

LABORATORY TRENDS



July 17, 2013

In this Issue:

Laboratory News	1
Recent Outbreaks/Clusters	2
Other Gastrointestinal Outbreaks..	4
Other Respiratory Outbreaks	5
Respiratory Surveillance	6
CRE Surveillance	7

Laboratory News

Retirement of Joe Fung, Public Health Water and Food Microbiologist Expert



After 35 years of service, Joe Fung, Section Head of the BC Public Health Microbiology & Reference Laboratory (BCPHMRL)'s Environmental Microbiology Program, has retired.

Joe has had a notable career in public health, starting as a Laboratory Health Science Officer 3 in the old Prov Lab in 1977 and then being promoted as the Head of the Food Poisoning Laboratory in 1978. In 1984, Joe became the Section Head of both the Water Bacteriology and the Food Poisoning Laboratories where he remained until his retirement.

Joe is an expert in public health food and water microbiology and a recognized leader in the province and in national and international circles. Among Joe's many accomplishments are changes and improvements to the laboratory science of food and water testing. These include being part of the first laboratory in BC to detect parasites in drinking water and being one of the first laboratories to introduce norovirus PCR and subsequently real time PCR testing. Quality and continuous improvement has also been an important activity during Joe's time as Section Head. Lean processes were promoted and integrated into the laboratory's workflows; staff members were also encouraged to advance themselves in this area, becoming Lean Champions.

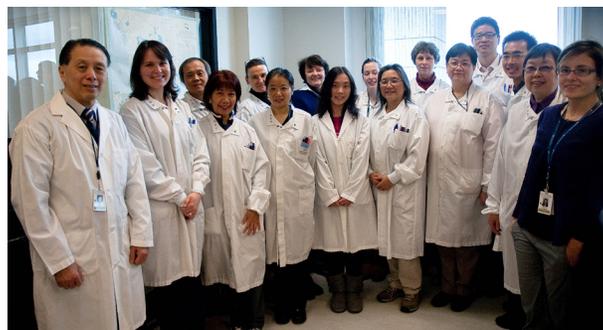
As a leader in this unique area of public health, Joe has fostered many relationships and valued for his expertise by many colleagues. He led the legislated Enhanced Water Quality Assurance Quality Assurance Advisory Group and has chaired the group since its inception. He also sits at the CMPT Proficiency Testing Advisory Group for water testing and has led countless educational sessions for those interested in food or water quality.

Joe has made vital contributions to public health and his dedication, expertise and leadership will be missed.

Appointment of New Section Head for BCPHMRL Environmental Microbiology Program

Brian Auk is the new Section Head of the Environmental Microbiology Program (EM). Brian has previously been the Supervisor of the Enhanced Water Laboratory within the EM Program and brings with him much experience in environmental microbiology research, quality and implementation of new technologies.

Brian may be contacted at [604-707-2608](tel:604-707-2608) or brian.auk@bccdc.ca.



Members of the Environmental Microbiology Program





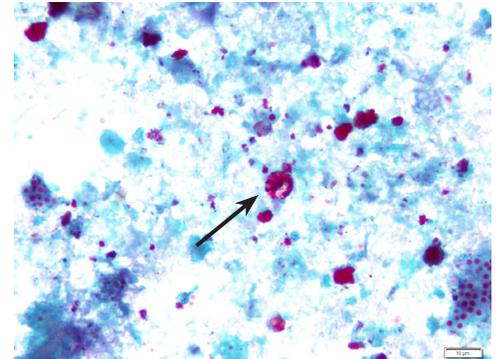
Recent Outbreaks and Clusters

Cyclosporiasis Cluster in BC

Cases of cyclosporiasis are being investigated in the province. To date, this cluster includes six adult cases with no travel history during the incubation period; the source remains unknown. There were 25 and 23 cases of cyclosporiasis in BC in 2010 and 2011, respectively; the majority were determined to be travel-related (British Columbia Annual Summary of Reportable Diseases, BCCDC).

