BC PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

LABORATORY TRENDS

May 14, 2013

In this Issue:

Laboratory News

Annual Cross Border Meeting

The Pacific NorthWest Border Health Alliance (PNWBHA) met from April 30-May 2, 2013 in Vancouver during the annual meeting for public health preparedness in the Pacific Northwest. This meeting celebrated 10 years of collaborative work in the areas of health emergency preparedness and management, epidemiology/ surveillance, public health laboratories, communications, law, and indigenous health between the states of Alaska, Idaho, Montana, Oregon and Washington (WA); the provinces of British Columbia (BC) and Saskatchewan; and the Yukon Territory.

During the workshop, the Public Health Laboratories Workgroup met to renew ties between Canadian and US public health laboratories in the region. This group discussed various items including preparedness for H7N9 avian influenza testing, biomonitoring and radiation response capacity in WA, whole genome sequencing (WGS) projects and Lyme disease surveillance opportunities. Some key action items from the discussion included: potential collaboration in WGS projects for foodborne illness; revisiting the Memorandum of Understanding (MOU) between WA State and BC that outlines the facilitation of aid and cooperation during an outbreak of disease, foodborne contamination or act of suspected terrorism (biological/chemical) across the border; outlining permit requirements for the shipping of specimens across the border; and, participation in a communications exercise.

Successful Genome Canada Funding

Dr. William Hsiao, BC Public Health Microbiology & Reference Laboratory (BCPHMRL) Bioinformatician and team were recently awarded funding from Genome Canada under the Bioinformatics and Computational Biology Competition. This competition arose out of the prioritization made by Genome Canada in partnership with the Canadian Institutes of Health Research (CIHR), to support the infrastructure required for computational biology in Canada. Modern genomics technologies produce large, complex amounts of data that require analysis and integration. The next generation of tools supported by this funding will provide the research community broad access to these tools while supporting analysis, data mining and a better understanding of the associated and underlying biology.

Over 100 proposals were submitted across Canada. Of the 17 awards, BC received 7 awards or about $2.7 million from $6.2 million available in funding.

The team led by Drs. Fiona Brinkman (Lead PI, Simon Fraser University), William Hsiao (co-PI, BCPHMRL) and Gary Van Domselaar (co-PI, National Microbiology Laboratory) will work over the next three years to address gaps in the use and sharing of whole genome sequence data of infectious agents. This will be accomplished by developing a robust genomics analysis platform (code named IRIDA for Integrated Rapid Infectious Disease Analysis) with easy-to-use tools. Public health workers and microbiologists will be trained to use the system to better manage communicable diseases and provide quicker responses to infectious disease outbreaks using whole genome sequence data.

