



LABORATORY TRENDS



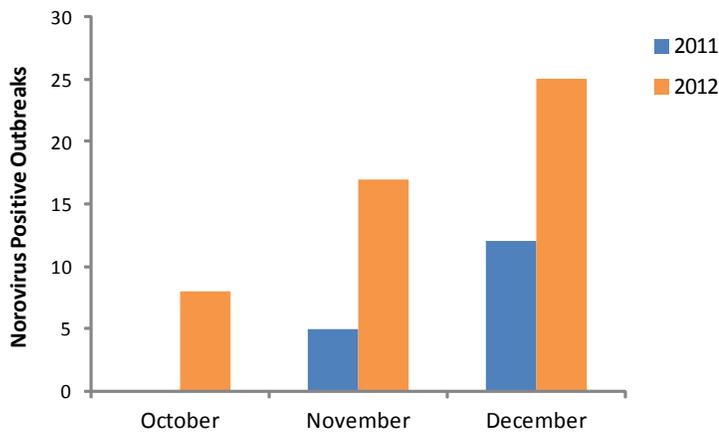
January 4, 2013

BC Observes Emergence of New Norovirus Strain (GII.4 Sydney 2012)

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During the months of October, November and December of 2012, there has been a marked increase in the number of reported gastroenteritis outbreaks across British Columbia as compared to previous seasons. This is the highest incidence of gastroenteritis outbreaks in October and November since 2006. Most of these outbreaks were tested by the BC Public Health Microbiology & Reference Laboratory (PHMRL) and the majority were caused by norovirus. The number of norovirus confirmed outbreaks in October-December in 2011 and 2012 are compared in Figure 1.

Figure 1
Confirmed norovirus outbreaks tested at BC Public Health Microbiology & Reference Laboratory in October, November and December, 2011 and 2012.



This increase in norovirus activity over previous years is not unique to BC; around the world higher than normal norovirus incidence have been reported (van Beek et al, 2013; HPA, 2012). These norovirus outbreaks extend beyond residential care facilities with outbreaks being reported in hospitals, day cares, events and food establishments. Please see page 3 on norovirus prevention measures.

Coinciding with the increase in norovirus activity is the worldwide replacement of norovirus GII.4K New Orleans (2009) by GII.4 Sydney (2012) as the dominant norovirus strain. This strain replacement is the most likely cause of increased norovirus outbreaks this season, due to lack of immunity to the current strain. GII.4 Sydney (2012) was first identified in Sydney, Australia in March 2012 and has been observed in the United States, Belgium and Denmark (van Beek et al., 2013).

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What is Norovirus

Norovirus is an extremely contagious virus, spread from human-to-human via the fecal-oral route. It is the most common cause of acute gastroenteritis worldwide. Symptoms associated with norovirus typically include vomiting, diarrhea, nausea and abdominal pain. Onset of symptoms occurs 12-48 hours after exposure. Norovirus causes a mild self-limiting infection; most people will recover within 1-3 days without medical treatment. Infection is sometimes called the 'winter vomiting illness' as it occurs primarily between November and April.

