1.3: Surveillance Cultures to be Performed to Identify MRSA and Appendix B: Guidelines for Specimen Collection.
 - If the infant tests MRSA Positive, contact precautions should be followed.
 - If the infant tests negative, deflagging should occur.

1.21 Discharge/Transfer between Facilities

- It is the responsibility of the transferring facility to identify known MRSA Positive and Suspect patients when they are being transferred. This must be communicated to the receiving facility in advance of the discharge/transfer.

MRSA Suspect

- The status of a MRSA Suspect patient must be documented on the patient's Inter-Facility Transfer Referral Form.

MRSA Positive

- Prior to discharge/transfer the receiving facility, physicians and other known involved health care agencies, (e.g. Home Care, Physiotherapy) must be notified of the patient's MRSA Positive status and treatment.
- Advise the patient of the importance of informing any health care worker of their MRSA Positive status.
- MRSA Positive must be documented on the patient's Inter-Facility Transfer Referral Form.

- The receiving ICP may request MRSA status, culture and antimicrobial information by telephone or fax from the ICP at the transferring facility. This must be recorded in the patient health record.
- The receiving facility should not routinely rescreen a known MRSA Positive patient following transfer.
- A MRSA Positive patient does not require an ambulance for transport. The patient can be transferred by a transportation company with trained staff who follow proper IP&C precautions. Other transportation systems (e.g. Stretcher Care Service) may be used.
 - Prior to discharge/transfer, the transferring facility must notify the transport service if the patient is on contact precautions.

Precautions relevant to the Patient for Transfer

- Use a clean stretcher or wheelchair.
- Patient to perform hand hygiene on leaving room.
- No gloves required for the patient.
- All wounds must be covered.
- Patient to wear clean clothes, housecoat or cover gown.

Precautions relevant to the Health Care Worker for Transfer

- Follow contact precautions to enter room and exit room.
- Remove PPE before leaving room.
- Hand hygiene before contact with the patient, after removal of PPE and before leaving room.
- Apply clean gloves and gown outside the room.
- Wear clean gloves and gown during transportation of patient.

Precautions relevant to the Transport Service

- Follow contact precautions inside the patient room and when leaving the room.
- At receiving facility, Transport Services follows contact precautions to place patient in their room and upon leaving patient room.
- Consider wheelchair/stretcher used to transport the patient as contaminated. Clean and disinfect prior to removal from isolation space or use with another patient.
- Disinfect vehicle surfaces and any equipment that was in contact with the patient with facility-approved disinfectant.

1.22 Home Visit/Pass with Health Care Worker, Companion or Family

Precautions required for Patient

- Patient should perform hand hygiene on leaving room.
- Patient is not required to wear gloves following hand hygiene.
- The patient should wear clean clothes.
- All wounds must be covered.

Precautions for Health Care Worker Accompanying Patient

- A separate transport person (e.g. HCW) should take the patient to the door of the facility they are leaving.
- The HCW accompanying the patient on the home visit should meet the patient at the door of the facility they are leaving.

- Alcohol-based hand rub must be available for hand hygiene of patient and health care worker during visit.
- Any equipment taken on the visit should be bagged and cleaned according to facility/RHA policy after return to the facility and before use by another patient

Family Accompanying Patient

- Hand hygiene prior to leaving room.
- Equipment taken on the visit should be bagged and cleaned according to facility/RHA policy after return to the facility and before use by another patient.

1.23 Visitor Visiting an MRSA Positive Patient

- Visitor does not need to wear PPE but must perform hand hygiene on entering and leaving the patient room.
- PPE is required if they are assisting in the direct care of a patient. This does not include feeding a patient or pushing them in a wheelchair.
- Visitor must be directed to ask for assistance in obtaining patient care supplies on the nursing unit.

1.24 MRSA Positive Patient Visiting Other Patients

- Patient who is MRSA Positive should not visit other patients in hospital.
- In exceptional circumstances, on a case-by-case basis, visiting may be allowed for compassionate reasons following consultation with IP&C.

1.25 Patient Requiring Rehabilitation

- Patient requiring rehabilitation in acute care settings (e.g. Physiotherapy, Occupational Therapy) should receive therapy as indicated for acute care settings. MRSA Positive Status is not a reason to alter therapy services available to the patient.
- Patient requiring rehabilitation in an ambulatory-care setting (e.g. Physiotherapy, Occupational Therapy) should receive therapy as indicated according to: MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Modifications for Contact Precautions for Ambulatory Care, page 59-60: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Transport the patient according to Section 1.18: Management of MRSA Positive Patient When they Leave their Room.
- Consult IP&C to develop case-by-case precautions as required during rehabilitation for a specific patient outside of their room.
 - Cohorting of MRSA Positive patients can be done (e.g. in a MRSA outbreak situation multiple MRSA Positive patients scheduled at one time). Contact precautions should be maintained by changing gloves, gowns and performing hand hygiene between patient contact. In discussion with IP&C, on a case-by-case basis, it will be determined if the gown does not need to be changed between each patient. This might be considered where patients are known to be colonized with the same strain.
 - Designate therapy to one area of the department.

- Schedule therapy to minimize possible exposure/transmission of the organism if possible.
- Patient-dedicated equipment is preferred. If unavailable, clean and disinfect shared equipment with facility-approved disinfectant between patient uses.
- Clean and disinfect communal equipment (e.g. parallel bars) with facility-approved disinfectant between patient use.

1.26 Patient Requiring Recreational Therapy

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Modifications for Contact Precautions for Long- Term Care, page 59: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Patients in acute care who are panelled for personal care home/long-term care facility and other long term stay patients should receive Recreational Therapy as indicated by caregivers.
- Precautions required during Recreational Therapy may be developed for a specific patient in consultation with IP&C.
- Transport the patient according to Section 1.18: Management of MRSA Positive Patient When They Leave Their Room.

1.27 Management of Patient on Mental Health Unit

- Follow Routine Practices. Additional precautions are not required.
- MRSA Positive patient must perform hand hygiene regularly and prior to leaving the unit. The importance of hand hygiene should be continually reinforced to encourage optimal practice.

1.28 Management of Contacts

- Contacts are identified by establishing “the contact” or “at-risk” period of time the positive MRSA index case may have been colonized or infected but was not identified as MRSA Positive. The “contact” or “at-risk” period is determined by either the date of admission to implementation of contact precautions or the date of the last negative MRSA culture of the index case until the implementation of contact precautions or date of discharge.
- Identify and screen close contacts (e.g. roommates and bathroom mates) of the index case during the “at-risk” period. See Appendix B Guidelines for Specimen Collection. Screening cultures must be collected 48 hours or more after contact with the index case for optimal detection of MRSA.
- Flag close contacts as MRSA Suspect. Notify the receiving facility if contacts are transferred to another facility. Contacts that have been discharged prior to screening will be screened upon readmission, as alerted by the flag.
- No further screening is obtained if all the close contacts are negative.
- If any close contacts are positive, expand the screening to include:
 - Patients that were exposed on the unit and those transferred from the unit from the date of admission or from the date of last negative screen. Screening cultures must be collected 48 hours or more following contact with the index case for optimal detection of MRSA.
- If a patient has received a potentially effective antimicrobial within 48 hours of rescreening, they must be rescreened again when the antimicrobials are discontinued.
- For selected cases an alternate time frame might be appropriate, following consultation with IP&C.

- Isolation of contacts pending screening culture results is generally not required. Contact precautions may be instituted prior to laboratory confirmation for selected patients believed to be high risk contacts in consultation with IP&C.
- The risk of transmitting MRSA must be balanced against the negative effects of placing a patient on contact precautions. Other factors to consider prior to instituting empirical contact precautions include the turnaround time for receiving laboratory reports, the likelihood of MRSA transmission (based on patients' risk factors and the amount of transmission on the unit/ward in the past) and whether the patient has a compromised immune system with increased risk of severe illness if transmission should occur.
- More frequent screening cultures may be necessary during an outbreak.
 - In selected situations, after discussion with the Microbiology Laboratory, additional sites of culture might be considered where there is an outbreak with a virulent strain.

1.29 Outbreak Management

- Refer to Appendix D for Steps for Outbreak Management
- Refer to Section 1.28: Management of Contacts Section.
- Report outbreaks to MHSAL Epidemiology and Surveillance Unit.

1.30 Surveillance

- Each facility/RHA IP&C should maintain data/information on patients screened for MRSA. This enables IP&C to keep track of the screening being done in the facility.
- There should be collection and maintaining of a data repository including every identified patient colonized/infected with MRSA in their facility/RHA. This enables IP&C to follow MRSA Positive patients and the prevalence of MRSA in the facility/RHA.
- Collection and storage of all relevant patient information must be consistent with PHIA.

1.31 Management of Pet/Animal Visitor

- Pet therapy animals or animals involved with a visiting pet program should not visit a MRSA Positive patient.
- Personal pets or service animals may visit a MRSA Positive patient.
- Exclude personal pets other than cats and dogs. Do not allow reptiles (e.g. iguanas, turtles, snakes), amphibians, birds, primates, ferrets or rodents to visit. Rare exceptions may be made for end-of-life patients who are in single patient rooms.
- A patient wishing to have contact with their personal pet must have approval from a physician or delegate before animal contact. Allergies and other considerations (e.g. fear) of the patient and other patients in the area should be considered before approving contact.
- Discourage pet visitation in an intensive care unit. Individual circumstances can be considered in extenuating circumstances.
- There must be a policy requiring hand hygiene practices for all patients, visitors and health care workers before and after each animal contact.
- The pet escort must carry with them an alcohol-based hand rub product, supplied by the facility/RHA and offered to everyone prior to and after contact with the animal.

- There should be a dedicated staff member to be aware of all animals entering the facility and facilitate contact tracing in the event of potentially zoonotic patient infections. The staff member should be familiar with institutional policies for managing animal bites and cleaning pet urine, feces or vomitus.
- Routine cleaning of environment following pet visit must occur.

1.32 Modifications for Additional Precautions in Long-Term Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Long-Term Care Settings, page 59: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.33 Modifications for Additional Precautions in Ambulatory Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Ambulatory Care Settings, page 59: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.34 Modifications for Additional Precautions in Home Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Home Care, page 60: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

1.35 Modifications for Additional Precautions in Pre-hospital Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Pre-hospital Care, page 61: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

2. Vancomycin-Resistant Enterococci (VRE) Guidelines for Health Care Settings

Enterococci are bacteria that are normal flora in the gastrointestinal tract of humans. They may also colonize the vagina, oral cavity, perineal area, hepatobiliary tract and upper respiratory tract. Human feces contain the greatest quantity of enterococci, and the fecal-oral route is the usual route of transmission. Enterococci seldom cause severe infection, but, immune suppressed patients and patients with central vascular lines may be at risk for infection with these bacteria. Enterococci may also contaminate open wounds and decubitus ulcers, creating a reservoir for the organism. *E. faecalis* is responsible for the majority of infections caused by enterococci while *E. faecium* has greater intrinsic resistance to multiple antibiotics and is the most commonly detected VRE.

