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

August 2018

Highlights for Q4 2017/18 (Dec 1, 2017 – March 31, 2018)

- 52 new cases of CPO were identified among 51 patients.
- 2 cases were reported in community healthcare settings, including the first CPO case identified in the region of Northern Health.
- The NDM resistance gene accounted for the majority of cases (41 cases, 78.9%).
- 26 cases (50.0%) reported 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 carbapenemase resistance genes include NDM, KPC, OXA-48, etc.

Why are CPOs considered important?

CPOs are an important emerging threat to public health. 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 *Enterobacteriacae* 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 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 we prevent the spread of CPOs?

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), and the Provincial Infection Control Network of BC (PICNet) have been working collaboratively to identify and monitor CPOs in the province.

A mandatory CPO surveillance program among BC acute care facilities was established in July 2014. 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, CPO that was identified for the first time or identified with a new carbapenamase gene from a patient in any health care settings from acute care to community care are to be reported to PICNet from December 2017.

Summary of CPO cases for Q4 2017/18

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 new cases of CPO identified in BC during fiscal quarter 4 of 2017/18 (Q4, December 1, 2017 – March 31, 2018).

There were fifty-two new cases of CPO identified from fifty-one patients during Q4; one patient was identified with two carbapenemase genes this quarter (each gene identified for the first time in a given patient is counted as a new case of CPO). The majority of new cases (41 cases, 78.9%) harbored NDM genes. Seven cases harbored OXA-48 genes (13.5%), two cases harbored KPC genes (3.8%), and two cases had other genes (3.8%).

Thirty-two cases (61.5% of all cases) were identified in acute care facilities in Fraser Health. Vancouver Coastal Health reported fifteen cases (28.9%), Provincial Health Services Authority reported two cases (3.8%), and Interior Health reported one case (1.9%). The remaining two cases (3.8%) were identified in community healthcare settings, including the first CPO case identified in the region of Northern Health.

New cases were investigated for risk factors that may have contributed to CPO acquisition in the past twelve months, including 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. Twenty-six cases (50.0%) reported healthcare exposure outside Canada, and ten (19.2%) were associated with other risk factors[1]. Sixteen cases (30.8%) reported no known risk factors, meaning that the source of their CPO acquisition could not be identified.

[1] These risk categories are not mutually exclusive – patients reporting healthcare exposure outside Canada may also have other risk factors identified.

Number of new cases of CPO identified in BC by carbapenemase gene (Dec 1, 2017 – March 31, 2018)*

Healthcare setting	NDM	OXA-48	KPC	Other	Total
Acute care settings	40	6	2	2	50
Interior Health	1	0	0	0	1
Fraser Health	28	4	0	0	33
Vancouver Coastal Health	9	2	2	2	15
Island Health	0	0	0	0	0
Northern Health	0	0	0	0	0
Provincial Health Services Authority	2	0	0	0	2
Community healthcare settings	1	1	0	0	2
Subtotal in Q4 2017/18	**41**	**7**	**2**	**2**	**52**
Total in 2017/18	**96**	**21**	**12**	**2**	**131**

* based on the date of specimen collection from which a carbapenamase resistant gene was first identified or a new gene was 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.