



THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

Guidelines for the Uganda National Health Laboratory Hub and Sample Transport Network



September 2017

FOREWORD

Accurate disease diagnosis is very critical for disease control and patient management. Quality Laboratory results are dependent on a number of factors including the quality of the specimens examined. It is therefore important that national health laboratory networks establish robust efficient specimen transport systems. Functional and effective national sample and results transport system requires guidance and regulation with well laid down guidelines in order to protect both the community and all stakeholders involved in laboratory service delivery. Uganda is committed to providing quality and accessible laboratory services, hence the development of these guidelines.

A process to develop this hub guideline document was started in 2016 by UNHLS/CPHL in collaboration with partners. Hubs and the NSRTN had been operating without guidelines since its inception in the country in 2011.

High caliber laboratory services are not attainable at all Health Facilities across the country, therefore a functional sample transport system is very critical in increasing access to quality laboratory services at all levels. In order for the Hub to support lower sites, there should be a functional means of sample movement from the lower sites to the Hub and to reference laboratories.

This guideline was developed in the context of the Uganda National Health Laboratory Services Policy document (NHLSP Volume I). The guidelines define direction in key areas that are fundamental towards attaining accessible and sustainable quality laboratory services in the country. This document, therefore, is intended to lay down all the guiding principles to enable effective operation of the sample and results transport network, sometimes known as the Hub system.

The roles and responsibilities of each of the stakeholders for hub operations and NRSTN are clearly stipulated in the guidelines, and therefore it is hoped the document will enable delivery of quality and coordinated laboratory services in the country.

I call upon all stakeholders to internalize and embrace the use of this document for planning and implementation of laboratory service in Uganda



.....
Dr. Diana Atwine
Permanent Secretary - MOH

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Special gratitude is extended to the institutions that were represented at various fora during the development process.

Finally, all institutions and individuals who have not been specifically mentioned above, but who directly or indirectly contributed to the successful development and finalization of this guidelines document are acknowledged.



Dr. Susan Nabadda

Ag. Head, Laboratory Services - MOH/CPHL

LIST OF ABBREVIATIONS AND ACRONYMS

CPHL	Central Public Health Laboratories
EID	Early Infant Diagnosis
GH	General Hospital
GIS	Geographic Information System
HC	Health Center
HLIMS	Health Laboratory Information Management System
IDSR	Integrated Diseases Surveillance Response
MOH	Ministry of Health
NHLN	National Health Laboratory Network
NPHLN	National Public Health Laboratory Network
NSRLs	National Specialized Reference Laboratories
NSRTN	National Sample and Results Transport Network
QA	Quality Assurance
RRH	Regional Referral Hospital
RRT	Routine and Reference/Specialized Testing
TAT	Turnaround time
UNHLS	Uganda National Laboratory Health Services
UNMHCP	Uganda National Health Minimum Health Care Package
WHO	World Health Organization

Figure 1: Map of Uganda Showing the 100 Hubs in the Lab Network

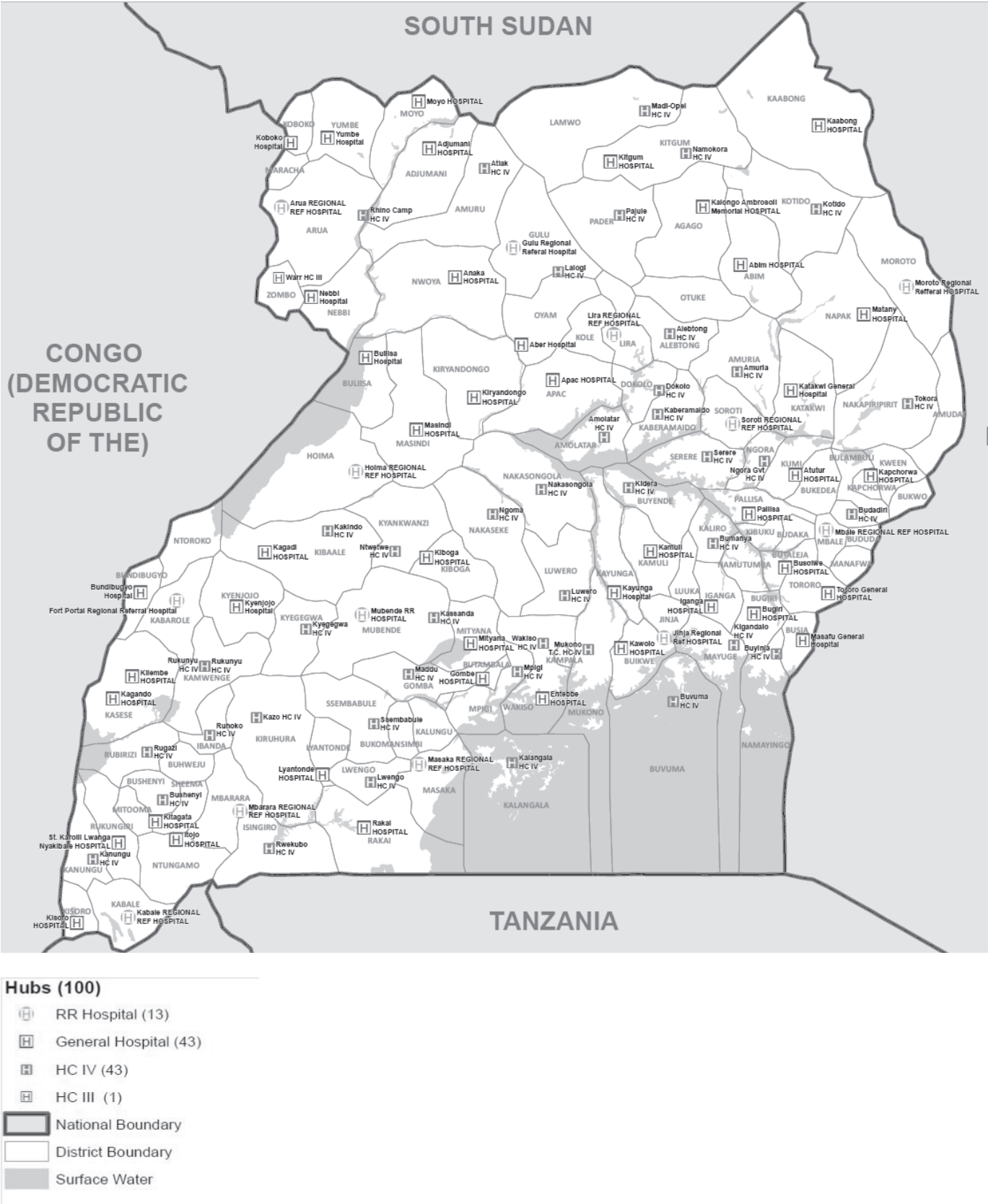


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BACKGROUND

1.1 Introduction

This guideline is the first formal document that directs the establishment and management of the Uganda National Health Laboratory Hub and Sample Transport Network. The guideline has been developed to guide operations towards supporting the health laboratory subsector to fulfil its mandate of: delivering quality and accessible health laboratory services to all people in Uganda. This mandate is in line with the National Health Development Plan because it accelerates movement towards the actualizing the Universal Health Coverage (UHC) by providing essential health services that are needed for a healthy and productive life.

Uganda's public healthcare system has health facilities starting at parish level through sub-county, county, district, region and national level. These facilities are classified as Health Center (HC) II, Health Center III, Health Center IV, General Hospital (GH), Regional Referral Hospital (RRH), National Referral Hospital (NRH). Health laboratory services are integrated into this system starting from HCIII level to NRH level, and the complexity of laboratory services increases with respect to the level of care. In addition, the most complex testing services are provided by National Specialized and Reference Laboratories (NSRLs). Thus, the Uganda National Health Laboratory Network (NHLN) comprises laboratories situated at HCIII, HCIV, GH, RRH, NRH, and NSRLs. Although the NHLN implied that peripheral laboratories would refer samples to higher level laboratories in the tier system, there was no functional mechanism to facilitate the referral of samples between and among health laboratories.

