BC PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

LABORATORY TRENDS

November 20, 2014

In this Issue:

Surge Teams Preparing for 2014/15 Respiratory Season

The early detection of influenza this season in BC indicates that timelines for preparation need to be shifted ahead to prepare for intensified activity. The predominant virus circulating so far has been influenza A(H3N2), in addition to co-circulation of influenza B in the early weeks of October.

Influenza A(H3N2) typically adversely affects the elderly and national surveillance from FluWatch already suggests that this is the pattern so far this season. BC has also observed several outbreaks at long-term care facilities in October (page 5); if influenza A(H3N2) continues to be the dominant virus circulating, we can expect a more severe season in older age groups. The past influenza season in Australia revealed peak activity sustained over 5 weeks with an overall moderate season. Influenza A(H1N1)pdm09 was the predominant subtype across most of the country except in two jurisdictions where influenza A(H3N2) was predominant and caused a substantial number of outbreaks in elderly care facilities.

In preparation for the upcoming respiratory season, the BC Public Health Microbiology & Reference Laboratory (BCPHMRL) is working on several projects as "Surge Teams", including:

Cross Training Surge Team

Over the coming weeks, 10-12 individuals from across BCPHMRL will be trained on the influenza nucleic acid amplification test (NAT) to be ready to assist in surge capacity. Much like during the influenza pandemic of 2009-2010, these individuals may be called to assist, as needed, based on thresholds of sample test volumes.

Enterovirus Testing

The BCPHMRL Virology Program with support from the Molecular Microbiology & Genomics Program, has over the last two months, been able to respond to the enterovirus (EV)-D68 outbreak by first amplifying and sequencing a portion of the virus genome to identify the virus and then validating and implementing a conventional NAT assay specific for D68. The laboratories have now developed, validated and implemented an EV-D68 specific real-time NAT assay which further reduces turnaround time. The laboratories continue to sequence the VP1 region of the virus genome to provide strain data and to track D68 strains through BC.

ABI Interface Team

As respiratory season involves high-volume testing, automation of any steps in the process shortens turnaround times, increases quality, and improves patient safety. Instrument interfacing is one example of reducing time spent transcribing results by having analytical results from an instrument sent (after validating) to the laboratory information system (LIS). This quality improvement LIS project to interface the instrument used for influenza NAT (ABI 7500/7900) is currently in progress. Once the interface has been validated, there will be decreased risk of transcription errors as well as faster sample turnaround.

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Liquid Handler Surge Team

The Beckman Coulter Biomek® FX^{P} Span 8 liquid handling system is a specialized 96-channel DNA PCR processing robot which transfers, dilutes and dispenses reagents and samples. A strategic decision was made by all BCPHMRL Programs to jointly make this our top capital request to lead more strategic changes in all molecular microbiology programs work to improving efficiency and quality for NATs.

Validation for pipetting accuracy and precision is the first phase interdisciplinary project team followed by a validation on clinical samples for herpes simplex/varicella virus detection. The liquid handler will then be assessed for use for other NATs. The automatic platform, once validated, will enable the Virology Program to fully automate nucleic acid extraction and set up. Successful application to higher volume NATs will mean a decrease in technologist time and better quality with reduction in pipetting errors. Investment in a complicated project by a cross-Program multidisciplinary team will be done in phases to improve both efficiency and effectiveness.

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Respiratory Illness Associated with Enterovirus D68

Since October 23, all respiratory samples are now being screened for enterovirus with subsequent positive samples being typed for EV-D68. Entero/rhinovirus has been detected in 23-48% of all respiratory samples with approximately 9-16% of all respiratory samples positive for EV-D68 (Figure 1).

Since the start of the enterovirus-D68 (EV-D68) outbreak at the end of August (week 35), the BCPHMRL Virology and Molecular Microbiology & Genomics Programs have been able to identify 222 EV-D68 positive samples from 201 patients. These have been from 110 (55%) males and 90 (45%) females. One hundred and fifteen (57%) cases have been under 10 years of age, while 29 (14%) cases have been between the ages of 10-19 years (Figure 2). Adult cases started to appear in October (week 40) with 10 cases currently in the over 60 years age group, including two cases from separate long-term care facilities (Figure 2). Seventy-six (39%) cases reside in the same health authority; however, the outbreak has now spread to all regions in the province (Figure 3).

Figure 1
Percent of entero/rhinovirus and EV-D68 from all respiratory samples, Virology and Molecular Microbiology & Genomics Programs, BCPHMRL.

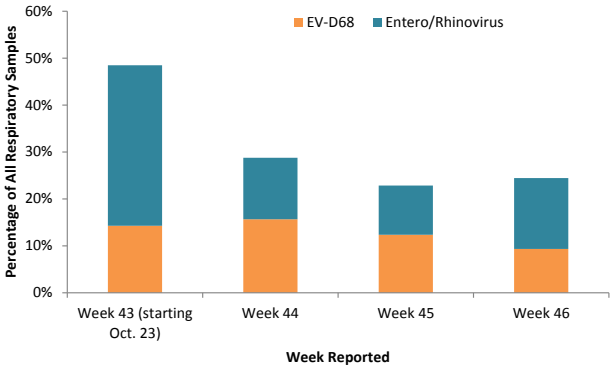


Figure 2
Age distribution of EV-D68 cases to date, Virology and Molecular Microbiology & Genomics Programs, BCPHMRL.

