

MANAGEMENT OF ANTIMICROBIAL-RESISTANT ORGANISMS ACROSS THE CONTINUUM OF CARE

Provincial Infection Control- NL

Revised: February 15, 2019

Updated: August 31, 2020

Updated: February 2, 2021

Updated: October 14, 2022

Updated: April 4, 2024

Summary of Revisions

Date	Revision	Page
20/09/23	Candida auris added to Table of Contents	p. 22
20/09/23	Candida auris fact sheet added	p.43
20/09/23	Candida auris added	p.6
20/09/23	Candida auris added	p.8
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Section 1: Introduction

Antimicrobial-resistant organisms (AMROs) are a concern in healthcare that require a number of strategies to be implemented at the organizational level and individual level. These strategies, discussed in this document, relate to administrative support Antimicrobial stewardship, identifying AMROs (surveillance, risk assessment, screening sections), education, IPAC measures and outbreak management.

Purpose

The purpose of this document *Management of Antimicrobial-Resistant Organisms Across the Continuum of Care* is to provide guidance 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 healthcare settings.
2. Minimizing development of infections with antimicrobial-resistant organisms in patients in all healthcare settings.
3. Promoting patient safety in all healthcare settings.
4. Achieving these goals in a fiscally responsible manner.
5. Providing evidence-based, best practice recommendations.

By providing a framework, the five zones of Newfoundland and Labrador Health Services (NLHS) can develop standardized 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.

These guidelines, whenever possible, have 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 these guidelines 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.

For the purposes of this guideline, the term patient refers to patients, clients and residents.

Background

AMROs are microorganisms that have developed resistance to the drugs to which they are normally susceptible. While often used interchangeably, the terms “antibiotic” and “antimicrobial” are not the same. Microbes include bacteria, viruses, fungi, and parasites. Antimicrobials are agents against any of these. Antibiotics are agents that target bacteria. Antibiotic resistance happens when bacteria that cause illness become resistant to the antibiotic

drugs used to treat them; these are known as antibiotic-resistant organisms (AROs). Antibiotic resistance can sometimes be passed from one bacterium to another. AROs are a subset of AMROs. This guideline focuses on the six key AMROs that are currently relevant to our population: Methicillin-resistant *Staphylococcus aureus* (MRSA), extended-spectrum beta-lactamases (ESBL), Vancomycin-resistant *Enterococcus* (VRE), carbapenemase-producing organisms (CPO), carbapenem-resistant organisms (CRO) and *Candida auris* (*C. auris*). There are others for which guidance will be made available as needed.

Infections with AMROs have been associated with increases in length of hospital stays, morbidity, mortality and cost of healthcare (CDC, 2020) .

Patients with an infection caused by an AMRO require treatment with second or third choice drugs that may be less effective, more toxic, and more expensive. This means that patients infected with an AMRO may suffer more and have more costly treatment.

Transmission

AMROs are spread directly from person to person via unwashed hands or indirectly through contact with contaminated equipment and environmental surfaces. Hands become contaminated when individuals (healthcare workers, families, visitors) have close contact with patient and patient environment while providing care, especially to those with wounds and devices. Routine Practices (RP) disrupt transmission (Ontario Hospital Association, 2017).

The spread of bacteria by human hands creates risk at home, in the community, and in healthcare settings. Without action, patients, their families, and healthcare workers are at risk. Patients, family members, and healthcare workers all have a role to play in reducing healthcare-associated infections (Healthcare Excellence Canada 2021).

Section 2: Administrative Support

The reduction of the burden of AMROs should be a goal that is supported by administrative and managerial leadership. Visible senior leadership support can lead to the removal of obstacles and the allocation of resources for implementing AMRO prevention and control strategies. Leadership commitment includes these elements:

- Acknowledgement that the prevention and control of AMROs is a top priority for patient safety and that it requires action and monitoring, including:
 - Incidence rates of AMROs
 - Overviews of outbreaks
 - Actions in place to prevent and control transmission
- Adequate resources to develop and maintain an infection prevention and control (IPAC) program including:
 - Sufficient numbers of Infection Control Practitioners (ICPs)
 - Availability of sufficient and appropriate equipment
 - Written infection prevention and control policies appropriate for the service provided
- Hand hygiene as an institutional priority evidenced by:
 - A multidisciplinary program designed to improve adherence of health personnel to recommended hand hygiene practices
 - Accessible sinks and/or availability of alcohol-based hand rub (ABHR) products
 - Monitoring compliance with hand hygiene recommendations on a regular basis
- Educational opportunities for staff, patients and their families and visitors based on an organizational needs assessment
- Support for inter-zone cooperation by endorsement of provincial strategies that can be applied consistently across the continuum of care in all healthcare facilities in all geographic locations
- Implementation and promotion of an antimicrobial stewardship (AMS) program

Section 3: Surveillance and Reporting

Surveillance

The purpose of surveillance is to identify trends, outbreaks and an increased incidence of AMROs in the population and to disseminate this information to those who require it for their practice. At present, Newfoundland and Labrador monitors MRSA infections, VRE, CPOs and *C. auris*. The goal of the surveillance program is to determine the epidemiology, incidence and burden of illness associated with AMROs and make recommendations for appropriate actions to be taken.

Laboratory Reporting

A system should be in place in the microbiology laboratory to ensure prompt notification of staff when an AMRO is identified. Microbiology laboratories should use the standardized methods established by the Provincial Public Health Microbiology Laboratory for the testing of microorganisms for identification of AMROs.

Section 4: Antimicrobial Stewardship

Antimicrobial stewardship is defined by the National Institute for Health and Care Excellence (NICE, 2015) as “an organizational or healthcare-system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness” (p. 8). The principles of antimicrobial stewardship apply wherever antimicrobial agents are used including hospitals, long term care facilities, community setting, and in the home.

Optimizing the use of antimicrobials is critical to effectively treat infections, protect patients from harms caused by unnecessary use, and combat resistance. Antimicrobial stewardship programs can help clinicians improve clinical outcomes and minimize harms by improving antimicrobial prescribing.

Section 5: Education

Education has been recognized as one of the key strategies for any initiatives aimed at eliminating healthcare-associated infections caused by AMROs. Education about AMROs should be provided to healthcare staff, patients, their families and visitors as appropriate. Education should be based on a needs assessment of each group.

Healthcare workers

The education program should address the basic competencies for infection prevention for healthcare workers (HCWs) plus specific education on AMROs. Fact sheets for HCWs are provided on AMROs in Appendix A. Fact sheets for patients, families and visitors are provided on AMROs in Appendix B.

- All staff should receive education at orientation and periodically on core competencies for infection prevention and control
The core competencies include:
 - Basic microbiology including identification of AMROs
 - Hand hygiene
 - Routine Practices & Additional Precautions
- Education on AMROs should include:
 - Risk factors
 - Transmission
 - Prevention and control measures
 - Outcomes associated with AMROs

Patient/Family/Visitors

Education for patients, families and visitors should include information on the AMRO and preventative measures.

- Hand hygiene awareness should be included in all educational programs
- A pamphlet, specific to the AMRO, should be available to be used for the education of patients, their visitors and families

Section 6: Organizational Risk Assessment and Screening

Organizational Risk Assessment

Performance of an organization specific AMRO risk assessment will result in the establishment of a baseline description of these organisms for each NLHS zone. This will help identify specific patient populations that are more likely to be colonized or infected with AMROs and evaluate the degree or magnitude of AMRO transmission and healthcare-associated infection risk within the facility.