In 2007 the sample referral system in Uganda was started to support:

- The National TB program by transporting samples for suspected drug resistant tuberculosis from peripheral health facility laboratories to the national TB reference laboratory for culture and sensitivity.
- The AIDS Control Program by transporting blood samples of infants from health facility laboratories across the country to any of the eight (8) regional molecular laboratories that were supported by Joint Clinical Research Centre to conduct Early Infant Diagnosis (EID) of HIV. The sample referral system later supported transportation of samples for CD4, chemistry and hematological tests.
- Transportation of samples for the Expanded Program on Immunization (EPI) surveillance and for outbreak investigations, which entirely required facility-level laboratory personnel to transport samples to the two specialized reference laboratories based at the Central Public Health Laboratories (CPHL) in Kampala and Uganda Virus Research Institute (UVRI) in Entebbe.

The above vertical systems of sample referral were all running in parallel, some of which incurred very high costs and long results turnaround (Kiyaga et al, 2013). Upon realizing these inefficiencies, different key stakeholders in 2013 started synchronizing efforts towards building a well coordinated national sample referral system, which would serve across different programs and laboratories.

To date, the Uganda National Sample and Results Transport Network (NSRTN) has been established based on the concept of the hub system and is facilitated by different partners within the healthcare system. Uganda's NSRTN has been hailed as the best on the African continent.

1.2 The Hub System

Uganda has more than 1500 laboratories including HC III labs, HCIV labs, GH labs, RRH labs, NRH labs and NSRLs. Considering that running a laboratory optimally requires sizeable amount of resources, and the fact that there are limited resources in this country, the Ministry of Health chose 100 laboratories across the country and enhanced their capacities to function optimally. The hubs are strategically located to serve as referral laboratories for 20 to 30 health facilities within a radius of about 40 kilometers. The hub may intersect several districts in its operational catchment area but the host district is considered as its administrative unit. The laboratories in a functional hub system have established communication channels for routine exchange of information and interaction in specified ways with each other, and with UNHLS.

A hub, therefore, is a laboratory situated within the health laboratory network with enhanced capacity in terms of infrastructure, equipment, human resource, and quality management. Apart from performing routine tests for patients of the facility in which it is located, a hub also performs analysis of patients' specimens referred from other health facilities within its geographic catchment area.

The Uganda NSRTN is based on hubs, in which samples are transported from the peripheral health facilities to the hub for analysis and results sent back to the facilities by means of motorbikes. Samples that cannot be analyzed at the hub are transported to the NSRLs through courier services and results sent back through the same system. However, efforts are underway to relay the results from the NSRLs to the hub through a web-based system in which results are downloaded directly from the hub and transported to the facilities by use of a motorbike that is situated at a hub. This is done to reduce the amount of time that laboratory results take to reach the intended beneficiaries.

The hub system and the NSRTN are synonymous and used interchangeably. The NSRTN comprises 100 hubs that serve over 3000 health facilities, thereby enabling patients across the country to have greater access to EID, CD4, HIV Viral Load, Histopathology and a number of other specialised tests, resulting in a standardised and elevated level of care.

1.3 Rationale of the Guideline

Figure 1 gives an overview of strategic directives that motivate the establishment of the hub system and the development of this guideline.

POLICY FOUNDATION OF THE HUB SYSTEM
THE SECOND NATIONAL HEALTH POLICY (2010)

2.8.3 Health Infrastructure: need for improved transport services across districts, rehabilitation of buildings and equipment

4.4.3 Equity: Government shall ensure equal access to the same health services for individuals with the same health conditions.

4.5.5 Pro-poor and sustainability: This policy shall provide a framework to support sustainable development.

UGANDA NATIONAL HEALTH LABORATORY SERVICES POLICY (2009)

4.1 Organization and Management: A clear organizational structure with appropriate authority to coordinate and manage the provision of comprehensive health laboratory services in the country shall be in place.

4.2 Laboratory Services: Quality Laboratory Services at the specified health system levels shall be provided to support effective patient management, disease surveillance, epidemic investigation, research and other specialized services in line with Uganda National Minimum Health Care Package (UNMHCP).

4.3 Facilities and Safety: All laboratory facilities shall have appropriate space and safe environment for health personnel, clients and the community.

4.5 Human Resources: The laboratory services shall have an adequate number of skilled staff with the necessary competency and motivation to deliver quality laboratory services at all designated levels.

4.6 Quality Management System: There shall be a national laboratory quality management system in place to ensure quality service delivery

Figure 1: Policy Foundation for the Hub System and Hub Guidelines

A strong laboratory service delivery system with an effective sample transport network is very critical for quality laboratory service delivery for routine surveillance, disease outbreak investigation and control, and for routine patients' management and care. Uganda has made much progress in this direction. The NSRTN has been built based on hubs to facilitate movement of samples across the whole country. The hub system or NSRTN operates within the healthcare system of Uganda and is supported by multiple partners that work with the government, and it has been hailed as the best on the African continent. Partners support the system by providing fuel, maintaining motorcycles, recruiting and paying the Sample Transporters among others.

Healthcare managers in the facilities directly manage the functionality of the system. Coordination of the various aspects of the hub system or NSRTN is done by the National Hub Coordination Office at the headquarters of Uganda National Health Laboratory Services (UNHLS). Section 2.2.2 elaborates this. However, there are still very many challenges with some hubs operating sub-optimally compared to others. There have been cases of lack of fuel, delayed repair of damaged motorcycles and even failure to pay salaries of the Sample Transporters. Transition from one partner to another has caused numerous challenges to the extent of even interrupting service delivery by a period of two months. This guideline, therefore, is intended to articulate all the guiding principles to enable effective operation of the NSRTN or the hub system in Uganda. Figure 2 shows key nodes that are critical in operations of NSRTN or the hub system in Uganda.

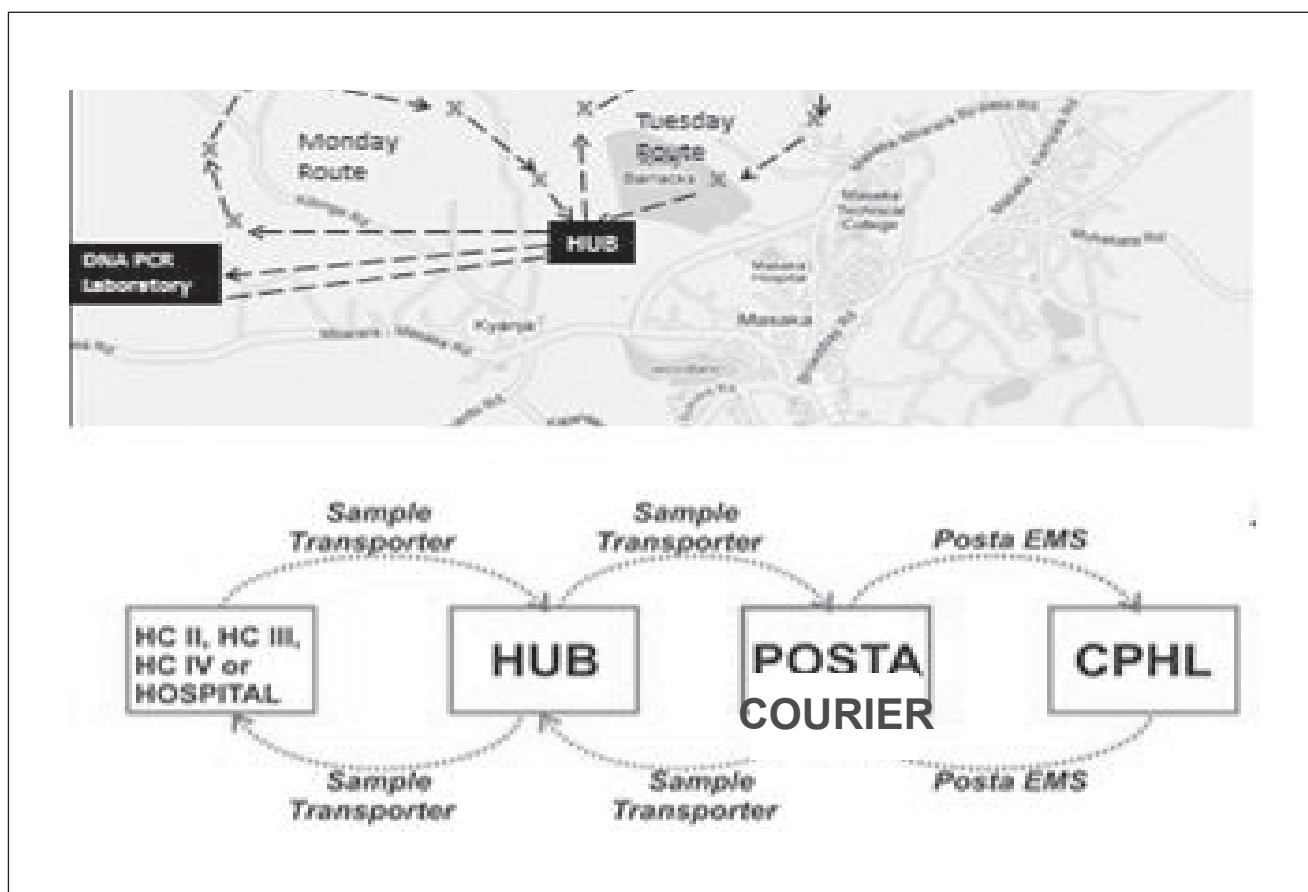


Figure 2: key nodes in Uganda's NSRTN or the hub system

1.4 Benefits of the Hub Guidelines

These guidelines are relevant because they:

- Enable effective delegation of stakeholder roles, in order to increase community access to laboratory services through peripheral health facilities and increase preparedness for epidemic response.
- Provide a foundation for implementation of good laboratory practices from which peripheral health facilities can easily adopt.
- Provide principal opportunities towards the engagement of greater public private partnerships for service delivery in order to contribute towards the national minimum health care package.
- Provide a framework for harmonizing equipment installation across the country, which will offer opportunities for better management and reduced costs of reagents in initiatives such as reagent mark-ups.
- Provide a benchmark for increased partnership within line departments of MOH for service delivery and thus ensure cost savings by leveraging resources across programs, implementing partners, the Civil Society Organizations (CSOs) and development partners.

1.5 Target Audience

This guideline highlights the synergy of actors across all levels e.g. laboratory oversight teams in the ministry of health, other health programs, the district level health and laboratory oversight teams, all health facilities in the tiered system and laboratory personnel. Other users of this guideline include IDSR focal persons at all levels, training officers and curriculum developers in Ministry of Health, development partners, and implementing partners.

1.6 Purpose of Hub Guidelines

1.7 Main objectives

To provide a framework for guiding the establishment and operation of Uganda's NSRTN in order to promote quality management, effectiveness, and efficiency in public and private health facilities in Uganda.

1.8 Specific objectives

The specific objectives of this guideline are:

- 1) To define the purpose, functions, and components of a hub as a focal point of the NSRTN
- 2) To outline roles, responsibilities and coordination structures of stakeholders of the NSRTN
- 3) To describe steps for selection, establishment, transfer and/or decommissioning of a hub
- 4) To describe process of specimen management within the NSRTN
- 5) To describe communication channels within the NSRTN
- 6) To provide general guidance for strengthening and scaling up the functions of the hubs as focal points in the NSRTN
- 7) To outline minimum monitoring indicators for tracking the performance and efficiency of the hub system or NSRTN of Uganda

Sections 2.2.1 to 2.2.7 present the details of objectives 1 to 7.

1.9 Objective 1 – Define the purpose, functions, and components of a hub as a focal point of the NSRTN

According to WHO, a National Public Health Laboratory Network (NPHLN) is composed of laboratories at each level of the health system (facility, district, regional, national) that are committed to proper diagnosis of priority infectious diseases and non-communicable diseases for public health decision making. The laboratories in a functional laboratory network have established communication channels for routine communication, exchange of information, and interaction in specified ways with each other, and with epidemiology departments at the level of the national health program¹. In Uganda, the hub system or

¹WHO (2008). Guide for National Public Health Laboratory Networking To Strengthen Integrated Disease Surveillance and Response (IDSR)

NSRTN serves the purpose of sample analysis, sample transportation, packaging, tracking sample referrals and timely return of results to inform clinical diagnosis, research and surveillance needs.

Functions of hubs in Uganda include but not limited to the following:

- Collecting samples from peripheral health facilities and transporting them to appropriate testing laboratories at regional and national level for routine testing; disease surveillance and outbreak investigations.
- Examining specimen collected at the referral laboratory and refer those that they are not able to test to higher facilities.
- Tracking, receiving, and relaying samples and test results from reference laboratories back to peripheral health facilities that requested for the tests.
- Distributing relevant commodities such as external quality assurance panels and sample collection materials for targeted programs to the peripheral health facilities served by the hub.
- Providing training, mentorships and technical support to peripheral health facility staff in development/customization of Standard Operating Procedures; diagnostic techniques and bio safety procedures; and collection, safe handling, storage and shipment of samples to referral laboratories.
- Coordinating implementation of hub based inter-laboratory quality control programs for selected tests such as comparability testing of POCs with analyzers; slide re-checking for specific tests etc.
- Preparing and submitting monthly, quarterly and annual hub reports
- Convening quarterly and annual hub coordination and performance evaluation meetings.

Minimum requirements of a hub

The following make up the hub:

- i. Essential harmonized laboratory equipment
- ii. Functional logistics and supply chain management systems
- iii. Enhanced laboratory human resources
- iv. Improved laboratory infrastructure and biosafety
- v. Enhanced Quality assurance system
- vi. Health laboratory information management systems (HLIMS)
- vii. Defined test menu to guide demand creation, training and mentorship roles and responsibilities
- viii. Defined area of coverage and schedule for sample transportation
- ix. Dedicated approved transport means
- x. A Multi-cadre hub coordination team

The above list of minimum requirements is explained below.

A. Harmonized laboratory equipment

The hubs shall be facilitated with harmonized laboratory equipment with sufficient capacity to meet their testing needs and those of the sites they support in their catchment. Every hub should have automated equipment for hematology, chemistry, CD4 among others. The equipment shall be harmonized for easy

logistics management, servicing, maintenance and quality control. The harmonized equipment list shall be provided by the NHLN coordination office (see section 2.2.2 for details).

B. Logistics and supply chain management systems

The hub will need more logistics than any laboratory at its level, because of the additional need to test samples that come from the peripheral sites in their catchment. Therefore, individual hubs shall manage their supply chain system in accordance to existing guidelines and their consumption rates.

C. Human resources

Despite the fact that the human resources at the hubs shall follow the national staffing norms, the hub shall be provided with additional staff to meet the volume of work resulting from the samples referred by peripheral labs in the NSRTN. The number of laboratory personnel at a hub will depend on the staffing norms prescribed in the scheme of service.

For sustainability purposes, the NHLN coordination office will work with Implementing Partners, Regional Referral Hospitals, and District Local Governments to do the following:

- a) **Ensure official appointment or recruitment** of the following as additional staff, i.e.: Regional Laboratory Services Coordinators, District Laboratory Focal Person (DLFP), Hub Coordinators, and Sample Transporters.

- o **Hub Coordinator:** This position shall be assigned as a focal position to a laboratorian attached to the hub facility. The hub coordinator shall:
 - Provide updates on hub performance indicators (provided in appendix I) to the health facility in-charge.
 - Shall report hub performance updates (through the health facility in-charge) to the District Health Team (DHT), Regional Laboratory Services Coordinators, and the National Hub Coordination Office.
 - Work with the clinical team at the hub and with the district health educator to draft Continuous Professional Development (CPD) and mentorship schedules to train peripheral facilities in order to create demand for hub services. This shall be facilitated by Implementing Partners.

Detailed roles of the hub coordinator are outlined in section 2.2.2. To execute these roles, the hub coordinator shall be facilitated by the Implementing Partners with monthly airtime and internet data.

- o **Sample Transporter:** The district health office and CAO of the host district shall take lead in recruitment of sample transporters who should: (a) have attained at least an ordinary level certificate, (b) have a valid riding permit, and (c) be trainable.
- o At least two full time sample transporters should be recruited.
- o Once at the hub, these sample transporters shall be staff of the hub health facility, and shall be directly supervised by the hub coordinator.

- Regardless of the cadre of staff recruited for this position, the sample transporter shall be:
 - Undergo a one-time professional defensive training in cycling
 - Undergo trainings in sample handling, biosafety and biosecurity, among others
 - Undergo Hepatitis B vaccination
 - Provided with annual health insurance
 - Facilitated with monthly airtime to coordinate their travels to peripheral facilities, Safari Day Allowance (SDA) and a monthly risk/over time allowance on top of their salary. This allowance shall be determined and specified by the national hub coordination team.
 - Covered by workman's compensation and other requirements under the Uganda labor laws (Workers Compensation act 2000 Chapter 225).
 - The roles of Regional Laboratory Services Coordinators and DLFPs are specified in section 2.2.2.

