



# MONTHLY LABORATORY SURVEILLANCE NEWS

July 20, 2011

Welcome to the inaugural issue of this laboratory report, a legacy of the laboratory surveillance report used during the 2010 Winter Games. This monthly report provides laboratory information for public health purposes province-wide and will feature laboratory projects and news, and describe some of the surveillance, outbreak and trends noted by the public health laboratory.

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## Laboratory News

### Measles and Rubella Surveillance

The BC Centre for Disease Control is a pilot site contributing to laboratory and case level data to the Measles and Rubella Surveillance (MARS) Program at the National Microbiology Laboratory. The Public Health Microbiology & Reference Laboratory (PHMRL), in collaboration with BCCDC Epidemiology Services, has been testing the new reporting system prior to implementation of real-time data contribution during the week of May 22- 28, 2011. The aim of MARS is to integrate national reporting and to improve coordination between laboratory and epidemiology partners at both the federal and provincial levels.

### Public Health Reporting Data Warehouse

Building on previous work of the Lab Data Management Server Project, the Public Health Reporting Data Warehouse (PHRDW) is a PHSA strategic initiative linking real-time PHSA Labs (PHMRL) LIS and epidemiology data. There are currently two datamarts in use, the enteric and respiratory datamarts. These datamarts allow analysis of laboratory data to support laboratory operations by both a patient-centric and specimen/test-centric view of linked data. This initiative enables enhanced surveillance capacity, promotes improvements in LIS data quality and facilitates the analysis of laboratory workload and other performance measures not available through the current LIS.

### West Nile Virus Testing in Human Plasma Samples

The Zoonotics & Emerging Diseases (ZEP) Program has used a successful, internally-developed RT-PCR assay for the detection of West Nile virus (WNV) since 2003. Conversely, the Virology Program testing for the presence of WNV for transplant patient samples for organ donation has utilized a commercial kit with a considerable cost difference. In an effort to reduce cost pressures with increasing testing demand, the Virology and ZEP Programs, assisted by Public Health Genomics & Molecular Services, is evaluating the use of the ZEP WNV RT-PCR assay currently with preliminary data demonstrating that the assay is robust for patient samples.

### Improving Detection of Parasitological Infections

In addition to using the conventional methods such as microscopy and culture (gold standards), the Parasitology Program has recently established adjunct molecular based assays for parasites such as *Plasmodium knowlesi* PCR detection and *Acanthamoeba* species genotyping. Further work into development of molecular tests for other high risk parasitic pathogens are under way for *Toxoplasma*, *Entamoeba histolytica*, *Babesia* and *Leishmania*. This work is being done together by the Public Health Genomics & Molecular Services, Parasitology and ZEP Programs.



\*\*\* The Public Health Microbiology & Reference Laboratory was recently recertified as an accredited laboratory with the College of American Pathologists.



## Global News

### Scarlet Fever in Hong Kong

Since April, 2011 increases in cases of scarlet fever has occurred in both Hong Kong, Macau and Mainland China with outbreaks occurring in several schools. As of July 14, 2011 in Hong Kong, 895 cases of scarlet fever were reported. Scarlet fever is a bacterial infection caused by Group A *Streptococcus* (*S. pyogenes*) (GAS) and is transmitted through respiratory secretions. Whether genetic alternations in new GAS clones is causing this outbreak remains to be further investigated. The level of scarlet fever activity is expected to be high through to the fall of 2011 (Centre for Health Protection).

### *E. coli* O104 Outbreak in Europe

Since early May, 2011, an outbreak of *E. coli* O104:H4 in Germany with widespread impact in other European countries has been linked with consumption of contaminated sprouts. The unusual serotype, not seen before in BC, has caused severe illness in adults, including hemolytic uremic syndrome (HUS) and death. This has been the largest HUS/enterohemorrhagic *E. coli* outbreak in Germany's history.

The Bacteriology & Mycology Program at the PHMRL will, as per routine, test bloody stools or stools from patients with HUS for shigatoxin using the verocell assay. Any travel to Germany and/or Northern Europe should be indicated on the requisition.