Information from the risk assessment for the organization can be used to develop facility and unit-specific strategies to reduce transmission and infection risk for patients, staff, and visitors. The risk assessment should be reviewed and updated annually. The risk assessment is part of the IPAC assessment of the potential for the spread of infectious organisms within the facility. Risk assessment is based on identified risk groups/population/location, surveillance data evaluation, prevalence calculations, and incidence rates.

Screening for AMROs on Admission to Acute Care or Long Term Care

Screening is used in healthcare settings to identify colonization of asymptomatic patients with AMROs with the purpose of isolating these patients to interrupt the transmission of these organisms.

Admissions and transfers to healthcare facilities should not be delayed nor denied because of AMRO status. If there are any infection prevention and control concerns relating to the admission or transfer, request a consultation with IPAC. The attending physician and the care team should be aware of the patient's AMRO status. To ensure consistent application of infection prevention and control practices province wide, NLHS zones must have written policies and procedures to govern and provide direction on the screening and management of AMROs.

Admissions and Transfers within Newfoundland and Labrador

Universal screening for AMROs is not required for patients being transferred between NL healthcare facilities. Based on local epidemiology, targeted screening programs of high-risk populations at admission and at intervals during their hospital stay may be necessary. This will be determined by the local IPAC Program who may consult with Medical staff and/or the Regional Medical Officer of Health if necessary.

Admissions and Transfers outside of Newfoundland and Labrador

Screening for AMROs may be required for patients being transferred from healthcare facilities outside NL as outlined in Table 1. For more information on AMRO screening, see Appendix C. For more information on patient placement, see Appendix D.

Table 1: AMRO Screening Quick Reference Tool

Admission type or history	External location	Type of Screening & Isolation Required
Direct transfer to any NLHS facility in NL	ANY hospital/Long Term Care facility outside of NL in the <u>past 12 months</u>	<ul style="list-style-type: none"> • Private room and washroom • Contact Precautions and other Additional Precautions per PCRA • VRE-rectal swab x 1: <ul style="list-style-type: none"> ○ Feces must be on the swab • CRO-rectal swab x 1: <ul style="list-style-type: none"> ○ Feces must be on the swab • <i>C. auris</i>-swab x 1: <ul style="list-style-type: none"> ○ bilateral swab axilla and groin
Any inpatient hospitalization in NL		

Section 7: Infection Prevention and Control Measures

The use of Routine Practices for all patients and Additional Precautions for patients infected with AMROs is recommended for decreasing the transmission of AMROs in the healthcare setting. Patients colonized with VRE, CPOs and *C. auris* also require Additional Precautions. While Contact Precautions are the most commonly used Additional Precautions, the Point of Care Risk Assessment (PCRA) of the patient would determine appropriate precautions to be implemented.

Disclosure to Patients

- The patient should be advised of their AMRO status by the most responsible care provider providing advice about the management and follow-up care.
- The information can be given in the hospital or long term care facility by the nurse or physician. See Appendix B for specific AMRO fact sheets.
- The process for informing the patient will be according to the disclosure policy of the NLHS zone.

Decolonization

- Decolonization therapy refers to the use of topical, oral and/or systemic antibiotic agents to remove resistant bacteria from a colonized individual. Decolonization therapy is not routinely recommended for AMROs at this time.

Patient Placement/Accommodation

- Admissions or transfers should not be delayed nor denied on the basis of AMRO status.
- A patient with a CPO or *C. auris* must have a private room if available.
- For all other AMROs, a single room with a private bathroom is preferred. The door may remain open. If a single room is not available perform a risk assessment to help determine placement options for the patient (see Appendix D).
- Cohorting of patients should be done in consultation with IPAC.

Hand Hygiene

Hand hygiene is one of the key strategies for the prevention and reduction of AMROs. Hand hygiene is essential for HCWs, patients and visitors in all healthcare settings.

There are four moments of hand hygiene:

1. BEFORE initial patient/patient environment contact
2. BEFORE aseptic procedure
3. AFTER body fluid exposure risk
4. AFTER patient/patient environment contact

The four moments of hand hygiene must be observed by all HCWs, patients and visitors. Patients

should be encouraged to perform hand hygiene as much as possible.

- ABHRs are the preferred method of hand hygiene when hands are not visibly soiled.
- When visible soil is present, soap and warm water are the preferred method of hand hygiene.
- If soap and warm water are not immediately available, use ABHR, then wash hands at nearest hand washing sink.
- ABHR must contain a minimum of 70% alcohol.

Additional Precautions

Contact Precautions are used in addition to Routine Practices for conditions/illnesses that may result in the contamination of the environment through direct or indirect contact. Contact Precautions should be implemented for all patients who are **infected** with AMROs (e.g., MRSA, VRE, ESBLs, CROs CPO and *C. auris*) and for those patients **colonized** with specific AMROs (e.g., VRE, CPOs and *C. auris*). Other types of Additional Precautions may be indicated based on PCRA. PPE are required and signage must be placed near entry to patient environment.

PCRA and PPE

A PCRA is a systematic process used to identify the risk of transmission of microorganisms so that healthcare workers can decide what control measures are needed to provide safe care. A PCRA must be performed before every interaction with a patient or their environment. The HCW performing the PCRA thinks about risk of transmission of the infectious agent for the interaction, environment, patient, and HCW. Then the HCW determines the appropriate interventions needed to minimize the risk of transmission.

The following PPE are required for Contact Precautions:

- Gloves
- Gowns for direct patient care

Additional PPE or other Additional Precautions may be required based on PCRA.

- Mask and Eye Protection or Face Shield
- N95

Environmental Cleaning

Patients and HCWs can transmit and/or acquire AMROs from contact with contaminated environmental surfaces. All HCWs have a responsibility for maintaining a hygienic patient environment. The overall maintenance of a clean, safe healthcare environment is the responsibility of Environmental Services (EVS) staff. Well-done surface cleaning and disinfection are important ways to prevent and control healthcare-associated infections.

- Recommendations for EVS include:
 - Initial training on cleaning and disinfection procedures and reinforcement of best practices
 - Policies and procedures which specify how, by whom and when environmental surfaces are cleaned (increasing cleaning frequency for Additional Precautions)
 - Monitoring of cleaning procedures which should include an assessment of the cleaning of surfaces nearest to the patient, including bedrails, call lights, doorknobs, bedside commodes, faucet handles, and chairs
 - Utilizing environmental cleaning checklists

Management of dishes, laundry and waste

- No special requirements are required for the handling of dishes, laundry and waste.
 - Follow Routine Practices

Patient movement/transfer

- Limit patient movement outside the room or bed space as much as possible
- Ensure patient has on a clean gown and has hands washed before leaving the room
- Contain draining wounds in a dressing, if applicable
- Clean and disinfect the wheel chair or stretcher after use, if applicable
- Notify receiving area of the need for Additional Precautions in the case of patient transfer
- Don appropriate PPE based on signage if direct patient contact is anticipated
- Implement an individualized care plan for a patient colonized with VRE, CPOs or *C. auris* including guidance for activities outside the patient's room

Family and Visitors

- Education of the family/visitor regarding the AMRO should be provided after consultation with the patient regarding confidentiality issues. Information on the specific AMRO should be discussed with the patient/family using fact sheets in Appendix B.
- Family and visitors should follow the recommendations on the Additional Precautions sign.

Treatment

- The treatment for an AMRO infection will be determined by the most responsible care provider.

