PICNet
PROVINCIAL INFECTION CONTROL NETWORK OF BRITISH COLUMBIA
A program of the Provincial Health Services Authority

BC Centre for Disease Control
AN AGENCY OF THE PROVINCIAL HEALTH SERVICES AUTHORITY

Surveillance Protocol for Carbapenemase-Producing Organisms & *Candida (Candidozyma) auris* in British Columbia

Revised May 2026

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Acknowledgements

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- Provincial Infection Prevention and Control Surveillance Working Group (IPC SWG)
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Land Acknowledgement

PICNet wishes to acknowledge with gratitude that we work and live on the traditional, ancestral and unceded territories of many B.C. First Nations who have cared and nurtured this land for all time. PICNet's office in Vancouver is located on the traditional land of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations. We also acknowledge that there are other Indigenous people that live on these lands that originate from their own respective territories outside of these lands, the Chartered Communities of the Métis Nation B.C., and Inuit.

Summary of Changes: 2025 to 2026

SECTION / TOPIC	CHANGE TYPE	2026 PROTOCOL
Land Acknowledgement	New section	Added after Acknowledgements, recognizing BC First Nations territories, Métis Nation BC, and Inuit
Introduction	New section	Preamble replaced with structured Introduction covering CPO and *C. auris* background, BC surveillance history, and PICNet's CPO Action Plan (new) Updated to 19 confirmed *C. auris* cases in BC since surveillance began
Protocol scope	Revised	New structured scope statement with surveillance activity bullets
Objectives	Language refinement	'Incident cases' added to objective a; objective b adds 'newly identified' and includes infections within one year of colonization for CPO only; objective d updated to 'integrate' data
Surveillance population and screening for CPO and *C. auris*	Revised	Minor wording refinements throughout; new bullet added under admission/intake screening swabs to capture health authority-defined high-risk individuals at the time of their health-care service visit CPO and *C. auris* screening sections focus on surveillance expectations, not procedures - Specimen collection details moved to Appendix A
Case identification and confirmation for CPO and *C. auris*	Language strengthened	'Should' to 'Must' for PHL submission; requisition forms listed separately by organism
CPO and *C. auris* case definitions	Restructured	Both definitions reorganized with new subheadings for clarity; *C. auris* definition clarified that subsequent isolates from the same patient are the same case regardless of colonization/infection status
Exposure Status Classifications for CPO	New section	New standardized classification framework: HA-YAF, HA-YAF Newborn, HA-YLTCF, HA-OTHER IN BC, HA-OTHER OUTSIDE BC, and CA
Case reporting for CPO and *C. auris*	Restructured	New subsections distinguish acute care and community pathways; community reporting explicitly limited to CPO only

SECTION / TOPIC	CHANGE TYPE	2026 PROTOCOL
New cases in acute care settings	New	New bullet clarifying that repeat samples or re-screening of patients with a known CPO history should not be submitted for provincial surveillance reporting if the same gene is detected again
Transmission investigation and notification	Restructured	Sections 8–11 consolidated into two sections (Transmission investigation; Notification of ongoing transmission investigation) with unified subsection for resolved investigations covering both organisms
Appendix A	Added	Moved specimen collection details (swabs, anatomic sites) to Appendix A
Appendix B (formerly A): Laboratory Interpretive Criteria	Revised	Scope of organisms requiring further carbapenemase investigation expanded to include *Shigella*, *Salmonella*, and non-enterobacterales, as outlined by CLSI M100 ED36:2026. Breakpoint table removed and replaced with reference to CLSI M100 ED36:2026. Submission pathway clarified: if local testing is available, submit CPO isolates to PHL for whole genome sequencing. Reference updated to 2026 CLSI interpretive criteria (M100, 36th ed.).
Appendix D (formerly C): Surveillance Form	Extensively revised	Extensively revised: questions restructured, Q10–Q13 removed, and new questions added for CPO exposure classification (Q10), mode of transmission for health care-associated cases (Q11), location for HA-OTHER OUTSIDE BC (Q12), and newborn birthing parent CPO status (Q13). Patient status field expanded from 2 to 4 options. Clinical status question renamed and updated throughout.
Appendix E (formerly D): Infection Form	Revised	'Addendum' removed from title; preamble restructured as 'Complete this form if:' with two explicit conditions; Q1 organism field, Q2 identifier format, Q3 patient status, and Q4/Q5 labels updated to match Appendix C; Q6 date field clarified as based on collection date; Q8 ICU and Q9 outcome questions reworded with explicit 30-day timeframe and loss-to-follow-up language
Appendix F (formerly E): Notification Form	Minor revisions	Title shortened; date fields reformatted with slash separators; footnote added

SECTION / TOPIC	CHANGE TYPE	2026 PROTOCOL
Appendix H (formerly G): Enhanced Surveillance Form	Revised	*C. auris* removed from title and throughout; Q1 organism limited to CPO only; Q3 renamed 'Clinical status of the current positive case' with 'Unable to determine' option; Q4 date label clarified; Q5 care setting question updated to ask where patient was 'first identified'

Abbreviations

BC	British Columbia
BCCDC	BC Centre for Disease Control
BCAMM	British Columbia Association of Medical Microbiologists
CA	Community-Associated
CDC/NHSN	Centers for Disease Control and Prevention / National Healthcare Safety Network
CLSI	Clinical and Laboratory Standards Institute
CNISP	Canadian Nosocomial Infection Surveillance Program
CPO	Carbapenemase-Producing Organisms
ED	Emergency Department
HA-YAF	Health care-Associated, acquired in Your health authority's Acute care Facility
HA-YLTCF	Health care-Associated, acquired in Your health authority's Long-Term Care Facility
HA-OTHER, IN BC	Health care-Associated, acquired from another health-care exposure in British Columbia
HA-OTHER, OUTSIDE BC	Health care-Associated, acquired from another health-care exposure outside British Columbia
ICP	Infection Control Practitioner
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
LTC	Long-Term Care
MHO	Medical Health Officer
MMB	Medical Microbiology
PHL	Public Health Laboratory
PHSA	Provincial Health Services Authority
PICNet	Provincial Infection Control Network of British Columbia
WGS	Whole Genome Sequencing
C. auris	*Candida* (*Candidozyma*) *auris*

Introduction

Carbapenemase-producing organisms (CPOs) are bacteria that produce enzymes capable of breaking down carbapenems, which are broad-spectrum antibiotics often considered a last line of defense against drug-resistant infections. Since their emergence in 2008, CPOs have become a global threat to patient safety, particularly in health-care settings where individuals may be at higher risk due to comorbidities, medical procedures, or prolonged hospitalization.

In British Columbia (BC), the first travel-related and BC health care-associated cases led the Provincial Health Officer to make acute care-identified CPOs reportable in July 2014. This triggered the launch of a mandatory provincial CPO surveillance program coordinated by the Provincial Infection Control Network (PICNet), in collaboration with health authority infection prevention and control (IPC) programs, medical microbiology laboratories, and the BC Center for Disease Control's Public Health Laboratory (PHL). In 2016, reportability expanded to include community-identified cases, and there were protocol updates in December 2017.

*Candida (*Candidozyma*) auris* (*C. auris*), a multidrug-resistant yeast first identified in Japan in 2009, has similarly raised concern due to its potential for health care-associated outbreaks and resistance to multiple of antifungal classes. Canada reported its first *C. auris* case in 2017, since then there has been a rapid increase of cases in health-care facilities in Canada and the United States. In response, *C. auris* became reportable in BC in September 2018, with surveillance of laboratory-confirmed cases and transmission event reporting integrated into PICNet's protocol alongside CPO. There has been a total of 19 confirmed *C. auris* cases in the province, including a health care-associated cluster, since surveillance began.

Although microbiologically distinct, CPO and *C. auris* are addressed together in this surveillance protocol because they share key surveillance characteristics, including targeted, risk-based screening; an emphasis on early detection of colonization; and collection of exposure and risk-factor information to support assessment of importation and health care–associated transmission.

The provincial surveillance program, built on a foundation of strong partnerships, standardized data collection, and evolving health priorities, enables data sharing and coordinated action. Surveillance activities at the health authority and/or provincial levels include patient screening, laboratory testing and subtyping, and integration of epidemiologic and genomic data to inform IPC measures. An ongoing process of review and consultation with partners informs updates to the provincial

CPO protocol, supporting continuous improvement in surveillance practices, case definitions, and implementation. This includes both routine annual reviews and broader provincial discussions with a wide range of partners, such as the 2018 provincial CPO working group and the 2023 and 2024 CPO Symposiums.

An important provincial initiative emerging from the 2023 Symposium was the development of a Provincial CPO Action Plan. Created by PICNet in partnership with health authorities, the Ministry of Health, BCCDC, and other partners, the plan outlines strategic goals and a coordinated roadmap for 2024-2028. It addresses the growing public health risk of CPO by strengthening surveillance, enhancing IPC guidance, advancing genomics integration, and promoting knowledge translation across the health system.

Protocol

This protocol establishes the minimum requirements for provincial surveillance of CPOs and *C. auris*. It sets standards for identification, data collection, and reporting in both acute and community care settings, and outlines processes for notification of transmission events in health-care facilities.

Surveillance activities include:

- Identification and reporting of CPO cases across acute and community care settings, including the detection and notification of ongoing transmission events.
- Identification and reporting of *C. auris* cases in acute care facilities, including ongoing transmission events.
- Integration of epidemiologic and laboratory data with genomic information generated by the BCCDC PHL to support surveillance interpretation and understanding of organism and strain distribution in BC health-care facilities.

The protocol provides a framework for consistent data collection, enabling coordinated provincial surveillance.

