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Carbapenemase-producing Organisms (CPOs) and Candida auris (C. auris)

Purpose

To prevent transmission of Carbapenemase-producing Organisms (CPO's), *Candida auris* (*C. auris*) in healthcare settings including acute care hospital and long-term care facilities.

Definitions

Antimicrobial-resistant Organisms (AROs) -See Review of Terminology.

Candida 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.

Carbapenemase-producing Organisms (CPOs) – See Review of Terminology.

Cohorting refers to the assignment of a geographic area such as a room or a patient care area of two or more patients who are either colonized or infected with the same microorganism, with staffing assignments restricted to the cohorted group of patients.

Colonization is the presence and multiplication of microorganism(s) in or on the body without any symptoms of infection or detected immune reaction. Colonization is often a natural process in the development of "normal flora".

Contact, in the context of communicable disease, a person or animal that has been in such association with a colonized or infected person or animal or a contaminated environment and thus has had an opportunity to acquire the micro-organism.

Infection is an invasion of the body by microorganism(s) that multiply and cause an interaction between the host and the organism. The interaction may only be a detectable immune response such as a TB skin test conversion (subclinical infection) or produce signs and symptoms resulting from the altered physiology and/or associated cell damage (clinical disease).

Screening refers to a process to identify patients at risk for being colonized with an ARO, obtaining specimens for identification, and ensuring Additional Precautions are implemented.

Single composite swab is the process of combining samples from multiple sample areas by using a single swab.

Overview

Review of Terminology

Antimicrobial-Resistant Organism (ARO) – A microorganism that is resistant to the action of one or more antimicrobial agents and that is of special clinical or epidemiological significance. This guideline uses ARO as an overarching term that refers to different types of epidemiologically important resistant bacteria and other epidemiologically important resistant microorganisms such as fungi (i.e., *Candida auris*).

In previous versions of this document, ARO abbreviation was used for Antibiotic-Resistant organisms. However, to reduce ambiguity in nomenclature and allow for inclusion of other types of epidemiologically important microorganisms identified (i.e., fungi) term antibiotic is substituted by antimicrobial. This will provide uniform definition and ensure consistent use of terminology in IPAC documents. While in the medical literature different abbreviations are often interchangeably used for description of carbapenem resistance in gram-negative organisms, this can often be confusing.
For clarification purposes and better understanding of types of resistance associated with Gram-negative organisms, different abbreviations mentioned in the literature and explanations are provided below.

Carbapenem-Resistant Organisms (CRO) – refers to Gram-negative bacteria including the members of Enterobacterales order (such as *Klebsiella pneumoniae and Escherichia coli*) and non-fermenters group (such as *Acinetobacter baumannii, Pseudomonas aeroginosa* and *Stenotrophomonas maltophilia*) that are resistant to carbapenems **by any mechanism**.

The non-fermenters can be intrinsically resistant to carbapenems through a presence of enzyme carbapenemase (e.g., L1 metallo-beta lactamase in *S. maltophilia*), or they can acquire carbapenemases (typically KPC, VIM, NDM and OXA-48 types). Enterobacterales do not have inherent carbapenem resistance but may be resistant to carbapenems and other beta lactam antibiotics through the production of carbapenemase or the presence of an extended spectrum beta-lactamase (ESBL) or AmpC beta-lactamase (cephalosporinase) combined with porin loss.

Carbapenem-Resistant Enterobacterales (CRE) - refers to members of the Enterobacterales order that are resistant to carbapenems through either production **of an enzyme** (acquired carbapenemase) **or other mechanisms** (ESBL or AmpC organism combined with efflux pumps or porin loss).

Carbapenemase-Producing Enterobacterales (CPE) - refers to members of the Enterobacterales order that are resistant to carbapenems through production of an enzyme carbapenemase. Carbapenemases can be chromosomally encoded (e.g., SME in *S. marcescens*) or plasmid acquired (typically KPC, VIM, NDM and OXA-48 types). Plasmid acquired resistance is **more important for IPAC practice** because of higher risk for transmission.

