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

PHSA Laboratories
Public Health Microbiology & Reference Laboratory

Healthcare-associated infections surveillance report

Carbapenemase-Producing Organisms (CPOs) Update

June 9, 2021

Highlights for Q1 – Q3 of 2020/21 (April 1 – December 10, 2020)

- 94 patients were newly confirmed with CPOs, including 2 patients who each had 2 different carbapenemase genes
- Each gene newly identified is considered a new case, totalling 96 new cases of CPOs in Q1 – Q3
- NDM was the most common carbapenemase gene, accounting for 52.1% (50/96)
- Among 96 new cases, 67 cases were reported to PICNet: 65 were identified in acute care facilities and 2 in community health care settings
- Surveillance information was complete for 25 cases[1]: of these, 7 (28.0% of reported cases) had received healthcare outside Canada and one (4.0%) reported travel abroad without a healthcare encounter.

What are carbapenemase-producing organisms (CPOs)?

Carbapenems are a class of antibiotics usually reserved to treat serious infections, and often considered one of the antimicrobial treatments of last resort. Over the last decade, some bacteria have developed resistance to carbapenems by producing an enzyme (carbapenemase) that breaks down the structure of these antibiotics and makes them ineffective. These antibiotic-resistant bacteria are called carbapenemase-producing organisms (CPOs). The most common carbapenemases in Canada include NDM, KPC, and OXA-48.

Why are CPOs considered important?

CPOs are an important emerging threat to healthcare settings and the community. First, these organisms are often resistant to multiple classes of antimicrobials, substantially limiting treatment options. Second, infections caused by these organisms are associated with high mortality rates, up to 50% in some studies. Third, many carbapenem resistance genes can be transmitted from one species of bacteria to another, potentially facilitating widespread resistance. Fourth, since Enterobacteriaceae are a common cause of infections, carbapenem resistance in these organisms could have far-reaching impact. Finally, outbreaks of CPOs are difficult and costly to contain.

How are CPOs spread?

People can carry CPOs without having any symptoms of illness (this is called colonization), but they can still pass the pathogens to other people. CPOs usually spread from person to person by direct contact, for example, if hands are not cleaned after going to the bathroom and before preparing or eating food, or by touching contaminated surfaces or sharing medical equipment that is not properly cleaned and disinfected. Without proper precautions, CPOs can spread easily from person-to-person in hospitals, especially in countries where CPOs are endemic.

How can the spread of CPOs be prevented?

Good hand hygiene by both healthcare providers and patients, such as washing hands often with soap and water or using an alcohol-based hand sanitizer, is a simple and effective way to prevent the spread of CPOs. The public should avoid unnecessary access to health care in endemic countries. In healthcare settings, identifying

[1] Surveillance information was not completed for the remaining cases due to reallocation and re-prioritization of resources to the COVID-19 pandemic response.

CPO cases and placing colonized or infected patients on contact precautions, wise prescribing and use of antimicrobials, and adequately cleaning and disinfecting rooms as well as medical equipment can significantly reduce the risk of CPO transmission.

How can CPOs be treated?

If a person is colonized with CPO, they do not need to be treated with antibiotics. If a person has an infection with CPO, the antibiotics that will work against it are limited, but some options are still available. In addition, some infections may be treatable with other therapies, such as draining the infection.

Tracking CPOs in BC

The first CPO case in British Columbia (BC) was identified in 2008 from a traveller returning from an endemic country where the patient had received medical procedures. Since then, the health authorities (HA), BC Center for Disease Control's Public Health Laboratory (PHL), the Provincial Infection Control Network of BC (PICNet), and the BC Ministry of Health have been working collaboratively to identify and monitor CPOs in the province.

A mandatory CPO surveillance program was established in BC's acute care facilities in July 2014. CPO-suspect isolates are required to be submitted to PHL for molecular testing and genotyping analysis. If the CPO is identified for the first time or identified with a gene encoding a new carbapenemase among inpatients, it is considered a new case of CPO and is to be reported to PICNet, who is responsible for publicly reporting the data. CPO was further designated a reportable condition in BC by the Provincial Health Officer on December 22, 2016. Under the revised provincial surveillance protocol for CPO, endorsed by the Provincial Communicable Diseases Policy Advisory Committee of BC, all newly identified cases of CPO in any health care setting (both acute care and community care) are to be reported to PICNet as of December 19, 2017. The surveillance results in the province have been routinely reported publicly on a quarterly basis.

Summary of CPO cases for Q1 – Q3 of 2020/21

Collection and reporting of CPO surveillance data was delayed due to the COVID-19 pandemic responses in BC health authorities. This report summarizes cases of CPOs newly identified by PHL and surveillance information for new cases reported to PICNet during fiscal quarters 1 to 3 (Q1 – Q3) of 2020/21 (Q1: April 1 –June 25,2020; Q2: Jun 26 – September 17, 2020; Q3: September 18 – December 10, 2020).