Objectives of Surveillance for CPO and *C. auris*

- To identify and monitor incident cases of CPO and *C. auris* colonization and/or infection across the province
- To examine the epidemiology of individuals newly identified with CPO or *C. auris* colonization or infection, and, for CPO only, infections occurring within one year of CPO colonization
- To describe the molecular characteristics of CPO and *C. auris* organisms identified through surveillance, including carbapenemase types and genetic lineages.
- To integrate epidemiologic and laboratory data to inform best practices for infection prevention and control and to support optimal patient care

Surveillance population and screening for CPO

Population under surveillance

Provincial CPO surveillance includes all individuals in BC who are identified as having a CPO through screening, clinical, or contact-tracing specimens collected as part patient care and IPC activities.

For surveillance purposes, CPO cases are defined within individuals based on identification of a carbapenemase gene. Multiple positive specimens collected from the same individual (for example, repeat screening swabs or clinical specimens) are considered part of the same surveillance case if the same carbapenemase gene is identified, and are not counted

again. If a different carbapenemase gene is later identified in the same individual, this constitutes a new surveillance case, in accordance with the eligible CPO case definition.

If an individual initially identified as colonized with CPO subsequently develops a CPO infection within one year of initial identification, this progression is reported for surveillance purposes to support monitoring of clinical outcomes but does not constitute a new surveillance case.

All CPO cases identified in BC are included in provincial surveillance activities. The following populations will be asked CPO screening questions at the time of admission or health-care service visit:

- Patients admitted to acute care facilities
- Individuals at high risk of CPO acquisition, as defined by the health authority (e.g., patients who receive intensive medical care at outpatient settings, such as hemodialysis clinics, oncology clinics, or transplant programs)

Minimum screening swabs

Admission or health-care service visit intake screening swabs

- Acute care patients with an overnight hospital stay or who have undergone a medical/ surgical procedure outside Canada within the past 12 months
- Individuals at high risk of CPO acquisition, as defined by the health authority at the time of their health-care service visit
- *Health authorities **may expand** admission screening beyond minimum requirements at their discretion*

Other screening swabs

- Individuals deemed high risk by the health authority, such as roommates or close contacts of a known CPO-positive individual
- *Health Authorities **may screen** acute care patients admitted to and/or transferred from a unit or facility within the same health authority under investigation for ongoing CPO transmission*

Serial screening swabs

- *Health Authorities **may** consider serial screening swabs over a period of up to 21 days following a high-risk exposure if initial screening is negative for CPO. Decisions should be made in consultation with the facility's medical microbiologists or infection control practitioners (ICPs).*

Organisms Under Surveillance

The following organisms that harbour a carbapenemase gene(s) are under surveillance:

- **Screening samples:** Enterobacterales harbouring carbapenemase gene(s)
- **Clinical Samples:** At minimum, Enterobacterales. *Pseudomonas* spp. and *Acinetobacter* spp. ***may*** *also be included at the discretion of each health authority*
- **Contact tracing samples:** Any organisms suspected of harbouring targeted CPO gene(s)

Specimen collection requirements for CPO surveillance are provided in Appendix A.

Surveillance population and screening and for *C. auris*

Population under surveillance

All confirmed cases of *C. auris* identified in BC are included in the provincial surveillance activities.

Minimum screening swabs

- Screening is conducted at the discretion of the health authorities, based on local epidemiology and individual patient risk factors
- *Health authorities* ***may choose*** *to screen, for example:*
    - *Patients who received health care outside of Canada and are CPO positive*
    - *Patients who have had a high-risk exposure and are CPO negative*

Specimen collection requirements for *C. auris* surveillance are provided in Appendix A.

Case identification and confirmation for CPO and *C. auris*

All patient isolates suspected of harbouring a carbapenamese gene (CPO) or *C. auris*, as identified by medical microbiology laboratories in health authorities or community settings, must be sent to PHL for molecular testing and genotyping (See Appendix B). Submissions must be accompanied by the appropriate requisition form. CPO testing: Appendix C; *C. auris* testing: Bacteriology and Mycology Isolates Submitted for Identification Requisition. PHL will report the molecular testing results directly to the submitting laboratory via the electronic laboratory information system in accordance with standard practice.

Eligible CPO case definition

For provincial surveillance, a CPO case is defined by the detection of a carbapenemase gene in a patient isolate. The following criteria apply:

New case:

- A carbapenemase gene identified from a patient isolate for the first time in the province.
- A newly identified carbapenemase gene in a patient with prior CPO colonization or infection with a different gene is considered a new case.

  Note:

  - The same gene identified again in the same patient, regardless of bacterial species or sample type is considered the same case.
  - Different carbapenemase genes identified in the same patient are considered separate cases, even if found in the same isolate, different isolates from the same sample, or subsequent samples are considered different cases.

Eligible *C. auris* case definition

New case: Identification of *C. auris* in a patient isolate for the first time in the province.

- Note: Any subsequent *C. auris* isolates identified from the same patient are considered the same case, regardless of colonization or infection status or sample type.

Once an isolate is confirmed to harbour a carbapenemase gene or to be *C. auris*, the PHL will determine – via the laboratory's CPO or *C. auris* testing database – whether it represents the first identification in the patient.

If *C. auris* or a CPO gene is identified for the first time from a particular patient, it will be considered a new case, as defined above, and a unique identifier will be assigned and included in the laboratory report. The medical microbiologist at PHL will notify the medical microbiologist in the submitting laboratory of identification of the new case. If *C. auris* or the CPO gene has already been identified from the same patient, the previous case identification number will be retrieved and included in the laboratory report.

Exposure Status Classifications for CPO

To support consistent provincial surveillance and enable meaningful interpretation of CPO data, this protocol includes standardized CPO exposure status definitions. These classifications provide a framework for distinguishing health care-associated and community-associated cases based on timing of specimen collection and relevant health-care exposures. They are intended to guide surveillance reporting and promote

comparability across health authorities while allowing for clinical judgment in complex scenarios.

HA-YAF: Health care-Associated acquired in Your health authority's Acute care Facility

- Patient is on or beyond 72 hours of their hospitalization[1]

  OR

- If less than 72 hours of hospitalization and the patient has had a health-care exposure (inpatient or outpatient[2]) at an acute-care facility in your health authority[3] that would have resulted in this infection or colonization in the last 12 months (using best clinical judgement)

  [1]If a patient tests positive on or beyond 72 hours of their hospitalization but are known to have a recent health-care exposure in long-term care, another health authority or out of country in an area with endemic CPO, please use best clinical judgement in consultation with a medical microbiologist or designate (e.g., admission screening) when determining HA-YAF, HA-YLTCF or HA-OTHER IN BC, HA-OTHER, OUTSIDE OF BC. See below for an example where clinical judgment may support an alternative categorization.

  [2]Refers to outpatient encounters that would pose an increased risk of acquiring CPO, including a documented history of weekly visits to an outpatient clinic (e.g., dialysis, oncology) in the reporting facility for more than 4 weeks in the last 12 months.

  [3]Refers only to facilities operated by your health authority

Examples:

- Inpatient exposure in last 12 months: Hospitalization (at least an overnight stay), or patient with an indwelling device (inserted by the reporting health authority).
- Outpatient exposure in last 12 months: Patient with visits to an acute care facility in the reporting health authority (e.g., dialysis, chemo, etc.), outpatient surgery, endoscopy.
- If a patient has a known epidemiological link from a previous admission in the last 12 months (e.g., was admitted to a unit under outbreak investigation or had known exposure to a CPO-positive patient with the same gene).

Example where clinical judgment may support an alternative categorization:

- If a patient tests positive on or beyond 72 hours but is known to have a recent foreign travel to one of the countries that your health authority currently screens for or foreign health-care encounters, but the admission screening specimen was delayed.

HA-YAF Newborn case definition

- The newborn is on or beyond 72 hours of their hospitalization in a facility in your health authority

  AND

- The birthing parent was **not** known to be CPO positive on admission and there is no epidemiological reason to suspect that the birthing parent was colonized prior to admission, even if the newborn is < 72 hours of age
- In the case of a newborn transferred from another health authority's institution, CPO may be classified as HA-YAF if the organism was **not** known to be present on admission and there is no epidemiological reason to suspect that acquisition occurred prior to transfer, otherwise HA-OTHER, IN BC may be considered

Example:

- Criteria 1 and 2: A CPO positive newborn (this could be less than 72 hours) and the birthing parent is not known to be CPO positive on admission then code as HA-YAF

Example where clinical judgment may support an alternative categorization:

- Criteria 3: CPO positive newborn transferred from another institution outside your health authority and CPO is identified less than 72 hours after admission then code as HA-OTHER

HA-YLTCF: Health care-Associated acquired in Your health authority's Long-Term Care Facility

- Patient is on or beyond 72 hours of their admission to a non-acute care facility (e.g. long-term care)[1]

  AND

- Patient has no history of any other health-care encounter(s) in or outside of your health authority (e.g. outside of Canada, or in other health authorities or other provinces) in the last 12 months

  OR

- If less than 72 hours of an acute care hospitalization **AND** meets the following: Admission to a non-acute care facility (e.g. long-term care) in your health authority[2] within the last 12 months.

[1]*If a patient tests positive on or beyond 72 hours of their hospitalization but are known to have a recent health-care exposure in long-term care, another health authority or out of country in an area with endemic CPO, please use best clinical judgement in consultation with a medical microbiologist (e.g., admission screening) when determining*

HA-YAF, HA-YLTCF or HA-OTHER IN BC, HA-OTHER, OUTSIDE OF BC. See below for an example where clinical judgment may support an alternative categorization.