Enterococci have always had inherent resistance to many antibiotics and can readily acquire resistance to additional antibiotics. Vancomycin-Resistant Enterococci (VRE) are enterococci that have acquired resistance to vancomycin, the drug of choice for treating multi-drug resistant enterococci infections. **VRE is neither more pathogenic nor more virulent than other enterococci.** (e.g. it is not more likely to cause infection, nor does it cause more serious infection than other enterococci). Historically there was a concern that VRE would be untreatable cause many deaths and share its resistance genes with other organisms. After over 20 years of experience with VRE in Canada, colonization with these strains has been common in many settings, but infections are infrequent. There are now several effective antimicrobials available, and transfer of resistance genes to MRSA has seldom been observed.

Since 2012 some facilities and jurisdictions across Canada have reduced VRE control measures. The reduction of measures includes:

- Discontinuation of screening patients for VRE, or only screening specific high risk patients (e.g. dialysis, BMT, critical care).
- Discontinuation of additional precautions for patients positive for VRE or only placing specific high risk VRE Positive patients on additional precautions. (e.g. hemodialysis, BMT, critical care).
- Discontinuation of declaring VRE outbreaks.
- No contact management for VRE positive patients.
- No prevalence screening for VRE.

The discontinuation of VRE measures was based on:

- Few clinical infections and no significant adverse outcomes identified related to VRE at these centres, despite increasing rates of colonization.
- Adverse events associated with the use of additional precautions.
- Patient flow and access to care were compromised in facilities by the additional precautions implemented for the control of VRE
- Costs for surveillance and containment of VRE were substantial and of certain benefit.
- Concerns that vancomycin resistance would be readily transferred to other pathogens, such as Methicillin-Resistant *Staphylococcus aureus* (MRSA), have not proven to be valid.
- There are several antibiotics currently available to treat VRE infection, which was not previously the case.

- Costs and resources required for VRE control measures were not sustainable in these facilities considering there were no adverse clinical outcomes. It was felt there was no evidence that patient safety and outcomes were improved through implementation of these measures while they diverted resources from other IP&C duties/practices.
- The adherence to optimal IP&C practices (e.g. hand hygiene, environmental cleaning, best practice bundles for central line-associated bloodstream infection) is higher today than it was in the past, when VRE was first described.

Since the discontinuation of VRE control measures, these facilities/jurisdictions have implemented checks and balances to monitor the impact, (e.g. monitoring VRE infections, particularly bacteremias). They have also implemented programs to improve IP&C practices (e.g. improved environmental programs, antimicrobial stewardship) with the cost savings gained from discontinuation of these measures.

In the development of this updated document extensive input was obtained from other Canadian facilities/ jurisdictions to review changes in practice. We also received information on programs and measures implemented with the cost savings and whether there was a positive or negative impact observed following discontinuation. Since discontinuation, these facilities report improved access to beds for patients with other infectious diseases (e.g. *C. difficile*, MRSA) and more time to work on other important IP&C issues. They have a process in place to monitor for adverse outcomes and have not identified any major negative impacts.

After careful and critical review of this information, the Manitoba Health, Seniors and Active Living Antimicrobial-Resistant Working Group recommend discontinuation of all existing VRE control measures. This would include but not limited to:

- No VRE screening on admission for contact management or prevalence screening purposes.
- No contact precautions for VRE Positive or Suspect.
- No flagging and subsequent deflagging of health records of VRE Positive or Suspects (except the deflagging of those individuals currently identified as VRE Positive or Suspect).
- Removal of flags of health records of VRE Positive of Suspects.
- No special infection prevention and control measures for home visits, discharge or transfer of VRE Positive or Suspects including specific areas of health care facilities, (e.g. operating room, rehabilitation).

The optimal IP&C measures outlined on page 16 in the Background should be maintained on an ongoing basis including patient safety and quality assurance processes to prevent transmission of VRE. Timely ongoing surveillance for VRE bacteremias must be done with timely review to monitor changes in morbidity and mortality attributable to VRE. Parameters for this surveillance are outlined in Part E: ARO Surveillance.

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3. Extended-Spectrum Beta-Lactamase (ESBLs) for Health Care Settings

ESBL is a bacterial enzyme with the ability to break down a wide range of beta-lactam antibiotics, including penicillins and extended-spectrum cephalosporins (e.g. ceftriaxone and/or ceftazidime). These enzymes do not hydrolyze carbapenems. ESBLs may be produced by many different gram-negative bacteria, but are most commonly found in strains of *Escherichia coli* and *Klebsiella pneumoniae*. Strains which produce these enzymes are frequently also resistant to other antimicrobials, including trimethoprim-sulfamethoxazole and fluoroquinolones, so antimicrobial treatment options may be limited.

In most cases, a person's immune system is able to successfully resist infection with ESBL-producing bacteria, so patients are colonized rather than infected. However, some people who become infected may fail antimicrobial therapy because of resistance. Persons at increased risk include neonates, children, the elderly, and people with chronic health conditions.^{1 2} ESBL-producing gram-negative bacteria can survive in the health care environment but the environment has rarely been implicated in outbreaks³ These strains are now isolated commonly from persons in the community as well as in the health care setting.

Preventing transmission of ESBL-producing bacteria requires adherence to Routine Practices, with particular attention to hand hygiene. Additional precautions are not required. Facilities/ organizations that have had infection prevention and control measures for ESBLs will need to revise their policies, procedures and processes (e.g. screening, flagging, additional precautions) to reflect the above recommendations.

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2. Provincial Infection Control Network of British Columbia (PICNET). Antibiotic Resistant Organisms Prevention and Control Guidelines for Healthcare Facilities. 2013
Available from: <https://www.picnet.ca/practice-guidelines>
3. Public Health Ontario Provincial Infectious Diseases Advisory Committee (PIDAC). Annex A: Screening, Testing and Surveillance for Antibiotic Resistant Organisms (AROs) in All Health Care Settings, 3rd ed. February 2013. Available from: http://www.publichealthontario.ca/en/eRepository/PIDAC-IPC_Annex_A_Screening_Testing_Surveillance_AROs_2013.pdf

4. Carbapenemase-Producing Enterobacteriaceae (CPE) Guidelines for Health Care Settings

Carbapenems (e.g. imipenem, meropenem, ertapenem) are broad spectrum antimicrobials, with in-vitro activity against a diverse array of gram-positive and gram-negative bacteria. They are slowly hydrolyzed by most beta-lactamases. Because of this, they have been the last line of defence against multi-drug resistant gram-negative organisms since they were introduced in the early 1980s.¹ Of concern, beta-lactamase enzymes capable of hydrolyzing carbapenems (carbapenemase enzymes) are being identified with increasing frequency. Carbapenemase-producing Enterobacteriaceae (CPE) are gram-negative bacteria in the family Enterobacteriaceae that produce a carbapenemase enzyme. The most frequently identified of these enzymes are VIM, KPC and OXA-48.

The first report of a carbapenem-resistant *Klebsiella pneumoniae* isolate producing a *Klebsiella pneumoniae* carbapenemase (KPC) was published in 2001. This strain was previously isolated in a North Carolina intensive care unit in 1996, but went unnoticed.² The strain was stored at the Centers for Disease Control and Prevention (CDC) as part of an ICU pathogen collection and investigated several years after its first isolation. Through 2004 only a few isolates of KPC-producing strains from various localities from Baltimore to New York were reported in the literature. In 2004 investigators from England's Health Protection Agency, together with colleagues from Tisch Hospital in New York City, reported a KPC-producing *K. pneumoniae* outbreak in 2000-2001 that affected 24 patients and had a case fatality rate of 33%.³ The researchers from Brooklyn N.Y reported in several publications that 62 (24%) of 257 *K. pneumoniae* isolates in their center were KPC producers⁴, and later, that 96 isolates collected from 10 Brooklyn hospitals during 2003-2004 were KPC producers.⁵ The National Healthcare Safety Network reported during 2006-2007 that 10-11% of all nosocomial *K. pneumoniae* isolates causing central line associated bloodstream infections or urinary tract infection were resistant to carbapenems.⁶ Since 2005, reports of spread of KPC-producing strains have appeared in multiple countries throughout the world, with nationwide outbreaks in Israel⁷, Greece⁸ and Italy⁹

The first VIM-producing Enterobacteriaceae were isolated in 2001 in Greece.¹⁰ VIM-producing Enterobacteriaceae have spread locally in Italy¹¹ and to a limited extent in Spain¹² The spread of KPC and VIM producers was followed by the spread of Enterobacteriaceae with the NDM enzyme, primarily originating in the Indian subcontinent and by the spread of OXA-48 around the eastern and southern parts of the Mediterranean basin. The spread of these four enzymes resulted in high endemicity of CPE in many regions. Countries with endemic KPC producers include China, Israel, Greece, Italy, Poland, Colombia, Argentina, Brazil, and some states in the United States. Other carbapenemases are endemic in India (NDM) and Turkey (OXA-48).¹

CPE, like other Enterobacteriaceae, may cause a variety of infections including urinary tract infection, intra-abdominal infections, bloodstream infections, pneumonia (ventilator associated or not) and skin and soft tissue (including surgical site).¹ **The high mortality associated with CPE infections is likely not due to the virulence of the pathogen but because adequate treatment is delayed or unavailable. Further, some of the antimicrobials currently used for treatment of infections caused by CPE may demonstrate suboptimal efficacy.**¹³

In developed countries CPE transmission occurs almost exclusively within health care settings. The main route of spread is from patient to patient via contaminated hands of health care workers although transmission has also been traced to contaminated endoscopes¹⁴ as well as sinks and drain pipes.¹⁵ Other risk factors for health care-associated CPE carriage or infection include prolonged hospital stay, ICU stay, antibiotic use, poor functional status, incontinence product use, presence of multiple invasive devices, mechanical ventilation, availability of isolation rooms, staff-to patient ratio and compliance with hand hygiene. Long-term care settings-including Long-Term Care Acute Care Hospitals (LTACHs) and Post-Acute Care Hospitals (PACH) that treat seriously ill patients, and nursing homes that provide care play a key role in the spread of CPE.¹ Patients in high-acuity long term settings have many risk factors for CPE colonization, including advanced age, multiple co-morbidities, use of multiple invasive devices, high exposure to antibiotics, and prolonged hospitalization.¹⁶ CPE can also commonly occur, usually as a colonizer in lower-acuity long term settings such as nursing homes. This high prevalence can be related to prior exposure to acute care facilities, advanced age and co-morbidities as well as shared rooms, communal areas, undesirability of restricting activities and lack of optimal infection control practices.¹⁷

Transmission of CPE outside of health care settings has rarely been documented in developed countries but is more common in developing countries. Discovery of an NDM-1-producing *K. pneumoniae* in Westerners returning from the Indian subcontinent in which some of the individuals had not been hospitalized would indicate there is transmission occurring in the community in that part of the world. Other reports of community-acquired CPE in developing countries and in Westerners returning from developing countries have been published.¹

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4.1 Identification/Notification of CPE

Policies must be in place for reporting of CPE Positive patients with appropriate laboratory resources to support these policies. When a patient is identified as CPE positive there must be clearly assigned responsibility for the following activities:

- Notification of the unit on which the patient resides.
- Notification of IP&C and, if applicable, Health Information.
- Implementation of contact precautions.
- Identification on the patient record of the CPE status and the contact precautions required.
- Providing the CPE Positive patient, family members and visitors verbal instructions and a Patient Information Sheet (refer to Appendix A) regarding CPE and contact precautions.
- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Routine Practices and Additional Precautions, Source Control, page 56:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.2 Admission Screening

- Routine admission screening is not recommended.
- Patients being screened for CPE must be isolated pending screening culture results.
- Screen a patient who has been admitted to or directly transferred from a health care facility within or outside Canada known to have endemic transmission as identified by IP&C. The patient must have been admitted to the source facility for more than 24 continuous hours.
- Screen a patient who is identified as CPE Positive and there is no documentation of positive culture. Consult IP&C from previous facility if status is unclear to determine if screening is required.
- Screen a patient identified as CPE Suspect in the flagging system.
- Screen a patient who is identified as a CPE contact.