Patient Care Equipment

- Dedicate the use of non-critical items (stethoscope, B/P cuff, dressing supplies, creams/lotions, wheelchair, commode etc.) to single patient use
 - Keeping supplies in the room to a minimum
 - Keeping equipment in the patient's room until no longer needed
 - Cleaning all equipment removed from the patient's room with a hospital-approved disinfectant
- Cleaning equipment on a regular scheduled basis, when visibly soiled and before use on another patient

- Cleaning and disinfecting the bathtub and tub chair lift after each use
 - Slings should be single use or should be laundered before use on another patient

Occupational Health

The risk of AMRO acquisition by HCWs is considered low when they follow Routine Practices and perform hand hygiene appropriately.

- Routine screening of a HCW is not recommended unless the person is deemed epidemiologically linked to an outbreak of an AMRO
- If a HCW has been colonized or infected with an AMRO (excluding MRSA colonization) they must report it to Occupational Health to develop an individualized follow-up plan

Section 8: Antimicrobial-Resistant Organisms

The following section provides quick reference Tables for each AMRO. Please refer to Section 7 in this document for further details on IPAC measures.

Methicillin-resistant *Staphylococcus Aureus* (MRSA)

MRSA Colonization

- Patients who have been previously identified as having MRSA colonization and who are flagged in their health record as being colonized with MRSA do not require Additional Precautions.

MRSA Infection

- Patients who have an MRSA infection will be placed on Contact Precautions and any other Additional Precautions based on PCRA for the duration of the infection
- These patients will not be flagged in the Meditech system
- On readmission these patients will not require screening or isolation for MRSA colonization

Table 2: MRSA Infection Management

MRSA Infection	Acute Care Settings	Long Term Care/Personal Care Homes/Mental Health and Rehabilitation	Community Settings
Patient placement	A private room with toileting facilities is recommended. If unavailable give highest priority for the single rooms to patients who have conditions which may facilitate transmission e.g. uncontained secretions or excretions.	A private room with toileting facilities is recommended. If unavailable, patients can be managed with precautions at the bedside.	Patients need to be placed so as to minimize transmission to others or contamination of the environment. Actions taken will vary depending on location and the patient's condition.
Signage	Contact Precautions (Other Additional Precautions based on the PCRA)	Contact Precautions (Other Additional Precautions based on the PCRA)	Not applicable
PPE	As per Additional Precautions signage	As per Additional Precautions signage	Based on the PCRA
Cleaning	Patient equipment is to remain in patient room. If removed, equipment must be cleaned between patients. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Patient equipment is to remain in patient room. If removed, equipment must be cleaned between patients. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Clinic environment is to be cleaned after patient encounter. Scheduled cleaning regimes should be in accordance with the policy of the facility.
Visitors	Visitors should follow the recommendations on the Additional Precautions signage	Visitors should follow the recommendations on the Additional Precautions signage	Not applicable
Screening of Contacts	Not required	Not required	Not required
Occupational Health	A personalized care plan will be developed for infected HCWs.	A personalized care plan will be developed for infected HCWs.	A personalized care plan will be developed for infected HCWs.

Vancomycin-resistant *Enterococcus* (VRE)

- Patients identified as having VRE infection or colonization should be placed on Contact Precautions and any other Additional Precautions based on PCRA.
- These patients will be flagged in the Meditech system
- On readmission these patients will require isolation for VRE colonization or previous infection.

Table 3: VRE Infection or Colonization Management

VRE Infection or colonization	Acute Care Settings	Long Term Care/ Personal Care Homes/Mental Health and Rehabilitation	Community Settings
Patient placement	A private room with toileting facilities is recommended. If unavailable give highest priority for the single rooms to patients who have conditions which may facilitate transmission e.g. uncontained secretions or excretions.	A private room with toileting facilities is recommended. If unavailable, patients can be managed with precautions at the bedside.	Patients need to be placed so as to minimize transmission to others or contamination of the environment. Actions taken will vary depending on location and the patient's condition.
Signage	Contact Precautions (Other Additional Precautions based on the PCRA)	Contact Precautions (Other Additional Precautions based on the PCRA)	Not applicable
PPE	As per Additional Precautions signage	As per Additional Precautions signage	Based on the PCRA
Cleaning	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Clinic environment is to be cleaned after patient encounter. Scheduled cleaning regimes should be in accordance with the policy of the facility.
Visitors	Visitors should follow the recommendations on the Additional Precautions signage	Visitors should follow the recommendations on the Additional Precautions signage	Not applicable
Screening of Contacts	If the patient was in a multi-bed room prior to being diagnosed with VRE the ICP should be consulted regarding the need to screen the roommates Screen those who have been roommates of the case for ≥ 48 hours	If the patient was in a multi-bed room prior to being diagnosed with VRE the ICP should be consulted regarding the need to screen the roommates Screen those who have been roommates of the case for ≥ 48 hours	Not required
Occupational Health	A personalized care plan will be developed for infected or colonized HCWs.	A personalized care plan will be developed for infected or colonized HCWs.	A personalized care plan will be developed for infected or colonized HCWs.

Extended-spectrum beta-lactamase (ESBL) producing bacteria

- It is not known how long bowel colonization with ESBL producing bacteria persists.
- If a patient has been put on Additional Precautions for an ESBL infection the precautions should remain in place until the infection has been treated and the patient is no longer symptomatic.
- These patients will not be flagged in the Meditech system
- On readmission these patients do not require Additional Precautions.

Table 4: ESBL Infection Management

ESBL Infection	Acute Care Settings	Long Term Care/ Personal Care Homes/Mental Health and Rehabilitation	Community Settings
Patient placement	Private or multi-bed room acceptable	Private or multi-bed room acceptable	Patients need to be placed so as to minimize transmission to others or contamination of the environment. Actions taken will vary depending on location and the patient's condition.
Signage	If infection cannot be contained implement Contact Precautions (can be implemented at bedside) (Other Additional Precautions or Routine Practice based on the PCRA)	If infection cannot be contained implement Contact Precautions (can be implemented at bedside) (Other Additional Precautions or Routine Practice based on the PCRA)	Not applicable
PPE	As per Additional Precautions signage	As per Additional Precautions signage	Based on the PCRA
Cleaning	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Clinic environment is to be cleaned after patient encounter. Scheduled cleaning regimes should be in accordance with the policy of the facility.
Visitors	Visitors should follow the recommendations on the Additional Precautions signage	Visitors should follow the recommendations on the Additional Precautions signage	Not applicable
Screening of Contacts	Not required	Not required	Not required
Occupational Health	A personalized care plan will be developed for infected HCWs.	A personalized care plan will be developed for infected HCWs.	A personalized care plan will be developed for infected HCWs.

Carbapenem-resistant organisms (CROs) and Carbapenemase-producing organisms (CPOs)

- Patients identified with CROs will not be flagged and patients identified with CPOs will be flagged in the Meditech system.
- Patients identified as having a CRO infection or CPO infection or colonization should be placed on Contact Precautions and any other Additional Precautions based on PCRA.
- On readmission these patients will require isolation for CPO colonization or previous infection.

Testing for CROs/CPOs is done in four stages:

1. Local testing will determine preliminary carbapenem resistance.
2. Samples with preliminary resistance will be sent to PHL for confirmatory (Kirby Bauer) testing. Samples confirmed are referred to as CROs.
3. Furthering testing is performed on confirmed CROs (CARBA-5) to determine if carbapenemase-producing with one of the five most common carbapenemases.
4. Specimens from screening of CPOs are sent to NML for possible identification of CPOs other than the CARBA-5.