[2]Refers only to facilities operated by your health authority

Example where clinical judgment may support an alternative categorization:

- If a patient tests positive on or beyond 72 hours but had contact with a known CPO positive patient with the same CPO gene during an acute care admission in your health authority.

HA-OTHER, IN BC: Health care-Associated acquired from any other health care exposure in BC

- Any patient who has an infection or colonization not acquired at a facility in your health authority[1] that is thought to be associated with another health-care exposure in BC (e.g. another acute-care facility, long-term care, rehabilitation facility, or exposure to a medical device) in the last 12 months (using best clinical judgement)[2].

[1]Refers only to facilities operated by your health authority.

[2] Some health authorities may not have complete access to health-care exposures that occurred in other health authorities.

Example:

- If a patient has a known epidemiological link from a previous admission in another health authority (e.g., was admitted to a unit under outbreak investigation or had known exposure to a CPO-positive patient with the same gene).

HA-OTHER, OUTSIDE BC: Health care-Associated acquired from any other health-care exposure outside BC

- Any patient who has an infection or colonization not acquired at your facility that is thought to be associated with another health-care exposure outside of BC (e.g. another acute-care facility, long-term care, rehabilitation facility, or exposure to a medical device outside of BC).

CA: Community-Associated

- No exposure to health care that would have resulted in this infection or colonization as defined in health authority-related exposure status classifications in the past 12 months (using best clinical judgement) and does not meet the criteria for a health care-associated infection or colonization.

Examples where clinical judgment may support an alternative categorization:

- Inpatient exposure in last 12 months: Hospitalization (at least an overnight stay), or patient with an indwelling device.
- Outpatient exposure in last 12 months: Patient with visits to an acute care facility (e.g., dialysis, chemo, etc.), outpatient surgery, endoscopy.

Case reporting for CPO and *C. auris*

After receiving the CPO or *C. auris* laboratory report from PHL, the submitting laboratory will determine the source of the isolate:

Patients admitted to an acute care facility

If the CPO or *C. auris* positive isolate was obtained from patients admitted to an acute care facility, including long-term care units or facilities that are housed in or affiliated to an acute care facility, the submitting laboratory will inform the IPC team in the health authority and the case will be reported by the health authority IPC to PICNet. PICNet will then inform Public Health through their quarterly and annual public report.

Patients in a community health-care setting (CPO only)

If the CPO positive isolate was obtained from a patient in a community health-care setting, including:

- isolates forwarded by community laboratories to PHL
- isolates obtained from all long-term care facilities identified by any laboratory
- isolates obtained from outpatient clinics or emergency department visits, where the patient was not subsequently admitted to an acute care facility,

PHL and the submitting laboratory will inform the local Medical Health Officer (MHO) as a "Reportable Condition", based on the location of patient's residence (including First Nations peoples on and off reserve and clients/residents in the long-term care facility). If the residence of the patient is not available, the submitting laboratory will contact the care provider directly. The MHO's office will receive (1) a copy of the PHL laboratory report with the unique identifier, which will be transcribed onto the "Letter to the Ordering Provider" (Appendix G), and (2) an "Enhanced Surveillance Form for CPO OR *C. auris* Identified in the Community" (Appendix H).

- PHL Medical microbiologist will inform health authority's IPC program of CPO cases identified in the communities within their health authority.
- The MHO's Office and IPC within each health authority will continue to communicate with each other regarding CPO cases identified in their health authority.

Surveillance data collection for CPO and *C. auris*

All new cases of CPO and *C. auris* cases identified in an acute care facility require completion of the surveillance forms, which should be sent to PICNet for the purpose of provincial surveillance and reporting.

New cases in acute care settings

ICPs in health authorities are responsible for collecting surveillance information and completing the surveillance forms (e.g., chart review, consultation with health-care provider or physician, etc.). The health authority IPC Epidemiologist will review the information collected and submit the data to PICNet as per established process.

- For a new case of CPO or *C. auris* (either colonization or infection), the surveillance form for CPO/*C. auris* (Appendix D) must be completed and submitted.

If the patient is infected with CPO/*C. auris*, or if the patient was initially reported as CPO/*C. auris* colonization and subsequently developed into an infection within a year from initial identification (based on date of collection), an addendum form for CPO/*C. auris* infection (Appendix E) must be completed and submitted.

- Repeat samples or re-screening of patients with a known history of CPO colonization or infection **should not** be submitted for provincial surveillance reporting if the same carbapenemase gene is detected again in a subsequent sample.

New cases in community health-care settings (CPO only)

MHO's office will send the following to the patient's ordering physician or care provider:

1. "Enhanced Surveillance Form for "Carbapenemase-Producing Organisms (CPO) (Appendix H)
2. "Letter to the Ordering Provider" (Appendix G) including the unique identifier number, and a CPO Health File,

and ask them to complete the enhanced surveillance form (Appendix H). Once completed, the physician or care provider should send the enhanced surveillance form to PICNet in a timely manner via email (picnet@phsa.ca).

Data Management and Reporting for CPO and *C. auris*

a. Provincial molecular testing and genotyping data for CPO or *C. auris* are managed by PHL. Provincial surveillance data are managed by PICNet. PHL and PICNet will share the information with health authorities when necessary for CPO and *C. auris* prevention and control, as per the data sharing agreement.

b. PICNet and PHL will cross-check the data for data quality and assurance purposes. The information on the Requisition Form for CPO Testing (Appendix C) and the

Bacteriology and Mycology Isolates Submitted for Identification Requisition for *C. auris* will be de-identified and shared with PICNet, along with the molecular testing results.

c. Each quarter, PICNet will report the number of new CPO cases identified by health authority and genotype and post them on the PICNet's website (Surveillance Reports | PICNet) for access by the Ministry of Health, health authorities, health-care professionals, and the public, as per established data validation and reporting protocols for dissemination of surveillance data.

d. PICNet will report the number of new *C. auris* cases identified by health authority annually and post them on the PICNet's website (Surveillance Reports | PICNet) for the Ministry of Health, health authorities, all health-care professionals, and the public. This will be based on established data validation and reporting protocols for dissemination of surveillance data.

e. PICNet and PHL will work together to summarize the CPO and *C. auris* laboratory testing and surveillance data and report back to the health authorities, British Columbia Association of Medical Microbiologists (BCAMM), and the Ministry of Health, annually or as necessary.

f. Health authority IPC should inform PICNet and PHL of suspected CPO or *C. auris* transmission (Appendix F). See *Transmission investigation for CPO and C. auris* and *Notification of ongoing transmission investigation for CPO* and *C. auris* sections for details. PICNet and PHL should also be informed of investigation closures (Appendix E), see *Notification of ongoing transmission investigation for CPO and C. auris* section. PICNet will inform other health authorities of investigation initiation and closures.

g. In case of a cluster of CPO or *C. auris* in an acute care facility, IPC will consult with the MHO or the Medical Microbiology (MMB) team regarding outbreak investigation and control, depending on their health authority's medical leadership structure for IPC in acute care. If the outbreak occurs in a community setting, such as long-term care facilities and outpatient clinics, IPC will assist the MHO/MMB team in case management and infection control. The health authority should communicate with or inform other health authorities, PICNet, PHL, as well as the public as per established outbreak management processes.

Transmission investigation for CPO and *C. auris*

Initiation of investigation

If there is suspected transmission of CPO or *C. auris* in a care unit or care facility, an investigation should be initiated following the procedures outlined in this section and the *Notification of ongoing transmission investigation for CPO and C. auris* section, including initiation, closure, and notification steps.

Closure of investigation

- A CPO investigation will be declared over if no further health care-associated CPO cases with the same resistance gene are identified within six weeks of the last detected case in the unit (see following sections).
- A *C. auris* investigation will be declared over if no *C. auris* positive isolates are identified within six weeks of the last detected case in the unit.

Notification of ongoing transmission investigation for CPO and *C. auris*

Notification of ongoing transmission investigation for CPO

When there is suspected ongoing CPO transmission that meets the definition of a transmission notification threshold below, health authority's ICP will complete the notification of ongoing CPO or *C. auris* transmission investigation form (Appendix F) and send it to PICNet in a timely manner. PICNet will disseminate the notification form to IPC partners.

- **Transmission notification threshold for CPO**: A recent increase in the incidence of new health care-associated CPO cases with the same resistance gene, with epidemiological evidence of ongoing transmission that is found through contact tracing, point prevalence or clinical specimen, where two or more cases originating from two or more different rooms are attributed to a unit in a six-week period.

Notification of transmission investigation for C. *auris*

When there is suspected *C. auris* transmission within a care unit or care facility, health authority IPC will complete the notification of CPO or *C. auris* transmission investigation form (Appendix F) and send it to PICNet in a timely manner. PICNet will disseminate the notification form to health authority IPC partners.

Notification of a resolved transmission investigation for CPO and *C. auris*

Once the transmission investigation is resolved, an updated notification of CPO or *C. auris* transmission investigation form (Appendix E) should be sent to PICNet, who will disseminate the updated notification form health authority IPC partners.

Health authorities should inform Public Health or MMB team as appropriate in their health authority, regarding initiation and closure of ongoing CPO or C. *auris* transmission investigations.

Appendix A: CPO and C. auris Sample Collection

This appendix describes specimen types and collection sites used to support laboratory identification of carbapenemase-producing organisms (CPO) and *C. auris* for provincial surveillance and infection prevention and control activities.

CPO Sample collection

Screening sample

- Rectal swab (preferred) with fecal staining (required)
- Stool sample (acceptable if rectal swab is not available; preferred for neonates, febrile patients, and neutropenic patients)

Clinical sample

- Specimens from relevant clinical sites (e.g., wounds, blood, urine, tracheostomies, ostomies, intravenous catheter sites, or other appropriate sources), in consultation with facility's medical microbiologist or ICPs.