Additional back up sample transporters (preferably two) shall be co-opted by the hub management team without necessary procurement of motorcycles for them but will be required to undergo mandatory defensive training and vaccinations. These sample transporters shall not be a fresh recruit but voluntary delegates who are already fully employed by the district hosting the hub e.g. laboratory assistants or data/stores assistants from peripheral health facilities.

- b) **Safeguard staff at the laboratory hubs from ad hoc transfers** in order to enable continuity and stable implementation of laboratory accreditation programs

D. Laboratory facility infrastructure and biosafety

In order to meet the need for extended laboratory services, the hub will need to have its infrastructure improved to create adequate space and meet the required biosafety standards. In doing so, national laboratory infrastructure guidelines and national biosafety guidelines will be followed.

E. Quality assurance system

All hubs shall design and implement a laboratory quality management system that ensures delivery of quality laboratory services. All hubs shall participate in national quality improvement programs implemented by the NHLN coordination office that lead to national certification and international accreditation.

F. Health laboratory information management systems

The documentation of records in hub laboratories shall follow standards using approved national HMIS-HLIMS tools. In addition, efforts will be undertaken to adopt the use of an electronic laboratory information system in a phased manner in order to yield quality data during service delivery and minimize interruptions to service delivery. In addition, an electronic mechanism will be adopted to support timely dissemination and relaying of results for referral samples to peripheral labs. To ensure data safety and quality, national data management and ICT assets management policies shall be adopted and regular information system audit trails shall be implemented.

G. Defined test menu to guide demand creation, training and mentorship roles and responsibilities

In light of the increased capacity of the hub laboratories, the clinical and laboratory teams in a given hub shall collaborate to provide updates to the staff at the hub and peripheral facilities on the capacity of services offered at a hub. This shall guarantee an increase in the demand for testing services at a hub. Staff at a hub and peripheral sites shall be updated/sensitized through regular periodic trainings, mentorships, and CPDs based on the test menus and testing capacities of respective hubs and clinical management guidelines. In addition, communities will be sensitized in order to increase demand for services available at a hub in accordance to the site test menu. Implementing Partners shall ensure that these mentorships and sensitizations are done systematically throughout the district/hub coverage.

H. Defined area of coverage and schedule for sample transportation

This shall be drafted and updated periodically in consensus with the district health office of the hosting district and other districts intersected by the hub, to ensure holistic coverage of health facilities across the hub catchment area. The sample transporter monitored by the hub coordinator shall ensure that all the sites on a given schedule are visited accordingly. The hub coordinator and sample transporter shall be responsible for diligent utilization of the data collection tools used for monitoring the transport network and provide regular reports to the district health office and national hub coordination as spelt out in the M&E framework. The co-option of additional riders and additional facilities shall be supervised by the DHO/Hospital Director to ensure equity and efficient re-scheduling of the visits. The hub shall ensure visualization of the area of coverage and their outputs on regular basis.

I. Dedicated approved transport means

Fundamentally sample transporters will use motorbikes as the transport means. Thus, a motorbike is one of the most important tools needed at the hub. It is what connects the hub to the peripheral facilities in its catchment area. Each hub should, therefore, have a minimum of two motorbikes and two full time sample transporters. This will enable each peripheral site to be visited at least two times a week to collect samples.

The Implementing Partner shall facilitate the fueling, servicing, repair, and maintenance of hub motorcycles using service providers that are approved by the district.

J. A Multi-cadre hub coordination team. Section 2.2.2. provides details on this.

1.1.1. Objective 2 – Clearly highlight roles and responsibilities of different stakeholders in the hub operations and their coordination structure

For the NSRTN system to function adequately, several key stakeholders need to operate in a collaborative mode. The list of these stakeholders and their roles and responsibilities are presented below.

List of Key Stakeholders

- Ministry of Health (MOH) HQ
- UNHLS
 - NHLN coordination office
 - National Hub Coordinator
 - Regional Laboratory Service Coordinators
 - National Specialized Reference Laboratories (NSRLs)
 - CPHL
 - UVRI
 - UBTS
 - Uganda Cancer Institute
 - NTRL
 - Uganda Heart Institute
 - Specialized laboratories at teaching institutions and Centers of Excellence
 - Regional Laboratory Quality Committee
 - Regional hub coordination committee
 - District Health Team
 - District hub coordination committee
 - Hub health facility
 - Hospital/health facility management
 - Laboratory management
 - Hub coordinator
 - Hub sample transporters
 - Peripheral Health facilities referring samples
 - Community
 - Private Health Laboratories
- Development partners
- Implementing partners
- Faith based organizations
- Courier service providers
- Other Ministries, Departments and Agencies (MDAs) under the One Health Approach

Roles and Responsibilities of Key Stakeholders

Ministry of Health (MOH)

Ministry of Health through UNHLS shall provide overall policy guidance, coordination, resource mobilization and stewardship of the NSRTN.

Uganda National Health Laboratory Services (UNHLS)

The Executive Director of UNHLS shall appoint a Technical Working Group for NSRTN. This TWG shall have representation from: NHLN coordination office, development partners, implementing partners,

surveillance unit at the MOH, MDAs under One Health approach², NSRLs, hub coordinators, DHOs, courier services, private sector, National warehouses and Uganda National Health Consumers Organization.

▪ **Roles of the NSRTN Technical Working Group**

The TWG shall:

- Provide overall policy guidance to all stakeholders in NSRTN
- Engage with other MOH departments, programs, line Ministries and stakeholders interested in leveraging the operations of the hub system
- Oversee and supervise activities of the NSRTN
- Conduct bi-annual stakeholders' meetings to review performance
- Ensure availability of commodities necessary for the hub operation activities
- Gazette, launch new Hubs, transfer and close others in consultation with other key stakeholders
- Undertake strategic planning for NSRTN
- Mobilize resources for NSRTN
- Coordinate all technical and administrative support supervision to the hubs
- Provide guidance to hubs and implementing partners when planning and budgeting for the hubs
- Harmonize operations of Implementing Partners and manage the transition period from one implement partner/project to another

National Hub coordination office

The National Hub coordination office (as one of the offices that constitute NHLN coordination office) shall be responsible for hub operations. It shall work with the Regional Laboratory Service Coordinators to plan, implement and monitor hub operations at national and subnational levels.

National Specialized Reference Laboratories (NSRLs)

To strengthen hub operations, NSRLs shall:

- Test samples referred for specialized testing and provide results within the acceptable turnaround time
- Support proficiency testing programs in line with the national quality assurance guidelines
- Provide technical support supervision to the hubs and peripheral laboratories towards improving quality of lab services.
- Provide feedback reports to NHLN coordination office and other stakeholders as may be required
- Support the development of hub policies, standards and guidelines

²One Health approach: This is a collaborative multi-sectoral and interdisciplinary approach working at local, regional, national and global levels with the goal of achieving optimal health outcomes with recognition of animal, plant and human health and their shared environment. The approach aims at addressing public health threats in the areas of zoonotic diseases, food safety and antimicrobial resistance under the International Health Regulations (IHR) of the World Health organization.

Regional Laboratory Quality Committee (RLQC)

RLQC shall have a subcommittee to oversee hub issues, referred to as the Regional hub coordination committee.

Regional Hub Coordination Committee

There shall be a regional hub coordination committee that is chaired by the director of a Regional Referral Hospital, who will be assisted by the In-charge of the laboratory in the Regional Referral Hospital. Accordingly, membership of the regional hub coordination committee shall include:

- Hub coordinators from each of the hubs in the health region
- The regional hub laboratory coordinator as the secretariat to the regional coordination committee
- DHOs and DLFPs of districts hosting hub(s) in the region
- The regional implementing partner
- The regional surveillance officer

The regional hub coordination committee shall:

- 1) Coordinate all hub activities in the health region and report directly to the national hub coordination office.
- 2) Provide technical oversight to the hubs in the region
- 3) Coordinate stakeholders to provide hub support within the region on logistical and operational issues as programmatic value of the hub evolves
- 4) Provide periodic (quarterly and annual) reports to the national hub coordination office and all key stakeholders
- 5) Organize and conduct the quarterly hub coordination meetings within the region
- 6) Coordinate mentorships and training for the hub
- 7) Coordinate inter hub meetings
- 8) Support implementation of quality management systems for the hubs within the region, including distribution and retrieving results of EQA panels
- 9) Coordinate support supervision at regional level

District Health Team (DHT)

DHT shall have a subcommittee to oversee hub activities, referred to as the district hub coordination team.