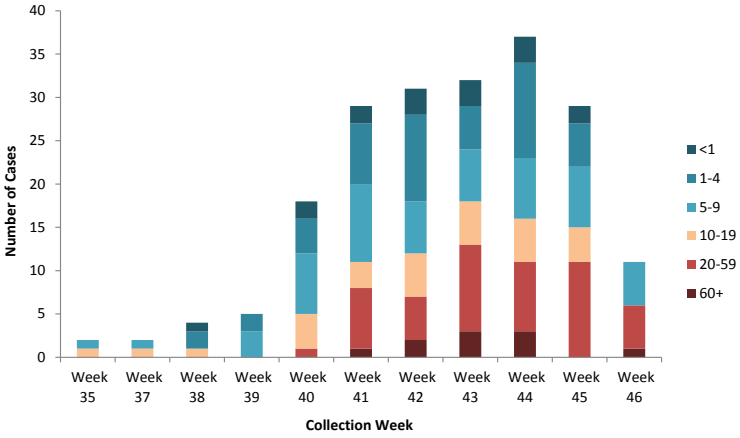
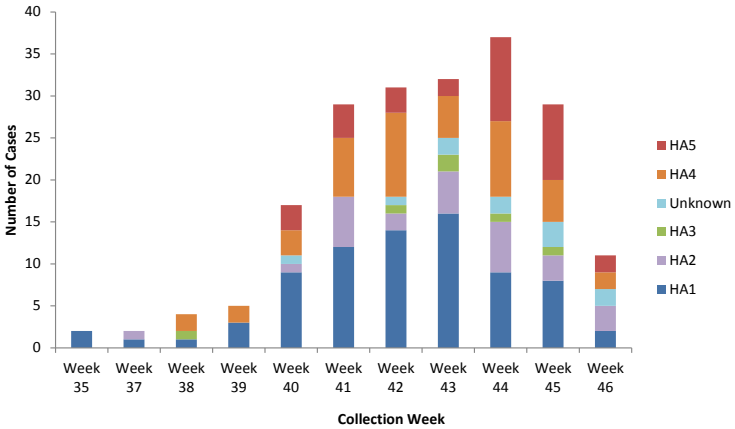


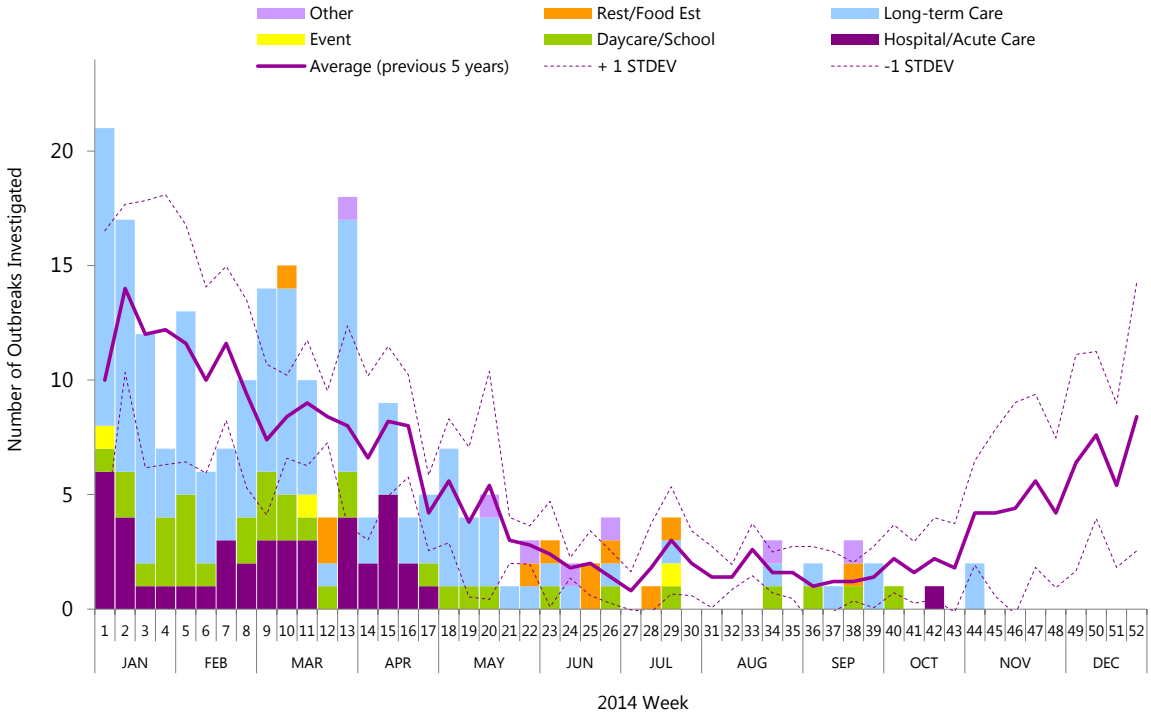
Figure 3
Regional distribution of EV-D68 cases to date, Virology and Molecular Microbiology & Genomics Programs, BCPHMRL.