Contact tracing sample

- Rectal swab (preferred) with fecal staining (required)
- Stool sample (acceptable if rectal swab is not available)

C. auris Sample collection

Screening sample

- Swab of bilateral axilla and groin

Clinical sample

- Specimens from relevant clinical sites, including open wounds, blood, urine, tracheostomies, ostomies, intravenous catheter sites, other sites as appropriate, including typically sterile sites

Contact tracing sample

- Swab of bilateral axilla and groin (same as screening samples)

Appendix B: Laboratory Interpretive Criteria for Identifying Suspected CPO

Included in this surveillance protocol are isolates recovered from **screening, clinical** and **contact tracing** samples received by the microbiology laboratories in the health authorities and community.

Screening samples are samples collected at the time of patient admission/visit to or stay at a care facility or a care unit for the purpose of detection, prevention and control of CPO. Enterobacterales will be tested for carbapenemase activities by the medical microbiology laboratories in health authorities or community. If the isolates are suspected carbapenem resistant, they should be tested further with phenotypic/molecular methods. Non-enterobacterales may be pursued if there are epidemiological risk factors for CPO and/or at the discretion of the health authority.

Clinical samples are samples collected for routine microbiology workup where carbapenem resistance is suspected by the medical microbiology laboratory based on 2026 CLSI interpretive criteria[1]. All isolates with suspected carbapenemase producing Enterobacterales, *P. aeruginosa*, and *Acinetobacter* spp., may be investigated further with phenotypic/molecular methods.

Contact tracing samples are samples collected from people who have been identified as having an epidemiological link with a confirmed CPO case(s). Enterobacterales, and/or non-enterobacterales harbouring the CPO gene identified in the confirmed case may be targeted in testing of contact tracing samples at the discretion of the health authority.

All carbapenem resistant strains of Enterobacterales, *Pseudomonas* spp., *Acinetobacter* spp., *Shigella*, *Salmonella* and non-enterobacterales, as outlined by CLSI M100 ED36:2026, should be further investigated for carbapenemase genes (NDM, KPC, OXA-48, VIM and IMP) using phenotypic and/or molecular assays. If local testing is unavailable, send the carbapenem resistant isolates to BCCDC PHL, otherwise, submit CPO isolates to PHL for whole genome sequencing. Include the "CPO Requisition Form" for molecular testing and additional genotyping analyses (Appendix C) and specify the carbapenemase detected and methods used.

Due to the importance of timely identification of these organisms for infection control and epidemiologic investigation, please send the isolates that are suspected of harbouring a carbapenemase gene(s) to the PHL as soon as possible.

When there is an internal alert or an outbreak of CPO is suspected, accelerated submission is strongly recommended.

PHL will report results back to the submitting laboratory directly via the electronic laboratory information system. For CPO positive isolates, PHL will check the laboratory database and determine whether it meets the definition of an eligible CPO case (see

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1. Clinical and Laboratory Standards Institute. 2026. Performance Standards for Antimicrobial Susceptibility Testing. 36th ed. CLSI supplement M100. Clinical and Laboratory Standards Institute, Wayne, PA.

Section 2e in the Protocol). If it is a new case, a unique identifier will be assigned and included in the laboratory report. The submitting laboratory should work with ICPs in the health authorities and care providers to ensure that the CPO surveillance information is collected and submitted to PICNet.

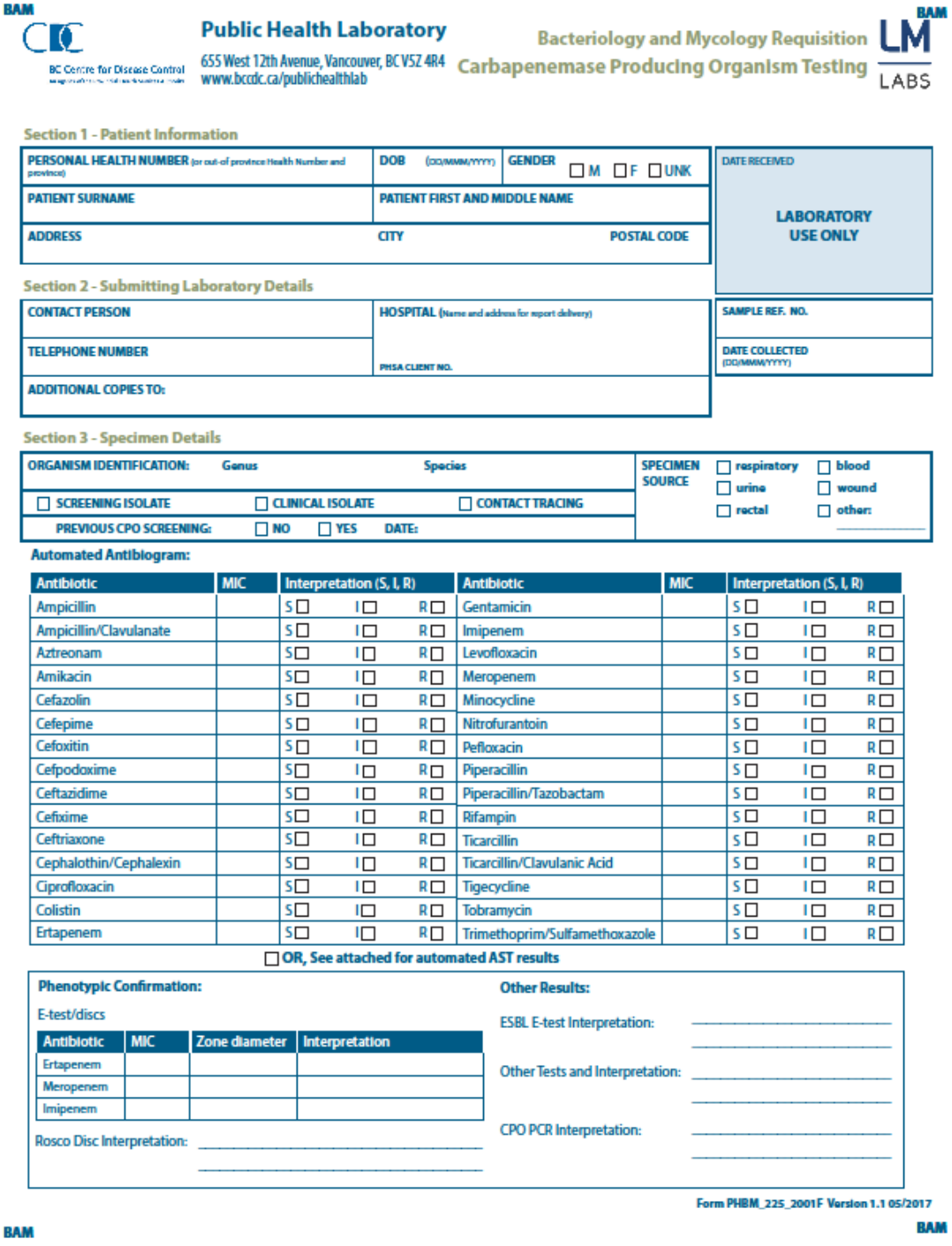
For urgent test requests, please contact Dr. Linda Hoang or the Public Health Advanced Bacteriology/Mycology Lab of PHL:

NAME/ROLE	PHONE/FAX	EMAIL
Dr. Linda Hoang Medical Director, BCCDC PHL	PH: (604) 707-2618	Linda.Hoang@bccdc.ca
Janet Fung	PH: (604) 707-2610	janet.fung@bccdc.ca
Lab Supervisors	PH: (604) 707-2617 FAX: (604) 707-2604	

Mailing address

Public Health Advanced Bacteriology/Mycology Lab
BCCDC Public Health Laboratory
655 West 12th Avenue, Vancouver, BC, V5Z 4R4

Appendix C: Requisition Form for CPO Testing



BAM

BC Centre for Disease Control

Public Health Laboratory

655 West 12th Avenue, Vancouver, BC V5Z 4R4
www.bccdc.ca/publichealthlab

Bacteriology and Mycology Requisition
Carbapenemase Producing Organism Testing

BAM LM LABS

Section 1 - Patient Information

PERSONAL HEALTH NUMBER (or out-of province Health Number and province)	DOB (DD/MMM/YYYY)	GENDER ☐ M ☐ F ☐ UNK
PATIENT SURNAME	PATIENT FIRST AND MIDDLE NAME	
ADDRESS	CITY	POSTAL CODE

DATE RECEIVED

LABORATORY USE ONLY

Section 2 - Submitting Laboratory Details

CONTACT PERSON	HOSPITAL (Name and address for report delivery)
TELEPHONE NUMBER	PHSA CLIENT NO.
ADDITIONAL COPIES TO:	

SAMPLE REF. NO.

