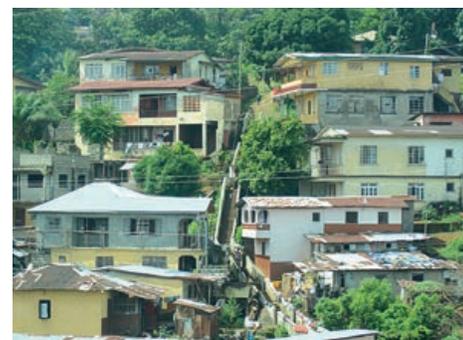


# Sierra Leone and Guinea: Strengthening Public Health Laboratories

APHL PARTNERSHIP AND GLOBAL HEALTH SECURITY



**COVER PHOTOS, CLOCKWISE FROM LEFT:** Dr. Doris Harding, director of Sierra Leone's Central Public Health Reference Laboratory (CPHRL), processing specimens alongside the Rapid Response Team; Ebola sign in Guinea; homes in Guinea; laboratory supply building at the CPHRL during renovation.



*Graduation ceremony for Sierra Leone's Rapid Response Team, March 2016.*

***The Association of Public Health Laboratories works to strengthen laboratories serving the public's health in the United States and globally.***

***A national nonprofit, APHL represents state and local governmental health laboratories in the United States. Its members, known as "public health laboratories," monitor and detect health threats to protect health and safety. Founded over 50 years ago as a forum for state public health laboratory directors, APHL has expanded to encompass governmental health laboratories and staff from multiple disciplines, including public health, environmental, agricultural and food safety laboratories.***

***APHL collaborates with laboratory and public health partners to assure effective surveillance, detection and response to health threats. It works closely with US federal agencies (including the Centers for Disease Control and Prevention, the Health Resources and Services Administration, the Food and Drug Administration and the Environmental Protection Agency) to develop and execute national health initiatives. During public health emergencies, APHL operates as a coordinating center for laboratory response.***

***APHL works across the nation and across the globe to develop effective national laboratory systems and expand***

***access to quality diagnostic testing services. With over 20 years' experience in 31 countries on five continents, it is recognized internationally as a leader in laboratory science and practice.***

***This report was created through a series of interviews with laboratory leaders and review of formal reports. APHL wishes to thank everyone at CDC and in the laboratories in Sierra Leone and Guinea who generously shared their experiences and insights with us.***

***Special thanks go to the dedicated APHL Global Health staff as well as our members and their staff who volunteer with APHL Global Health.***

## EXECUTIVE SUMMARY

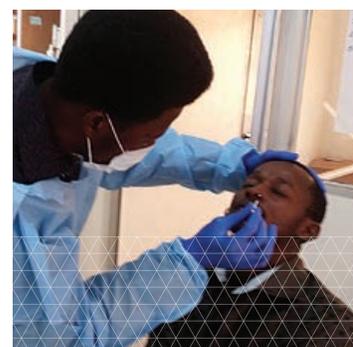
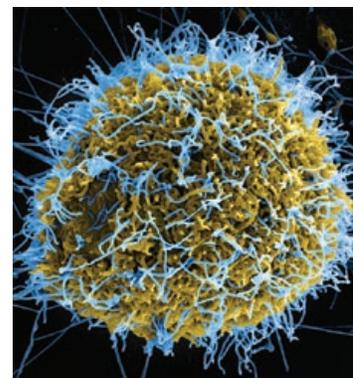
The world's most widespread epidemic of Ebola Virus Disease (EVD) began around December 2013. Within six months, cases were found throughout Guinea, Liberia and Sierra Leone, countries that eventually suffered 28,616 cases and 11,310 deaths due to the outbreak. Initial response was marked by disease surveillance gaps and weaknesses but heroic efforts eventually led to monumental successes.

### Need for Assistance

Laboratory infrastructure in these countries was weak and unprepared to respond effectively. In August 2014, the World Health Organization declared a Public Health Emergency of International Concern that galvanized international action to bring resources and direct assistance.

The US government pledged \$5 billion in emergency funds for the Ebola response.

The Centers for Disease Control and Prevention (CDC) assigned a portion of the funds to APHL for work in Guinea and Sierra Leone. In partnership with the countries' national laboratory systems, APHL immediately began to build capability and capacity for quality laboratory services: testing for case detection, treatment monitoring and surveillance.





### APHL's Vital Role

The combination of APHL's network of field staff in Africa, technical and program management staff and its US public health laboratory members became a crucial resource of technical, administrative and management expertise.

