BC PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

LABORATORY TRENDS

March 14, 2014

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Remembering World Water Day – March 22

by Dr. Judy Isaac-Renton, Brian Auk, Dr. Natalie Prystajecky, Environmental Microbiology Program

Tuesday, March 22, 2014 is the United Nations World Water Day, an annual reminder that water security and safety issues still require our vigilance.

Contaminated drinking water is a major cause of morbidity and mortality in many parts of the world, particularly for young children. Closer to home, outbreaks in Walkerton, Ontario and North Battleford, Saskatchewan, remind us that infectious diseases are also spread in Canada by this route. We are stewards of a rich fresh water resource and microbial quality monitoring is a joint responsibility.

Genome Canada, Genome BC and the Canadian Water Network funded work (Applied Metagenomics of the Watershed Microbiome) is underway, led by public health laboratory scientists at the BC Public Health Microbiology and Reference Laboratory (BCPHMRL), BCCDC site, with the University of British Columbia and with other partners across Canada. Using new tools including metagenomics, analysis is underway looking for better indicators of microbial quality at source. While this applied public health scientific work continues, we are also reminded of the often behind the scenes but fundamental role laboratory testing has in ensuring the safety of water for BC residents. This work includes the Provincial Health Officer Enhanced Water Quality Assurance (EWQA) Program based on an environmental laboratory expert peer-review process that promotes best monitoring practices in testing laboratories in British Columbia. Monitoring of up to 1000 water samples per day from across British Columbia, is carried out by experts at BCPHMRL. Any *E. coli* positive drinking water samples, indicative of faecal contaminaton, are deemed critical results by legislation; they are immediately telephoned to the responsible Health Authority Drinking Water Officer and water suppliers.

Combining the promotion of laboratory quality management system best practices, our day-to-day service and applied public health research is something laboratories do for the safety and protection of our water.

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Chikungunya (pronounced chik-un-GUN-ya) **– Coming to a Neighbourhood Near You?**

by Alan McNabb, Molecular Microbiology & Genomics Program

Chikungunya (CHIKV) is a mosquito-borne viral disease that until recently was limited to Africa, Asia and the Indian subcontinent. The name Chikungunya comes from the Kimakonde language of the Makonde people a tribe in eastern Tanzania and translates to "the one which bends" describing the stooped appearance of the patients with arthralgia. More recently the virus has spread to include the Philippines, Burma, Thailand, Australia, Mauritius, Seychelles, Madagascar, Java, Indonesia, several European countries and several Caribbean Islands. It is expected to spread to Central and South Americas and the Southern United States (US) in time.

Photo credit: CDC Image Library

The virus was originally discovered in Tanzania in 1953 as a cause of joint inflammation, fever and general illness during a dengue epidemic in the Newala district of Tanzania. The first epidemic of CHIKV was recorded in 1963 in Calcutta. This virus is spread by two main vector mosquitoes *Aedes aegypti* and *Aedes albopictus*. Although these mosquito species are not present in BC, they are widespread in the Americas including the Southern US and are described as "aggressive daytime biters" with peak biting activity at dawn and dusk. It is currently thought that humans are the main reservoir of the disease outside of Africa, but it is likely that wild primates or bats bitten by forest dwelling vectors in Africa are the main source of the virus there.

Unlike West Nile virus (WNv) it is believed that most people that are infected with CHIKV experience symptoms. Once infected the virus multiples to high levels in the blood, but viraemia typically lasts only for 2 to 6 days, a shorter period of time than WNv, which is typically 14 days. The initial symptoms occur routinely 3 to 12 days after being bitten by an infected mosquito and can be flu-like with fever, chills and muscle aches, but may also include pain or inflammation in multiple joints typically the hands and feet, sudden severe headache, rash on the arms, legs and trunk, fatigue and nausea or vomiting. Rare complications can involve the eye, heart or nervous system. Death from the disease is rare.

The initial symptoms usually last 3 to 5 days and if a rash occurs it is usually maculopapular, lasts about 2 to 3 days and occurs after fever onset. Most patients make full recoveries, but joint pain can persist for months to years. Some people who get infected feel better after a short period of time, but then get persistent symptoms. This does not indicate a reinfection with the virus, but rather a continuation of symptoms, which can make diagnosis of the disease difficult. Infection with CHIKV is thought to provide lifelong immunity.