District Hub Coordination committee

The district hub coordination committee shall be chaired by the DHO of the district hosting the hub. The secretary to the committee shall be the hub coordinator. Other members of the committee shall include:

- In-charges of the health facilities served by the hub
- DLFPs of all districts whose sites are serviced by the hub
- Hub coordinator
- Hub lab in charge
- Medical Superintendents / In-charges and Lab In-charges of peripheral facilities served by the hub.
- The district surveillance officer

- Implementing Partners.

The following shall be the functions of the district hub coordination committee:

- Lobby and liaise with partners, to ensure that hubs are adequately funded to be able to undertake the responsibilities
- Provide oversight and supervision of the sample transport network activities
- Conduct district quarterly stakeholders' meetings for sharing lessons learnt and good practices
- Conduct regular monitoring and evaluation of the sample transport network activities
- Provide technical support supervision to the hubs
- Work with stakeholders and district local governments to provide resources necessary for running the hub
- Mobilize political commitment and community involvement
- Agree on the sites to be served by a given hub
- Assist in coordination of hub mentorships and activities
- Sensitize the community about the hub operations
- To ensure that the required human resource positions are filled up at the different health facilities, especially at the hub

Courier service providers

Any contracted courier services provider shall abide by this guideline and shall:

- Ensure timely dispatch of samples and return of results, keep records and packages well organized and maintain effective communication with partners.
- Maintain records of samples/commodities transported and results packages returned
- Ensure adequate opening hours of their offices on a daily basis and effectively serve sample transporters, hub coordinators of other personnel from the hub.
- Maintain open communication between destination reference laboratories and district health teams about the results delivery status.
- Provide a storage mechanism (where applicable) to enable temporary storage of samples or commodities prior to transportation.
- Ensure that their personnel are adequately trained on bio-safety and biosecurity, spill management, and documentation requirements for specimen referral.

Implementing partners

- Support the day to day operations of the sample transport network which includes but not limited to; provision of fuel for daily routes, service maintenance and repair of the motor bikes, and other day to day operational needs at the hub
- Together with the hub administration and the DHO of the district, the partner shall recruit and second Sample Transporter to the district/hub
- Where needed, provide infrastructural, equipment and human resource support to the hub lab to enable it provide specialized lab services to sites within its catchment area
- Assist the hub administration to build capacity within the hub lab in order to carry out tests for all referred samples as well as hospital samples
 - Adequate laboratory staff numbers

- Functional diagnostic equipment (CD4, Hematology, Clinical Chemistry, etc)
- Stocked reagents and consumables for all diagnostic equipment
- Lab registers for all laboratory tests
- Build capacity in all sites for sample collection, and handling for all sample types
- Provide support for technical assistance and quarterly performance review meetings
- Provide comprehensive insurance to the sample transporters
- Mobilize Resources for hubs

Community

The community shall be represented by the health unit management committee/Hospital Management Boards to:

- Provide political support for the sample and results transport network
- Provide security for the sample transporter and the health facilities
- Provide feedback on the functionality of the sample and results transport network
- Provide reports on suspected outbreaks
- Mobilize other members in the community for health services

Hub Management Team

At every hub, there shall be a hub management team comprising of the in-charge of the health facility hosting the hub, the Administrator, Laboratory in charge, and the Hub Coordinator and all in-charges of at peripheral facilities served by the Hub. This team shall provide immediate oversight on the operations of the hub and shall report to the facility management committee. The team will be chaired by the facility in charge deputized by the facility administrator (where this position exists) with the hub coordinator as the secretary. The hub coordinator and the hub lab in charge will implement the activities of the hub.

Below are the roles and responsibilities:

- Provide overall supervision/oversight of the hub and related activities
- Support of laboratory staff, EID staff, TB staff, ART clinic staff, hub coordinator and sample transporter in executing their duties
- Identify potential candidates for positions of Hub coordinator and sample transporter
- Coordinate other stakeholders in planning for hub activities
- Support laboratory in-charge in ensuring the hub conducts minimum tests for referred samples that can be analyzed at the hub and refer those samples that cannot be analyzed at the hub level. The support includes ensuring:
 - Adequate laboratory staff numbers with the right qualifications available at official work hours
 - Availability of fully functional diagnostic equipment with their respective documentation
 - Adequate Stocks of reagents and consumables for all diagnostic equipment
 - Adequate storage space for reagents and consumables
 - Ensure timely utilization of approved laboratory registers and reporting templates

- Manage sample transport network resources which include:
 - Hub Motorcycle (maintenance, repair and security)
 - Fuel
 - IT equipment (computer, printer, scanner, internet modems, phones)
- Review and approve hub reports from the hub coordinator

Hub Management Roles:

- Ensure the hospital laboratory has enough material and human resources to execute minimum tests for all referred samples as well as hospital samples
 - Functional diagnostic equipment (CD4, Hematology, Clinical Chemistry, Gene Xpert)
 - Stocked reagents and consumables for all diagnostic equipment
 - Lab registers for all laboratory tests
 - Order all necessary lab supplies bi monthly before needed.
- Ensure the laboratory staff conduct testing of all referred samples and hub facility samples in a timely manner.
- Ensure the quality of results produced
- Ensure that all the required documentation and record keeping is done in the relevant registers
- Ensure that results of all tests run at the hub are ready for dispatch by the sample transporter less than one week after sample collection
- Ensure proper sample identification, reception, packaging and storage of referral samples for transportation and corrective action
- Keep track of referred samples and return of results to and from reference lab in accordance with the TAT
- Perform testing of EQA samples
- Liaise with the hub coordinator in cases of equipment break down to communicate to the health facilities served and also refer samples to another reference laboratory
- Prepare regular laboratory monthly reports
- Mentorship of the peripheral health personnel in coordination with the DLFP
- Capacity building and staff orientation
- Ensure implementation of the LQMS
- Perform quality checks on completeness of information regarding samples for outbreak investigations e.g. name and location of the patient (village, Sub County, county and district)
- Avail their test Menu to peripheral health facilities

The Hub Coordinator

- Orient the sample transporter and introduce them to the health facility managers
- Keep comprehensive record keeping of all samples referred to and all results sent from the hub
- Manage finances for all hub activities and submits monthly expenditure reports to facility managers and Implementing Partner
- Directly supervise the activities of the sample transporter
- Perform regular scheduled check-ins with the hub, EID focal point, viral load focal point, ART clinic, TB clinic and courier

- Ensure all required infrastructure is available, including but not limited to:
 - Secure storage space for results at the hub
 - All required laboratory registers and hub registers
 - Ensure safe storage of motor bikes
- Review all logbooks to ensure appropriate use of fuel, finances, bike maintenance and execution of responsibilities by all parties
- Organize quarterly support supervision visits to the peripheral facilities served by the hub
- Organize quarterly hub review/coordination meetings
- Prepare hub monthly reports and share with the Health facility manager, laboratory manager, District Health Officer, Implementing Partner and NHLN Coordination Office
- Communicate any (resource) constraints in real time to the IP, facility manager, DHO and copy to NHLN Coordination Office
- Work with the relevant stakeholders to develop a sample transportation schedule
- Attend the regional hub coordination and national stakeholders meetings
- Ensure distribution of EQA schemes to the different testing participating sites
- Print patient reports from the hub electronic download module (VL/EID dashboards) and distribute them to sites

Hub Sample Transporters

- Follow daily and weekly schedule of visits to the hospital, health centers, and courier
- Collect samples from the facilities and deliver them to the hub and /or courier in a timely manner
- Check the hub or courier on daily basis to Pick results and/or deliver them to respective facilities
- Keep motorbike and other equipment including safety gear and carrying box well maintained and safe from theft
- Maintain comprehensive records of samples collected, results picked and delivered, bike maintenance/repairs and daily movements made
- Work with the hub coordinator and DLFPs to ensure timely distribution of EQA samples
- Communicate (phone or physical) immediately to the hub coordinator in case of inability to move to the peripheral facilities or if anything happens which interferes with sample transportation
- Prepare and submit weekly reports to the hub coordinator
- Keep a copy of valid riders' permit at all times
- Each hub has two motorbikes for routine surveillance and should be given one additional motorbike for outbreak surveillance, to help move samples from the peripheral health facilities and community to the hub.

