PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

LABORATORY TRENDS

November 7, 2011

In this Issue:

National Collaboration

Canadian Public Health Laboratory Network

The Canadian Public Health Laboratory Network (CPHLN) provides national leadership in the public health laboratory system by being a forum for the sharing of knowledge through its working groups and initiatives. CPHLN core team (Public Health Lab Directors from across Canada) and its working groups function to provide laboratory standards, recommendations and evidence for best practices. Its many surveillance, preparedness and emerging infectious disease projects inform and allow sharing of provincial and territorial data.

National links through CPHLN and CPHLN-linked programs and groups by the BC Public Health Microbiology and Reference Laboratory (PHMRL) are outlined below:

- Antimicrobial Resistance Surveillance System
- Biosafety Officer Network (BSON)
- Bioterrorism Working Group
- Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)
- CRTI Mathematical Modeling
- Multi-Lateral Information Sharing Agreement (MLISA)
- National Enteric Surveillance Program (NESP)
- Pandemic Influenza Laboratory Preparedness Network (PILPN)
- PulseNet Canada
- Reference Standards Working Group
- Syphilis Laboratory Task Group
- Water and Food Task Group
- ViroNet Canada

Laboratory News

Sunquest Laboratory Information System Integration and Upgrade

As part of the Lower Mainland Laboratory Information System (LIS) integration, PHSA Laboratories at the BCCDC Site (PHMRL, Provincial Toxicology and Tumor Marker Laboratory) are upgrading to the same version of the Sunquest LIS that Vancouver Coastal Health (VCH) and Providence Health Care (PHC) are currently using. This integration on the same platform will enable the sharing of electronic orders and results between all sites.

Activities to do date have included a review of each Program's order codes (over 16,000 codes) and result codes (over 22,000 codes) for creation in the new instance of Sunquest. Management of existing shared codes, processes for transfer of specimens from previously different sites into now the same LIS environment and defining approval processes are the types of integration issues that need to be addressed and standardized. The next few months will see much code building and testing prior to the Go Live date of the end of March, 2012.

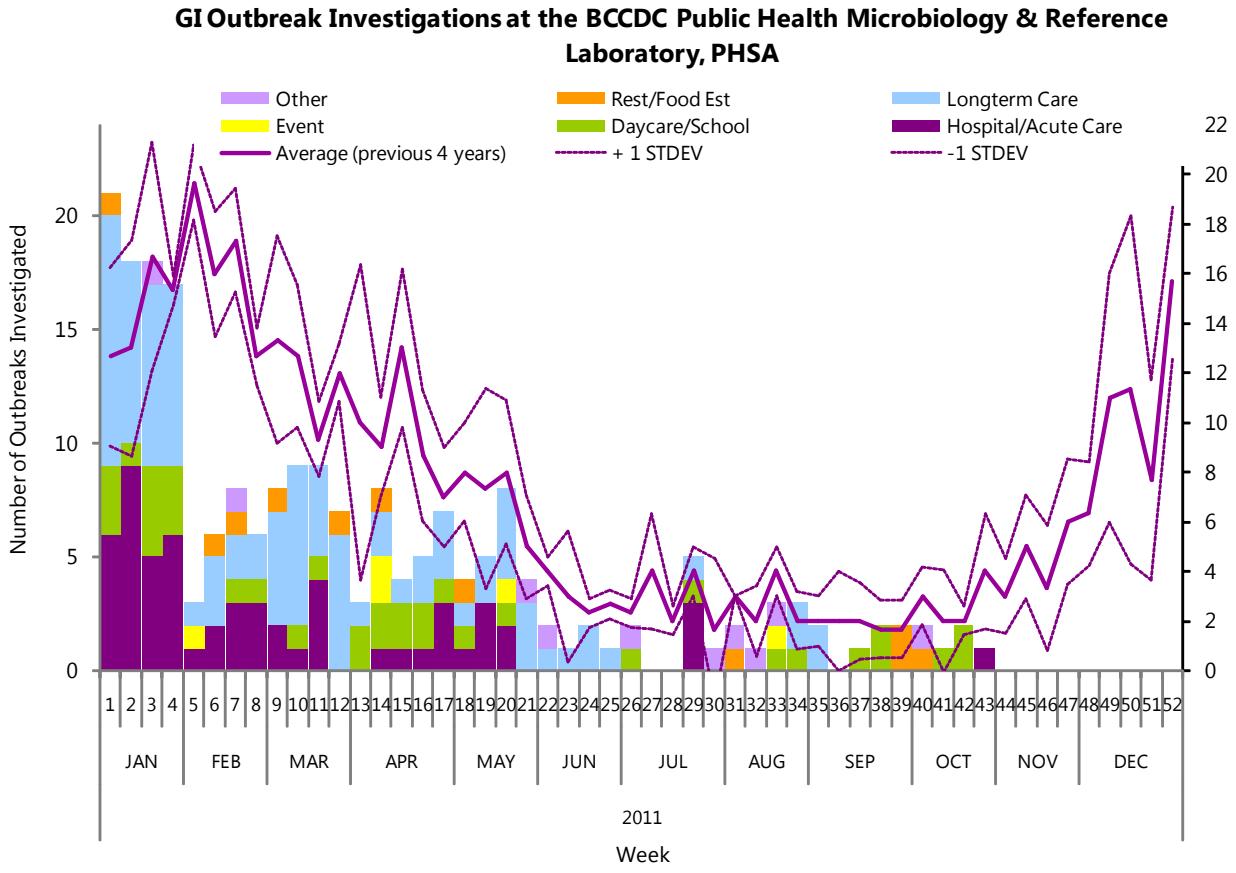
This project will also create better links with the Fraser Health Authority Meditech LIS and Lower Mainland laboratories and allow sharing within the SunSet environment. SunSet is a data repository of laboratory data that will enable historical look up of patients and specimens for both patient care and management functions.