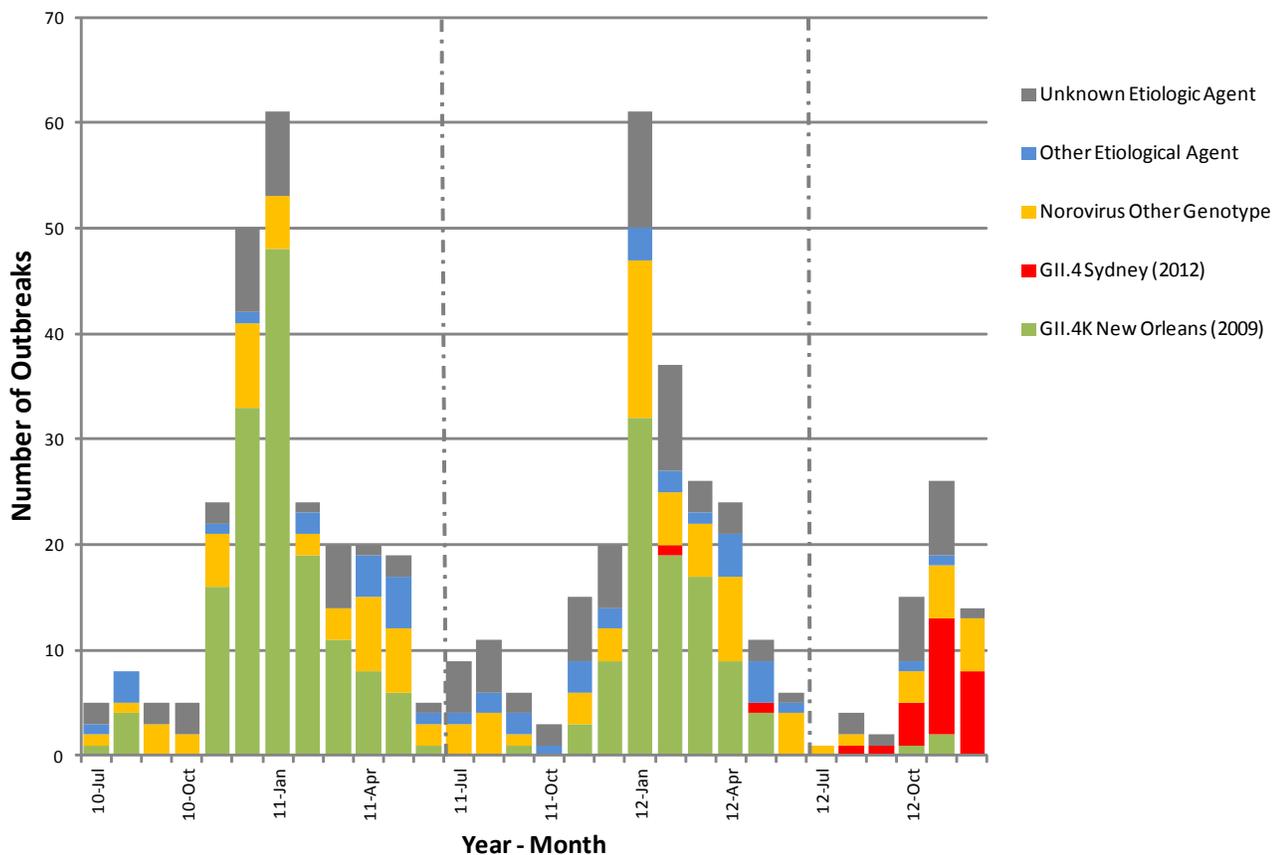
There are many groups of norovirus; the most common genotype (based on DNA sequencing) is GII.4, accounting for ~90% of outbreaks in BC. There are many variants of GII.4 and typically only one variant dominates worldwide at any time. When a genetically unique variant emerges, it can replace the current strain and cause an epidemic of norovirus, likely due to the lack of host immunity to the new strain. Epidemic waves of norovirus have been observed in 2002, 2004, 2006 and 2009.





As part of the ongoing norovirus outbreak assessment program at the Environmental Microbiology Program of PHMRL, all confirmed norovirus outbreaks are genotyped to track the molecular epidemiology of norovirus transmission across British Columbia. Preliminary data shows that GII.4 Sydney (2012) was first observed in a single outbreak in BC in February 2012. Since June 2012, GII.4K New Orleans (2009) has nearly disappeared and has been replaced by the new strain GII.4 Sydney (2012) (Figure 2). This is the first report of GII.4 Sydney (2012) in Canada.

Figure 2
Genotyping data from gastrointestinal outbreaks investigated in BC (July 2010 - December 2012), Environmental Microbiology, PHMRL. Data is complete as of December 20, 2012 and clearly shows the earlier emergence of norovirus this season in October, compared to previous years.



References

van Beek J, Ambert-Balay K, Botteldoorn N, Eden JS, Fonager J, Hewitt J, Iritani N, Kroneman A, Vennema H, Vinjé J, White PA, Koopmans M, on behalf of NoroNet. Indications for worldwide increased norovirus activity associated with emergence of a new variant of genotype II.4, late 2012. *Euro Surveill.* 2013;18(1):pii=20345. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20345>

Health Protection Agency (HPA) (United Kingdom). 2013. HPA update on seasonal norovirus activity: 2 January 2013. http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317137571276.

Last accessed Jan 3, 2014.



Norovirus Prevention Measures from the Provincial Infection Control Network (PICNet) of BC

The best preventions for norovirus infection are **frequent hand cleaning and staying home when sick.**

Visitors and volunteers play an important role in supporting healthcare, and should be advised not to visit the facility if they have GI symptoms such as nausea, diarrhea, etc. During an outbreak, visitors and volunteers should be warned that they may be at risk of acquiring an infection within the facility. They should also be instructed on how to wear appropriate personal protective equipment (such as gloves and gowns) and encouraged to use hand hygiene before and after their visits. Visitors should visit only their own friend/relative in their own room, unless otherwise approved by the staff.

Hand hygiene is the single most effective way of preventing the transmission of infections. Because microorganisms can be spread by anyone, hand hygiene is everybody's responsibility: staff, patients, residents, visitors, and volunteers.

