



LABORATORY TRENDS



December 17, 2013

Revision of Amoebiasis Reportable Case Definition

Amoebiasis has been identified as one of the most commonly reported communicable diseases in British Columbia (BC), with 340 cases reported in 2012 (BC Annual Summary of Reportable Diseases). This figure, however, is likely an over-representation of the true number of *Entamoeba histolytica* infections occurring.

Laboratory diagnosis of amoebiasis is based on microscopy and serological methods. Routine ova and parasite (O&P) examination is done on preserved (SAF) stool specimens. The definitive morphological diagnosis for *E. histolytica* is the presence of cysts and/or trophozoites containing ingested red blood cells in stool samples. However, since non-pathogenic *E. dispar* is morphologically similar to pathogenic *E. histolytica*, in the absence of ingested red blood cells, frontline laboratories can not differentiate between the two parasites by microscopy and they are reported together. Therefore both organisms are included in the current BC amoebiasis case definition for communicable diseases reported to public health.

The BC Public Health Microbiology and Reference Laboratory (BCPHMRL) carries out O&P and also offers an antigen ELISA test to distinguish *E. histolytica* from *E. dispar*. However, this test (on unpreserved stool samples) requires obtaining a follow-up sample.

Serological tests may also be useful in detecting *E. histolytica* infection. One limitation of serology, however, is its inability to differentiate between past and current infections as antibodies may persist years after the initial infection. BCPHMRL offers serological testing, which is most useful in symptomatic clinical cases, with a presentation consistent with invasive disease.

In this Issue:

| | |
|----------------------------------|---|
| Amebiasis Case Definition | 1 |
| Program Updates | 3 |
| Recent Outbreaks | 5 |
| Gastrointestinal Outbreaks | 6 |
| Respiratory Outbreaks | 7 |
| CRE Surveillance | 8 |

Since there is limited use of stool antigen and serological tests and microscopy alone cannot distinguish between *E. dispar* and *E. histolytica* the number of true *E. histolytica* infections in the province is unclear. A review of reporting procedures in other Canadian public health jurisdictions found differing public health case definitions: some use very sensitive (broad) definitions, others use a specific (narrow) definition. Some include positive serology and some do not. Based on these findings and working with the BC Centre for Disease Control Communicable Disease Prevention and Control Services and the BC Enteric Policy Working Group, a more specific case definition was proposed.

The BC Enteric Policy Working Group (reporting to the BC Communicable Diseases Policy Committee) recommended including individuals diagnosed with *E. histolytica/dispar* in stool as "probable cases" and addition of stool antigen tests or demonstration of *E. histolytica* as "confirmed" cases.

The revised case definitions are:

Confirmed Case

Laboratory confirmation of infection with/without symptoms:

- Positive for *E. histolytica* by stool antigen ELISA on unpreserved stool samples OR
- Demonstration of *E. histolytica* trophozoites in intestinal tissue biopsy or ulcer scraping (e.g. stained smears) OR
- Demonstration of *E. histolytica* trophozoites in extra-intestinal tissues (e.g. stained sections) OR
- Demonstration of *E. histolytica* trophozoites or cysts with ingested red blood cells in stool samples.

continued...



Revision of Amoebiasis Reportable Case Definition

Probable Case

Laboratory evidence of infection:

- Presence of *E. histolytica/dispar* cysts or trophozoites by microscopy in preserved stool samples with/without symptoms OR
- Positive serological test(s) for *E. histolytica* with clinical evidence of invasive amoebiasis.

The recommendations were reviewed by the BC Communicable Disease Policy Committee and approved. Implementation will begin in January 2014.

Updated BCPHMRL Vision, Mission, Quality Statements

Our annual Strategic Planning yielded a new Vision, Mission and Quality framework for the province's public health microbiology and reference laboratory (BCPHMRL). The senior leadership team also reviewed last year's Goals and Objectives (Top Three's), noting the previous year's achievements and looking forward with new targets for more efficiencies, better Core Function deliverables for public health, and improved client services. Clearer information on our current extended work hours and improvements on our online Guide to Programs and Services document were also determined to be opportunities for improvement.