An outbreak of cyclosporiasis beginning in mid-June is also occurring in the Midwestern US. Investigations are ongoing with 80 cases documented to date (ProMED 20130715.1825812). No source has yet been determined

Cyclosporiasis is typically acquired through ingestion of fecally-contaminated fruit, vegetables or water in *Cyclospora cayetanensis*-endemic countries. In Canada and the United States (US), outbreaks of cyclosporiasis have previously been associated with consumption of imported fresh produce. Laboratory confirmation is made by microscopic detection of the oocysts of the parasite. Due to its relatively longer incubation period of approximately two weeks, delay to diagnosis makes public health investigations challenging. We urge the front line microbiology laboratories to ensure cyclosporiasis is ruled out in the stool O&P samples and reports are submitted to the local Health Authorities with as rapid a turn around time as possible to aid in the follow up by public health.



Cyclospora cayetanensis oocysts have variable staining characteristics when stained with a modified acid-fast stain. The image above reveals a fully stained oocyst in the centre.

Measles Outbreak

In June and early July, measles has been confirmed in residents of Vancouver Coastal Health Authority, North Shore/Coast Garibaldi regions and in out of province visitors (three siblings). The seven BC cases are 86% female, 14% male and range from 22 to 49 years old. Exposures in BC have likely resulted in secondary and tertiary transmission in Ontario. Genotype D8 has been found to be the measles genotype in several of these patients.

The last measles outbreaks in BC were associated with a ski resort city in Interior Health Authority in February 2011 with 8 confirmed cases and previous to that, following the 2010 Winter Games with 78 confirmed cases.



Recent Outbreaks and Clusters

Pertussis Outbreak

Between January to June 2013, *Bordetella pertussis* was detected in 111 patient samples by nucleic acid testing (NAT) (Figure 1). This is a decrease from 2012 when there were 152 detections of *B. pertussis* during this period, however, likely a result of high test volumes (Figure 1). Monthly positivity rates ranged from 4.8-6.6% in 2013, compared to 1.9-5.2% in 2012 with the majority of samples and positive results between from Vancouver Island Health Authority. There has been no pertussis activity in Northern Health Authority in 2013. During this period, 56% of patients positive for pertussis have been female while 42% have been male. The age range has been under 1-69 years with 33% 10-19 years old (Figure 2).

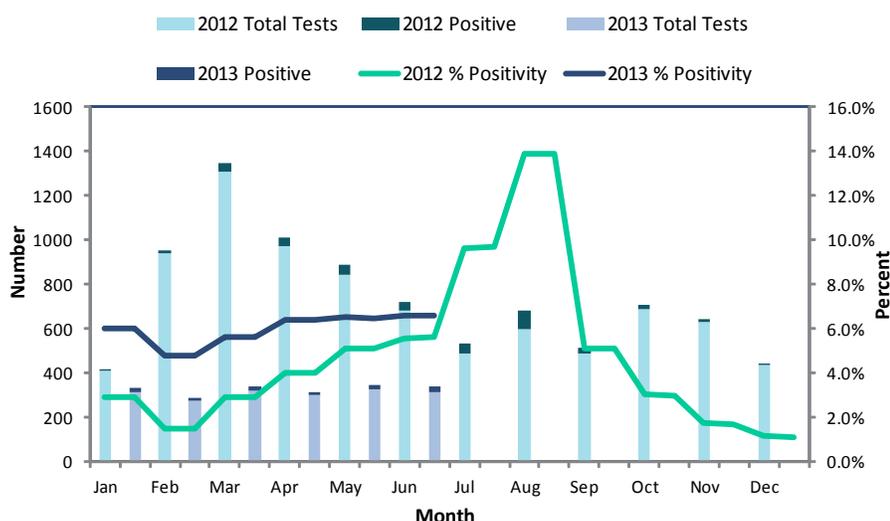


Figure 1 _____
Bordetella pertussis tests requested and positive by PCR, Public Health Advanced Bacteriology & Mycology Program, BCPHMRL.