Gastrointestinal Outbreaks

In October, there were 6 gastrointestinal (GI) outbreaks investigated at the PHMRL with 1 confirmed to be due to *Salmonella* Enteritidis. Outbreaks were identified from 1 hospital, 3 daycares, 1 food service establishment and 1 treatment facility (Figure 1).

The data available are from outbreaks in which the PHMRL has been notified. Some acute care microbiology laboratories are also testing for norovirus in the province and these data do not include outbreaks from Vancouver Island Health Authority. Given the nature of GI outbreaks, samples are not always available for testing.

Figure 1
Gastrointestinal outbreaks investigated since January, 2011, Environmental Microbiology, Bacteriology & Mycology, Parasitology and Virology Programs, PHMRL.



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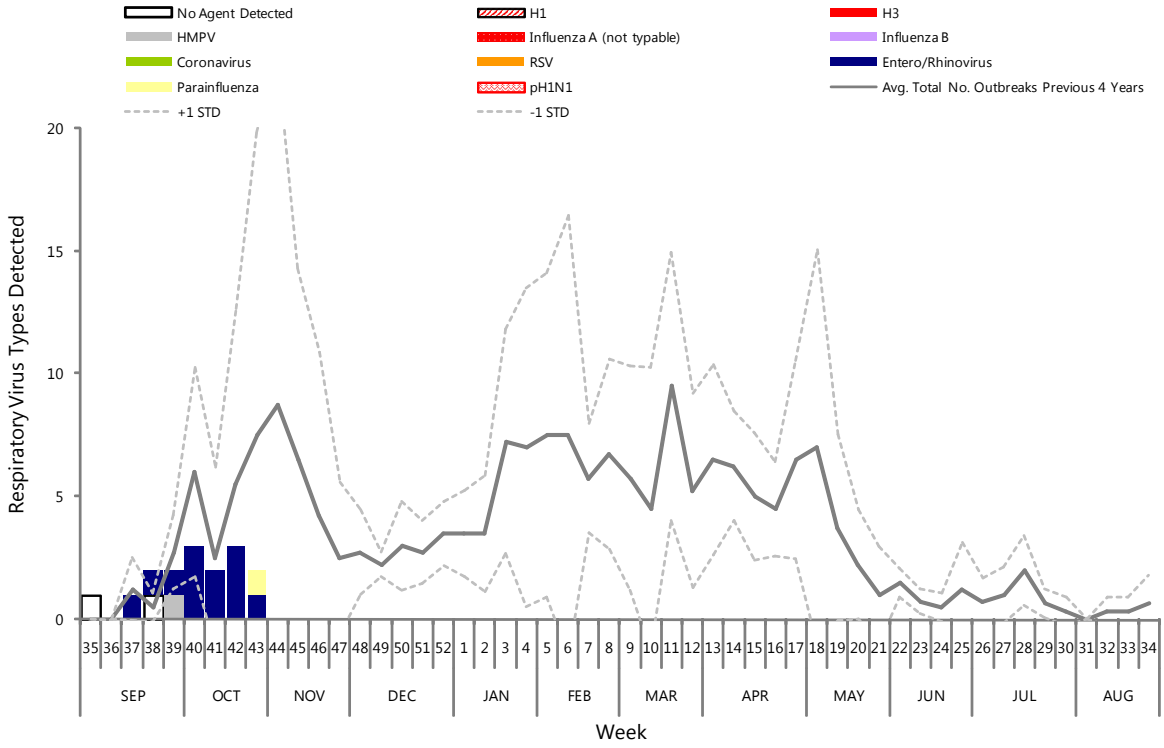
Respiratory Outbreaks