In addition, the Global Health Security Agenda (GHSA), launched before the outbreak, proved to be a prescient initiative that rapidly ramped up the disease prevention efforts and laboratory systems needed to combat Ebola. APHL's abilities in collaboration with CDC and GHSA resources improved laboratory systems to meet the urgent Ebola crisis and build sustainable capabilities for guarding against future health threats.

The graphic at left shows how APHL's expertise aligned perfectly with the objectives in Guinea and Sierra Leone.

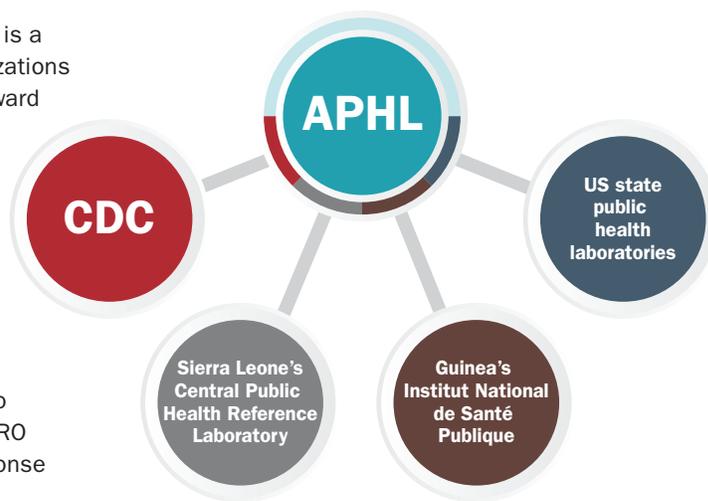


### About the GHSA

The Global Health Security Agenda (GHSA) is a joint effort by nations, international organizations and civil society to accelerate progress toward a world safe and secure from infectious disease threats. Prevention, detection and effective response are treated as an international security priority. APHL's participation in GHSA activities is in coordination with and funded by CDC.

A major focus of GHSA is to help countries meet the requirements of the International Health Regulations (IHR, 2005). GHSA also uses core guidelines such as the WHO/AFRO Integrated Disease Surveillance and Response (IDSR) as well as CDC and APHL technical and management documents to build harmonized and sustainable capabilities for laboratory systems.

GHSA is important to the US government. For example, the US is one of three leading countries (along with Thailand and South Africa) supporting the GHSA's National Laboratory Action package; APHL is an ideal partner to assist in this real-time biosurveillance effort.



*APHL is often the integral link between public health laboratories that have primary roles in infectious disease response.*

*This is because: 1) its members work in state public health laboratories, providing services similar to ones in national laboratories; and 2) as a member organization with CDC funds, APHL supports and facilitates laboratory strengthening initiatives.*

## INTRODUCTION

### Public Health Laboratories on the Front Lines of Global Health Security

Cautious optimism, deep reflection and enhanced surveillance: This is the state of mind in Sierra Leone and Guinea.

The Ebola outbreak ended in both countries with thousands of lives lost. The disease devastated families, decimated economies and threatened to imperil health systems for generations.

As in many African countries, the national public health laboratories in Guinea and Sierra Leone lacked the basic resources to provide timely, accurate and comprehensive testing services. GHSA funding from CDC enabled APHL to collaborate with the national laboratories, developing initiatives in accord with national strategic plans.

APHL brought in senior technical consultants to advise laboratory leadership; give technical assistance and training to strengthen laboratory systems; and improve laboratory testing diagnostics at Sierra Leone's Central Public Health Reference Laboratory (CPHRL) and Guinea's Institut National de Santé Publique (INSP).

Drawing from its two decades of global health experience, APHL integrated Ebola emergency response efforts and GHSA-focused systems strengthening to help the laboratory systems stem the outbreak. At the same time, the effort built local capability to assure effective disease surveillance and response for the long term.

#### Seeing the Value of Public Health

The cornerstone of an effective public health system is a strong national public health laboratory system. Low- and middle-income countries recognize this but often lack the resources to build effective surveillance and response components. Also, laboratory services are not always well understood at financial decision levels in governments.

APHL's expertise can aid countries in rapid design, planning and implementation of sustainable initiatives for continual improvement. Our members and staff thrive in this environment because they can make a lasting contribution and save lives.

We see it throughout this report with stories about the teams led by senior consultant Dr. Isatta Wurie, who returned to her native Sierra Leone to help build a more robust public health system, and consultant Dr. Alpha Diallo, who went back to lead change in his native Guinea after directing the Washington, DC, public health lab. Like all the APHL staff and members who lend their expertise to global health, they're inspiring and determined to make a difference.

