

# *Core Functions and Capabilities*

**British Columbia Centre for Disease Control**

## *Laboratory Services*



*Understanding the role and value of British Columbia's  
public health laboratory in protecting our community's well-being*

Revised from White Paper material from  
the Association of Public Health Laboratories by

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# ***Core Functions and Capabilities***

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### ***Laboratory Services***

Provincial public health laboratories in Canada, like their counterparts in the United States, are a critical component of the health delivery system. As providers of both essential services and public health leadership supporting and strengthening programs that protect health, laboratories such as BCCDC Laboratory Services offer the science and the service needed to support informed policy decisions.



All sectors of the public health infrastructure including disease control and prevention, environmental health, epidemiology, emergency preparedness and response are critically linked to public health laboratories. Teams of clinical laboratory experts provide early warning signals of health risks, compile data to solve outbreak investigations and identify disease causes to aid in treatment and prevention. Leadership through science and service promotes health of our community.

As new public health challenges arise, the effectiveness of the public health system's response will, in an important part, depend on the efficacy of provincial public health laboratories such as BCCDC Laboratory Services. It is evident that the advent of new diseases and outbreaks such as HIV/AIDS, Cryptosporidiosis, Giardiasis, Legionella, Lyme Disease, drug-resistant communicable disease agents "Superbugs" or drug-resistant tuberculosis, toxigenic *E coli* 0157:H7, and many water and foodborne infectious diseases as yet undefined etiologically, presents a tremendous challenge to the public health system.

Facing these challenges will mean ongoing evaluation of functions, responsibilities, and the capacity of this critical component of the public health system.

#### **KEY QUESTIONS**

- What functions do public health laboratories such as BCCDC Laboratory Services perform?
- What capabilities do they have?
- What is their unique role in safeguarding the public's health?

## Defining Core Functions, Capabilities and Capacity

Before *Core Functions* are defined, it is important to understand the scope of responsibilities in today's public health laboratory. Far from the confines of their traditional role of simple testing, provincial public health laboratories are now engaged in the broader challenge of prevention and control of disease and improvement of health. They are now Core Health Team Members.



The term *Core Function* is a role which underlies a laboratory's mandate. The term *Capability* refers to a specific activity that ensures the laboratory's success in implementing the *Core Function*. Each organization also has a *Capacity*, or in the case of public health laboratories, output services completed over a defined time period. Public health laboratories as a minimum should thus accomplish the following *Core Functions* supported by adequate *Capabilities*, as part of their organizational *Capacity*.

Canadian public health laboratories such as the BCCDC Laboratory Services perform essential functions in population-based public health policy development. They also provide reference and diagnostic data for health care and public health workers. Since their *Core Functions* and *Capabilities* are geared toward meeting the needs of their provincial constituencies the characteristics of each province's public health laboratory may be slightly different.

Synergy arising from Canadian provincial health laboratories working together is also important. This is particularly critical in outbreaks that span provinces (e.g. foodborne disease). BCCDC Laboratory Services is actively engaged in promoting our growing synergy between the National Microbiology Laboratory and the national network of public and private laboratories.

## Core Functions, Capabilities and Capacity

The following are ten core functions and capabilities basic to the Canadian public health laboratory system. As the core of BCCDC Laboratory Services, they are a minimum requirement for optimal service on behalf of communities throughout British Columbia.

1. Communicable disease surveillance prevention and control
2. Outbreak and emergency response to communicable diseases
3. Environmental health and food safety
4. Reference, specialized and diagnostic testing
5. Biosafety and Containment Level 3 programs
6. Integrated communicable disease data management
7. Public Health policy development and evaluation
8. Laboratory improvement and regulation (Quality Assurance)
9. Training and education of health care and public health works
10. Public health related research

# Core Functions, Capabilities and Capacity

BCCDC Laboratory Services should have the ability to provide optimal service in:

