

FELLOWSHIP TRAINING ACTIVITY GUIDE

FOUNDATIONS OF PUBLIC HEALTH LABORATORIES



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ABOUT FOUNDATIONS OF PUBLIC HEALTH LABORATORIES (PHL)

This activity guide looks at how you can demonstrate awareness of public health laboratories, laboratory organization, operations, and internal and external policies.

LEARNING OBJECTIVES

Once you have completed all the activities in this training guide and met with your mentor, you should be able to:

- Outline the organizational structure and core functions of your host public health laboratory
- Describe the importance of mission, vision, and value statements, as well

as selected internal and external policies to public health laboratories

- Describe the leadership structure of your laboratory

REFLECTION

Describe how the objectives above can help you in your position as a fellow:



FELLOW PROFILE: HARUMI

Harumi is an Infectious Diseases fellow* hosted by a public health laboratory in Florida.

Harumi joined the fellowship after completing her MS degree in biology. Recent stories in the media about bioterrorism and pathogens such as Ebola and Zika sparked an interest in applied research and public health while Harumi was a student. The fellowship program will

allow Harumi to explore opportunities in public health laboratory science.

As Harumi begins her fellowship, she will explore the different functions of her laboratory under the guidance of a mentor. She will have the opportunity to work with a team of microbiologists and chemists working toward a common goal – the identification of disease agents of public health importance.

FELLOW PROFILE: YOUR STORY

How does your own experience align with or differ from Harumi's profile?

**The fellows profiled in this publication are fictitious. Any resemblance to real persons, living or dead, is purely coincidental.*

PUBLIC HEALTH LABORATORY GENERAL INFORMATION

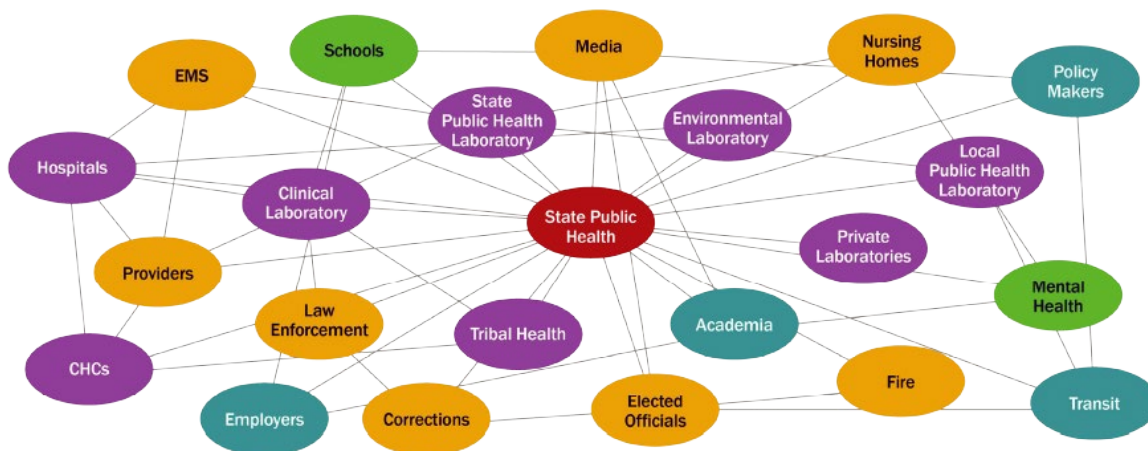
Public health laboratories serve major cities, counties, and states. Federal public health laboratories include the Centers for Disease Control and Prevention (CDC). These laboratories vary widely in structure and function. A county public health

laboratory is part of a larger board of health that addresses everything from epidemiology to tattoos and food safety. It is said that once you have seen one public health laboratory, you have seen ONE public health laboratory!

THE PUBLIC HEALTH LABORATORY SYSTEM

Public health laboratories often work collaboratively with other entities like emergency medical services and law enforcement organizations, the media and school systems to serve the public by providing diagnostic and reference testing, disease surveillance, emergency response

support and training for laboratory personnel. The actual structure and function of your host public health laboratory will vary on the basis of available resources, needs and governance in your particular jurisdiction.