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Chikungunya

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The recent outbreak of CHIKV in the Caribbean, initially on the island of St Martin/St Maarten, has now spread to many other Caribbean islands, which is of concern given that the Caribbean is a major travel destination for Canadians. This has caused the Public Health Agency of Canada to issue a travel advisory for people travelling to the region in response to over 2000 cases being confirmed in the Caribbean since November 2013. Phylogenetic analysis based on the E1 gene sequences of the virus indicates that three genotypes are circulating worldwide: Asian genotype, East/Central/South African genotype, and West African genotype. The genotype preferentially being spread by *A. aegypti* in the Caribbean appears to be the Asian genotype.

Diagnosis of the disease can be accomplished by two means: detection of antibody to the virus and RT-PCR detection of the virus. Serology is the primary diagnostic test using a gold top serum separator tube and will require specific travel history for the BCPHMRL to send blood samples to the National Microbiology Laboratory (NML) for testing. IgM antibody levels are highest 3 to 5 weeks after onset of illness and levels usually persist for two months. For those acutely ill with recent travel to CHIKV prevalent areas including the Caribbean an additional EDTA tube is preferred for PCR testing. Samples collected during the first week of symptoms should be tested by both serological and RT-PCR methods. However given the short window of viraemia serology may be the preferred method for diagnosis of the virus.

The Molecular Microbiology and Genomics Program in cooperation with the NML are validating an in-house RT-PCR assay based on the E1 gene region for the detection of the virus, which should be available soon. This will allow RT-PCR detection of viral infection at the BC Public Health Microbiology & Reference Laboratory.

More information regarding CHIKV can be found at http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/chikungunya-eng.php.

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Influenza Surveillance

After high levels of activity in the beginning of 2014, the influenza season continued with decreased detection rates and volumes into February. Nearly 550 samples were tested in week 6 with decreasing volumes in the following weeks. Influenza A(H1N1)pdm09 continued to be the dominant subtype early in February with nearly 90% of influenza A detected being this subtype; this has since decreased towards the end of the month with more influenza A(H3) and influenza B detected. Influenza A detection rates were 23% at the beginning of February and decreased to about 17% at the end of the month. Influenza B rates increased from 1 to 5% over the course of the month (Figure 1).

Nationally, BC had slightly higher influenza A detection rates compared to the other provinces with the exception of the Atlantic Provinces early in February (Figure 2). Influenza B rates have been steadily increasing in all provinces which is typical at this time of the year (Figure 3).

Figure 1
Respiratory testing volumes and influenza detection rates, Virology Program, BCPHMRL.

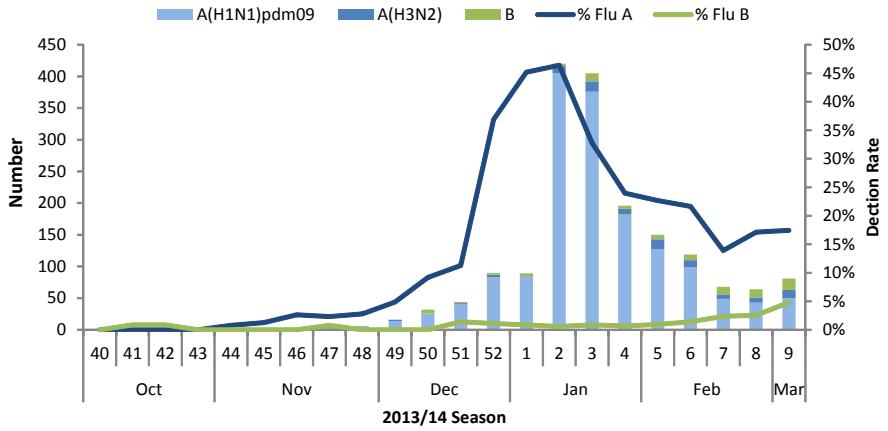


Figure 2
Influenza A detection rates across Canada, October 2013 to present. Data derived from FluWatch reports.