These efforts and more provide a foundation for disease detection, surveillance and response. They help ensure a resilient response to Ebola and support more immediate country-led responses to future outbreaks of health threats.

The people and organizations collaborating in Sierra Leone and Guinea know that every day brings challenges as well as celebrations. This report highlights these significant accomplishments, which will lead to more secure global health.

**Scott Becker, MS**  
EXECUTIVE DIRECTOR, APHL

*Clockwise from lower left: Lucy Maryogo-Robinson, APHL director of global health; Ralph Timperi, APHL senior advisor of laboratory practice and management; Dr. Isatta Wurie, APHL Sierra Leone country team lead and senior laboratory consultant; Dr. Abu Bakarr Fofanah, Sierra Leone health and sanitation minister; Scott Becker, APHL executive director; Dr. Alpha Diallo, APHL lead consultant Guinea; and Paul Jankauskas, APHL global health manager, Ebola.*





# Sierra Leone

## Coordinating the Laboratories

By Isatta Wurie, PhD

*Through more than seven years of collaborative PEPFAR projects, APHL built a strong rapport with Sierra Leone's Ministry of Health and Sanitation. In 2014, when the first Ebola cases were reported in Sierra Leone, APHL consultants were already in the labs. The ministry and CDC asked them to help address the Ebola outbreak because they understood the public health system and the strengths and challenges of public health laboratories.*

*As the Ebola crisis worsened, I kept in communication from the United Kingdom where I was working on African PEPFAR and HIV issues and lecturing*

*on pathology. I was born in Sierra Leone, so my concern was great. I felt an urgent need to return.*

*I knew that public health laboratory strength would be crucial to fighting this epidemic and preventing future public health hazards. So I came back to Sierra Leone, first as a CDC/ASLM lab advisor and later transitioning to APHL's Ebola response effort funded by CDC.*

*Partners and aid poured in to Sierra Leone from organizations worldwide. APHL's pivotal role was to coordinate 16 international partners, ensuring their laboratory work and resources were coordinated and effective.*

*It was a complex logistical effort. With our team's help, turnaround for Ebola test results decreased from five days to one day.*

*Faster diagnosis has an exponentially beneficial effect. It leads to a faster public health response—the isolation and quarantine needed to halt the disease's spread as well as the care and treatment that aid survival.*

*While this achievement was fundamental, Sierra Leone is determined to make it sustainable. Developing internal expertise in disease surveillance and response is the key, and APHL is proud to help achieve this goal.*

## Restoring an Essential Link

The national reference laboratory is a critical element in an effective public health laboratory system—a linchpin for surveillance, detection, response and accurate diagnosis to guide treatment and prevention. It assures the quality of testing in public laboratories through training and setting standards as well as monitoring and evaluation.

Sierra Leone's CPHRL was overwhelmed by the sharp increase in demand for testing related to the Ebola outbreak and lacked the biosafety containment laboratory facilities to safely process specimens from suspect cases. In response, international partners brought in mobile laboratory systems to perform molecular diagnostics in high containment laboratories; they operated the facilities and CPHRL played a central role in inventory management, materials storage and compilation of test reports.

Working with CDC and the Ministry of Health and Sanitation, APHL helped improve the ability of CPHRL to sustain a response to outbreaks and elevate it to take on the responsibilities of an apex laboratory in a national public health laboratory system. Mentorship and training for CPHRL personnel began at the same time as infrastructure improvements.

Emergency repairs and renovations to the main laboratory building were imperative: Stop further leaks, get the water running, restore electric power for equipment and refrigeration, and add a new septic tank well to release pressure in future storm conditions.

Facility improvement efforts also restored capacity for important molecular testing services that did not require high biosafety containment. Testing services resumed for early infant diagnosis of HIV infection (an essential test to detect the disease and provide lifesaving treatment) and for HIV viral load testing to assure effective treatment.

A key question for the CPHRL facility is how to provide high containment laboratory space (BSL-3 and possibly BSL-4) in the future. The US Department of Defense (DoD) has offered to donate the mobile laboratory that it flew in and operated next to the CPHRL. APHL is working with the Ministry of Health and Sanitation,

CDC and DoD to evaluate options and develop a plan for this necessary capability. As part of this process, APHL helped coordinate the laboratory's physical integration into the campus and provided foundational training to Rapid Response Team members who can be further trained to operate it.