**BC PUBLIC HEALTH MICROBIOLOGY
& REFERENCE LABORATORY**

VISION *Better health for the public through innovative, quality-focused, dedicated microbiology practices*

MISSION *To provide province-wide leadership with a client focus in a national network for the detection and control of communicable diseases*

QUALITY *Committed to excellence in laboratory practices by:*

1. Continued Improvement
2. Focusing on Clients
3. Valuing Staff
4. Ensuring a Safe Work Place
5. Meeting Legislative Requirements



Program Updates

[Helicobacter pylori Serology Test Moved to the High Volume Serology Program in Central Processing and Receiving](#)

by Dr. Muhammad Morshed and Annie Mak

Recently we have validated *Helicobacter pylori* serology testing on a new platform (Immulite XPI), an upgraded version of the current Immulite 2000. Our evaluation of this new testing platform shows excellent correlation in sensitivity and specificity between the two instruments.

Effective November 25, 2013, serological testing for *Helicobacter pylori* will be performed and resulted in the High Volume Serology Program, Central Processing and Receiving. This new efficiency builds further on the BCPHMRL fully automated high volume serology testing track located in the Lane Level.

Please feel free to call Dr. Morshed at 604-707-2622 if you have questions about the testing and/or for clinical questions related to *H. pylori*.

[Extension of the Automated Track in Central Processing and Receiving](#)

by Annie Mak

The automated sample handling and testing track for infectious diseases serology and tumour marker chemistry in Central Processing and Receiving was built in 2005. Since then, there has been a steady increase of samples passing through this high volume laboratory, particularly on the automated track.

Over the past four months, this track has undergone a major extension and the replacement of four aging automated analyzers. This process started in the summer with the verification of six new analyzers over the course of three months. The last month was spent testing out the new *H. pylori* markers in the laboratory information system and staff training on the new analyzer with the transition of the test to this area.

The successful extension of the automated track has been a major project in Central Processing and Receiving and would not have been possible without the hard work of the staff in this area.



Program Updates

Expansion of Program Offering the Tuberculosis Interferon Gamma Release Assay (IGRA)

by Dr. Muhammad Morshed and Quantine Wong

Tuberculosis is still one of the world's most deadly diseases. Interferon-Gamma Release Assays (IGRAs) are new cell-mediated immunology tests helpful in ruling out latent Tuberculosis (TB) infection. The demand for this test has been increasing since its implementation in the BCPHMRL Zoonotic Diseases & Emerging Pathogens (ZEP) Program in 2008. The ZEP Program offered IGRA testing for investigational purposes first to a select group of BCCDC TB clinic physicians then validated and implemented the test for defined, high risk patient groups. Patients tested include: (1) tuberculin skin test (TST)-negative immunocompromised individuals; (2) BCG persons who had a positive TST, and; (3) TST-positive Aboriginal and Foreign born persons.

There are two types of IGRA tests: T-Spot and the Quantiferon Gold I Tube (QFT). The QFT test requires specialized blood collection and transportation processes. BCPHMRL works with our regional health authority partner collection sites on standard, quality assured processes with original collection sites including BCCDC TB Clinic, Royal Jubilee Hospital, Prince George Regional Hospital and Kelowna General Hospital. New sites who follow these public health best practices/processes include the New Westminster TB Clinic and physicians managing dialysis transplant patients (Vancouver General Hospital, St. Paul's Hospital). BCPHMRL and BCCDC TB Control continue to partner with a variety of health care professionals to study the usefulness of IGRA in other populations.