Table 5: CRO Infection or Colonization Management

CRO Infection or colonization	Acute Care Settings	Long Term Care/ Personal Care Homes/Mental Health and Rehabilitation	Community Settings
Patient placement	A private room with toileting facilities is recommended. If unavailable give highest priority for the single rooms to patients who have conditions which may facilitate transmission e.g. uncontained secretions or excretions.	A private room with toileting facilities is recommended. If unavailable, patients can be managed with precautions at bedside.	Patients need to be placed so as to minimize transmission to others or contamination of the environment. Actions taken will vary depending on location and the patient's condition.
Signage	Contact Precautions: CPO pending result If negative for CPO, Contact Precautions can be discontinued immediately for colonization or once infection has been treated. (Other Additional Precautions based on the PCRA)	Contact Precautions: CPO pending result If negative for CPO, Contact Precautions can be discontinued immediately for colonization or once infection has been treated. (Other Additional Precautions based on the PCRA)	Not applicable
PPE	As per Additional Precautions signage	As per Additional Precautions signage	Based on the PCRA
Cleaning	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Clinic environment is to be cleaned after patient encounter. Scheduled cleaning regimes should be in accordance with the policy of the facility.
Visitors	Visitors should follow the recommendations on the Additional Precautions signage	Visitors should follow the recommendations on the Additional Precautions signage	Not applicable
Screening of Contacts	Not required	Not required	Not required
Occupational Health	A personalized care plan will be developed for infected HCWs.	A personalized care plan will be developed for infected HCWs.	A personalized care plan will be developed for infected HCWs.

Table 6: CPO Infection or Colonization Management

CPO Infection or colonization	Acute Care Settings	Long Term Care/ Personal Care Homes/Mental Health and Rehabilitation	Community Settings
Patient placement	A private room with toileting facilities is recommended.	A private room with toileting facilities is recommended.	Not applicable
Signage	Contact Precautions (Other Additional Precautions based on the PCRA)	Contact Precautions (Other Additional Precautions based on the PCRA)	Not applicable
PPE	As per Additional Precautions signage	As per Additional Precautions signage	Based on the PCRA
Cleaning	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required.	Clinic environment is to be cleaned after patient encounter. Scheduled cleaning regimes should be in accordance with the policy of the facility.
Visitors	Visitors should follow the recommendations on the Additional Precautions signage	Visitors should follow the recommendations on the Additional Precautions signage	Not applicable
Screening of Contacts	If the patient was in a multi-bed room prior to being diagnosed with CPO the ICP should be consulted regarding the need to screen the roommates Screen those who have been roommates of the case for ≥ 48 hours	If the patient was in a multi-bed room prior to being diagnosed with CPO the ICP should be consulted regarding the need to screen the roommates Screen those who have been roommates of the case for ≥ 48 hours	Not required
Occupational Health	A personalized care plan will be developed for infected or colonized HCWs.	A personalized care plan will be developed for infected or colonized HCWs.	A personalized care plan will be developed for infected or colonized HCWs.

Candida auris (C. auris)

- Patients identified with *C. auris* should be placed in a private room on Contact Precautions and any other Additional Precautions based on PCRA.
- These patients will be flagged in the Meditech system
- On readmission these patients will require isolation for *C. auris* colonization or previous infection.

Table 7: *C. auris* Infection or Colonization Management

CA Infection or colonization	Acute Care Settings	Long Term Care/ Personal Care Homes/Mental Health and Rehabilitation	Community Settings
Patient placement	A private room with toileting facilities. If unavailable, please consult IPAC.	A private room with toileting facilities. If unavailable, please consult IPAC.	Patients need to be placed so as to minimize transmission to others or contamination of the environment. Actions taken will vary depending on location and the patient's condition.
Signage	Contact Precautions (Other Additional Precautions based on the PCRA)	Contact Precautions (Other Additional Precautions based on the PCRA)	Not applicable
PPE	As per Additional Precautions signage	As per Additional Precautions signage	Based on the PCRA
Cleaning	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required. Quaternary Ammonium products are NOT to be used.	Patient equipment is to remain in patient room. Room cleaning is to be done twice a day. Increased frequency of cleaning of high touch surfaces is to be implemented. Adequate training and supervision of housekeeping staff about the additional cleaning is required. Quaternary Ammonium products are NOT to be used.	Clinic environment is to be cleaned after patient encounter. Scheduled cleaning regimes should be in accordance with the policy of the facility. Quaternary Ammonium products are NOT to be used.
Visitors	Visitors should follow the recommendations on the Additional Precautions signage.	Visitors should follow the recommendations on the Additional Precautions signage.	Not applicable
Screening of Contacts	If the patient was in a multi-bed room prior to being diagnosed with <i>C.auris</i> the ICP should be consulted regarding the need to screen the roommates. Screen and isolate those who have been roommates of the case for any duration of time.	If the patient was in a multi-bed room prior to being diagnosed with <i>C.auris</i> the ICP should be consulted regarding the need to screen and isolate the roommates. Screen those who have been roommates of the case for any duration of time.	Not required
Occupational Health	A personalized care plan will be developed for infected or colonized HCWs.	A personalized care plan will be developed for infected or colonized HCWs.	A personalized care plan will be developed for infected or colonized HCWs.

Section 9: Specialty Areas

Operating Rooms

Operating Room (OR) staff need to be notified of a patient's status in order to implement appropriate Additional Precautions to prevent the spread of AMROs in the OR. The Operating Room Nurses Association of Canada (2021) recommends following the facility's policy for Contact Precautions. These include:

- Remove all unnecessary supplies/equipment from the OR
- Remove any necessary supplies to be used in the case from drawers/cupboards and ensure that the drawers/cupboards are closed
- Only have supplies to be used for the case on the anesthetic cart
- When possible transport patients directly to the OR
- Only required staff should be in the OR
- Designate a clean area in the OR for charting
- If Additional Precautions can be implemented the patient's surgery does not need to be deferred until the last case of the day

Outpatient Hemodialysis Units

There is no standard protocol in Canada to guide placement of patients with AMROs when receiving treatment in a hemodialysis (HD) unit.

Routine Practices apply to all patients in HD Units. Central to the application of Routine Practices is a PCRA.

- HCWs have a responsibility to do a PCRA prior to every interaction as the patient's status can change
- The PCRA is based on professional judgment about the clinical presentation
- Control measures are based on the PCRA

As part of Routine Practices, specific precautions are recommended for HD units because of the increased potential for contamination with blood and pathogenic microorganisms.

Precautions for HD units include:

- Performing hand hygiene (i.e., hand washing or use of a ABHR)
- Using gloves for contact with blood or body fluids
- Restricting the use of common supplies, instruments, medications, and medication trays
- Prohibiting the use of a common medication cart
- Using a bundle care approach to prevent intravascular catheter related infections
- Implementing enhanced cleaning of equipment

Additional Precautions must be implemented based on the clinical assessment for the management of patients who might be at increased risk of transmitting an AMRO. This includes patients with an infected wound with drainage that cannot be contained by a dressing, urinary incontinence, fecal incontinence or diarrhea.

Admissions and transfers to HD units must not be delayed nor denied on the basis of AMRO status.

Inpatient Hemodialysis Units

For patients infected with MRSA and patients infected or colonized with VRE and CPOs, Contact Precautions and Additional Precautions based on PCRA are used in the inpatient hospital setting. Use Contact Precautions for

- Patients infected with MRSA
- Patients infected or colonized with VRE
- Patients infected or colonized with CPO
- Patients infected or colonized with *C. auris*

For other AMROs (e.g., CRO and ESBL) use Routine Practices and Additional Precautions based on PCRA.