The peripheral health facilities referring samples

The peripheral health facility management through the leadership of the Health Facility In-charge shall be responsible for:

- Collection, preparation and packaging of all referral samples before scheduled arrival of the sample transporter
- Carefully fill the test request form, labelling all samples with patient name, ID, health center name, date and test type
- Maintain accurate laboratory records of all samples referred and results received

- Document dispatch of samples and receipt of results
- Ensuring that all results are promptly transcribed into patient records and delivered to the patients
- Ensuring patients are informed of any re-schedule or procedure adjustments
- Keep track of referred samples and results return in accordance to prescribed TAT
- Ensuring all supplies for sample collection and all logbooks are fully stocked. Order new supplies at least 3 months before you need them
- Provide feedback on the performance of the sample transporters
- Ensure adequate information regarding samples for outbreak investigations e.g. name and location of the patient (village, sub county, county and district)

Figure 3: Shows the hierarchical operational structure of key stakeholders mentioned above.

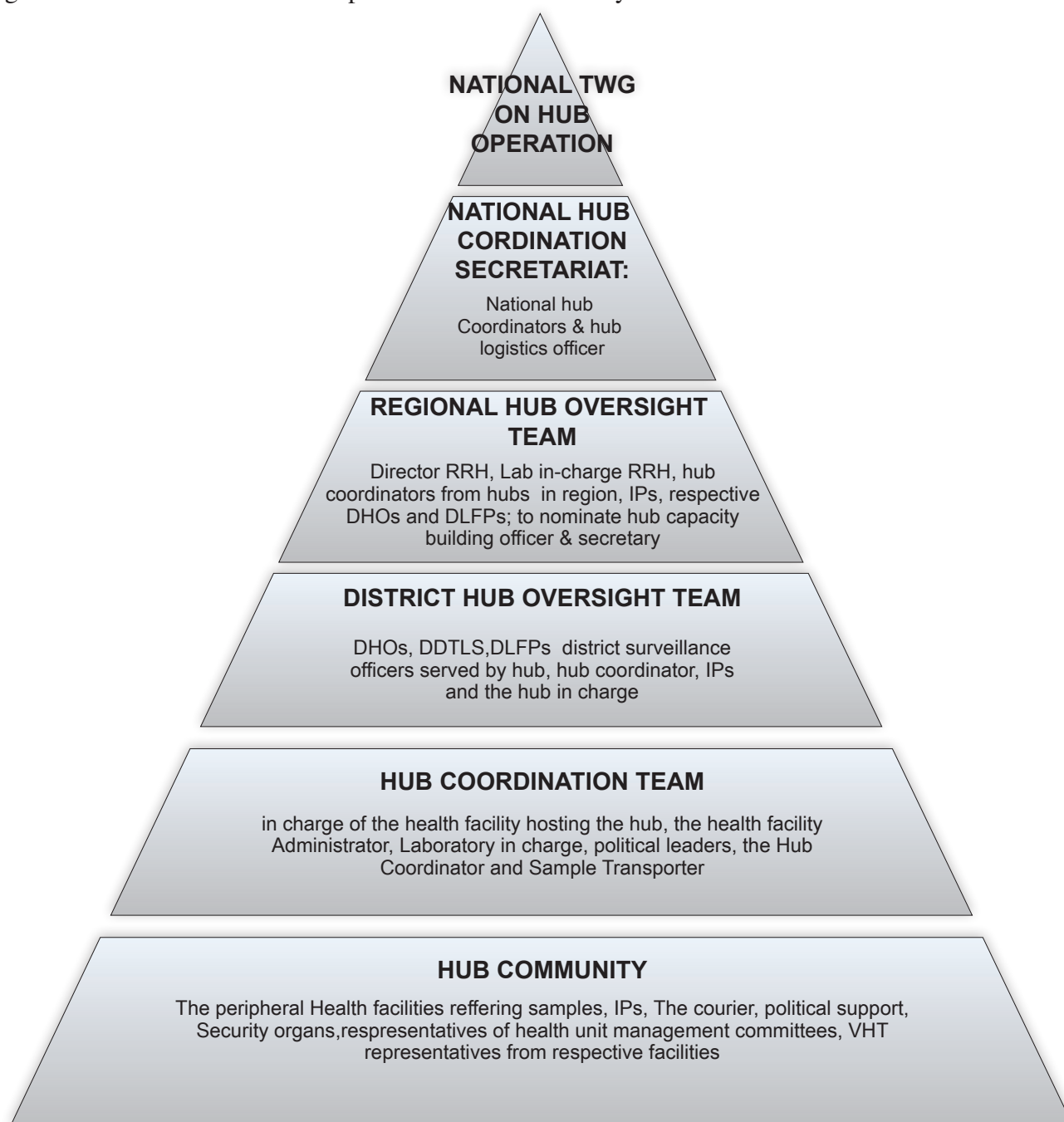


Figure 3: Hub and Sample Transport Network Coordination Chart

1.1.2. Objective 3 – Describe steps for selection, establishment, transfer and/or decommissioning of a hub

Hub Selection

The guiding principle in selection of hubs is geographical access under the principle of equity. A site to be selected as a hub in the sub region should be accessible to a number of peripheral level health facilities and should have a functional laboratory. For a site to be a viable hub it should at least be accessible to a minimum of 15 health facilities within a radius of 40km maximum. The process of selecting the hub is very consultative with stakeholders especially those on ground. A public health facility is preferable to a private one to host a hub.

Hub Establishment

- Upon selection of a hub, GIS mapping of 40km radius around it is done. All health facilities within that radius are located with the road network. A schedule is created where each of the health facilities are visited at least once a week but more preferably twice a week. Political leaders of the district (where all sites to be served by the hub are allocated) launch the hub in a public meeting. The reason the hub is launched in a public meeting by politicians with the media around is to create publicity in regard to the availability of the services in the sample transport network that increase accessibility to quality laboratory services to all Ugandans irrespective of where they stay.

Hub decommissioning/ re-location

- If for one reason or another the hub has been changed from one health facility to another, there is a comprehensive consultative process with all key stakeholders right from the regional to district hub oversight teams to ensure an agreeable position on the decision. When the position is reached, the government, development partners and the implementing partner are informed in writing with appended record of the resolutions to make arrangement for resource relocation to the new selected hub facility. The old facility then ceases to be a hub after the new facility is launched.

1.1.3. Objective 4 – Describe process of specimen management within the sample transport system

Specimen types

This guideline applies to all sample types - whole blood, serum, plasma, sputum, swabs, dried blood spots (DBS), faecal matter, urine, tissues - that will be referred from one lab to another irrespective of the purpose of the referral.

- Samples from disease specific programs
- Samples from epidemiological outbreak investigation
- Samples for research purposes
- Samples for clinical diagnosis
- Samples for routine surveillance of targeted diseases

Specimen collection and transport supplies management:

- Specimen collection materials will be distributed according to the national distribution systems with the exception of specialized reference testing materials when necessary.
- The logistics and equipment team will liaise with QPPU to forecast and ensure that adequate stocks of sample collection commodities are available at the hubs and in peripheral health facilities.