DATE COLLECTED (DD/MMM/YYYY)

Section 3 - Specimen Details

ORGANISM IDENTIFICATION: Genus Species

☐ SCREENING ISOLATE ☐ CLINICAL ISOLATE ☐ CONTACT TRACING

PREVIOUS CPO SCREENING: ☐ NO ☐ YES DATE:

SPECIMEN SOURCE ☐ respiratory ☐ blood ☐ urine ☐ wound ☐ rectal ☐ other: _____

Automated Antibiogram:

Antibiotic	MIC	Interpretation (S, I, R)	Antibiotic	MIC	Interpretation (S, I, R)
Ampicillin		S☐ I☐ R☐	Gentamicin		S☐ I☐ R☐
Ampicillin/Clavulanate		S☐ I☐ R☐	Imipenem		S☐ I☐ R☐
Aztreonam		S☐ I☐ R☐	Levofloxacin		S☐ I☐ R☐
Amikacin		S☐ I☐ R☐	Meropenem		S☐ I☐ R☐
Cefazolin		S☐ I☐ R☐	Minocycline		S☐ I☐ R☐
Cefepime		S☐ I☐ R☐	Nitrofurantoin		S☐ I☐ R☐
Cefoxitin		S☐ I☐ R☐	Pefloxacin		S☐ I☐ R☐
Cefpodoxime		S☐ I☐ R☐	Piperacillin		S☐ I☐ R☐
Ceftazidime		S☐ I☐ R☐	Piperacillin/Tazobactam		S☐ I☐ R☐
Cefixime		S☐ I☐ R☐	Rifampin		S☐ I☐ R☐
Ceftriaxone		S☐ I☐ R☐	Ticarcillin		S☐ I☐ R☐
Cephalothin/Cephalexin		S☐ I☐ R☐	Ticarcillin/Clavulanic Acid		S☐ I☐ R☐
Ciprofloxacin		S☐ I☐ R☐	Tigecycline		S☐ I☐ R☐
Colistin		S☐ I☐ R☐	Tobramycin		S☐ I☐ R☐
Ertapenem		S☐ I☐ R☐	Trimethoprim/Sulfamethoxazole		S☐ I☐ R☐

☐ OR, See attached for automated AST results

Phenotypic Confirmation:

E-test/discs

Antibiotic	MIC	Zone diameter	Interpretation
Ertapenem			
Meropenem			
Imipenem			

Rosco Disc Interpretation: _____

Other Results:

ESBL E-test Interpretation: _____

Other Tests and Interpretation: _____

CPO PCR Interpretation: _____

Form PHBM_225_2001F Version 1.1 05/2017

BAM BAM

Appendix D: Surveillance Form for CPO OR *C. auris* Cases Identified in Acute Care Facilities[1,2]

Q1	**Organism** ☐ CPO (Carbapenamese-Producing Organism) ☐ *C. auris [Candida (Candidozyma) auris]* *If the patient is colonized or infected with both organisms, please complete two separate forms.*
Q2	**Unique Identifier** Assigned by BCCDC Public Health Laboratory (PHL) CPO format: yyyy####-###-## *C. auris* format: yyyy####-Caur-## _____
Q3	**Patient status** ☐ **Inpatient** (admitted to an acute care unit/facility) ☐ **Outpatient (ED only)*** - (sample was collected from emergency department where the patient was not subsequently admitted to an acute care facility) ☐ **Outpatient (Other)*** - *Specify location* (sample was collected from outpatient clinics) _____ ☐ **Long-term Care (LTC) Setting* -** (the sample was collected from a long-term or residential care facility, identified by any laboratory, including health authority owned and operated LTCs) * **Note:** This is an acute care surveillance form. These categories are included to capture cases reported by acute care partners where the specimen was collected outside of an acute care admission, ensuring they are not misclassified as acute care inpatient cases.
Q4	**Date of admission or visit related to the positive culture** *(dd/mmm/yyyy):* _____ / _____ / _____
Q5	**Facility Name:** _____

Q6	**Clinical status of the current positive case** (*Use current CDC/NHSN Surveillance Definitions for Specific Type of Infections: http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf*). ☐ Infection – *also complete Surveillance Form for CPO OR C. auris Infections Identified in Acute Care Facilities* ☐ Colonization ☐ Unknown / Unable to determine
Q7	**Did the patient travel outside of Canada within the past 12 months?** ☐ Yes - *specify country/countries:* _____ ☐ Yes - country unknown (travel confirmed, country not known) ☐ No - *skip to Q9* ☐ Unknown / Unable to determine if travel occurred - *skip to Q9*
Q8	**If "Yes" to Q7, did the patient have a health-care encounter outside of Canada within the past 12 months?** *(Select all that apply)* ☐ Yes – overnight stay in a hospital or underwent medical/surgical procedure outside of Canada in the past 12 months ☐ Yes – other health-care encounter in the past 12 months (e.g., visited GP, walk-in clinic, dentist, ER) ☐ No health-care encounter outside Canada in the past 12 months ☐ Unknown / Unable to determine
Q9	**Did the patient have an overnight stay in a Canadian facility or undergo a medical/surgical procedure in Canada (including BC) within the past 12 months (excluding the current admission)?** ☐ Yes – *specify province(s):* _____ ☐ No ☐ Unknown / Unable to determine

Q10 – Q13 are to be completed only for CPO cases	
Q10	**Where was this CPO case acquired? (***See exposure status classification definitions on page 16)* ☐ HA-YAF (Health care-Associated acquired in your health authority's acute care facility) ☐ HA-YLTCF (Health care-Associated acquired in your health authority's Long-Term Care Facility) ☐ HA-OTHER, IN BC (Health care-Associated acquired from any other health care exposure in BC) ☐ HA-OTHER, OUTSIDE BC (Health care-Associated acquired from any other health-care exposure outside BC) – *skip to Q12* ☐ CA (Community-Associated) – *skip to Q13* ☐ Unknown / Unable to determine - *skip to Q13*
Q11	**If the case was classified as HA-YAF, HA-YLTCF, or HA-OTHER, IN BC in Q10, is there evidence of any of the following modes of CPO transmission?** *(Select all that apply. If unsure, please select unknown* / Unable to determine*)* ☐ N/A (not HA-YACF, HA-YLTCF, or HA-OTHER, IN BC) ☐ Sink/drain ☐ Hemodialysis ☐ Outbreak/cluster associated ☐ Device/procedure (e.g., endoscopy) – *specify*: _____ ☐ Another patient (e.g., contact tracing, contact with known CPO positive patient) ☐ Other exposure – *specify*: _____ ☐ Unknown / Unable to determine
Q12	**If the CPO case was classified as HA-OTHER, OUTSIDE BC in Q10, please specify the location:** ☐ Yes – in Canada (*specify province/s)***:** _____ ☐ Yes – in Canada, location unknown ☐ Yes – outside Canada *(specify country/countries)*: _____ ☐ Yes – outside Canada, location unknown ☐ Unknown/Unable to determine

Q13	**If this patient is a newborn (<28 days), was the birthing parent known to be CPO positive?** ☐ N/A – patient is not a newborn ☐ Yes – confirmed on admission ☐ No – screened negative on admission and no previous positive ☐ Unknown / Unable to determine – not screened on admission and no previous positive

[1]Once completed, please send to PICNet at picnet@phsa.ca; [2]Some questions and response options adapted in part from the CNISP Surveillance Protocol for Carbapenemase-Producing Organisms (2025). https://ipac-canada.org/wp-content/uploads/2025/03/CNISP_2025_CPO_protocol_EN.pdf

Appendix D Definitions and Notes

Q1	Organism	Specify whether the case is CPO or *C. auris* based on the laboratory report.
Q2	Unique Identifier	Record the Public Health Laboratory (PHL) identifier exactly as shown on the PHL report. **CPO format:** yyyy####-###-## • yyyy = year of the CPO test for the patient • #### = patient serial number for CPO testing that year (starting from 0001 each year) • ### = isolate serial number for the patient • ## = carbapenamase gene serial number for the patient ***C. auris* format:** yyyy####-Caur-## • yyyy = year of the *C. auris* test for the patient • #### = patient serial number for *C. auris* testing that year (starting from 0001 each year) • ## = isolate serial number for the isolate for the patient **Note:** If the PHL identifier has not been received or is unclear, please contact PHL
Q3	Patient status	**Inpatient:** Check "Inpatient" (hospitalized) if the patient was admitted to an acute care unit/facility. **Outpatient (ED only)*:** Check "Outpatient (ED only)" if the sample was collected from emergency department where the patient was not subsequently admitted to an acute care facility. **Outpatient (Other)*:** Check "Outpatient (Other)" if the sample was collected from outpatient clinics, Hemodialysis, Oncology clinics etc., where the patient was not subsequently admitted to an acute care facility and specify the location. **Long-Term Care (LTC) setting*:** Check "Long-Term Care setting" if the sample was collected from a long-term or residential care facility, identified by any laboratory, including health authority owned and operated LTCs. * **Note:** This is an acute care surveillance form. These categories are included to capture cases reported by acute care partners where the specimen was collected outside of an acute care admission, ensuring they are not misclassified as acute care inpatient cases.

