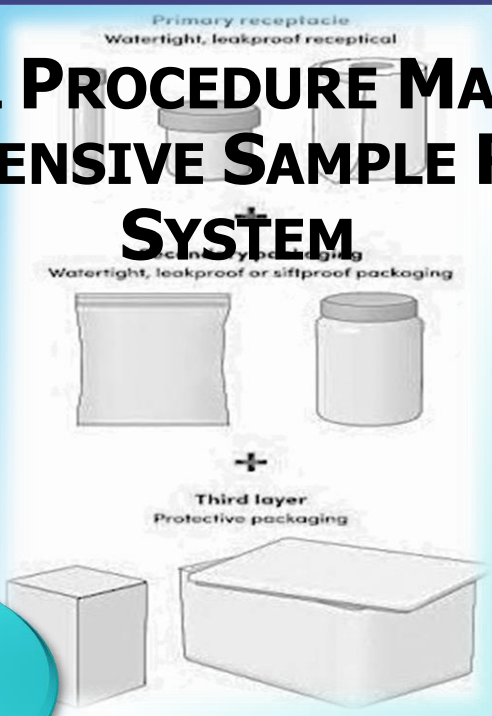
THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER, ELDERLY AND CHILDREN

NATIONAL PROCEDURE MANUAL FOR COMPREHENSIVE SAMPLE REFERRAL SYSTEM



SAFETY AND QUALITY IN SAMPLE REFERRAL SYSTEM

MAY 2020

NATIONAL PROCEDURE MANUAL FOR COMPREHENSIVE SAMPLE REFERRAL SYSTEM

Published in 2020

Government City, Afya Road/Street, Mtumba,

PO Box 743,

40478 Dodoma, Tanzania.

Landline: **+255 (0)26 232 3267**

Email: **ps@afya.go.tz**

Website: **www.moh.go.tz**

ISBN: XXX-XXXX-XXX-XX-X

TABLE OF CONTENTS

LIST OF TABLES

LIST OF CHARTS

LIST OF ANNEXES

Abbreviations and Acronyms

%	Percentage
AFB	Acid-Fast Bacillus
AFP	Acute Flaccid Paralysis
AIDS	Acquired Immunodeficiency Syndrome
ASLM	African Society for Laboratory Medicine
ASM	American Society for Microbiology
BGS	Blood Grouping Serology
CBC	Complete Blood Count
CDC	Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CHW	Community Health Worker
DBS	Dried Blood Spot
DRCHCo	District Reproductive and Child Health Coordinator
DST	Drug Susceptibility Testing
DTLC	District Tuberculosis and Leprosy Coordinator
DTS	Dried Tube Serum
EDTA	Ethylenediamine Tetraacetic Acid
EMS	Expedited Mail Services
EQA	External Quality Assessment
GCLA	Government Chemist Laboratory Authority
GHSA	Global Health Security Agenda
HAI	Health Associated Infections
HBV	Hepatitis B Virus
HCF	Health Care Facility
HCV	Hepatitis C Virus
HCW	Health Care Worker
HDL	High Density Lipoprotein
HEID	HIV Early Infant Diagnosis
HIV	Human Immunodeficiency Virus
HLI	Health Links Initiative
HSS	Health Systems Strengthening
HVL	HIV Viral Load
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ID	Identification
IDSR	Integrated Disease Surveillance and Response
IP	Implementing Partner

IPC-IS	Infection Prevention Control and Injection Safety
IVT	Infant Virological Testing
LDL	Low Density Lipoprotein
LN	Liquid Nitrogen
MDH	Management and Development for Health
MERS	Middle East Respiratory Syndrome
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MOI	Medical Officer In-charge
mRDT	Malaria Rapid Diagnostic Test
MSU	Mid-Stream Urine
MTB	*Mycobacterium Tuberculosis*
NACP	National AIDS Control Programme
NBTS	National Blood Transfusion Service
NHLQATC	National Health Laboratory Quality Assurance and Training Centre
NMCP	National Malaria Control Programme
NPHL	National Public Health Laboratory
NTLP	National Tuberculosis and Leprosy Programme
PEPFAR	President's Emergency Plan for AIDS Relief
PHEIC	Public Health Events of International Concern
PHEOC	Public Health Emergency Operation Centre
PO-RALG	President's Office-Regional Administration and Local Government
POC	Point of Care
PPT	Plasma Preparation Tube
PSA	Prostate Specific Antigen
PT	Proficiency Testing
QR code	Quick Response code
RRH	Regional Referral Hospital
RRCHCO	Regional Reproductive and Child Health Coordinator
SDGs	Sustainable Development Goals
SMS	Short Message Service
SOP	Standard Operating Procedures
SRS	Sample Referral System
SST	Serum Separator Tube
TAT	Turn Around Time
TB	Tuberculosis
TBS	Tanzania Bureau of Standards
TI	Trans Isolate medium

TORCH	Toxoplasmosis, Other (syphilis, varicella-zoster, parvovirus B19), Rubella, Cytomegalovirus and Herpes infections
TPC	Tanzania Posts Corporation
TTI	Transfusion Transmissible Infection
TVLA	Tanzania Veterinary Laboratory Agency
TWG	Technical Working Group
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UPU	Universal Postal Union
USA	United States of America
USAID	United States Agency for International Development
VLDL	Very Low Density Lipoprotein
VTM	Viral Transport Media
WHO	World Health Organization

FOREWORD

The Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) is concerned with the current practice of sample referral system, which often cause delays in addressing disease outbreaks timely, patient care and management and fair justice in medico-legal situations.

Referral of samples for testing during disease outbreaks, surveillance, diagnostic and medico-legal from primary level of care to the higher level, has been identified as an integral component of health delivery systems. Therefore, there is a need to ensure a well-structured and efficient sample referral system that will stand the test of time (Turn Around Time (TAT)), benefit a client or patient, be cost-effective and sustainable to the public in general. Delay in sample referral to the required facility due to lack of sample referral network has adverse outcome to health delivery system especially disease diagnosis and management in outbreak situations. This can be attributed by poor infrastructures and weak health systems, which affects delivery of health care during disease outbreaks and contributes to increase in number of cases as well as high case fatality rates.

Timely laboratory arrival of sample for disease outbreak and routine surveillance will aid in timely confirmation of disease pathogens to enhance appropriate control intervention. Sample referral system will enable lower level health facility to refer samples to higher level tests or to same (horizontal) level where capacity is available.

The MoHCDGEC in its quest to ensure the attainment of its vision of creating a healthy population for national development, is committed to operate a robust sample referral system that will ensure safe and efficient transportation of samples. It is important to acknowledge that a good and reliable sample referral system is cost effective and compliment to the existing pillars of Health Systems Strengthening (HSS). It is equally important to acknowledge that a well-functioning sample referral system will allow for better collaboration and communication between health facilities. This will contribute to the reduction or elimination of the challenges faced in sample referral system in line with the Global Health Security Agenda (GHSA).

This Procedure Manual has nine (9) chapters, describing in details: sample type, purpose, volume/device, storage and transportation conditions, sample container, referral level, TAT, communication channel and remarks to ensure sample integrity is maintained during referral to testing and results feedback. Furthermore, the contents of Chapter 4, which is the back-bone of this Manual does not supersede other National and International literatures addressing the same, nevertheless, they complement each other during the implementation.

Challenges faced in sample referral during disease outbreaks, routine surveillance, routine testing due to equipment downtime or reagent stock outs, justice to victims of crime, crime scene investigation, unknown causes of death, identification of human remains in disasters, biological parenthood disputes and for whatever reason that a test menu cannot be performed, has provided the impetus for the formulation of this strategy for the delivery of health care. It also offers long-term potential for all primary health care services and for overall health systems strengthening.

While materials containing biological agents are being transported, there is possibility of exposure to the public, animals and the environment through which the material passes. To appropriately control and reduce this risk, various international groups have developed recommendations or regulations (or both) that outline the way in which infectious substances should be packaged, marked, labelled and documented, to ensure safety and containment throughout the transport process. These have also been addressed in this document.

It is the hope of the MoHCDGEC that, this Procedure Manual will help to build and improve public confidence in containment of disease outbreaks and ensure efficient health care delivery in the country. All health facilities (public and private), shall adhere to this Procedure Manual. To ensure the continuous relevance of this Procedure Manual to prevailing situations, it shall be revised as and when deemed necessary.

The MoHCDGEC acknowledges the contribution of the facilitator and TWG of various stakeholders and professionals drawn from various Government institutions, private sectors, Implementing and Development Partners with interest in sample referral system in the country.

PROF. MABULA DAUDI MCHEMBE
PERMANENT SECRETARY (HEALTH)

ACKNOWLEDGEMENT

The development of this Procedure Manual for Comprehensive Sample Referral System was initiated by the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) in collaboration with Health Links Initiative (HLI) and Management and Development for Health (MDH) with financial support from Centers for Disease Control and Prevention (CDC), USA.

This Procedure Manual for comprehensive Sample Referral System was undertaken in a consultative and participatory process involving series of meetings with stakeholders from relevant institutions and organizations. The Ministry extends sincere gratitude to all the stakeholders for their valuable technical contributions during the process of developing this Procedure Manual.

It is not possible to mention each stakeholder, but this task could not have been accomplished without their valuable support. Also, special appreciation goes to the technical working group on providing technical support and endeavour to discuss strategies for implementing the development of this Procedure Manual, commendable inputs and comments that enriched in the accomplishment of this important document.

Furthermore, the Ministry would like to thank all individuals (**see ANNEX 10** refers) or representatives of the institutions and organizations who participated in developing this document.

PROF. ABEL MAKUBI
CHIEF MEDICAL OFFICER

TERMS AND DEFINITIONS

For the purposes of this Procedure Manual for Comprehensive Sample Referral, these terms and definitions will apply:

Terms	Applicable Definitions
6S	refers to Sort, Straighten, Shine, Standardise, Sustain and Safety.
Aflatoxin	refers to a naturally occurring mycotoxin produced by Aspergillus species of fungus, and is carcinogenic. Habitat include soil, decaying vegetation, cereals, grains, oil seeds, nuts before harvest or at storage.
Barcode	A barcode is a machine-readable optical label that contains information about the item to which it is attached.
Biohazard	refers to an agent of biological origin material or a condition that has the capacity to produce harmful effects on the health and safety of humans, animals, or the environment; i.e. microorganisms, toxins and allergens derived from those organisms, and allergens and toxins derived from human.
Biosafety	refers to regulation of addressing the safe handling and containment of infectious microorganisms and hazardous biological materials. The practice of safe handling of pathogenic micro-organisms and their toxins in the biological Laboratory is accomplished through the application of containment principles and the risk assessment.
Biosecurity	refers to protection, control and accountability for biological agents and toxins within Laboratories, in order to prevent their loss, theft, misuse, diversion of, unauthorized access or intentional unauthorized release.
Category A	refers to an infectious substance is classified as Category A if it is transported in a form that, when exposure to it occurs, could cause permanent disability, or life-threatening or fatal disease in otherwise healthy humans or animals. In other words, if the substance were released from the craft carrying it or from the protective packaging used during the transportation, it could have severe consequences on the health of any humans or animals that came into contact with it.
Category B	refers to an infectious substance containing biological agents capable of causing infection in humans or animals, but NOT meeting the criteria for Category A; that is, the consequences of an infection are not considered severely disabling or life-threatening.
Coordination:	refers to the process of organizing people or groups for proper working.