Refer to organism specific Tables in Section 8 for more information.

Ambulatory Settings

Ambulatory care services include settings such as Medical and Surgical Clinics, Dentistry, Endoscopy, Day Surgery, and other similar areas. Services in these settings range from noninvasive history and physical examinations to provision of immunotherapy, chemotherapy, and blood transfusions.

- In ambulatory settings, use Routine Practices for all patients
- Do a PCRA prior to every patient interaction to identify risk of transmission and appropriate actions. For example, use gloves and gowns for contact with secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes and bags
- Limit the supplies and equipment in procedure rooms to prevent cross contamination of clean and sterile supplies

Correctional Facilities

Settings such as correctional facilities which house a large number of people for extended periods of time have the possibility of spreading communicable diseases. Basic IPAC practices, such as hand hygiene and environmental cleaning, should be implemented to prevent the transmission of AMROs.

Administrative Support

An IPAC program should be in place with written policies and procedures appropriate for the service.

- Infection prevention and control education and training should be provided for all staff at orientation and repeated regularly
- Hand hygiene practices should be supported by appropriate infrastructure
- Personal protective equipment should be available to staff
- Occupational Health education should be provided on safe injection practices
- Policies should be in place for the cleaning and disinfection of reusable medical equipment
- Environmental Services
 - Cleaning of the environment is critical to the containment of infectious diseases
 - Scheduled cleaning regimes should be in accordance with the policy of the facility
 - Audits should be done of the cleaning to ensure that the correct procedures are being followed

Recommendations for Inmates

A focus should be on prevention which involves basic measures to prevent AMRO infection and transmission within a correctional facility. Basic measures to consider are:

- Assessment
 - All inmates undergoing intake medical screening and physical examinations should be carefully evaluated for skin infections
 - All inmates, especially food handlers, should be advised on the necessity of self-reporting of any infections especially skin infections
- Education
 - Inmates should be provided information on methods of transmission and containment of infections, such as AMROs, including: hand hygiene practices, general hygiene and cleaning of the environment.

Section 10: Outbreak Control

Outbreak Recognition and Control

The appearance of a single case of an AMRO in an area with no previously identified cases should prompt the timely implementation of selected control measures. The appearance of two or more temporally or geographically associated AMROs should evoke a heightened response. A consultation with IPAC is recommended and further investigation is required. If an outbreak is suspected or confirmed additional control measures may be necessary. The first step would be to place the patient(s) on Additional Precautions while further investigation is being done.

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Glossary of Terms

Alcohol-based hand rub: An alcohol containing preparation (liquid, gel or foam) designed for application to the hands to remove or kill microorganisms.

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).

Additional Precautions: Infection prevention and control precautions and practices required in addition to Routine Practices. They are based on the mode (means) of transmission of the infectious agent: airborne, droplet, and contact.

Cohorting: The practice of grouping patients/residents infected or colonized with the same infectious agent together to confine their care to one area.

Colonization: A microorganism is present in or on the body but is not causing disease or cellular changes.

Community Care setting: Healthcare provided in the home, doctors' offices, clinics and other ambulatory clinics outside of the Acute or Long Term Care settings.

Contact Precaution: Used in addition to Routine Practices to reduce the risk of transmitting infectious agents via direct contact with an infectious person or indirect contact with contaminated object or surface.

Hand Hygiene: A comprehensive term that applies to hand washing, use of alcohol-based hand rub ABHR and actions taken to maintain healthy hands and fingernails.

Healthcare-associated infection: An infection that is acquired during the delivery of healthcare.

Healthcare worker (HCW): A person (paid or unpaid) who works in a healthcare setting.

Infection: A microorganism is present in or on the body, has invaded tissue, causes tissue changes, and normally causes signs and symptoms of disease.

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.

Patient Chart Flag: Patient chart flags are short visual markers and notes linked to a patient record to highlight considerations important to patient care.

Personal protective equipment: Personal protective equipment consists of gowns, gloves, masks, facial protection (i.e., masks and, face shields or masks with visor attachment) or respirators that can be used by HCWs to eye protection provide a barrier that will prevent potential exposure to infectious microorganisms.

Point-of-care risk assessment: A systematic process used to identify the risk of transmission of microorganisms so that healthcare workers can decide what control measures are needed to provide safe care.

Routine Practices: The Practices recommended by PHAC (2016) to describe infection prevention and control guidelines recommended in Canada to prevent and control the transmission of microorganisms in healthcare settings from recognized and unrecognized sources.

- The components of Routine Practices include:
 - Hand Hygiene
 - Point of Care Risk Assessment
 - Patient Placement/Accommodation
 - Personal Protective Equipment
 - Patient Care Equipment
 - Environmental Cleaning
 - Patient Education

Screening: A strategy used in a population to identify an unrecognized disease in individuals without signs or symptoms. For AMROs, screening involves obtaining swabs from potential carriage sites to identify colonization.

Surveillance: The systematic ongoing collection, collation and analysis of health-related information that is communicated in a timely manner to all who need to know which health problems require action in their community.

Appendices: A1 – A5 for Healthcare Professionals

Appendix A-1: Methicillin-resistant *Staphylococcus aureus*

Fact Sheet for Healthcare Professionals

What is MRSA?

Staphylococcus aureus is a bacterium that normally lives on the skin and mucous membranes of healthy people. When *Staphylococcus aureus* develops resistance to the beta-lactam class of antibiotics, it is called methicillin-resistant *Staphylococcus aureus* or MRSA.

How is MRSA spread?

MRSA is spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Risk factors for MRSA Infection

MRSA infection usually develops in hospitalized clients/patients/residents who are elderly or very sick (weakened immune systems). Other factors that increase the risk for acquiring MRSA infection include:

- Being colonized with MRSA
- Previous hospitalization or transfer between healthcare facilities
- Presence of an indwelling device

Hand Hygiene Practices

Hand hygiene is the key strategy for disruption of transmission of infectious microorganisms. Staff and visitors should be reminded to practice hand hygiene before and after client/patient/resident contact/care. Healthcare staff should review the correct method and indications of hand hygiene with clients/patients/residents families and visitors.

Prevention and Control of MRSA

Contact Precautions should be initiated if the client/patient/resident has an active MRSA infection.

Family and Visitors

All families/visitors should practice hand hygiene before and after leaving the client/patient/resident room. Families/visitors who provide direct care are to wear the same PPE as staff.

Appendix A-2: Vancomycin-resistant *Enterococcus* (VRE)

Fact Sheet for Healthcare Professionals

What is VRE?

Enterococci are bacteria that colonize the gastrointestinal tract and generally do not cause harm. Vancomycin-resistant enterococci (VRE) are strains of *Enterococcus* that are resistant to vancomycin, one of the few antibiotics to which enterococci are normally susceptible. An infection caused by VRE may therefore be difficult to treat.

How is VRE spread?

VRE is spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Risk Factors for VRE

People at risk for colonization or infection with VRE are usually hospitalized and have an underlying medical condition that makes them susceptible to infection. These conditions include clients/patients/residents with:

- Previous hospitalization or transfer between healthcare facilities (in Canada or outside Canada)
- Critical illness(es) in intensive care units
- Severe underlying disease or weekend immune systems
- Urinary catheters
- Exposure to (or contact with) a client/patient/resident with VRE
- Antibiotic use, particularly vancomycin

Hand Hygiene Practices

Hand hygiene is a key strategy for disruption of transmission of infectious microorganisms. Staff and visitors should be reminded to practice hand hygiene before and after client/patient/resident contact/care. Healthcare staff should review the correct method and indications of hand hygiene with clients/patients/residents, families and visitors.