Q4	Date of admission or visit related to the positive culture	Record the admission or visit date related to the positive culture for the organism identified in Q1 in the **Day–Month–Year format** using a three-letter month abbreviation (**e.g., 17-Jul-2025**)
Q5	Facility Name	Enter the name of the facility where the patient was admitted or visited at the time of specimen collection.
Q6	Clinical Status	Indicate whether the patient's CPO or *C. auris* status represents an infection, colonization according to the following definitions: **Infection:** Clinical signs and symptoms attributable to CPO or C. *auris* and a positive culture. Clinical evidence may be derived from direct observation of the infection site (e.g., a wound) review of information in the patient chart or other clinical records, or a physician or surgeon diagnosis of infection. Reference: Use current CDC/NHSN Surveillance Definitions for Specific Types of Infections (http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf). *If infection is selected, please complete Surveillance Form for CPO OR C. auris Cases Identified in Acute Care Facilities.* **Colonization:** Organism present without adverse clinical signs or symptoms. **Unknown / Unable to determine:** Insufficient information to define whether the patient's CPO or *C. auris* status represents an infection or colonization.
Q7	Did the patient travel outside of Canada within the past 12 months?	**Yes – specify country/countries:** Record all countries visited during the past 12 months. **Yes – country unknown:** Travel outside Canada is confirmed, but the specific country/countries are not known. **No –** *skip to Q9***:** The patient did not travel outside Canada in the past 12 months. **Unknown / Unable to determine –** *skip to Q9***:** Insufficient information to determine whether travel occurred.
Q8	If "Yes" to Q7, did the patient have a health-care encounter outside of Canada within the past 12 months?	**Yes – Overnight stay in a hospital or underwent medical/surgical procedure**: Includes inpatient admission or procedures such as surgery, endoscopy, dialysis, chemotherapy, IV therapy. **Yes – Other health-care encounter:** Includes outpatient visits such as GP, walk-in clinic, dentist, Emergency Department without admission. **No health-care encounter outside Canada in the past 12 months**

		Unknown / Unable to determine: Insufficient information to determine health-care encounters outside Canada. Note: If both hospital admission and other encounters occurred, select both options.
Q9	Did the patient have an overnight stay in a Canadian facility or undergo medical/surgical procedure in Canada (including BC) within the past 12 months?	**Yes:** The patient had an overnight stay in a Canadian facility or underwent a medical/surgical procedure in Canada within the past 12 months. *Specify the province/s where the patient had the health-care encounter/s.* **No** **Unknown / Unable to determine:** Insufficient information to determine health-care encounters outside Canada
Q10 – Q13 are to be completed for CPO cases only		
Q10	Where was this CPO case acquired?	Classify the case using the exposure status categories below. These are summarized definitions only - *please refer to the full protocol for detailed criteria and examples, especially for cases involving multiple exposures or unusual circumstances.* **HA-YAF (Acute Care Facility in your health authority):** Typically applies if the patient is on or beyond calendar day 3 (≥72 hours) of hospitalization OR had a relevant acute care exposure in your health authority within the past 12 months. Clinical judgment may support an alternative categorization if other significant exposures exist (e.g., recent foreign travel with delayed screening). **HA-YLTCF (Long-Term Care Facility in your health authority):** Applies if the patient is on or beyond calendar day 3 (≥72 hours) of admission to a long-term care facility in your health authority and has no other health-care exposures in the past 12 months. Use judgment if there are overlapping exposures (e.g., recent acute care admission). **HA-OTHER, IN BC:** Associated with health-care exposure in BC outside your health authority (e.g., another acute care facility, long-term care, rehabilitation, clinic, or device-associated exposure). **HA-OTHER, OUTSIDE BC:** Associated with health-care exposure outside BC (e.g., another province or country). **CA (Community-Associated):** No health-care exposure in the past 12 months that would plausibly result in acquisition and does not meet criteria for health care-associated classifications. **Unknown / Unable to determine:** Insufficient information to classify exposure.

Q11	If the case was classified as HA-YAF or HA-YLTCF in Q10, is there evidence of any of the following modes of CPO transmission?	Indicate whether there is evidence suggesting how CPO transmission occurred. Select all that apply: **N/A:** Case not classified as HA-YACF or HA-YLTCF **Sink/drain**: Environmental contamination linked to plumbing or drains. **Hemodialysis**: Transmission associated with dialysis procedures or equipment. **Outbreak/cluster associated**: Case linked to a known outbreak or cluster within the facility. **Device/procedure**: Transmission associated with a medical device or invasive procedure (e.g., endoscopy). *Specify details*. **Another patient**: Epidemiologic link to a known CPO-positive patient (e.g., roommate, contact tracing). **Other exposure**: Specify any other suspected source or route. **Unknown / Unable to determine**: No clear evidence of transmission mode.
Q12	If the CPO case was classified as HA-OTHER, OUTSIDE BC in Q10, please specify the location	If the case was classified as HA-OTHER, OUTSIDE BC, specify where the health-care exposure occurred: **Yes – in Canada (specify province/s):** Provide the province(s) where exposure occurred. **Yes – in Canada, location unknown:** Exposure confirmed in Canada, but province not known. **Yes – outside Canada (specify country/countries):** Provide the country or countries where exposure occurred. **Yes – outside Canada, location unknown:** Exposure confirmed outside Canada, but country not known. **Unknown / Unable to determine:** Insufficient information to determine location.
Q13	If this patient is a newborn (<28 days), was the birthing parent known to be CPO positive?	If the patient is a newborn (<28 days), indicate whether the birthing parent was known to be CPO positive: **N/A**: Patient is not a newborn. **Yes**: Birthing parent was confirmed CPO positive on admission. **No**: birthing parent was confirmed not CPO positive on admission. **Unknown / Unable to determine**: Insufficient information to determine birthing parent's CPO status.

Appendix E: Form for CPO OR *C. auris* Infections Identified in Acute Care Facilities[1,2]

Complete this form if:

a. the case was initially identified as a CPO or *C. auris* infection

b. the case was initially reported as colonization and subsequently developed into a CPO or *C. auris* infection within a year of initial identification (based on date of collection).

Please ensure that the surveillance form for CPO or *C. auris* (Appendix D) has been completed for this case.

Q1	**Organism** ☐ CPO (Carbapenamese-Producing Organism) ☐ *C. auris [Candida (Candidozyma) auris]* *If the patient is colonized or infected with both organisms, please complete two separate forms.*
Q2	**Unique Identifier** Assigned by BCCDC Public Health Laboratory (PHL): CPO format: yyyy####-###-## *C. auris* format: yyyy####-Caur-## _____
Q3	**Patient status** ☐ **Inpatient** (admitted to an acute care unit/facility) ☐ **Outpatient (ED only)* -** (sample was collected from emergency department where the patient was not subsequently admitted to an acute care facility) ☐ **Outpatient (Other)* -** *Specify location* (sample was collected from outpatient clinics and the patient was not subsequently admitted to an acute care facility) _____ ☐ **Long-term Care (LTC) Setting* -** (the sample was collected from a long-term or residential care facility, identified by any laboratory, including health authority owned and operated LTCs) * **Note:** This is an acute care surveillance form. These categories are included to capture cases reported by acute care partners where the specimen was collected outside of an acute care admission, ensuring they are not misclassified as acute care inpatient cases.
Q4	**Date of admission or visit related to the positive culture** *(dd/mmm/yyyy)*: ___ / ___ / _____

Q5	**Facility Name:** _____
Q6	**Date of CPO infection identification** (based on specimen collection date) *(dd/mmm/yyyy)*: ____ / ____ / _____
Q7	**Site(s) of infection** *(Select all that apply)* ☐ Bloodstream ☐ Urinary tract ☐ Respiratory tract ☐ Wound ☐ Surgical site ☐ Other *(specify site):* _____
Q8	**Was the patient admitted to ICU due to the infection or its related complications within 30 days after infection identification?** ☐ Yes – ICU admission was required because of the infection or its complications ☐ No – ICU admission was not required because of the infection or its complications ☐ Patient was already in the ICU for unrelated medical reasons ☐ Unknown / Unable to determine – Insufficient information to determine ICU admission status
Q9	**What was the patient's outcome within 30 days of infection identification or until loss to follow-up occurred (e.g., discharge, transfer)?** ☐ Patient alive and still in hospital 30 days after identification of the infection ☐ Patient survived and discharged within 30 days of infection identification ☐ Patient survived and transferred within 30 days of infection identification ☐ Patient died (all causes) within 30 days of infection identification

[1]Once completed, please send to PICNet at picnet@phsa.ca; [2]Some questions and response options adapted in part from the CNISP Surveillance Protocol for Carbapenemase-Producing Organisms (2025). https://ipac-canada.org/wp-content/uploads/2025/03/CNISP_2025_CPO_protocol_EN.pdf

Appendix E Definitions and Notes

Q1	Organism	Specify whether this is a CPO or *C. auris* case
Q2	Unique Identifier	Record the Public Health Laboratory (PHL) identifier exactly as shown on the PHL report. **CPO format:** yyyy####-###-## • yyyy = year of the CPO test for the patient • #### = patient serial number for CPO testing that year (starting from 0001 each year) • ### = isolate serial number for the patient • ## = carbapenamase gene serial number for the patient ***C. auris* format:** yyyy####-Caur-## • yyyy = year of the *C. auris* test for the patient • #### = patient serial number for *C. auris* testing that year (starting from 0001 each year) • ## = isolate serial number for the isolate for the patient **Note:** If the PHL identifier has not been received or is unclear, please contact PHL
Q3	Patient status	**Inpatient:** Check "Inpatient" (hospitalized) if the patient was admitted to an acute care unit/facility. **Outpatient (ED only)*:** Check "Outpatient (ED only)" if the sample was collected from emergency department where the patient was not subsequently admitted to an acute care facility. **Outpatient (Other)*:** Check "Outpatient (Other)" if the sample was collected from outpatient clinics, Hemodialysis, Oncology clinics etc., where the patient was not subsequently admitted to an acute care facility and specify the location. **Long-term Care (LTC) setting*:** Check "Long-term Care setting" if the sample was collected from a long-term or residential care facility, identified by any laboratory, including health authority owned and operated LTCs. * **Note:** This is an acute care surveillance form. These categories are included to capture cases reported by acute care partners where the specimen was collected outside of an acute care admission, ensuring they are not misclassified as acute care inpatient cases.