In October, samples were submitted from 11 longterm care facilities for outbreak investigation at the PHMRL (Figure 2). Enterovirus/rhinovirus were detected in 8 facilities and Parainfluenza 1 in the remaining facility using PCR and Luminex methods. Figure 2 reflects respiratory sample results submitted for investigation to the PHMRL and is not representative of respiratory outbreaks in the entire BC community.

Figure 2
Respiratory outbreaks investigated by respiratory season, Virology Program, PHMRL.



Carbapenemase Resistant Enterobacteriaceae (CRE)

The latest counts for cases of carbapenemase resistance can be found in Table 1 (updated from our October 2011 issue). 10 cases with the New Delhi Metallo-β-lactamase gene (NDM) endemic to South Asia have been detected since this work began in 2010. Two cases had the *Klebsiella pneumoniae* carbapenem (KPC) β-lactamase gene (one case with KPC as well as a Verona integron-encoded metallo-β-lactamase (VIM) gene) and 1 case with only the VIM gene. No cases with the IMP-type β-lactamase have been detected.

Table 1. Carbapenem Resistant Enterobacteriaceae Detected, Bacteriology & Mycology Program, PHMRL.

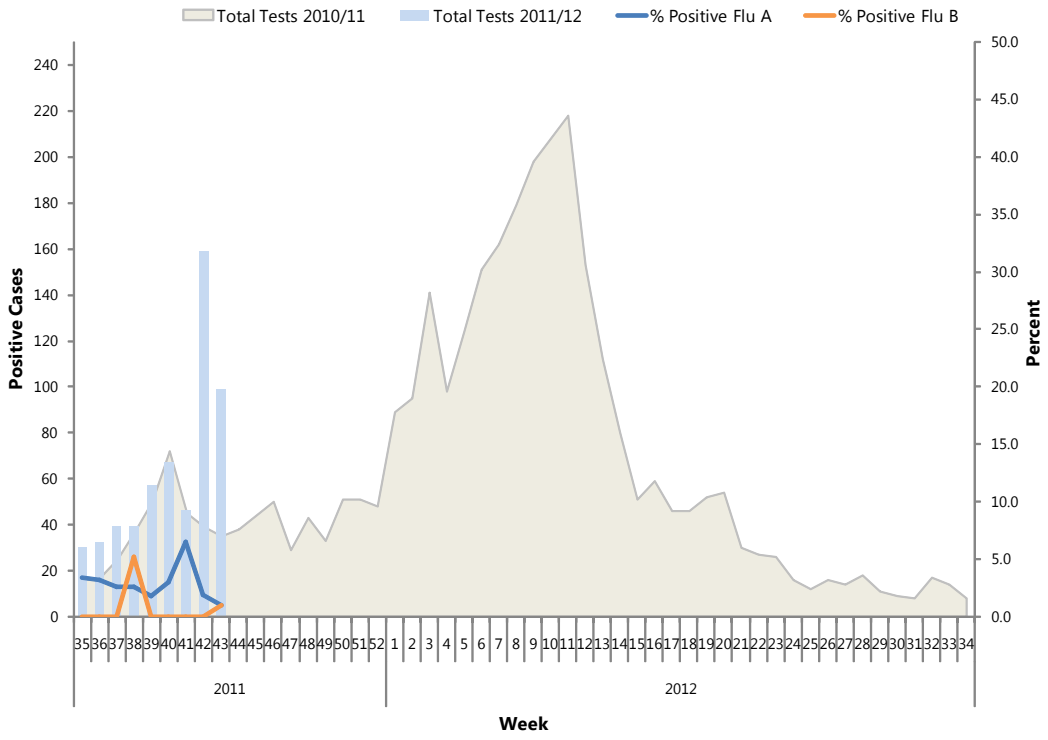
Type	No. of Cases	Comments
NDM	10	
KPC	2	1 case also harboured the VIM gene
VIM	1	In addition to above KPC/VIM case
IMP	none	

