

# Carbapenemase Producing Organisms (CPO)

## Site Applicability

PHC Acute Care Sites

## Practice Level

*Basic: Physicians, NPs, Nursing, Clinical Nurse Leader, Clinical Site Coordinator, Bed Placement Coordinator*

## Standards

In addition to Routine Practices, [Contact Precautions](#) and a private room are required for all patients colonized or infected with CPO for the duration of their stay in hospital. [Droplet and Contact Precautions](#) will be implemented for coughing patients with CPO in the sputum.

All health care staff should follow basic Infection Control practices for patients with CPO:

- Washing hands with soap and water or using an ABHR (alcohol based hand rub) **before and after** caring for a patient.
- Remove Personal Protective Equipment (PPE) and clean hands prior to leaving the room of a CPO patient.
- Cleaning and disinfecting rooms and medical equipment.
- Whenever possible, dedicate equipment for a CPO patient.

Admitted patients who are known to be CPO positive will have a “Disease Alert” appear in the banner bar of the patient’s Cerner chart that will indicate that the patient is positive for CPO.

[Screening for AROs in acute care](#) will be conducted using the Infectious Disease Risk Screening (IDRS) form in Cerner. The IDRS will be ordered on all admitted patients and completed by the admitting RN/RPN/LPN. The RN/RPN/LPN will take swabs of patients that are identified as high risk for [ARO](#)s as identified from the IDRS ARO Risk Factors questions.

- Screening swabs for CPO organisms are routinely required for patients admitted to PHC acute care who in the last 12 months have had a household contact with known CPO or had a health care encounter outside Canada. Additional swabs may be ordered by Infection Prevention and Control depending on when the potential exposure occurred.
- Screening swab for CPO will include a rectal or colostomy site swab, with fecal staining. Perianal swabs are acceptable for NICU patients if rectal is contraindicated.
  - *If you are collecting a VRE swab at the same time, only one swab is required. You can place both the VRE and CPO labels on the same swab specimen.*

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- Contact Precautions will be ordered automatically for any patient at high risk of CPO while swab results are pending, and a private room is recommended during this time. If screening swab(s) result negative Contact Precautions can be discontinued, unless indicated for another reason.

Note:

- Repeat CPO swabs and swabs of other sites are not routinely required unless ordered by physician or directed by Infection Prevention and Control.

## Description of the Disease

Carbapenemase Producing Organisms (CPO) are multidrug resistant gram-negative bacteria including *Enterobacteriales* (e.g. *Klebsiella pneumoniae*, *Escherichia coli*), *Acinetobacter* spp. and *Pseudomonas* spp. that produce enzymes, which inactivate carbapenems (an antibiotic class of last resort). The carbapenem group of antimicrobials is a safe and generally effective treatment for severe bacterial infections when resistance to other classes of antimicrobials is present; when resistance to carbapenem occurs, there are few alternatives available. Patients can be colonized with CPO in their gastrointestinal tract. Infection due to CPO can result in high mortality.

CPO prevalence has increased worldwide, and has become endemic in many countries in Asia (e.g. India and China), Europe (e.g. Greece and Italy) and the Middle East (e.g. Israel). CPO has also been detected in the United States. Patients with hospitalization or hemodialysis outside of Canada within the past 12 months are at higher risk of CPO acquisition.

CPO transmission has been attributed to poor hand hygiene and contaminated patient equipment. Broad spectrum antimicrobial use also contributes to CPO development. Hospital outbreaks of CPO are difficult and costly to contain. Patients who are screened for CPO or have confirmed CPO colonization/infection will require a private room and Contact precautions.

## Signs & Symptoms

CPO may be recovered from stool, urine, blood, skin wounds, and the respiratory tract. Positive CPO cultures may indicate either:

- Colonization: this occurs when the organism is recovered from a patient in the absence of clinical signs and/or symptoms of infection. A common area for colonization is the gastrointestinal tract. Generally, CPO colonization is not treated, as it does not cause illness.
- Infection: this occurs when the organism enters a body site, multiplies in tissue and causes the clinical manifestations of disease (e.g., fever, draining wound or immune response).

## Incubation Period

Variable

## Period of Communicability

Variable, as CPO may be transmitted whether the patient is colonized or infected.

## Routes of Transmission

CPO can spread from one person to another through direct contact via contaminated hands or through indirect contact with contaminated surfaces and equipment.

## Populations at Risk

The primary risk factor for acquiring CPO is health care exposure in countries where these bacteria are endemic. A previous history of hospital admission, hemodialysis or medical/surgical procedure at a health care facility outside of Canada and/or facilities known to have a CPO outbreak are at increased risk of acquiring CPO.