Specimen Collection, handling, packaging and transportation:

- Specimen Collection, handling, packaging and transportation shall be done by trained healthcare workers according to the standard operating procedures following universal infection and prevention measures.
- Where the patient is to collect the sample, clear Instructions for proper specimen collection shall be given
- Referral specimens shall be properly packaged using triple packaging system
- Laboratory specimen must be transported to the respective reference laboratory as quickly as is reasonably possible. Where this cannot be achieved, specimens awaiting transportation should be kept at the correct temperature within the laboratory or approved storage site within a health facility under optimum conditions to ensure sample viability.
- Where necessary, cold chain should be maintained for samples being referred to reference laboratories.
- Specimen movement shall follow the already laid out sample transport network pathways.
- The designated sample transporters shall bring all specimens from the facilities or communities within the hub catchment area to the hub laboratory where packaging and documentation will be done.
- On reaching the hub, samples to run at the hub are sorted out and those to be referred to national reference laboratories are repackaged
- All sample for specialized reference testing shall first be transported to CPHL and thereafter conveyed to their definitive specialized testing laboratories under appropriate conditions.
- In case of an outbreak, the second motor bike shall be used to transport the outbreak samples. This will be done in coordination with the implementing partners, district, Ministry of Health, UNHLS and other MDAs (in line with One Health Approach). The second motorbike shall back-up the first bike but reserved for transportation of case based surveillance samples, according to a national biosafety biosecurity guideline.
- An outbreak event that has triggered national response, the National Task Force (NTF) shall take over the expeditious transportation of those samples according to set guidelines.
- Transportation of the specimen should be in compliance with international and national legislation regulating specimen transport
- Where possible, specimens being referred to the same testing lab should be transported together to minimize transport costs
- The specimen transport days should be specified in the health facilities for tests that can be batched. In such cases, the shipment day(s) shall be documented and communicated to the clinical

teams. The batched specimens should be stored at the appropriate temperature and conditions that maintain specimen integrity

- Incidents during specimen transportation, which may affect quality of the specimen or safety of personnel, should be reported to the referring laboratory/ facility.
- Chain of custody forms should accompany all specimen transported and be duly completed by all responsible parties. A copy should be maintained at the referring and receiving laboratory.

1.1.4. Objective 5 – Describe communication channels within the sample transport system

Report Communication

Effective means for sending reports and results include the following:

- a) Providing hard copy of reports: At the national level, when the lab finishes running the tests, patient results from the same health facility are put in one envelope which is sealed and addressed to the health facility. Envelopes of different health facilities, which are from the same hub, are all put together in a bigger envelope and addressed to the hub. This envelope is then sent back to the hub through the courier. On reaching the hub, the envelope is opened and individual health facility envelopes removed. Health facility envelopes will be dropped back by the sample transporter when they next go to pick samples. For samples processed at the hub, hard copies are sent the next time the rider will visit the facility. In case of emergency results, the lab in charge/hub coordinator communicates results back to the requesting clinician by phone such that patient management begins as the hub copy results follow.
- b) Electronic Results Transfer: CPHL has developed a results download module on both the EID and Viral Load dashboards. By this each hub is given access rights through which they can download and print results of the patients from all health facilities they support. Each hub has been facilitated with a computer, printer and Internet connectivity to be able to download the results.
- c) For the outbreak samples emergency results are communicated by the Short Message Service system (SMS) through the emergency control center (EOC). The messages go to the designated persons as has been already established through their communication channels. To achieve this, NHLN coordination office is developing a lab based disease surveillance response module of HLIMS that will send data on confirmed samples on public health events to the MTRAC-DHIS 2 reporting framework.
- d) For surveillance and epidemiological interventions, results may be transmitted by SMS using MTRAC
 - Logistical support should be provided to maintain the agreed communication channels for regional and national referral networks.
 - Patient confidentiality should be maintained at all times.

Routine operational communications within the NSRTN

Operational communications at the hub rotates around the hub coordinator who are the lab managers at the hub. The hub coordinators and /or laboratory managers are therefore the main links between hubs and the sample transporter, peripheral health facilities, the hub health facility manager the district health offices, the Implementing Partners and NHLN Coordination Office. The hub coordinator must therefore communicate on a daily basis with these stakeholders to maintain smooth running of the hub. Any

logistical challenges affecting hub operations should be urgently communicated to the Lab advisor of the Implementing partner, the health facility manager, District Health Officer, and the Central Public Health Laboratories.

▪ **Other forms of communication within the hub system are as outlined below:**

○ **Feedback reports**

- The hubs shall provide feedback reports for rejected samples and any other information in writing to the facilities through the sample transporter. There will also be email and phone communication between the hub coordinator, laboratory manager, sample transporter and facilities served by the hubs

○ **Quarterly hub coordination meeting**

- The hubs shall hold quarterly hub coordination meeting according to national schedules where all facilities served by the hub will attend. The meeting will be convened by the District Health Officer in consultation with the Health facility manager and the hub coordinator. If the hub is located in a regional referral hospital, then the hub coordination meeting will be convened by the Hospital Director and co-chaired by both the Hospital Director and the District Health Officer.
- The following will form part of the agenda for discussion in the quarterly hub coordination meeting:
 - Monthly performance of the hub for a given period, which should contain the total number of samples received from each health facility and results returned, sample rejection rate per facility, equipment and reagents status of the laboratory among others.
 - Quarterly supervision and operational report from the hub coordinator, which should provide information about the sample transporter's contract and consistency of work, motorbike status and service contract, logistics status.
 - The meeting will be facilitated by the Implementing Partner that supports the hub.

○ **Regional Hub Coordination meeting**

- There will be regional hub coordination meetings twice a year in each of the 4 geographical regions of Uganda namely Central, Western, Eastern and Northern.
- The meeting shall be attended by all the staff from the hubs and districts within the region including but not limited to the hub coordinators, laboratory managers, health facility managers, and District Laboratory Focal Persons (DLFPs), District Health Officers and laboratory advisors of the Implementing Partners that operate from the region.

- The regional hub coordination meeting shall be convened and chaired by a representative from the NHLN Coordination Office. It shall be supported by Partners within the regions.
- This meeting will discuss reports from the laboratories within the region.
- **Annual Laboratory stakeholders' meeting**
 - There will be laboratory stakeholders meeting once every year during which a report of hub performance at national level will be presented.

1.1.5. Objective 6 – Provide general guidance for strengthening and scaling up the functions of the hubs as focal points in the national laboratory network

Strengthen the National Hub Sample Transport Network

- **Case Based Surveillance Motorbike:** Working with the district surveillance team the second motorbike will be used for case based surveillance to respond to calls that come from a direction where the routine motorbikes are not scheduled to visit that day.
- **Regional Health Courier:** Based on complexity of the sample transport network, a more efficient courier system is needed to route lab samples and commodities between districts and the central referral laboratories. Innovative methods, are being sought out such as regional health courier.
- **Regional Hub Capacity Building Officer:** should be the regional lab coordinator who already exists. The hub has become not only the coordination center for the sample referral network, but also the center for laboratory strengthening efforts in Uganda. Since the hub is connected to between 25 to 30 health facilities; strengthening lab services at the hub would solve problems for all the 25 to 30 health facilities it serves. This is why all the stakeholders including the health development partners saw it strategic to make the hub a center of all laboratory strengthening. With a chain of 100 hubs serving close to 3000 health facilities, if you strengthen lab services at the 100 hubs, you have solved problems for the close to 3000 health facilities. It is therefore a smart investment to make laboratory services at the hub robust and efficient and also strengthen the sample transport network to enable peripheral health facilities to access the efficient lab services at the hub.
 - However, the system now and again faces challenges and lapses in services due to inconsistencies in supporting the hubs by providing support for fuel, motorbike servicing and repair, salaries for Sample Transporter Sample Transporter s and so on. The system is also challenged by poor attitude of laboratory personnel at the hub not being to do more work by supporting peripheral sites, though part of it is due to lack of capacity by the laboratory personnel at the hub. In this hub strengthening effort, we are proposing placing a

senior lab scientist at the regional referral hospital to act as a hub capacity building officer. This officer will work with the relevant stakeholders within the region and the districts to strengthen the sample transport system. The officer will also work with the respective hub lab personnel to not only build their capacity but also change their attitude. This way we will strengthen laboratory services at the hub and also build the quality their system.

- **Sample Tracking in the Hub Network:** Currently, samples that move through the sample transport system are not tracked; this makes it difficult to account for every sample that moves through the sample transport system and track its turnaround time. We have also had instances where samples have been lost or take unnecessarily too long. This becomes critical for samples suspected to carry highly infectious outbreak prone pathogens. For that matter, we would want to integrate a sample tracking system into the sample transport system. We plan to barcode every parcel at the hub. The rider will then carry a barcode scanner with mobile communication abilities. When the rider scans the barcode at the hub, the information about this parcel is electronically communicated to CPHL. Besides tracking the samples the tracking system will help track the movements of the rider to ensure that he visits all sites on schedule for a particular. Each health facility will have a barcode fixed on its wall, which the rider will be required to scan and send. When this is sent, then it will be possible to know that the rider reached this facility and at what time he reached the facility.
- **Operational research:** Hubs and supported facilities shall participate in the national research agenda and use routinely collected data to carry out focused operational research to inform and guide improvement of the NSRTN

1.10 Objective 7 – Outline minimum monitoring indicators for tracking performance and efficiency of the hub system of Uganda

A robust Monitoring and Evaluation framework aligned to the National Health Laboratory Services policy (NHLSP) and the National Health Laboratory Services Strategic Plan (NHLSSP) is critical to the effective implementation of key laboratory strategic objectives in the management and operations of the Hub system in Uganda.