Carbapenemase-Producing Organisms (CPO) - refers to Gram-negative bacteria from the Enterobacterales order (e.g., *K. pneumoniae and E. coli*) and non-fermenters (such as *Acinetobacter baumannii, Pseudomonas aeroginosa*) that are resistant to carbapenems by production **of a plasmid acquired enzyme carbapenemase** (typically KPC, VIM, NDM and OXA-48 types)**.**

Carbapenemase - beta-lactamase able to inactivate carbapenems together with other beta-lactam antibiotics such as penicillins and cephalosporins.

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For screening and implementation of Additional Precautions in Interior Health for organisms resistant to carbapenems, IPAC activities will primarily focus on Carbapenemase-Producing Organisms (CPO) due to higher transmission risks associated with these organisms. For organisms with other mechanisms of resistance to carbapenems IPAC will perform risk assessment on a case-by-case basis and implement additional measures if required.

Epidemiology

Carbapenemase-producing Organism (CPO) prevalence has increased worldwide and has become endemic in many countries outside of Canada. Unfortunately, there are now a few Canadian hospitals that have endemic areas within their facilities. Patients with Emergency Department (ED) visits, hospitalizations, surgery, hemodialysis, and chemotherapy outside of Canada within the past 12 months are at higher risk of acquiring a CPO. Patients can be colonized with CPO in their gastrointestinal tract and not have any symptoms; however, if an infection occurs, it can result in high morbidity and mortality.

Candida auris (*C. auris*) was first identified in, 2009 and is considered an emerging fungal pathogen that can cause both invasive and non-invasive healthcare-associated infections, including bloodstream infections, wound infections, and otitis media. In Canada, 43 individuals tested positive for *C. auris* between 2012- 2022 with almost half of those cases being identified in the last 3 years. Mortality rates of *C. auris* infections are estimated to be greater than 40%.

Mode of Transmission

CPO and *C. auris* are more commonly spread indirectly via contaminated hands that have acquired it through contact with contaminated equipment and surfaces, and through direct contact with people who are colonized or have infections. Routine Practices, hand hygiene, equipment and environmental surface cleaning and disinfection are important measures to prevent transmission.

Admission Screening for CPO and/C. *auris* in Acute Care

All patients being admitted to acute care are to be screened. Nurse to complete screening form and collect required swabs upon receiving admission orders. Follow the procedure outlined in the Acute Care Admission Screening for Antimicrobial-Resistant Organisms (ARO) for screening swab requirements. The screening tool is used to determine patient risk factors and identify necessary screening actions for all admitted patients, pre-surgical screening, surgical patients with an unplanned admission, and patient transfers between acute care facilities.

All patients with any risk factors are to have required screening swab collected after receiving admission orders and are to be placed on Contact Plus Precautions**.** Precautions may be discontinued if the screening swab is negative, and the patient was not previously CPO and/or *C. auris* positive, and they were not identified as being exposed to a confirmed case.

All admitted patients in the ED must have screening completed within 12 hours of admission, it is important not to delay screening until admission to a unit to ensure best inpatient bed placement to prevent potential exposures to other patients.

For any patient previously positive for CPO and/or *C. auris* as per the medical chart or reported history, MDR indicator must be entered into Meditech. Patient must be placed in a single room with dedicated equipment and Contact Plus Precautions implemented regardless of admission status to hospital (e.g., patient presenting to ED for assessment and not being admitted). Assessment of ARO status is covered in Syndromic Surveillance Screening Toolkit under the following tools: IPAC Syndromic Screening Requirements Table (p.8) and Antimicrobial-Resistant Organisms (ARO) Additional Precautions Assessment diagram (p.13).

Patients require screening swabs for CPO and/or *C. auris* if they answer "Yes" to any of the following:

1. Has the patient ever had a CPO and/or *C. auris*?
2. Has the patient had a healthcare interaction **outside of Canada** in the last 12 months? (e.g., hospitalization, emergency department visit, dental work, hemodialysis, or invasive medical procedure)
3. Has the patient had close contact with a known CPO and/or *C. auris* positive person within the past 12 months? (e.g., household member or hospital roommate).
4. Has the patient been transferred from a facility with known active CPO and/or C. auris transmission?
5. Has the patient had an overnight stay in a facility or undergone a medical and/or surgical procedure **outside of Interior Health** within the past 12 months?

If the patient meets screening criteria for questions 1-4 a single room is ***required***. If the patient meets criteria for question 5, a single room is ***preferred*** (this refers to CPO only).