4.3 Surveillance Cultures to be Performed to Identify CPE

- Rectal or ostomy site.
- Refer to Appendix B: Guidelines for Specimen Collection.

4.4 Refusal of Screening

- If a patient/family refuses CPE screening, explain the procedure and rationale for the screening and any testing to the patient/family again.
- If the patient/family still refuses screening, notify IP&C and where achievable, place the patient on contact precautions for the duration of the admission.

4.5 Flagging of Patient Record

- A patient identification system (chart flagging) must be developed by IP&C together with Health Information to support rapid identification of CPE status on future admissions or interactions with another health care facility.

4.6 Patient Accommodation and Placement

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Patient Accommodation and Placement, page 56: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Isolate in a private room or cohort patients with the same strain.
- Cohorting of staff should occur on a case by case basis in discussion with Infection Prevention and Control.

4.7 Personal Protective Equipment (PPE)

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Personal Protective Equipment, page 57: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.8 Non-Critical Patient Care Equipment

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, Cleaning and Disinfection of Non-Critical Patient Care Equipment, page 57-58: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.9 Waste, Laundry, Dishes and Cutlery

- Refer to MHSAL *Routine Practices and Additional Precaution: Preventing the Transmission of Infection in Health Care*, contact precautions, Waste, Laundry, Dishes and Cutlery, page 58 <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.10 Laboratory Specimens

- Use equipment for collection of specimens which is dedicated to the specific patient.
- Do not take phlebotomy trays into the room.
- Take all required equipment into the room at the start of the procedure.
- Deposit the specimen(s) into an impervious, sealable bag immediately following removal from the patient room, ensuring the outside of the bag does not become contaminated.

4.11 Environmental Control/Housekeeping

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Cleaning of the Patient Environment, page 58: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Facility-approved disinfectant must be used for the manufacturer's instructions including recommended contact time on all surfaces to ensure proper disinfection.

- During an outbreak more extensive and frequent cleaning with a facility-approved disinfectant may be required. Any changes to routine cleaning practice will be recommended by the outbreak management team. Please see Appendix D: Steps for Outbreak Management.

4.12 Patient Health Record

- Written records should not go into the room of a patient on contact precautions.
- If the health record is required to accompany the patient for tests or treatments, place it in a protective cover (e.g. plastic bag) to prevent contamination. Otherwise, have a dedicated staff person carry the chart ensuring that they and the chart are not contaminated.
- If the outside of the chart becomes contaminated, clean and disinfect with facility-approved disinfectant.
- Mobile computers or e-records that cannot be cleaned and disinfected should not go into the room of a patient on contact precautions unless it is protected by a cover that is either disposable or cannot be disinfected. After coming out of the room, the cover should be removed and disposed of or disinfected.

4.13 Personal Documents (e.g. Power of Attorney, Paneling Papers, Advanced Care Directive)

- There are no special precautions for documents that are not going into the patient health record.
- Documents retained as part of the patient health record should be handled in the following manner:
 - Prior to signing, wipe the table on which the document is to be signed using a facility-approved disinfectant.
 - Assist the patient to perform hand hygiene with alcohol-based hand rub prior to signing/handling the document.
 - Wipe the pen with a facility-approved disinfectant after signing.

4.14 Duration of Additional Precautions

- Given the likelihood for prolonged gastrointestinal carriage and risk of spread of these microorganisms, do not discontinue contact precautions. Once a patient is positive, they will always be considered positive.
- Once a patient is identified as CPE Positive, maintain contact precautions for current admission and all subsequent admissions.

4.15 Handling of Deceased Bodies

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Handling of Deceased Bodies, page 58:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipcr/pap.pdf>

4.16 Treatment or Decolonization

- There is no indication for treatment for decolonization.
- Treatment of infections is at the discretion of the attending physician, in consultation with an Infectious Diseases Specialist, as appropriate.

4.17 Subsequent Cultures for Persistent Carriage

- Routine screening is not recommended for a positive patient who remains in hospital.

4.18 Management of CPE Positive Patient When they Leave their Room

- The patient must remain in their room unless medically indicated.
- If the patient is transferred, the referring ward or clinic must notify in advance the receiving department of the contact precautions required.
- During procedures a health care worker in contact with the patient must maintain contact precautions. A dedicated clean person may be used to minimize environmental contamination.

Precautions for the Patient when Transported

- Patient to perform hand hygiene on leaving room.
- No gloves or isolation gown required by the patient.
- Patient to wear clean clothes, housecoat or cover gown.
- All wounds must be covered.
- If the patient must be transferred in a bed, wheelchair or other equipment that resides in the patient room, the external frequently touched surfaces (e.g. handles, bed rails) must be cleaned with a facility-approved disinfectant prior to leaving the room. The patient and transfer equipment (e.g. wheelchair, bed) should be covered with a clean sheet.
- If the patient is transferred using a clean transport stretcher or wheelchair, the stretcher or wheelchair does not need to be cleaned prior to transport but must be cleaned with a facility-approved disinfectant after returning the patient to the room.

Health Care Worker Precautions for Transport

- Follow contact precautions to enter room.
- Remove PPE before leaving the room.
- Hand hygiene after removal of PPE and before leaving room.
- Apply clean gloves and gown outside the room for transport.

Visitor Precautions for Transporting the Patient

- Hand hygiene before leaving the room.
- Visitors are not required to wear gloves and gown outside the room.

4.19 Management of CPE Positive Patient in the Operating Room

- The patient can be scheduled on the regular OR slate and does not need to be scheduled for a particular time of day.
- Transport the patient according to Section 4.18: Management of CPE Positive Patient When they Leave their Room.
- During the procedure a health care worker who is in contact with the patient must maintain contact precautions. A dedicated clean person may need to be present to minimize environmental contamination.

- The patient health record and other necessary specific forms may be taken into the OR. They should be kept on a designated table in a low traffic corner of the theatre that does not have contact with the health care worker who has patient contact.
- Recover the patient in the Post Anaesthetic Care Unit on contact precautions. If the patient is unable to be recovered in the Post Anaesthetic Care Unit, rescheduling of patients may need to be done so they can be recovered in the theatre on contact precautions.
- After the case, standard OR cleaning procedures are sufficient to clean the theatre.

4.20 Management of Neonate Born to CPE Positive Mother

Infant is Rooming in with Mother

- Implement contact precautions for care of the mother and infant with the following modifications
 - Assisting the mother with the infant (e.g. breastfeeding, holding infant), gloves/gowns do not need to be changed when moving between mom and infant. Perform hand hygiene and change gloves/gown as required to prevent cross contamination from one body site to another (especially prior to performing health care procedures and assessments such as post-partum checks).
 - Infant is identified as CPE Suspect. Upon discharge the infant will be maintained as CPE Suspect and screened if readmitted to a health care facility.

Infant Admitted to Level II or Level III Nursery

- Infant is flagged as CPE Suspect.
- Screen infant and place on contact precautions pending results of screening.
- Screening cultures should be obtained from the newborn 48 or more hours after birth, preferably between 48 and 72 hours. Refer to Section 4. 3 Surveillance Cultures to be Performed to Identify CPE and Appendix C: Guidelines for Specimen Collection.
 - If the infant tests CPE positive, contact precautions should be followed. Screening for persistent carriage will be done with direction by IP&C.
 - If the infant tests negative discontinue contact precautions but maintain CPE Suspect flagging.
- Upon discharge the infant will be maintained as CPE Suspect and screened if readmitted to a health care facility.

4.21 Discharge/Transfer between Facilities

- It is the responsibility of the transferring facility to identify known CPE Positive and Suspect when the patient is being transferred. This must be communicated to the receiving facility in advance of the discharge/transfer.

CPE Suspect

- The status of a CPE Suspect patient must be documented on the patient's Inter-facility Transfer Referral Form.

CPE Positive

- Prior to discharge/transfer the receiving facility, physician and other involved health care agencies, (e.g. Home Care, Physiotherapy) must be notified of the patient's CPE Positive status and treatment.
- Advise the patient of the importance of informing any health care worker of their CPE Positive status.

- CPE Positive must be documented on the patient's Inter-facility Transfer Referral form.
- The receiving ICP may request CPE status, culture and antimicrobial information by telephone or fax from the ICP at the transferring facility. This must be recorded in the patient health record.
- The receiving facility should not rescreen a known CPE Positive patient following transfer.
- A CPE Positive patient does not require an ambulance for transport. If clinically appropriate, the patient can be transferred by a transportation company with trained staff who follow proper IP&C precautions. Other transportation systems (e.g. Stretcher Care Service) may be used.
 - Prior to discharge/transfer the transferring facility must notify the transport service if the patient is on contact precautions.

Precautions relevant to the Patient for Transfer

- Use a clean stretcher or wheelchair.
- Patient to perform hand hygiene on leaving room.
- No gloves required for the patient.
- All wounds must be covered.
- Patient to wear clean clothes, housecoat or cover gown.

Precautions relevant to the Health Care Worker for Transfer

- Follow contact precautions to enter and exit room.
- Remove PPE before leaving the room.
- Hand hygiene before contact with the patient, after removal of PPE and before leaving the room.
- Apply clean gloves and gown outside the room.
- Wear clean gloves and gown during transportation of patient.

Precautions relevant to the Transport Service

- Follow contact precautions inside the patient room and when leaving the room.
- At receiving facility, Transport Services follow contact precautions to place patient in the room and upon leaving patient room.
- Consider wheelchair/stretcher used to transport the patient as contaminated. Clean and disinfect prior to removal from isolation space or use with another patient.
- Disinfect vehicle surfaces and any equipment that was in contact with the patient with facility-approved disinfectant.

4.22 Home Visit/Pass with Health Care Worker, Companion or Family

Precautions required for Patients

- Patient performs hand hygiene on leaving room.
- Patient is not required to wear gloves following hand hygiene.
- The patient should wear clean clothes.
- All wounds must be covered.

Precautions for Health Care Worker Accompanying Patient

- A separate transport person (e.g. HCW) should take the patient to the door of the facility they are leaving.

- The HCW accompanying the patient on the home visit should meet the patient at the door of the facility they are leaving.
- Alcohol-based hand rub must be available for hand hygiene of patient and health care worker during visit.
- Any equipment taken on the visit should be bagged and cleaned according to facility/RHA policy after return to the facility and before use by another patient.

Family Accompanying Patient

- Hand hygiene prior to leaving room.
- Equipment taken on the visit should be bagged and cleaned according to facility/RHA policy after return to the facility and before use by another patient.

4.23 Visitor Visiting a CPE Positive Patient

- Visitor does not need to wear PPE but must perform hand hygiene on entering or leaving the patient room.
- PPE is required if they are assisting in the direct care of a patient. This does not include feeding a patient or pushing them in a wheelchair.
- Visitor must be directed to ask for assistance in obtaining patient care supplies on the nursing unit.

