

Healthcare-associated infections surveillance report

Carbapenemase-Producing Organisms (CPOs) Update

October 2019

Highlights for Q1 of 2019/20 (April 1 – June 27, 2019)

- 83 carbapenemase genes were newly identified from 80 isolates – 3 isolates harboured 2 different genes
- NDM were predominant in the carbapenemase genes identified (45/83, 54.2%)
- Surveillance information was reported for 63 new cases of CPO, including 2 new cases identified at community healthcare settings
- 41 of the reported cases (65.1% of reported cases) had healthcare encounters outside Canada

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 include NDM, KPC, OXA-48, etc.

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 more 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 germs 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 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 Q1 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 CPOs newly identified at PHL and surveillance information for new cases reported to PICNet during fiscal quarter 1 of 2019/20 (April 1 – June 27, 2019).

Of the isolates submitted to PHL during Q1, 83 carbapenemase genes were newly identified from 80 isolates, including three isolates harbouring genes encoding two different carbapenemases – each gene identified for the first time in a given patient is considered a new case of CPO.

Of the 83 genes newly identified, 45 were NDM (accounting for 54.2%), 27 were OXA-48 (32.5%), 7 were KPC (8.4%), 2 were VIM, and 2 were IMP (4.3% each) (Figure 1).

Surveillance information was collected and reported to PICNet for 63 new cases of CPO (Table 1) – 61 cases (96.8%) were identified in acute care facilities and two cases (3.2%) were identified in community healthcare settings. Of the 61 cases in acute care facilities, 46 cases (73.0% of total reported cases) were identified in Fraser Health, 14 cases (22.2%) were identified in Vancouver Coastal Health, and 1 case (1.6%) was identified in Interior Health.

The surveillance information collected includes risk factors that may have contributed to CPO acquisition in the prior 12 months, including travel or healthcare encounters outside Canada (e.g. overnight hospitalization, medical or surgical procedures, etc.); close contact with a known CPO patient or the patient's environment; and transfer from or stay in a care unit which was under investigation for CPO transmission. Among 63 reported cases, 41 cases (65.1%) reported healthcare exposure outside Canada. Another 9 cases reported travel without healthcare encounter. There were 26 cases (41.3%) that were associated with other risk factors listed in the provincial surveillance protocol¹. Three cases (4.8%) reported no risk factors listed in the provincial surveillance protocol.

¹ 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, Q1 of 2019/20 (April 1 – June 27, 2019)

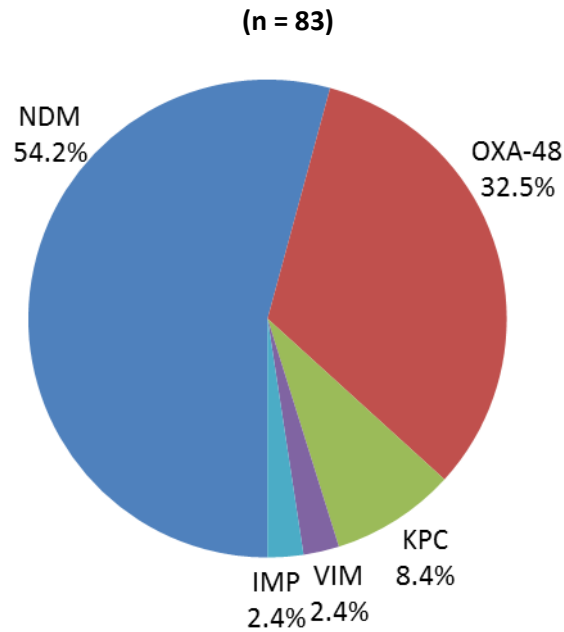


Table 1. Number of new cases of CPO reported in BC by healthcare setting, Q1 of 2019/20 (April 1 – June 27, 2019)* (n = 63)

Healthcare setting	NDM	OXA-48	KPC	IMP	Total
Acute care facilities	35	21	5	0	61
<i>Interior Health</i>	0	1	0	0	1
<i>Fraser Health</i>	28	17	1	0	46
<i>Vancouver Coastal Health</i>	7	3	4	0	14
<i>Island Health</i>	0	0	0	0	0
<i>Northern Health</i>	0	0	0	0	0
<i>Provincial Health Services Authority</i>	0	0	0	0	0
Community healthcare settings	1	0	0	1	2
Subtotal in Q1 2019/20	36	21	5	1	63
Total in 2019/20	36	21	5	1	63

* 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>.