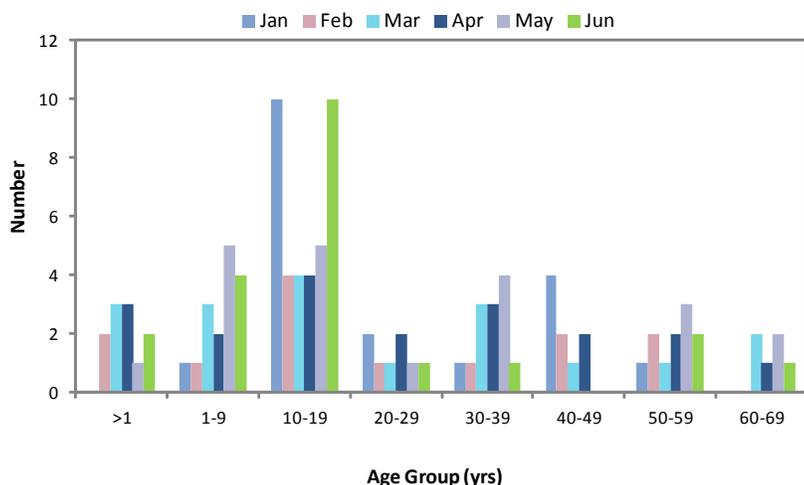


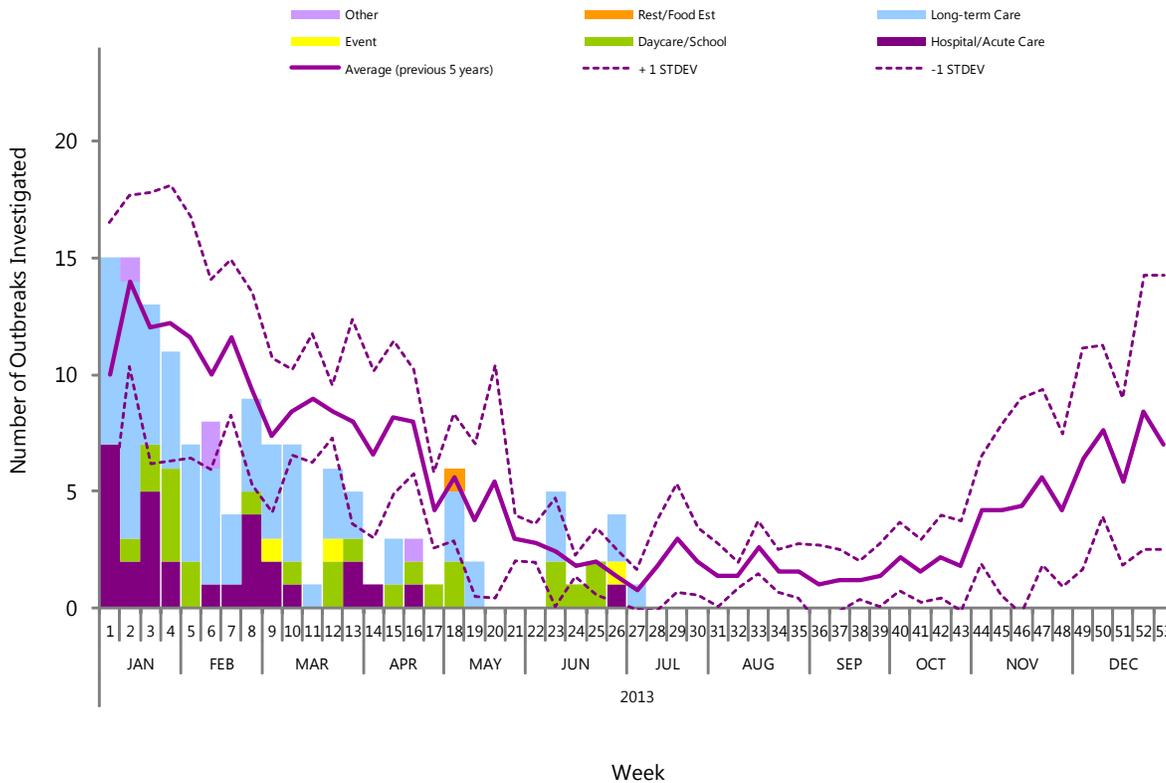
Figure 2 _____
Age groups of *Bordetella pertussis* positive patients, January-June, 2013, Public Health Advanced Bacteriology & Mycology Program, BCPHMRL.