Prevention and Control of VRE

Contact Precautions should be initiated if the client/patient/resident is known to be colonized or infected with VRE.

Family and Visitors

All families/visitors should practice hand hygiene before and after leaving the client/patient/resident room. Families/visitors who provide direct care are to wear the same PPE as staff.

Appendix A-3: Extended-spectrum beta-lactamase (ESBL) producing bacteria

Fact Sheet for Healthcare Professionals

What are ESBLs?

ESBLs are Gram-negative bacteria that produce an enzyme, beta-lactamase, which has the ability to break down commonly used antibiotics, such as penicillins and cephalosporin, and render them ineffective for treatment. The most common ESBLs are some strains of *Escherichia coli* and *Klebsiella pneumoniae*.

How are ESBLs spread?

ESBLs are spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Risk Factors for ESBLs

- Direct transfer between facilities e.g. hospital, long term care, personal care home or other healthcare facility
- Any hospital, long term care, personal care home or other healthcare facility admission in the past year
- Home healthcare services or hemodialysis
- Communal living settings (e.g. shelter, halfway house)
- Previous infection or colonization with an antimicrobial-resistant organism
- Invasive devices e.g. urinary catheter and drainage tubes
- History of antibiotic use, such as cephalosporin and fluoroquinolones
- Compromised immunity

Hand Hygiene Practices

Hand hygiene is a key strategy for disruption of transmission of infectious microorganisms. Staff and visitors should be reminded to practice hand hygiene before and after client/patient/resident contact/care. Healthcare staff should review the correct method and indications of hand hygiene with clients/patients/residents, families and visitors.

Prevention and Control of ESBLs

Contact Precautions should be initiated if the client/patient/resident is known to be infected with an ESBL.

Family & Visitors

All families/visitors should practice hand hygiene before and after leaving the client/patient/resident room. Families/visitors who provide direct care are to wear the same PPE as staff.

Appendix A-4: Carbapenem-resistant organisms (CRO) and Carbapenemase-producing organisms (CPO)

Fact Sheet for Healthcare Professionals

What are Carbapenem-resistant organisms (CRO)?

CRO are a group of bacteria that are resistant to many different types of antibiotics including carbapenems. Carbapenems are a type of antibiotic used when other common antibiotics are not effective.

What are Carbapenemase-producing organisms (CPO)?

CPO are bacteria that are resistant to carbapenem antibiotics by producing an enzyme (carbapenemase) to break down the carbapenem antibiotics. CPO are a type of CRO that are more serious and difficult to manage.

How is it spread?

CRO/CPOs are spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Risk Factors for CRO/CPO

For healthy people these bacteria generally do not pose a threat. For those people who are ill, these bacteria may cause an infection.

Hand Hygiene Practices

Hand hygiene is a key strategy for disruption of transmission of infectious microorganisms. Staff and visitors should be reminded to practice hand hygiene before and after client/patient/resident contact/care. Healthcare staff should review the correct method and indications of hand hygiene with clients/patients/residents, families and visitors.

Prevention and Control of CROs/CPOs

Contact Precautions should be initiated if the client/patient/resident is known to be infected with a CRO/CPO.

Family and Visitors

All families/visitors should practice hand hygiene before and after leaving the client/patient/resident room. Families/visitors who provide direct care are to wear the same PPE as staff.

Appendix A-5: *Candida auris* (*C. auris*)

Fact Sheet for Healthcare Professionals

What is *C. auris*?

C. auris is a fungus that can cause healthcare-associated invasive infections and outbreaks. *C. auris* is often resistant to multiple antifungal drugs and can be challenging to identify in the laboratory.

How is *C. auris* spread?

C. auris is spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient. The propensity of *C. auris* to spread can have serious implications for the Canadian healthcare system.

Risk Factors for *C. auris*

Invasive *C. auris* infections can lead to severe morbidity and mortality, especially among hospitalized patients who are immunocompromised or receiving intensive care.

Hand Hygiene Practices

Hand hygiene is a key strategy for disruption of transmission of infectious microorganisms. Staff and visitors should be reminded to practice hand hygiene before and after client/patient/resident contact/care. Healthcare staff should review the correct method and indications of hand hygiene with clients/patients/residents, families and visitors.

Prevention and Control of *C. auris*

Contact Precautions should be initiated if the client/patient/resident is known to be colonized or infected with *C. auris*.

Family and Visitors

All families/visitors should practice hand hygiene before and after leaving the client/patient/resident room. Families/visitors who provide direct care are to wear the same PPE as staff

Appendices: B-1 – B6 for Patients and Visitors

Appendix B-1: Methicillin-resistant *Staphylococcus aureus* - Acute/Long Term Care

Information for Patients/Residents and Families

What is methicillin-resistant *Staphylococcus aureus* (MRSA)?

Staphylococcus aureus is a germ that normally lives in the nose, rectum and on human skin. MRSA is a type of *Staphylococcus aureus* that is not killed by the usual antibiotics.

How is MRSA spread?

Anyone can get MRSA. You can get it by touching someone or something that has the germs on it and then touching your skin or your nose.

Are certain people at risk of getting MRSA?

Yes, certain people have been found to be more at-risk, including:

- People who are seriously ill, or are hospitalized for a long time
- People who have taken antibiotics frequently
- People involved in contact sports
- People using intravenous drugs and sharing needles
- People living in crowded conditions
- Children, as they are less likely to wash their hands

Does everybody that comes in contact with MRSA become sick?

No, sometimes the germ lives on the body without causing infection and does not require treatment. This is called colonization. MRSA may go away on its own, but sometimes it does not. If you have an infection with MRSA, your healthcare provider will advise you on the best treatment.

MRSA...What does this mean for me?

Frequent handwashing is the best way to prevent the spread of all germs

- Everyone, and yourself, should wash their hands when entering/exiting your room

If you have an **active** MRSA infection (such as an open weeping wound):

- In the hospital you may be in a private room, if available
- A sign will be placed to remind others about the precautions
- Staff and family members will wear a gown and gloves when providing direct care
- All items in your room will be cleaned on a daily basis

If you are **colonized** with MRSA but do not have an active infection:

- You will be permitted to take part in all activities and social events

If you are discharged home from the hospital with an MRSA infection:

- See fact sheet Methicillin-resistant *Staphylococcus aureus* in the community.

Appendix B-2: Methicillin-resistant *Staphylococcus aureus* in the community

Information for Patients and Families

What is methicillin-resistant *Staphylococcus aureus* (MRSA)?

Staphylococcus aureus is a germ that normally lives in the nose and on human skin. MRSA is a type of *Staphylococcus aureus* that is not killed by the usual antibiotics.

How is MRSA spread?

Anyone can get MRSA. You can get it by touching someone or something that has the germs on it and then touching your skin or your nose.

Are certain people at risk of getting MRSA?

Yes, certain people have been found to be more at-risk, including:

- People who are seriously ill, or are hospitalized for a long time
- People who have taken antibiotics frequently
- People involved in contact sports
- People using intravenous drugs and sharing needles
- People living in crowded conditions
- Children, as they are less likely to wash their hands

Does everybody that comes in contact with MRSA become sick?

No, sometimes the germ lives on the body without causing infection and does not require treatment. This is called colonization. MRSA may go away on its own, but sometimes it does not. If you have an infection with MRSA, your healthcare provider will advise you on the best treatment.

MRSA...What does this mean for me?

Basic hygiene is the best prevention...

