

REPUBLIC OF LIBERIA

NATIONAL LABORATORY SYSTEM

**MULTISECTORAL COORDINATION OF
LABORATORY SYSTEMS AND SERVICES
TOWARD ONE HEALTH**

NOVEMBER 2022



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ABBREVIATIONS AND ACRONYMS

AMR	Antimicrobial Resistance
CMS	Central Medical Stores
DSIS	Disease Surveillance Information System
EHL	Environmental Health Laboratory
EQA	External Quality Assessment
HCQMU	Health Care Quality Management Unit
HTMU	Health Technology Management Unit
ICT	Information and Communication Technology
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
IPC	Infection Prevention and Control
LAMLT	Liberia Association of Medical Laboratory Technology
LBTS	Liberia Blood Transfusion Service
LIMS	Laboratory Information Management System
MoH	Ministry of Health
MoU	Memorandum of Understanding
M&E	Monitoring and Evaluation
NACP	National AIDS Control Program
NASCP	National AIDS and STI Control Program
NAPHS	National Action Plan for Health Security
NBSP	National Blood Safety Program
NDD	National Diagnostics Division
NDU	National Diagnostic Unit
NHLSP	National Health Laboratory Strategic Plan
NHSSP	National Health Sector Strategic Plan
NLNL	National Laboratory Network of Liberia
NLS	National Laboratory System
NLTCP	National Leprosy and Tuberculosis Control Program
NMCP	National Malaria Control Program
NPHIL	National Public Health Institute of Liberia
NPHRL	National Public Health Reference Laboratory
NSL	National Standards Laboratory
PT	Proficiency Testing
QMS	Quality Management System
SLIPTA	Stepwise Laboratory Improvement Process Towards Accreditation
SLMTA	Strengthening of Laboratory Managers towards Accreditation
SOPs	Standard Operating Procedures
TB	Tuberculosis
TWG	Technical Working Group
WHO	World Health Organization

1. Introduction

The Ministry of Health in Liberia works closely with several units and organizations to support laboratory operations (**Figure 1**).

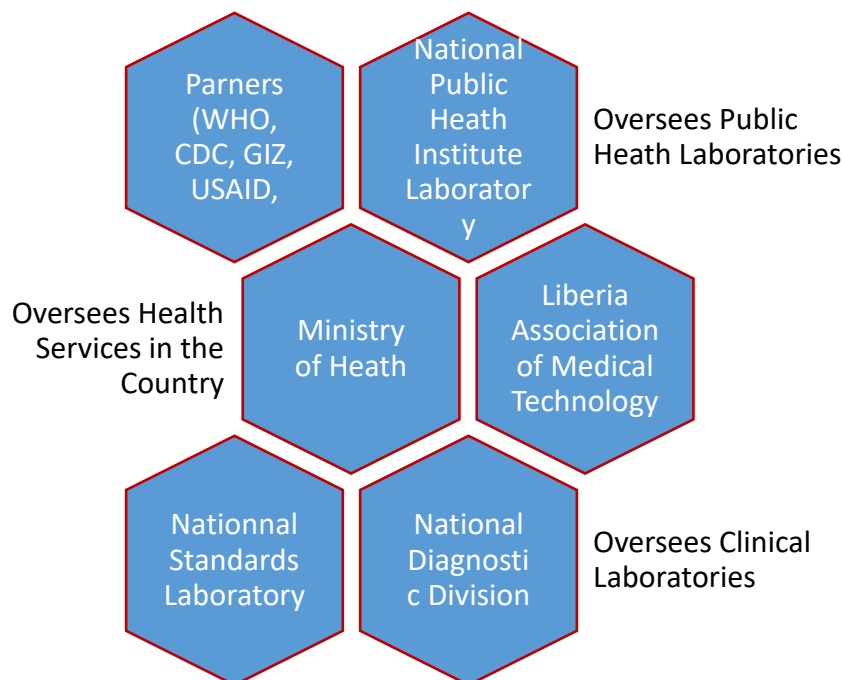


Figure 1. The Ministry of Health and Associated Laboratory Units/Partners

2. National Laboratory System

The National Laboratory System (NLS) comprises the Public Health Reference Laboratory, the Research Laboratory, Clinical Laboratories, the Animal Health Laboratory, the Environmental Health Laboratory (EHL) (food and water safety) both in public and private institutions, and the National Laboratory Network of Liberia (NLNL). All these institutions are under the One Health Platform, with the goal of providing high-quality, accurate, and timely laboratory-based information among network members in the NLS.