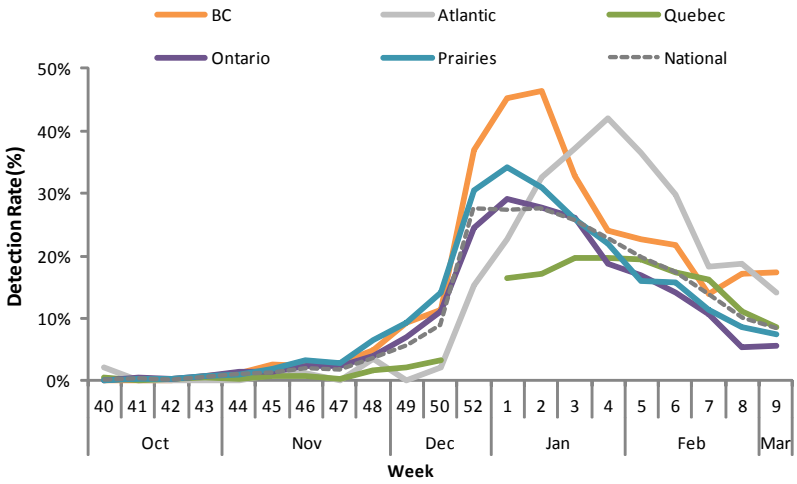
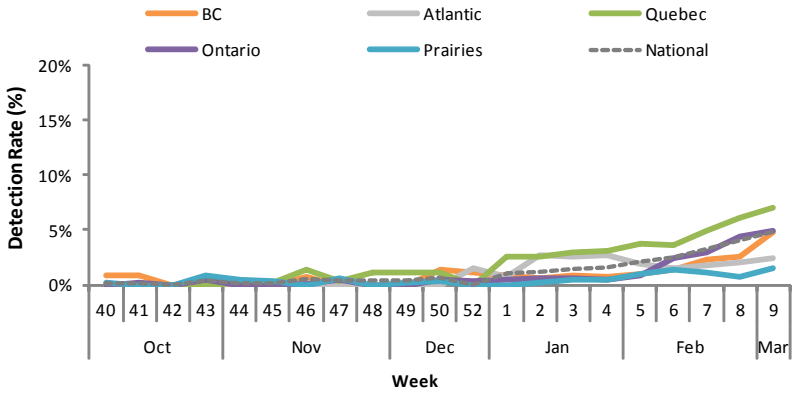


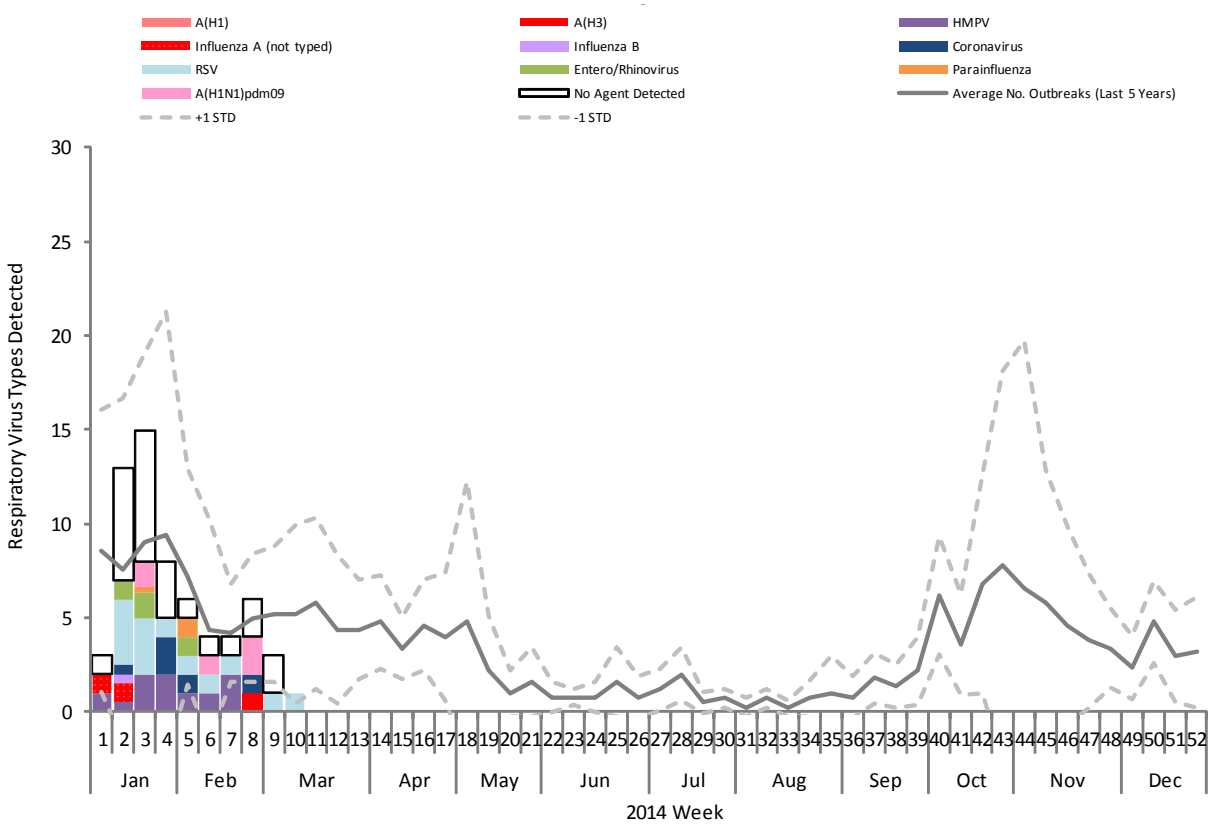
Figure 3
Influenza B detection rates across Canada, October 2013 to present. Data derived from FluWatch reports.