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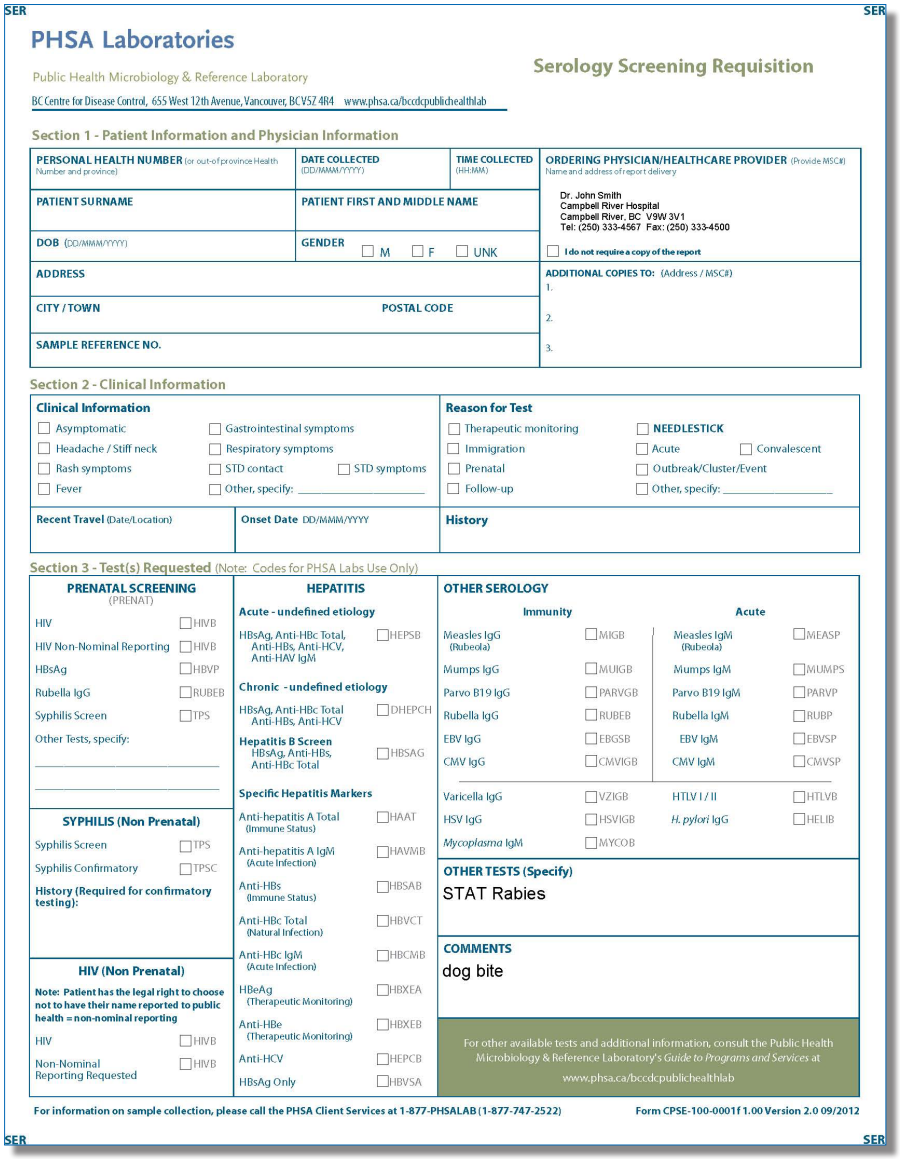
Changes in Rabies Serology Reporting

Testing for rabies virus antibody for pre-and post-exposure vaccinees and for clinical cases is performed by the National Microbiology Laboratory (NML). In British Columbia, such sera are sent to the BCPHMRL and then forwarded to NML. For stat or urgent requests, the NML requests contact information on the ordering physician, public health nurse, MOH, etc. so that test results can be reported in parallel to the submitter treating the patient and the BCPHMRL as soon as possible.

To facilitate this improved communication, it is requested that for all stat/urgent cases, contact information (name, address, telephone number, fax number) be entered on the BCPHMRL Serology Screening Requisition form. NML will no longer be able to provide results directly to individuals that contact them and will refer their requests to the BCPHMRL.

These changes are expected to improve the turnaround for rabies serology results reporting.



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PHSA Laboratories

Public Health Microbiology & Reference Laboratory

BC Centre for Disease Control, 655 West 12th Avenue, Vancouver, BC V5Z 4R4 www.phsa.ca/bccdcpublichealthlab

Serology Screening Requisition

Section 1 - Patient Information and Physician Information

PERSONAL HEALTH NUMBER (or out-of province Health Number and province)	DATE COLLECTED (DD/MMM/YYYY)	TIME COLLECTED (HH:MM)	ORDERING PHYSICIAN/HEALTHCARE PROVIDER (Provide MSC#) Name and address of report delivery
PATIENT SURNAME	PATIENT FIRST AND MIDDLE NAME		Dr. John Smith Campbell River Hospital Campbell River, BC V9W 3V1 Tel: (250) 333-4567 Fax: (250) 333-4500
DOB (DD/MMM/YYYY)	GENDER ☐ M ☐ F ☐ UNK		☐ I do not require a copy of the report
ADDRESS			ADDITIONAL COPIES TO: (Address / MSC#) 1.
CITY / TOWN	POSTAL CODE		2.
SAMPLE REFERENCE NO.			3.