Gastrointestinal Outbreaks

In October, the BCPHMRL investigated 8 gastrointestinal (GI) outbreaks, consistent with what is expected at this time of the year (Figure 4). Outbreaks were identified from 4 long-term care facilities, 2 daycares, 1 food service establishment and a cruise ship. Samples were submitted for 4 (50%) of these outbreaks with norovirus detected in 3 (75%).

Figure 4
Gastrointestinal outbreaks investigated* in 2014, Environmental Microbiology, Public Health Advanced Bacteriology & Mycology, Parasitology and Virology Programs, BCPHMRL.

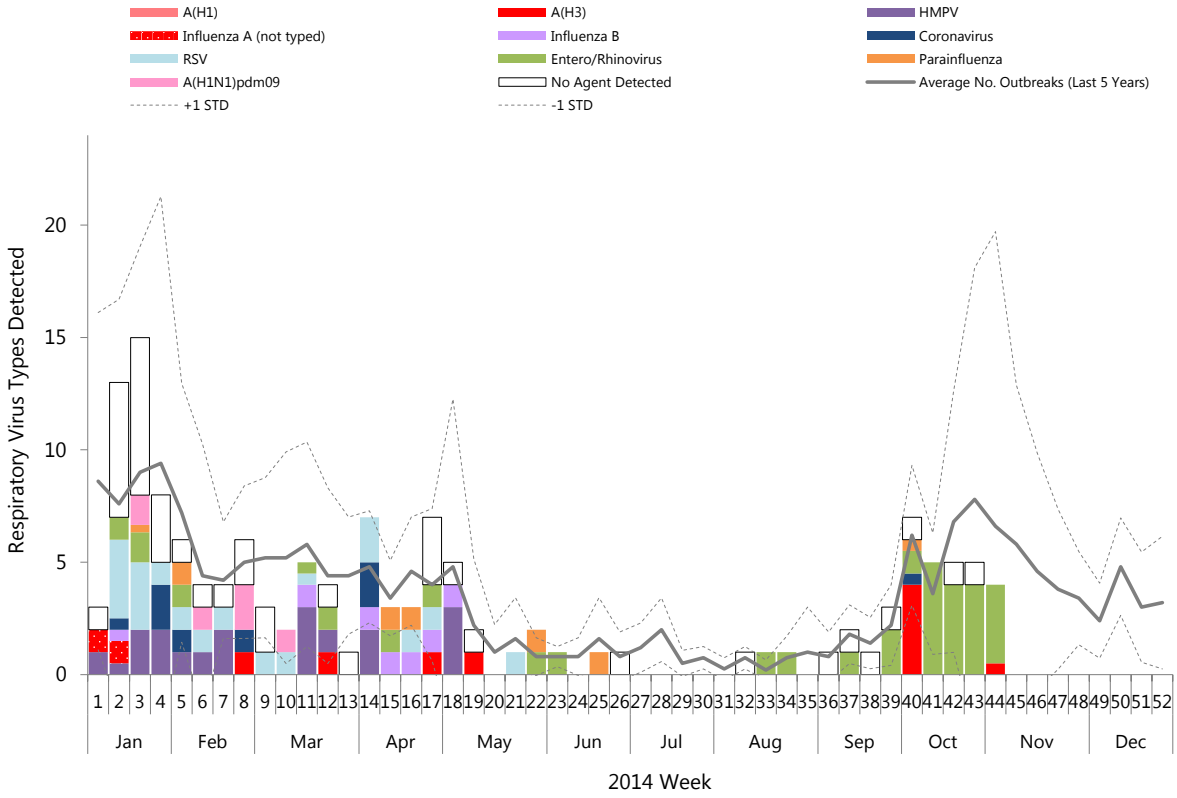


* The data available are from outbreaks in which the BCPHMRL has been notified. Some acute care microbiology laboratories are also testing for norovirus in the province and these data may not include outbreaks from all Health Authorities. Given the nature of GI outbreaks, samples are not always available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

Influenza-Like Illness Outbreaks

In October there were 25 influenza-like illness outbreaks investigated. This is consistent with what has been seen historically at this time of the year (Figure 5). Samples were submitted from long-term care facilities except for one outbreak from a school. Entero/rhinovirus was detected from samples from 17 (68%) of these outbreaks. Influenza A(H3) was detected in four (16%) of these outbreaks in addition to being detected in an outbreak where cases also had entero/rhinovirus. Coronavirus and parainfluenza virus were also detected from separate patient samples from another outbreak.

Figure 5
Influenza-like illness outbreaks investigated* in 2014, Virology Program, BCPHMRL.



* The data available are from outbreaks in which the BCPHMRL has been notified. Some acute care microbiology laboratories are also testing for influenza in the province.

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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.

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