NOTE: As there are different types of CPO's, patients who are known to be CPO positive must be re-tested at each hospital admission.

For patients with previous positive CPO and/or *C. auris*

- For negative screening results, there will be a comment on the lab result stating: 'Continue Contact Plus precautions in a single room with dedicated equipment. This patient has previously tested positive for CPO and/or *C. auris*'.

Additional or repeat screening may be requested by IPAC or the Medical Microbiologist.

Screening is not required for:

- Outpatient areas
- Long term Care Residents unless identified as a close contact to a positive case
- Clients in Community and Acute Mental Health

Best Practices

Additional Precautions

- In addition to Routine Precautions, Contact Plus Precautions are required for all confirmed and suspected CPO and/or *C. auris* patients with the appropriate Contact Plus Precautions signage posted outside the patient's door.
- Droplet Precautions and Contact Plus Precautions are required if CPO and/or *C. auris is* identified in a sputum culture or if the point of care risk assessment (PCRA) identifies respiratory symptoms such as a productive cough, or the patient is ventilated in the Intensive Care Unit (ICU). Post both Droplet Precautions and Contact Plus Precautions signage outside the patient's door.
- Inform Infection Prevention and Control (IPAC) of all patients with high suspicion of or confirmed CPO and/or *C. auris* in the Healthcare Setting.

Internal Alert

- An internal **MDR alert** is entered in the patient's electronic record by Infection Preventionists for all confirmed positive CPO and/or *C. auris* patients.
- An internal **EXP alert** is entered in patient's electronic record by Infection Preventionists for patients identified as exposed to CPO and/or *C. auris*.
- Special Indicators Internal Webpage

Hand Hygiene

Perform Hand Hygiene as per (AH0700) Hand Hygiene Policy

Patient Placement and Accommodation

- Patients suspected or confirmed to be positive for CPO and/or *C. auris* infection or colonization, **must** be cared for in a single room with a dedicated washroom on Contact Plus Precautions
- When a dedicated washroom is not available, a dedicated commode **must** be used
- Door may remain open
- Additional Precautions signage is placed at the entrance to the patient room, cubicle, or designated bed space (e.g., ED).
- As there are many distinct types of CPO and/or C. *auris,* it is not appropriate to cohort patients unless directed by IPAC or Medical Microbiologist.

Patient Flow/Transport

Transfers and/or bed moves should be avoided unless clinically necessary. However, the CPO and/or *C. auris* status of a patient should not prevent transfer of the individual within a facility or to another facility if medically necessary for care.

Clinical Health Care Provider (HCP)

Before transport consider/follow the 5 C's, educate, and assist the patient if necessary:

1. **C**ommunicate: notify receiving department if patient is on Additional Precautions
2. **C**o- operative: is the patient able to follow instructions
3. **C**lean hands: assist patient if required to clean their hands
4. **C**lean clothes/clean sheet: patient to wear clean gown or clothes/cover with clean sheet
5. **C**over/Contain sources:
    - Cover wounds with clean dressings
    - Contain urine/feces or other body fluids
    - Cover cough: If coughing and/or on droplet or airborne precautions place medical mask on patient (if tolerated)

Transport Health Care Provider (HCP)

Before transport:

- Clean hands and Personal Protective Equipment (PPE) as per PCRA and/or signage.
- Cover cough: if coughing or on Droplet or Airborne Precautions (mask if tolerated).
- After assisting patient, doff PPE inside patient room (if patient on Airborne Precautions, do not remove N95 respirator) and clean hands prior to transport.
- Provide clean sheet/blanket for transport.
- Thoroughly clean and disinfect equipment used for transport after each use.

During Transport:

- If a patient required assistance during transport, clean hands after contact.
- If a patient on Airborne Precautions is unable to tolerate a medical mask, consult IPAC.
- If transport assistance is needed in the new unit transport HCW to don new PPE.

Personal Protective Equipment (PPE)

- PPE to be available directly outside the patient room, cubicle, or designated bed space.
- Clean Hands and wear gloves and gown when in direct contact with patient or patient environment.
- Remove gown and gloves and discard before leaving the room or bed space and clean hands.
- Perform a PCRA prior to interacting with the patient to determine if additional PPE is required.