- Frequent hand washing is the best way to prevent the spread of all germs especially:
 - After touching the nose or mouth, and compromised areas on the skin
 - After touching body fluids such as urine, or things soiled with body fluids
 - After blowing your nose, coughing, sneezing or using the bathroom
 - Before preparing food, eating or drinking
 - When hands look dirty

- When house cleaning:
 - Use regular household cleaner
 - Pay special attention to areas that are touched often, like door handles
 - Clean once a week and more frequently if someone is sick with an infection
 - Clothes and linens can be washed in the regular household laundry
 - Dishes/cutlery can be washed with other utensils in soap/water or the dishwasher

- When sending children to daycare centers and/or schools, remind them to:
 - Clean their hands before leaving and when returning home
 - Avoid sharing personal items like towels and clothing

- If participating in sports or athletic activities:
 - Clothing and equipment (e.g. mats) should be washed/wiped down after use
 - Do not share personal items like water bottles, towels, clothing, razors, etc.
 - Take a shower after each practice or game

- If an individual has an infected skin lesion, the person should:
 - Clean their hands with soap and water after touching the lesion or dressing
 - Cover the lesion with a dressing to contain the drainage and wash hands afterwards
 - Seek medical care if required
 - If the dressing becomes wet with drainage it should be changed, and the area used for changing the dressing should be cleaned with a household cleaner
 - Place the soiled dressing in a small bag and put it in the garbage
 - Do not share soaps, creams, lotions, makeup, and other personal products
 - Do not share personal items that come in contact with the skin
 - It is OK to have visitors and friends visit at home

Appendix B-3: Vancomycin-resistant *Enterococci* (VRE)

Information for Patients/Residents/Clients and Visitors

What is Vancomycin-Resistant Enterococci (VRE)?

Enterococci are bacteria (germs) that live in the bowel of all people and very rarely cause infections. Vancomycin-resistant enterococci (VRE) are strains of *Enterococcus* that are resistant to vancomycin, one of the few antibiotics that are effective against enterococci. An infection caused by VRE may therefore be more difficult to treat.

How is VRE spread?

VRE is spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Are certain people at risk of getting VRE?

People who have been previously treated with many antibiotics especially vancomycin are at risk of developing VRE.

Do all people with VRE get sick?

No. Most people who acquire it only carry it in their bowel and never become sick. Some people will carry it for many years and not be affected.

VRE...What does this mean for me?

VRE is not a problem outside of hospital or long-term care facility and poses no risk for friends and family. Family members should be educated about the importance of hand hygiene. If a patient is transferred from one healthcare facility to another, the receiving institution will be informed.

Isolation of admitted clients/patients/residents known to have VRE and strict attention to hygiene have been shown to reduce the spread. Specific measures include:

- Private rooms or sharing of rooms among clients/patients/residents with VRE
- Frequent handwashing by clients/patients/residents with VRE and by all persons entering the room
- Gloves for all people who provide direct care; gowns might also be worn
 - Removal of gowns and gloves within the room and handwashing before leaving
- Equipment, e.g. blood pressure cuffs, should not be shared among clients/patients/residents
- Frequent and thorough cleaning of the environment

Appendix B-4: Extended-spectrum beta-lactamase producing bacteria

Information for Patients and Visitors

What are extended-spectrum beta-lactamase (ESBL) producing bacteria?

- ESBLs are enzymes produced by bacteria, such as *Klebsiella* and *Escherichia coli*
- These enzymes make certain antibiotics ineffective
- The extended-spectrum (third generation) antibiotics affected can be Cefotaxime, Ceftazidime or Ceftriaxone.
- ESBL producing bacteria are often resistant to other drug classes

How are ESBLs Spread?

ESBLs are spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Are certain people at risk of getting ESBLs?

People most likely to get ESBLs are those who:

- Are seriously ill
- Are hospitalized for a long time
- Have taken many antibiotics

Do all people with ESBLs get sick?

No. Most people who acquire it only carry it in their bowel and never become sick. Infections can be treated but there are fewer antibiotic choices.

ESBLs...What does this mean for me?

ESBLs are not a generally a problem outside of hospital or long-term care facility and pose little risk for friends and family. Family members should be educated about the importance of hand hygiene. If a patient is transferred from one healthcare facility to another, the receiving institution will be informed.

Isolation of admitted clients/patients/residents known to have an infection with an ESBL and strict attention to hygiene have been shown to reduce the spread. Specific measures include:

- Private rooms or sharing of rooms among clients/patients/residents with ESBL
- Frequent handwashing by clients/patients/residents with ESBL and by all persons entering the room
- Gloves for all people who provide direct care; gowns might also be worn
 - Removal of gowns and gloves within the room and handwashing before leaving
- Equipment, e.g. blood pressure cuffs, should not be shared among clients/patients/residents
- Frequent and thorough cleaning of the environment

Appendix B-5: Carbapenem-resistant organisms (CRO) and Carbapenemase-producing organisms (CPO)

Acute Care -Information for Patients and Families

What are Carbapenem-resistant organisms (CRO)?

CRO are a group of germs (bacteria) that are resistant to many different types of antibiotics including carbapenems. Carbapenems are a type of antibiotic used when other common antibiotics are not effective.

What are Carbapenemase-producing organisms (CPO)?

CPO are bacteria that are resistant to carbapenem antibiotics by producing an enzyme (carbapenemase) to break down the carbapenem antibiotics. CPO are a type of CRO that are more serious and difficult to manage.

How are CROs/CPOs spread?

CROs/CPOs are spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient.

Are certain people at risk of getting CRO/CPO?

For healthy people these bacteria generally do not pose a threat. For those people who are ill, these bacteria may cause an infection.

Does everyone who comes in contact with CRO/CPO get sick?

No, sometimes lives on the body without causing infection and does not require treatment. This is called colonization. It may go away on its own, but sometimes it does not. If you have an infection with CRO/CPO, your healthcare provider will advise you on the best treatment.

CRO/CPO...What does this mean for me?

As a patient in hospital this means:

- Extra precautions are taken in the hospital because we want to prevent the spread of CRO/CPO to other vulnerable patients.
- Leave your room only for essential purposes (e.g. to go for a medical test).
- Every time you leave your room, clean your hands with soap and water or with alcohol-based hand rub. You do not have to wear gloves.
- Ask your caregiver to cover wounds with a clean dressing, or to change your dressing if it is soiled or falling off.

At home this means:

- Hand washing is the best way to stop the spread of infections. Wash your hands regularly with soap and water.
- Do not share personal items (e.g., towels, clothing, bar soap, razors, or sports equipment).
- Clean your home regularly, especially the kitchen and bathroom.
- Wash clothing using regular laundry soap in the regular wash cycle.
- Tell your healthcare worker if you have CRO/CPO or have had CRO/CPO in the past

Appendix B-6: *Candida auris* (*C. auris*)

Information for Patients/Residents/Clients and Visitors

What is *Candida auris* (*C. auris*)?

C. auris is a fungus that can cause healthcare-associated invasive infections and outbreaks. *C. auris* is often resistant to multiple antifungal drugs and can be challenging to identify in the laboratory.

How is *C. auris* spread?

C. auris is spread from one person to another or from contact with a contaminated surface or object. Hands are easily contaminated during the process of care-giving or from contact with environmental surfaces in close proximity to the patient. The propensity of *C. auris* to spread can have serious implications for the Canadian healthcare system.

Are certain people at risk of getting *C. auris*

Invasive *C. auris* infections can lead to severe morbidity and mortality, especially among hospitalized patients who are immunocompromised or receiving intensive care.