Either alcohol based hand rub (ABHR) or soap and warm water are accepted methods of hand hygiene:

- soap and water is required if hands are visibly soiled
- ABHR is quick and effective; it kills 99% of germs on contact.

Patients, volunteers, and visitors should be reminded of the importance of hand hygiene, especially before eating or preparing food, after using the toilet or other personal hygiene activities, before leaving their homes for public areas, and when returning home from public places.

For more information on infection prevention and control practices, please visit the Practice Guidelines page of the PICNet website: <http://www.picnetbc.ca/practice-guidelines>.



References

Provincial Infection Control Network of British Columbia.
Gastrointestinal Infection Outbreak Guidelines for Healthcare Facilities
June 2010

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PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

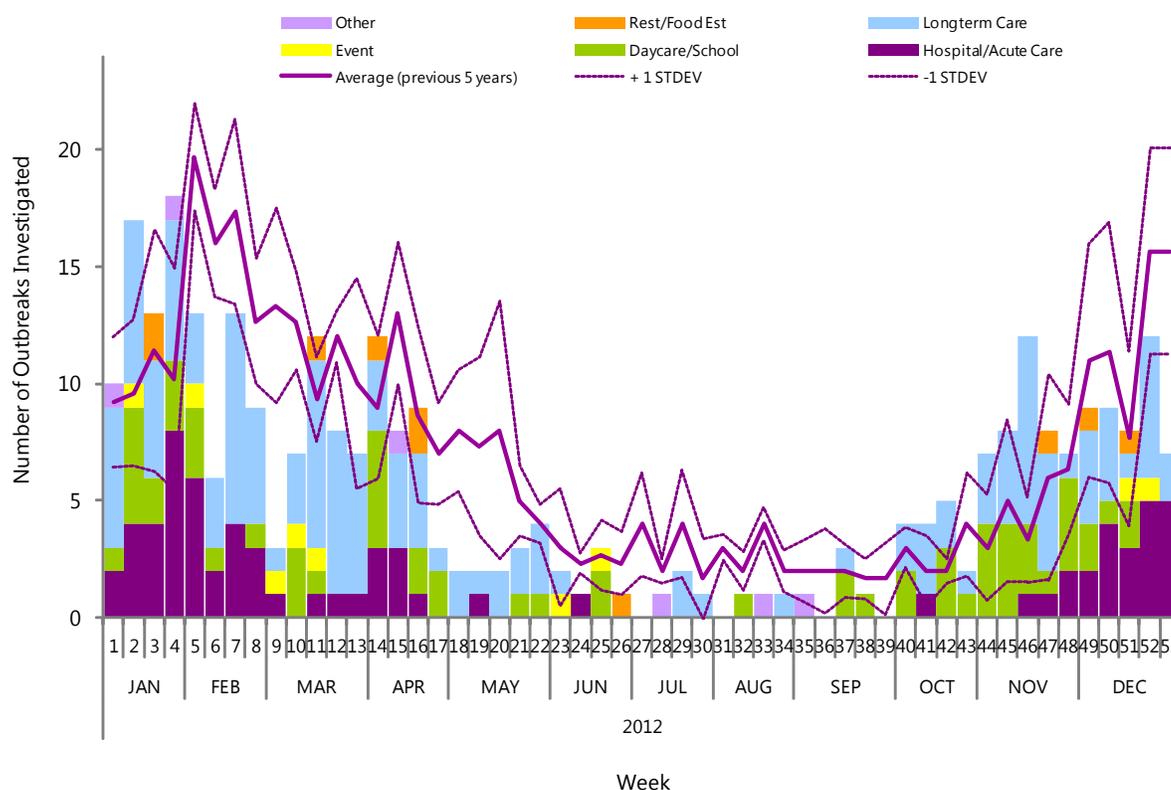
Vancouver, BC



Gastrointestinal Outbreaks

The Environmental Microbiology Program at the PHMRL investigated 45 gastrointestinal (GI) outbreaks in December 2012; this is consistent with what is typically observed in December over the past 5 years (Figure 3). Outbreaks were identified from 19 hospitals, 17 longterm care facilities, 5 daycares/schools, 2 restaurants and 2 events (Figure 3). Samples for laboratory testing to date were submitted for 29 (64%) of these outbreaks. Of these, norovirus was confirmed in 25 (86%) of these outbreaks, 2 outbreaks had unknown etiologies, 1 outbreak was positive for *Cryptosporidium* sp. while another outbreak was positive for *Aeromonas veronii* biovar sobria.

