PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

LABORATORY TRENDS

October 11, 2011

In this Issue:

Laboratory News

Human Pathogens and Toxins Act

In 2009, Parliament of Canada passed the *Human Pathogens and Toxins Act* (HPTA) in an effort to have nationally consistent, rigorous controls and requirements over the possession, containment and movement of non-imported human pathogens and toxins.

Under the Act, the PHMRL has registered as a facility that works with Risk Group 2 or higher organisms. The next stage is to await the regulations that will dictate the implementation of the HPTA. The Public Health Agency of Canada will be developing a program and regulatory framework informed by nation-wide consultations on the following:

- Licenses: procedures required to engage in controlled activities
- Security screening: requirements needed for access
- Inventories: requirements needed for which pathogens and toxins
- Laboratory incidents: reporting on laboratory acquired infections
- Biological Safety Officers: qualifications and training required and roles identified in exercising regulations

THE PHMRL as part of the Canadian Laboratory Response Network and the Biological Safety Officer Network is working on a number of initiatives related to HPTA. More information about the Act and the consultation process is available on the HPTA website.

Cross Border News

Listeria monocytogenes Food Recalls

A multi-state outbreak of listeriosis has been linked to cantaloupes from a Colorado farm. The recalled cantaloupes were shipped to several states from 29 Jul 2011 through 10 Sep 2011.

There are four PFGE patterns and two serotypes of *Listeria monocytogenes* involved in this outbreak. According to the CDC website as of 3 Oct 2011, a total of 100 individuals have been infected with 18 deaths of mainly elderly, reported from 20 states. No Canadian reports of illness connected to this outbreak have occurred.

On 27 and 28 Sep 2011, the Canadian Food Inspection Agency and Les Cuisines Gaspésiennes de Matane Ltée issued warnings against consumption of smoked ham by the Compliments Sensations brand due to potential contamination with *L. monocytogenes*. The product was sold in Ontario, Quebec and in the Maritimes. There have been no reports of illness to date.

2008-2010 Program Highlights

A copy of our *Laboratory Program Highlights* from 2008-2010 can be found on our website. The report describes some of the events, improvements and achievements of the Public Health Microbiology & Reference Laboratory (PHMRL) during these years.

cap ACCREDITED™

LABORATORY TRENDS

PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

Trends

FluWatch

The 2011-2012 FluWatch surveillance season began on week 35 (28 Aug 2011) and ends on week 34 (25 Aug 2012). National influenza trends remains at low inter-seasonal levels. In weeks 36-39 there were 9 detections of influenza from Alberta, BC, Quebec and Newfoundland. Rhinoviruses have been detected at an increased rate from weeks 37-39. More information can be found on the FluWatch website at http://www.phac-aspc.gc.ca/fluwatch/index-eng.php.

WHO Influenza Vaccine Recommendations

The World Health Organization (WHO) convened in September to decide on vaccine recommendations for the upcoming (2012) southern hemisphere influenza season. Based on circulation of influenza viruses in previous seasons, the same triplet of strains has been recommended for inclusion in the 2012 vaccine composition:

A/California/7/2009(H1N1)pdm09
A/Perth/16/2009 (H3N2)
B/Brisbane/60/2008

These are the same strains that were recommended for influenza vaccines in the northern hemisphere in February, 2011.

Carbapenemase Resistant Enterobacteriaceae (CRE)

The latest counts for cases of carbapenemase resistance can be found in Table 1 (updated from our July 2011 issue). The Bacteriology & Mycology Program performs genotypic analysis on carbapenem resistant, gram-negative Enterobacteriaceae and intermediate isolates forwarded from microbiology laboratories province-wide. 8 cases with the New Delhi Metallo-β-lactamase gene (NDM) endemic to South Asia have been detected since this work began in 2010. 2 cases had the *Klebsiella pneumoniae* carbapenem (KPC) β-lactamase gene (one case with KPC as well as the a Verona integron-encoded metallo-β-lactamase (VIM) gene) and 1 case with only the VIM gene. No cases with the IMP-type β-lactamase has been detected. All cases where travel history was obtained had travelled to CRE-endemic regions with exposure to local hospitalization.