Respiratory Outbreaks

The numbers of outbreaks for weeks in February were at the expected average levels based on previous years' investigations. Samples were submitted to the BCPHMRL for 15 respiratory outbreak investigations from longterm care facilities. A variety of different respiratory pathogens were detected, including: respiratory syncytial virus (RSV) (20%; 3), human metapneumovirus (HMPV) (20%; 3), influenza A(H1N1)pdm09 (13%; 2) and influenza A(H3) (7%; 1). Coronavirus, HMPV and influenza A were also detected from samples from facility (Figure 4).

Figure 4
Respiratory outbreaks investigated* in 2014, Virology Program, BCPHMRL.

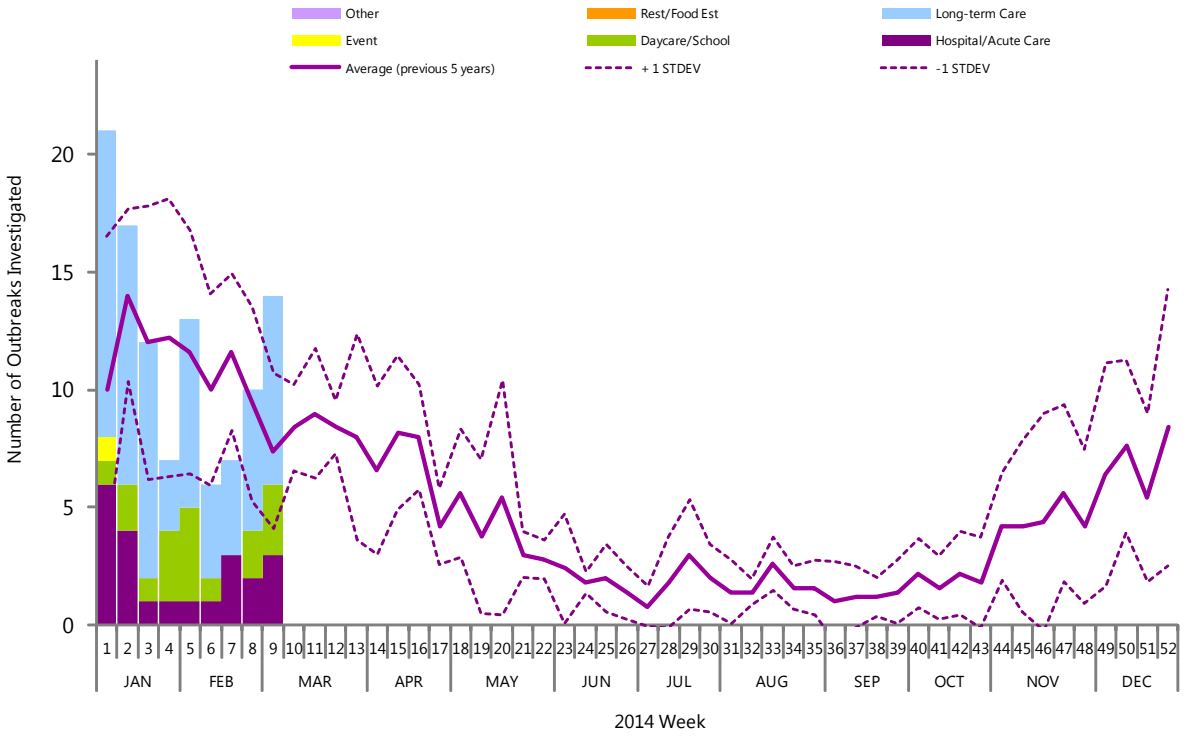


* Figure 4 reflects respiratory sample results submitted for investigation to the BCPHMRL and may not be representative of respiratory outbreaks in the entire BC community.

Gastrointestinal Outbreaks

In February, the BCPHMRL investigated 37 gastrointestinal (GI) outbreaks with investigations increasing over the course of the month beyond historical trends (Figure 5). Outbreaks were identified from 22 (59%) longterm care facilities, 9 (24%) hospitals and 6 (16%) daycares/schools (Figure 5). Samples for laboratory testing were submitted for 32 (86%) of these outbreaks with norovirus confirmed in 28 (87%) from 19 (76%) longterm care facilities, 8 (29%) hospitals and 1 (4%) daycare/school. The number of outbreaks is consistent with what has been investigated in previous years.

Figure 5 _____
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.

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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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