Q4	Date of admission or visit related to the positive culture	Record the admission or visit date related to the positive culture for the organism identified in Q1 in the **Day–Month–Year format** using a three-letter month abbreviation (**e.g., 17-Jul-2025**) **Note:** If the case was initially identified as an infection, this is the same date as identified in Q4 of the Surveillance Form for CPO OR *C. auris* Cases Identified in Acute Care Facilities.
Q5	Facility Name	Enter the name of the facility where the patient was admitted or visited at the time of infection identification.
Q6	Date of CPO infection identification	Record the date when the CPO infection was identified, based on collection date in the **Day–Month–Year format** using a three-letter month abbreviation (**e.g., 17-Jul-2025**)
Q7	Site(s) of infection	Select all applicable sites of infection or specify if not listed.
Q8	Was the patient admitted to ICU due to the infection or its related complications within 30 days after infection identification?	Indicate whether the patient required ICU admission within 30 days of infection identification due to the infection or its complications. **Yes:** ICU admission was required because of the infection or its complications. **No:** ICU admission was not required due to the infection or its complications. **Patient was already in ICU for unrelated reasons:** The patient was in ICU but not due to the infection or its complications. **Unknown / Unable to determine:** Insufficient information to determine ICU admission status.
Q9	What was the patient's outcome within 30 days of infection identification?	Indicate the patient's outcome within 30 days after infection identification or at discharge. **Note:** If outcome is unknown at 30 days, use the status at discharge.

Appendix F: Notification of Ongoing CPO or C. auris Transmission[1]

Please complete this form for notification of ongoing CPO transmission / *C. auris* case investigation in your facility or health authority and email to

A. Notification Information

Health Authority: _____ Facility Name: _____ Unit: _____

Contact Person: _____ Title: _____

Contact Phone: _____ Email: _____

Facility type: ☐ Acute Care Hospital ☐ Long-term Care Facility ☐ Other _____

Is this report: ☐ Notification of CPO or *C. auris* transmission investigation *(complete section B)*

☐ Notification of CPO or *C. auris* transmission investigation resolved *(complete section C)*

B. Investigation Notification

Organism: ☐ CPO ☐ *C. auris*

Date the index case* was identified (dd/mmm/yyyy): ____ / ____ / _____

Date investigation initiated (dd/mmm/yyyy): ____ / ____ / _____

If CPO, please specify:

Organism (Genus species): _____

CPO gene identified (e.g. NDM, KPC): _____

C. Transmission Investigation Resolved[2]

Date investigation closed (dd/mmm/yyyy): _____

Notes:

_____

_____

_____

Reported by: _____ Date: _____ / _____ / _____

[1] Once completed, please send to PICNet at picnet@phsa.ca; [2] A CPO investigation will be declared over if no further health care-associated CPO cases with the same resistance gene are identified within six weeks of the last detected case in the unit (see following sections). A C. auris investigation will be declared over if no C. auris positive isolates are identified within six weeks of the last detected case in the unit.

Appendix G: Letter to Ordering Provider in Response to CPO Identified in the Community

Date:

Dear *Health Care Provider (ordering provider),*

Re: *Patient Last name, First name; PHN; DOB*

Public Health has received laboratory notification that your patient tested positive for a carbapenemase-producing organism (CPO). As per the Public Health Act and the Reporting Information Affecting Public Health Regulation (B.C. Reg. 167/2018), physicians/administrators for laboratories that identify CPO are required to report cases to their local medical health officer.

A provincial non-nominal surveillance program is in place to monitor the epidemiology (e.g. risk factors, laboratory data) of CPO in BC. Each patient isolate is assigned a unique identifier for this purpose. The unique identifier for your patient is _____. Attached is a surveillance form. We ask that you complete this form to the best of your ability and return it by email to the Provincial Infection Control Network of BC at picnet@phsa.ca.

CPOs pose significant risk to vulnerable patients in health-care facilities. In the case of CPOs, these are multi-drug-resistant gram-negative bacteria for which antibiotics available to treat infections are very limited. Due to this risk, please request that your patient inform any health-care facility on admission and/or routine health-care encounters (such as hemodialysis, oncology clinics, BMT day care) that they have tested positive for CPO. Infection Control measures will be put in place to decrease the likelihood of spreading these bacteria to other patients.

At this time, little is known about the carriage and clearance of CPO infections in the community after treatment. Follow-up testing of clearance is not recommended, as carriage may return after treatment with a carbapenem antibiotic.

Interpretation of this laboratory result should be in context of the overall health of your patient. In the community, patients who test positive for a CPO do not generally pose a risk to others. Patients should be advised to maintain good personal hygiene and avoid sharing personal items to prevent spread to others. Added precautions are NOT required in the community office setting.

Attached is a patient information sheet for your patient (CPO Health file). Further information on CPO is available at BCCDC website.

Appendix H: Enhanced Surveillance Form for CPO Identified in the Community[1]

Q1	**Organism** ☐ CPO (Carbapenamese-Producing Organism)
Q2	**Unique Identifier** Assigned by BCCDC Public Health Laboratory (PHL): _____
Q3	**Clinical Status of the current positive case** (*Use current CDC/NHSN Surveillance Definitions for Specific Type of Infections: http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf*). ☐ Infection ☐ Colonization ☐ Unknown / Unable to determine
Q4	**Date of visit related to the positive culture** *(dd/mmm/yyyy):* ____ / ____ / _____
Q5	**At which care setting was the patient first identified with CPO?** ☐ Outpatient clinic ☐ Emergency Department (without subsequent admission) ☐ Community health center/clinic ☐ Long-term care facility ☐ GP's office ☐ Other *(specify location):* _____
Q6	**Did the patient travel outside of Canada within the past 12 months?** ☐ Yes – *(specify country/ countries):* _____ ☐ Yes - country unknown (travel confirmed, country not known) ☐ No - *skip to Q8* ☐ Unknown / Unable to determine if travel occurred - *skip to Q8*
Q7	**If "Yes" to Q6, did the patient have a health-care encounter outside of Canada within the past 12 months?** ☐ Yes – overnight stay in a hospital or underwent medical/surgical procedure outside of Canada in the past 12 months ☐ Yes – other health-care encounter in the past 12 months (e.g., visited GP, walk-in clinic, dentist, ER)

	☐ No health-care encounter outside Canada in the past 12 months ☐ Unknown / Unable to determine
Q8	**Did the patient have an overnight stay in a Canadian facility or undergo medical/surgical procedure in Canada (including BC) within the past 12 months?** ☐ Yes – *(specify province/s):* _____ ☐ No – *skip to Q10.* ☐ Unknown / Unable to determine – *skip to Q10.*
Q9	**If "Yes" to Q8 and BC was one of the provinces, what types of health-care encounters did the patient have in BC in the past 12 months (excluding current admission)?** *(Select all that apply)* ☐ Admission to an acute care unit/facility in BC in the past 12 months ☐ Admission to a long-term care facility in BC in the past 12 months ☐ A medical/surgical procedure in an outpatient setting in BC in the past 12 months ☐ No health-care encounter in BC in the past 12 months ☐ Unknown / Unable to determine
Q10	**Did the patient have a minimum of 12 hours of contact with a known case or environmental sources for CPO within the past 12 months?** *(Check all that apply)* ☐ Yes – within an acute care facility ☐ Yes – within a long-term care facility ☐ Yes – in a private household ☐ Yes – other *(specify):* _____ ☐ No – *skip to Q12* ☐ Unknown / Unable to determine – *skip to Q12*
Q11	**If answered "Yes" to Q10, what was the *nature* of the contact?** *(Select all that apply)* ☐ Roommate ☐ Person in the same unit/facility or house ☐ Health-care provider ☐ Friend/Relative ☐ Environmental sources (e.g., contaminated sink or other surface, medical equipment, etc.) ☐ Other *(specify):* _____ ☐ Unknown / Unable to determine

If the patient was confirmed to have an infection (not just colonized), please complete the following questions	
Q12	**Site(s) of infection** (*Select all that apply*) ☐ Bloodstream ☐ Urinary tract ☐ Respiratory tract ☐ Wound ☐ Surgical site ☐ Other *(specify site):* _____
Q13	**Was the patient admitted to an acute care facility in BC due to CPO?** ☐ Yes – admission was required because of the infection or its complications – *(specify facility name):* _____ ☐ No – admission was for other medical conditions ☐ No – the patient was not admitted ☐ Unknown / Unable to determine