Table 1. Carbapenem Resistant Enterobacteriaceae Detected

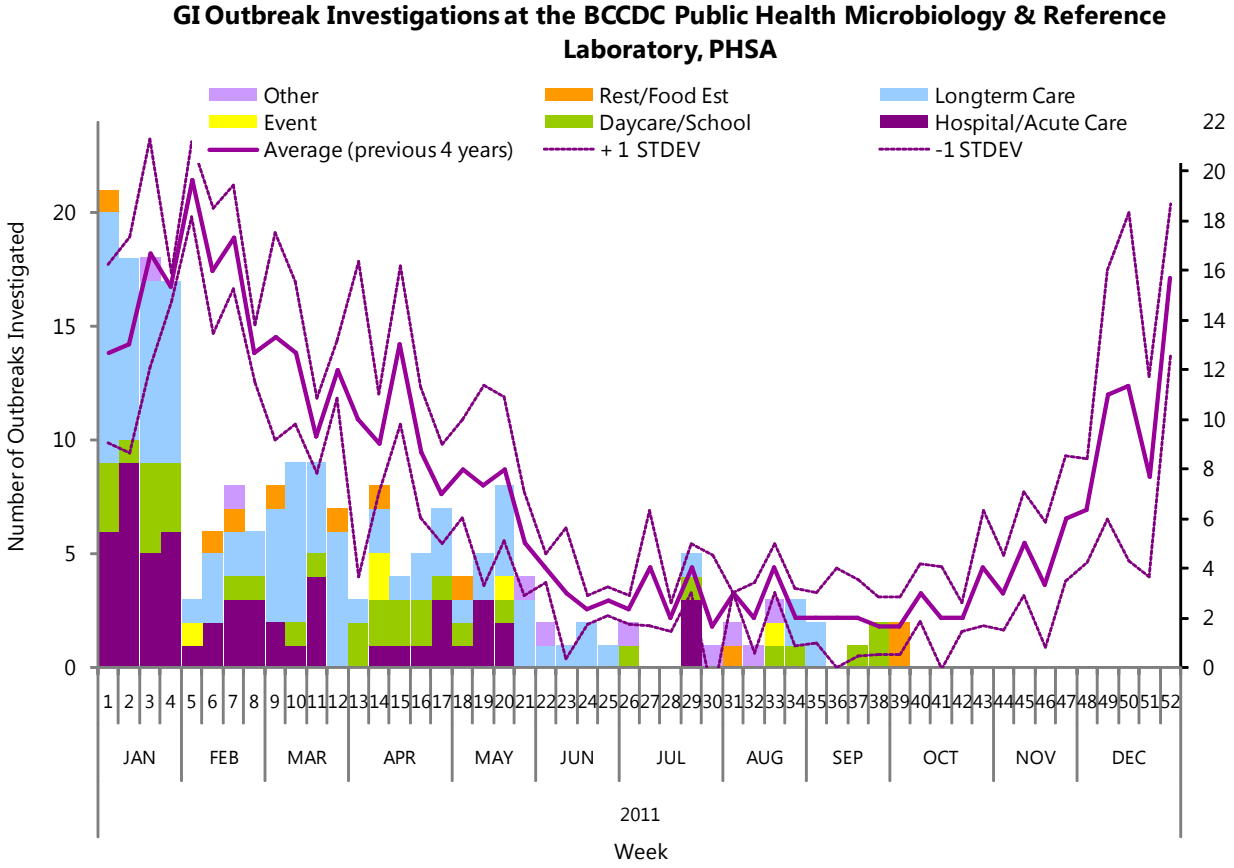
Type	No. of Cases	Comments
NDM	8	
KPC	2	1 case also harboured the VIM gene
VIM	1	In addition to above KPC/VIM case
IMP	none	

Gastrointestinal Outbreaks

In September, there were 6 gastrointestinal (GI) outbreaks investigated at the PHMRL; 1 was confirmed to be due to norovirus by RT-PCR, one was due to *Salmonella* Enteritidis and another due to histamine (scombroid) poisoning confirmed by the Canadian Food Inspection Agency. Outbreaks were identified from 1 longterm care facilities, 3 daycares and 2 food service establishment (Figure 1).