Other Gastrointestinal Outbreaks

In June, the Environmental Microbiology Program at the BCPHMRL investigated 13 gastrointestinal (GI) outbreaks. Outbreaks were identified from six long-term care facilities, five daycares/schools, one event and one hospital (Figure 3). Samples for laboratory testing were submitted for seven (54%) of these outbreaks. Norovirus was confirmed in four (57%) and sapovirus confirmed in one (14%) of these outbreaks at five longterm care facilities.

Figure 3
Gastrointestinal outbreaks investigated* since January, 2013, Environmental Microbiology, Public Health Advanced Bacteriology & Mycology, Parasitology and Virology Programs, BCPHMRL.



* The data available are from outbreaks in which the BCPHMRL has been notified. Some acute care microbiology laboratories are also testing for norovirus in the province and these data may not include outbreaks from all Health Authorities. Given the nature of GI outbreaks, samples are not always available for testing.

LABORATORY TRENDS

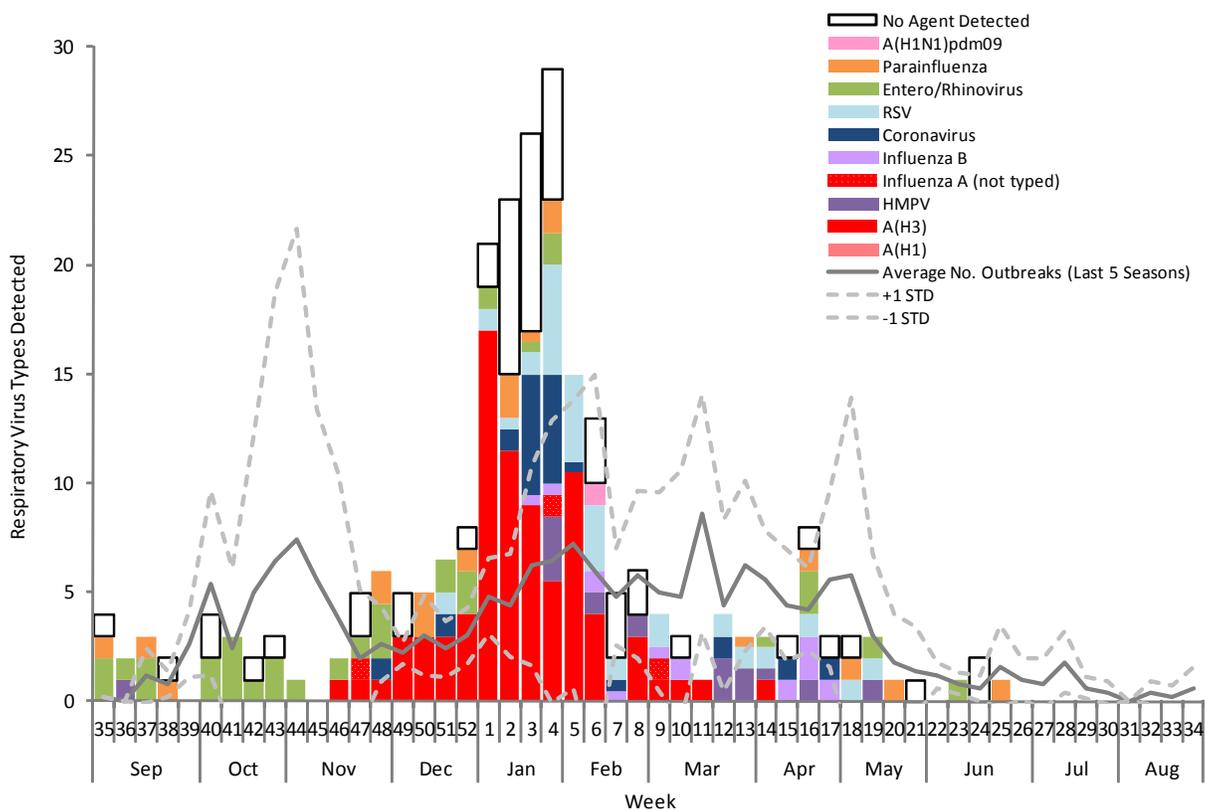
BRITISH COLUMBIA PUBLIC HEALTH
MICROBIOLOGY & REFERENCE
LABORATORY
Vancouver, BC



Other Respiratory Outbreaks

In June, samples were submitted to the BCPHMRL for four respiratory outbreak investigations from long-term care facilities. The number of outbreaks investigated is consistent with what has been historically observed at this time of the year (Figure 4). Parainfluenza virus was detected in one of these outbreaks and entero/rhinovirus detected in another.