Section 2 - Clinical Information

Clinical Information			Reason for Test	
☐ Asymptomatic	☐ Gastrointestinal symptoms		☐ Therapeutic monitoring	☐ NEEDLESTICK
☐ Headache / Stiff neck	☐ Respiratory symptoms		☐ Immigration	☐ Acute ☐ Convalescent
☐ Rash symptoms	☐ STD contact	☐ STD symptoms	☐ Prenatal	☐ Outbreak/Cluster/Event
☐ Fever	☐ Other, specify: _____		☐ Follow-up	☐ Other, specify: _____

Recent Travel (Date/Location)	Onset Date DD/MMM/YYYY	History

Section 3 - Test(s) Requested (Note: Codes for PHSA Labs Use Only)

PRENATAL SCREENING (PRENAT)

HIV	☐ HIVB
HIV Non-Nominal Reporting	☐ HIVB
HBsAg	☐ HBVP
Rubella IgG	☐ RUBEB
Syphilis Screen	☐ TPS
Other Tests, specify:	

SYPHILIS (Non Prenatal)

Syphilis Screen	☐ TPS
Syphilis Confirmatory	☐ TPSC

History (Required for confirmatory testing):

HIV (Non Prenatal)

Note: Patient has the legal right to choose not to have their name reported to public health = non-nominal reporting

HIV	☐ HIVB
Non-Nominal Reporting Requested	☐ HIVB

HEPATITIS

Acute - undefined etiology	
HBsAg, Anti-HBc Total, Anti-HBs, Anti-HCV, Anti-HAV IgM	☐ HEPSB
Chronic - undefined etiology	
HBsAg, Anti-HBc Total Anti-HBs, Anti-HCV	☐ DHEPCH
Hepatitis B Screen HBsAg, Anti-HBs, Anti-HBc Total	☐ HBSAG
Specific Hepatitis Markers	
Anti-hepatitis A Total (Immune Status)	☐ HAAT
Anti-hepatitis A IgM (Acute Infection)	☐ HAVMB
Anti-HBs (Immune Status)	☐ HBSAB
Anti-HBc Total (Natural Infection)	☐ HBVCT
Anti-HBc IgM (Acute Infection)	☐ HBCMB
HBeAg (Therapeutic Monitoring)	☐ HBXEA
Anti-HBe (Therapeutic Monitoring)	☐ HBXEB
Anti-HCV	☐ HEPCB
HBsAg Only	☐ HBVSA

OTHER SEROLOGY

Immunity		Acute	
Measles IgG (Rubeola)	☐ MIGB	Measles IgM (Rubeola)	☐ MEASP
Mumps IgG	☐ MUIGB	Mumps IgM	☐ MUMPS
Parvo B19 IgG	☐ PARVGB	Parvo B19 IgM	☐ PARVP
Rubella IgG	☐ RUBEB	Rubella IgM	☐ RUBP
EBV IgG	☐ EBGSB	EBV IgM	☐ EBVSP
CMV IgG	☐ CMVIGB	CMV IgM	☐ CMVSP
Varicella IgG	☐ VZIGB	HTLV I / II	☐ HTLVB
HSV IgG	☐ HSVIGB	*H. pylori* IgG	☐ HELIB
Mycoplasma IgM	☐ MYCOB		

OTHER TESTS (Specify)

STAT Rabies

COMMENTS

dog bite

For other available tests and additional information, consult the Public Health Microbiology & Reference Laboratory's *Guide to Programs and Services* at www.phsa.ca/bccdcpublichealthlab

For information on sample collection, please call the PHSA Client Services at 1-877-PHSALAB (1-877-747-2522) Form CPSE-100-0001f 1.00 Version 2.0 09/2012

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LABORATORY TRENDS

BRITISH COLUMBIA PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY
Vancouver, BC

Neisseria gonorrhoeae Susceptibility Testing Trends

Gonorrhea, second most common sexually transmitted infection after chlamydia, is primarily diagnosed by nucleic acid-based testing. However, for the purpose of monitoring antimicrobial resistance trends, culture based methods are required for susceptibility analysis against antibiotic agents. Recent reports demonstrate emergence of resistant strains not only in Canada, but also globally (MMWR, 2013; 62(06): 103-6).