## National Laboratory Trends

### FluWatch

National trends from our laboratory respiratory reporting system, FluWatch, have seen very low levels of influenza A and B in all provinces which seems to indicate that the 2010/2011 influenza season is over. The Atlantic Provinces' rate of influenza A dropped from the national high of 28% at the beginning of April down to 0% at the end of June. Influenza B rates, which were on the rise in the Prairies since January, peaked at 37.7% positivity at the beginning of April and is now down to 0% in the province. Influenza A rates in Ontario have decreased since February while influenza B peaked only at 4.5% in mid April. In BC, positivity rates have been dropping since April with influenza B detected in only 1 sample in all of June. Circulation of other respiratory viruses continue.

For further information, see the FluWatch website at: <http://www.phac-aspc.gc.ca/fluwatch/index-eng.php>.

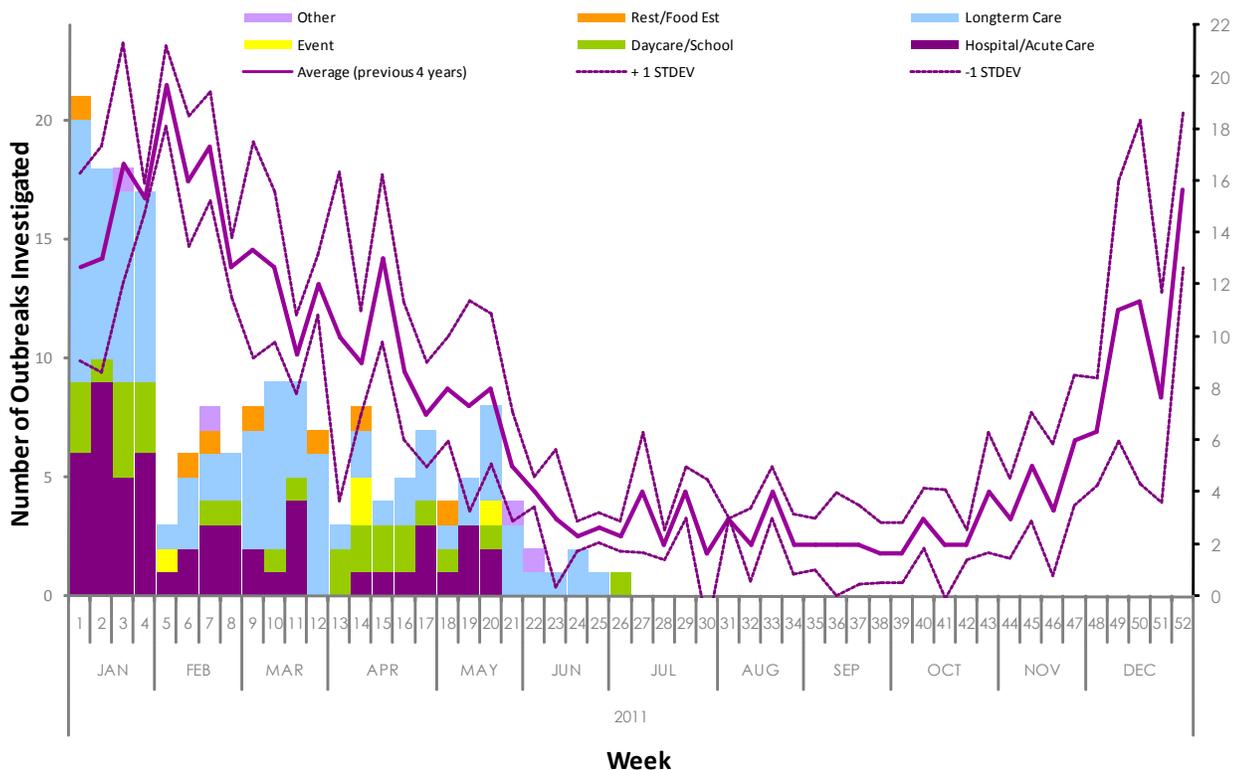
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## Gastrointestinal Outbreaks

In June, there were 6 gastrointestinal (GI) outbreaks investigated at the PHMRL; 2 of these were confirmed to be due to Norovirus by RT-PCR. Samples were sent from 1 daycare, 4 longterm care facilities and from suspect travel-related cases to the *E. coli* O104 outbreak. Note that these only concern outbreaks in which the PHMRL has been notified. 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