Implementation of Dimorphic (*Coccidioides*) Serology Test

by Dr. Muhammad Morshed and Quantine Wong

Coccidioidomycosis is an infection caused by inhalation of spores of *Coccidioides* spp., a fungus endemic to arid regions of Mexico, Central and South America, and the southwestern United States (US) (Arizona, California, Nevada, New Mexico, and Utah). *Coccidioides* serology used to be one of the tests that the ZEP Program referred out to national and international reference laboratories. The incidence of this fungal infection has increased significantly over the years in the southwestern US. As a result, the number of tests requests for those living or travelling to this region have also increased proportionately. The ZEP Program has recently validated and implemented a commercial *Coccidioides* IgG and IgM immunoassay. This initiative will significantly reduce the turnaround time for results for health care providers.



Recent Outbreaks

Botulism Case

In November, a patient presented with neurological findings consistent with botulism. Testing at the BCPHMRL for this rare, often foodborne intoxication was found to be positive for Type A *Clostridium botulinum* toxin. Food testing results are pending. Other forms of this disease are: gastrointestinal botulism (often thought of as infant botulism, but this can occur in adults) and wound associated botulism. All suspect cases of botulism are considered a public health emergency. A clinical consultation must be done when a test request is planned. Consult the Environmental Microbiology Program Head/Medical Microbiologist, Dr. Judy Isaac-Renton at 604-707-2619/604-707-2611 or the Medical Microbiologist On Call at 604-661-7033.

Mumps Activity

An ongoing mumps outbreak in the Northern Health Authority continued through November with a total of 11 laboratory confirmed cases. The cases ranged from 13-44 years with mostly young adults 13-17 years affected (82%).

A mumps outbreak in the interior of the province occurred in November among members or contacts of hockey teams in the Merritt area. Seven males aged 18-24 years were laboratory-confirmed and several other cases were clinically confirmed with the mumps virus. More information can be found on the Interior Health [website](#).

Measles Activity

The outbreak of measles in the Bible Belt region of the Netherlands continues to create opportunities for travel-related transmission on unimmunized Canadians. A recent case in November from a resident of the Fraser Health Authority had a travel history consistent with acquisition in the Netherlands. The D8 genotype of the case is also the same as what is circulating in the Netherlands. Similar travel-related cases are also being observed in Alberta.

LABORATORY TRENDS

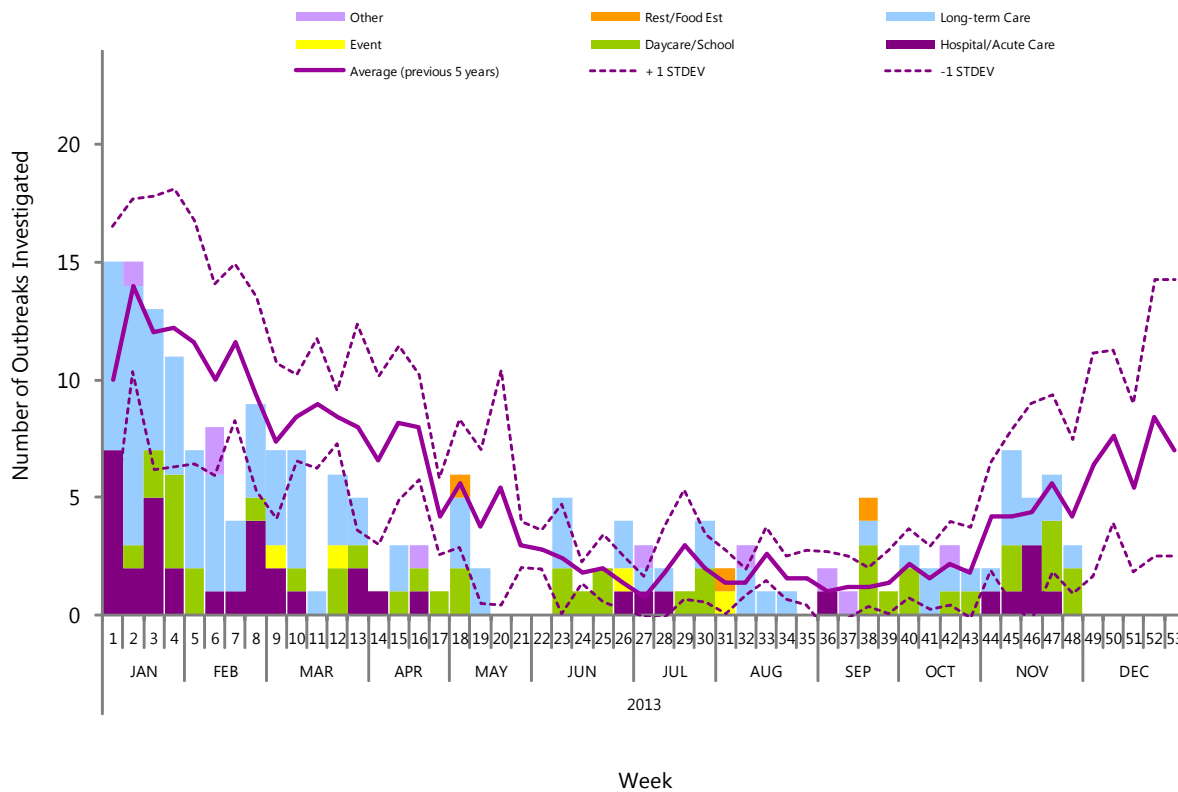
BRITISH COLUMBIA PUBLIC HEALTH
MICROBIOLOGY & REFERENCE
LABORATORY
Vancouver, BC



