

OBJECTIVES

- To strengthen a robust, partnership-driven Carbapenemase-Producing Organisms (CPO) surveillance system in British Columbia (BC) based on standardized health authority data.
- To maintain the provincial system that closely monitors CPO incidence in BC.
- To provide an automated, quarterly CPO surveillance report to internal partners.

METHODS

Collaboration

- Since 2014, PICNet has collaborated with multiple partners on various elements of the provincial CPO surveillance system by creating a standardized protocol, data flow processes, automated analyses with accurate interpretation, and consideration of feedback for improvements to the system.

2024 Novel Reporting

- In 2024, PICNet developed an automated quarterly surveillance report that provides advanced descriptive analyses on CPO surveillance in the province.
- This interactive report links surveillance data on CPO risk factors (e.g., travel, healthcare-use, and contact history) to gene and allele-level genomics laboratory data, discovering novel insights into the provincial epidemiology of CPO. Analyses of this report were automated to be reproduced, and shared with internal partners, on a quarterly frequency.

RESULTS

- Following a low incidence rate in 2020/21, concurrent with the COVID-19 pandemic, the provincial CPO incidence rate in acute care settings has been on the rise (Figure 1).
 - This dip and rise in rate may partially be explained by various measures during the COVID-19 pandemic. (e.g., travel restrictions, resource allocation).
 - The rate of CPO cases in the first quarter of 2024/25 was 10 per 10,000 admissions, compared to 5.7 per 10,000 admissions in the first quarter of 2019/20, prior to the COVID-19 pandemic.
- From the first quarter of 2019/20 to the first quarter of 2024/25, there has been a 68% rise in total new CPO cases in BC.
- The proportion of cases reporting travel and healthcare outside Canada dipped during the pandemic before rebounding, whereas the proportion of cases with a prior healthcare exposure within BC has remained more consistent (Table 1).
- Alleles NDM-5 and OXA-181 were more common in cases with travel history while NDM-1 and KPC-3 were more common in cases without travel history (data not shown).

Figure 1: CPO Incidence Rates per 10,000 Admissions in Acute Care Settings in BC.

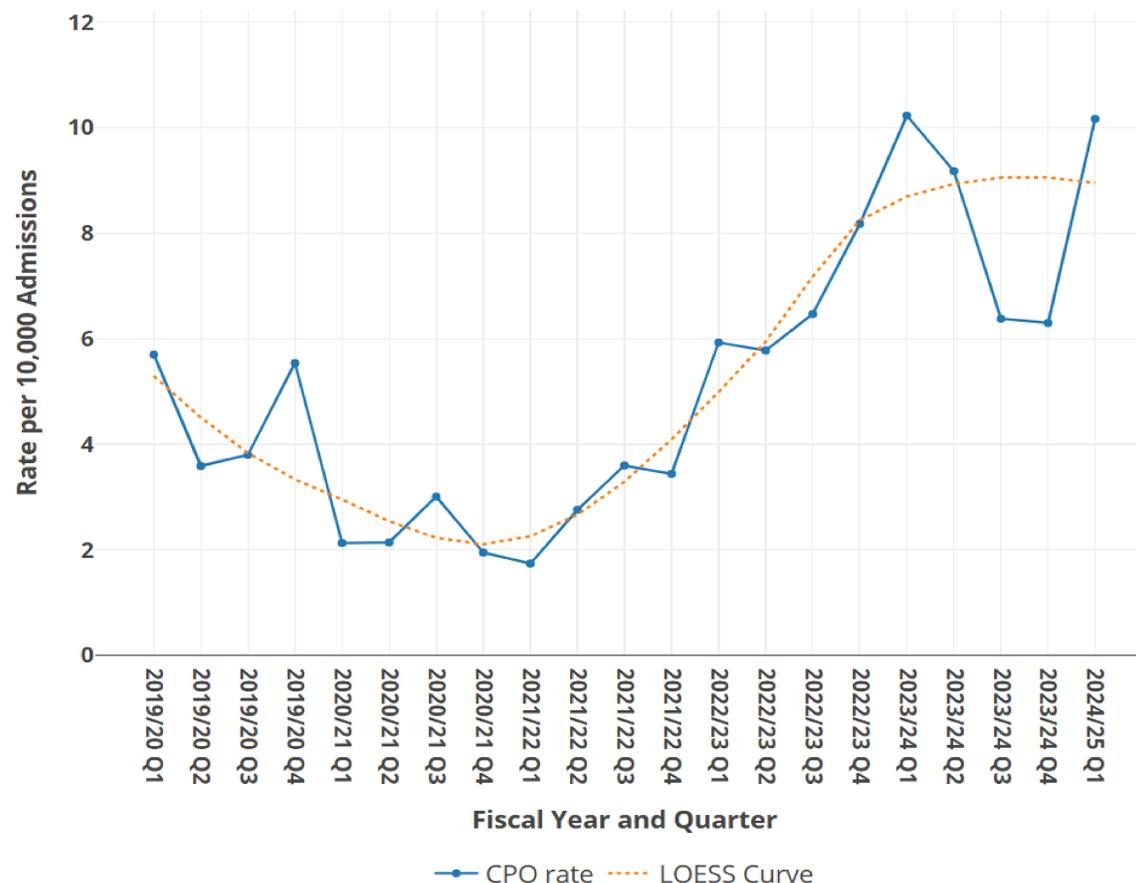


Table 1: CPO Cases in BC by Key Risk Factors in the Year Before Presentation*.

| Fiscal Quarter | Travel Outside Canada | Healthcare outside Canada | Healthcare in BC | Total Cases |
|----------------|-----------------------|---------------------------|------------------|-------------|
| 2019/20 Q1 | 51 (61%) | 41 (49%) | 26 (31%) | 84 |
| 2020/21 Q1 | 11 (41%) | 5 (19%) | 11 (41%) | 27 |
| 2021/22 Q1 | 2 (9%) | 1 (4%) | 10 (43%) | 23 |
| 2022/23 Q1 | 37 (52%) | 31 (44%) | 34 (48%) | 71 |
| 2023/24 Q1 | 61 (48%) | 43 (34%) | 61 (48%) | 127 |
| 2024/25 Q1 | 72 (51%) | 41 (29%) | 45 (32%) | 141 |

*Note: Risk factors are not mutually exclusive. A CPO case can have more than one risk factor.

CONCLUSIONS

- Continual partner-informed improvements occur to the provincial CPO surveillance system, such as adding genomics-related analytics and improving the interactive features of the report.
- The new quarterly report provides information to guide action and decision-making to address CPO within health authorities and province-wide. It has also led to novel insights in the epidemiology of CPO in BC. For example:
 - During the COVID-19 pandemic there was a greater reduction in the proportion of cases with travel history than in the proportion of cases with a health-care encounter in BC history.
- BC is experiencing similar CPO trends to what is observed nationally.
- BC is prioritizing CPO surveillance and advanced analytics to monitor existing and emerging trends, to facilitate a provincial response.
- Collaboration will continue in order to improve CPO surveillance measures including additional genomic analyses and collection and reporting of CPO case exposure status (e.g. healthcare-associated).

ACKNOWLEDGEMENTS

We would like to thank infection prevention and control, laboratory and epidemiology partners in the health authorities, including Fraser Health, Interior Health, Island Health, Northern Health, Provincial Health Services, Vancouver Coastal Health, and Providence Health Care, Community practitioners, the BCCDC Public Health Laboratory, and the Ministry of Health.