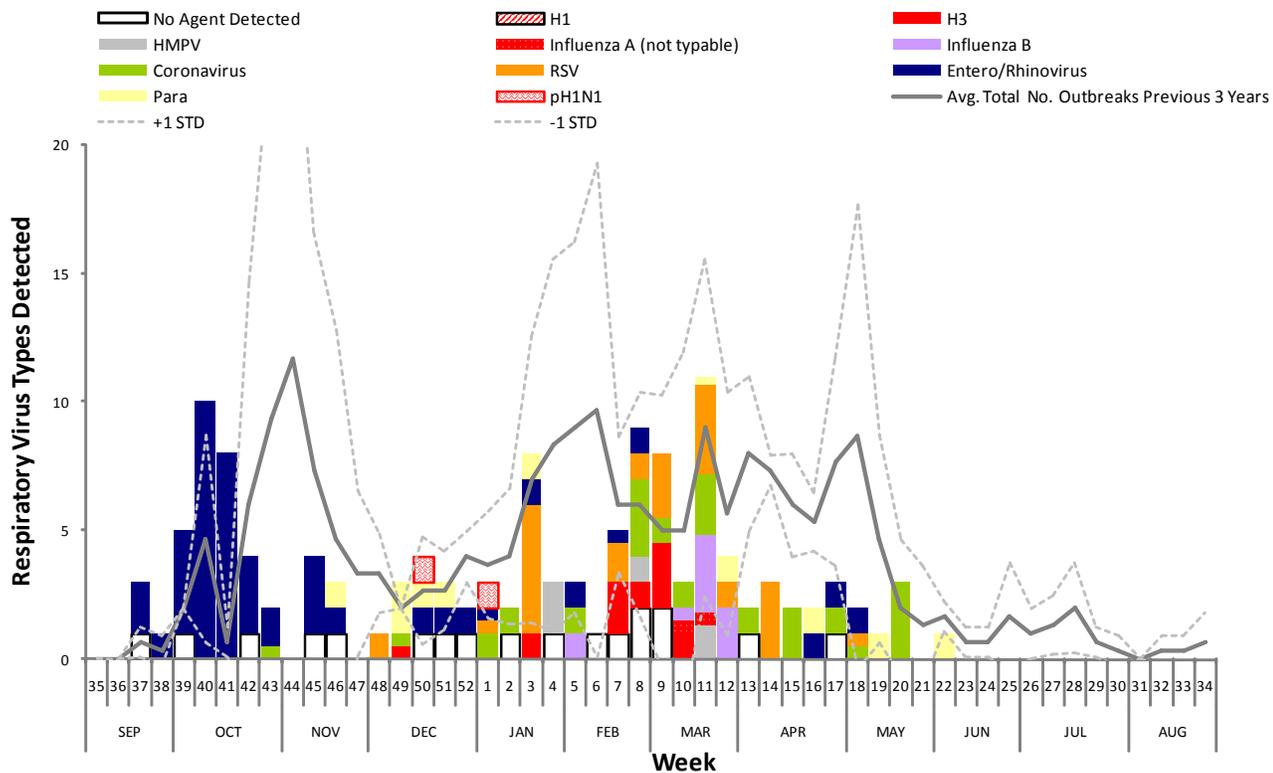


## Respiratory Outbreaks

In June, 2011 there were 2 respiratory virus outbreaks investigated at the PHMRL using Nucleic Acid Amplification Testing (NAAT) methods (Figure 2). Samples were all submitted from longterm care facilities with parainfluenza detected for both outbreaks.

Figure 2 is not representative of respiratory outbreaks in the entire BC community (data reflect respiratory sample results submitted for investigation to the PHMRL). Previous year averages fluctuated widely due to the 2009 pandemic H1N1 outbreak. There was also a change in testing methodology in 2010.