Gastrointestinal Outbreaks

In November, the Environmental Microbiology Program at the BCPHMRL investigated 20 gastrointestinal (GI) outbreaks. Outbreaks were identified from eight long-term care facilities, seven daycares, and five hospitals (Figure 1). Samples for laboratory testing were submitted for 14 (70%) of these outbreaks. Norovirus was confirmed at six long-term care facilities, two daycares and two hospitals. *Salmonella* Enteritidis was confirmed in one hospital outbreak.

Figure 1
Gastrointestinal outbreaks investigated* since January, 2013, 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.

LABORATORY TRENDS

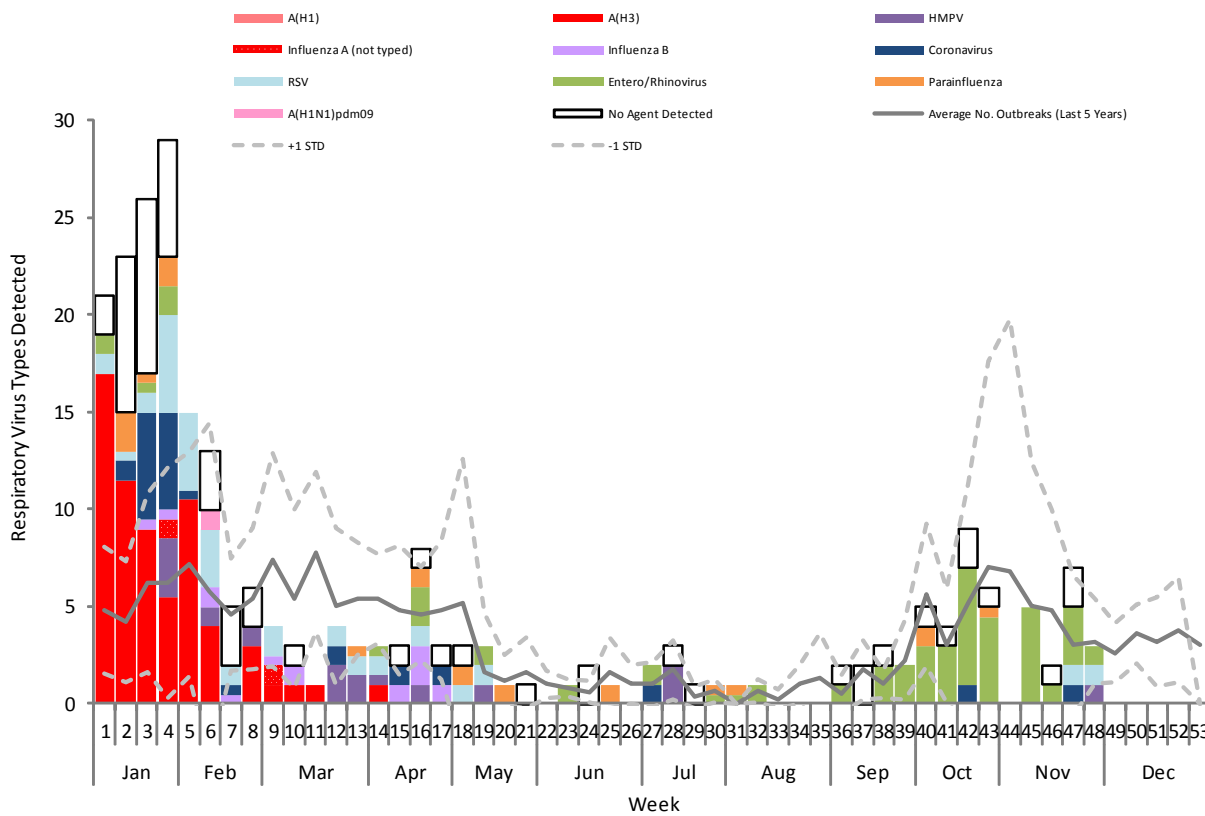
BRITISH COLUMBIA PUBLIC HEALTH
MICROBIOLOGY & REFERENCE
LABORATORY
Vancouver, BC