2.1 The National Public Health Institute of Liberia

The National Public Health Institute of Liberia (NPHIL) was established by the Liberian government to work with the Ministry of Health (MoH) to strengthen laboratory capacity and disease surveillance, support infection prevention and control (IPC) efforts, and build general public health capacity. It oversees the National Public Health Reference Laboratory (NPHRL) which is composed five units: Molecular Unit, Parasitology Unit,

Serology Unit, Bacteriology Unit, and the tuberculosis (TB) Reference Laboratory Unit. The NPHRL is currently enrolled in the Strengthening of Laboratory Management Towards Accreditation (SLMTA)/Stepwise Laboratory Improvement Process Towards Accreditation (SLIPTA) WHO/AFRO program pursuing international accreditation of ISO 15189 standards of best practices.¹

The MoH and NPHIL have outlined diseases of major public health concern in the Integrated Disease Surveillance and Response (IDSR) guidelines, which classify diseases into three categories: routine reportable diseases monthly, diseases or events of international public health concern, and diseases of high epidemic potential or high morbidity/mortality.²

2.2 National Diagnostic Division

The National Diagnostics Division (NDD) is responsible for overseeing all medical and diagnostic operations in Liberia. It is composed of five units: Clinical Unit, Blood Safety Unit, Imagery Unit, Bio-Medical Engineering Unit, and Private Laboratory Unit. It has a network of 401 diagnostic centers across Liberia, and of these, 285 are public medical diagnostic laboratories, and 116 are private laboratories.¹

2.3 Other Laboratories

There are five other laboratories and one tertiary hospital laboratory outside the public health laboratories. These are as follows:

- Water Quality Laboratory: Responsible for public health intervention with respect to food and water quality with oversight by the MoH and NPHIL.
- EHL: Responsible for environmental and occupational health with oversight by the MOH and NPHIL.
- Agriculture Laboratory: Responsible for animal health with oversight by the Ministry of Agriculture.
- National Standard Laboratory: Responsible for setting standards for laboratory equipment and supplies with oversight by the Ministry of Commerce.
- Liberian National Police Crime Laboratory: Responsible for forensic research and examining evidence from criminal cases with oversight by the Liberian National Police.

3. Liberia Association of Medical Laboratory Technology

The Liberia Association of Medical Laboratory Technology (LAMLTL) is a regulatory body for laboratory services that was founded in Monrovia in 1976. The main goal of this regulatory body is to uplift the standards of laboratory practice in Liberia. Their main functions are:

- To access and evaluate all medical laboratory schools for quality education.
- To access and evaluate all health facilities with medical laboratories for quality services.
- To review and provide valid practicing licenses to all members.

Currently, public laboratories do not need to be registered or licensed to operate. However, private laboratories need to be registered and licensed by the association to operate.³

4. Roles and Functions of the NDD and NPHIL

NDD and NPHIL oversee the integrated tiered network (**Figure 2**) consisting of 401 public and private registered diagnostic laboratories operating at four main levels organized along the referral system. The four main levels are:

- The NPHRL
- Regional public health laboratories
- County laboratories
- Health center laboratories

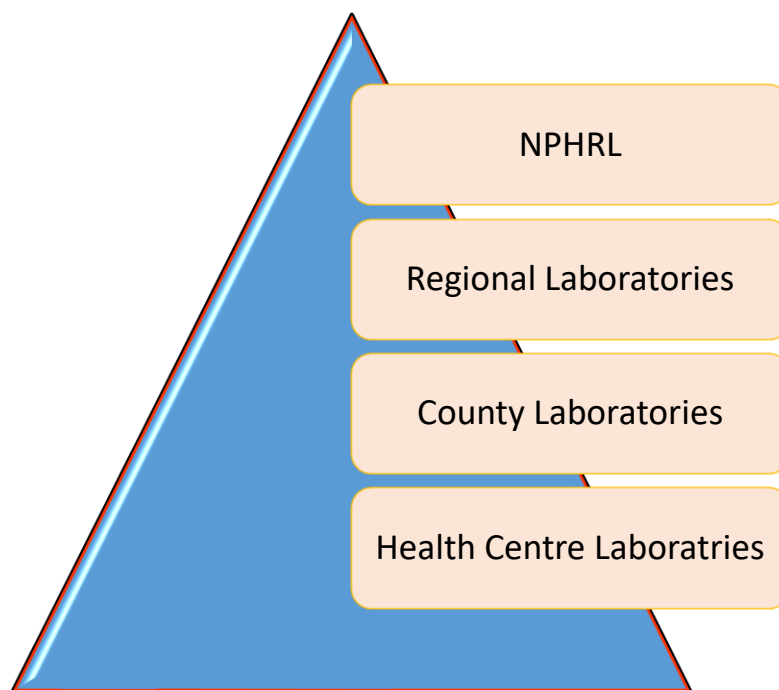


Figure 2. *The Tiered Laboratory System*

The current laboratory services serve both clinical and public health needs. Therefore, the national laboratory services, as part of the national health system, supports curative, preventative and public health components of the health system. The NPHRL, which tends to public health issues is governed by NPHIL while NDD governs clinical health laboratories. Most clinical laboratories are housed within a hospital setting.

