Carbapenemase-Producing Organisms (CPO)

15.5G

GUIDELINE

Guidelines are recommended actions allowing for professional judgement

island health

Purpose:	Management of patients/residents/clients who are colonized and/or infected with a Carbapenemase-producing organism (CPO) in clinical settings in accordance with PICNet BC *Toolkit for the Management of Carbapenemase-Producing Organisms*. For more about CPO, see Appendix A: Background on Carbapenemase-Producing Organisms (CPO).
Scope:	Direct clinical care staff, clinicians and clinical support staff in all programs and services across Island Health.
Outcomes:	Provide safe and effective care for patients/residents/clients and prevent the transmission of CPO.

1.0 Guideline

1.1 Screening/Risk Assessment

An Island Health Antibiotic Resistant Organism (ARO) Screening Questionnaire is completed for all inpatients admitted to acute care. An inpatient admission is defined as greater than 24 hours.

In Island Health, high risk for CPO is defined as having had the following in the past 12 months:

- An overnight stay in a hospital off Vancouver Island/Gulf Islands.
- Received hemodialysis in a facility off Vancouver Island/Gulf Islands.
- A surgical or medical procedure outside of Canada.
- A direct transfer from a newly identified outbreak area as communicated in the CPO investigation notification.

Additionally, a patient/client with known or possible exposure to a CPO positive patient should be treated as high risk.

1.1.1 All Inpatient Units

Use the ARO Screening Questionnaire for:

- All patients admitted to acute care inpatient units as part of their admission assessment.
- All patients transferred from hospitals outside of Island Health.
- Patients admitted to the hospital through the surgical program.

1.1.2 Emergency

If an admitted patient is still in the Emergency Department, staff should complete swab collection within 24 hours, when possible. It is preferable for the swab to be collected prior to the initiation of antibiotic therapy.

1.1.3 When Screening is Not Required

Screening is **NOT** required for:

- ER patients, who are not admitted.
- Out-patient areas (e.g. Surgical Day Care, Post Anesthetic Recovery Room, Endoscopy, Chemotherapy etc.).
- Long Term Care residents.
- Clients in Community/Mental Health care.

1.2 Swab and Specimen Collection

1.2.1 Antibiotic Resistant Organism Screening Questionnaires

Collect swabs within 24 hours of admission if there is an existing ARO alert for CPO and/or if the patients/residents/clients answers yes to any question on the ARO screening questionnaire (CPO screen). Immediately place the patient on Contact Precautions and add Droplet Precautions if respiratory symptoms are present (e.g. cough) with priority for a private room, as directed on the screening form.

1.2.2 CPO Screen Collection

If directed by the ARO Screening tool, collect the following routine specimens and request CPO testing on the requisition[1] (use a separate swab for each site):

- Rectal swab: ensure stained with feces OR
- Stool sample (if it is not possible to obtain a rectal swab).
- Urine (if indwelling catheter): C&S container.
- Sputum (if coughing): C&S container.
- Sputum ETT: C&S container.
- Ostomy/colostomy swab (if applicable): ensure stained with feces.
- Open wound/s (if applicable): if evidence of infection, in addition to surveillance swabs, appropriate clinical samples should be obtained.

Collect additional clinical specimens for diagnosis and treatment decisions, as ordered by a physician.

1.2.3 NICU

Newborns/neonates: rectal swab, urine, and sputum specimens should be collected when they have had a hospital stay of more than 24 hours off Vancouver Island /Gulf Islands.

1.2.4 Neonates/ Pediatrics

Neonates admitted to pediatrics should be screened using the Neonatal Screening Tool.

1.2.5 Laboratory Link for CPO specimen collection

Use Collection Instructions for Routine Microbiology Culture Using the Single eSwab for appropriate CPO specimen collection device.

1.3 Management of Patient/Resident/Client with Suspected or Confirmed CPO

In addition to routine practices, further measures are required to prevent the spread of CPO whether a person is colonized or infected (see Appendix B: Management of Patient/Resident/Client with CPO).
Patients/residents/clients identified as CPO positive or assessed as high risk and flagged as such on their Electronic Health Record (EHR) should be placed on appropriate precautions as outlined below.
Diligent hand hygiene is the most effective way to prevent transmission between other patients and/or staff. Alcohol-based hand rub (ABHR) is effective against these organisms.