4.24 CPE Positive Patient Visiting Other Patients

- Patient who is CPE Positive should not visit other patients in hospital.
- In extraordinary circumstances, and on a case-by-case basis, visiting may be allowed for compassionate reasons following consultation with IP&C.

4.25 Patient Requiring Rehabilitation

- Patient requiring rehabilitation in acute care settings (e.g. Physiotherapy, Occupational Therapy) should receive therapy as indicated for acute care settings.
- Patient requiring rehabilitation in an ambulatory-care setting (e.g. Physiotherapy, Occupational Therapy) should receive therapy as indicated according to: MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Modifications for Contact Precautions for Ambulatory Care, page 59-60:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Transport the patient according to Section 4.18. Management of CPE Positive Patient When They Leave Their Room.
- Consult IP&C to develop case-by-case precautions as required during rehabilitation for a specific patient outside of their room
 - Designate therapy to one area of the department.
 - Schedule therapy to minimize possible exposure/transmission of the organism as possible.
 - Patient-dedicated equipment is preferred. If unavailable, clean and disinfect shared equipment with facility-approved disinfectant between patient uses.
 - Clean and disinfect communal equipment (e.g. parallel bars) with facility-approved disinfectant between patient use.

4.26 Patient Requiring Recreational Therapy

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Precautions, Modifications for Contact Precautions for Long-Term Care, page 59: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- Patients in acute care who are panelled for nursing home and some other long term stay patients should receive Recreational Therapy as indicated by caregivers.
- Precautions required during Recreational Therapy may be developed for a specific patient in consultation with Infection Prevention and Control.
- Transport the patient according to Section 4.18: Management of CPE Positive Patient When They Leave Their Room.

4.27 Management of Patient on Mental Health Unit

- Follow Routine Practices. Additional precautions are not required.
- CPE Positive patient must perform hand hygiene regularly and prior to leaving the unit. The importance of hand hygiene should be continually reinforced to encourage optimal practice.

4.28 Management of Contacts

- If one patient within a specific facility is found to be infected or colonized with CPE there should be immediate consultation with IP&C, Microbiology, MOH and possibly Infectious Diseases to determine the approach for active surveillance cultures to be done on contacts. The following steps should be followed:
 - Contacts are identified by establishing “the contact” or “at-risk” period of time the positive CPE index case may have been colonized or infected but was not identified as CPE Positive. The “contact” or “at-risk” period is determined by either the date of admission to implementation of contact precautions or the date of the last negative CPE culture of the index case until the implementation of contact precautions or date of discharge.
 - Identify and screen close contacts (e.g. roommates and bathroom mates) of the index case during the “at-risk” period. See Appendix B Guidelines for Specimen Collection.
 - Flag close contacts as CPE Suspect. Notify the receiving facility if contacts are transferred to another facility. Contacts that have been discharged prior to screening will be screened upon readmission, as alerted by the flag.
 - No further screening is obtained if all the close contacts are negative.
 - If any close contacts are positive, expand the screening to include:
 - ◆ Screen patients that were exposed on the unit and those transferred from the date of admission or to the date of last negative screen.
 - Isolation of contacts pending screening culture results is required.
 - More frequent screening cultures may be necessary during an outbreak.
 - ◆ After discussion with the Microbiology Laboratory, additional sites of culture may be considered in selected situations.

4.29 Outbreak Management

- Refer to Appendix D for Steps for Outbreak Management
- Refer to Management of Contacts Section 4.28 above.
- Report outbreaks to Manitoba Health, Seniors and Active Living Epidemiology and Surveillance Unit.

4.30 Surveillance

- Facility/RHA IP&C should maintain data/information on patients screened for CPE. This enables IP&C to keep track of the screening being done in the facility.
- There should be a real time data repository identifying every identified patient colonized/infected with CPE in their facility/RHA. This enables IP&C to follow CPE Positive patients and the prevalence of CPE in the facility/RHA.
- Collection and storage of all relevant patient information must be consistent with PHIA.

4.31 Management of Pet/Animal Visitor

- Animals should not visit a CPE Positive patient. This includes personal pets and service animals.

4.32 Modifications for Additional Precautions in Long-Term Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Long-Term Care Settings, page 59: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.33 Modifications for Additional Precautions in Ambulatory Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Ambulatory Care Settings, page 59: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.34 Modifications for Additional Precautions in Home Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Home Care, page 60:
- <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

4.35 Modifications for Additional Precautions in Pre-hospital Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Pre-hospital Care, page 61:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

5. Other Antimicrobial-Resistant Gram Negative Bacilli (GNB) Guidelines for Health Care Settings

Antimicrobial resistance in gram negative bacilli (GNB) is evolving. For selected GNB (e.g. *Pseudomonas aeruginosa*, *Burkholderia* spp., *Acinetobacter* spp.) that are highly resistant (usually characterized by resistance to 3 or more antimicrobial classes), additional precautions may be indicated as determined by IP&C in discussion with the microbiology laboratory. There is minimal evidence to determine if these organisms are transmissible in the health care environment. Therefore unlike CPE, precautions for these organisms would not be routinely recommended.

The following measures are recommended to be followed.

5.1 Identification and Notification of Other Antimicrobial-Resistant GNB

Policies must be in place for reporting of antimicrobial-resistant GNB with appropriate diagnostic criteria and laboratory resources to support these policies. When a patient is identified, responsibility for the following activities must be clearly assigned:

- Notification of IP&C to determine if the patient requires contact precautions.
 - In special circumstances (e.g. outbreak), after discussion with the laboratory, IP&C would determine if contact precautions would be required.
 - ◆ Depending on the severity and characteristics of the outbreak, there could be consideration of additional interventions.
- If the patient requires additional precautions
 - Notification of the unit on which the patient resides.
 - Implementation of contact precautions
 - Documentation on the patient record and whether contact precautions are required.
 - Providing the patient, family members and visitors verbal instructions regarding the antimicrobial-resistant GNB and contact precautions.

5.2 Flagging/Deflagging of Patient Record

- Flagging and deflagging of the patient record is not routinely required. In selected cases, IP&C after discussion with the Laboratory may choose to flag/deflag a specific patient record.

5.3 Screening

- Routine admission screening is not required
- If an outbreak occurs, screening may be appropriate, as directed by IP&C in discussion with the laboratory.

5.4 Additional Precautions-Contact Precautions

5.4.1 Acute Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, contact precautions, page 56:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>
- The patient will remain on contact precautions for as long as directed by IP&C.

5.4.2 Modifications for Additional Precautions in Long-Term Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Long-Term Care Settings, page 59:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

5.4.3 Modifications for Additional Precautions in Ambulatory Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Ambulatory Care Settings, page 59:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

5.4.4 Modifications for Additional Precautions in Home Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Home Care, page 60:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

5.4.5 Modifications for Additional Precautions in Pre-hospital Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care*, Special Considerations for the Care of Patients with Antibiotic-Resistant Organisms in Pre-hospital Care, page 61:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>

5.5 Other Infection Prevention and Control Management Practices

- Treatment should be done in consultation with an Infectious Disease Consultant.
- Screening cultures for persistent carriage are not recommended. If they are done, they would be directed by IP&C in discussion with the laboratory.
- Screening of contacts is not recommended. Screening may be considered during an outbreak as directed by IP&C in discussion with the laboratory.

- If the patient is on contact precautions, the transferring facility must document a known positive on the patient's Inter-facility Transfer Referral Form prior to transfer.

References:

1. Wilson A, Livermore D, Otter J, et al. Prevention and Control of Multi-Drug-resistant Gram-negative Bacteria: Recommendations from a Joint Working Party. *J of Hosp Infec* 2015: 1-44.

6. Other Emerging Antimicrobial-Resistant Organisms

Antimicrobial-resistance in microorganisms is continually evolving and may present a public health threat including outbreaks in health care facilities (e.g. multidrug-resistant yeast organisms, *Candida auris*). It is sometimes unknown how resistant organisms emerge and epidemiologically they may be unique to a specific country or spread widely globally. Although the specific reasons for such emergence may be unknown, new or increasing antimicrobial pressures on humans, animals or the environment is often a factor.

It is important to be aware of the possible emergence of new antimicrobial-resistance organisms. If you suspect this is occurring in your facility/RHA, clinicians, IP&C and the laboratory need to be notified promptly and participate in discussions to implement procedures/processes to be followed to prevent transmission of these organisms.

At present there is a reporting process for clinicians to advise the Provincial Public Health Surveillance Unit about unusual occurrences of emerging or non-reportable diseases. This can be done on the Clinical Reporting form:

<http://www.gov.mb.ca/health/publichealth/cdc/protocol/form13.pdf>

under section III (c) ii. In addition, there is an informal avenue for the laboratory to report unusual findings to the Manitoba Health CDC Unit Medical Officer of Health by calling 204-788-8666 during office hours.

These guidelines are supported by the existing document Manitoba Health Seniors and Active Living *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipclrpap.pdf>.

There are important differences between acute care facilities and community-based health services with respect to infection prevention and control. Home Care programs need to balance infection prevention and control measures with promoting optimal, healthy lifestyles for their patients. Colonization or infection with an ARO may persist indefinitely or may periodically re-emerge, despite treatment or attempts at decolonization. Patients who are colonized or infected with these microorganisms have not been shown to pose a health risk to health care providers or other household contacts if Routine Practices are followed.

Routine Practices are essential infection prevention and control measures recommended for all patients at all times. **Hand hygiene and equipment and environmental cleaning are the primary infection prevention and control measures. They are essential for all community care patients at all times, including persons colonized or infected with an ARO.** This is important as many colonized patients are not known to be colonized. Hand hygiene is the most important measure to reduce risk of transmission of AROs as microorganisms are readily transmitted among individuals by the hands of health care providers. Special attention to handling, cleaning and disinfection of shared equipment between patients, including those carried to and from the home is also important to avoid cross-contamination.

1. Transfers of ARO Colonized or Infected Patients To and From Facilities

- Open and timely communication regarding a person's colonization or infection history of AROs is essential between the community care service and the facility.
- If the new patient is found to be infected or colonized with an ARO within 48-72 hours of admission, a receiving facility or community care service should inform the facility or community care where the patient originated.
- Follow-up cultures for AROs are not usually required when an individual is transferred into community care services as patients who are colonized or infected do not pose a risk to health care workers or other family members. If follow-up cultures are required by IP&C or Infectious Disease Specialists, the patient should be followed by their health care provider.

2. Home Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipclrpap.pdf> for information on management of patients in home care settings.
- Admission to home care services should not be denied or delayed on the basis of colonization or infection with an ARO.
- Home care services should be notified of the patient's ARO status.
- There is no need to disrupt housing arrangements if a household member is colonized or infected with an ARO.
- Patients colonized or infected with an ARO may participate in all recreational and social activities. Open wounds or lesions that are colonized or infected should be covered by clean, dry dressings.