Figure 4
Respiratory outbreaks investigated* by respiratory season, Virology Program, BCPHMRL.



* Figure 4 reflects respiratory sample results submitted for investigation to the PHMRL and may not be representative of respiratory outbreaks in the entire BC community.



Respiratory Surveillance

Requests for respiratory testing in the BCPHMRL Virology Laboratory have been consistent over the weeks of May and June and are similar to what was seen in the 2011/12 season (Figure 5). Influenza A virus was detected in 3-4% of the specimens in June compared to 6-14% detected during this period last season (Figure 5). Influenza B virus was detected in 0-3% of the specimens which was similar to the rate in the 2011/12 season (Figure 4). RSV was detected in less than 2% of the specimens.

Nationally, influenza A activity generally decreased to very low levels in all provinces in June (Figure 6). Influenza B rates have also decreased in June to levels either at or below the national rate from the previous season in June (Figure 7).

Figure 5
Respiratory testing volumes and influenza percent positivity, Virology Program, BCPHMRL.

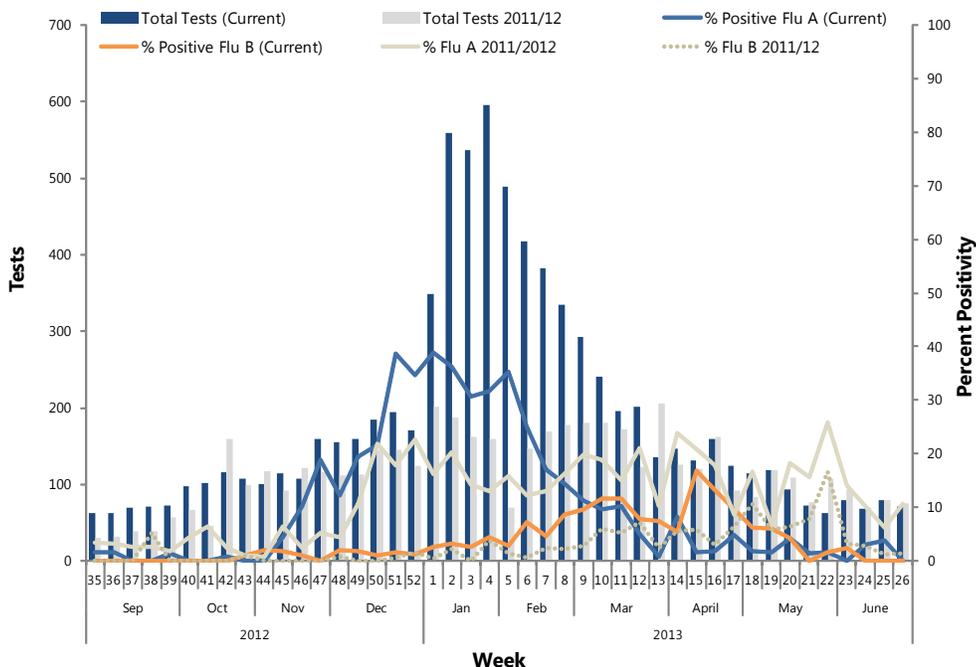


Figure 6
Influenza A percent positivity across Canada, 2012/2013 season.
Source: FluWatch, Public Health Agency of Canada