Figure 2  
Respiratory outbreaks investigated since January, 2011, Virology Program, PHMRL



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## Other Outbreaks

### Mumps Outbreak

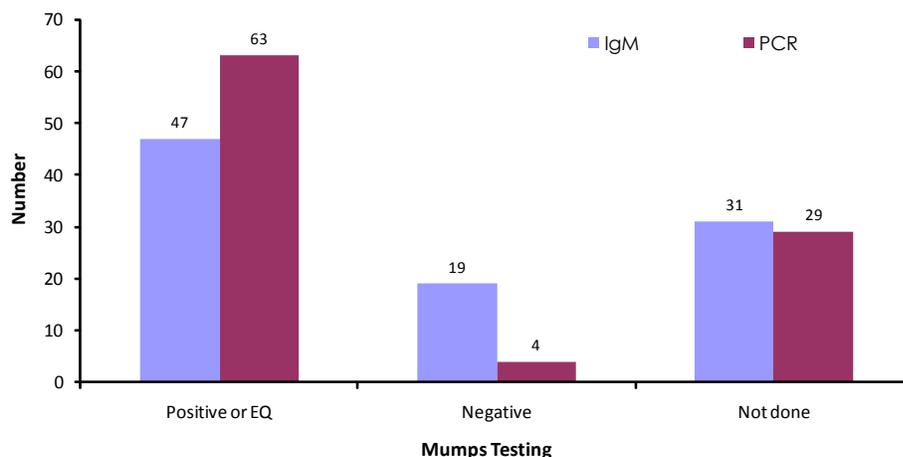
A mumps outbreak continues in the province. Since the first case was confirmed in January, there have been 97 cases laboratory-confirmed at the PHMRL (more clinically reported cases). The outbreak began in Vancouver Coastal Health Authority with links to the Whistler area but has become more widespread with cases now identified in Fraser Health, Interior Health and Vancouver Island Health Authorities.

Mumps is tested by both serology and NAAT methods at the PHMRL. Genotype G mumps virus has been identified by the NML. NAAT testing shows that nearly 29% of IgM serology tests were non-reactive samples (Figure 3).

Since IgM serology may be inconclusive, physicians are encouraged to send both urine/buccal swabs for PCR testing and blood for serology.

See our [Guide to Programs and Services](#) for more information.

Figure 3 Mumps testing by serology and RT-PCR, Virology and Public Health High Volume Serology Programs, PHMRL. Negative PCR result due to low titres in a CSF sample.



## Carbapenemase Resistant Enterobacteriaceae (CRE)

Microbiology laboratories across the province have been forwarding carbapenem resistant and intermediate isolates to the Bacteriology & Mycology Program for genotypic analysis. These have included gram negative Enterobacteriaceae that harbour the New Delhi Metallo-beta-lactamase gene (NDM) endemic in South Asia, *Klebsiella pneumoniae* carbapenem (KPC) and Enterobacteriaceae that produce either a Verona integron-encoded metallo-beta-lactamase (VIM) or IMP-type  $\beta$ -lactamase. Latest counts for these organisms are listed in Table 1; all cases where travel history was obtained, had travelled to CRE endemic regions and have had exposure to local hospitalization. Health Care Acquired Infections (HCAI) and Antibiotic Resistant Organisms (ARO) are detected in front-line microbiology laboratories across BC; the PHMRL and NML offer support and do further characterization as required in this collaborative network.

Table 1. Carbapenem Resistant Enterobacteriaceae Detected

Type	No. of Cases	Comments
NDM	7	
KPC	2	1 case also harboured the VIM gene
VIM	1	In addition to above KPC/VIM case
IMP	none	

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## Streptococcus Surveillance

Pneumococcal diseases are a major public health problem globally and in Canada. The Bacteriology & Mycology Program works closely with front-line microbiology laboratories in BC and with the National Microbiology Laboratory to provide these lab data. Test volumes for *Streptococcus pneumoniae* submissions in 2011 have been within range in comparison to previous years (Figure 4); *S. pneumoniae* continues to affect the elderly and young children (Figure 5).

Figure 4 Streptococcus pneumoniae isolates forwarded to the Bacteriology & Mycology Program, PHMRL, 2008 to present

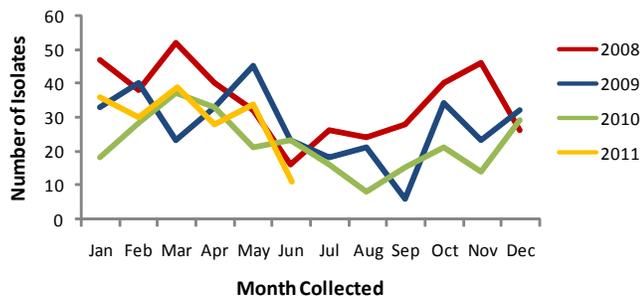


Figure 5 Ages of invasive pneumococcal disease cases and gender ratios submitted to the Bacteriology & Mycology Program, PHMRL, 2011 to present