Figure 3
Gastrointestinal outbreaks investigated* since January, 2012, Environmental Microbiology, Bacteriology & Mycology, Parasitology and Virology Programs, PHMRL.



* 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.

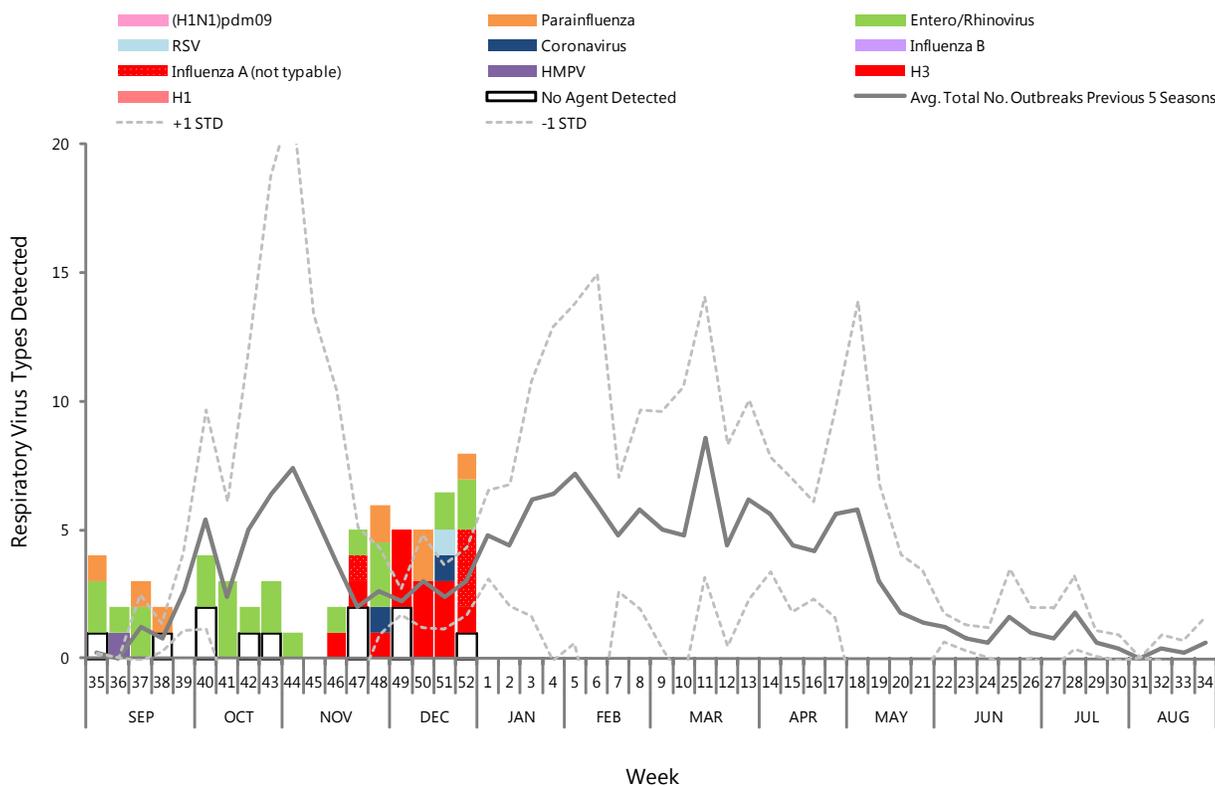


Respiratory Outbreaks

In December, samples were submitted for 26 outbreak investigations at the PHMRL from 14 longterm care facilities, 6 hospitals, 3 schools/daycares and 3 from community clinics (Figure 4). The number of outbreaks investigated in December and since the end of November has been higher than what has been observed in previous years (Figure 4).

Influenza A has been detected in 50% of these outbreaks. Using PCR and Luminex methods, influenza A(H3) was detected in 10 outbreaks (from 3 community clinics, 3 hospitals, 2 longterm care facilities and 2 schools/daycares). Enterovirus/rhinovirus was detected in 3 longterm care facilities and another 2 longterm care facilities with co-infections with other respiratory viruses. Parainfluenza detected at 3 longterm care facilities and 1 hospital; coronavirus detected in 1 hospital and RSV detected at another longterm care facility. Three other outbreaks of influenza A remains to be typed from 2 longterm care facilities and 1 hospital.

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



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



Respiratory Surveillance

Current volumes for respiratory testing in the PHMRL Virology Laboratory have been 35-54% higher than the same weeks from the 2011/12 season (Figure 5). In the month of December (weeks 49-52), influenza A positivity rates have varied from 19-37%; these have also been higher than rates seen at this time in the previous season (Figure 5). Influenza B was detected at 1-2% positivity this month compared to 0-1.6% in the 2011/12 season.