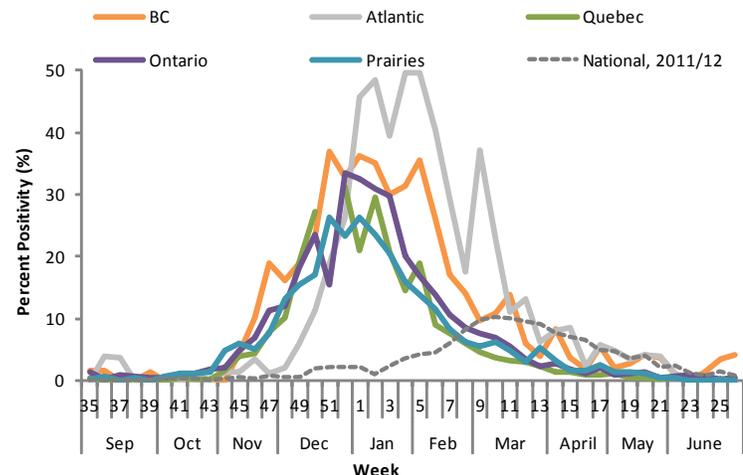
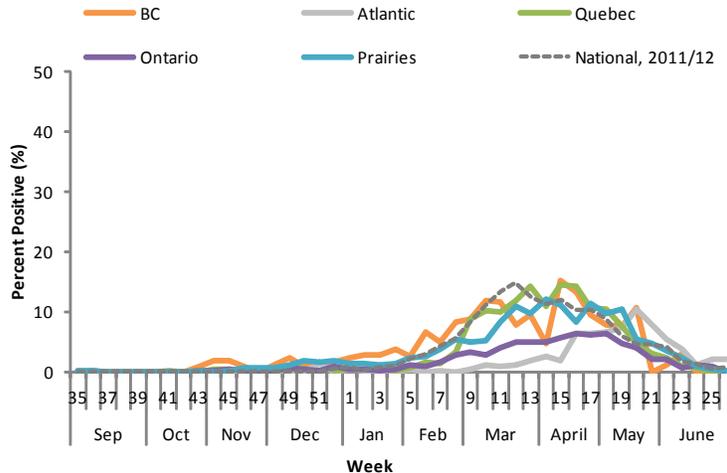


Figure 7
Influenza B percent positivity across Canada, 2012/2013 season.
Source: FluWatch, Public Health Agency of Canada





Carbapenem-Resistant Enterobacteriaceae (CRE) Surveillance

The latest counts for cases of carbapenem-resistant Enterobacteriaceae (CRE) in BC can be found in Table 1 (updated from our March 2013 issue). To date, there have been 75 patients with carbapenem-resistant organisms: 41 harboured the New Delhi Metallo- β -lactamase-1-gene (NDM-1), 11 cases with OXA-48 carbapenemase and two with the *Klebsiella pneumoniae* carbapenem (KPC) β -lactamase gene; some patients had multiple resistance factors including two patients with NDM-1 and OXA-48 carbapenemase and one other case with the KPC β -lactamase gene as well as a the Verona integron-encoded metallo- β -lactamase (VIM) gene (Table 1).

Table 1
Carbapenem-resistant Enterobacteriaceae detected since 2010, Public Health Advanced Bacteriology & Mycology Program, BCPHMRL. Counts include one patient* with KPC and VIM, two patients^ with NDM-1 and OXA-48 in the same year and one patient^s with NDM in 2008 and 2009 (n=79).

Type	Collection Year					
	2008	2009	2010	2011	2012	2013
NDM-1	1 ^s	1 ^s	4	10	15 [^]	13
KPC			1*	1	1	
VIM			1*			
IMP						
OXA-48				1	10 [^]	2
SME			1	3	8	6

In addition to these above plasmid-mediated carbapenemases, resistance can also be achieved by chromosomal-mediated mechanisms such as the *Serratia marcescens* enzyme (SME), found exclusively in *S. marcescens*. There have been 18 cases with SME resistance genes (Table 1). To date, NDM-1-producing isolates are the predominant CRE, comprising 56% of the cases, followed by SME-producing (23%), OXA-48-producing (16%), KPC-producing (4%) and VIM-producing (1%) isolates.

The age range of patients with carbapenem-resistance was from 18 years to 97 years, with the majority (78%) above 60 years old. A variety of CRE organisms were isolated, including *K. pneumoniae*, *E. coli*, *Citrobacter freundii* and *Enterobacter* spp., *Serratia* spp. and *Morganella morganii*. (Figure 8). *K. pneumoniae* has been the most frequently isolated (48%), followed by *Serratia* spp. (25%).