1.3.1 Patient Education

- Education should highlight the importance of hand hygiene and not sharing of personal items. Also include understanding the difference between colonization and infection.
- Visitors should be provided with education on the proper use of PPE.
- Health Link BC CPO File.

1.3.2 Electronic Health Record

- The EHR system will create automatic orders to place the patients/residents/clients on Contact Precautions when they have an existing CPO alert or when there is a new CPO positive result. The precautions status will appear in the patient banner across the top.
- The IPAC team will identify and follow patients who have been close contacts (exposed) of a patient who is colonized, or has an active infection with CPO. Exposed patients will have an alert placed in their EHR in the banner bar identifying a "Possible ARO Exposure". These patients should be placed on additional precautions until otherwise directed by IPAC.

1.4 Acute Care

	Steps
Additional Precautions	Contact Precautions are initiated for: • All known and newly diagnosed patients with CPO infection or colonization. • Those patients as identified on the admission screening. • Any patient identified as having an exposure to a patient with known CPO. Additional Droplet Precautions are required for any patient that present: • Presenting with a new or worsening cough. • Is ventilated. • Has a sputum specimen confirmed as CPO.

	Steps
Accommodation	• Patients with confirmed CPO require a private room with priority over all other IPAC concerns (e.g., C. difficile, MRSA, diarrhea not yet diagnosed), except those requiring Airborne Precautions within an airborne isolation room. • If a private room is not available, consult with your Infection Control Practitioner (ICP) or Medical Microbiologist (MM) regarding placement or cohorting decisions (a semi-private room with a blocked bed would be an alternate). • While cohorting is not preferred, in situations where cohorting is unavoidable, do not cohort with patients who are positive with a different ARO (e.g. ESBL) or have other high risk factors, i.e. invasive devices, draining wounds, immunocompromised, incontinence, intubation, unable to maintain their own personal/hand hygiene, etc. • Management of CPO exposed patients: Discuss with ICP and MM regarding cohorting decisions.
Personal Hygiene	• Patients must wash at their bedside or in the bathroom/shower at a pre-arranged time. ○ Bath or shower room will require an appropriate terminal clean after use. • Patients in multibed rooms should not use a shared bathroom.
Equipment and Supplies	• Equipment should be dedicated to the patients: ○ All reusable equipment that cannot be dedicated must be cleaned and disinfected appropriately immediately after use and upon exit of the patient bed space. ○ Limit patient supplies and equipment in the room.
Environmental Cleaning	• IPAC will send a requisition for "Precaution Plus" housekeeping for patients/clients with confirmed CPO. • Additional high touch twice daily cleaning for the patient zone/bathroom/unit as determined by IPAC.
Dishes, Laundry and Waste	• Routine Practices apply for all patients/residents/clients and no special treatment of dishes, laundry, or waste is required.
Mobility and Activities	The patient: • May be out of the room for tests, mobilization or rehabilitation. • Shall wear clean attire, have any wounds covered with fresh dressings and perform hand hygiene on exiting and re-entering their room. • Is NOT expected to wear a precaution gown or gloves. They should not visit other patients/residents/clients in their rooms and are discouraged from visiting public areas within the facility (unit kitchen, cafeteria, shops). • Is encouraged to frequently perform hand hygiene when out of room and between activities/areas. • May participate in activities, exercise and/or mobilization will not be impeded if a patient is colonized with CPO and the patient is compliant with hand hygiene. For all patients with infected wounds and/or respiratory infections, please consult IPAC.

1.5 Special Populations

	Steps
Transitional and Rehabilitation Care	• Patients with CPO admitted to transitional care units/rehabilitation units are required to have a dedicated commode regardless of whether the unit is located in long term care or acute care.

ICU	• Currently, patients transferred to ICU from other units within Island Health will not require routine CPO screening on admission, weekly, or on transfer or discharge from ICU.
	• If patient transferred from a facility outside of Island Health, CPO screening/risk assessment should be completed using the ARO Screening tool and appropriate specimens sent to the lab.
	• If a patient/client admitted to ICU tests positive for CPO:
	  ○ Obtain initial CPO prevalence screening for all patients on the unit.
	• While the positive patient remains in ICU screen:
	  ○ All ICU patients weekly for CPO.
	• All remaining and transferred patients weekly until 21 days after their last exposure (on day 1, 7, 14 & 21).
	• All patients who were exposed before precautions were implemented for the index case should be placed on additional precautions until their CPO screening is completed. After precautions have been implemented on the index case, newly admitted patients to ICU require CPO screening only and do not require additional precautions.
	• Request Precaution Plus environmental cleaning for the unit.
	• All patients discharged to another unit during screening will be placed on Additional Precautions in a private room where possible.
	Contact screening requirements will be evaluated by IPAC on a case-by-case basis.