The lessons learned and successes in laboratory infrastructure improvement in Sierra Leone can be applied to many countries with similar laboratory challenges. Connecting to a reliable power supply and protecting laboratory space from extreme weather are basic requirements for sustainable laboratory operations. Integrating continual staff training is a central component to assuring quality testing and technological improvement. APHL will continue its role as a knowledge transfer agent for this national laboratory system and others.

## Rapid Response Team— a Model for the Future



Even as the Ebola crisis was happening, Sierra Leone and its international health partners looked at the big picture and gathered lessons for the future. As the crisis abated, the Ministry of Health and Sanitation expressed the need for an early-detection warning system to address not only possible Ebola flare-ups, but also infectious disease outbreaks of any kind.

***“I had a passion to help my country and decided to get involved in the molecular unit. I see myself assisting with whatever virus comes along.”***

**—JULIAN CAMPBELL,**  
Rapid Response  
Team member



*Dr. Isatta Wurie and APHL Headquarters Team, Ralph Timperi and Paul Jankauskas, meeting with CPHRL Director Doris Harding and Chief Medical Officer Brima Kargbo to review renovations of CPHRL building and progress on program activities.*



*“Ever since I was a kid, I always dreamed of becoming a health scientist. Our work is a great pleasure. It’s all about saving lives ... we’re a major part of combating AIDS, Ebola and yellow fever.”*

—FATMATA BARRIE  
Rapid Response Team Member

*Rapid Response Team graduates and mentors.*

**“Sierra Leone identified key committed partners to assist the Ministry of Health and Sanitation because of the large amount of work to accomplish. APHL is one of these partners and has provided substantial laboratory support for national healthcare delivery.”**

— DR. VICTOR E. MATT-LEBBY  
Director, Hospital and Laboratory Services

APHL helped ramp up system-building efforts and created an effective and sustainable model that would simultaneously advance capacity and workforce training: a certified Rapid Response Team that would cross-train on tests for Ebola and other pathogenic diseases.

Working with the directorate of training and the College of Medicine and Allied Health Sciences (COMAHS), APHL collaborated with WHO and other partners to provide short, intensive courses in Ebola epidemiology and diagnosis as well as data management and health and safety. The smooth transfer of students to this laboratory science track was a success: Of the 24 students who graduated, APHL supported 12 to become the Rapid Response Team.

This elite group mastered molecular testing for Ebola and other diseases. The teammates can perform independent testing in existing labs using the molecular assay, activate the public health network for epidemic-prone diseases and take a mobile lab-in-a-suitcase to remote areas.

Their capacity was soon tested when an international partner’s laboratory unexpectedly had

to pull its entire staff out of the country. Suddenly, a vital resource for the health of families in that region would disappear and continuity—essential in laboratory work—was threatened.

The Rapid Response Team took over immediately, preserving the quality and turnaround time of all steps in the elaborate testing process. This triumph combined passion, expertise and teamwork and proved the team’s ability to work independently.

This investment in human resources brought a new level of technology and quality testing services. The one-year results were remarkable: significant molecular diagnostic testing capacity to respond to outbreaks and a sufficient number of certified laboratory staff to train and mentor the next generation and sustain the capability.

Rapid response itself is an imperative when tackling biological threats and infectious diseases—where time can make the difference between a manageable outbreak and a regional emergency. Other countries will seek to develop such teams to meet GHSA goals and improve public health.

## TEST AND TRAINING ACHIEVEMENTS OF THE RAPID RESPONSE TEAM

**TRAINED IN THESE TESTS  
+ CURRENTLY ANALYZING  
(more than 3,400 tests to date)**

- Ebola
- Influenza
- Pediatric Meningitis
- Measles
- Rubella
- HIV – EID
- HIV – Viral Load
- HIV – Serology

**TRAINED IN  
THESE TESTS**

- Cholera
- Malaria
- Tuberculosis
- Yellow Fever

**ADDITIONAL  
TRAINING**

- Specimen Management
- Data Entry
- Biosafety, Biosecurity and Best Laboratory Practices
- Activation of Ola During Children’s Hospital’s Clinical and Sentinel Laboratory Site

**“The Ministry has prioritized maintaining a ‘resilient zero’ [level of] Ebola infections with efforts to prevent, detect and respond swiftly. Clearly laboratories are at the center. APHL’s valuable partnership has accomplished a lot in a short amount of time, and we depend on the collaboration to support our laboratories.”**

**—DR. ABU BAKARR FOFANAH**  
Minister of Health and Sanitation



The renovated laboratory supply building at the CPHRL in Lakka ensures essential laboratory supplies for outbreak response.

