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

September 2020

Highlights for Q3 & Q4 of 2019/20 (September 20, 2019 – March 31, 2020)

- 153 patients were newly confirmed with CPO
- 168 cases of carbapenemase were newly identified, including 15 patients each having 2 different carbapenemase genes
- NDM was the most common carbapenemase genes identified, accounting for 59.5% (100/168)
- Among 168 cases of newly identified carbapenemase, 102 were reported to PICNet: 100 were identified in acute care facilities and 2 were reported in community healthcare settings[1]
- Surveillance information was complete for 29 cases[2]: Of these, 11 cases had a healthcare encounter outside Canada and another 4 cases 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 for treatment. 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 person-to-person through direct contact with infected or colonized people, or by contaminated surfaces. This can happen in both community and healthcare settings. 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 CPO cases and placing colonized or infected patients on contact precautions, using medical devices and

[1] A case of CPO identified outside BC from a BC resident was not included.

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

antimicrobials wisely, and carefully 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.

Summary of CPO cases for Q3 & Q4 of 2019/20

CPOs have been identified among patients in both acute care and community care settings, but remain uncommon in the majority of hospitals and communities. This quarterly report summarizes cases of CPOs newly identified by PHL and surveillance information for new cases reported to PICNet during fiscal quarter 3 and 4 of 2019/20 (Q3: September 20 – December 12, 2019; Q4: December 13, 2019 – March 31, 2020).

Of the isolates submitted to PHL during Q3 and Q4, 153 patients were newly confirmed with CPO, with 168 carbapenemase genes newly identified. Fifteen patients were identified harboring two different carbapenemase genes – each gene identified for the first time in a given patient is considered a new case of CPO.

Among the 168 cases of newly identified carbapenemase, 100 were NDM (accounting for 59.5%), 42 were OXA-48 (25.0%), 21 were KPC (12.5%), 1 was VIM (0.6%), and 2 were SME (1.2%), with the remaining 2 of other genes (1.2%) (Figure 1).

Of the 168 cases of newly identified carbapenemase, 102 cases were reported to PICNet. Among these, 100 (98.0%) were reported in acute care facilities and two (2.0%) were reported in community healthcare settings (Table 1). Of 100 cases in acute care facilities, 73 were in Fraser Health, 26 were in Vancouver Coastal Health, and one in Provincial Services Health Authority.

Surveillance information was complete for 29 cases reported to PICNet: 11 (37.9%) cases had a healthcare encounter outside Canada and another four (13.8%) cases reported travel without a healthcare encounter in the past 12 months prior to CPO identification. In addition, 12 (41.4%) cases were associated with other risk factors listed in the provincial surveillance protocol[3]. Five cases (10.5%) reported no risk factors listed in the provincial surveillance protocol. Surveillance information was not completed for the remaining cases due to the reallocation and re-prioritisation of resources to the COVID-19 pandemic response.

[3] 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.

Figure 1. Distribution of carbapenemase genes newly identified in BC, Q3 & Q4 of 2019/20 (September 20, 2019 – March 31, 2020) **(n = 168)**

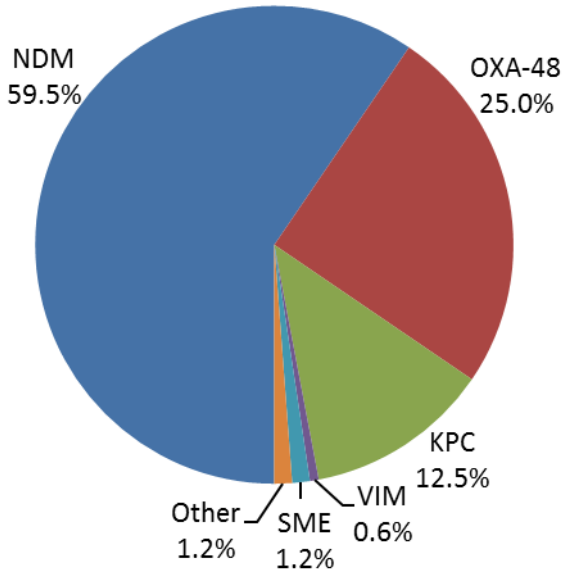

Table 1. Number of new cases of CPO reported in BC by healthcare setting, Q3 & Q4 of 2019/20 (September 20, 2019 – March 31, 2020)*** (n = 102)**

Healthcare setting**	NDM	OXA-48	KPC	IMP	VIM	SME	Total
Acute care facilities	62	27	9	0	1	1	100
Interior Health	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Fraser Health	*45*	*21*	*5*	*0*	*1*	*1*	*73*
Vancouver Coastal Health	*17*	*5*	*4*	*0*	*0*	*0*	*26*
Island Health	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Northern Health	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Provincial Health Services Authority	*0*	*1*	*0*	*0*	*0*	*0*	*1*
Community healthcare settings	2	0	0	0	0	0	2
Subtotal in Q3 &Q4 of 2019/20	**64**	**27**	**9**	**0**	**1**	**1**	**102**
Total in 2019/20	124	56	22	1	1	1	205

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

** a case of CPO identified outside of BC from a BC resident was not included.

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