## 1. Communicable Disease Surveillance, Prevention and Control

- By serving as a first line of defense in the rapid recognition and prevention of the spread of communicable diseases by:
  - Examining specimens and analysing test results for the identification of disease outbreaks.
  - Isolating and identifying causative agents of communicable diseases.
  - Determining the source of infection by analysis of outbreak organisms using molecular epidemiological tools.
  - Working in a leadership consulting and advisory capacity to Medical Health Officers and their public health staff.
  - Identifying infectious carriers through laboratory testing.
  - Locating sources of infection in the environment.
  - Working as a key counterpart to BCCDC Epidemiology Services in all the above services.
- By providing population surveillance for infections of importance to the public health community. This includes testing for environmental contaminants (food and water), determining the patient's or community's immune status to communicable diseases, the study of antibiotic resistance, and enhanced laboratory surveillance using state-of-the-art information technology.
- By serving as a centre of expertise for the detection and identification of micro-organisms of importance in human disease. As such, ensure access to reference as well as some diagnostic laboratory expertise and capabilities in the areas of:
  - Bacteriology including sexually transmitted diseases and mycobacteriology (TB)
  - Emerging and re-emerging pathogens
  - Molecular laboratory epidemiology
  - Parasitology
  - Virology, including HIV services
- By providing specialized investigations of low-incidence infections or high-risk diseases such as tuberculosis and botulism. This includes, but is not limited to:
  - Testing for suspect cases of tuberculosis (*M. tuberculosis*) to identify infections and determine effective antibiotic treatment (antibiotic susceptibility testing).
  - Testing influenza specimens as directed by national and international surveillance efforts to identify viral strains and control influenza.
  - Assisting public and private health care providers in the investigation and control of unusual communicable or environmental diseases (emerging and re-emerging pathogens, bio-terrorist biological events).
- Perform tests to meet specific program needs of public health agencies.

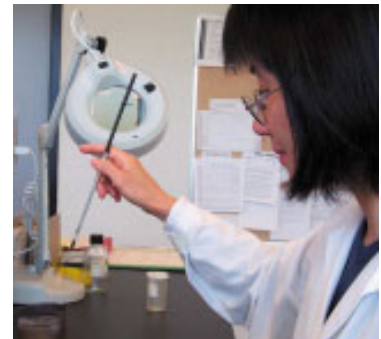


## 2. Outbreak and Emergency Response for Communicable Diseases

- By serving as a provincial centre to:
  - Provide infection control and laboratory support for investigation of outbreaks of antibiotic-resistant organisms.
  - Provide laboratory support as part of provincial (BRAT) and national (Health Canada) disaster preparedness plans for environmental or health emergencies.
  - Support investigative analysis of biological agents regardless of the source of exposure (i.e., accidental, bioterrorist or natural disaster).
  - Assist in the co-ordination of and development of our capacity to quickly and accurately handle a large volume of tests during a public health emergency situation.

## 3. Environmental Health and Food Safety

- By serving as a province-wide centre to:
  - Conducting analyses of environmental specimens (food, water) to identify and monitor potential microbiological threats to human health.
  - Conducting analyses of environmental specimens to ensure compliance with environmental regulations.
  - Providing services that support the Quality Assurance aspects of the province's network for water microbiology.
  - Providing leadership in the certification of laboratory's that carry out drinking water testing for public health purposes.
  - Conducting scientific studies or laboratory analyses of environmental specimens (food, water) to determine the relationship between environmental hazards and human health.
  - Testing specimens implicated in food borne illness to identify causes and sources. Testing may include assays to detect organisms such as *E. coli* O157, *Staphylococcus*, *Salmonella*, *Shigella*, *Vibrio*, *Listeria* and *Clostridium botulinum* and *clostridium perfringens*.
  - Analysing agents of food borne or water borne illness using molecular epidemiological (DNA fingerprinting) tools such as Pulsed Field Gel Electrophoresis (PFGE), genetic sequencing and PCR.
  - Providing services that network with national (National Microbiology Laboratories) and international collaborators (USA Centres for Prevention and Disease Control).



## 4. Reference, Specialized and Diagnostic Testing

- By serving as a provincial reference microbiology laboratory:
  - Providing services with national and international links.
  - Testing for unusual or rare pathogens (emerging and re-emerging pathogens)
  - Providing nucleic acid amplification testing and molecular epidemiology services.
  - Confirming atypical laboratory test results and verifying results of other laboratory testing in infections of public health importance.
  - Providing reference diagnostic testing to laboratories that may not have the capability to fully identify disease agents of clinical or public health importance.



## 5. Biosafety and Containment Level 3 Programs

- By serving as the provincial resource for laboratory biosafety including:
  - Responsibility for and management of CL3 laboratories of international size and scope.
  - Leadership in CL3 laboratory education and training
  - Maintenance of excellent biosafety programs for laboratory staff including Transportation of Dangerous Goods (TDG), WHMIS training and other Biosafety training programs.
- By providing leadership and training opportunities in biosafety at a regional, provincial, national and international level.
- By acting as a link with other national and international Biosafety programs.
- By integrating with other jurisdictions in biosafety for an integrated response (Medical Microbiologist 24/7 On Call Service) to RG4 organisms (ERAP Program for Health Canada).