Courier	refers to an organizational entity personnel who has a responsibility for laboratory sample transportation and result delivery in safely and confidentiality.
Diagnostic samples	refers to any human or animal material including, but not limited to, excreta, blood and its components, tissue and tissue fluids collected for the purposes of diagnosis, but excluding live infected animals. Diagnostic samples resulting from medical practice and research are considered a negligible threat to the public health. Diagnostic samples obtained from patients with suspected infectious diseases may contain limited quantities of an infectious agent. There are very few agents which may be the source of an infection as a result of a transport mishap. If exposure to the sample due to transport mishap could result in an infection, the diagnostic sample will be packaged, labelled and transported as an infectious substance. Diagnostic samples collected during an investigation of an outbreak of a serious disease of unknown cause will be handled as infectious substances.
Hub	refers to a designated second level facility that receives samples from referring facilities (Spokes).
Illicit drug	refers to substances that either stimulate or inhibit the central nervous system. Examples includes cocaine, heroin and amphetamines. (https://www.sciencedirect.com)
Incidents	refers to an event or occurrence involving infectious material, infected animals, or toxins, including a spill, exposure, release of infectious material or toxins, personnel injury or illness, missing infectious material or toxins, fire, explosion, flood, or other crisis situations.
Infectious substances	refers to a substance containing a viable microorganism, such as a bacterium, virus, rickettsia, parasite or fungus that is known or reasonably believed to cause disease in humans or animals. With respect to packaging and transport situations, infectious substances include: a) all cultures containing or suspected of containing an agent which may cause infection; b) human or animal samples that contain such an agent in quantities sufficient to cause infection, if an exposure to them occur due to a transport mishap; c) sample(s) from a patient with a serious disease of unknown cause; d) other samples not included above and designated as infectious by a qualified person, e.g. a physician, scientist, nurse, etc.

Network	refers to Laboratory set of connections which indicate the flow of all referring Health Facilities with all their respective referral Laboratories for sample testing and results delivery system.
Pathogens	refers to micro-organisms (including bacteria, viruses, rickettsia, parasites, fungi) and other agents such as prions which can cause disease in humans or animals.
Private Courier	refers to non-governmental agency providing courier services at an agreed cost from one point to another or vice versa.
QR Code	Refers to the trademark for a type of matrix barcode (or two-dimensional barcode) first designed in 1994 for the automotive industry in Japan.
Referral (Receiving) Laboratory	refers to a Laboratory that received sample for examination or further investigation through the integrated Laboratory tiered structures healthcare delivery system.
Referring Laboratory	refers to a health facility that sends sample for laboratory testing or further investigation purpose to other health facility based on the available healthcare delivery tiered system.
Rejection Criteria	refers to a set of requirements or preconditions standard (principle) to determine qualified samples during the time of accepting procedure to achieve quality result in laboratory testing process.
Sample	refers to human or animal materials, collected directly from humans or animals, including, but not limited to, excreta, secretions, blood and its components, tissue and tissue fluid swabs, sputum, urine, blood, surgical drain fluid and body parts being transported for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.
Spoke	refers to the first level facility which collects and refers samples to the Hub/testing laboratory.
Testing Laboratory	refers to laboratory that received sample for examination or further investigation through the integrated laboratory tiered structures healthcare delivery system.
TPC	refers to the holder of the national mandate to provide courier services to and from collection site to testing laboratory and/or internationally.
Transit time	refers to planned time for transporting samples from sample collection sites to receipt at the testing laboratory
Triple Package	refers to transporting diagnostic samples and biological agents based on National/International accepted regulation system in tri part sample container mechanism by once; that includes three distinct layers of protection primary receptacles, secondary packaging and outer packaging.
Turn Around Time	refers to Time taken from sample receipt in the testing laboratory to results delivery to the requester.

CHAPTER ONE

1. Introduction

Laboratory is a critical infrastructure for early detection, response and reporting of disease, and is most effective when organized into an integrated, multi-level network, enabling timely access to appropriate diagnostic tools at each level. The laboratory network levels facilitate diagnostic testing to identify or confirm the etiological agent(s) causing disease. Within the laboratory network, a formal structure for the referral and transport of diagnostic samples can minimize transfer steps and facilitate rapid diagnosis and laboratory confirmation, thus reducing the time for reporting of new cases, or an emerging outbreak or support in routine laboratory investigations with infrastructure, equipment, reagent stock-outs and human capacity challenges, as well as improving safe and secure sample management.

The MOHCDGEC identified creation of a holistic (safe, secure and timely) national sample referral system as a priority for improved detection and confirmation of priority diseases in line with national Integrated Disease Surveillance and Response Guidelines and the One-Health Concept for Global Health Security Agenda (GHSA).

In line with the above, the MOHCDGEC developed this procedure manual for comprehensive sample referral to be used for transportation of infectious substances and diagnostic samples both nationally and internationally. It provides information for identifying and classifying the material to be transported and for its safe packaging and transport. The guidelines stress the importance of developing a working relationship between the groups that involve the sender, the carrier and the receiver in order to provide the safe and expeditious transport of this material.

Tanzania Posts Corporation (TPC), airlines and other transport industry personnel are concerned about the possibility of their becoming infected as the result of exposure to infectious microorganisms that may escape from broken and/or leaking shipment. The packaging of infectious materials for transport will therefore address these concerns and be designed to minimize the potential for damage during transport. In addition, the packaging will serve to ensure the integrity of the materials and timely processing of samples.

The national and international regulations for the transport of infectious materials by any mode of transport are based upon the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods. The Universal Postal Union (UPU) reflects these recommendations in its regulations, particularly for packaging. The International Civil Aviation Organization (ICAO) and the International

Air Transport Association (IATA) have also incorporated the UN Recommendations in their respective regulations, as have other international transport organizations. This Procedure Manual provides practical guidance to facilitate compliance with national and international regulations.

1.1 Hierarchy of sample referral system

The hierarchy of sample referral system is the different level of facilities in which referral of samples and results will be applied. In this hierarchy, sample movement mechanism will be from bottom to top but for Proficiency Testing (PT)/External Quality Assessment (EQA) and result feedback will be top to bottom (vertical) while for horizontal movement of samples/results will be from one facility to another of the same level (**CHART 1** refers).

In Tanzania, transportation services for public goods including biological samples for diagnostic purposes is mandated to TPC, who will ensure shipment of biological samples transported reach their intended destinations to the testing laboratories within the specified and agreed TAT.

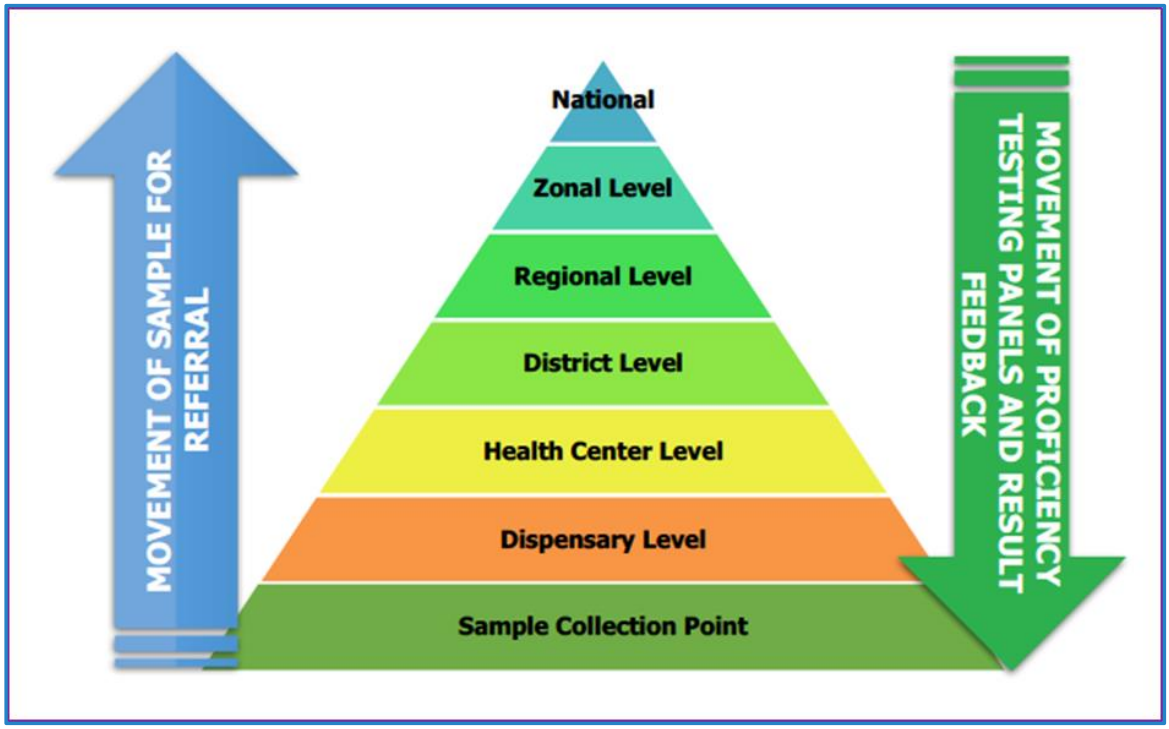


CHART 1: HIERARCHY OF SAMPLE REFERRAL LEVELS IN TANZANIA

Source: MOHCDGEC 2020

1.2 Purpose of this procedure manual

This procedure manual for comprehensive SRS is aims at:

a) Standardising the national sample referral system for public health emergency and clinical services management to improve accessibility of diagnostic testing services by the community;
b) Defining the laboratory network structure and its functions for sample referral system;
c) Defining roles and responsibilities of all parties involved in the implementation of the sample referral system;
d) Facilitating communication among stakeholders in the network.

1.3 Target audience

The users of this procedure manual include:

Policy makers, health managers and administrators, healthcare providers and trainers, programmers, Regional Health Management Teams and Council Health Management Teams, individuals and international organizations engaged in healthcare service provision in the country.

Others are: Development and Regionalised Implementing Partners (**ANNEX 13** refers), public and private health institutions, training institutions, public couriers and professionals in the public health and clinical laboratory medicine.

1.4 Scope

This procedure manual specifies the requirements for quality and competence in different operations and functions of the SRS in Tanzania. Personnel involved with SRS will familiarize themselves with the quality requirements detailed in this document.

1.5 Quality assurance

Quality assurance measures will be implemented to ensure the proper collection, storage, packaging, transportation and delivery to laboratory testing including Proficiency Testing (PT)/External Quality Assessment (EQA) panels and the timely provision of results and feedback in a safe manner.

1.6 Rationale for using hub and spoke

Spoke refers to the facility where sample is collected, packaged and labelled before the courier collects the package for transportation to the hub. A hub is the facility that receives samples from spokes, prepares and temporarily stores them for shipment to the testing laboratories. The hub also receives results from testing laboratories and distributes to the spokes.

Hub and spoke is a system is a reliable and efficient for sample transportation and maintaining sample integrity. It ensures that while more rural health facilities may not have the capacity to analyse samples on site, samples are referred to higher-level facilities with results returned via electronic system (e-system) in a timely manner. However, at present, SRS is built around Dry Blood Spot (DBS) and plasma samples being referred to testing laboratories for HIV early infant diagnosis (HEID), HIV Viral Load (HVL) and Tuberculosis (TB) tests. Currently, there are 336 functional hubs in all the regions of Mainland Tanzania by 2019 (**Table 24** refers) and there were 7,329 spokes by 2018.

Integrating health services is important in making service delivery more efficient for the health system and more accessible for clients, as well as for improving individual and family/community outcomes. Integration of clinical services has centred on facilitating and promoting access to a comprehensive package of services, rather than waiting for clients to seek out the individual services on their own.