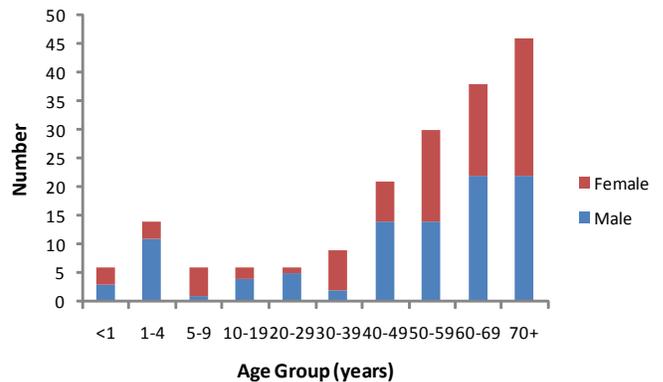


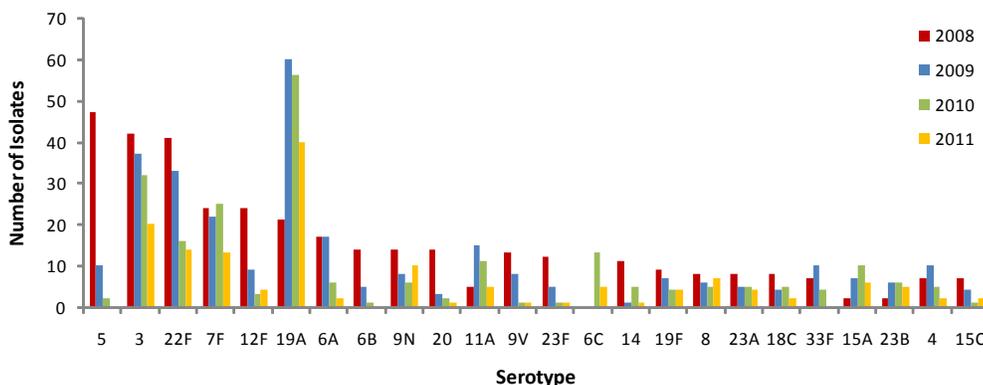
Table 2. British Columbia pneumococcal vaccination history.

Vaccine	Implemented	Serotypes Covered
PCV 7	April, 2003	4, 6B, 9V, 14, 18C, 19F and 23F
PCV 13	June, 2010	Above + 1, 3, 5, 6A, 7F and 19A

More than 90 *S. pneumoniae* known serotypes can cause invasive pneumococcal disease (IPD). In addition to performing preliminary serotyping, the PHMRL also forwards invasive isolates for additional subtyping to our reference centre at the

NML. The recently introduced serotype 5 was the leading serogroup in 2008 and has since been replaced by 19A (Figure 6), accounting for 20.5%, 24.9% and 26.8% of all serotypes in 2009, 2010 and so far in 2011, respectively. Serotype prevalence appears to be affected by vaccine coverage (Table 2); those serotypes contained in the PCV 7 vaccine have been responsible for fewer cases of IPD over the years (Figure 6). Inclusion of 19A in PCV 13 should also manifest in fewer cases of IPD of this serotype in coming years.

Figure 6 Occurrence of top Streptococcus pneumoniae serotypes submitted to the Bacteriology & Mycology Program, PHMRL, 2008 to present