Respiratory Outbreaks

In November, samples were submitted to the BCPHMRL for 17 respiratory outbreak investigations from 15 longterm care (LTC) facilities, from one community outbreak and one unknown facility outbreak. Enterovirus/rhinovirus was detected in 10 (59%) of these outbreaks at 9 LTC facilities and in the community outbreak; coronavirus was detected in two (12%) of these LTC outbreaks, RSV was detected in two (12%) LTC facility outbreaks and HMPV was detected in one LTC facility outbreak (Figure 2).

Figure 2
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.



Carbapenem-Resistant Enterobacteriaceae (CRE) Surveillance

The latest counts for cases of carbapenem-resistant Enterobacteriaceae (CRE) in BC can be found in Table 1 (updated from our July 2013 issue). To date, there have been 108 patients with carbapenem-resistant organisms: 62 harboured the New Delhi Metallo- β -lactamase-1-gene (NDM-1), 11 cases with OXA-48 carbapenemase and seven with the *Klebsiella pneumoniae* carbapenem (KPC) β -lactamase gene; some patients had multiple resistance factors including two patients with NDM-1 and OXA-48 carbapenemase, one other case with the KPC β -lactamase gene as well as a the Verona integron-encoded metallo- β -lactamase (VIM) gene and one case with NDM-1 and KPC genes. There have been 24 cases with *Serratia marcescens* enzyme (SME) resistance genes (Table 1).

Table 1 Carbapenem-resistant Enterobacteriaceae detected since 2010, Public Health Advanced Bacteriology & Mycology Program, BCPHMRL. Counts include one patient* with KPC and VIM in 2010, two patients^ with NDM-1 and OXA-48 in 2012 and one patient# with NDM-1 and KPC in 2013 (N=106).

| Type | Collection Year | | | | | |
|--------------|-----------------|----------|----------------|-----------|-----------------|-----------------|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
| NDM-1 | 1 | 1 | 3 | 8 | 12 [^] | 40 [#] |
| KPC | | | 1 [*] | 1 | 1 | 6 [#] |
| VIM | | | 1 [*] | | | |
| IMP | | | | | | |
| OXA-48 | | | | 1 | 9 [^] | 3 |
| SME | | | 1 | 4 | 8 | 11 |
| Total | 1 | 1 | 6 | 14 | 29 | 53 |

To date, NDM-1-producing isolates are the predominant CRE, comprising 58% of the cases, followed by SME-producing (21%), OXA-48-producing (12%), KPC-producing (8%) and VIM-producing (1%) isolates.