Among the challenges contributing to the delay or lack of appropriate timely clients' management and response to outbreaks and other routine diseases, has been contributed by: limited laboratory capacity networks, routine tests not available in the facility test menu, identification and confirmation of suspected case, verification studies, reagents out-of-stock, equipment downtime, backlog clearance, forensic and medical-legal cases, illicit drug testing, quality assurance, EQA/PT, culture and susceptibility testing, histopathological, Transfusion Transmissible Infections (TTIs) and Blood Grouping Serology (BGS) and TB testing.

An effective sample referral networks with appropriate guidelines will lead into timely diagnosis, enabling appropriate clinical management, and supporting public health intervention. Effective sample referral networks will be achieved through timely referring of the samples and results feedback, maintaining sample integrity, tracking of the samples and bio-risk management (bio-safety and bio-security) due to limited laboratory capacity networks.

During needs assessment conducted by MOHCDGEC in collaboration with Health Link Initiative (HLI) in Arusha and Kilimanjaro regions (Needs Assessment for Sample

Referral System Report, Arusha And Kilimanjaro Regions, 27th-31st March, 2017), it was recommended that hub and spoke system be streamlined to include samples for routine surveillance and outbreak investigations. This system has facilitated access to virological diagnosis of HIV, reduced TAT and early dissemination of results.

Experiences from countries in the region have shown that establishment of laboratory referral networks using hub and spoke system, standard guidelines and diagnostic network optimization enhances the efficiency and effectiveness of laboratories in support of client management and surveillance for priority diseases.

Laboratory SRS involve the transportation of a biological sample(s) from one facility to another with laboratory diagnostic capacity for investigative purposes and results feedback. The organizational structure of national laboratory sample referral system should follow the hub and spoke model (**FIGURE 1** refers). By applying the SMART approach (**s**afety is paramount and first priority, **m**eticulous in approach, **a**ccurate diagnosis, **r**eliable results and **t**echnologically appropriate and approved methods) in SRS coordination of projects and programmes that need to refer samples to testing laboratories in-country will benefit from this integrated SRS.

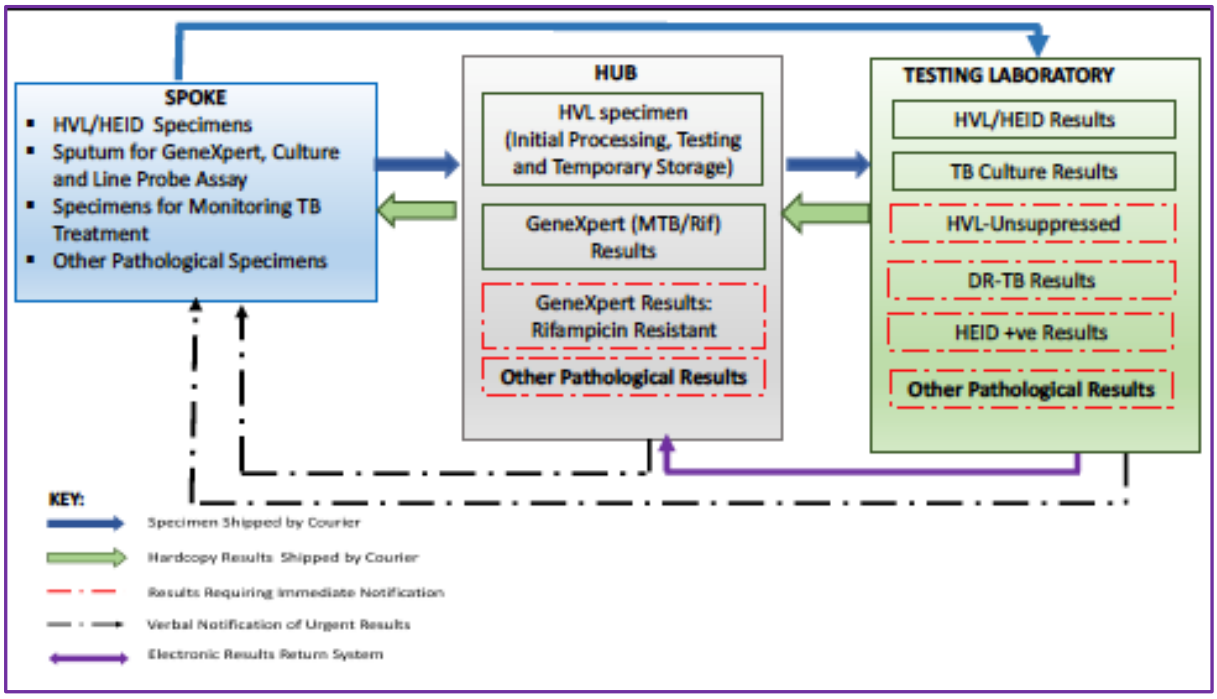


FIGURE 1: SPOKES AND HUBS SAMPLE REFERRAL AND RESULTS FEEDBACK SYSTEM

Source: MoHCDGEC: National Guideline for Laboratory Sample Referral and Results Feedback System, November 2019

CHAPTER TWO

2. Coordination of Sample Referral System

For an effective and timely implementation of the Procedure Manual for Comprehensive Sample Referral System at each level, the key areas which need to be coordinated and integrated include:

2.1 Leadership and governance

The SRS network generates information useful for disease diagnosis and prevention and will be used in decision making related to public health diseases in the country. This also promotes a strong linkage and collaboration among testing laboratories in the system. A functional referral laboratory network should have an established communication channel that is efficient, facilitates the exchange of information and specifies ways in which each member communicates with other members at all levels. The network should have robust mechanisms for sample package, transport (tracking), receiving and a results delivery system.

The MOHCDGEC will take the overall leadership and governance in the SRS network with support from stakeholders and implementing partners. The following are minimum areas to be covered in leadership and governance:

a) Ensuring strategic policy frameworks exist and are combined with effective oversight, coalition building, regulation, attention to system-design and accountability;
b) Delivery of SRS and results feedback using the hubs and spokes system services on implementation of SRS accountability arrangements at all levels;
c) Enabling universal access to testing for everyone receiving clinical management;
d) Placement strategies for introducing and disseminating the new technologies nationwide;
e) Ensuring availability of resources for implementation of SRS functions.

2.2 Funding mechanism

The funding of sample referral activities shall come from internal and external sources such as the central and local government authorities, government organizations and agencies, development and implementing partners.

2.2.1 Internal funding sources

After sensitization of stakeholders on the importance of the sample transportation system, the internal sources will be used to support SRS implementation during start and for the sustainable system. The government will determine the budget line for SRS by implementing a sustainable system of funding, through the health facilities plans and budgeting which will be developed annually. Health facilities should allocate funds for sample referral systems (SRS) from their own sources of funds

2.2.2 External funding sources

In the beginning of the SRS, funds will be sourced by MOHCDGEC from development partners such as CDC/PEPFAR, CHAI, Abbott Fund Tanzania, World Bank and Global Fund, Implementing Partners (**ANNEX 13** refers), and programmes involved in health for different activities (HVL/HEID, National Tuberculosis and Leprosy Programme (NTLP), National Malaria Control Programme (NMCP), National Blood Transfusion Service (NBTS) and High risk diseases)).

CHAPTER THREE

3. Roles and responsibilities

To enable smooth implementation of SRS procedure manual at different levels there are some roles and responsibilities assigned to each level as follows:

3.1 MoHCDGEC

a) Revise, update and monitor implementation of the Procedure Manual for Comprehensive Sample Referral System that will support:

   i. Generate demand for sample testing;
   ii. Enable systems and environment for sample testing;
   iii. Integrate all sample referral and results feedback into the hubs and spokes system; and
   iv. Sample transportation management coordination from lower to upper levels.

b) Lead the response and align plans for implementing SRS with National Health Laboratory Strategic Plan;
c) Collect issues related to SRS, present and discuss them in laboratory technical working groups; and
d) Implement SRS activities in regional referral, zonal referral, specialized and national hospitals.

3.2 PO-RALG

a) Implement SRS activities in dispensaries, health centres and district hospitals;
b) Ensure availability of trained and qualified human resource for SRS function; and
c) Secure local funding support by allocating budget line in their respective Council Comprehensive Health Plans for sustainability of the SRS functions.

3.3 National Sample Referral Coordinator

a) Serve as a technical lead for the implementation and administration of the National Integrated Sample Referral Network (NISRN) policies, objectives and goals.
b) Coordinate Sample referral task force in carrying out the following functions:
   i. Provide policy guidance and related support;
   ii. Review and update the national laboratory sample referral mapping;

iii. Coordinate training and scale-up best practices for optimizing the sample referral system;
iv. Enforce optimal utilisation of the sample referral and results feedback systems;
v. Mobilize resources.

c) Work with the Regional Laboratory Technologists to plan, implement and monitor sample referral operations at national and subnational levels;
d) Monitor the quality standards of samples in the referral system, such as establishing and overseeing TAT and conducting regular review to the sample referral system;
e) Ensure implementation of electronic sample referral system for managing sample referral data;
f) Perform quarterly monitoring and evaluation of the system;
g) Forecast and quantify the national commodity requirements for sample and results transfer;
h) Coordinate national implementing partner activities in support of sample referral networks;
i) Be the link with TPC SRS focal person on issues of SRS and general coordination;
j) Work with RLTs to ensure samples are collected from all designated health facilities/ hub sites and transported to the Testing laboratory;
k) Ensure SOPs, SRS manuals, guidelines and forms are available and are appropriately utilized at health facilities, sample processing and storage hub, referral and testing laboratories;
l) .

3.4 Tanzania Posts Corporation

a) Transport samples from collection point to testing laboratories and deliver results feedback in timely manner; and
b) Ensure integrity, safety, security, confidentiality and traceability of samples throughout transportation chain and results feedback.

3.5 Implementing Partner

a) Ensure smooth operation of sample referral systems by supporting availability of supplies, commodities, personnel and infrastructure related to sample referral and results feedback in the respective regions (see **ANNEX 13** refers);
b) Facilitate monitoring and evaluation of the sample referral system to identify gaps and recommend remedial measures and best practices;
c) Provide financial and technical assistance to the government to support smooth operations of sample referral system.

NOTE 1: Regionalised Implementing Partners allocation is not permanent, therefore, changes may occur from time-to-time.

3.6 Regional Surveillance Focal Person

a) Coordinate all activities related to surveillance sample referral system in the region;
b) Work with focal person at the district level for all activities related to surveillance sample referral.

3.7 Regional Laboratory Technologist

Coordinate all activities related to sample referral system in the region; and work closely with District Laboratory Technologists to resolve any sample referral issues to ensure the system works effectively.

3.8 District Laboratory Technologist

Coordinate all activities related to sample referral system in the district or council and health facility in charges to resolve any sample referral issues to ensure the system works effectively.

3.9 Focal Person at Testing Laboratory

Focal person at testing laboratory coordinate all issues related to sample testing and return of results feedback to hubs and/or spokes (where applicable such as critical results) within established TAT.

3.10 Focal Person at Hub

Focal person at a hub coordinate all issues related to receiving and storing samples from spokes and transporting to the testing laboratories and results feedback cascade from the laboratory to hub and finally to the spoke.

3.11 Focal Person at Spoke

Focal person at the spokes coordinate all issues related to collection, packaging and storage of samples at facility, and its transportation to the hub, as well as results feedback from the hub to the facility.