- If this is not possible, the patient should be assessed on a case by case basis to determine if they may participate.
- Normal household dishwashing effectively cleans dishes and utensils.
 - Wash dishes in a regular dishwasher or in the kitchen sink, using hot water and regular dish soap. Gloves may be worn while washing dishes but are not necessary.
- Gloves are not required when handling food trays, dishes or eating utensils.
- The use of disposable dishes and utensils are not necessary.
- Patients infected or colonized with an ARO should undergo the same bathing schedule in their home that is routinely provided to other patients.
 - Regular soap may be used as there is no evidence that AROs are more resistant to removal from the skin than regular microorganisms.
 - Patients should have their own bath towel, which should not be shared with others.
 - In the event of fecal or other type of body fluid contamination, the bathtub should be cleaned and disinfected with a disinfectant (e.g. household bleach).

3. Group Homes for the Physically and Mentally Challenged

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>.
- Refer to MHSAL *Infection Control Guidelines For Community Shelters and Group Homes* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/fs/infcontshelter.pdf>
- There is no need to disrupt housing arrangements if a household member is colonized or infected with an ARO.

4. Doctors Offices/Outpatient Clinics/Dental Offices/Travel Clinics

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf> for information on management of patients in these settings as well as community and outpatient settings.
- Follow-up cultures for AROs are not usually required when an individual is discharged from hospital. These individuals are not a risk to health care workers or other family members in the community when Routine Practices including good hand hygiene are consistently and properly applied. If follow-up cultures are required, the positive individual should be followed by their health care provider in conjunction with facility IP&C.

5. Pre-hospital Care

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf> for information on management of patients in pre-hospital setting.
- There is no evidence that providing services to patients with AROs is a risk for pre-hospital workers when Routine Practices are followed.

6. Community (Workplace, School, Daycare, Shelters, Hospice)

- Refer to MHSAL *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* document located at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>.
- Refer to *Infection Control Guidelines For Community Shelters and Group Homes* document located at <http://www.gov.mb.ca/health/publichealth/cdc/fs/infcontshelter.pdf>
- There is no need to disclose colonization with AROs in the workplace, school or daycare setting.
- Admission to school, daycare and shelters should not be denied or delayed on the basis of colonization or infection with an ARO.
- Employment should not be denied on the basis of colonization or infection with an ARO.

7. Community-Associated MRSA (CA-MRSA)

MRSA can cause illness in persons outside of hospitals and health care facilities.

CA-MRSA usually manifests itself as skin and soft-tissue infections such as boils or abscesses.¹ CA-MRSA can also cause more serious infections, such as osteomyelitis, necrotizing fasciitis, necrotizing pneumonia or endocarditis. The transmission of CA-MRSA occurs through direct contact between an infected person and uninfected person, or by indirect contact through touching contaminated objects or surfaces that are part of the infected person's environment.² Risk factors associated with transmission of CA-MRSA are crowding, frequent skin contact, compromised skin, sharing contaminated personal care items and lack of cleanliness.³

Clusters of CA-MRSA have been reported in high risk populations in Canada such as Indigenous communities (including First Nations, Inuit and Métis), intravenous drug users, homeless individuals, sex trade workers and inmates in correctional facilities.^{1 2 4}

Persons that meet the following criteria will likely have CA-MRSA:

- No previous known MRSA.
- MRSA Positive sample identified within 48 hours after admission to a health care facility.
- No known admission to a health care facility in the previous 12 months.
- No known residence in a long-term care facility in the previous 12 months.
- No known surgery or dialysis in the previous 12 months.
- No known indwelling catheter or medical device (e.g. Foley catheter, tracheostomy, feeding tube) in previous 12 months.

Certain strains such as CMRSA-7 and CMRSA-10 are predominantly CA-MRSA. These strains may be characterized by the presence of genes such as metallo- β -lactamase gene.⁶ and Panton-Valentine leukocidin (PVL).^{6 7} CMRSA-10 outbreaks have been reported in Canada in Vancouver's Downtown Eastside among injection drug users, in Calgary among younger individuals (median 35 years) and in Ontario in correctional facilities and homeless shelter residents. CMRSA-7 outbreaks have been reported in Canada in younger individuals in Saskatoon, among residents of remote northern communities in Saskatchewan, and in residents in Nunavut.¹

There are several measures to prevent the transmission of CA-MRSA.³

Individuals:

- Follow basic practices for good hygiene. This includes consistent hand hygiene and regular bathing with soap and water.
- If skin lesions are present, cover them and ensure they receive appropriate medical care.
- Do not share personal care items (e.g. unwashed towels, razors, toothbrushes).

Health care practitioners:

- Use antibiotics judiciously.
- Educate patients about the importance of good hygiene practices.
- Notify Public health officials if aware of transmission within a family unit or community group.

Health authorities:

- Have communication strategies that inform the general public and high-risk groups about CA-MRSA and the practices to limit spread.
- Develop strategies to ensure early diagnosis and appropriate treatment of skin infections and educate physicians about risk factors, clinical features and expected treatment response time.
- Develop regional and local programs to review antibiotic use and resistance.
- Develop education programs for the public on the proper use of antibiotics in the community.

References:

1. Cimolai N. Methicillin-resistant *Staphylococcus aureus* in Canada: a historical perspective and lessons learned. *Can. J. Microbiol* 2010; 56: 89-120.
2. Barton M, Hawkes M, Moore D, et al. Guidelines for the Prevention and Management of Community-acquired Methicillin-resistant *Staphylococcus aureus*: A Perspective for Canadian Health Care Practitioners. *Can J Infect Dis Med Microbiol* 2006; 17; 4C-24C.
3. Hawkes M, Barton M, Conly J, et al. Immunity-associated MRSA: Superbug at our Doorstep. *Canadian Medical Association* 2007; 54; 176(1):54-56.
4. Irvine, J. Community-acquired methicillin-resistant *Staphylococcus aureus* in Indigenous communities in Canada. *Paediatr Child Health* 2012; 17(7):395-396.
5. Crawford SE, Daum RS. Epidemic Community-acquired Methicillin-resistant *Staphylococcus aureus*: Modern Times for an Ancient Pathogen. *Pediatr Infect Dis J* 2005; 24:459-60.
6. Gillet Y, Issartel B, Vanhems P, et al. Association between *Staphylococcus aureus* Strains Carrying Gene for Panton-Valentine leukocidin and Highly Lethal Necrotising Pneumonia in Young Immunocompetent Patients. *Lancet* 2002; 359:753-759.
7. Reichert B, Birrell G, Bignardi G. Severe Non-pneumonic Necrotising Infections in Children Caused by Panton-Valentine leukocidin Producing *Staphylococcus aureus* strains. *J Infect* 2005; 50: 438-42.

Winnipeg Regional Health Authority Occupational and Environmental Safety and Health and Infection Prevention and Control provided their regional Antibiotic Resistant Organism (ARO) Management Protocol for Health Care Workers document. It was adapted from the WRHA document and revised to be applicable in Manitoba RHAs.

Health care workers who acquire an ARO **may** acquire it from occupational exposure or from a community exposure. Transmission of an ARO to patients may be minimized by consistent use of Routine Practices which includes good hand hygiene.

A HCW who tests positive for an ARO and is a patient, should be treated and managed the same as other ARO positive patients.

The following guidelines can be used to manage the HCW positive for MRSA from an occupational health perspective. These guidelines would only be appropriate for other AROs when there is an outbreak.

1. HCW Exposed to an ARO

Colonized or infected HCWs are rarely implicated as the source of ongoing transmission of an ARO. Screening cultures should be reserved for situations where specific HCWs have been epidemiologically implicated in the transmission of an ARO. Screening of HCWs may be warranted as part of an outbreak investigation at the discretion of IP&C, and in conjunction with the investigation of other possible sources of transmission. Discussion between OH Professional/designate, IP&C, diagnostic laboratories and the MOH (according to RHA processes) is recommended prior to proceeding with staff screening.

HCWs who have unprotected exposure or contact with a person known to be colonized or infected with an ARO do not require medical evaluation, treatment or investigation.

No modifications to work practices or work restrictions are necessary provided there is no evidence of infection. Routine Practices should be followed at all times.

OH Professionals/designate should not routinely obtain specimens for culture from HCWs exposed to an ARO. Identification by IP&C, Infectious Diseases, OH Physician/designate or Regional Health Authorities of a HCW epidemiologically linked to patient transmission may be an indication to obtain screening cultures.

2. HCW Infected with an ARO

OH Professional/designate will direct the HCW to their treating health care provider. This may be a family physician/nurse practitioner, occupational health or infectious diseases specialist. For complex cases, OH Professionals/designate should refer to an Infectious Disease Specialist for direction regarding infection treatment and management. Clinical management may include laboratory investigations with molecular typing and/or antimicrobial treatment/therapy.

HCWs diagnosed with an ARO infection (regardless of where the infection may have been acquired) will be assessed by an OH Professional/designate before returning to work.

Depending upon the nature of the infection, work restrictions and reassignments may be imposed until effective treatment for the infection has been provided. This will be determined on a case by case basis in conjunction with the HCW's treating health care provider, OH Professional/designate and IP&C.

OH Professional/designate will document the therapeutic intervention for the HCW in their confidential health file according to facility/RHA processes.

OH Professionals/designate will provide education to the HCW regarding Routine Practices and treatment compliance.

A clear designation of who will be responsible for assessment of the site of infection once the therapeutic intervention is complete is necessary. If this is not Occupational Health, the assessment must be communicated to them. Any clinical evidence of infection shall be reported to the HCW's care provider for consideration of additional intervention. Any work modifications /restrictions will continue to apply.

If the HCW's previously positive wound site is healed no further follow-up is needed.

OH Professional/designate will guide the HCW to follow-up with their health care provider in the event another infection develops.

2.1 Work Assignment Modification

The OH Professional/designate in conjunction with IP&C and MOH (according to RHA processes) shall determine the need for modification of work assignment or work restriction and liaise with the HCW's manager.

The OH Professional/designate will provide education to the HCW regarding their responsibility for good hand hygiene as well as other Routine Practices as required.

2.2 Clearance to Return-to-Work/Assignment Following Work Modification

OH Professional/designate shall provide the clearance for the HCW to Return-to-Work (RTW) and to full duties. HCWs who are instructed to RTW by their health care provider must still receive clearance to return by OH Professional/designate. Upon evaluation by the OH Professional/designate, if the ARO infection has resolved and the HCW is no longer thought to be a risk, the HCW may be returned to their regular work assignment.

The Occupational Health Professional/designate will provide education to the HCW regarding their responsibility for good hand hygiene as well as other Routine Practices if required.

The OH Professional/designate will guide the HCW to follow-up with their health care provider in the event another infection develops.

2.3 Work Ability/Limitation for HCW with an Infected Wound

2.3.1 HCW with an ARO infection of the lower arms or hands:

If a HCW has direct patient care and will not be able to perform adequate hand hygiene, restrict the HCW from all direct patient care and patient care activities.

Reassignment to non-direct patient care duties is acceptable and will be assessed on a case by case basis determined by OH Professional/designate staff in conjunction with IP&C.

HCW must keep wounds properly and securely bandaged while in the workplace.

2.3.2 HCW with an ARO infection on other areas of the skin:

HCW may be allowed to provide direct patient care if the affected area can be properly covered and securely dressed with an appropriate dressing which contains drainage. These workers may be reassigned to areas/wards housing lower risk patients. Reassignment to non-direct patient care duties is also acceptable as determined by the HCW manager in discussion with OH Professional/designate and IP&C.

Restrict HCW from all patient care and patient care areas if the affected area(s) cannot be properly covered and securely dressed with an appropriate occlusive dressing.