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.

Figure 1 _____
Gastrointestinal outbreaks investigated since January, 2011, Environmental Microbiology, Bacteriology & Mycology, Parasitology and Virology Programs, PHMRL.

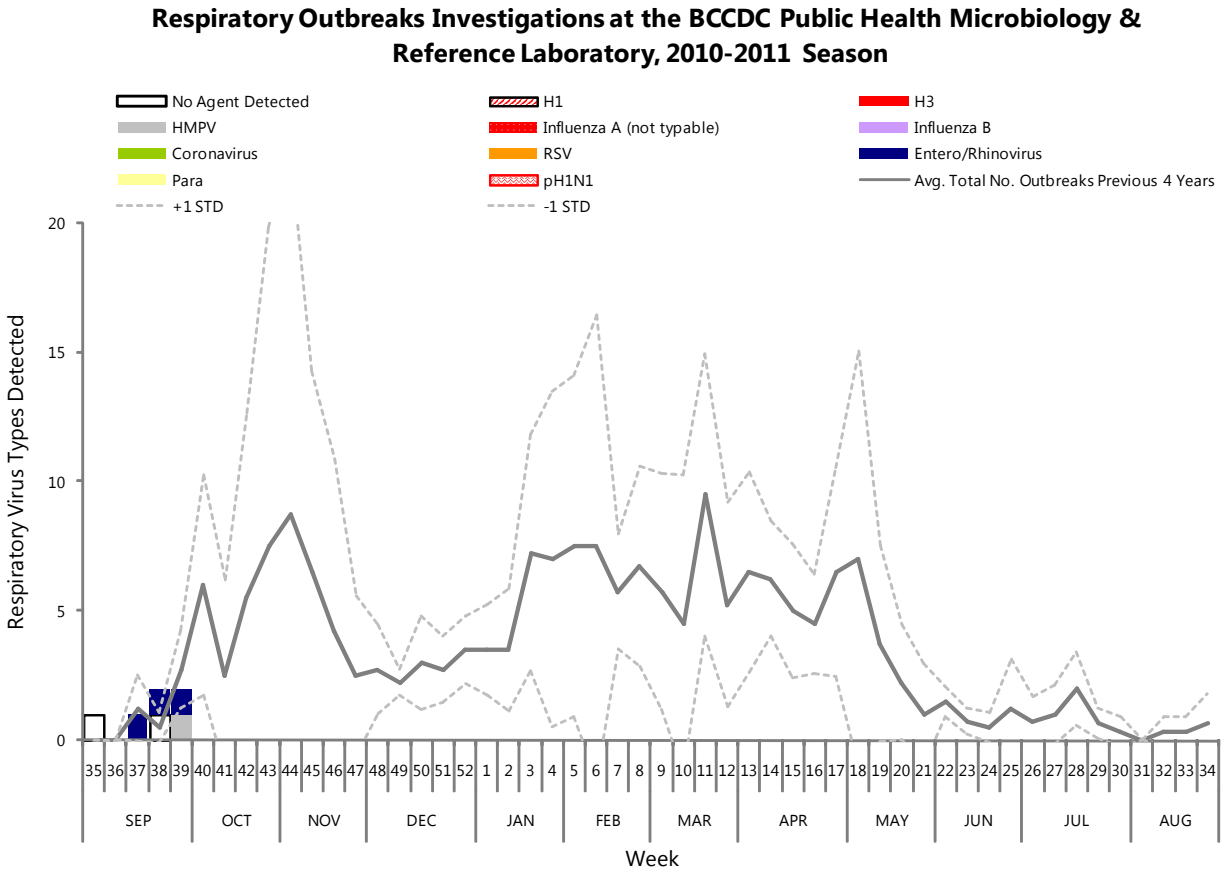


Respiratory Outbreaks

In September, samples were submitted from 6 longterm care facilities for outbreak investigation at the PHMRL (Figure 2). Enterovirus/rhinovirus were detected in 3 outbreaks and human metapneumovirus detected in one other using PCR and Luminex methods.

