

# Carbapenemase-Producing Organisms (CPO) Fact Sheet

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## What is Carbapenemase-Producing Organisms (CPO)?

CPO refers to bacteria such as *Klebsiella*, *Escherichia coli* (*E. coli*), *Acinetobacter*, and *Pseudomonas*, that are found in normal human intestines. In some parts of the world this group of bacteria have acquired genes that make them resistant to a broad spectrum type of antibiotics including those known as carbapenem antibiotics.

Some common examples of these genes are the New-Delhi Metallobetalactamase (NDM) and *Klebsiella pneumoniae* Carbapenemase (KPC). The NDM genes originated in India and Pakistan and are considered common in some health care settings. KPC originated in the US, and is now regularly found in places such as the US, Greece and Asia.

## Where is CPO found?

CPOs are found commonly in quite a number of countries in the world. They don't always cause infections, but often reside in the intestine of people who have become carriers of bacteria with these genetic changes. Infections are most likely acquired through health care exposures in areas where these bacteria are commonly found. These include countries where CPO have been identified in their health care facilities.

The common Enterobacteriaceae (the family of bacteria that includes *E. coli*, *Serratia*, *Klebsiella* and *Enterobacter*) are found in normal human intestines. When members of this family have become resistant to carbapenam by producing carbapenemase, they have been called carbapenem resistant enterobacteriaceae (CRE) or carbapenemase producing enterobacteriaceae (CPE). CPOs include the larger group of bacteria, beyond the enterobacteriaceae family.

Sometimes these bacteria can spread outside the gut and cause serious infections, such as urinary tract infections, bloodstream infections, wound infections, and pneumonia. When these normal gut bacteria acquire the characteristics for CPO and spread outside the gut, they can be very difficult to treat. The patient can become susceptible to infections caused by these antibiotic-resistant bacteria.

## **What are the risk factors for CPO?**

The initial risk factor is health care exposures in countries where these bacteria are commonly found. This means individuals who have had surgery, dialysis or been admitted to health care facilities in CPO affected locales are at increased risk of acquiring the bacteria and developing infections.

## **How are CPO infections treated?**

CPO is sometimes difficult to treat because they have high levels of resistance to antibiotics. However, there are combinations of antibiotics available to effectively treat most infections. Strains of CPO resistant to all antibiotics are very rare but have been reported internationally. Depending on the type of infections other therapies might be available such as draining the infection.

## **What is the situation in British Columbia health care facilities related to CPO in 2013?**

Since the global increase of CPOs in the last few years, hospitals along with the Provincial Health Services Authority's Public Health Laboratory in Vancouver have been actively testing for and monitoring CPO in BC. Facility infection control programs are quickly alerted of identified cases to prevent transmission. As well, patients who are returning from countries where they have received health care services and where these bacteria are common are also tested for CPO when they enter a BC facility. These screening programs allow hospitals to reduce the spread of these bacteria to other patients through enteric infection control practices.

Last year, 53 were identified in the province compared to 29 in 2012 and 14 in 2011. These cases included NDM, KPC, as well as less significant CPOs. Most of those persons were carriers of the CPO and did not have an invasive infection with the CPO.

The increase in numbers between 2011 and 2013 were mostly from returning overseas travellers. Although transmission within facilities have occurred and contributed to this increase, outbreaks were identified and effectively controlled.

## **What is status of surveillance and action in British Columbia related to CPO?**

In BC, CPO is being tracked by the Health Authorities who are responsible for health care facilities and infection control within these settings.

Both health care acquired infections and antibiotic resistant organisms are detected in microbiology laboratories across the province. The PHSA Public Health Laboratory in Vancouver assists with specimen testing, CPO confirmation and provincial data tracking.

## **What level of concern do health care officials and infection control experts have about CPO currently in BC?**

As with all antibiotic resistant organisms that are found in some patients in health care facilities, we have a high level of alert but a moderate level of concern. A combination of active surveillance, aggressive infection control screening protocols and laboratory testing measures are in place to identify cases and take appropriate actions.

## What can be done to prevent CPO?

To prevent the spread of CPO, health care personnel and facilities should follow infection control precautions:

- Washing hands with soap and water or an alcohol-based hand sanitizer before and after caring for a patient,
- Carefully cleaning and disinfecting rooms and medical equipment,
- Wearing gloves and a gown before entering the room of a CPO patient,
- Keeping patients with CPO infections in a single room or sharing a room with someone else who has a CPO infection,
- Whenever possible, dedicating equipment and staff to CPO patients,
- Removing gloves and gown and washing hands before leaving the room of a CPO patient,
- Only prescribing antibiotics when necessary.

To prevent the spread of CPO, the public should:

- Avoid unnecessary exposures to health care measures in endemic countries,
- Inform your health care professionals if you had a medical procedure done recently while travelling to an endemic country prior to a procedure (e.g. dialysis) or seeking treatment (e.g. Emergency room visit, elective surgery) in a facility in Canada.

## What is the difference between CPO, CPE and CRE?

The differences depend on the type of bacteria that is being included and the mechanisms of resistance to carbapenem antibiotics.

Carbapenem Resistant Enterobacteriaceae (CRE) refers to bacteria in the family of Enterobacteriaceae (e.g. *E.coli*, *Klebsiella*, etc) that are resistant to carbapenem antibiotics regardless of the method of resistance, as there are a number of different ways.

Carbapenemase Producing Enterobacteriaceae (CPE) refers to bacteria in the family of Enterobacteriaceae (e.g. *E.coli*, *Klebsiella*, etc) that are resistant to carbapenem antibiotics by producing an enzyme to break down the carbapenem antibiotics. This is determined by testing for the genes that produce these enzymes, such as KPC and NDM.

Carbapenemase Producing Organisms (CPO) refers to bacteria in the family of Enterobacteriaceae (e.g. *E.coli*, *Klebsiella*, etc) and those that do not belong to this family such as *Pseudomonas*, that are resistant to carbapenem antibiotics by producing an enzyme to break down the carbapenem antibiotics. This is determined by testing for the genes that produce these enzymes, such as KPC and NDM.

## Why is the BCCDC using the term CPO?

As we know that the genes for carbapenem resistance can be transferred to bacteria in the Enterobacteriaceae family and to bacteria not within this family, the term CPO includes the larger group of potentially affected bacteria. This is important for surveillance purposes so that we do not miss any groups of bacteria that may be carrying and spreading these antibiotic resistant genes.