The PHMRL Public Health Advanced Bacteriology & Mycology (PHABM) Program tests for gonococcal infections on endocervical, rectal, pharyngeal and urethral swabs and urine samples by nucleic acid tests (NATs) (all samples) and by culture on potentially high yield samples which is consistent with national testing guidelines (*Canadian Guidelines on Sexually Transmitted Infections*, updated 2010) The PHABM program is the sole lab in BC that performs antimicrobial susceptibility testing so that resistance trends may be monitored for first-line cephalosporins as well as alternative antimicrobials. These include azithromycin, ceftriaxone, cefixime, ciprofloxacin, penicillin, spectinomycin, and tetracycline. We reported in our September, 2011 issue that elevated minimum inhibitory concentrations (MICs) were being observed for cefixime between 2006 to 2010. We are happy to report the overall decreasing MIC trends for 2010-2012 for both cefixime and ceftriaxone (Figure 1). From 2010-2012, 0.6%, 2.1% and 0.3% of isolates, respectively, were found to have MICs of ≥0.25 µg/mL while 2.9%, 0.6% and 0.3% had MICs of ≥0.125 µg/mL; these are the new thresholds established by the World Health Organization for decreased susceptibility (Table 1). After a slight increase in MICs in 2011, azithromycin also demonstrated decreased MICs in 2012 (Figure 1). The percentage of isolates with resistance to azithromycin (CLSI (2011) threshold of MIC ≥2 µg/mL) was found to be 2.1 % in 2010, 0.2% in 2011 and 0.8% in 2012 (0.9% over the 3 years).

Table 1. Criteria for decreased susceptibility to cephalosporins (WHO, 2012)

Drug	MIC (µg/mL)
cefixime	≥0.25
ceftriaxone	≥0.125

Additionally, a case of high azithromycin resistance (MIC >256 µg/mL) was observed in 2012*. This was the 3rd case of high azithromycin resistance in the country and was revealed to be a unique strain by the National Microbiology Laboratory. Azithromycin resistancein *Neisseria gonorrhoeae* was first observed in Canada in 1997; since then, resistance mechanisms have been described (Ng et al, 2002) and further differentiated for high resistance strains (Chisholm et al, 2010). No additional high resistance cases have been detected since.

These trends and unusual cases underscore the need for the close partnerships that have been established between the PHMRL, BC Centre for Disease Control (BCCDC) STI Clinics as well as front-line community laboratories and physicians for continued antimicrobial resistance surveillance as well as support to clinicians in the event of treatment failures.

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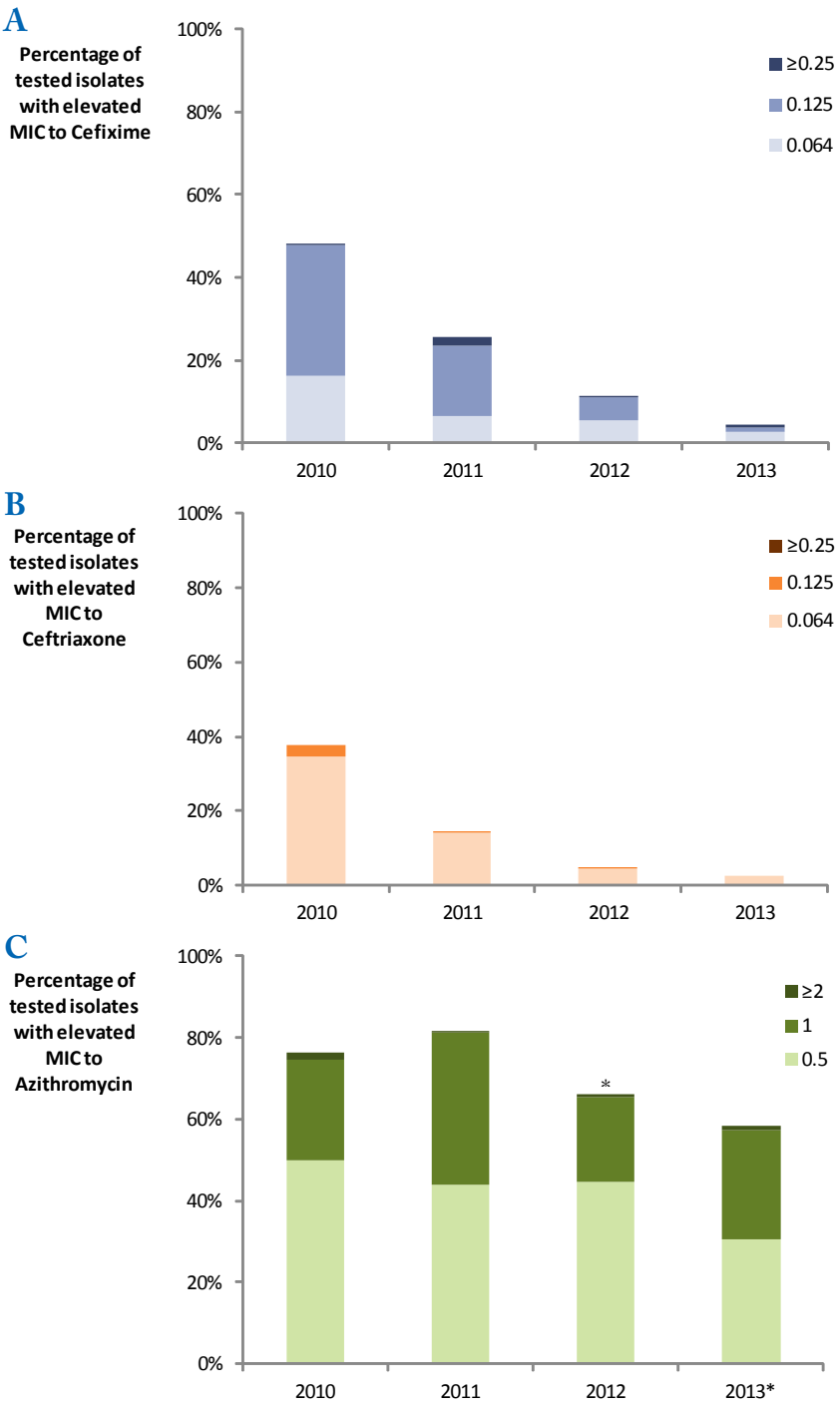
Neisseria gonorrhoeae Susceptibility Testing Trends