Figure 2 reflects respiratory sample results submitted for investigation to the PHMRL and is not representative of respiratory outbreaks in the entire BC community.

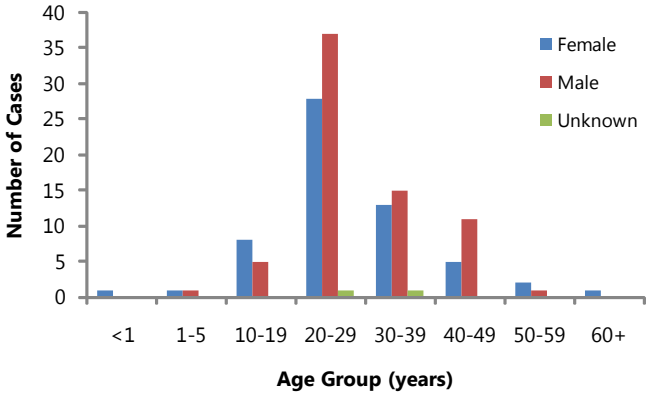
Figure 2
Respiratory outbreaks investigated by respiratory season, Virology Program, PHMRL.



Mumps Outbreak

A provincial mumps outbreak has been ongoing since January with a total of 133 PHMRL laboratory-confirmed cases of mumps. The outbreak has affected residents of mainly Vancouver Coastal Health and Fraser Health with some residents from Interior Health and Vancouver Island Health Authorities as well. Nearly 73% are within the 20-39 age range and 53% are male (Figure 3).

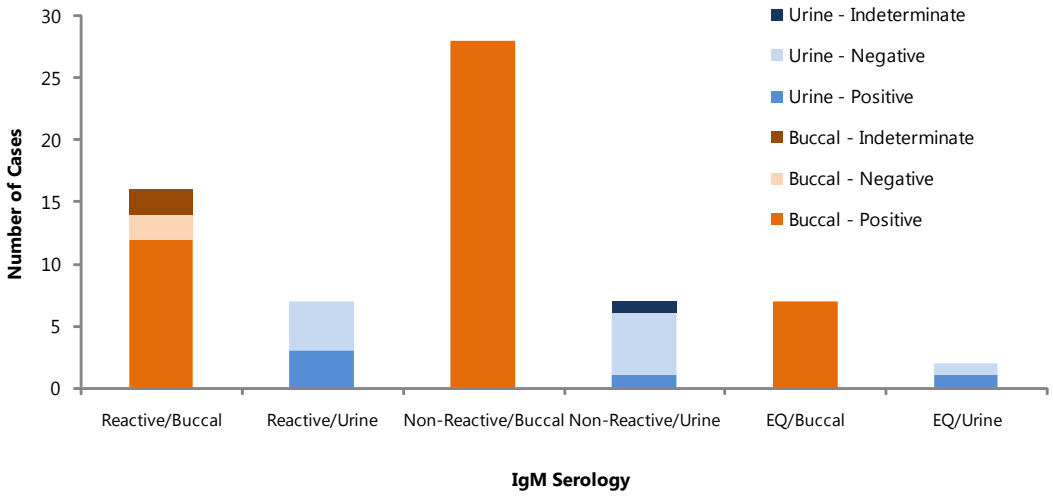
Figure 3
Age and gender of laboratory-confirmed mumps cases, Virology and High Volume Serology Programs, PHMRL.