- This section of these guidelines will provide guidance on collection, recording, reporting and visualization of data for monitoring and evaluating performance of the Hub system and sample transport network. This section is aligned to the National strategic plan 2016/2017-2020/2021 and cognizant of the National policy for National Health Laboratory Services in Uganda. The M&E framework being proposed here has been developed to aid the tracking of progress towards quality, responsive, accessible and cost effective delivery of the Hub system and sample transport network national health laboratory services in Uganda. This framework will support different stakeholders (managers, planners, implementer, policy makers and donors) acquire the information and understanding they need to make informed and strategic decisions about delivery and quality of the

Hub system and sample transport network, thereby ensuring that partner support is aligned with the NSP objectives. Finally, the M&E will not only help with identifying the most valuable and efficient use of resources but also provide data for strategic planning, designing and implementing innovative ways of delivering quality the Hub system and sample transport network.

- The future requires that NHLN coordination office further strengthens M&E data collection platforms across the country wide roll out of HLIMS and subsequent review of DHIS2 tools to enable detailed data capture including that critical for monitoring and evaluation of the Hubs system and sample transport network.

Purpose of monitoring and evaluating hub guidelines

- To routinely monitor performance, functionality and efficiency of as well as evaluate the Hub system or NSRTN in Uganda.

Health Laboratory Information Management system (HLIMS)

- HLIMS is the laboratory component of the existing Health management information system (HMIS) at the national level, that uses the DHIS2 platform for data collation and transmission, and the NHLN coordination office aims at using the same platform and mechanisms to support monitoring and evaluation of NSRTN activities. HLIMS is being built to comprehensively embrace the task of collecting accurate and timely data which will be used to strengthen national laboratory M&E system and provide information (status updates) on progress towards set targets for the Laboratory sub-sector as well as inform (policy and management) decisions making. The Hub system and sample transport network will routinely report through the HMIS tools like; periodic surveys, Surveillance, supervision visits, case studies, client satisfaction exit interviews, HLIMS Reporting, HMIS online platform, HMIS and DHIS2 tools (Weekly, monthly, quarterly), M-TRAC, SMS, Dashboard, automatic electronic report etc. These same platforms and mechanisms will be the source of information for the M&E systems proposed for the Hub and sample transport network. In table 1 below are some of the indicators that have been developed for purposes of M&E the implementation of these guidelines.

2 Proposed Indicators for M&E of the Hub System

Indicators are presented in table 1 below:

Table 1. Proposed indicators

	Standard	Indicators	What it measures	Numerator	Denominator	Disaggregation	Source	Reporting Frequency	Responsible agency (Data collection)
1	All facilities in the hub catchment area should be submitting samples through the hub network	Proportion of targeted facilities submitting samples to the corresponding Hub	Measures utilization of the hub and sample transport network system by the facilities in the catchment area	Number of the targeted facilities referring samples to the Hub	Total number of targeted facilities that are in the Hub catchment area	By level, Ownership, Region, by test, by number of visits	Numerator: (Hub register) District facility Master list	Monthly	Hub
2	All Hubs should pass the proficiency tests/EQA	Proportion of Hubs that pass the proficiency tests/EQA	Measures the quality (Proficiency of the assigned tasks in the laboratory processes at the Hubs	Number of hubs that pass the proficiency test/EQA	Total number of lab hubs enrolled on proficiency test panels	By Region, IP, by test	Regional EQA report	bi-annually	NHLN coordination office
3	All hubs should have functional harmonized equipment to perform the test as per the test menu for the level of care	Proportion of hubs that have functional harmonized equipment for the test menu by level of care	Measure the number of hubs that have functional standardized equipment that adheres to the established test menu for the level care	Number of hubs that report equipment down time of more than 5 days for any of the harmonized equipment	Total number of hubs	By Regional hub coordination teams, equipment	Support supervision reports	monthly	Regional hub coordination teams
4	Hubs should attain at least star 3 in quality management systems	Proportion of Hubs that score at least Star 3 in most recent SLIPTA audit	Measures the proportion of hubs that have established a functional LQMS and making steady progress towards accreditation	Number of Hubs that attained the recommended at least Star 3 in most recent SLIPTA audit (External or Internal)	Total number of functional hubs	By Region, IP	Support supervision reports	Quarterly	NHLN Coordination Office
5	95% of peripheral facilities should receive results for referred samples from the hub within pre-set turn-around time (TAT)	Proportion of facilities receiving results within pre-set turn-around time; rejection rates, technical support supervision/mentorship provided, proportion of rider visits per site	Measure the turn-around time (TAT) for specialized reference testing	Number of facilities receiving results within pre-set turn-around time	Total number of facilities that referred samples for testing	Facility, District,	Hub performance reports	Quarterly	hubs
6	All hubs should have 100% vacancy filled rate with qualified technical laboratory workforce	Proportion of vacancy filled of technical laboratory workforce	Measures availability of qualified laboratory workforce in the hubs	vacancy filled rate per hub of technical Laboratory workforce	Total number of hubs	By Hub	Support supervision report, Lab staff nominal lists, duty roster	annual	UNHLS
7	Hubs should have the ability to test all patient samples expected from its catchment area	Proportion of completed samples tested	Number of samples tested within the catchment area	No of samples tested within the catchment area	Total number of expected tests in the catchment area	By hub, by test	Hubs	Quarterly	Hubs

3 Appendix 1 – Guidance to Partners on Hub Operations

Hubs and the sample transport system are now a critical part of our laboratory landscape and strengthening efforts. Therefore, their functionality is critical to the general operation of laboratory services in Uganda. The sample transport network should be improved to make it robust enough to adequately and efficiently support the transportation of all samples and sample types. Under no circumstance should any intended route fail to be made. Any hub should therefore have a minimum of 2 motorbikes and riders. One motorbike and rider should operate the scheduled routes and the 2nd one operating the unscheduled routes including emergency sample pickup and case based surveillance. A hub serving many sites like more than 30 should have more than 2 motorbikes and riders. Under no circumstance should a scheduled route fail to be made at any given day. The unscheduled routes or emergency sample pickup calls should also be attended to under any circumstance. If the 2nd motorbike is not available for any reason, a backup rider should be caused to attend to emergency calls for sample pick up in any unscheduled route. It is therefore very important to plan well for the sample transport system to ensure that all the required logistics are available in good time not to interrupt services. The following are logistical and operational costs and considerations that should be taken care of and planned well in advance not to have any service interruptions.

Hub operational costs

Motor Bike and Accessories

- Bike procurement and registration – (\$300 to \$4000) usually paid for by HDP and MOH
- Riding gear – (\$200) usually included with the purchase of motorbikes but should be replenished in case they grow old.
- Comprehensive insurance - (\$ 250) important in case bike gets accident or is stolen.
- Riders back pack – (\$100) – needed for the safe couriership of samples
- Cold boxes and packs 10 per hub – (\$650 for all 10) – needed for samples that require cold chain.
- IT infrastructure needed for down loading and printing of results from NSRLs. In this case, the hub needs a computer, a printer and Internet.

Sample Transporters

- Every hub should have Sample Transporters according to the number bikes they have been given.
- Every Sample Transporter should be trained in sample handling, biosafety and biosecurity and proper maintenance of the motorbikes
- Hepatitis B immunization = \$70 – very important for all Sample Transporters.
- Medical and life insurance for riders \$120

- **Hub Coordination and Mentorships**

- Hub coordination meetings where all sites served by the hub are represented should be conducted quarterly

- Hub should be mentored to ensure they are able to do all the needed work for the peripheral sites.

Hub monthly costs

- Fuel for each of the motor bikes = \$200
- Monthly salary for each of the Sample Transporter Sample Transporter s = \$300
- Bike servicing maintenance and repair for each motorbike = \$150
- Allowance for back up rider whenever needed = \$150
- Air time for hub coordinator, Sample Transporter Sample Transporter , hub lab in charge, and data for results down load = \$50
- Printing paper, cartridges for results printing = \$150
- Incidental expenses - \$150

Ministry of Health Uganda
P.O. Box 7272 Kampala