Figure 1
Percentage of tested N. gonorrhoeae isolates with elevated minimum inhibitory concentrations (MICs) to cefixime (A), ceftriaxone (B), and azithromycin (C) from 2010-April 30, 2013, Public Health Advanced Bacteriology & Mycology Program, PHMRL. MIC units are in µg/mL. *A case of high azithromycin resistance (>256 µg/mL) was observed in 2012.



References

Chisholm SA, Dave J and Ison CA. 2010. High-Level Azithromycin Resistance Occurs in Neisseria gonorrhoeae as a Result of a Single Point Mutation in the 23S rRNA Genes. Antimicrob Agents Chemother. 54(9): 3812–3816.

Clinical and Laboratory Standards Institute. Performance Standards for Antimicrobial Susceptibility Testing: Twenty-First Informational Supplement M100-S21 vol. 31. Clinical and Laboratory Standards Institute. Wayne, PA, 2011.

Ng L-K, Martin I, Liu G and Bryden L. 2002. Mutation in 23S rRNA Associated with Macrolide Resistance in *Neisseria gonorrhoeae*. Antimicrob Agents Chemother. 46(9): 3020–3025.

World Health Organization (WHO). Global action plan to control the spread and impact of antimicrobial resistance in *Neisseria gonorrhoeae*. 2012. Available from: http://www.who.int/reproductivehealth/publications/rtis/9789241503501/en/