Genotype G has been identified by the National Microbiology Laboratory as the predominant mumps strain for this outbreak; genotype G is a common genotype that has been circulating globally for decades. One (Chinese national) patient sample has also been genotyped with type F, a genotype that has been circulating in China.

Testing by both serology and PCR is recommended. Analysis of PCR results for urine vs. buccal swabs demonstrates that urine although generally not necessary for diagnosis (Figure 4) will be the only specimen that is positive for mumps RNA in about 6% of cases.

Figure 4
Mumps testing by serology and RT-PCR, Virology and High Volume Serology Programs, PHMRL.



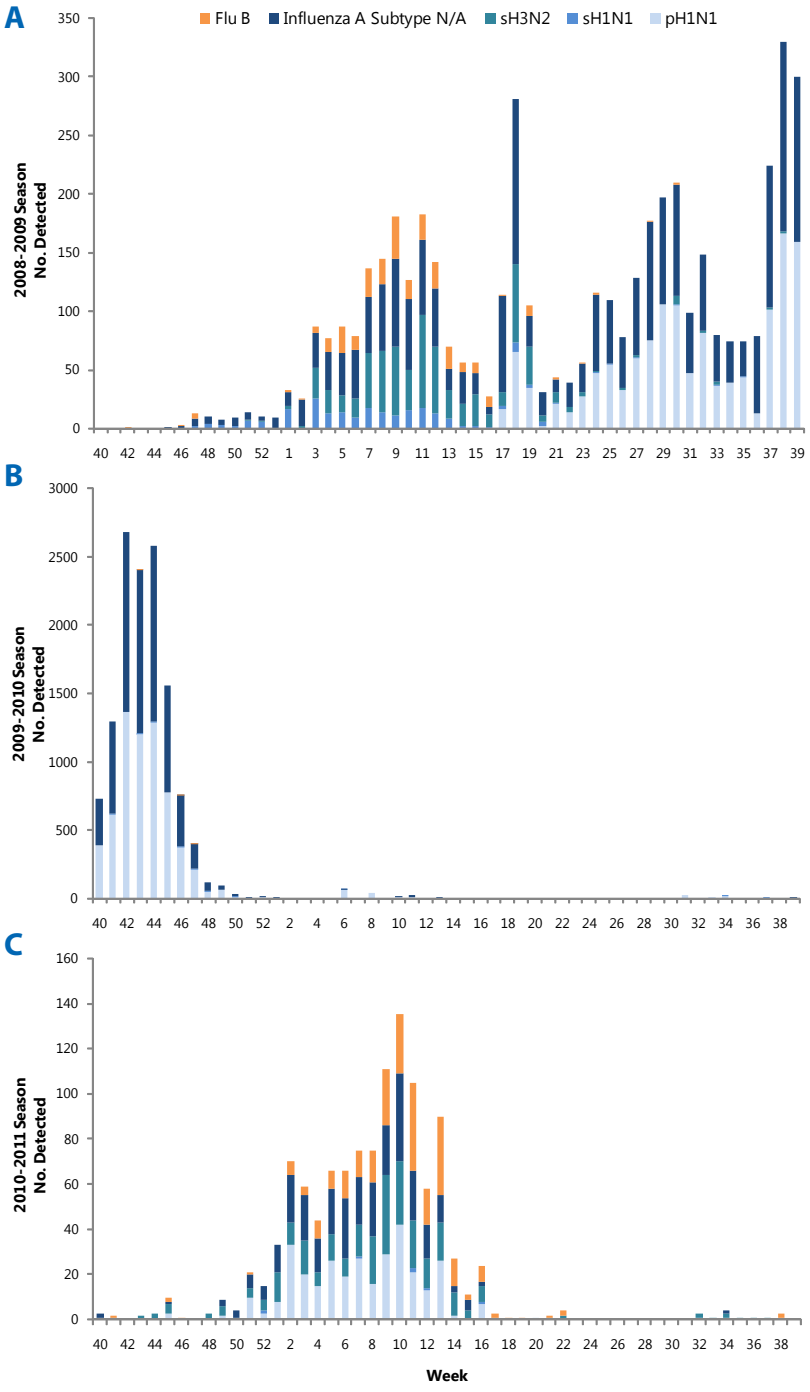
Influenza Surveillance

The 2010/2011 influenza season began in December in BC with very low levels of influenza detected (Figure 5C, week 49) with the bulk of influenza activity from January to April, 2011 (Figure 5C, weeks 1-14). Influenza A(H3N2) and influenza type B co-circulated with influenza A(pH1N1). A review of the last 3 respiratory seasons is depicted in Figure 5. The virus type/subtype composition of 2008/09 changed with the arrival of influenza A(pH1N1) at the end of April in 2009, extending the season for that year, well into November 2010 (Figure 5B), and becoming a part of the composition of circulating strains to date.

The PHMRL supports public health follow up by reporting cases of positive influenza to Health Authorities in the province. Prior to the 2010/11 season, a reverse transcriptase polymerase chain reaction (RT-PCR) assay was used to detect influenza A or B and further subtype any influenza A viruses. Further testing of specimens from sentinel physicians, respiratory outbreaks, children under age 5 and hospitalized patients was done using a multipathogen testing system called the Luminex xTAG-fast Respiratory Viral Panel. The