## Building Workforce Capacity



An invaluable part of Sierra Leone’s advancement is APHL’s collaboration with Dr. Doris Harding, director of the CPHRL, and her staff. This joint effort with the ministry provides comprehensive training and mentoring in testing methods, quality systems and accreditation.

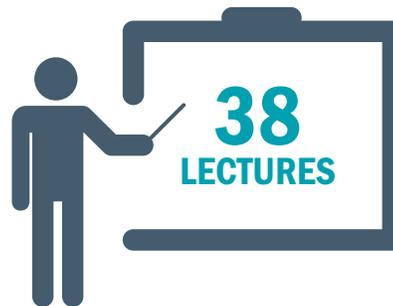
The alliance has changed the culture, upgraded the degree programs and given students a new mindset about public health laboratories as a valued career path. APHL is also advocating for a regulatory body to cover public health laboratories, with the goal of creating a pipeline that keeps a critical mass of laboratorians in the country. These skilled workers would raise the caliber of talent in public health laboratories to the level currently seen in the reference laboratory and centers of excellence.

Another important action was the repair of the campus’s COMAHS training laboratory. Before it could support training for new generations of technicians, it needed running water, benchtops, new stocks of supplies and renovated floors and ceilings. With these in place, training has begun via the new Laboratory Medicine degree curriculum, and students are learning Ebola diagnosis and monitoring.

In the coming year, the laboratory will support a new initiative to develop experts and improve advanced laboratory training in microbiology, chemical pathology and hematology.

**“My biggest challenge was entering the biocontainment chamber for the first time. My favorite achievement was the first test result we sent by ourselves. I’m hugely confident now.”**

**—JONE NGOBEH**  
Rapid Response Team member



**302**  
STUDENTS

APHL created new courses in case management (including laboratory medicine) for Bachelor of Medicine and Bachelor of Surgery students as well as graduate students.

The templates for these courses can now be used by any institution, and their influence will spread to other countries.

## Ensuring Adequate Supplies and Supply Chain Systems



To streamline the supply chain and prevent delays, APHL helped CPHRL renovate an unused building to become a storage facility for reagents for testing and personal protection equipment, establishing a structured inventory management system for Ebola supplies.

### THE NEW NATIONAL TESTING ALGORITHM



To ensure proper care and response, which testing methods should a public health laboratory use to identify and diagnose epidemic-prone diseases? What supplies, tests, equipment and communications are essential? The answers form the National Testing Algorithm.

The Ministry of Health and Sanitation and APHL led the algorithm’s development. It’s now available as a poster to all laboratories and is having a dramatic impact on care. By improving supply chain management and communication, this approach spurs laboratory staff to focus on the most critical needs and equips them to prevent service interruptions.

## Support for the Most Vulnerable

Sierra Leone has a high rate of infant mortality and maternal death. To improve laboratory services for these vulnerable populations, APHL provided biochemistry and hematology analyzers and technical support to Princess Christian Maternal Hospital, Ola During Children's Hospital and Jenner Wright Children's Clinic. APHL also linked the hospitals with CPHRL to meet Integrated Disease Surveillance and Response guidelines and enhance clinical management of patients. Leaders in the Ministry of Health and Sanitation and at the facilities immediately noticed improvements in laboratory services, morale and admittance.



## Progress Toward Quality Assured Testing

Laboratory quality starts with leadership. Coordinating with CDC and the Ministry of Health and Sanitation, APHL will begin operations, leadership and management training for program leaders, heads of units and regional leads. These leaders can then become staff mentors and reinforce concepts that will drive better results.

In the near future, APHL will also help to make these changes:

- Improve quality management by adding the Strengthening Laboratory Management Toward Accreditation (SLMTA) program.
- Move toward a national External Quality Assurance (EQA) program by expanding the CPHRL's national EQA laboratory beyond HIV programs to include panels for malaria, basic hematology and biochemistry and priority epidemic-prone diseases.
- Support post-market validation of test kits and training at all levels to support quality assurance.

## Updating a Plan for New Realities

As health needs and conditions changed in Sierra Leone, the National Laboratory Strategic Plan needed significant updates. The plan is crucial to implementation of IHR and will strengthen national capacity for:

- Early warning, detection and response
- Linking laboratory services to the surveillance framework
- Coordinating stakeholders
- Streamlining data flow

As part of preserving the current level of Ebola response and preparing for future threats, the plan highlights a new paradigm: biorisk management, which encompasses both biosafety and biosecurity.