3.12 Co-opted Health Workers

a) Regional Reproductive and Child Health Coordinator (RRCHCO);

b) District TB and Leprosy Coordinator (DTLC);
c) District Reproductive and Child Health Coordinator (DRCHCO);
d) Community health worker (CHW).

This group will coordinate all activities related to sample referral system in the specific sample category.

CHAPTER FOUR

4. Sample management

Sample management encompasses collection, labelling, packaging, transportation and storage. Proper sample management is critical to the accuracy and reliability of testing, therefore confidence in laboratory diagnostics and thus translating into better patient outcomes. This refers to all activities done in all phases; Pre-examination, Examination and Post-examination to ensure that the sample maintains its quality/consistence as it was in the body of the client before collection to produce final significant results for client management.

4.1 Sample collection and preparation for referral

Biological samples from human like blood, urine, sputum, cerebral spinal fluid, tissue, biopsy, post-mortem materials, bacteriology swabs (throat, cervical, rectal, nasal, urogenital etc.), isolates of organisms (parasite, virus, bacteria and fungi) and many others biological materials are collected and referred for variety reasons including patient management, monitoring and care, clinical and epidemiological research studies, surveillance purposes, forensic pathology, medico-legal and investigation of epidemic outbreaks.

At all times observe and follow safety precautions related to sample collection, preparation, storage and transportation. The matrices in **Tables 1-19** below provide procedural guidance for the different types of samples for referral.

NOTE 2: Staff involved in handling of biological materials must receive sample management training and be covered by appropriate vaccinations.

NOTE 3: Review and update Transit time and TAT on definition and terms

4.1.1 Blood

Blood tests are used to determine physiological and biochemical states, pathological conditions, mineral content, drug effectiveness, and organ function. Most blood-based tests are ordered and performed for the purposes of haematological, clinical chemistry, microbiological, immunology and serology, blood banking, coagulation and genetic determinations. Blood components and products will be stored and transported within the specified temperature as indicated in the **table 1** refers.

TABLE 1: BLOOD SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Whole blood/ Capillary blood	Blood film for haemoparasite, blood morphology differential count and Point of care	3 slides	Transport at ambient temperature (18 to 28°C) free from dust and moisture by using slide box	Microscope Slide	Health Centre, District, Regional, Zonal and National	5 days	Haemoparasite <2 days Morphology and differential <2 days	Laboratory results should be reported electronically through e-SRS	Film can be prepared whenever requested Hard copy of results and feedback will be delivered by courier.
					Research and accredited laboratories	5 days	TAT is based on the protocol in use		
Whole blood/Venous blood	Blood film for haemoparasite, blood morphology, differential count, Point of care	2 to 5 mL for adults and children 1 to 2 mL for infants and neonates	Transport at ambient temperature (18 to 28°C) for CD4 up to 48 hrs.	K2/K3 EDTA tube (purple top)	District, Regional, Zonal and National Research Laboratories	5 days	2 days	Laboratory results should be reported electronically through e-SRS	For CBC film can be prepared whenever requested, if abnormality detected

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	HbA1C chemistry analysis	2 to 5 mL for adults and children	**CBC:** Transport at ambient temperature (18 to 28ºC) up to 8 hrs, if delayed more than 8 hrs, 2 to 8ºC up to 24 hrs	K2/K3 EDTA tube (Purple top)	District, Regional, Zonal and National	5 days	2 day	Laboratory results should be reported electronicall y through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Bacteriology	For bacteriology culture 10 to 20 mL for adult & 2 to 5 mL for children **NOTE 4:** blood to broth ratio is 1:5	Transport at ambient temperature (18 to 28ºC) Store the blood in the incubator at 35 to 37ºC if possible, or transport at ambient temperature (18 to 28ºC)	Blood culture Broth medium for bacteriology	District, Regional, Zonal and National	1 day	7 days	Laboratory results should be reported electronicall y through e-SRS	Before antibiotic administrati on, 2-3 cultures per septic episodes Hard copy of results and feedback will be delivered by courier.
	TB culture				District, Regional, Zonal and National	5 days	41 days	Laboratory results should be reported electronicall y through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Virology	For viral culture 10 to 20 mL for	Transport at ambient temperature, (18	Viral Transport	Zonal, Research and	5 days	14 days	Laboratory results should be	Before antiviral administrati

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
		adult & 2 to 5 mL for children **NOTE 5**: blood to broth ratio is 1:5	to 28°C) within 6 hrs and at 2 to 8°C up to 5 days' culture	Medium (VTM)	National Laboratory			reported electronicall y through e-SRS	on, 2 to 3 cultures per septic episodes
Dried blood spot (DBS)	HIV Early Infant Diagnosis (HEID)	3 to 5 fully saturated circles of DBS card	Transport at ambient temperature (18 to 28°C) for up to 2 weeks, if not tested freeze at (-70°C or above)	DBS Card	Health centre, District, Regional, Zonal, National	7 days	7 days	Laboratory results should be reported electronicall y through e-SRS	Call the client immediatel y for positive results TAT for research samples will be determined by specific protocol DBS should be kept in dust-free area Hard copy of results and feedback will be
	DBS for HIV drug resistance testing/sequenc ing	3 to 5 fully saturated circles of DBS card	Transport at ambient temperature, (18 to 28°C) within 6 hrs and at 2 to 8°C up to 5 days' culture	DBS Card	Zonal, National	5 days	5 days		
	HIV Viral Load (HVL)		Transport at ambient temperature (18 to 28°C) for up to 2 weeks, if not tested freeze at (-70°C or above)	DBS Card	Health centre, District, Regional, Zonal, National	7 days	7 days		

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									delivered by courier.
Serum	Chemistry: Renal markers, Hormone profile and others PSA Liver Markers Lipid profile (LDL, VLDL, HDL, TG) Endotoxin, Biochemistry test and Electrophoretic profile	2 to 5 mL	Transport at 2 to 8°C for 10 days, below -20°C if delayed for more than 10 days.	Serum separator tube (SST) Screw capped cryogenic tube or plain tube	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronicall y through e-SRS	Second serum sample for polio should be collected after 2 weeks or after one-month depending on phase of the disease
	Serology and Immunology TORCH.	2 to 5 mL	Transport at 2 to 8°C for 10 days, below -20°C if delayed for more than 10 days.	Serum separator tube (SST) Screw capped	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronicall	Hard copy of results and feedback will be

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Serological, acute phase viral detection, Allergens profile			cryogenic tube or plain tube				y through e-SRS	delivered by courier.
	Blood banking (HIV, HBV, HCV and Syphilis)	5 to 9 mL	Transport at 2 to 8°C and -20°C for longer storage	Serum separator tube (SST) Screw capped cryogenic tube or Plain tube	NBTS zones	2 days	3 days	Laboratory results should be reported electronicall y through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Blood grouping, Antibody screening and titration	5 mL	Transport at 2 to 8°C and -20°C for longer storage	EDTA tube Screw capped cryogenic tube or plain tube	NBTS zones	2 days	3 days	Laboratory results should be reported electronicall y through e-SRS	Hard copy of results and feedback will be delivered by courier.
Serum	Aflatoxin poisoning investigation	2 to 5 mL	Freeze at -20°C until transportation to reference laboratory	Sterile 2 mL propylene screw capped cryogenic tube	National	2 days	3 days	Laboratory results should be reported electronicall y through e-SRS	Hard copy of results and feedback will be delivered by courier.
Plasma	HIV Viral Load, clinical chemistry, coagulation	2 to 5 mL	Transport at ambient temperature (18 to 28°C), up to 24	Screw capped cryogenic tube, blue	District, Regional, Zonal, National	7 days	7 days	Laboratory results should be reported	For viral load until transport store at

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	tests and serology		hrs and 2 to 8°C for 5 days	top vacuum tubes				electronically through e-SRS	frozen at 20°C or lower Hard copy of results and feedback will be delivered by courier.
	Lipid profile (LDL, VLDL, HDL, TG)	2 to 5 ml	Transport at ambient temperature (18 to 28°C), up to 24 hrs and 2 to 8°C for 5 days	Plasma preparation tube	Health centres, District, Regional, Zonal, National	2 days	3 days		
	Cancer markers	2 to 5 mL	Transport at ambient temperature (18 to 28°C) up to 24 hrs and 2 to 8°C for 5 days	Sterile 2 mL propylene screw capped cryogenic tube PPT tube	Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.

4.1.2 Stool

Stool sample for examination, is collected in a clean container and then sent to the laboratory. Laboratory examination includes microscopic examination, chemical tests and microbiological tests. The stool sample can be referred for epidemic prone disease and other clinical laboratory investigations **table 2** refers.

TABLE 2: STOOL SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Stool/ rectal swab	Bacteriology	5 to 10 gm of fresh stool Sterile swabs	Transport in alkaline peptone water media, Cary-Blair Medium, if transport is delayed refrigerate samples at 2 to 8°C.	Cary-Blair Transport Medium Sterile container Alkaline peptone water	Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS. For outbreak and notifiable disease, test results will be reported according protocol	Use sterile container for *B. anthrax* isolation. Collect sample before antibiotic administration Hard copy of results and feedback will be delivered by courier.
	Parasitology	5 to 10 gm of fresh stool	Transport at ambient temperature, (18 to 28°C) with appropriate preservative	Leak proof clean plastic container	District, Regional, Zonal, National	2 days	1 day	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for appropriate preservative
	Virology - Enteroviruses/Surveillance/outbreak (culture)	A minimum of 10 gm fresh stool	Transport at 2 to 8°C and store at -20°C whenever needed	Sterile plastic container VTM	Regional, Zonal, National	2 days	14 days	Laboratory results should be reported	For measles within 48 to 72 hours and 2 to 6 weeks for

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Virology-Enteroviruses/Surveillance/outbreak (Molecular laboratory tests)	A minimum of 10 gm fresh stool	Transport at 2 to 8°C and store at -20°C whenever needed	Sterile plastic container VTM	Regional, Zonal, National	2 days	5 days	electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according protocol	polio after onset of illness; for SARS If delayed it can be collected as late as one month. Always use PPE when handling patient with suspected high-risk infections. Hard copy of results and feedback will be delivered by courier.
	MTB Xpert, MTB RIF	At least 5 gm fresh stool	Transport at 2 to 8°C	Sterile plastic container	Health centres, District, Regional, Zonal, National	2 days	2 days	Laboratory results should be reported electronically through e-SRS	Always use PPE when handling patient with suspected

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Solid TB Culture and DST	At least 5 gm fresh stool	Transport at 2 to 8°C	Sterile plastic container	Zonal, National	2 days	10 weeks		high-risk infections. Hard copy of results and feedback will be delivered by courier.
	Liquid TB culture and DST	At least 5 gm fresh stool	Transport at 2 to 8°C	Sterile plastic container	Zonal, National	2 days	14 days		

4.1.3 Urine

A complete urinalysis includes macroscopic, chemical, microbiology and microscopic examinations. These are routine examination of the urine for cells, tiny structures, microbial infection and chemicals that suggest various illnesses **Table 3** refers. Since urine is prone to contamination from urethral and vaginal commensals and urine by itself is a growth medium for microorganisms, the collection and transportation should strictly follow the SOP.