OH Professional/designate will counsel HCW regarding seeing their health care provider and informing OH Professional/designate in the event another infection develops.

3. HCW Who has been Colonized with an ARO

3.1 Nasal Colonization of MRSA without Discharge

An asymptomatic HCW with MRSA colonization that has not been linked epidemiologically to patient cases may remain at work and does not require work reassignment or work restrictions.

The HCW is not required to wear a surgical/procedure mask when providing patient care. If there is a decision by Infectious Diseases to conduct decolonization therapy, OH Professional/designate will counsel the HCW of the need for therapy. The OH Professional/designate will notified promptly of any respiratory tract infection or infection present at other anatomical sites.

OH Professional/designate will reinforce the importance of Routine Practices, in particular the need for good hand hygiene.

3.2 Nasal Colonization of MRSA with Discharge

Restrict a HCW who is colonized with MRSA and has nasal discharge from care of all high-risk patients (see glossary). If there is a decision by Infectious Diseases to do decolonization therapy, OH Professional / designate will counsel the HCW regarding the indications for therapy and may arrange referral for treatment.

Reassignment to areas/wards housing low risk patients is acceptable and can be determined by the HCW manager in discussion with the OH Professional/designate, IP&C and MOH (if needed). HCW will wear a surgical/procedure mask while providing all patient care as respiratory shedding of MRSA is possible. OH Professional/designate will provide education to the HCW regarding handling, fitting, changing and disposing of the mask during the work day.

Once symptoms abate, no follow-up is necessary.

OH Professional/designate will provide education to the HCW regarding their responsibility to perform good hand hygiene as outlined in Routine Practices.

3.3 Decolonization

Decolonization should be considered for the HCW(s) only if an outbreak investigation epidemiologically links them to ongoing patient transmission. These HCWs should be referred for medical assessment, laboratory investigation with molecular typing and appropriate antibiotic therapy.

4. Outbreak Situations

If an ongoing outbreak of ARO infection occurs in the workplace, screening cultures of all HCWs linked to the infected patients may be considered. **THIS IS CONSIDERED AN EXCEPTIONAL CIRCUMSTANCE** and is undertaken following discussion/approval from OH Professional/designate, MOH (according to RHA processes) and IP&C. Colonized or infected HCWs are rarely the source of ongoing transmission, so this strategy should be reserved for settings/situations where specific HCWs have been implicated in transmission based on an epidemiological investigation.

To proceed with this, approval is required from OH Professional/designate following consultation with MOH (according to RHA processes) and IP&C. Specific follow-up directives will be required for each specific outbreak situation.

HCWs implicated in transmissions of ARO are candidates for decolonization and should be treated and culture negative (according to requirements for specific ARO) before returning to direct patient care. **They cannot work in a patient care area.** In contrast, HCWs who are colonized with an ARO but are asymptomatic and have not been linked epidemiologically to transmission do not require decolonization.

If an ARO positive HCW is identified, the health care facility/RHA shall provide at no cost to the HCW or pay for appropriate antimicrobial treatment if it is deemed the ARO infection/colonization occurred as a consequence of the HCW's employment. Any required time off work may be covered by the Workers Compensation Board if the HCW is found to have acquired ARO from the workplace so it may not be necessary to use the HCW's accumulated sick time. This would only occur if the HCW is found to have acquired ARO from the workplace.

Consider reassignment of HCW if decolonization is not successful and ongoing transmission to patients persists.

The OH Professional/designate should track statistics according to RHA/facility processes on:

- Number of HCWs with ARO infections
- Time lost due to ARO infection
- Number of HCWs with ARO epidemiologically linked to transmission

1. ARO Surveillance Recommendations:

Specific requirements for reporting to Manitoba Health, Seniors and Active Living are being developed and will be provided when available.

- Colonization and infections will be analyzed and reported separately according to facility/RHA reporting processes using.
 - CNISP analysis and reporting recommendations

The following are the recommendations for ARO surveillance:

- ARO definitions for MRSA, VRE and CPE will be used. They are available at <http://www.gov.mb.ca/health/publichealth/cdc/ipc.html#guide>.
- Surveillance for ARO colonization and infections will be done for MRSA and CPE.
- **Bacteremias will be the only surveillance done for VRE.**
- Health care-associated infection definitions will be used to determine the infections. The MHSAL definitions are currently in development. Until these are finalized, RHAs should use their existing regional HAI definitions for this surveillance.
- Samples of the following data base forms are available at <http://www.gov.mb.ca/health/publichealth/cdc/ipc.html#guide>:
 - Screening Line Listing
 - New Cases Line List

Methicillin-Resistant *Staphylococcus aureus* (MRSA) Fact Sheet

What is Methicillin-Resistant *Staphylococcus aureus* or MRSA?

Staphylococcus aureus (*S. aureus*) is a bacteria (germ) that lives on the skin or in the nose of many people. Usually, people are not aware of it and are completely healthy. This is known as colonization. If *S. aureus* gets “inside” the body, for example, in an open wound, urine or blood, it can cause infection. When it does cause infection, this can be treated with antibiotics. Antibiotics are drugs used to treat infections caused by bacteria. Sometimes when *S. aureus* can no longer be killed by the usual antibiotics; this means they have become resistant. When this happens a different antibiotic is needed to treat the infection. These resistant bacteria are called Methicillin-Resistant *Staphylococcus aureus* or MRSA. MRSA often occurs following care or treatment in a hospital or other health care facility. Some strains of MRSA can also occur in the community or in otherwise healthy individuals. This is referred to as community-associated MRSA. MRSA does not harm healthy people, including pregnant women, children and babies. People with MRSA do not look or feel different from anyone else.

How is MRSA identified?

Testing for resistant bacteria is important to see if it is spreading to other patients. Usually we look for this bacteria by taking swabs of the nose and wounds and send them to the laboratory. Testing for MRSA is not done in a long-term care facility or for people living in the community unless an infection is suspected. If someone tests positive, while they are in the hospital, they and their doctor will be notified the test is positive and of the need to place them on special precautions.

How does a person get MRSA?

MRSA can spread from one person to another by touch (usually with hands) for example touching, hugging, shaking hands or taking a blood pressure. It can also be spread by touching surfaces that a person positive for MRSA has touched such as door knobs, bed rails, tables, counter tops, water taps or medical equipment. Like many other bacteria, MRSA can get into the body if hands are not cleaned before eating or touching the mouth or an open wound (contact) or touching something the person positive for MRSA has touched. Hospitals are places where bacteria may be passed from one patient to another. The most common way to spread MRSA is by unwashed hands of staff.

Who gets MRSA?

Anyone can get MRSA. Patients in hospitals who have open wounds, catheters or drainage tubes, and those who are very ill, are most likely to get MRSA. Residents living in personal care homes are at a lower risk for MRSA infection unless they are admitted for a long stay in hospital or receive a lot of antibiotics. Patients receiving care in community settings are at a very low risk of getting MRSA. Health care workers are not at increased risk for MRSA. The chances of infection with MRSA does not increase even if they have been in contact with a MRSA Positive individual. If the health care worker has low immunity or is pregnant, the risk is still very small.

What are good hand hygiene practices?

Everyone should practice good hand hygiene at all times. This includes health care workers, individuals positive for MRSA, family and visitors. Good hand hygiene practices include cleaning hands with alcohol-based handrub (sanitizer) or soap and water for at least 15 seconds.

Are special precautions needed?

Special precautions (contact precautions) are taken during a hospital stay to stop MRSA from spreading to other sick patients. These precautions may also be needed in a long-term care facility or personal care home, but only under special circumstances. The best way to stop the spread of MRSA is for staff, patients, families and visitors to clean their hands often. No additional precautions are needed at home. Hand hygiene is always a good practice to prevent the spread of bacteria.

What are the special precautions?

Some of the precautions for a MRSA positive patient during a hospital stay may include:

- Placement in a private room.
- Placement of a sign on the room door to alert everyone of the precautions needed.
- Use of alcohol-based hand rub (sanitizer) or handwashing by everyone entering and exiting the room.
- Use of a long sleeved gown and gloves by caregivers
- If the patient has to leave the room, their hands must be cleaned well and their open wounds covered.
- They may not be able to go to other areas of the hospital or to the cafeteria.
- Testing (swabs) may be done on a regular basis to see if they still carry MRSA.
- Follow the procedures outlined by the staff to prevent spreading MRSA to others.

We understand these measures may be inconvenient, but it is important to protect other patients from MRSA. Your cooperation is appreciated.

In a long-term care facility or personal care home, precautions may include the above if the person has an infection with MRSA and it cannot be contained (e.g. covering a wound with a dressing).

Can a person with MRSA have visitors?

Family and friends can visit. They will be told to clean their hands before entering and leaving the room. They also may be asked to wear a gown and gloves when entering the room. They may still have close contact such as hugging, kissing and handholding. Before leaving the room, visitors must remove the gown and gloves and dispose of them as directed by staff.

Can family and friends get MRSA?

The risk to healthy family members and friends is very low. The best way to protect themselves is to clean their hands often. It is important they follow directions from staff, as well as signs on the patient's room door. If family or visitors are concerned about MRSA, they should speak with staff or contact Infection Prevention and Control.

How can the person with MRSA help?

- Follow advice from the health care provider to prevent spreading MRSA to others.

- Frequently clean their hands. Remind all health care workers and visitors to practice good hand hygiene before and after touching patients.
- Do not share personal items that come in contact with their skin such as bar soap, lotions, towels and nail files.
- See a health care provider as soon as possible if an infection is suspected.
- Tell health care providers they are MRSA positive. This includes home health care workers, therapists and staff in the doctor's office.
- At home, the chance of spreading MRSA to family is small.
 - Good hand hygiene should be practiced by the MRSA Positive individual as well as their family members all of the time including before preparing food, before eating and after using the toilet.
 - Shower or bathe regularly.
 - Do not share towels, clothes and bed sheets.
 - Do not share grooming items such as nail scissors, tweezers, razors and toothbrushes.
 - Keep sores or wounds covered, if they share a bed with someone.

Good hand hygiene is the best way to prevent the spread of these bacteria.

Vancomycin-Resistant Enterococci (VRE) Fact Sheet

What is Vancomycin-Resistant Enterococci (VRE)?

Enterococci are bacteria (germs) that are normally found in the bowel. They are usually harmless and do not normally cause illness. Usually, people are not aware of them and are completely healthy. This is known as colonization. If enterococci get “inside” the body, for example, into an open wound, urine or blood, they can cause an infection. When they cause an infection, it can be treated with antibiotics. Antibiotics are drugs used to treat infection caused by bacteria. Sometimes enterococci can no longer be killed by the usual antibiotics; this means they have become resistant. These resistant bacteria are called Vancomycin-Resistant Enterococci or VRE. When this happens a different antibiotic is needed to treat the infection.

Are special precautions needed?

Special precautions are no longer required for VRE.

Why are special precautions no longer needed?

In the past, special precautions were taken when a VRE positive individual received care in a health care facility. **These precautions are no longer needed.** Current evidence indicates the presence of VRE (colonization) rarely leads to serious infections. If a person does have a VRE infection, it can be treated with antibiotics without having to isolate the person.

Good hand hygiene is the best way to prevent the spread of bacteria.

Carbapenemase-Producing Enterobacteriaceae (CPE) Fact Sheet

What is Carbapenemase-Producing Enterobacteriaceae (CPE)?