Influenza Surveillance

Volumes for respiratory testing have been consistent with those of the previous season with the exception of weeks 42-43 with higher than expected requests for testing (Figure 3). Influenza detections at the PHMRL for this period have been low with influenza A (H3N2) being the major virus type (Table 2).

National influenza trends continues at low inter-seasonal levels. In weeks 40-43 there were 12 detections of influenza A(H3) from BC, Quebec, Ontario and Alberta and 2 detections of influenza B from BC and Quebec. More information can be found on the FluWatch website at http://www.phac-aspc.gc.ca/fluwatch/index-eng.php.

Figure 3
Respiratory testing volumes and influenza percent positivity, Virology Program, PHMRL.



Influenza activity in North America has been low. Influenza activity continues in the tropical regions of the Americas, Central Africa and Southern and Southeast Asia. The influenza season in the southern hemisphere has peaked in Australia and New Zealand and continuing to decline in temperate South America (WHO, 21 Oct 2011 Update).

Table 2
Positive influenza A and B detections for weeks 40-43 (October 2-October 29, 2011, Virology Program, PHMRL. (H1N1)pdm09 refers to the 2009 influenza A(H1N1) pandemic virus.

	Week 40	Week 41	Week 42	Week 43	Total
Number of Specimens Tested	**67**	**46**	**159**	**99**	**371**
Number of Positive Specimens	**3 (4.48%)**	**2 (4.35%)**	**4 (2.52%)**	**2 (2.02%)**	**11 (2.96%)**
Influenza A	3 (4.48%)	2 (4.35%)	4 (2.52%)	1 (1.01%)	10 (2.69%)
(H1N1)pdm09					
sH3N2	*3 (4.48%)*	*2 (4.35%)*	*4 (2.52%)*	*1 (1.01%)*	*10 (2.69%)*
Not typeable					
Influenza B				1 (1.01%)	1 (0.27%)

Enteric Surveillance

One of the key services of the Bacteriology & Mycology Program at the PHMRL is the diagnosis and outbreak investigation of enteric bacterial pathogens for the province. Labs around the province refer in bacterial isolates for serotyping and molecular subtyping for the purposes of public health surveillance. These include: *Salmonella*, *Shigella*, *E.coli*, *Campylobacter* and *Listeria*. Although Campylobacter species are provincially the most common enteric bacterial pathogen isolated by laboratories, most labs do not submit their isolates to the PHMRL for further characterization. Therefore, *Salmonella* represents the most frequent enteric pathogen at the PHMRL with about 1000 cases identified each year compared to about 200 cases of *Shigella* and about 180 *E. coli* annually (Figure 4). *Salmonella* Enteritidis (SE) remains the most common serotype of *Salmonella*, accounting for over 60% of the top 10 serotypes (Figure 5). 2011 has seen much higher numbers of SE cases identified compared to previous years (Figure 6).

Figure 4
Identification of enteric organisms from clinical specimens, Bacteriology & Mycology Program, PHMRL.