## DATA INFORMS EFFECTIVE PLANNING

A public health network is a key priority in the plan. Major takeaways from the network strategy, developed with support from APHL, include:

- Ensuring testing capacity is available in all regions
- Developing testing algorithms, including Rapid Diagnostic Tests
- Retaining laboratory molecular testing as confirmatory
- Establishing CPHRL as the apex public health laboratory with links to satellites in district health facility laboratories in the North, South and East regions

Sierra Leone's current laboratory system ranges from local laboratories performing point-of-care tests to district labs to regional centers performing high-end, complex testing. Creating a workable strategic plan meant collecting data from a broad sample of all levels—315 facilities out of the 1,200 in the country's 14 districts.

After giving logistical and technical support to this intensive data collection effort, APHL helped prepare a Rapid Laboratory Assessment Report that informs an action plan on access, quality, turnaround time and vigilance from the lowest level of lab to the highest. APHL also developed laboratory guidelines and policy documents to improve laboratory procedures, quality of testing and health and safety.

The National Laboratory Strategic Plan will provide guidance to enable a more effective national laboratory system, structure and network.



# Guinea

## Vast Positive Change in the Wake of an Epidemic

By Alpha Diallo, PhD, HCLD/PHLD(ABB)

*I was directing the public health laboratory in Washington, DC, when the Ebola outbreak ravaged my native Guinea. This is close to my heart—I knew that I needed to return to my homeland and help the people.*

*Opening APHL's first permanent field office in Guinea was an opportunity to help create a strong national public health laboratory system and change Guinea's trajectory. Collaborating with the Ministry of Health and CDC to update the National Laboratory Strategic Plan and Policy, we're laying the foundation for vast changes.*

*On the ground, we're advancing our national public health laboratory, the*

*Institut National de Santé Publique, into a full reference lab with surveillance and quality management systems.*

*With technical support and logistics assistance from APHL, we're increasing testing capacity for Ebola and other infectious diseases as well as our capacity to prevent, rapidly detect and effectively respond to public health threats—GHSAs goals that are also the highest priorities for the country.*

*Training in both laboratory science and in management/leadership is at the heart of our efforts. We are identifying training needs and resources in partnership with the RESOLAB teaching laboratory, part*

*of a network of francophone clinical and teaching labs throughout West Africa.*

*These changes depend on sustained effort, strong mentoring and a very different paradigm—a proven stepwise approach that's tailored for Guinea's needs.*

*Guinea's government now places a high value on public health laboratories (just the way I hoped when I was packing for the flight to my homeland). The Ministry of Health looks to both APHL's network and to the Guinean achievements by the Institut Pasteur as models: proven alternatives to the status quo that build on their success and allow them to constantly improve.*



Dr. Alpha Diallo (left) introducing objectives of the Biobanking, Biosafety and Biosecurity Workshop in Conakry, Guinea (March 2016). At the head table: Guinea Ministry of Health leadership, WHO representative and workshop faculty.



APHL global health manager, Ebola, Paul Jankauskas (left) greeting professor Akin Abayomi, lead faculty for the Biobanking, Biosafety and Biosecurity Workshop.

### An Important Team

APHL's Dr. Diallo is a key member of the Guinea Laboratory Technical Working Group, which consists of Ministry of Health institutions (such as INSP), CDC and key international partners. This group is linked to the Ebola Emergency Operations Center and provides critical technical advice, coordination and planning to upgrade laboratory services.

These experts identified elements needed for a National Testing Algorithm that was developed by CDC; they're exploring additional capacity-building initiatives.

### Updating National Plans

Dr. Diallo worked with the Ministry of Health and key stakeholders such as WHO, Pasteur Institut and the George Washington University to prepare for a crucial November 2015 Kindia, Guinea, laboratory meeting. Insights from this meeting helped shape the National Laboratory Roadmap, which outlines the system's priorities over the next six months with a three-year vision.

This was a critical step toward updating the National Strategic Plan and National Laboratory Policy, which will integrate outbreak response and surveillance for high-priority infectious diseases. The process is a multi-partner effort including APHL, CDC, WHO, the US Defense Threat Reduction Agency, UNICEF, European CDC, Médecins Sans Frontières, Agence de Médecine Préventive and the Global Fund. APHL is working alongside CDC senior laboratory advisors to support these updates, which will ensure Guinea's sustainable progress.