Luminex panel was used exclusively in the 2010/11 season as it was able to detect influenza A(H3N2), influenza A(sH1N1), influenza A(pH1N1), influenza B as well as 10 other respiratory viruses. The plan for the upcoming season is to return to screening by RT-PCR using an assay that detects influenza A/B as well as Respiratory Syncytial Virus within hours. Luminex testing will be used to confirm the presence of other respiratory viruses as appropriate.

The influenza season in the southern hemisphere has been mild to moderate with only continued activity in some countries of the Carribbean, West Africa, Southern Asia and parts of Australia (WHO, 23 Sept 2011 Update). We expect another low prevalence year in North America for the upcoming season.

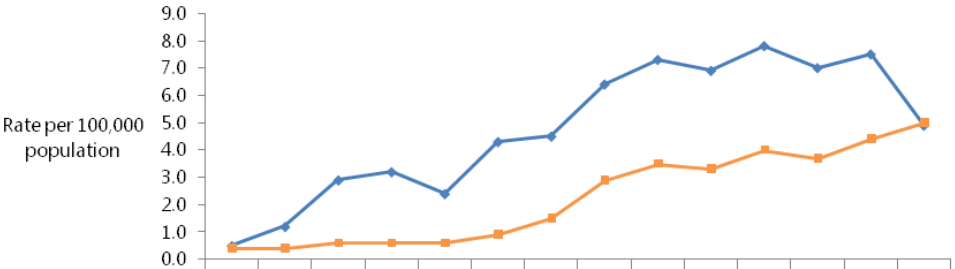
Figure 5
Positive influenza A and B detections over 3 respiratory seasons, Virology Program, PHMRL. pH1N1: influenza A/2009 pandemic H1N1 subtype, sH1N1: influenza A/seasonal H1N1 subtype, sH3N2: influenza A/seasonal H3N2 subtype, Flu B: influenza B. A: 2008/09 season, B: 2009/10 season, C: 2010/11 season.



Laboratory Diagnosis of Syphilis

Syphilis rates in Canada have been on the rise since the mid to late 1990s. A resurgence of infections in BC over the previous decade saw the provincial rate rising sharply compared to that of the national rate, peaking at 7.8 positive infections per 100,000 population in 2006 (Figure 6). In 2009, the provincial rate decreased to nearly that of the national rate, however, volumes for syphilis testing remains high due to the resurgence of infections in the previous decade as well as increased prenatal testing.

Figure 6
Reported rates of infectious syphilis in Canada and BC, 1996-2009. Source: Public Health Agency of Canada and 2009 Annual Surveillance Report, HIV and Sexually Transmitted Infections, BCCDC STI HIV Prevention and Control.