Perinatal/NICU	• Patient with CPO Alert: Additional Precautions are required for mother and baby for the duration of admission. However, the mother may use Routine Practices for contact with the infant such as breastfeeding or skin to skin contact. ○ Send a Precaution Plus environmental cleaning request for the patient's space. • If CPO screening is required the mother and baby will be placed on Additional Precautions until screening results are reported as negative. • For all NICU patients whose mother has suspected or confirmed CPO, staff should use Contact Precautions for the mother and baby. However, the mother may use Routine Practices for contact with the infant such as breastfeeding or skin to skin contact. • NICU and (neonate) admissions: Use the Neonatal Admission form (Neonatal ARO Screener).
Renal Hemodialysis	• Routine screening of community and home hemodialysis patients/clients is not required. • Patients/clients who have had hemodialysis treatments outside of Island Health within the last 12 months will be:

	Steps
	○ Screened once on their return to Island Health dialysis OR if admitted to an Island Health acute care unit. ○ Placed on Additional Precautions until the screening results are reported as negative. • Visiting hemodialysis patients/clients from outside Island Health will be asked to provide results from a CPO screen, completed not more than one month before their first run in Island Health. • Visiting hemodialysis patients who are coming from an area with a CPO outbreak/ongoing transmission will require additional precautions while on the unit and CPO screening.

1.6 Long-Term Care

	Steps
Management	• A resident's ARO status should have no bearing on whether they are admitted to a residential care facility. Admission should not be denied or delayed by a residential care facility on the basis that a client is confirmed colonized or has CPO infection. • Screening for CPO is not required on admission to Long Term Care. • Residents colonized with a CPO: ○ Do not require a private room or a dedicated commode. ○ Do not required Additional Precautions. ○ Do not require any special linens, housekeeping or food service practices. • Routine Practices for handling soiled materials are required. • Residents may eat in the communal dining room and participate in all social activities and programs, unless on Additional Precautions. • Encourage good hand hygiene and general hygiene with the resident with assistance as needed. • Staff must use Routine Practices to prevent contact with body fluids, as with all residents. • Residents with a CPO infection ensure: ○ Appropriate use of PPE. ○ Must have a dedicated bathroom or commode. ○ Residents from acute care admissions who have a CPO test pending require Contact Precautions until confirmed negative, or confirmed CPO colonization only. ○ No further screening is required while in Residential Care. ○ Refer to: Memorandum to All Residential Care Facilities 2015.
Accommodation	• Placement preference is single room. • Do not cohort with residents who are positive with a different ARO (e.g. MRSA). • Do not cohort with residents who are positive with a different ARO or have other high risk factors, (i.e. immunocompromised, extensive/complex wounds) or who require extensive hands on care.

PPE	• When the resident has evidence of an active CPO infection Contact Precautions are required for direct contact with the resident and their physical environment.
	• A mask with visor should be worn if the resident has respiratory considerations:
	  ○ Presenting with a new or worsening cough.
	  ○ Is ventilated.
	  ○ Has a sputum specimen confirmed with CPO.
	• Gloves are not required for bathing activities, but may be worn if indicated following a point of care risk assessment (broken skin on hands, or evidence of active infection of resident).
	• Additional Precautions are required for a CPO infection.

1.7 Community Care

	Steps
Management	• Routine practices including excellent hand hygiene are essential. • Open wounds should be covered with a clean dry dressing prior to a resident participating in recreational activities. • In group homes/assisted living, a person's ARO status is confidential and changes to the home are not required. • PPE is only required for direct client care (e.g. wound care, invasive medications) from health care providers, and not for home support services (cleaning, routine activity of daily living such as oral medications). • Clean and disinfect any equipment that has direct contact with a client and /or their environment, including the nursing bag. Only bring in the supplies required for that client into the home.
Visitors To All Island Health Facilities	• There are no restrictions specific to CPO on visiting provided visitors of residents are not acutely unwell (e.g. influenza-like illness, gastro-intestinal symptoms). • Visitors must be directed to wash their hands with soap and water or use alcohol based hand rub on entering and leaving the resident room and the facility. • Visitors are to use gown and gloves in addition to hand washing only if they are providing close personal care. Guidance must be given by the Most Responsible Nurse. • Visitors should be advised not to visit any other resident(s).