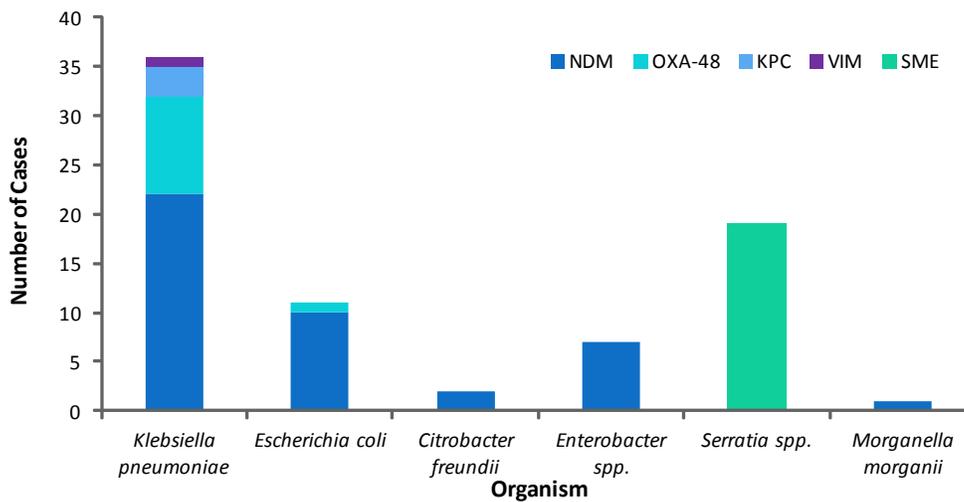


Figure 8
Organisms producing carbapenem-resistance genes, isolated since 2010, Public Health Advanced Bacteriology & Mycology Program, BCPHMRL. Includes patients with more than one resistance factor and organism isolated.



A Report of the BC Public Health Microbiology & Reference Laboratory, Vancouver, BC

The BC Public Health Microbiology Reference Laboratory (BCPHMRL) at the BCCDC site provides consultative, interpretative testing and analyses for clinical and environmental infectious diseases in partnership with other microbiology labs and public health workers across the province and nationally. The PHMRL is the provincial communicable disease detection, fingerprinting and molecular epidemiology centre providing advanced and specialized services along with international defined laboratory core functions province-wide.

This report may be freely distributed to your colleagues. If you would like more specific information or would like to include any figures for other reporting purposes, please contact us.

Editor: Yin Chang

Contact: yin.chang@bccdc.ca

Website: www.bccdc.ca/PHSALaboratories

Co-Editors:

Biosafety, Biosecurity, Biohazard Containment Program

Public Health Lead: Neil Chin

Assistant Biosafety Officer: John Tansey

Environmental Microbiology Program

Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton

Section Head: Brian Auk

Molecular Microbiology & Genomics Program

Program Head and Medical Microbiologist: Dr. Patrick Tang

Section Head: Alan McNabb

Parasitology Program

Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton

Section Head: Quantine Wong

Pre-Analytical, Central Processing & Receiving Program

Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton

Section Head: Annie Mak

Public Health Advanced Bacteriology/Mycology Program

Program Head and Medical Microbiologist: Dr. Linda Hoang

Section Head: Ana Paccagnella

Public Health High Volume Serology Program

Program Head and Medical Microbiologist: Dr. Mel Krajden

Section Head: Annie Mak

Technical Support Program

Section Head: Dr. Mabel Rodrigues

TB/Mycobacteriology Program

Program Head and Medical Microbiologist: Dr. Patrick Tang

Section Head: Dr. Mabel Rodrigues

Virus Isolation Program

Program Head and Medical Microbiologist: Dr. Mel Krajden

Section Head: Alan McNabb

Zoonotic Diseases and Emerging Pathogens Program

Program Head and Clinical Microbiologist: Dr. Muhammad Morshed

Section Head: Quantine Wong

PHSA Laboratories

Public Health Microbiology & Reference Laboratory