For better management and coordination of laboratory services in the country, a strong linkage is necessary between the two governing bodies so that services are not fragmented. Also, the provision of focal persons at the lower levels of the laboratory system will strengthen technical capabilities of these laboratories while also supporting communication needs along the tiered network.

4.1 National Diagnostic Division

1. Mobilize resources for the development and operations of the NLS.
2. Facilitate interdepartmental coordination within MoH and NPHIL.
3. Facilitate the establishment of linkages between laboratories under the One Health Platform and other sectors whose operations have health components.
4. Develop an integrated NLS through the organization, regulation, and oversight of all clinical laboratories in the country, through policy development and implementation.

5. Enforce rules and regulations to promote the development of a standardized clinical laboratory network.
6. Provide technical support to the Laboratory Accreditation Board, Laboratory Association, and institutions with laboratory training, to ensure quality services.
7. Support clinical and reference laboratories by providing oversight responsibility and building capacity for both public and private laboratories.
8. Support continuous professional development of laboratory professionals working in laboratories.
9. Provide support to national programs, including the National Blood Safety Program (NBSP), National AIDS Control Program (NACP), National Leprosy and Tuberculosis Control Program (NLTCP), National Malaria Control Program (NMCP) and Health Care Quality Management Unit (HCQMU).
10. Provide training and oversight of the Quality Management System (QMS).¹

4.2 National Public Health Reference Laboratory

1. Detect and confirm epidemics through the testing of clinical and environmental samples, in collaboration with the EHL.
2. Contribute to the surveillance of anti-microbial resistance (AMR).
3. Test biological specimens, record results, report to sending agents and public health authorities, and conduct analysis of trends in isolation/identification.
4. Detect the sources of infection, including new agents.
5. Identify carriers of infection.
6. Provide support for all laboratories by providing training, quality assurance, and reference diagnostics services.
7. Collaborate with other laboratories, both nationally and internationally.
8. Test validation for new assays.
9. Develop standard operating procedures (SOPs) during outbreak investigation.
10. Develop evidence-based laboratory strategies and interventions.
11. Provide calibration services to the public health laboratories.
12. In collaboration with NPHIL and MOH, set standards relevant to laboratory operations.
13. Inspect and certify laboratory equipment and apparatus.
14. Organize and coordinate sample transportation from and to other regional reference laboratories.

15. Contribute to research and development efforts.

16. Provide technical guidance to the NLS.¹

4.3 Collaborative Roles

Both NDD and NPHIL are already working towards a unified front in coordination of laboratory operation. Towards this end, current areas of collaboration include:

- The network for public health surveillance purposes where the NPHRL together with both public and private clinical laboratories participate in public health events. These laboratories have been enabled to refer samples for suspected outbreaks to NPHRL for analysis. Riders for Health support the transportation of these samples.
- In QMS activities, personnel from NPHRL work closely with the QMS unit at NDD to support peripheral laboratories under the SLMTA program.

5. Recommendations

There are several areas where NPHIL and NDD can collaborate and align laboratory operations including:

1. Draw up data sharing agreements that will encourage the use interoperable laboratory information management systems (LIMS) for ease of information sharing.
2. Establish a unified system for unique specimen identification.
3. Establish joint biosafety guidelines and Memoranda of Understanding (MOUs) for specimen referral.
4. Initiate communities of practice for laboratory technical staff with respect to Monitoring and Evaluation (M&E), waste management and diagnostic network optimization.
5. Carry out nationwide joint laboratory asset mapping initiatives.
6. Set up QMS and Biosafety units that work as a one unit to support both public health and clinical laboratories.
7. Capacity building for Proficiency Testing (PT) panel production at NPHRL to support the clinical laboratories in External Quality Assurance (EQA).
8. Capacity building for personnel can also be done through twinning, where exchange of personnel between clinical and public health laboratories is done.

This allows personnel to expand their skills and as a result may be called upon to support the public health laboratories during public health events.

9. Improve laboratory AMR pathogen detection and surveillance by equipping dedicated clinical laboratories for antimicrobial surveillance and expanding capacity for antimicrobial sensitivity testing.
10. Although clinical microbiology laboratories do not usually perform public health testing or genetic sequencing, these laboratories can share specimen resources and expertise (where possible) with the NPHRL. Therefore, this is an area that can also be explored.
11. Introduce the LABNET scorecard system for standardized laboratory assessments to measure the performance of national laboratory networks over time as they are strengthened. The system clearly identifies gaps that need targeted intervention.
12. Set up Technical Working Groups (TWGs) that incorporate personnel from both units so that discussions around laboratory operations remain cohesive and decisions unanimous.

6. References

1. Ministry of Health (2019). National Laboratory System Policy of Liberia.
2. Ministry of Health and National Public Health Institute of Liberia (2019). National Technical Guidelines for Integrated Disease Surveillance and Response. Third Edition.
3. Ministry of Health (2022). The National Laboratory Assessment Report- Liberia.