1.8 Transport and Transfers

When transferring patients/residents/clients for appointments off the unit, personnel in the receiving unit or facility should be advised of additional precautions or ARO status.

	Steps
Patient/Resident	No PPE is required for Contact precautions; mask without visor only for Droplet Precautions.

Porter	• Should a porter be required to assist the patient into stretcher/wheelchair, the porter should don appropriate PPE when entering the room. • PPE is not required during transport. • If required and the patient/resident/client is unable to wear a mask then a surgical mask with visor must be worn by the porter.
Transport & Transfer staff	The need for patient/resident/client precautions should be communicated to transport staff as part of transfer of care. • The patient/resident/client should wear clean clothes between facility transfers. • Patient/resident/client to wear mask if able when they have respiratory symptoms. • Transport staff will wear: ○ Masks/face shield if patient has respiratory symptoms. ○ Gown and gloves if providing patient care. ○ Appropriate hand hygiene Provide resources so the cleaning and disinfection of all equipment and kits used, and all surfaces touched in the vehicle by patient and crew are possible.

1.9 Contact Tracing of Exposed Patients

In cases where a patient has a new lab confirmation of CPO, tracing of all other patients/residents/clients that may have been exposed through close contact with this patient may be requested by IPAC. All patients exposed during this patient's current admission should be placed on Contact Precautions and screened once weekly for 21 days following the last known exposure and IPAC should be consulted with regard to bed placement. The ICP will add an alert of "Possible ARO Exposure" to patient's EHR.

The number of contacts affected will vary depending on size of unit:

- High Acuity Areas (ICU, HAU, NICU, NICU): Complete unit.
- Medical/surgical unit: all patients in that room (4 bed room, 3 bed room, 2 bed room).

Consult IPAC on a case by case basis. Environmental sampling may be considered and performed by IPAC.

	Steps
Screening Patients after exposure to CPO	• Screen patients/clients who have been in close contact/exposed to a patient/client with a positive CPO. • If the exposed patient is having ongoing close contact with a patient who is confirmed • CPO positive, screen patient(s) weekly **(day 0, 7, 14, 21)** • If patient is transferred to new unit, screen: ○ Baseline at time of last exposure to CPO patient **(Day 0)**. ○ Day **7, 14, 21** after the last exposure, or first screen, whichever comes later (if still an inpatient).

	• If exposed patient is discharged before all 4 swabs are collected at day **21** and readmitted within 12 months then one additional CPO swab will be collected. If CPO screen is negative then the "Possible ARO Exposure" alert will be removed from EHR and no further screening will be required.

1.10 IPAC practices at Discharge and Re-Admission

	Steps
Same Admission	• If a patient is confirmed as being colonized or infected with a CPO, or results are still unknown, Contact Precautions should continue for the duration of the hospitalization during which the CPO was isolated, or until cleared by IPAC.
Readmission	• If a patient is confirmed as being colonized or infected with a CPO during a previous admission, that patient should be rescreened for CPO on new admission and placed on Contact Precautions until results of screening cultures are known and negative.

1.11 Discontinuing Additional Precautions

Please consult with IPAC before discontinuing precautions.

1.12 Addition/Removal of Disease Alert

If patient is assessed as meeting the criteria for CPO alert removal/discontinuation of precautions please consult IPAC:

- The disease alert is activated by Infection Prevention and Control at the time of a positive CPO culture result.
- The disease alert is a confidential way to notify health care providers that Additional Precautions are required during health care encounters to prevent transmission of AROs.

2.0 Definitions

- **Additional Precautions**: Interventions implemented for certain pathogens or clinical presentations in addition to routine infection control practices, to reduce the risk of transmission of microorganisms from patient to patient, patient to HCP, and HCP to patient.
- **Antibiotic Resistant Organisms (ARO):** Microorganisms that are resistant to one or more classes of antibiotics. Some of these organisms have the ability to cause serious health issues, while others rarely seem to cause infections.
- **Carbapenemase-producing Organism (CPO)**: Gram negative bacteria with carbapenemase producing genes. Examples include: Klebsiella pneumonia_carbapenemase (KPC), metallo-beta-lactamases in P. aeruginosa and Acinetobacter spp. NDM-1, OXA-48, VIM, IMP.
- **Client:** Refers to any individual receiving care in an outpatient, home or community care setting.
- **Client: Close Contact**: A household member or a roommate in an acute care setting (greater than 24 hours). In high risk units such as transplant units, ICU, etc. close contacts may constitute all patients in the unit.