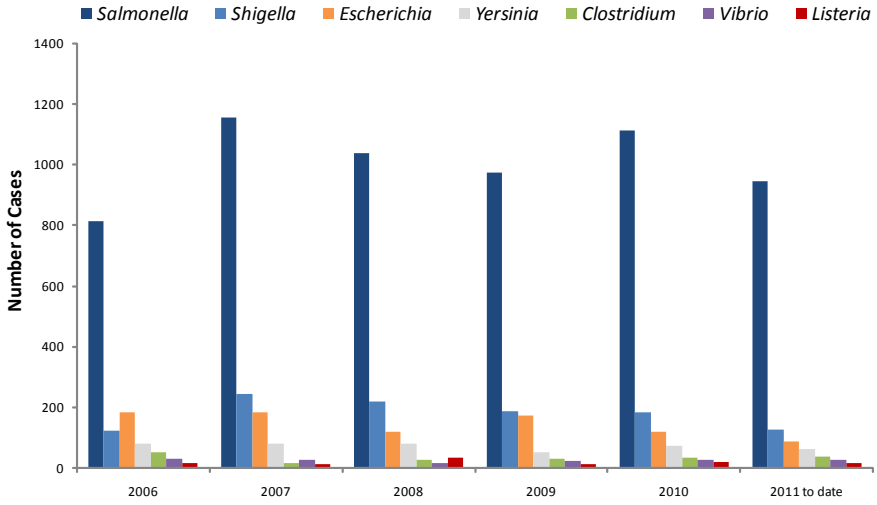


Figure 5
Top 10 serovars of *Salmonella enterica enterica*, 2011 to date. Bacteriology & Mycology Program, PHMRL.

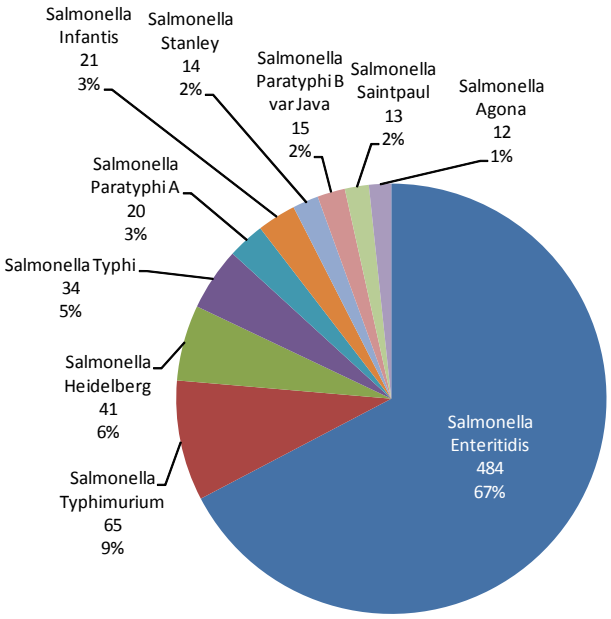
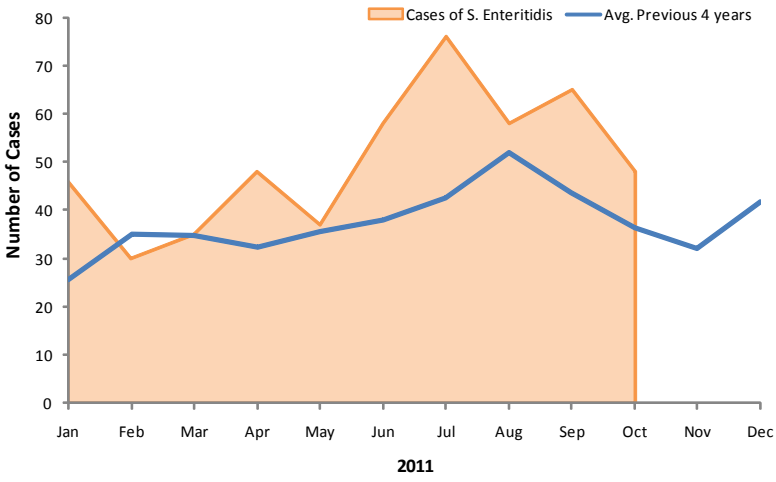


Figure 6
Detections of *Salmonella* Enteritidis in 2011. Bacteriology & Mycology Program, PHMRL.