Patient Care Equipment

- Dedicate equipment to patients who are being screened for CPO and/or *C. auris* or known to have CPO and/or *C. auris* (e.g., vitals machines, blood pressure cuffs, commodes etc.) and introduce single-use items wherever feasible.
- Clean and disinfect equipment with a sporicidal agent between every use when equipment cannot be dedicated.
- Do not take extra supplies into patient's room
- Do not take patient chart into patient's room
- Do not take medication cart into patient's room
- Thoroughly clean and disinfect equipment used for transport with a sporicidal agent, after each use.

Cleaning and Disinfection of Patient Environment

- Patient room to be cleaned and disinfected daily and frequently touched surfaces to be cleaned and disinfected twice daily as per Environmental Services Cleaning for Carbapenems-Producing Organisms SOP.
- Environmental services (EVS) to be notified by Health care providers when patient is discharged or transferred.
- EVS to complete an **Additional Precautions Discharge Clean and Disinfection** of the room/bed space and bathroom which includes changing privacy curtains and cleaning and disinfecting or changing string/cloth call bells or light cords once the patient has been discharged or transferred (EVS Manual p109)
- Surgical Settings (OR, PAR, DCS) refer to the Surgical Practice Manual

Waste, Laundry, Dishes and Cutlery

- Use Routine Practices.

Management of Exposed Patients

The Infection Control Professional will identify potentially exposed patients to CPO and/or *C. auris* and will enter an internal "EXP alert" in patient's electronic record.

Patient(s) Potentially Exposed to a Known CPO Positive Patient

- All exposed patients must be placed on Contact Plus Precautions in a single occupancy room with dedicated toileting immediately. Consult IPAC for additional precaution requirements and for guidance on discontinuation of Additional Precautions.
- Screening cultures should be performed on day 0, 7 and 21 from the date of exposure.
- Screening consists of rectal swab (preferred) with visible fecal staining OR submit a stool specimen if rectal swab is not available. Additional specimens of other clinically relevant sites may as be requested by IPAC (e.g., open wounds, urine if catheterized, tracheal aspirate if intubated, exit sites if lines, bilateral axilla and groin)

1.1. If the patient is discharged before completing the screening series, screening must resume at the next admission and patient must have at least 2 screening cultures collected on different days, including at least one screening culture obtained 21 days or more after the last exposure.

- Contact Plus Precautions may only be discontinued after consultation with IPAC.

Patient(s) Potentially Exposed to a Known *C. auris* Positive Patient

- All exposed patients should be placed on Contact Plus Precautions in a single occupancy room with dedicated toileting immediately. Consult IPAC for additional precaution requirements and for guidance on discontinuation of Additional Precautions.
- Screening consists of a single composite swab of the patient's bilateral axilla and groin. Additional swabs of other clinically relevant sites may also be indicated (i.e.) skin folds, nares, oropharynx, external ear canal, vagina, rectal and, ostomy site swabs and will be determined by IPAC in consultation with the Medical Microbiologist.
- Serial screening (i.e., screening across multiple days) is required and will be directed by IPAC in consultation with the Medical Microbiologist.
- If the patient is discharged before completion of the recommended screening series, screening must be resumed at the next admission.
- Contact Plus precautions may only be discontinued after consultation with IPAC and the Medical Microbiologist.

Education for Patient and Visitors

- Encourage patients to perform hand hygiene before meals, after using the washroom and frequently throughout the day.
- Visitors should be educated on the following precautions:
  - Before entering room, visitors must perform hand hygiene then put on a gown and gloves.
  - Visitors must stay in the patient's room and not visit other areas of the hospital.
  - Visitors should not use patient's dedicated bathroom or commode.
  - Before leaving patient's room, visitor must take off their gloves and gown and clean their hands.
- Provide the CPO and/or *C. auris* patient handout to the patient and family (available on the Infection Prevention & Control website).

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Effective Date	February 2016		
Last Reviewed	October 2024		
Partners Reviewed			
Approved By	IPAC		
Owner	Infection Prevention and Control		
Revision History	Date	Section	Revision
	2023-03-14	All	• Addition of C. auris • Screening requirements and Additional Precautions
	2026-07-27	Management of Exposed Patients	• Modification of screening of close contacts