- **Cohort**: The sharing of a room or ward by two or more patients/residents who are either colonized or infected with the same microorganism; or the sharing of a room or ward by colonized or infected patients/residents who have been assessed and found to be at low risk of dissemination, with roommates who are considered to be at low risk for acquisition.
- **Colonization**: The presence, growth and multiplication of an organism in one or more body sites without observable clinical symptoms.
- **Electronic Health Record**: The electronic chart where patient information is entered and maintained in Island Health
- **High Acuity Unit:** A High Acuity Unit (HAU) is part of the critical care continuum and provides an intensity of care that is intermediate between that of a ward/unit level care and the Intensive Care Unit (ICU).
- **Infection**: Occurs when microorganisms invade a body site, multiply in tissue and cause clinical manifestations of local or systemic inflammation (e.g. fever, redness, heat, swelling, pain).
- **Patient:** Refers to any individual receiving care in an acute care setting.
- **Resident:** Refers to any individual residing in a long-term care facility.
- **Routine Practices**: a set of infection control strategies and standards designed to protect workers and patients/residents/clients from exposure to potential sources of infectious diseases.

3.0 References

- Healthlink BC CPO Document. Retrieved on 16 Aug 2019: Carbapenemase-producing Organisms (CPO) | HealthLink BC
- Health Canada. (2012). Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings. Retrieved on 16 Aug 2019: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/routine-practices-precautions-healthcare-associated-infections/part-c.html#C
- Island Health Laboratory- Non Blood Collection Process.
- World Health Organization. 2017. Guidelines for the Prevention and Control of Carbapenem-Resistant Enterobacteriaceae, Acinetobacter baumannii and Pseudomonas aeruginosa in Health Care Facilities. Retrieved on 16 Aug 2019: https://www.ncbi.nlm.nih.gov/books/NBK493061/

4.0 Resources

- BC Renal Hemodialysis Committee Carbapenemase Producing Organisms (CPOs) for Hemodialysis Outpatients
- Island Health Antibiotic Resistant Organisms (ARO) Screening Questionnaire for Adults[1]
- Island Health Antibiotic Resistant Organisms (ARO) Screening Questionnaire for Neonates
- Island Health CPO Surveillance Manual 2019[4]
- Island Health Discontinuing Additional Precautions: Adult
- Island Health Discontinuing Additional Precautions: Pediatrics
- Island Health Environmental Cleaning Guideline
- Island Health Managing Food Delivery
- Island Health Personal Protective Equipment (PPE) for Patient Transport

- Provincial Infection Control Network of British Columbia (PICNET BC) Surveillance Protocol for Carbapenemase Producing Organisms (CPO) in British Columbia 2019[2]
- Provincial Infection Control Network of British Columbia (PICNET BC) Carbapenemase Producing Organisms (CPO) Toolkit 2018[3]

Appendix A: Background on Carbapenemase-producing Organisms (CPOs)

The term carbapenemase-producing organisms (CPOs) refers to a group of predominantly enteric bacteria with genetic resistance to broad-spectrum antibiotics, including the carbapenem family of drugs which are considered one of the antibiotic treatments of last resort. Examples of multi drug resistant bacteria that can be a CPO include *Klebsiella, Escherichia coli (E.Coli), Enterobacter, Acinobacter and Pseudomonas.*

Carbapenemase producing organisms present a patient safety concern and in 2014 the Ministry of Health mandated surveillance of CPO cases across all acute care facilities in BC.

CPOs can survive on/in body sites, predominantly in the gastrointestinal tract, without causing infection, which is known as colonization. CPO infections can be associated with the urinary tract, lungs or bloodstream.