[1]*Once completed, please send to PICNet at picnet@phsa.ca*

Appendix H Definitions and Notes

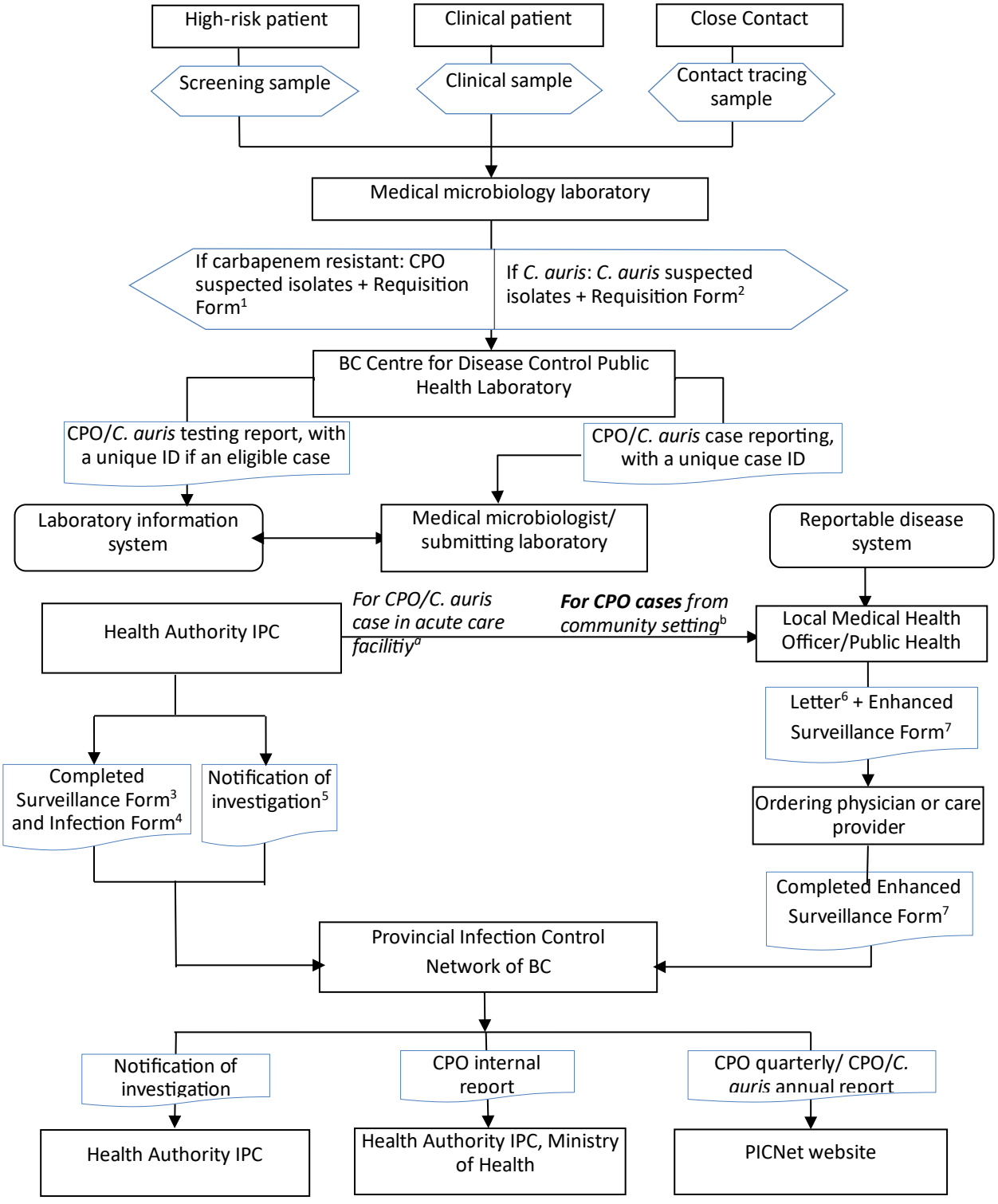
Q1	Organism	Specify CPO
Q2	Unique Identifier	Record the Public Health Laboratory (PHL) identifier exactly as shown on the PHL report. **CPO format:** yyyy####-###-## • yyyy = year of the CPO test for the patient • #### = patient serial number for CPO testing that year (starting from 0001 each year) • ### = isolate serial number for the patient • ## = carbapenamase gene serial number for the patient **Note:** If the PHL identifier has not been received or is unclear, please contact PHL
Q3	Clinical Status	Indicate whether the patient's CPO status represents an infection, colonization according to the following definitions: **Infection:** Clinical signs and symptoms attributable to CPO and a positive culture. Clinical evidence may be derived from direct observation of the infection site (e.g., a wound) review of information in the patient chart or other clinical records, or a physician or surgeon diagnosis of infection. Reference: Use current CDC/NHSN Surveillance Definitions for Specific Types of Infections (http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf). *If infection is selected, please complete Surveillance Form for CPO OR C. auris Cases Identified in Acute Care Facilities.* **Colonization:** Organism present without adverse clinical signs or symptoms. **Unknown / Unable to determine:** Insufficient information to define whether the patient's CPO represents an infection or colonization.
Q4	Date of admission or visit related to the positive culture	Record the admission or visit date related to the positive culture for CPO in the **Day–Month–Year format** using a three-letter month abbreviation (**e.g., 17-Jul-2025**)
Q5	At which care setting was the patient first identified with CPO?	Specify the setting where the patient was first identified with CPO, based on the location of specimen collection: **Outpatient clinic:** A hospital-affiliated or standalone clinic providing scheduled outpatient services.

		Emergency Department (without subsequent admission): The patient was seen in the ED and discharged without inpatient admission. **Community health center/clinic:** A community-based clinic providing primary care or specialized services. **Long-term care facility:** Includes nursing homes, residential care, or other facilities providing 24-hour care for residents. **General practitioner's (GP) office:** A practice providing primary care services. **Other (specify location):** Any setting not listed above (e.g., dialysis unit, correctional facility). Provide details in the space provided.
Q6	Did the patient travel outside of Canada within the past 12 months?	**Yes – specify country/countries:** Record all countries visited during the past 12 months. **Yes – country unknown:** Travel outside Canada is confirmed, but the specific country/countries are not known. **No –** *skip to Q9***:** The patient did not travel outside Canada in the past 12 months. **Unknown / Unable to determine –** *skip to Q9***:** Insufficient information to determine whether travel occurred.
Q7	If "Yes" to Q6, did the patient have a health-care encounter outside of Canada within the past 12 months?	**Yes – Overnight stay in a hospital or underwent medical/surgical procedure**: Includes inpatient admission or procedures such as surgery, endoscopy, dialysis. **Yes – Other health-care encounter:** Includes outpatient visits such as GP, walk-in clinic, dentist, Emergency Department without admission. **No health-care encounter outside Canada in the past 12 months** **Unknown / Unable to determine:** Insufficient information to determine health-care encounters outside Canada. Note: If both hospital admission and other encounters occurred, select both options.
Q8	Did the patient have an overnight stay in a Canadian facility or undergo medical/surgical procedure in Canada (including BC) within the past 12 months?	**Yes:** The patient had an overnight stay in a Canadian facility or underwent a medical/surgical procedure in Canada within the past 12 months. *Specify the province/s where the patient had the health-care encounter/s.* **No:** *Skip to Q10* **Unknown / Unable to determine:** Insufficient information to determine health-care encounters outside Canada - *Skip to Q10*

Q9	If "Yes" to Q8, what types of health-care encounters did the patient have in BC in the past 12 months*?*	Excluding the current admission, indicate the type(s) of health-care encounters in BC. *Select all that apply:* **Admission to an acute care unit/facility:** Includes emergency department visit with subsequent admission **Admission to a long-term care facility in BC in the past 12 months:** Includes both private and health authority owned and operated **A medical or surgical procedure in an outpatient setting in BC in the past 12 months:** Includes day surgery, endoscopy, dialysis **No health-care encounter in BC in the past 12 months** **Unknown / Unable to determine:** Insufficient information to determine health-care encounters in BC
Q10	Did the patient have a minimum 12 hours of contact with a known case or environmental source for CPO within the past 12 months?	Environmental source includes contaminated surfaces, sinks/drains, or medical equipment linked to transmission. *Select all applicable options if multiple types of CPO contact occurred*: **Yes – within an acute care facility**: Contact occurred within an acute care unit **Yes – within a long-term care facility**: Contact occurred within a private or health authority owned and operated long-term care unit **Yes – in a private household:** Contact occurred in a private residence **Yes – other:** If the contact occurred elsewhere, please specify the location. **No:** No contact with a known case or environmental source **Unknown / Unable to determine:** Insufficient information to determine CPO or C. *auris* contact history

Q11	If "Yes" to Q10, what was the nature of the contact?	Specify the nature of the contact with the known case or environmental source. Select all applicable options if multiple types of contact occurred: **Roommate**: Shared the same room during admission or stay **Person in the same unit/facility or household**: Shared common spaces or had prolonged proximity. **Health-care provider**: Direct care or contact with the patient. **Friend/Relative**: Social or caregiving contact outside a health-care role. **Environmental source**: Contact with contaminated surfaces, sinks/drains, or medical equipment linked to transmission. **Other** – Specify any other type of contact not listed above. **Unknown / Unable to determine**: Insufficient information to determine CPO contact history.
The following apply if the patient was confirmed to have an infection (not just colonized)		
Q12	Site(s) of infection	Select all applicable sites of infection or specify if not listed.
Q13	Was the patient admitted to an acute care facility in BC due to CPO?	Indicate whether the patient required acute care admission within 30 days of infection identification due to the infection or its complications: **Yes – admission was required because of the infection or its complications** – *(specify facility name).* **No – admission was for other medical conditions:** The patient was admitted, but not for infection-related reasons. **No – the patient was not admitted:** The patient did not have any acute care admission within 30 days of infection identification. **Unknown / Unable to determine:** Insufficient information to determine whether admission occurred or the reason for admission.

Appendix I: Process Flowchart for CPO and C. auris Surveillance



[a] *includes long-term care units/facilities housed in or affiliated to an acute care facility*
[b] *includes CPO cases identified in community clinics, outpatient clinics, emergency rooms, and long-term care facilities*
1. Requisition Form for CPO Testing (Appendix C); 2. Bacteriology and Mycology Isolates Submitted for Identification Requisition; 3. Surveillance Form for CPO/C. auris (Appendix D); 4. Addendum Form for CPO/C. auris Infection (Appendix E); 5. Notification Form of CPO/C. auris Transmission (Appendix F); 6. Sample Letter to Ordering Provider (Appendix G); 7. Enhanced Surveillance Form for CPO/C. auris (Appendix H)

Contact information

For questions regarding CPO and *C. auris* prevention and control, please visit PICNet's website (www.picnet.ca) for general information, or contact with IPC in your health authority.

Fillable forms for Appendix C, D, E, F, G, and H are available on the PICNet website (PICNet Surveillance Protocols)

For questions regarding CPO or *C. auris* confirmatory tests, please contact

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Medical Director/Medical Microbiologist,
BCCDC Public Health Laboratory
655 West 12th Avenue, Vancouver, BC, V5Z 4R4
Phone: (604) 707-2618
Email: Linda.Hoang@bccdc.ca

For questions regarding the protocol, please contact

Provincial Infection Control Network of BC (PICNet)
200 - 1333 West Broadway
Vancouver, BC V6H 4C1
Tel: 604-875-4373 ext. 205622
Fax: 604-875-4373
Website: www.picnet.ca
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