Among the isolates submitted to PHL for confirmatory testing during Q1 – Q3 of 2020/21, 94 patients were newly confirmed with CPOs: 92 patients were identified harbouring one carbapenemase gene and two patients had two different carbapenemase genes. Each gene identified for the first time in a given patient is considered a new case of CPO. This amounted to a total of 96 new cases in Q1 – Q3 of 2020/21. Of these, NDM was the most common carbapenemase gene, accounting for 50 cases (52.1%), followed by OXA-48 (21 cases, 21.9%), KPC (18 cases, 18.8%), SME (5 cases, 5.2%), and IMP (2 cases, 2.1%) (Figure 1).

Of the 96 new cases identified at PHL, 67 cases were reported to PICNet by health authorities or care providers. Among the 67 reported cases, 65 (97.0%) were reported in acute care facilities and two (3.0%) were reported in community health care settings (Table 1). Of 65 cases in acute care facilities, 42 were in Fraser Health, 19 were in Vancouver Coastal Health, three were in Interior Health, and one was in Provincial Health Services Authority.

The provincial surveillance protocol includes collecting related patient risk factor details, for example, their travel history, any healthcare encounter whether within BC and/or outside Canada, as well as known exposure to a CPO case or environment in the past twelve months. This surveillance information was complete for 25 cases reported to PICNet (see footnote 1 on page 1): seven cases (28.0% of reported cases) had a healthcare encounter outside Canada and one case (4.0%) reported travel abroad without a healthcare encounter in the past twelve months prior to CPO identification. In addition, eight cases (32.0%) were associated with other risk factors, such as admitted to an acute or long-term care facility, contact with a CPO case, etc. as listed in the provincial surveillance protocol[2]. Ten cases (40.0%) reported no risk factors listed in the provincial surveillance

[2] These risk categories are not mutually exclusive – patients reporting healthcare exposure outside Canada may also be identified with other risk factors listed in the provincial surveillance protocol.

protocol. Surveillance information was not completed for the remaining cases due to the reallocation and re-prioritisation of resources required for the COVID-19 pandemic response. It is worth noting that the number and population of patients screened for CPO may vary compared to previous quarters, due to restrictions including non-essential travel and delay of non-urgent healthcare services during COVID-19 pandemic.

Figure 1. Distribution of carbapenemase genes newly identified in BC, Q1 – Q3 of 2020/21 (April 1 – December 10, 2020) **(n = 96)**

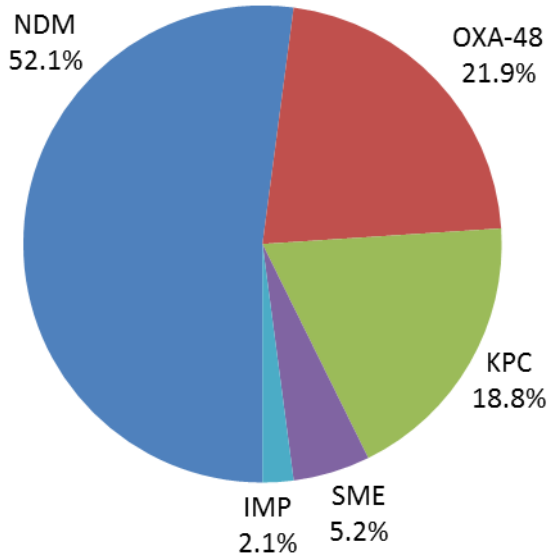

Table 1. Number of new cases of CPO reported in BC by healthcare setting, Q1 – Q3 of 2020/21 (April 1 – December 10, 2020) *** (n = 67)**

Healthcare setting	NDM	OXA-48	KPC	IMP	SME	Total
Acute care facilities	40	12	12	1	0	65
Interior Health	*2*	*1*	*0*	*0*	*0*	*3*
Fraser Health	*26*	*10*	*6*	*0*	*0*	*42*
Vancouver Coastal Health	*12*	*1*	*5*	*1*	*0*	*19*
Island Health	*0*	*0*	*0*	*0*	*0*	*0*
Northern Health	*0*	*0*	*0*	*0*	*0*	*0*
Provincial Health Services Authority	*0*	*0*	*1*	*0*	*0*	*1*
Community healthcare settings	1	0	0	0	1	2
Subtotal (Q1 – Q3 of 2020/21)	**41**	**12**	**12**	**1**	**1**	**67**

* based on the date of specimen collection from which a carbapenamase-encoding gene was first identified from the patient.

For more information about CPOs and the provincial surveillance program, please visit the PICNet website at https://www.picnet.ca/surveillance/cpo.