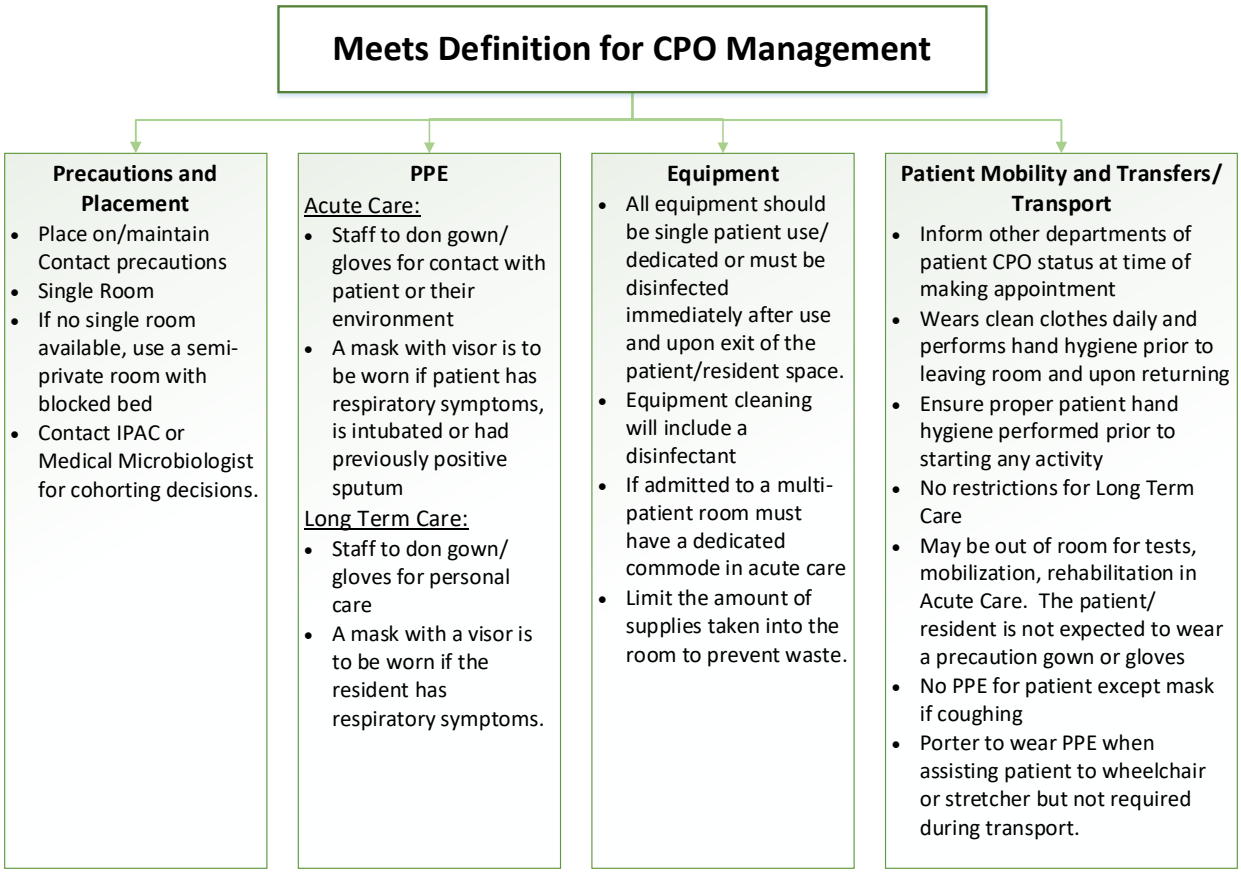
CPOs are transmitted from person to person by direct and indirect contact through the use of contaminated equipment shared between patients. Droplet transmission should be considered for patients with respiratory symptoms.

The morbidity and mortality associated with infections, especially health care associated, due to carbapenemase producing organisms (CPO) is a cause of major global concern.[3]

Appendix B: Management of Patient/Resident/Client with Carbapenemase-Producing Organism

A patient/resident/client is counted as a case for CPO (Carbapenemase Producing Organism) if the following apply:

- Laboratory identification of CPO.
- A newly identified case of CPO either infection or colonization at the time of hospital/residential care admission or identified during hospitalization/residential care.
- Has a CPO Alert on the EHR.



Environmental Cleaning

- Send a requisition for "Precaution Plus" clean for patients/residents/clients with confirmed CPO.
- Additional high touch twice daily cleaning for the patient zone/unit as determined by IPAC.
- Cleaning will be upgraded to include a disinfectant.
- Terminal clean is required after bathing in communal shower or tub.