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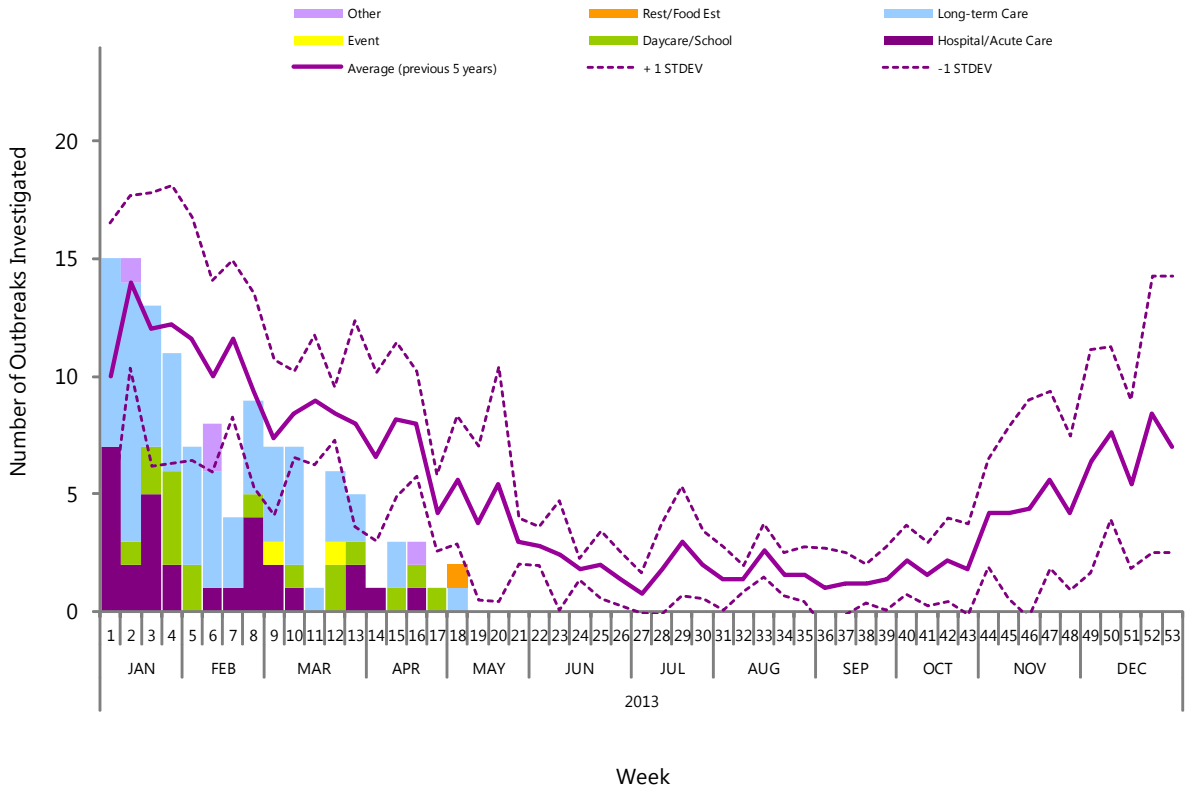
Gastrointestinal Outbreaks

In April, the Environmental Microbiology Program at the BCPHMRL investigated 10 gastrointestinal (GI) outbreaks which is on the lower end of what has typically been observed at this time over the past 5 years (Figure 2). Outbreaks were identified from 3 long-term care facilities, 3 daycares/schools, 2 hospitals and 1 restaurant (Figure 1). Samples for laboratory testing to date were submitted for 6 (60%) of these outbreaks. Of these, norovirus was confirmed in 3 (50%) of these outbreaks at 2 hospitals and 1 unknown facility/event type; 2 (33%) outbreaks had unknown etiology.

Figure 2
Gastrointestinal outbreaks investigated* since January, 2013, Environmental Microbiology, 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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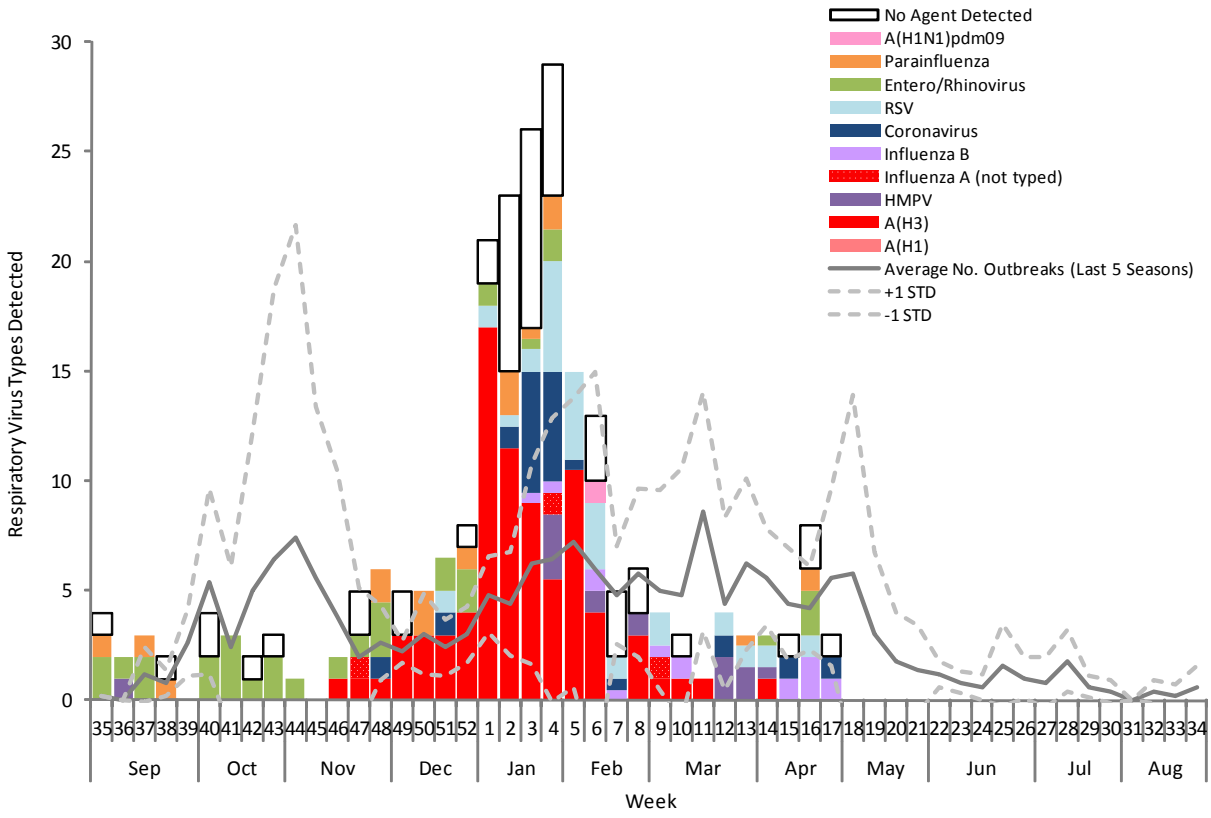
Respiratory Outbreaks