# Assessment and Intervention

## Infection Control Precautions

- **Additional Precautions:** In addition to Routine Practices, [Contact Precautions](#) and a private room will be implemented for all patients with CPO. This includes previously known patients who were positive and newly identified patients. [Droplet and Contact Precautions](#) are indicated if the patient is coughing with CPO in the sputum. The Infection Control Practitioner will flag the patient care record on the Cerner system for all patients known to be colonized or infected with CPO. The ward/unit nurse will ensure the appropriate Additional Precautions are ordered in Cerner and post the appropriate sign(s) on the door.
- **Hand Hygiene:** Hands should be cleaned before and after every patient contact, as well as after touching potentially contaminated items in the environment (i.e. commodes). Using an alcohol based hand rub solution is preferred if hands are not visibly soiled. Encourage and assist the patient to perform hand hygiene.
- **Patient Placement:** Required accommodation in acute care for patients with CPO is a single room with a dedicated toilet and patient sink. The door may remain open. Patients with CPO cannot be cohorted with other patients who are also infected with CPO. If a private room is not available, please refer to the [Patient Placement](#) Guidelines and contact IPAC.
- **Equipment:** Dedicate equipment whenever possible. Clean and disinfect equipment thoroughly if using between different patients. Clean commodes regularly and wipe touchable surfaces (armrest, seat and back) with disinfectant wipes between uses.
- **Environment:** All high-touch surfaces in the patient's room and bathroom must be cleaned and disinfected twice daily. Keep the room free of clutter. Following discharge of the patient, the room should have a terminal clean carried out prior to the next patient being admitted.
- **Visitors:** Education should be provided regarding hand hygiene, and visitors must perform hand hygiene before entry and on leaving the room. PPE (gown and gloves) is not required unless the visitor is providing [direct care](#).

- **Patient Transport:** The patient will remain in their room unless absolutely necessary. When the patient is required to leave the room for diagnostic or rehabilitative purposes:
  - Notify receiving department prior to transport of the precautions in place.
  - Encourage and/or assist patient to clean their hands.
  - Cover open wounds and/or lesions with a clean dressing as per Routine Practices, efforts will be made to contain body substances with leak proof garments.
- **Unit Screening:** When a patient with CPO has been admitted to an inpatient unit for greater than one week, Infection Prevention and Control will coordinate unit-wide CPO screening for all patients who have been admitted for at least 7 days. Follow-up unit screening may be requested by Infection Prevention and Control for patients with CPO who have prolonged admissions. Contact Precautions are not required for patients being screened during unit prevalence testing, unless already implemented for another reason.
- **CPO Exposures:** In the case of potential exposure to a patient with known CPO, Infection Prevention and Control will order 3 post-exposure CPO swabs for identified contacts - one at time exposure identified, one swab 7 days later, and a final swab 21 days after the first swab. Contact Precautions are required until final CPO swab results negative or the patient is discharged, whichever occurs first.

### Lab Testing

- Screening swab for CPO will include a rectal or colostomy site swab, with fecal staining. Perianal swabs are acceptable for NICU patients if rectal is contraindicated.
- Lab will send a notification to the unit when a specimen results positive for CPO.

### Treatment

- Patients with CPO infections are typically managed by the Infectious Diseases consult service in collaboration with the Medical Microbiologist.
- There are no clinically proven methods of decolonization for CPO.
- Usual wound care protocols will be followed. Intact skin around a wound or insertion site may be cleansed with an antimicrobial agent (i.e. aqueous chlorhexidine, Hibidil, Baxedin).

### Transfer/Discharge Planning

- Notify the receiving facility, hospital, nursing home or community agency involved in the patient's care of their status.

### Outbreak Management

- Direction will be provided to the unit/hospital staff, should the Infection Control Practitioner/Physician determine there is an outbreak of CPO.
- Environmental testing is not routinely recommended. In selected situations, this may be done under the direction of the Medical Microbiologist and the Infection Prevention and Control Team.

## Documentation

- Complete IDRS form on admission.
- Ensure order for Contact Precautions is in patient's Cerner chart and Disease Alert for CPO is present in Cerner banner bar.

## Patient and Family Education

- [Patient Health Education Materials](#)

## Related Documents

- [B-00-07-13029](#) - Contact Precautions - Infection Control
- [B-00-07-13079](#) - Droplet and Contact Precautions - Infection Control
- [B-00-07-13001](#) - Antibiotic Resistant Organisms Screening - Acute Care
- [B-00-07-13087](#) - Patient Placement Guidelines - Infection Control

## References

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## Definitions

**Antimicrobial-resistant organisms (AROs)** - A microorganism that has developed resistance to the action of several antimicrobial agents and that is of special clinical or epidemiological significance (e.g., MRSA, VRE, ESBL, CPO).

**Direct care** - Providing hands-on care, such as bathing, washing, turning the patient, changing clothing, continence care, dressing changes, care of open wounds/lesions or toileting. Feeding and pushing a wheelchair are not classified as direct care.

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