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BC Rate	0.5	1.2	2.9	3.2	2.4	4.3	4.5	6.4	7.3	6.9	7.8	7	7.5	4.9
Canadian Rate	0.4	0.4	0.6	0.6	0.6	0.9	1.5	2.9	3.5	3.3	4	3.7	4.4	5

Syphilis testing is centralized in BC with all samples tested at the PHMRL Zoonotic Diseases & Emerging Pathogens Program. Syphilis screening is based on serological methods either detecting antibodies produced as a response to lipoidal or lipoprotein-like materials (released from damaged host cells) called non-treponemal tests (NTT) and antibodies directed against *Treponema pallidum* cellular components, called *T. pallidum*-specific tests (TT). A recent national survey conducted by the Syphilis Laboratory Task Group of the Canadian Public Health Laboratory Network (CPHLN) showed that different methods are used by clinical laboratories across the country (Tsang et al, 2011). Of the 25 laboratories responding to the survey, 92% used the rapid plasma reagin (RPR) screening assay (the recommended diagnostic algorithm of NTT screening) followed by confirmation with a TT of all positives. The remaining laboratories use newer tests such as enzyme immunoassay (EIA) and chemiluminescent microplate immunoassay (CMIA) which are TT. Positives are followed by RPR to determine the status of infection as well as a second TT to confirm the diagnosis. The purpose of the CPHLN Task Group was to standardize the complex testing and interpretation algorithm used for syphilis testing by reviewing the current state in Canada and to assess the role of EIAs and CMIAs. Currently CDC USA is recommending NTT-based screening; Europe's recommendation is TT based screening. Canadians are using both NTT- and TT-based screening.

At the PHMRL, the traditional approach is followed with the RPR screen followed by *T. pallidum* particle agglutination (TPPA), Fluorescent treponemal antibody (FTA) and line immunoassay (LIA) confirm reactive results. Evaluations of the more automated EIAs and CMIAs are underway.

Tsang RSW, Radons SM, Morshed M. (2011). Laboratory diagnosis of syphilis: A survey to examine the range of tests used in Canada. Can J Infect Dis Med Microbiol. 22(3): 83-87.

October 11, 2011

LABORATORY TRENDS

PUBLIC HEALTH MICROBIOLOGY & REFERENCE LABORATORY

Vancouver, BC

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

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.

Editor: Yin Chang
Contact: yin.chang@bccdc.ca
Website: www.phsa.ca/bccdcpublichealthlab

Co-Editors:

Bacteriology & Mycology Program
Program Head and Medical Microbiologist: Dr. Linda Hoang
Section Head: Ana Paccagnella

Biosafety, Biosecurity, Biohazard Containment Program
Public Health Lead: Neil Chin
Assistant Biosafety Officer: John Tansey

Molecular Microbiology & Genomics Program
Program Head and Medical Microbiologist: Dr. Patrick Tang
Section Head: Alan McNabb

Parasitology Program
Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton
Section Head: Quantine Wong

Pre-Analytical, Central Processing & Receiving Program
Section Head: John Chan

Public Health High Volume Serology Program
Program Head and Medical Microbiologist: Dr. Mel Krajden
Section Head: Annie Mak

Technical Support Program
Section Head: John Chan

TB/Mycobacteriology Program
Program Head and Medical Microbiologist: Dr. Patrick Tang
Section Head: Dr. Mabel Rodrigues

Virus Isolation Program
Program Head and Medical Microbiologist: Dr. Mel Krajden
Section Head: Alan McNabb

Water and Food Microbiology Program
Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton
Section Head: Joe Fung

Zoonotic Diseases and Emerging Pathogens Program
Program Head and Clinical Microbiologist: Dr. Muhammad Morshed
Section Head: Quantine Wong

PHSA Laboratories

Public Health Microbiology & Reference Laboratory

cap ACCREDITED™