In April, samples were submitted for 17 respiratory outbreak investigations at the BCPHMRL from 16 long-term care (LTC) facilities and 1 rehabilitation centre. The number of outbreaks investigated has been on the lower end of what has been historically observed except for week 16 when 8 outbreaks were investigated (Figure 3).

Influenza B was detected in 4 (24%) of these outbreaks while influenza A(H3) was detected in another outbreak. A variety of other respirtory pathogens were also detected this month, including: enter/rhinovirus in 2 (12%) of these outbreaks, RSV in 2 (12%) of these outbreaks, coronavirus in 2 (12%) of these outbreaks, and one outbreak with coinfection of entero/rhinovirus and HMPV; parainfluenza was detected at the rehabilitation centre.

Figure 3
Respiratory outbreaks investigated* by respiratory season, Virology Program, BCPHMRL.



* Figure 3 reflects respiratory sample results submitted for investigation to the PHMRL and may not be representative of respiratory outbreaks in the entire BC community.

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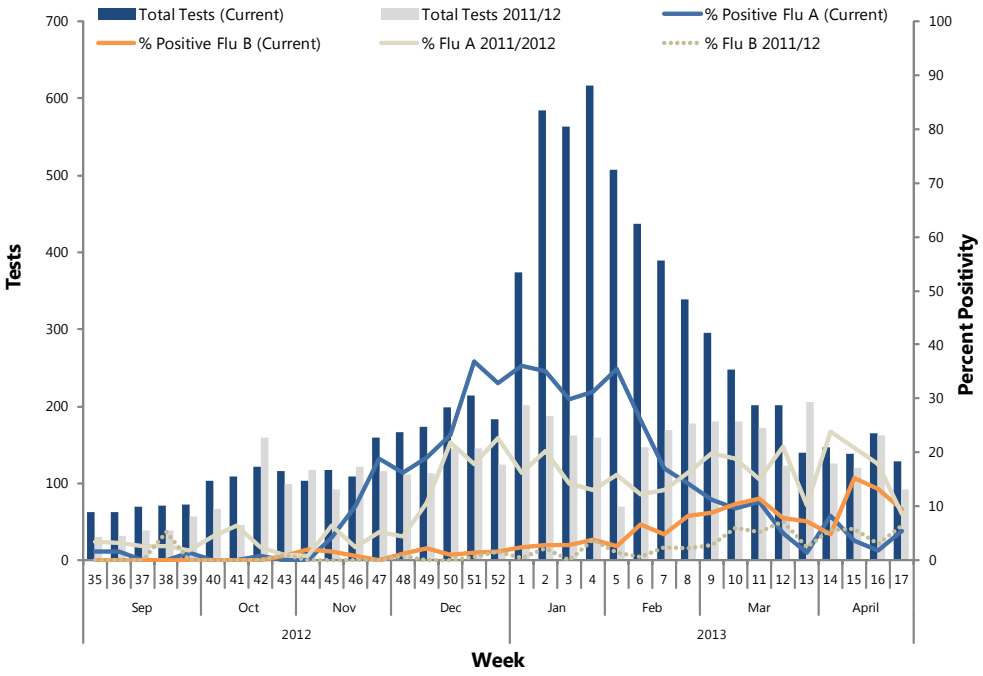
Respiratory Surveillance