Enterobacteriaceae are a family of bacteria (germs) many of which live naturally in our bowel. Usually people are not aware of them and are completely healthy. This is known as colonization. If Enterobacteriaceae get “inside” the body, for example, into an open wound, urine or blood, they can cause an infection. These infections can be treated with antibiotics. Antibiotics are drugs used to treat infections caused by bacteria. Carbapenemase-producing Enterobacteriaceae (CPE) produce a carbapenemase enzyme that can break down many types of antibiotics, making the bacteria antibiotic resistant. CPE does not harm healthy people including pregnant women, children and babies. People with CPE do not look or feel different from anyone else.

How is CPE identified?

Testing for resistant bacteria is important to see if they are spreading to other patients. Usually we look for this bacteria by taking swabs of the rectum or ostomy. Testing for CPE is not done in a long-term care facility, personal care home or for people living in the community. If someone tests positive, while they are still in hospital, they and their doctor will be notified the test is positive and the need to place them on special precautions.

How does a person get CPE?

CPE can spread from one person to another by touch (usually with hands), for example touching, hugging, shaking hands or taking a blood pressure. It can be spread by touching surfaces that a person positive for CPE has touched such as door knobs, bed rails, tables, counter tops, water taps or medical equipment. Like many other bacteria, CPE can get into the body if hands are not cleaned before eating or touching the mouth or an open wound (contact) or touching something the person positive with CPE has touched. Hospitals are places where bacteria may be passed from one patient to another. The most common way to spread CPE is by the unwashed hands of staff.

Who gets CPE?

Patients in hospitals who have open wounds, catheters or drainage tubes, and those who are very ill, are most likely to get CPE. Residents living in personal care homes are at a lower risk for CPE. Their risk is increased if they are admitted for a long stay in hospital, receive a lot of antibiotics, or have contact with an individual positive for CPE or with equipment that is contaminated with CPE. Health care workers are not at increased risk for CPE. The chances for infection with CPE do not increase even if they have been in contact with a CPE Positive individual. If the health care worker has low immunity or is pregnant, the risk is still very small. Patients receiving care in community settings are not at risk of getting CPE.

What are good hand hygiene practices?

Everyone should practice good hand hygiene at all times. This includes health care workers, individuals positive for CPE, family and visitors. Good hand hygiene practices include cleaning their hands with alcohol-based handrub (sanitizer) or soap and water for at least 15 seconds.

Are special precautions needed?

Special precautions (contact precautions) are taken during a hospital stay to stop CPE from spreading to other sick patients. These precautions may also be needed in a long-term care facility or personal care home, but are only used under special circumstances. The best way to stop the spread of CPE is for staff, patients, families and visitors to clean hands often. No additional precautions are needed at home. Hand hygiene is always a good practice to prevent the spread of bacteria.

What are the special precautions?

Some of the precautions for a CPE positive patient during a hospital stay may include:

- Placement in a private room.
- Placement of a sign on the room door to alert everyone of the precautions needed.
- Use of alcohol-based hand rub (sanitizer) or handwashing by everyone entering and exiting the room which includes the patient.
- Use of a long sleeved gown and gloves by caregivers.
- If the patient has to leave the room, their hands must be cleaned well and their open wounds covered.
- Patients may not be able to go to other areas of the hospital or to the cafeteria.
- Testing (swabs) may be done on a regular basis to see if they still carry CPE.
- Follow the procedures outlined by the staff to prevent spreading CPE to others.

We understand these measures may be inconvenient, but it is important to protect other patients from CPE. Your cooperation is appreciated.

In a long-term care facility or personal care home, precautions may include the above if the person has an infection with CPE and it cannot be contained (e.g. covering a wound with a dressing).

Can a person with CPE have visitors?

Family and friends can visit. They will be told to clean their hands before entering and leaving the room. They also may be asked to wear a gown and gloves when entering the room. They may still have close contact such as hugging, kissing and handholding. Before leaving the room, visitors must remove the gown and gloves and dispose of them as directed by staff.

Can family and friends get CPE?

The risk to healthy family members and friends is very low. The best way to protect themselves is to clean their hands often. It is important they follow direction from staff, as well as signs on the patient's door. If family or visitors are concerned about CPE, they should speak with staff or contact Infection Prevention and Control.

How can the person with CPE help?

- Follow advice from their health care provider to prevent spreading CPE to others.
- Clean their hands frequently. Remind all health care workers and visitors to practice good hand hygiene before and after touching patients.
- Do not share personal items that come in contact with their skin such as bar soap, lotions, towels and nail files.

- See a health care provider as soon as possible if an infection is suspected.
- Tell health care providers they are CPE positive. This includes home health care workers, therapists and staff in the doctor's office.
- At home, the chance of spreading CPE to family is small
 - Good hand hygiene should be practiced by CPE positive individual as well as their family members all of the time including before preparing food, before eating and after using the toilet.
 - Shower or bathe regularly.
 - Have their own towels, clothes and bed sheets.
 - Do not share grooming items such as nail scissors, tweezers, razors and toothbrushes.
 - Keep sores or wounds covered, if they share a bed with someone.

Good hand hygiene is the best way to prevent the spread of these bacteria.

Specimen collection should be performed according to facility/RHA based policy using the following guidelines.

1. Surveillance Specimen Collection from Nares

- Carefully insert the swab approximately 2 cm into the nares. Rotate the swab against the nasal mucosa. **Note:** Both nares should be sampled using the same swab.
- Place the swab in the transport container.
- Label the container with the site of sample collected and at least two unique patient identifiers.
- Make sure the specimen is accompanied by the appropriate requisition which has been completed with all pertinent patient information.
- Specimens should be kept at room temperature and sent to the lab as soon as possible according to facility/RHA procedure.

2. Surveillance Specimen Collection from Wounds

- Swab wound site. If the wound is dry, moisten the swab with sterile normal saline first. Collect cultures before cleansing the wound.
- Place the swab in the transport container.
- Label the container with the site of sample collected and at least two unique patient identifiers.
- Make sure the specimen is accompanied by the appropriate requisition which has been completed with all pertinent patient information.
- Specimens should be kept at room temperature and sent to the lab as soon as possible according to facility/RHA procedure.

3. Specimen Collection from Rectum/Ostomy

- Insert the swab approximately 2.5 cm (for adults) beyond the anal sphincter/stoma and gently rotate. Rectal swabs should be visibly soiled. Unsoiled swabs are suboptimal. Contact the laboratory for specimen collection for children.
- Place the swab in the transport container.
- Label the container with the site of sample collected and at least two unique patient identifiers.
- Make sure the specimen is accompanied by the appropriate requisition which has been completed with all pertinent patient information.
- Specimens should be kept at room temperature and sent to the lab as soon as possible according to facility/RHA procedure.

4. Nares and Rectal Specimen Collection

Nares

Carefully insert the swab approximately 2 cm into the nares.

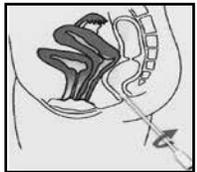


Rotate the swab against the nasal mucosa. **Note:** Both nares should be sampled using the same swab.



Return swab to its container and send to laboratory immediately.

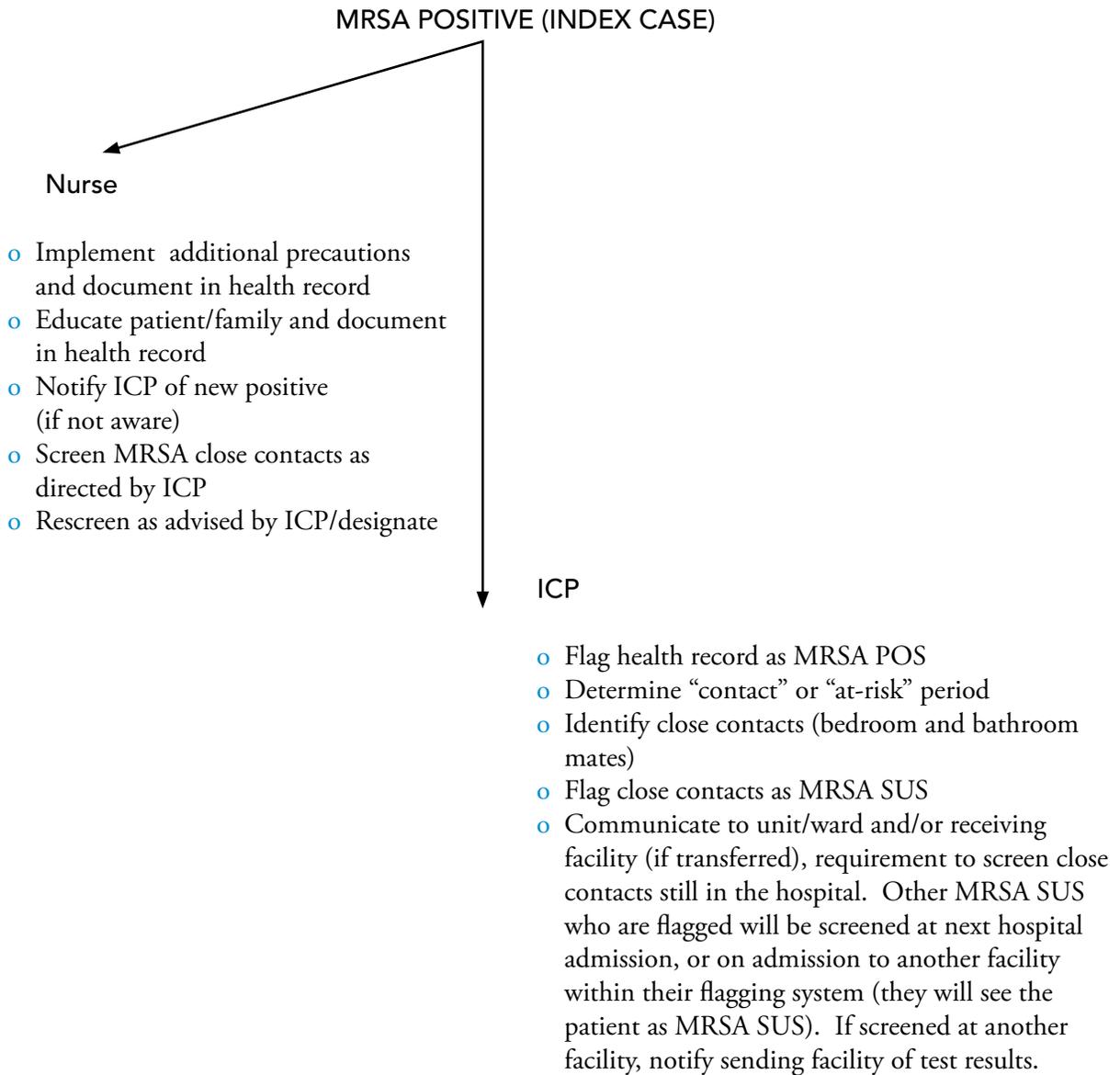
Rectum/Ostomy



Insert the swab approximately 2.5 cm (for adults) beyond the anal sphincter/stoma and gently rotate. Contact the laboratory for specimen collection for children.