TABLE 3: URINE SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Urine	Solid TB culture and DST	50 mL for 3 consecutive days	Transport at 2 to 8°C	Sterile tube of 50 mL	Zonal TB culture reference laboratories	2 days	10 Weeks (For TB culture)	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for urine collection

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
							4 weeks (For DST)		Hard copy of results and feedback will be delivered by courier.
	TB molecular laboratory tests	50 mL for 3 consecutive days	Transport at 2 to 8°C	Sterile tube of 50 mL	Zonal TB culture reference laboratories	2 days	5 days	Laboratory results should be reported electronically through e-SRS	
	Bacteriological culture and AST	>15 mL MSU	Transport at 2 to 8°C	Sterile wide mouth container	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for urine collection Hard copy of results and feedback will be delivered by courier.
	24 hrs urine bio-chemical examination.	All 24 hrs urine starting on a specified time	Transport as soon as possible to the testing laboratory avoiding direct sunlight	>2 litre capacity brown bottle with preservative	District, Regional, Zonal, National	2 days	2 days	Laboratory results should be reported electronically through e-SRS	Urine is a good liquid culture medium, always add preservative Hard copy of results and

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									feedback will be delivered by courier.
	Viral isolation	10 to 50 mL	Transport sediment in VTM within 48 hrs	VTM	Zonal, National	2 days	14 days	For outbreak and notifiable diseases, test results will be reported according protocol	First void morning sample in a sterile container Follow sample collection manual for further guidance.

4.1.4 Urogenital tract sample

Urogenital comprises anatomical sites of genital tract and part of urinary tracts **Table 4** refers. Most of the urogenital areas are colonized by normal flora hence accurate diagnosis of genital infections depends on the differentiation of pathogens from normal flora. Recovery of specific pathogenic organisms depends on culture of the proper sample, with special care taken to exclude normal flora.

NOTE 6: Urogenital sample transportation needs special precautions because it may contain very fragile and fastidious pathogens such as *N. gonorrhoea*.

TABLE 4: UROGENITAL TRACT SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Cervical or endocervical	Isolation of urogenital pathogens and DST Like *N. gonorrhoea, Chlamydia* Species	2 Swabs Microscope slide	Transport at ambient temperature (18 to 28°C) and appropriate transport media	Amies Transport Medium with activated charcoal, Microscope slide box	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Transport dried smear by slide box. Do not refrigerate if *N. gonorrhoea* is suspected. Hard copy of results and feedback will be delivered by courier.
Other Genital tract samples: swabs from high vaginal, fallopian tube, Bartholin gland and others	To isolate urogenital pathogens like fungus, bacteria and viruses plus DST	2 Swabs/ 1 to 2 mL aspirates	Transport in appropriate transport media at ambient temperature (18-28°C) within 48 hrs	Amies Transport Medium with activated charcoal	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	If chlamydia and herpes species are suspected, store at 2 to 8°C for less than 48 hrs. and at -70°C or less; if delay of more than 48 hrs is anticipated.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									Hard copy of results and feedback will be delivered by courier.
Male urethral swabs	Diagnose; *N. gonorrhoea*, and *Chlamydia* species and DST	2 Swabs	Transport at ambient temperature (18 to 28ºC) in appropriate transport medium within 24 hrs	Amies Transport Medium with activated charcoal	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier **NOTE 7:** It is recommended to perform bed side inoculation if *N. gonorrhoeae* is suspected

4.1.5 Respiratory tract sample

Respiratory infection is common in both hospital and community settings, sample is collected from both upper and lower respiratory tracts. Upper respiratory tract region is colonized by normal bacterial flora. Collection and transportation of respiratory tract sample aims at isolation of the pathogen microorganisms; hence, transportation and handling of sputum sample vary according to the pathogen to be detected. Respiratory tract samples include; sputum, saliva, swabs, aspirates and lavages **Table 5** refers.

TABLE 5: RESPIRATORY TRACT SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Sputum	Bacterial, fungal culture	3 to 5 mL	Transport at 2 to 8°C	In sterile container, any time after onset of illness and before starting antibiotic	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Delay of >72 hrs compromise the ability to isolate fastidious organisms. Hard copy of results and feedback will be delivered by courier.
	Mycobacterium (TB culture and DST)	2 to 5 mL	Transport at ambient temperature	Sterile container	Zonal, National	4 days	10 weeks	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	AFB microscopy	3 to 5 mL	Transport at ambient temperature (18 to 28°C)	Sterile container	Health Centre District, Regional, Zonal, National level	4 days	3 days	Laboratory results should be reported electronically through e-SRS	For diagnostic purpose Spot-spot (2 different sample) Hard copy of results and feedback

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									will be delivered by courier.
	GeneXpert MTB/Rif	2 mL	Transport at ambient temperature (18 to 28°C) within 7 days	Sterile tubes	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronically through e-SRS	Spot samples. Refer to NTLP Manual Hard copy of results and feedback will be delivered by courier.
	LPA	2 to 5 mL	Transport at ambient temperature (18 to 28°C)	Sterile tubes	District, Regional, Zonal, National level	2 days	5 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according protocol	Spot samples. Hard copy of results and feedback will be delivered by courier.
	Molecular laboratory tests for nCOVID-19	2 to 5 mL	Transport at ambient temperature (18 to 28°C) within 5 days	Sterile tubes	National level	1 day	5 days		
Saliva	Diagnosis for viral Outbreak	2 to 5 mL	Transport in VTM at 2 to 8°C within 24 hrs	VTM	Zonal, National	1 day	48 hrs	For outbreak and notifiable disease, test	Collect acute 2 to 3 days

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
								results will be reported according to protocol.	after disease onset
Bronchial alveolar wash / secretion	Mycobacterium (TB) culture and DST	2 to 5 mL	Transport at 2 to 8°C	Sterile container	Zonal and National	2 days	10 weeks	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Viral detection (SARS, MERS, nCOVID-19 and others)	0.5 mL	Transport at 2 to 8°C within 24 hrs	VTM	Zonal, National	1 day	5 days	For outbreak and notifiable disease, test results will be reported according protocol.	Hard copy of results and feedback will be delivered by courier.
Nasopharyngeal (aspirate, lavages and swab)	Bacteriology and DST	2 Swabs/not less than 1 mL	Transport at 2 to 8°C	Sterile container Stuart's Transport Medium	Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Use transport media based on the suspected pathogens Hard copy of results and feedback will be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Viral isolation for outbreak and surveillance (culture)	2 Swabs/2-3 mL	Viral transport medium (VTM) at 2 to 8°C	VTM	Zonal, National	1 day	14 days	For outbreak and notifiable diseases, test results will be reported according protocol.	Collect during the onset of the disease; for HAI use balanced salt solution, bovine serum albumin and antibiotics. Follow sample collection manual for further guidance.
	Viral isolation-Molecular laboratory tests for	2 Swabs/2-3 mL	Viral transport medium (VTM) at 2 to 8°C	VTM	Zonal, National	1 day	5 days		
Throat swab	Bacterial isolation/identification	2 Swabs	Transport in transport medium within 24 hrs or at ambient temperature (18 to 28°C)	Amies Transport Medium or Stuarts Transport Medium	Regional Level, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	surveillance samples	2 Swabs	Transport in VTM at 2 to 8°C	VTM	Zonal, National	2 days	14 days	For outbreak and notifiable diseases, test results will be reported according to protocol.	Hard copy of results and feedback will
	Molecular tests for viral pathogens (e.g COVID-19)	2 Swabs	Transport in VTM at 2 to 8°C	VTM	Zonal, National	1 day	5 days		be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Gastric lavages	Mycobacterium (TB) isolation	At least 5 mL	Transport at 2 to 8°C within 24 hrs	Sterile tube	Zonal, National	2 days	10 weeks	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for further guidance. Hard copy of results and feedback will be delivered by courier.

4.1.6 Discharge, Scraping and Secretions

Discharges/secretions can be collected directly into avail or tube, or can be collected using swabs for any sort of bacteriological, fungal, parasitological **Table 6** refers. Discharges can be collected from un-ruptured vesicles using a sterile needle and syringe, and immediately transferred in to a securely sealed vial or tube. Samples for eye disease investigation can be obtained from conjunctiva, ocular scrapings, lacrimal fluids, corneal scraping sand other inner eye infections. Ear samples can be obtained from both outer and inner ear.

NOTE 8: Discharges for medico-legal investigations refer to **Table 16**.

TABLE 6: DISCHARGE, SCRAPING AND SECRETIONS SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Eye discharge Corneal scraping)	Bacterial and fungal isolation and DST	2 swabs scraping 1 to 2 mL aspirate, lacrimal fluids	Transport at ambient temperature (18 to 28°C) within 24 hrs	Amies Transport Medium without charcoal, Stuart's Transport Medium Sterile tube	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
Nose discharge	Bacterial isolation and DST	2 swabs	Transport at ambient temperature (18 to 28°C) within 24 hrs	Amies Transport Medium without charcoal, Stuart's Transport Medium	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
Ear discharge	Bacterial isolation and DST	2 swabs	Transport at ambient temperature (18 to 28°C) within 24 hrs	Amies Transport Medium without charcoal, Stuart's Transport Medium	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for further instruction Hard copy of results and feedback will be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Bacterial isolation and DST	2 swabs or not less than 1 mL aspirates	Transport at ambient temperature (18 to 28°C) within 24 hrs	Amies Transport Medium without charcoal, Stuart's Transport Medium	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.

4.1.7 Wounds and abscesses

Abscesses are accumulations of pus in the tissues and any organism isolated from them may be of significance. They occur in many parts of the body as superficial infections or as deep-seated infections associated with any internal organ. Aspirate or swabs from wound/abscess can be collected to laboratory for identification of pathogens. Samples should be packed transported within 24 hours' **Table 7** refers.

TABLE 7: WOUNDS AND ABSCESSES SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Pus/Aspirate	Bacterial isolation and DST Other molecular tests	2 swabs or aspirate	Transport at ambient temperature (18 to 28°C) within 24 hrs	Amies Transport Medium without charcoal or Stuart's Transport Medium	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for further instruction. Hard copy of results and

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
				Plain sterile test tube Anaerobic container					feedback will be delivered by courier.

4.1.8 Cerebrospinal fluid

A competent medical practitioner performs a lumbar puncture to collect Cerebrospinal fluid (CSF) for laboratory investigation to establish a diagnosis of infection (bacterial, fungal, viral or amoebic meningitis), malignancy, subarachnoid haemorrhage, multiple sclerosis, or demyelinating disorders. CSF has to be collected into three tubes, which do not contain any anticoagulant. The tubes are distributed to the appropriate laboratory according to their sequence of collection. The following description indicates the sample conditions and suitability of the sample for each test type **Table 8** refers.

NOTE 9:

a) First tube is for clinical chemistry examination;
b) Second tube is for microbiological testing;
c) Third tube is for cell counts.

TABLE 8: CEREBROSPINAL FLUID SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
CSF	Fungal, bacterial, viral	A minimum of 2 mL	Transport at ambient temperature (18	Sterile plain test tube	District, Regional,	2 days	5 days	Laboratory results should be reported	Do not refrigerate CSF for

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	and parasitic isolation		to 28°C) within 24 hrs; for viral at 4°C	Trans-isolate (TI) media	Zonal, National			electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	bacterial examination Do not reject CSF sample If only one tube of CSF is collected, it will be submitted to microbiology. Hard copy of results and feedback will be delivered by courier.
	Mycobacterium (TB) detection	3 mL	Transport at 2 to 8°C within 24 hrs	Sterile plain test tube	District, Regional, Zonal, National	2 days	10 weeks	Laboratory results should be reported electronically through e-SRS	10 weeks for culture and 24 hrs for AFB smear microscopy and other molecular tests. Hard copy of results and feedback will be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Serological tests	At least 1 mL	Transport at 2 to 8°C or ambient temperature (18 to 28°C)	Sterile plain tube	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	CSF sample without transport medium should be transported in less than 1 hr. If only one tube of CSF is collected, it will be submitted to microbiology. Hard copy of results and feedback will be delivered by courier.
	Cell count/differential count	At least 1 mL	Transport at ambient temperature (18 to 28°C)	Sterile plain tube	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Clinical chemistry	At least 1 mL	Transport at 2 to 8°C	Sterile plain tube	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.