PHL ORGANIZATION HIERARCHY

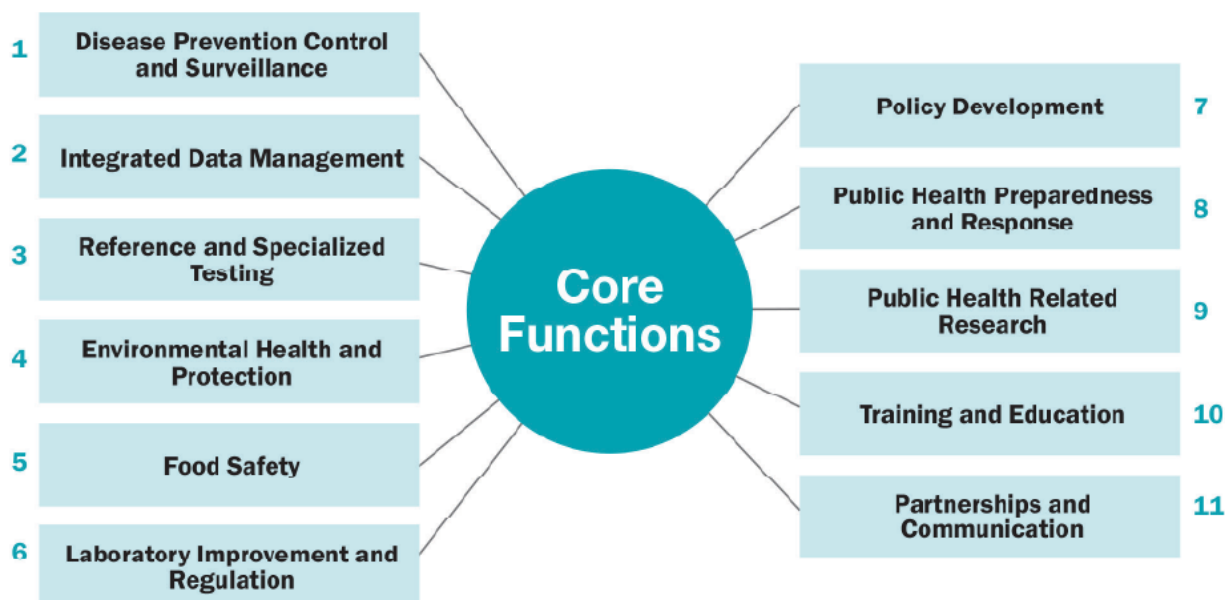
Public health laboratories are part of a network that make up the public's first line of defense against infectious diseases and other health hazards. They work to protect and improve public health by testing specimens to support identification and confirmation of illnesses during outbreaks, providing the expertise required to conduct research for future responses to public health situations and communicating information that can be used to generate policies and procedures related to public health.



How does your laboratory function within the larger public health system?

THE PUBLIC HEALTH LABORATORY CORE FUNCTIONS

The operations of the public health laboratory can be categorized into eleven core functions. Each of these functions is described in detail below.



1. DISEASE PREVENTION, CONTROL AND SURVEILLANCE

Provides accurate and precise analytical data in a timely manner in support of the:

- Prevention and control of infectious, communicable, genetic, and chronic diseases and environmental exposure. This may include testing for emerging and re-emerging microbial agents, immune status, antibiotic resistance, inherited neonatal metabolic disorders, environmental toxins, and heavy metals like blood lead.
- Recognition of outbreaks and other significant public health events, by identifying and characterizing the causative agents of disease and their origin.
- Population-based surveillance for conditions of public health importance and to guide programmatic decisions.
- Early detection of congenital disorders in newborns leading to timely diagnosis and treatment.
- Monitoring of low incidence and/or high-risk diseases, such as antibiotic-resistant tuberculosis, influenza, botulism, and rabies.
- Investigation and control of communicable or environmental diseases when testing is not available in the private sector.

2. INTEGRATED DATA MANAGEMENT

Serve as the conduit for scientific data and information in support of public health programs through the:

- Capturing of laboratory data essential for public health analysis and decision making, including detecting trends and sentinel events.
- Use of standardized data formats.
- Influencing public health policy.
- Participation in statewide disease reporting networks.
- Linkage with CDC and other national and international surveillance databases.
- Collaboration with state and national laboratory systems.
- Continuous improvement of laboratory data systems.