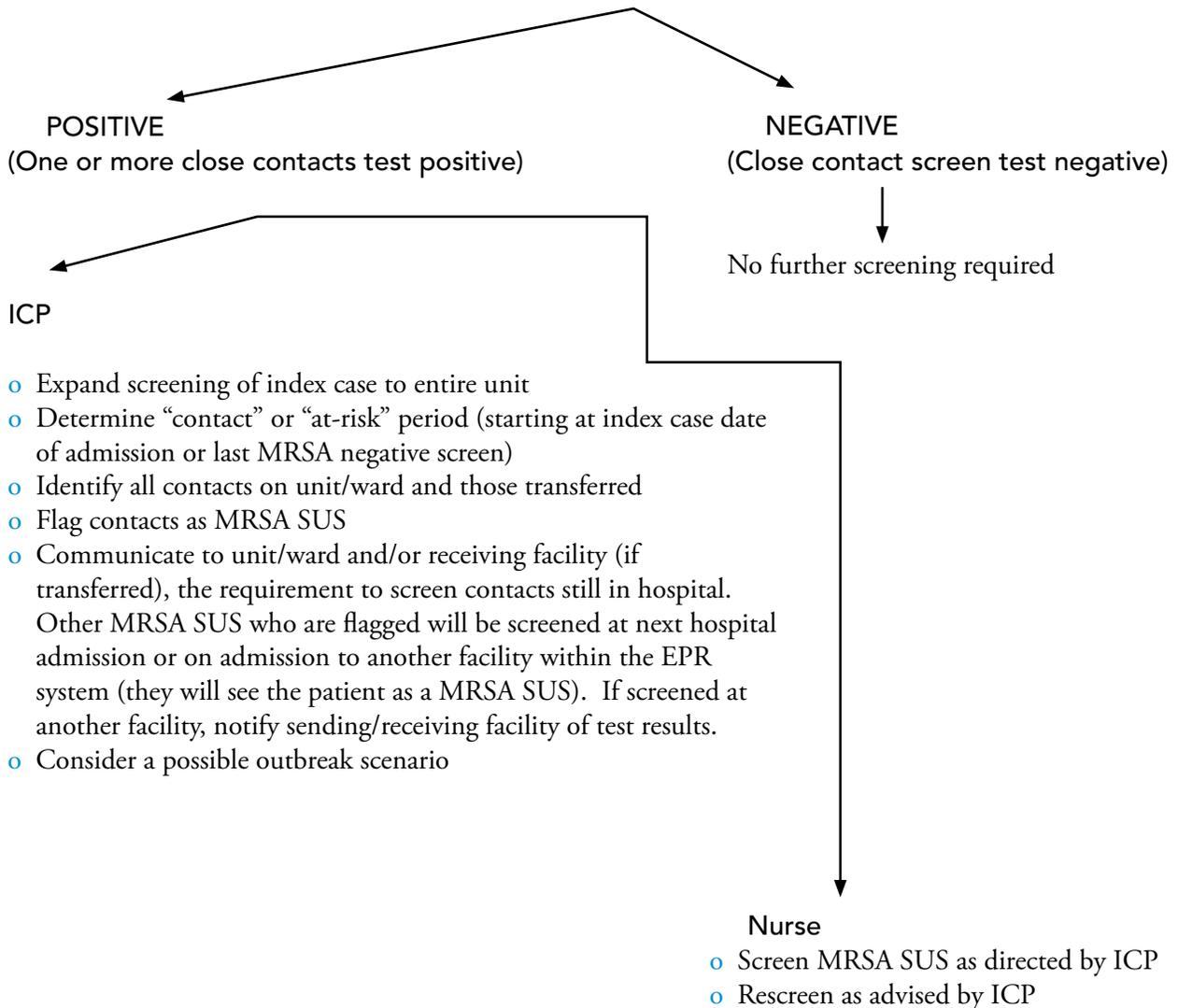


Return swab to its container and send to laboratory immediately.

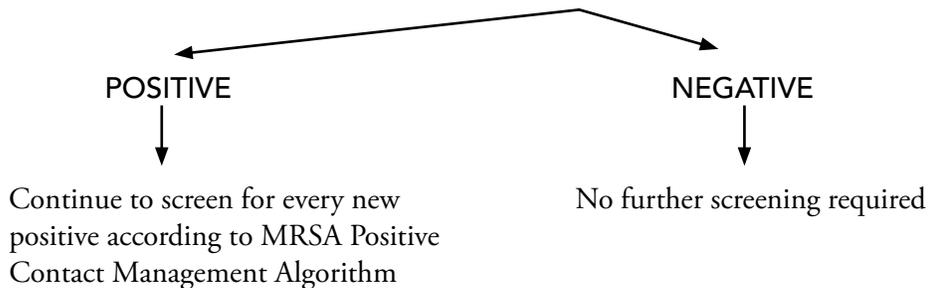


When close contact screening results show transmission, widen the circle of contacts and include other patients in secondary screening.

CLOSE CONTACT SCREENING RESULTS



UNIT/WARD CONTACT SCREENING RESULTS



Regional Health Authorities and facilities must ensure they have an approved outbreak management plan to address specific epidemiologically significant organisms or infectious disease (e.g. AROs). This outbreak management plan should include the following steps as well as clearly defining roles and responsibilities of individuals and agencies.

Outbreak management team members could include but not limited to:

- Facility/organization executive/management
- Infectious Diseases
- Laboratory
- Physician and nursing representatives
- Epidemiology
- IP&C
- Housekeeping/Facility Management
- Communications

If this is not available internally, then external support should be identified.

Progress updates and other outbreak related communications must be done on a regular and timely basis.

1. Purpose:

- 1.1 To promptly identify and control outbreaks of infection.
- 1.2 Minimize patient and health care worker morbidity and effectively control and end outbreaks due to AROs.

2. Components of an Outbreak Investigation

- 2.1 Establish the existence of an ARO outbreak.
- 2.2 Confirm the diagnosis.
- 2.3 Establish the case definition and count cases.
- 2.4 Describe the outbreak in time, place and person.
- 2.5 Determine who is at risk of becoming ill (risk factors).
- 2.6 Formulate a tentative hypothesis.
- 2.7 Compare the hypothesis with the established facts.
- 2.8 Plan a detailed epidemiologic investigation.
- 2.9 Prepare a written report.
- 2.10 Implement prevention and control measures.

3. Sequences of Events in an Outbreak Investigation

The sequence of events may vary, depending on the nature of the outbreak and infecting organism. Always confirm an ARO outbreak exists, establish or verify diagnosis of ARO cases and identify agent before formulating a hypothesis. Steps often occur simultaneously.

3.1 Establish the Existence of an Outbreak

- Compare current ARO incidence with usual or base line incidence (calculate rates). If local data is not available, compare to the literature.
- Compare available information about new cases with a predetermined case definition.
- Assess the need for outside consultation (e.g. Infectious Diseases, Public Health).
- Report to Public Health authorities if required.
- Institute appropriate early measures to control the cases of AROs.

3.2 Confirm the Diagnosis

- Analyze histories of cases and in consultation with the laboratories, ensure the appropriate specimens are obtained and isolates of relevant organisms are stored.
- Analyze laboratory results to confirm or reject the suspected diagnosis and to determine the type of ARO.

3.3 Establish the Case Definition and Count Cases

- Develop a case definition and establish methods for identifying and counting cases. The case definition may be broad initially and then refined as the outbreak progresses. The case definition may include a specific laboratory component.
- Using the case definition, review cases identified to describe the disease presentations.
- Obtain the appropriate laboratory specimens to identify the specific ARO outbreak.
- Seek additional ARO cases and collect critical relevant data and specimens. Encourage intermediate reporting of new ARO cases by other health care workers. Search for other ARO cases that may occur retrospectively or concurrently by reviewing laboratory reports, health records, discussing with other health care workers as well as, possibly reviewing public health data. Select relevant information that needs to be collected on a data collection form. This could be by using a questionnaire or data abstract form.

3.4 Relate the Outbreak to Time, Place and Person

- Characterize the outbreak according to time, place and person.
- **Time:** What is the exact period of the ARO outbreak? Identify the first ARO case or first indication of the outbreak. What is the probable period of exposure? Record date of onset of illness for cases by drawing an epidemic curve. Is the outbreak a common source or propagated?
- **Place:** Where is the outbreak occurring? Search for clustering of cases by type of service, ward and place. This might involve the use of tables or spot maps.
- **Person:** Evaluate patient characteristics (e.g. age, sex, underlying disease). Evaluate possible exposures (e.g. surgery, nursing or medical staff, infected cases). Evaluate therapeutic interventions used (e.g., invasive procedures, medications, antibiotics).

3.5 Determine Who is at Risk of Becoming Ill

- Count cases and relate the number of cases to appropriate risk groups to determine who is at risk of becoming ill.
- Contact those who can provide information on the illness or about other circumstances that have contributed to the outbreak.
- Calculate rates of infection, including stratification on the basis of potential risk factors

3.6 Formulate a Tentative Hypothesis

- Do an evaluation of the ARO outbreak by reviewing the epidemic curve.
- Record, tabulate and review common host factors and exposures.
- Using the analysis, formulate a tentative hypothesis to explain the most likely cause, source and distribution of cases.

3.7 Compare the Hypothesis with the Established Facts

- The hypothesis will direct the course of the investigation and will be tested using data gathered during the investigation. Several hypotheses may be required.
- The investigation may end with descriptive epidemiology (e.g. problem goes away without intervention).

3.8 Plan a Detailed Epidemiologic Investigation

- Determine from the initial observations what additional information is needed and what resources are required to test the hypothesis.
- The extent of the investigation will be determined by the severity of the problem, available personnel and resource allocations.
- Epidemiological approaches for testing a hypothesis:
 - Case control study (most frequently used).
 - Cohort study.
 - Experimental interventions study.
- Analyze data derived from case investigation to determine the potential routes of ARO transmission and risk factors associated with the disease.
- Refine the hypothesis and carry out additional studies, as appropriate.
- Summarize and interpret all of the information collected including the results of laboratory tests conducted.
- Plot epidemic curves, calculate infection rates, develop appropriate tables and charts, apply statistical tests to the data and develop conclusions based on the data.
- On the basis of the available data and analysis, accept or reject the hypothesis.

3.9 Prepare a Written Report

- A written report which summarizes the investigation should be prepared as soon as the investigation is completed and be disseminated to those who need to know.
 - Findings can also be communicated by an oral briefing report at an appropriate forum.
- The report should include:
 - A description of the study methods.
 - Information on Laboratory, epidemiology, case definition, case finding and verification of diagnosis.
 - **Sources of data:** Hypothesis testing, if any. Description of the study design, description of control groups, rationale for choice and statistical tests used.
 - **Results used:** Facts only with no explanations. May use tables, graphs and charts. Analysis of data and statistical conclusions.
 - Discussion
 - Interpretation.
 - Description of control measures
 - Recommendations for future surveillance and control.

3.10 Implement Prevention and Control Measures

- Implementation of the most appropriate control measures may be done anytime during the outbreak.
- Identify specific preventative and control measures on the basis of the nature of the ARO and characteristics of high risk groups and sources (e.g. eliminate contaminated products, modify procedures).
- Evaluate the control and preventative measures on an ongoing basis.
- Use the opportunity of the ARO outbreak to review and correct practices that may have contributed to the outbreak.
- If imminent danger exists, control and preventative measures should be initiated after the tentative hypothesis has been formed.

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