4.1.9 Other body fluids

These fluids are collected from the pericardial, thoracic, or peritoneal cavity, or from joint spaces, by aspirating with a needle and syringe. Body fluid samples are collected for different laboratory tests including, microbiological, haematological and clinical chemistry **Table 9** refers.

When collecting these aspirates special care should be taken to avoid contaminating the sample with commensal organisms from the skin. A volume of 1 to 5 mL is adequate for isolating most bacteria, but 10 to 15 mL is optimal for recovery of mycobacteria and fungi, which are generally present in low numbers. Moreover, to diagnose peritonitis associated with chronic ambulatory peritoneal dialysis, collection of at least 50 mL of fluid may improve recovery of the responsible pathogen.

TABLE 9: OTHER BODY FLUIDS SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Peritoneal, pericardial, pleural fluids	Mycobacterium (TB) detection, identification and DST	10 mL	Transport at 2 to 8°C	Sterile tube	District, Regional, Zonal, National	2 days	10 weeks	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Bacterial and fungal isolation	10 to 15 mL	Transport at 2 to 8°C	Sterile container	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	Cell count and differential	3 to 5 mL	Transport at ambient temperature (18 to 28°C)	EDTA tube	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	Bio-chemical examination (Total protein, LDH, glucose and amylase)	0.5 to 1 mL	Transport at 2 to 8°C	Sterile plain test tube	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
Amniotic fluid	Bacteriological	1 to 10 mL	Transport at 2 to 8°C within 72 hrs in Anaerobic condition	Anaerobic transport medium	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
Synovial fluid	Bacterial and fungal isolation	Minimum of 1 mL	Transport at ambient temperature (18 to 28°C), 2 to 8°C within 24 hrs	Sterile container	District, Regional, Zonal, National	2 days	3 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	MTB	More than 10 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs	Sterile tube	Zonal, National	2 days	10 weeks	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.

NOTE 10: *For bacteriological examination sample can placed directly in to blood culture bottle.*

4.1.10 Tissue and biopsy

A biopsy is tissues taken from a living body for examination to discover the presence, course or extent of the disease. Biopsy is most often done to look for cancer and many other conditions **Table 10** refers.

TABLE 10: TISSUE AND BIOPSY SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Fine-needle aspiration (FNA)	For histopathological/cytological examination	3 slides, aspirate	Transport at ambient temperature (18 to 28°C) (both the slide and/or the fluids in a test tube as soon as possible)	Slide box and/or Clean container	Zonal, National	2 days	14 days	Laboratory results should be reported electronically through e-SRS	Never transport in a syringe and needle. Follow sample collection manual for further instruction Hard copy of results and feedback will be delivered by courier.
	Mycobacterium (TB)	In 0.9% saline solution	Transport at 2 to 8°C	Sterile tube	Zonal, National	2 days	14 days	Laboratory results should be reported electronically through e-SRS	Any time after onset of illness and before starting of anti-TB treatment Hard copy of results and feedback will be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Bone marrow biopsy (bone marrow aspiration)	Mycobacterium (TB)	0.5 to 2 mL; in 0.9% saline solution	Transport at 2 to 8°C	Sterile tube	Zonal, National	2 days	14 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
	For blood dis-orders	0.5 to 2 mL and slides	Transport at ambient temperature (18 to 28°C)	EDTA or Heparin tube Slide box	Zonal, National	2 days	14 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
Liver Biopsy	Viral isolation (e.g. YF)	0.5 gm	Transport at 2 to 8°C	Clean container	Zonal, National	2 days	21 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	Hard copy of results and feedback will be delivered by courier.
Skin vesicle for Anthrax	To detect and identify *B. anthracis*	Refer sample collection manual	Transport at ambient for immediately at or 2 to 8°C for >1 hr	Sterile container	Zonal, National	2 days	14 days	For outbreak and notifiable diseases, test results will be reported according to protocol.	Hard copy of results and feedback will be delivered by courier.

NOTE 11: If the sample cannot be recollected, discuss the issue with the physician. It may be possible to examine the sample with disclaimer indicating on the report the problem, it is important to indicate the name of the physician taking the responsibility of accepting the sample.

4.1.11 Dermatological sample

A skin lesion biopsy is a simple medical procedure in which a skin sample is removed and tested in a laboratory **Table 11** refers. The sample size is just large enough to test for various issues that could be the cause of a skin lesion.

TABLE 11: DERMATOLOGICAL SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Nail	Fungal examination	Nail clippings,	Transport at ambient temperature (18 to 28°C)	Sterile container Paper envelop	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for further instruction Hard copy of results and feedback will be delivered by courier.
Hair		15 infected hairs	Transport at ambient temperature (18 to 28°C)	Sterile container Paper envelop	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									further instruction Hard copy of results and feedback will be delivered by courier.
Skin		Adequate amount as per protocol	Transport at ambient temperature (18 to 28°C) within 24 hrs	Sterile container	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.

4.1.12 Bacterial isolate

Bacterial isolate can be referred to a high level for different reason like identification, microbial susceptibility test and quality check **Table 12** refers.

TABLE 12: BACTERIAL ISOLATE SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container/ Media	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Bacterial isolates	Other common Bacteria antimicrobial resistance confirmation Identification, Quality check	>5 pure colonies and Swabs	Transport at 2 to 8°C	Stuart's Transport Media	District, Regional, Zonal, National	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Follow sample collection manual for further instruction Hard copy of results and feedback will be delivered by courier.
	TB antimicrobial resistance confirmation	Pure isolates	Transport at 2 to 8°C	Glycerol or whole media with growth	Zonal, National	2 days	10 weeks		

4.1.13 Water sample for bacteriological examination

Bacteriological water testing is a method of analysing water sample to estimate and determine the numbers of disease-causing bacteria present in particular faecal coliforms, and assess its safety and suitability for human and animal consumption, domestic and recreation use **Table 13** refers.

TABLE 13: WATER SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Tap water	Bacteria identification	200 mL	Transport in an insulated box with ice packs	Sterile sampling bottles (glass or plastic)	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported	Hard copy of results and feedback will be

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
			immediately to testing laboratory	200 mL, screw caps with rubber seal				electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	delivered by courier.
Bottled water	Bacteria identification	200 mL	Transport in an insulated box with ice packs immediately to testing laboratory	Sterile sampling bottles (glass or plastic) 200 mL, screw caps with rubber seal	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Hard copy of results and feedback will be delivered by courier.
Surface water (River, Stream, Reservoir, Lake, Recreational pool)	For culture/identification/confirmation and anti-microbial resistance testing	200 mL	Transport in an insulated box with ice packs immediately to testing laboratory	Sterile sampling bottles (glass or plastic) 200 mL, screw caps with rubber seal	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	Hard copy of results and feedback will be delivered by courier.
Deep well	For culture/identific	200 mL	Transport in an insulated box with	Sterile sampling	District, Regional,	2 days	5 days	Laboratory results should	Hard copy of results and

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
	ation/confirmation and anti-microbial resistance testing		ice packs immediately to testing laboratory	bottles (glass or plastic) 200 mL, screw caps with rubber seal	Zonal, National			be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	feedback will be delivered by courier.
Shallow (Open) or Spring Well	For culture/identification/confirmation and antimicrobial resistance testing	200 mL	Transport in an insulated box with ice packs immediately to testing laboratory	Sterile sampling bottles (glass or plastic) 200 mL, screw caps with rubber seal	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	Hard copy of results and feedback will be delivered by courier.
	For chemical testing	200 mL	Transport in an insulated box with ice packs immediately to testing laboratory	Sterile sampling bottles (glass or plastic) 200 mL, screw caps with rubber seal	District, Regional, Zonal, National	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Chemical indicators commonly used to describe and assess water quality, include: temperature

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									and dissolved oxygen, pH, total dissolved solids, conductivity, and suspended sediment, nutrients. Hard copy of results and feedback will be delivered by courier.

4.1.14 Food sample for bacteriologic examination

Food sample is examined to determine bacterial organism causing food poisoning **Table 14** refers. Common organisms encountered in food poisoning are: *Staphylococcus aureus, Salmonella species, Clostridium perfringens and C. botulinum, Escherichia coli, Vibrio cholerae, Campylobacter jejuni*.

TABLE 14: FOOD SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Cooked, raw, and food remains	Bacteria identification	100 gm or 100 mL	Transport at 2 to 8°C within 24 hrs	Sterile plastic, leak-proof sealable bags Sterile sampling utensils (spatula, knife)	National, NPHL, TBS	2 days	5 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	Collect from various parts of the food put in separate sterile containers and label Hard copy of results and feedback will be delivered by courier.
Tinned or canned foods		Randomly collect several suspected unopened cans	Transport at 2 to 8°C within 24 hrs	Original sample container	District, Regional, Zonal, National, TBS, NPHL	2 days	5 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	Hard copy of results and feedback will be delivered by courier.

4.1.15 Post-mortem sample

Post-mortem sample is collected from the body of a deceased and maybe referred to determine the nature and cause of death, which occur in situations as unexplained death, poisoning, disaster, murder and research studies **Table 15** refers.

TABLE 15: POST-MORTEM SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Post-mortem tissues and body fluids	Medico-legal Forensic Pathology	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau Laboratory	2 days	21 days	Laboratory results should be reported electronically through e-SRS	Follow SOP for chain of custody Refer to SOP for reporting results of medico-legal investigation

4.1.16 Medico-legal sample

Medico-legal sample is analysed to provide fair justice for victim of assault, alleged sexual assault, non-accidental injury, food poisoning outbreak and/or paternity issues **Table 16** refers. For example, the culture for sexually transmitted microorganisms (e.g. *Neisseria gonorrhoeae*) from children below the age of consent or the presence of spermatozoa in urine or vaginal swab examination from a female under the age of consent may be evidence of sexual assault or abuse, or anal/rectal swab (both female and male) for culture and spermatozoa examination in a victim of sodomy.

TABLE 16: MEDICO-LEGAL SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Anal and vaginal discharge	Medico-legal and Forensic Pathology	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau Laboratory	2 days	14 days	Refer to SOP for reporting results of medico-legal investigation	Follow SOP for chain of custody Consult forensic experts
Blood	Medico-legal and Forensic Pathology Biological parenthood determination	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau Laboratory	2 days	14 days	Refer to SOP for reporting results of medico-legal investigation	Follow SOP for chain of custody Consult forensic experts
Other Genital tract samples: swabs from high vaginal, Bartholin gland and others	Medico-legal and Forensic Pathology	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau	2 days	14 days	Refer to SOP for reporting results of medico-legal investigation	Follow SOP for chain of custody Consult forensic experts

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
					Laboratory				
Dental bite marks	Medico-legal and Forensic Pathology	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau Laboratory	2 days	14 days	Refer to SOP for reporting results of medico-legal investigation	Follow SOP for chain of custody Consult forensic experts
Materials under nails	Medico-legal and Forensic Pathology	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau Laboratory	2 days	14 days	Refer to SOP for reporting results of medico-legal investigation	Follow SOP for chain of custody Consult forensic experts
Hair	Heavy metal poisoning such as Arsenic	Refer to SOP for collection of pathological samples	Refer to SOP for storage and transportation of pathological samples	Refer to SOP for sample container for pathological samples	National Laboratory, Government Chemist, Police Forensic Bureau	2 days	14 days	Refer to SOP for reporting results of medico-legal investigation	Follow SOP for chain of custody Consult forensic experts

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
					Laboratory				

NOTE 12: Chain of custody is key to fair justice

4.1.17 Proficiency Testing

This is a method that allows comparison of a laboratory's testing to a source outside the laboratory. This comparison can be made to the performance of a peer group of laboratories or to the performance of a reference laboratory system for objectively checking the laboratory's performance using an external agency or facility **Table 17** refers. Participation in a Proficiency Testing or External Quality Assessment programme provides valuable data and information which:

a) Allows comparison of performance and results among different test sites;
b) Provides early warning for systematic problems associated with kits or operations;
c) Provides objective evidence of testing quality;
d) Indicates areas that need improvement;
e) Identifies training needs.