3. REFERENCE AND SPECIALIZED TESTING

Serve as centers of excellence using their expertise, reference and resources in the areas of biological, chemical and radiologic issues of public health importance to:

- Support the diagnosis of and surveillance for unusual and emerging pathogens.
- Confirm atypical laboratory test results.
- Verify results of other laboratories' tests.
- Provide reference services to laboratories that may not have the capability to fully identify disease agents of public health importance.
- Provide diagnostic testing for diseases of public health importance directly to providers when testing is not readily available.
- Test for diseases of public health importance that are too rare and unusual for other laboratories to maintain capacity.

4. ENVIRONMENTAL HEALTH AND PROTECTION

Collaborate with partners to coordinate and ensure scientific analysis of environmental and human samples to identify, quantify and monitor potential threats to health by:

- Testing for toxic chemical, radiological and microbiological contaminants in air, water, soil and hazardous waste.
- Conducting biomonitoring of human specimens in the assessment of toxic chemical exposure.
- Testing of environmental samples in support of federal and state regulations, aiding in the compliance with those regulations.
- Industrial hygiene/occupational health testing to assist in efforts to protect indoor air quality and worker health, such as routine analysis of asbestos, lead, pesticides, and radon.
- Participating in the Chemical Laboratory Response Network (LRN-C) and the Environmental Response Laboratory Network (ERLN).

5. FOOD SAFETY

Collaborate in the detection, monitoring and response to food safety issues by:

- Testing samples from persons, food and beverages implicated in food-borne illness outbreaks to detect and identify potential food-borne pathogens.
- Characterizing isolates and participating in national strain characterization databases, such as PulseNet, to inform epidemiologic investigations.

- Analyzing food specimens to detect, identify and quantify toxic contaminants such as pesticide residues, heavy metals, and volatile organic compounds.
- Monitoring for radioactive contamination.
- Participating in the Food Emergency Response Network (FERN).

6. LABORATORY IMPROVEMENT AND REGULATION

Provide leadership for laboratory improvement in areas of public health importance by:

- Promoting quality improvement programs for partner laboratories through activities such as training, consultation, and proficiency testing.
- Developing and overseeing statewide laboratory improvement programs to ensure the reliability of laboratory data used for environmental monitoring and communicable disease surveillance and control.
- Promoting safe laboratory practice through education, training, and consultation.
- Assessing and improving the State Public Health Laboratory System by implementing the Laboratory System Improvement Program (L-SIP).
- Guiding the creation of and supporting enforcement of regulations and laws that contribute to laboratory improvement.

7. POLICY DEVELOPMENT

Play role in the development of state and federal health policy by:

- Generating scientific evidence that informs public health practice and law.
- Monitoring the impact of public health laboratory practice on health outcomes.
- Serving as centers of expertise, reference, and resources in the areas of biological, chemical and radiologic issues of public health importance.
- Participating in the development and evaluation of standards related to the operation and performance of laboratories involved in public health testing.
- Advocating for the use of sound reasoning in the application of laboratory science and system infrastructure sustainment.
- Engaging in strategic planning at local, state, and national levels.

8. PUBLIC HEALTH PREPAREDNESS AND RESPONSE

Fulfill a key partnership role in local, state and national disaster preparedness and response by:

- Functioning as a Laboratory Response Network (LRN) Reference Laboratory for biological agents and as an LRN Chemical Laboratory at a level designated by CDC.
- Assuring the triaging of environmental samples for the rapid identification of threat agents (chemical, biological, radiological, and nuclear — CBRN) and food samples as a part of the Food Emergency Response Network (FERN).
- Planning for and ensuring that surge capacity is available in a public health emergency.
- Having a Continuity of Operations Plan in the event of a disruption of laboratory services.
- Participating in the Environmental Response Laboratory Network (ERLN).

9. PUBLIC HEALTH RELATED RESEARCH

Engage in research to improve and expand the scientific and policy basis of public health laboratory practice and assure their optimal application in support of the public health system by:

- Developing, evaluating, and implementing new technologies and methodologies.
- Partnering with other public health disciplines.
- Collaborating with academic institutions to carry out clinical and translational science research.
- Conducting public health systems and service research.
- Working with the private sector to foster scientific innovation.

10. TRAINING AND EDUCATION

Facilitate access to training and education by:

- Sponsoring training opportunities to improve scientific and technical skills within the public health laboratory system.
- Supporting management and leadership development opportunities.
- Participating in the training of both domestic and international scientists.
- Partnering with academia to provide experiential learning opportunities.
- Providing continuing education in the area of laboratory practice.