### APHL's Key Partner

Guinea's national public health laboratory, the Institut National de Santé Publique (INSP), coordinates the linkages to regional and local laboratories and performs essential testing for surveillance, outbreak investigations and confirmatory diagnostic testing.

APHL provides an array of skills to INSP:

- Technical advice on laboratory operations and services
- Input on the development of strategic planning to respond directly to outbreaks
- Technical classroom training on topics such as biosafety and laboratory quality management systems
- In-lab technical skills training and support for movement toward meeting international laboratory standards

The lack of functional laboratories in certain areas of Guinea slowed down the Ebola response, so APHL is helping to ensure that testing capacity is available in all regions. Supporting INSP and national clinical laboratories in the capital (Conakry) and creating strong connections to regional public health laboratories are steps toward meeting this goal.

### Mentoring Managers, Modeling Security

A core requirement under IHR is that countries have people ready to respond to public health threats. Without trained public health professionals, countries cannot meet the needs of the Global Health Security Agenda or ensure their own security and ongoing health.

APHL brought its long history of laboratory safety training to Guinea with a workshop on Biobanking, Biosafety and Biosecurity. Specimen storage and biobanking ensure

***“It took a synergy of actions between national and international actors to reach our current results. Among these actors is APHL, an NGO to which we remain very grateful.”***

**—DR. YOUNOUSSA BALLO**

Secretary General of Guinea’s Ministry of Health,  
introducing the APHL-led Biobanking,  
Biosafety and Biosecurity Workshop



*Guinea Ministry of Health leadership, participants and faculty at the Biobanking, Biosafety and Biosecurity Workshop.*

that biological material is secure; these processes must be managed to gold-standard quality and raise important policy issues, which were discussed during the workshop.

In the months afterward, APHL led trainings on Laboratory Quality Management Systems for INSP and national hospital laboratory personnel. These trainings introduced the concepts of laboratory quality assurance, biosafety, and the essentials of quality management systems. APHL laboratory technicians at INSP followed up by reinforcing each concept via bench-level technical support.

APHL is also mentoring the leaders of INSP and modeling leadership for the next generation. This big-picture understanding is helping to build a sustainable workforce and a management pipeline.

Future plans include partnerships with research labs and twinning with US public health laboratories that send personnel to share their expertise. APHL will also invite postdoctoral students into INSP to learn new skills and be groomed for laboratory management—a win-win scenario.

In June 2016, INSP deputy director Dr. Falaye Traore visited the New Mexico State Public Health Laboratory to view its services, operations, test capacity and management systems as a possible model for INSP as it develops into a true public health laboratory.

### **Seeing the Future Clearly**

The vision for Guinea’s public health laboratory network sounds bold—but so did the vision for many other countries including the United States, where APHL led the creation of a multi-state, multi-partner network.

Guinea’s vision follows these models in many ways, such as inclusion of QMS-certified accredited sites with highly trained staff who are proactive in surveillance and promptly address every health issue. But other aspects of Guinea’s system will be unique to the country’s needs—such as aligning with GHSA goals not only for emergency response but for detection and prevention.

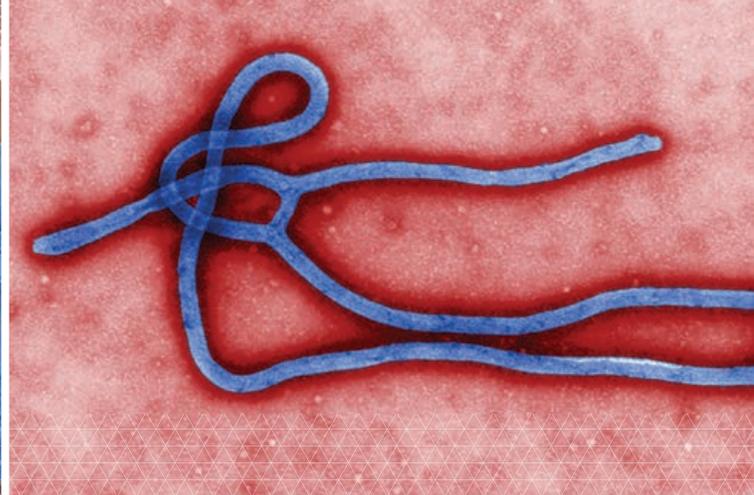
Guinea is at a critical point similar to that of the United States in the early 2000s: Emergency response may push capacity to new levels, but the importance of establishing capacity in other areas, such as water safety, can’t be overlooked.