For laboratories performing public health-related testing, assure that results from different laboratories during surveillance activities are comparable. Participation creates a network for communication, and can be a good tool for enhancing a national laboratory network.

TABLE 17: PROFICIENCY TESTING SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Blood	Parasite (Thick and thin films) Detection, Quantification and Species identification	2µl to 10µl	Transport at ambient temperature (18 to 28°C) within 24 hrs	Clean microscope glass slide, calibrated pipette (2µL to 10µL), slide mailer, slide box	National, Zonal, Regional, District, Health Centre	2 days	5 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
	TTI samples	1 to 2 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs	Cryogenic tube	National, Zonal	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
	Blood Grouping Serology	1 to 2 mL	Transport at ambient temperature (18	Cryogenic tube	National, Zonal, Regional,	2 days	7 days	Laboratory results should be reported	Participant's instruction, protocol and

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
			to 28°C) within 24 hrs		District, Health Centre			electronically through e-SRS	calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
	Haematological test	Slides, 1 to 2 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs	Slide box, EDTA tube	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
Serum/plasma	Clinical chemistry	2 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs	Cryogenic tube	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									transportation Hard copy of results and feedback will be delivered by courier.
	HVL	DTS	Transport at ambient temperature (18 to 28°C)	DTS	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
	Serology test; HIV, syphilis	DTS	Transport at ambient temperature (18 to 28°C) within 24 hrs	DTS, cryogenic tube	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									Hard copy of results and feedback will be delivered by courier.
Urine	Parasite identification	2 to 5 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs with appropriate preservative	Clean urine container with leak proof screw cap	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
	Clinical Chemistry	2 to 5 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs with appropriate preservative	Polyethylene tube	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
Bacteria Isolates (from urine, sputum, blood, swabs, stool, CSF, other body fluids)	Bacteria identification and AST GeneXpert	Swab, slides	Transport at ambient temperature (18 to 28°C) within 24 hrs	Stuart's transport medium, Amies transport medium, lyophilized vials, slide box/mailer	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
Stool	Parasite identification	2 to 5 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs with appropriate preservative	Clean stool container with a leak proof screw cap	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
DTS	HIV detection	2 to 5 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs with	Sterile cryotubes	National, Zonal, Regional, District,	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
			appropriate preservative		Health Centre				sample transportation Hard copy of results and feedback will be delivered by courier.
Stool	Bacteriology identification	2 to 5 mL	Transport at ambient temperature (18 to 28°C) within 24 hrs with appropriate preservative	Sterile clean container, glass slide	National, Zonal, Regional, District, Health Centre	2 days	7 days	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation Hard copy of results and feedback will be delivered by courier.
Sputum	Mycobacteria (MTB) Bacterial identification	2 to 5 mL	Transport at ambient temperature (18 to 28°C) in appropriate preservative (cold chain)	Clean sputum container	National, Zonal, Regional, District, Health Centre	2 days	10 weeks	Laboratory results should be reported electronically through e-SRS	Participant's instruction, protocol and calendar will accompany sample transportation

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample container	Referral Level	Transit Time	TAT	Results Feedback	Remarks
									Hard copy of results and feedback will be delivered by courier.

4.1.18 Health care-associated infections

Health care-associated infections (HAIs) are infections people get while they are receiving health care for another condition in a health facility, especially in areas with high turnout of people. HAIs can happen in any health care facility, including hospitals (maternity, peadiatric and surgical wards, OPD, ambulatory surgical centres, end-stage renal disease facilities, and long-term care facilities. HAI appears between 48 hours and four days after admission to a health-care facility (CDC). Therefore, samples from different surfaces in a health facility set-up will be regular collected and examined for HAI pathogens **Table 18** refers.

The common pathogens that cause nosocomial infections are *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Clostridium difficile* and *E. coli*. Some of the common nosocomial infections are urinary tract infections, respiratory pneumonia, surgical site wound infections, bacteremia, gastrointestinal and skin infections.

WHO definition of HAI: An infection caught while hospitalized. The medical term for a hospital-acquired infection is nosocomial. Since antibiotics are frequently used within hospitals, the types of bacteria and their resistance to antibiotics is different than bacteria outside of the hospital.

NOTE 13: To prevent and control HAI from a laboratory, it is recommended NOT use the Laboratory Investigation Request Form to report test results instead they should printout the results or use e-SRS or available LIMS.

TABLE 18: HEALTH CARE-ASSOCIATED INFECTION SAMPLE COLLECTION AND PREPARATION

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample Container	Referral Level	Transit Time	TAT	Results Feedback	Remark
Surface (hard and soft) Swabs (tables, benches, beds, instruments for physical examination, door and tap handles etc.)	Bacterial culture to determine source of health care-associated infection causing organisms (*Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Clostridium difficile* and *E. coli*.)	2 sterile swabs per area swabbed	Transport at 2 to 8°C or ambient temperature (18 to 28°C) with 24 hrs	Amies Transport Medium without charcoal Stuart's Transport Medium	Regional, Zonal and National	2 days	5 days	Laboratory results should be reported electronically through e-SRS For outbreak and notifiable diseases, test results will be reported according to protocol.	Collect samples from high client contact areas such as: Labour, peadiatric, surgical, theatre, ICU, sterilisation facilities, OPD, staff common room, wash rooms (staff & public) Hard copy of results and feedback will be delivered by courier.

4.1.19 Samples referred outside the country for studies and investigations

Human biological material especially blood and blood products will only be referred for specialised testing outside the country under the following situations: 1) facilitate diagnostic testing to identify or confirm the etiological agent(s) causing unknown disease, where diagnostic capacity and capability are lacking; 2) to detect and confirm priority diseases, in line with national Integrated Disease

Surveillance and Response guidelines and the One-Health Concept for Global Health Security Agenda (GHSA) and 3) for approved clinical and epidemiological studies and trials; and 4) for human health research and development. High level approval of protocol for sample referral outside the country is mandatory **Table 19** refers. TPC will liaise with NHLQATC in case of sample referral outside the country as to the point of departure and destination. TPC will arrange legally and transport the sample to destination country. Samples will be transported by Expedited Mail Services (EMS).

TABLE 19: SAMPLE REFERRED OUTSIDE THE COUNTRY

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample Container	Referral Level	Transit Time	TAT	Results Feedback	Remark
Human biological material such as blood and blood products, body fluids, tissues	1. To identify or confirm the etiological agent(s) causing unknown disease or outbreak; 2. To detect and confirm priority diseases; 3. For approved clinical studies 4. For human health research and	Refer to protocol	Refer to protocol Follow national and international requirements	Refer to protocol	Specialised testing laboratory or institution	Refer to existing guidelines	Refer to protocol	Laboratory results and feedback to be reported as per protocol or study instrument For outbreak and notifiable diseases, test results will be reported according protocol	For suspected high risk infection consult relevant authorities for shipping requirements Use approved study protocol

Sample Type	Purpose	Volume/ Device	Storage and Transportation Conditions	Sample Container	Referral Level	Transit Time	TAT	Results Feedback	Remark
	development								

4.2 Sample rejection criteria

a) All samples should meet the documented requirements before being accepted by the Laboratory.
b) Samples will be rejected after evaluation under the following conditions:

i. **Sample collection issues**

- Samples submitted in the improper container will be evaluated by technical staff for acceptance. If deemed necessary, the sample will be recollected in the proper container.
- Samples submitted that have insufficient quantity of sample for testing shall be rejected.

ii. **Sample label and order issues**

- Inadequately labelled samples can be accepted if they fall under the exception testing, and are approved by management. Exceptions include the following samples: CSF, Body Fluids, or other unrecoverable samples due to patient recollect inconvenience.
- Mislabelled samples shall not be accepted.

iii. **Sample Integrity Issues** – Samples of poor quality for testing shall be rejected:

- Contaminated shall be rejected;
- Haemolysed shall be rejected;
- Lipemic shall be rejected.

iv. **Sample storage issues**

- Samples stored under conditions not listed in the testing laboratory sample Manual shall be rejected. Exceptions may include the following samples: CSF, Body Fluids, or other unrecoverable samples.

v. **Sample transport issues**

- Samples received by the testing laboratory out of the documented testing time constraints will be a rejected;
- Technical staff will determine if the testing can be performed without compromising the test results if the transport time was extended;

- Samples transported without following the proper sample transport conditions shall be rejected;
- Leaking or broken containers will be evaluated for acceptance. Exceptions include the following samples: CSF, Body Fluids, or other unrecoverable samples.

c) If the sample does not meet documented or evaluation requirements, the following steps will be taken:

i. All rejected samples will be documented. Document the reason for rejection in sample rejection form;
ii. Perform appropriate corrective action.

NOTE 14: Refer to specific sample rejection criteria in the Sample Management Manual or Quality Manual.

NOTE 15: Samples not meeting the minimum requirements as stated above may be accepted by testing laboratory under the following circumstances:

a) The test is time specific and delay for a new sample will compromise patient care (i.e., drug levels);
b) Sample has been acquired through an invasive procedure or is irretrievable (i.e. Sterile Body Fluids, tissue samples, pathology sample);
c) Samples submitted are from a patient in a life-threatening situation;
d) Additional exceptions are based according to individual testing laboratory's policies;
e) When compromised or irretrievable samples are accepted for processing, a signature will be obtained from the person responsible for sample collection.

4.3 Packaging, labelling and documentation for transport

a) Whole blood samples in EDTA or PPT tubes will be transported from the Spoke to the Hub at an ambient temperature within six (6) hours after collection;
b) When transporting whole blood sample by motorbikes, one will carry the sample in a backpack in a secured manner using standard packaging materials to avoid rupturing of red blood cells due to vibration of the motorbike engine (often not addressed);
c) Plasma will be transported in cold chain (2-8^{o}C) on frozen ice packs within five (5) days of collection;
d) Frozen plasma will be transported on dry ice (-80^{o}C) or liquid nitrogen (-196^{o}C);

e) Appropriate Data Logger should be used to monitor temperature during all SRS or any other sample requiring cold chain transportation;
f) DBS should be transported in a rip resistant and waterproof envelope in humidity controlled conditions within one week after collection;
g) Plasma/whole blood sample for HVL testing should be packed in a triple packaging container and labelled with BIOHAZARD signage (**FIGURES 6, 7, 8 & 9** refers). Because of the distinction of risks between infectious substances and diagnostic samples, there are variations to the packaging, labelling and documentation requirements. The packaging requirements are determined by the UN and are contained in ICAO and IATA regulations.

4.4 Data loggers for cold chain monitoring

Data logger is a device or approved alternative methods for monitoring temperature-sensitive products throughout the entire SRS cold chain. The automatically created PDF report contains extensive information that receiver will use to assess the integrity of the samples being monitored: data curve, statistical values such as minimum, maximum, average and every single measurement value shown in table form.