11. PARTNERSHIPS AND COMMUNICATION

Support their respective state public health laboratory systems by:

- Highlighting the importance of laboratory contributions to support public health.
- Maintaining a strong communication plan that links all system partners.
- Utilizing information technology for robust connectivity.
- Engaging traditional and non-traditional partners.
- Coordinating activities through the use of a laboratory program advisor (i.e., laboratory system coordinator).
- Linking the State Public Health Laboratory System to appropriate national surveillance networks.



ACTIVITY: WHICH CORE FUNCTIONS DOES YOUR LABORATORY HAVE?

Identify the core functions of your laboratory and contacts operating within each function that can help you gain a better understanding of your laboratory. If you need help, work with your mentor.

MANAGEMENT AND LEADERSHIP

Management and leadership are not always the same thing, but they are necessarily linked and complementary.

Public health laboratory leaders are usually required to be both good managers and good leaders. They must empower staff to perform to their maximum potential. Building positive relationships with staff and partners is also fundamental to successful leadership, as it is often necessary to not only manage and inspire, but to also resolve conflict and facilitate change while promoting the laboratory's mission, vision and values.

In addition to inspiring and motivating staff, effective public health laboratory leaders model other leadership behaviors. They are **strategic thinkers**, able to **see ahead clearly** and **manage both conflict and change**. They

are also able to **solve problems** with a mixture of **logical analysis** and wisdom.

Effective public health leaders also have organizational awareness. They have to have the ability to explain how the **organizational structure** of the laboratory meets operational objectives and supports its mission, vision and values. They are also able to **describe the public health significance** of internal and external policies on laboratory operations.

Effective public health leaders are **effective communicators** with a particular ability to resolve conflicts in a fair and equitable manner. Effective communicators are able to deliver messages through written, verbal and digital means clearly and succinctly across a variety of settings and styles.



ACTIVITY: YOUR LABORATORY'S LEADERSHIP

1. Describe the leadership structure of your laboratory.

MISSION, VISION AND VALUES

The mission, vision and values statements communicate the purpose of the laboratory to stakeholders, inform strategy development and serve as a set of goals by which success of the organization's strategy can be measured.

- The mission statement is a declaration of the organization's reason for being or view of itself. It answers the question "What do we do?"
- The vision statement communicates how the organization aspires to serve the community. It answers the question "Why are we here?"
- The values statement describes, as the name suggests, the most important beliefs of the organization. It answers the question "Who are we?"

INTERNAL AND EXTERNAL POLICIES

Internal policies are statements of prescribed acceptable methods or behaviors for staff and can provide guidance for everything from human resources issues to laboratory best practices and guidelines for meeting safety regulations. Some internal policies are in direct response to government regulation.

External laboratory policies outline the position of the governing entity behind the laboratory.

These policies advise and communicate to the public a laboratory's position on particular issues related to disease prevention and health promotion. External policies range from recommendations for preventing injuries or maintaining fitness to statements that help shape the development of legislative, regulatory and media advocacy activities.





ACTIVITY: IDENTIFY YOUR PHL STRUCTURE

Use this space to sketch out the organizational structure for your laboratory. If necessary, ask your mentor for assistance.



ACTIVITY: IDENTIFY YOUR LAB’S MISSION, VISION AND VALUES

MISSION

VISION

VALUES



ACTIVITY: FIND YOUR POLICIES

INTERNAL POLICIES

1. Identify several key internal policies at your laboratory.

2. Categorize them as human resources, best laboratory practices, safety or other.

3. Identify the consequences of violating each policy

EXTERNAL POLICIES

1. Identify several key external policies that impact practice at your laboratory.

2. Categorize them as health recommendations, public policy issues or other.

3. Identify the consequences of violating each policy.



CASE STUDY: A VIOLATION OF LABORATORY POLICIES

The senior director of one state public health laboratory was faced with a dilemma. While conducting testing in response to a recent industrial accident involving biohazardous waste, a number of laboratory personnel violated processes and procedures in order to decrease turnaround time and report test results as quickly as possible. The incident was picked up by the local news media. It was clear that the personnel in question acted with the best of intentions—timely reporting of test results—but it was reported that personnel safety was potentially put at risk in the laboratory and the reliability of the test results have been called into question.

The situation has exposed the laboratory to public controversy in the media. The laboratory supervisor is in favor of taking action against the laboratory personnel involved. It is up to the director to manage the conflict within the lab, gather all the facts and communicate with the public, as needed.