Test volumes for respiratory testing in the BCPHMRL Virology Laboratory remained stable over the weeks of April, resembling volumes seen in the 2011/12 season (Figure 4). Influenza A positivity rates decreased over the month, ranging from 1-11%; these have been lower than rates seen at this time in the previous season (Figure 4). Influenza B rates increased slightly in week 15 before falling in weeks 16-17, with detection rates of 5-15%, compared to 3-7% in the 2011/12 season (Figure 4). RSV positivity rates have decreased from 19% down to 6% at the end of April.

Figure 4
Respiratory testing volumes and influenza percent positivity, Virology Program, BCPHMRL.



Nationally, influenza A activity generally decreased in all provinces in April with detection rates either at or below the national rate from the previous season (Figure 5). Influenza B rates have fluctuated above and below the national rate from the previous season in April; detection rates generally increased in Ontario and the Atlantic provinces and fluctuated in the Prairies, BC and Quebec (Figure 5).

Figure 5
Influenza A percent positivity across Canada, 2012/2013 season.
Source: FluWatch, Public Health Agency of Canada

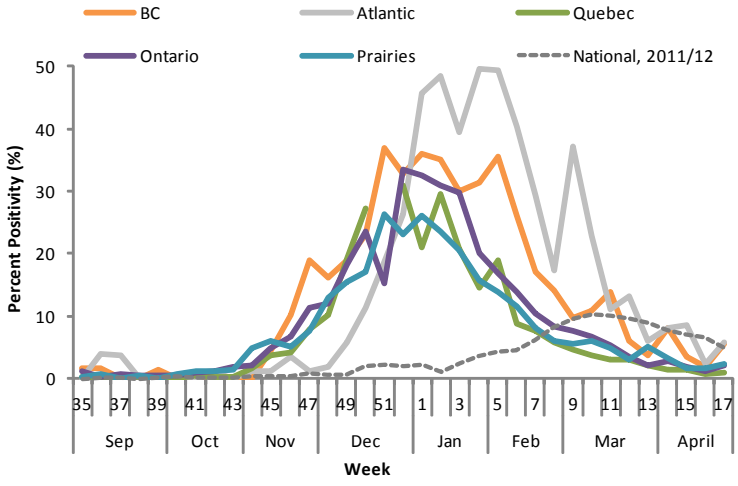
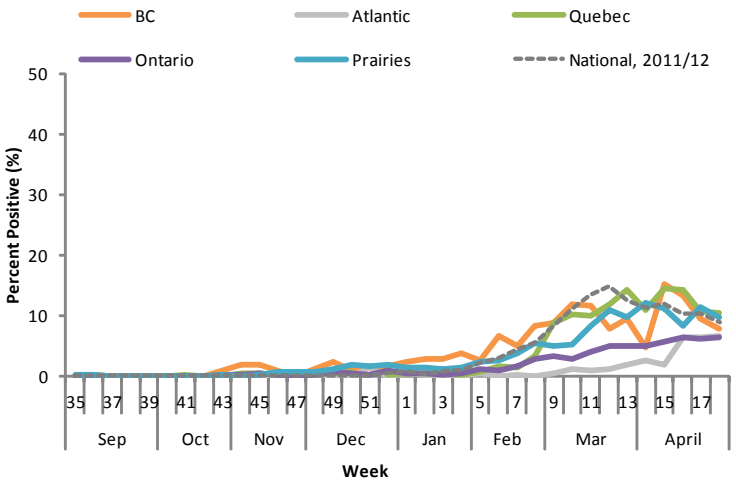


Figure 6
Influenza B percent positivity across Canada, 2012/2013 season.
Source: FluWatch, Public Health Agency of Canada



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BRITISH COLUMBIA PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY
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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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