The age range of patients with carbapenem-resistance was from 21 years to 97 years, with the majority (77%) 60 years and older. A variety of CRE organisms were isolated, including *K. pneumoniae*, *E. coli*, *Citrobacter freundii* and *Enterobacter* spp., *Serratia* spp. and *Morganella morganii* (Figure 3). *K. pneumoniae* has been the most frequently isolated (50%), followed by *Serratia* spp. (20%), *Enterobacter* spp. (14%), *E. coli* (9%) and *C. freundii* (5%).

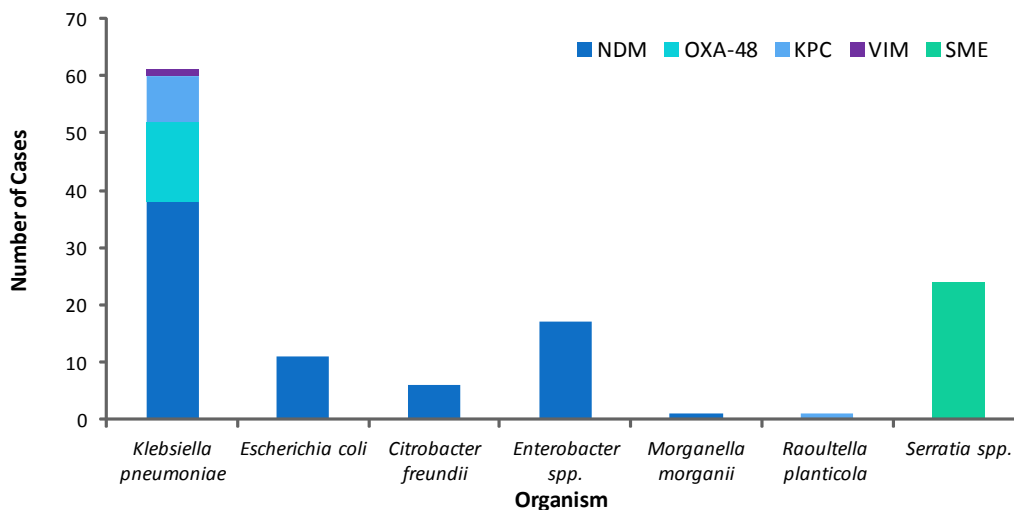


Figure 3 Organisms producing carbapenem-resistance genes, isolated since 2010, Public Health Advanced Bacteriology & Mycology Program, BCPHMRL. Includes patients with more than one resistance factor and organism isolated.

* Collection dates range from March, 2008-December 2, 2013.

LABORATORY TRENDS

BRITISH COLUMBIA PUBLIC HEALTH
MICROBIOLOGY & REFERENCE
LABORATORY
Vancouver, BC



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.

Editor: Yin Chang

Contact: yin.chang@bccdc.ca

Website: www.bccdc.ca/PHSALaboratories

Co-Editors:

Biosafety, Biosecurity, Biohazard Containment Program

Public Health Lead: Neil Chin

Assistant Biosafety Officer: John Tansey

Environmental Microbiology Program

Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton

Section Head: Brian Auk

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

Program Head and Medical Microbiologist: Dr. Judy Isaac-Renton

Section Head: Annie Mak

Public Health Advanced Bacteriology/Mycology Program

Program Head and Medical Microbiologist: Dr. Linda Hoang

Section Head: Ana Paccagnella

Public Health High Volume Serology Program

Program Head and Medical Microbiologist: Dr. Mel Krajden

Section Head: Annie Mak

Technical Support Program

Section Head: Dr. Mabel Rodrigues

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

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