ACTIVITY: WHAT ACTION WOULD YOU TAKE?

Just as laboratories differ in the way they are organized, structured and what tests are performed, so too, do they differ in how information is shared with the public. This is highly regulated by each jurisdiction. It may be the Laboratory Director, the Public Information Officer or the State Health Official, to name a few. For this case study we will assume the Laboratory Director has authority to convey to the public.

1. Your first task is to manage conflict. If you were the Laboratory Director, who within the laboratory would you engage in discussion? Would you speak to both the personnel who violated the policy and the supervisor? Why?

2. How might this incident affect people outside of the laboratory?

3. What does your laboratory's policy say to do if someone from the media or the general public asks you about an incident in the laboratory?



CASE STUDY RESOLVED

1. The director could speak to each individual separately and then meet everyone involved as a group. It is important to get all sides of the story to be able to answer who, what, when, where and why questions. In the group meeting, discuss the facts of the situation and the outcomes – both positive and negative, to make sure that the supervisor and the employees see where the process and communications broke down.
2. Among other impacts, this incident could cause the general public to have less confidence in the test results produced by the laboratory.
3. Most laboratories have a policy that provides guidance related to how employees should respond to requests for information from the public and/or the media. Familiarize yourself with your laboratory's policy.



- The larger organizational structure within which your laboratory fits
- Which core functions your laboratory performs. Does it perform any additional functions?
- Your laboratory's mission, vision and values statements
- Some internal policies at your laboratory
- External policies that impact laboratory practice
- The leadership structure of your laboratory

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ADDITIONAL RESOURCES

Resource Name/Title	Institution	Website/Periodical Information
Introduction to Public Health Series	CDC	These training materials introduce public health core functions and essential services. Topics include key public health terms, historical developments from four public health perspectives, and determinants of health and their effects on population health.
TRAIN	Public Health Foundation	TRAIN website is a national learning network that provides quality training opportunities for professionals who protect and improve the public's health.
American Society for Clinical Pathology	American Society for Clinical Pathology	The American Society for Clinical Pathology unites more than 100,000 anatomic and clinical pathologists, medical laboratory professionals, residents and students to accelerate the advancement of laboratory medicine to better improve patient care through knowledge, collaboration, and global community.

Resource Name/Title	Institution	Website/Periodical Information
Making the Right Moves: A Practical Guide to Scientific Management for Postdocs and New Faculty, Second Edition	Howard Hughes Medical Institute	Based on workshops co-sponsored by the Burroughs Wellcome Fund and HHMI, this free downloadable book is a collection of practical advice and experiences from seasoned biomedical investigators and includes chapters on laboratory leadership, getting funded, project management, and teaching and course design
Leadership and Staffing Resources	Lab Manager	Articles focused on issues regarding laboratory staffing as well as HR resources for laboratory managers.
What is the Importance of Standard Operating Procedures (SOPs)?	Lab-Training.com	Article that examines some of the key areas covered by different standard operating procedures in different groups of organizations.
How to Manage a Lab and Staff	Science Magazine	A webpage with a list of articles that will help develop an understanding of the challenges and growth opportunities of leading a team in the lab.
The Leadership Edge/Resources	The Leadership Edge	A website that outlines business training for scientists, engineers and their executives. The Leadership Edge is a catalyst for empowering people worldwide to continually make positive changes in their personal and professional lives.
Motivate Your Lab	The Scientist	This article discusses how to run an efficient and creative lab without micromanaging.

Resource Name/Title	Institution	Website/Periodical Information
The Leading Researcher: Explore and Develop Your Leading Potential	University of Sussex	This booklet is an introduction to leadership.
Building Leadership Among Laboratory-based and Clinical and Translational Researchers: the University of California, San Francisco Experience	National Library of Medicine	In 2005 the University of California, San Francisco (UCSF) implemented the Scientific Leadership and Management (SLM) course, a 2-day leadership training program to assist laboratory-based postdoctoral scholars in their transition to independent researchers managing their own research programs. In 2011, the course was expanded to clinical and translational junior faculty and fellows. This paper describes the background, structure, and content of the SLM and reports on participant evaluations of the course offerings from 2007 through 2011.
How to Become a Good Lab Manager	ASBMB Today	This article discusses the most important skills to learn to be an effective lab manager.