## 6. Integrated Data Management

- By serving as a focal point repository for analysis and dissemination of information in support of public health programs. This includes:
  - Capturing laboratory data essential for public health decision-making.
  - Assuring an ability to maintain and communicate laboratory data using standardized data formats (e.g. HL7, LOINC).
  - Assuring rapid dissemination of laboratory information to assist in identification, understanding, and control of disease outbreaks.
  - Providing primary data necessary to inform and carry out policy and planning
  - Actively participating in a province-wide disease reporting network with centralized facilities for receipt, storage, retrieval and analysis of data.
  - Participating as a key link in the Canadian national and, where indicated, international, database systems to collect, monitor and analyse laboratory data (advanced laboratory surveillance).
  - Serving as a primary data link with Health Canada and the National Microbiology Laboratory for surveillance of diseases of national and global concern.
  - Serving as an important link in development of Canada-wide as well as provincial electronic health records and surveillance initiatives.



## 7. Policy Development and Evaluation

- By serving as a source to:
  - Provide medical and scientific leadership in developing provincial public health policy and integrating public health laboratory science into practice.
  - Participate in the development of standards for health-related laboratories, including food, environmental, clinical and research standards.



## **8. Laboratory Improvement and Regulation (Quality Assurance)**

- Serve as a centre of Laboratory Quality Assurance setting the standard of excellence for local and private laboratory performance:
  - Coordinating and promoting Laboratory Quality Assurance programs for clinical and environmental laboratories through training, consultation, certification and proficiency testing programs
  - Exercising leadership as a Ministry of Health agency assisting in testing and regulation in the environmental areas
  - Developing and overseeing provincial Quality Assurance programs to ensure the reliability of laboratory data used for communicable disease environmental monitoring
  - Overseeing the licensure, certification and accreditation of laboratories to ensure that environmental (water) quality testing for public health purposes is of the highest caliber.

## **9. Training and Education of Health Care and Public Health Works**

- By serving as a provincial academic centre particularly in areas related to public health including:
  - Providing training opportunities to improve the scientific and technical skills of public health laboratory staff.
  - Participating in the training of technologists, under-graduate and post-graduate medical and non-medical trainees, post-graduate trainees.

## **10. Public Health Related Research**

- By serving through the evaluation of new technologies and analytical methodologies to ensure state-of-the-art, cost-effective and timely services are provided in support of the public health and health care communities. This includes:
  - Conducting applied research projects related to public health.
  - Identifying the need for new laboratory methodologies for communicable disease detection and prevention.
  - Conducting research to improve laboratory tests for more effective communicable disease surveillance.
  - Collaborating with academic and private sector researchers and other government agencies to adapt, test, and evaluate emerging technologies for a public health laboratory.
  - Conducting applied studies into new and improved analytical methods and services that are necessary to meet changing public health surveillance and environmental regulatory requirements.

## Partnerships, Communication and Resourcing

To develop the above *Core Functions* and *Capabilities* BCCDC Laboratory Services needs to:

- Develop and strengthen partnerships with provincial, regional and national public health leaders and private industry.
- Maintain strong communication ties with Medical Health Officers, Provincial Epidemiologists, Infectious Disease experts, as well as Environmental Health Officers, Public Health Nurses, and policy makers.
- Participate in provincial strategic policy planning and development processes.
- Develop creative new ways to optimize resources in a fiscally challenging environment.
- Develop accountabilities in a framework of evaluation for the optimal delivery of public health and reference services.



## BCCDC Laboratory Services

Staff at BCCDC Laboratory Services are proud to be an integral part of the BC Centre for Disease Control. Partnering with our centre-teams, we are committed to developing our provincial functions and capabilities. New directions from our Year 2000 Strategic Planning and Visioning are consistent with these core functions described. Our goals are:

- To be leaders in Laboratory Total Quality Management Systems.
- To be leaders in Laboratory Molecular Epidemiology.
- To be leaders in Laboratory Communications.

Our vision and mission are:

### *VISION*

- We strive to be a competitive, knowledge-based enterprise committed to improving community health through innovation, education and research.
- We value our people and their exceptional contribution.
- We aspire to provide services in an accountable manner.

### *MISSION*

- To provide leadership in microbiology laboratory services for the detection and control of communicable disease, through learning, sharing information and policy development



### **With the future in mind...**

Emerging pathogens were recognized in the last decade as being of critical importance to the health of citizens of the United States. The US public health laboratory system, identified as critical to addressing this challenge, was targeted for resource allocation. An enhancement of their public health laboratories is underway. As yet Canada has no formal review or plan to address similar issues. Public health laboratories are critical to Canada's health. Provincial and federal public health laboratory services must be fostered, strengthened and appropriately integrated into our health care system.

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