Other elements include building capacity for a fully functioning national reference lab and improving training. For instance, a former US Department of Defense laboratory is being utilized for advanced training in Ebola testing; APHL is assisting in integration of this facility into the Ministry of Health and developing advanced molecular virology capabilities.

Sharing the lessons learned with Sierra Leone is an indispensable part of preparing for the future. APHL’s Dr. Wurie and Dr. Diallo communicate regularly on the activities and experiences in each country and opportunities to share resources.

Guinea is especially focused on biosafety, biosecurity and biobanking issues, which require strong training, external quality assessments and good data management—all opportunities and challenges to increase capacity.

Together, these elements will fulfill a vision that raises the quality of Guinea’s public health system and ensures that these improvements endure.



## CONCLUSION

### Building on Our Successes

APHL's global public health team has a big-picture understanding that keeps us going, one step at a time, toward GHSA goals. We know infectious disease threats will arise, and we build strong foundations for a response even as we hope they won't be needed. We understand the value of assuring a robust infrastructure for surveillance, detection and response as envisioned in the GHSA initiative.

Incremental progress toward these goals is worth celebrating. It's inherent in the Stepwise Laboratory Improvement Process Towards Accreditation (SLIPTA) approach approved by the WHO/AFRO, implemented by ASLM and adopted by Sierra Leone. Each step reaches further and helps secure the future.

One such step is APHL's collaboration with ASLM in a major initiative to establish the African Public Health Laboratory Network. Leveraging the experience of the CDC and APHL implementation of the US Laboratory Response Network and our role as a collaborating CDC partner in disease surveillance, we offer experience and expertise from which ASLM and African national laboratory systems can draw concepts and options to consider while developing this key surveillance capacity.

Another APHL global initiative is to help lab professionals take on managerial and leadership roles by providing effective management training courses geared to challenges of laboratory systems in developing countries. This priority area has been further advanced by managing the successful "twinning programs" that match APHL member labs with national reference labs to offer

mentoring and technical assistance, which fits well with SLIPTA goals.

#### Focused on GHSA goals

GHSA's emphasis on early detection of threats to minimize the impact of outbreaks is precisely aligned with the vision and mission of APHL. We are dedicated to assisting international efforts to strengthen sustainable laboratory systems globally while we aid and advocate for the essential functions of the US public health laboratory network.

Securing risky materials is a critical part of GHSA. Redeploying biosecurity infrastructure used before and during the Ebola outbreak is a key solution, and we're helping our country partners to develop additional methods for secure infrastructure.

But our most important step is helping to integrate GHSA goals into National Laboratory Strategic Plans. A nation's strategic plan is the channel through which it talks to tomorrow—the health professionals, the policymakers, the laboratorians and the public. During those times when we can see only a few steps ahead, it provides a vision which reminds us that the journey is worthwhile.

Thank you to CDC, our global partners and all APHL staff and consultants. We are privileged to walk with you.

**Lucy Maryogo-Robinson, MPH**  
DIRECTOR, APHL GLOBAL HEALTH

**“In the 21st century, we cannot build moats around our countries. There are no drawbridges to be pulled up. We shouldn’t try. What we should do is instead make sure everybody has basic health systems — from hospitals to disease detectives to better laboratory networks.”**

**— US PRESIDENT BARACK OBAMA**

*This project was supported by the Centers for Disease Control and Prevention (CDC) through the Supporting Laboratory Strengthening Activities in Resource-Limited Countries under the President’s Emergency Plan for AIDS Relief (PEPFAR) Cooperative Agreement # U2GGH001097-03 (Sierra Leone – Ebola). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC or APHL.*

## **PHOTO CREDITS**

**PAGE 1:** *Members of Sierra Leone’s Rapid Response Team, courtesy of APHL; digitally-colored scanning electron micrograph of Ebola virus particles (blue) budding from a chronically-infected VERO E6 cell (yellow-green), courtesy of the National Institute of Allergy and Infectious Diseases*

**PAGE 2:** *A meeting on GHSA and Ebola, courtesy of the US Mission Geneva/Eric Bridiers*

**PAGE 4:** *Laboratory training workshop, courtesy of APHL*

**PAGE 5:** *Ebola virus, courtesy of CDC*

**PAGE 8:** *Members of Sierra Leone’s Rapid Response Team, courtesy of APHL*

**PAGE 9:** *Staff members at CMC Flamboyants Health Clinic in Conakry, Guinea, courtesy of Dominic Chavez/World Bank*

**PAGE 12:** *Members of Sierra Leone’s Rapid Response Team, courtesy of APHL; Ebola virus, courtesy of CDC*



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