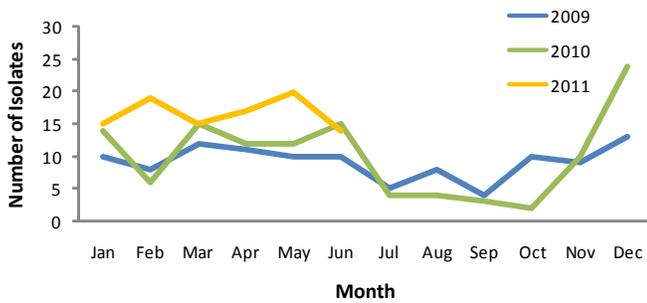


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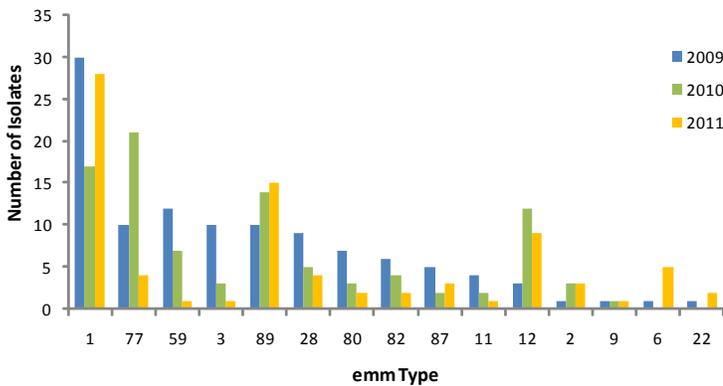
The number of isolates collected for invasive Group A *Streptococcus* (iGAS) were higher in the months of February, April and May in 2011 than in the same months of previous years (Figure 7).

**Figure 7**  
*Streptococcus pyogenes* (iGAS) isolates forwarded to the Bacteriology & Mycology Program, PHMRL, 2009 to present

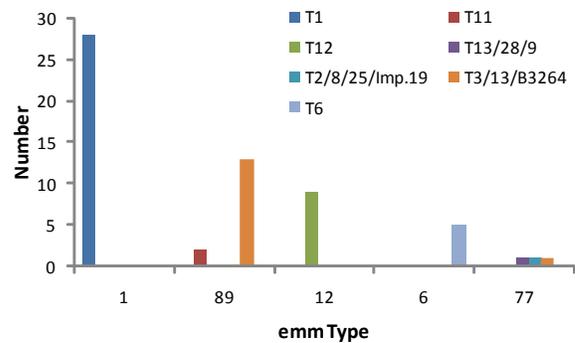


Serotyping of *Streptococcus pyogenes* by the National Microbiology Laboratory is based on both the M protein virulence factor and by the surface T antigen, also known as *emm* typing and T-typing. There are over 100 *emm* types and 20 T-types known. The most common serotypes seen in BC are as shown in Figures 8 and 9. About 33% of the iGAS isolates submitted in 2011 have been *emm* type 1 and T-type 1. *emm* and T-types are conserved for *emm* serotype 1, 12 and 6 (Figure 10).

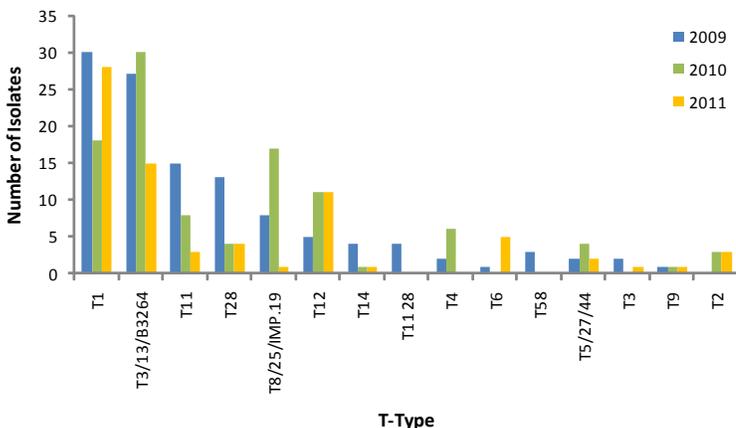
**Figure 8**  
 Top *Streptococcus pyogenes* (iGAS) *emm* serotypes, submitted to the Bacteriology & Mycology Program, PHMRL 2009 to present



**Figure 10**  
 Most common *Streptococcus pyogenes* (iGAS) *emm* types and their corresponding t-types, submitted to the Bacteriology & Mycology Program, PHMRL, 2011-present



**Figure 9**  
 Top *Streptococcus pyogenes* (iGAS) T serotypes, submitted to the Bacteriology & Mycology Program, PHMRL 2009 to present



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## A Report of the Public Health Microbiology & Reference Laboratory

Editor: Yin Chang

Contact: [yin.chang@bccdc.ca](mailto:yin.chang@bccdc.ca)

Website: [www.phsa.ca/bccdcpublichealthlab](http://www.phsa.ca/bccdcpublichealthlab)

Co-Editors:

### **Bacteriology & Mycology Program**

Program Head and Medical Microbiologist: Dr. Linda Hoang

Section Head: Ana Paccagnella

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