Do all people with *C. auris* get sick?

No. Most people who acquire it only carry it in their bowel and never become sick. Some people will carry it for many years and not be affected.

C. auris ...What does this mean for me?

Risk of C. auris infection outside of hospital or long-term care facility is low. Family members should be educated about the importance of hand hygiene. If a patient is transferred from one healthcare facility to another, the receiving institution will be informed.

Isolation of admitted clients/patients/residents known to have *C. auris* and strict attention to hygiene have been shown to reduce the spread. Specific measures include:

- Private rooms or sharing of rooms among clients/patients/residents with *C. auris*
- Frequent handwashing by clients/patients/residents with *C. auris* and by all persons entering the room
- Gloves for all people who provide direct care; gowns might also be worn
 - Removal of gowns and gloves within the room and handwashing before leaving
- Equipment, e.g. blood pressure cuffs, should not be shared among clients/patients/residents
- Frequent and thorough cleaning of the environment

Appendix C: AMRO Screening

Antimicrobial-resistant organisms (AMROs) are microorganisms resistant to one or more antimicrobials. There are high proportions of antibiotic resistance in bacteria that cause common infections (e.g., urinary tract infections, pneumonia, and bloodstream infection) everywhere. Screening is used in hospital settings to identify colonization of asymptomatic patients with AMROs with the purpose of isolating these patients to interrupt transmission of these organisms. However, there is no standard protocol in Canada to guide screening for AMROs. In fact, the conclusion from the literature review by Bond et al. (2014) found that there was no high quality evidence to indicate that screening of patients is associated with reduction in healthcare-associated AMRO incidence, infection, mortality or morbidity in endemic settings.

There is evidence to show that rates of transmission of AMROs are related to infection prevention and control practices in healthcare settings. Early interventions that focus on preventing cross-transmission have been shown to have a greater relative impact in controlling AMROs and preventing endemicity in healthcare facilities than other control measures (PIDAC 2013).

The Canadian Consensus Development Conference (2014) recommended that universal screening for AMROs should not be done. Other major infection prevention strategies recommended were:

- Pursue relentlessly and fully resource hand hygiene, environmental cleaning, antimicrobial stewardship, and routine practices in hospitals.
- Ensure consistent application of infection prevention and control practices province-wide.
- Continue and/or implement targeted screening programs of high-risk populations at admission and at intervals during their hospital stay, based on local epidemiology.

In May 2023, PIC-NL members agreed on the following recommendations for the screening for AMROs in the province. See Appendix E for information on screening specimens.

- Screen any patient who has been transferred from a healthcare facility outside NL during the last year for vancomycin-resistant enterococcus (VRE), carbapenemase -producing organisms (CPO) and *Candida auris* (*C. auris*).
 - Place the patient in a private room, if available, on Contact Precautions while awaiting results of the screen.

References

Bond K, Tjosvold L, Harstall C. Effectiveness of screening for endemic antibiotic resistant organisms (AROs) in hospital settings. Summary of systematic reviews, primary studies, and evidence-based guidelines. Canadian Consensus Development Conference on Surveillance and Screening for AROs. Edmonton AB: Institute of Health Economics; 2014 July.

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Appendix D: Risk Assessment for Placement

Infected or Colonized Source Patient

	Higher Risk of Transmission	Lower Risk of Transmission
PATIENT	<ul style="list-style-type: none"> • Draining skin lesions or wounds not covered by dressings • Respiratory secretions (uncontrolled) • Patient requiring extensive hands-on care • Patient has invasive devices • Poor compliance with hygienic practices and infection control precautions, e.g., confused patient • Incontinence of stool or urine (not contained) • Exfoliating skin conditions 	<ul style="list-style-type: none"> • Skin lesions or wounds covered by dressing • Able to control respiratory secretions • Capable of self-care • Good hygiene • Able to comply with infection control precautions • Continent
MICROORGANISMS	Characteristics that promote transmission: <ul style="list-style-type: none"> • Spread by contact • Able to survive in the environment • Able to colonize invasive devices • Propensity for asymptomatic/carrier state 	
ENVIRONMENT	<ul style="list-style-type: none"> • Inadequate housekeeping • Shared patient care equipment without cleaning between patients (e.g., thermometer bases, commodes) • Crowded facilities • Shared facilities (e.g., rooms, toilets, bath, sinks) • High patient-nurse ratio 	<ul style="list-style-type: none"> • Appropriate housekeeping • Dedicated equipment • Adequate spacing between beds • Dedicated bathroom facilities • Low patient-nurse ratio
ROOMMATE	<ul style="list-style-type: none"> • Requiring extensive hands-on care • Have invasive procedures or devices • Non-intact skin • Exfoliating skin conditions • Debilitated, severe underlying disease • Extremes of age • Recent antibiotic therapy • Immunosuppression 	<ul style="list-style-type: none"> • Able to do self-care • No indwelling devices • Intact skin and mucous membranes

Appendix E: Specimen collection

1. For clinical isolates collect:

- Open wound – swab
- Urinary catheter –urine
- Tracheostomy –sputum

2. Screening

If a rectal swab or a stool culture is required:

- Stool specimen is preferred, as the yield is higher
- If a stool specimen is obtained it should be placed in a sterile container
- If a swab is taken, pre moisten in culture tube transport medium
- The request on the requisition should identify the specimen for “Screen” only

If bilateral axilla and groin is required:

- Use one swab for both sites

Ensure specimen is labelled appropriately and sent to lab with completed requisition.

Appendix F: Quick Reference AMRO Management

Organism	Chart Flag	Admission Screen	Additional Precautions	Specimen Collection	ENV Cleaning
Methicillin - resistant Staphylococcus aureus (MRSA)	No	No	Colonization- Routine Practice Infection- Contact Precautions for duration of infection	As per clinical isolates	*Daily and as needed *Twice daily and as needed
Vancomycin - resistant enterococcus (VRE)	Yes	Yes If admitted from outside NL (previous hospitalization within last 12 months)	Pending screening result and if positive: Contact Precautions for duration of all admissions	1 rectal swab	*Twice daily and as needed
Carbapenem-resistant organism (CRO)	No	Yes If admitted from outside NL (previous hospitalization within last 12 months)	Pending screening results: Contact Precautions Positive for CRO but negative for CPO if asymptomatic: Routine Practice	1 rectal swab	*Twice daily and as needed
<div style="text-align: center;">↓</div> Carbapenemase - producing organism (CPO)	Yes	CRO testing first [If positive] <div style="text-align: center;">↓</div> Secondary testing for CPO	Positive for CRO but negative for CPO if symptomatic and contaminating pt environment: Contact Precautions Positive for CRO and positive for CPO: Contact Precautions (private room) for duration of all admissions		

Organism	Chart Flag	Admission Screen	Additional Precautions	Specimen Collection	ENV Cleaning
Extended - spectrum beta-lactamase (ESBL)	No	No	Routine Practice Contact Precautions (at bedside) - if symptomatic and contaminating pt. environment	As per clinical isolates	*Twice daily and as needed
Candida auris (C. auris)	Yes	Yes If admitted from outside NL (previous hospitalization within last 12 months)	Private Room and washroom on Contact Precautions during screening process and for duration of hospital admission if positive Contact Precautions for subsequent visits or admissions Contact Precautions and testing for roommates in the event of exposure	<u>One</u> bilateral swab of axilla and groin Relevant sites such as wounds or device exit sites	*Twice daily and as needed Quaternary Ammonium product <u>NOT</u> to be used