Nationally, influenza activity increased in all provinces during the weeks of December. The Prairies, Ontario and Quebec (two datapoints unavailable), along with BC are experiencing influenza A positivity from 15% up to 37% (BC); the Atlantic provinces have seen lower influenza A positivity in the earlier weeks of the month until week 52 when the rate observed was 26% (Figure 6). Influenza B rates are below 2% for all provinces (figure not displayed).

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

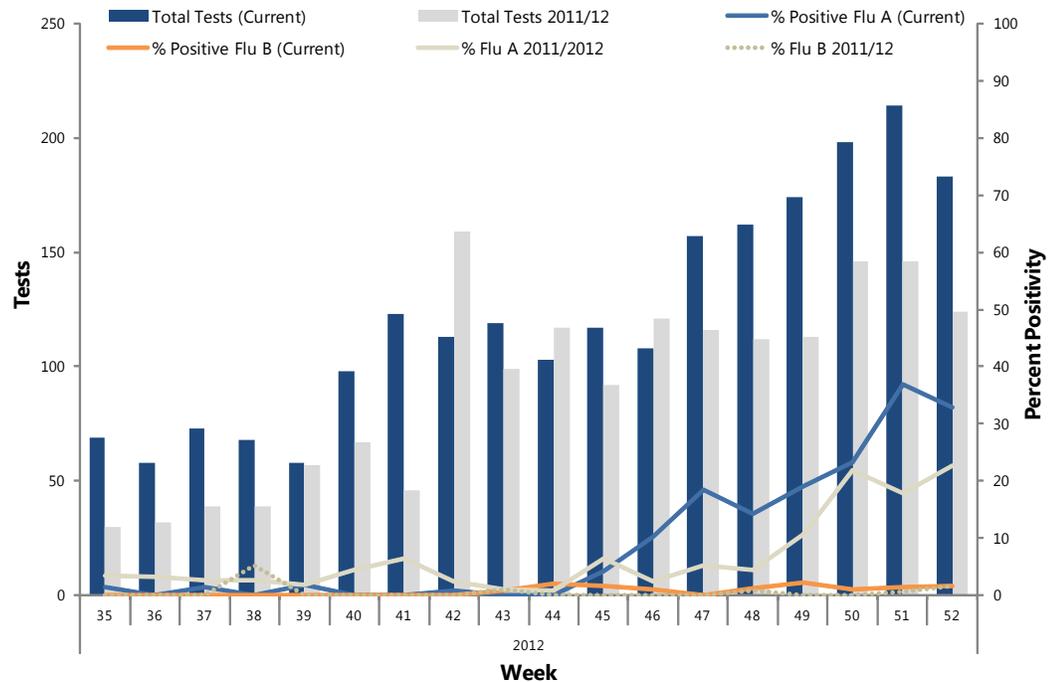
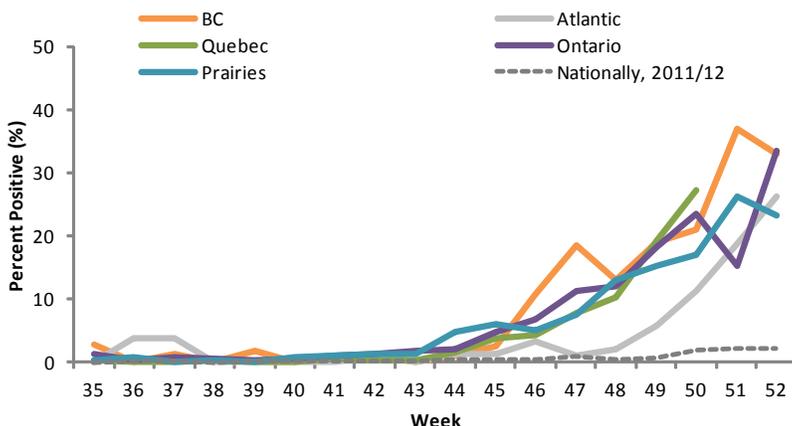


Figure 6 Influenza A percent positivity across Canada, 2012/2013 season. Source: FluWatch, Public Health Agency of Canada



Changes to Respiratory Sample Testing

Since mid-December, 2012, the Virology Program has been testing respiratory samples using a PCR assay that detects influenza A, B and RSV. Influenza A positives are then further subtyped for influenza strain. The Luminex test has been reserved for a subset of submitted samples, including samples from:

- outbreaks (2 per outbreak)
- hospitalized patients
- those under 5 years old, and
- sentinel physicians (subset).



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

The Public Health Microbiology Reference Laboratory (PHMRL) 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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