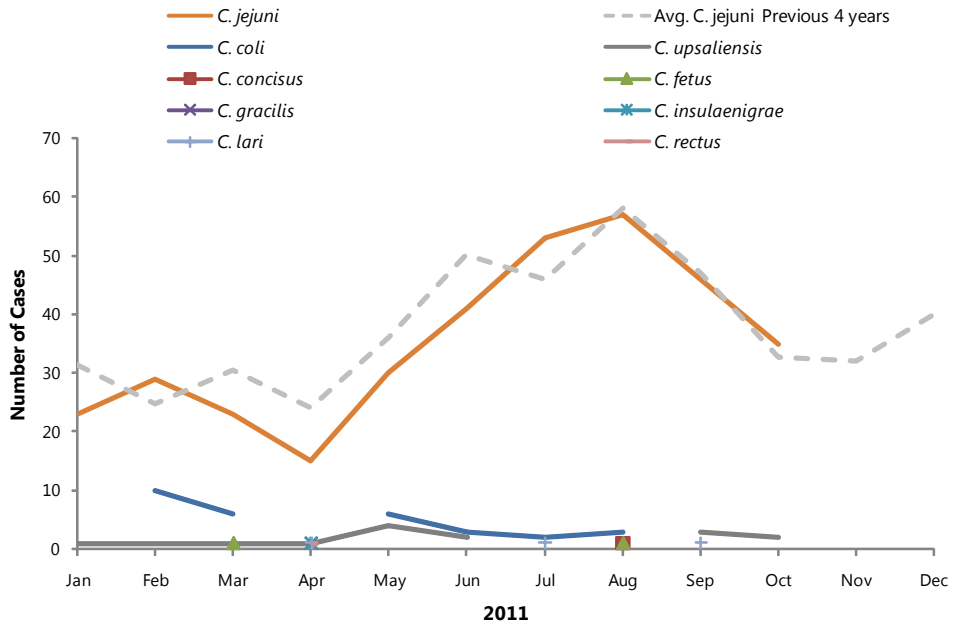


Molecular Enteric Surveillance

The most common subtyping methods currently used are Pulsed-Field Gel Electrophoresis (PFGE) and phage typing. The Bacteriology & Mycology Program performs PFGE to subtype isolates of *Salmonella*, *Shigella*, *E. coli* and *Listeria*. DNA is cut into fragments of different sizes using restriction enzymes and sorted by size under the influence of an alternating electrical current. Small bands migrate further than large bands. The resulting band patterns are compared to patterns in our provincial database and uploaded to PulseNet Canada where the database is queried to see if there are matches nationally. If there are no matches a new pattern name is issued. In cases where there are two isolates with indistinguishable patterns within the last 60 days we term this a cluster. Distinguishing PFGE strain types can be very useful for case clustering and outbreak investigation; however, PFGE has limitations especially for isolates that are extremely clonal which result in the same PFGE patterns. In these cases, phage typing can be used to help cluster isolates.

The PHMRL processes approximately 500 *Campylobacter* isolates yearly for identification by PCR. This is not a true representation of campylobacteriosis in the province since not all the other laboratories which test for this organism refer them to the PHMRL. The majority of isolates received are identified as *C. jejuni*, with cases peaking in the summer months (Figure 7). Standard protocols for subtyping *Campylobacter* do not yet exist and surveillance remains a challenge. In collaboration with the National Microbiology Laboratory, the PHMRL is working on new molecular methods of *Campylobacter* subtyping including Comparative Genomic Fingerprinting.

Figure 7
Cases of *Campylobacter* detected at the Bacteriology & Mycology Program, PHMRL.



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Editor: Yin Chang
Contact: yin.chang@bccdc.ca
Website: www.phsa.ca/bccdcpublichealthlab

Co-Editors:

Bacteriology & Mycology Program
Program Head and Medical Microbiologist: Dr. Linda Hoang
Section Head: Ana Paccagnella

Biosafety, Biosecurity, Biohazard Containment Program
Public Health Lead: Neil Chin
Assistant Biosafety Officer: John Tansey

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Pre-Analytical, Central Processing & Receiving Program
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