4.4.1 Importance of temperature data loggers

a) Transparent recording of temperature fluctuations within a cold chain;
b) Economical and reliable;
c) Very small and light: can be inserted into virtually any package;
d) Multi-Use;
e) No additional software required for analyses;
f) Detailed analysis with chart and table;
g) Secure and easy download of data files;
h) Display shows the status.

Depending on the sample use, one of three temperatures will typically be specified for blood sample storage: ambient temperature, refrigerated, or frozen. Ambient temperature is specified as between 18 to 28°C; refrigeration temperature is between 2 to 8°C; frozen temperature is at or below 20°C or -40°C, -70°C (Dry ice or CO_2), -196°C in liquid Nitrogen. Sample types for short-term and long term storage are: whole blood, serum, plasma and DBS.

TABLE 20: STORAGE AND TRANSPORT CONDITIONS FOR WHOLE BLOOD

Condition	Temperature range	Storage Time
Transport of pre-processed blood	+20°C to +24°C	Less than 6 hours
Storage of pre-processed or processed blood	+2°C to +6°C	Approx. 35 days
Transport of processed blood	+2°C to +10°C	Less than 24 hours

Source:

https://www.who.int/bloodsafety/Manual_on_Management,Maintenance_and_Use_of_Blood_Cold_Chain_Equipment.pdf

NOTE 16: Plasma sample will not be stored at -20°c for more than 30 days or refer to manufacturer's package insert for specific test requirement.

NOTE 17: For freeze and thaw cycles, refer to SOP for specific programme sample management or manufacturer's testing requirements.

TABLE 21: ROLES AND RESPONSIBILITIES IN SRS

Facility level	Roles and responsibilities
Testing Laboratory	a) Process and test samples; b) Disseminate laboratory test results to Hubs/Spokes; c) Archive laboratory samples; d) Take lead in Proficiency Testing (PT)/External Quality Assessment (EQA) programme for lower level laboratories; e) Supervise and mentor lower level laboratories; f) Train service providers in testing requirements; g) Monitor and evaluate SRS activities.
Hubs	a) Process sample; b) Document and record sample; c) Transport samples to testing laboratories; d) Report, record and dispatch results to lower level facilities; e) Monitor Laboratory Information System in the laboratory; f) Share information according to protocols and policy.
Spokes	a) Collect samples; b) Document collected samples; c) Package samples for referral; d) Document received test results and dispatch to respective Spoke (clinic) immediately;

	e) Inform client (where appropriate) of test result availability.

4.5 Courier rejection criteria for goods transportation

4.5.1 TPC will reject pick up of goods if:

a) Unclear labelling and marking;
b) No shipper's address;
c) No destination address;
d) No biohazard warning signage;
e) Goods not in triple packaging;
f) Leaking goods;
g) Goods with no paper work;
h) No unique identifier (sample type, sample site, date);
i) Sample which are labelled with wrong accompanying requisition;
j) Unpacked samples;
k) No time given for pick-up and delivery which causes failure to meet standard properly;
l) In appropriate temperature controlling for sample transportations.

NOTE 18: TPC will NOT open and/or repackage dangerous shipment.

NOTE 19: In case of leakage or damaged goods, while in transit, staff will immediately notify relevant section within TPC and/or shipper; and containment measures instituted immediately.

NOTE 20: Document all events such as time of occurrence, action taken and if exposure occurred.

NOTE 21: Rejection will not cover critical/expensive samples such as Bone marrow aspirates, biopsies, CSF and all samples collected from infants and other samples regarded under this category as defined in national guidelines.

CHAPTER FIVE

5. Referral of infectious substances

It is the responsibility of the sender to ensure the correct designation, packaging, labelling and documentation of all infectious substances and diagnostic samples.

Efficient referral and transfer of infectious materials requires good coordination between the sender, the courier and the receiver (receiving laboratory), to ensure that the material is transported safely and arrives on time and in good condition. Such coordination depends upon well-established communication and a partner relationship between the three parties. All have specific responsibilities to carry out in the transportation effort.

5.1 Sender

a) Make advance arrangements with the receiver of the samples including investigating the need for an import permit;
b) Make advance arrangements with the courier to ensure that:

   i. The shipment will be accepted for appropriate transport;
   ii. The shipment (direct transport if possible) is undertaken by the most direct routing, avoiding arrival at weekends;
   iii. Provide correct instructions on conditions to maintain quality of sample (e.g. cold chain).

c) Prepare necessary documentation including permits, dispatch and shipping documents and handover to courier;
d) Retain copies of the documentation for shipment;
e) Notify the receiver of transportation arrangements once these have been made, well in advance of expected arrival time.

5.2 Courier

a) Provides the sender with the necessary shipping documents and instructions for their completion;
b) Provides advice to the sender about correct packaging;
c) Assists the sender in arranging the most direct routing and then confirms the routing;
d) Maintains and archives the documentation for shipment and transport;
e) Monitors required holding conditions of the shipment while in transit;

f) Notifies the sender of any anticipated (or actual) delays in transit;
g) Maintains hand to hand check at all levels (sign, date and time).
h) Delivers the consignments to the receiver

5.3 Receiver

a) Obtains the necessary authorisation(s) from national authorities for the importation of the material;
b) Provides the sender with the required import permit(s), letter(s) of authorisation, or other document(s) required by the national authorities;
c) Arranges for the most timely and efficient collection on arrival;
d) Immediately acknowledges receipt to the sender.

5.4 Conditions for dispatch of shipments

a) Advance arrangements have been made between the sender, courier and receiver;
b) The receiver has confirmed with the national authorities that the material (s) may be legally imported;
c) The receiver has confirmed that there will be no delay incurred in the delivery of the package to its destination.

Internal transport from a spoke through the hubs to the testing laboratory using approved agencies or organizations have been used (e.g. public transport companies). The principle of safe transport by this means is not the same as for international transport it will be transported as normal item; the materials will not have any possibility of leaking from the package under normal conditions of transport. The following practices are recommended:

a) Sample containers will be waterproof and leak-proof;
b) If the sample container is a tube, it will be tightly screw capped and placed in a rack to maintain it in an upright position;
c) Sample containers and racks will be placed in hard, leak-proof plastic or metal transport boxes with secure, tight fitting covers;
d) The transport box will be secured in the transport vehicle;
e) Each transport box will be labelled appropriately, consistent with its contents, and marked "**PATHOLOGICAL sample**";
f) Sample data forms and identification data will accompany each transport box;
g) A spill kit containing absorbent material, a chlorine disinfectant, a leak-proof waste disposal container and heavy-duty reusable gloves will be kept in the transport vehicle in cases of leakages due to unexpected events.

5.5 Courier sample transportation procedure

It is the responsibility of the sender to ensure the correct designation, packaging, labelling and documentation of all diagnostic/follow up samples. The effective transport and transfer of infectious materials requires good coordination between the sender, the courier and the receiver to ensure that the material is transported in safe containment and arrives on time and in good condition. Such coordination depends upon well-established communication and a partner relationship between the three parties. All three parties have specific responsibilities to carry out in the transport action effort. Tanzania Posts Cooperation will collect samples from spokes (health centres, dispensaries) and transport to the hubs and testing laboratories. High risk samples will be transported using approved protocols so as to reach the testing laboratory within 24 hours.

5.4.1 By land

Biological Substance, Category B sample transportation through the internal local roads and railways will follow the same protocol in collection, handling, packaging, storage and transportation.

FIGURE 2: RECOMMENDED TRANSPORTATION OF BLOOD SAMPLES USING BACK PACK

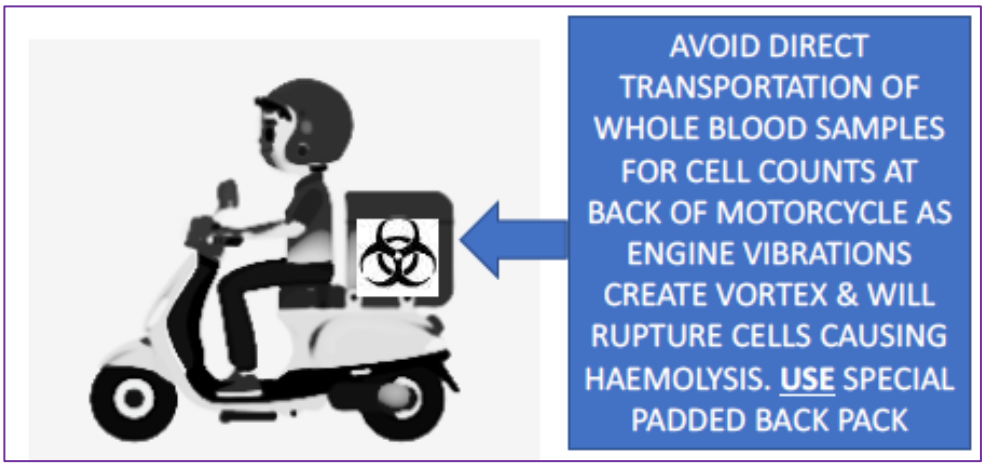


FIGURE 3: DISCOURAGED MODE TRANSPORTING OF BLOOD SAMPLES ON MOTORBIKE

Illustration by © dvd 2019

NOTE 22: Potential contributor to low cell counts in haematological examinations and causes of haemolysis

5.4.2 By air

Infectious substances in Category A will not be accepted for shipment through postal services. Infectious substances in Category B may be shipped by registered air mail, and the UPU recommends the following procedure. POSTA will develop a contract when this shipment is needed. The basic triple packaging system is used with the same requirements as for other means of transport. The address label will display the word "Letter" and the green Customs Declaration Label for Postal Mail is required for international mailing. "**BIOLOGICAL SUBSTANCE, CATEGORY B**" will be identified with the white diamond label with black letters "**UN 3373**".

5.4.3 By waterways

Biological Substance, Category B sample transportation through the internal waterways from facilities surrounded by water bodies or served by waterways as means of transportation, will follow the same protocol in collection, handling, packaging, storage and transportation. However, for waterways, add waterproof protection is recommended for the final outer containment.

5.6 Transportation of high-risk samples

High risk sample is an infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals.

NOTE 23: An exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.

5.6.1 Priority high risk sample for laboratory confirmation

The priority diseases that are classified as the causes of epidemics and that are the leading causes of illness, death and disability. These diseases are divided into three major groups: epidemic-prone diseases; diseases targeted for eradication or elimination; and other diseases of health importance. Priority diseases are a combination of communicable and non-communicable diseases, and not all of them require laboratory testing for confirmation.

5.6.2 Sample container preservatives

Continuous, real time monitoring of samples occurs when they are received in the laboratory. This monitoring checks for the correct sample container and volume of sample for the requested tests as well as completeness of patient and/or client ID.

5.6.3 Sample integrity

Laboratory test results are dependent on the quality or the integrity of the sample submitted. It is important that all samples and requisitions be properly labelled with the name of the patient, collection date, and the origin (source) of the sample, when applicable. In intervention programmes or PHEIC, then appropriate sample identifier will be used.

5.6.4 Shipping conditions

5.6.4.1 Wet ice

Wet ice is the term used to describe frozen, solid water. It is not considered a dangerous good and is therefore not assigned a proper shipping name or UN number. If wet ice is used, consideration should be given to a leak-proof outer container to prevent water leakage, because ice will melt.

5.6.4.2 Dry ice

Dry ice is one of the most commonly used coolants for the transport of infectious substances. It belongs to Dangerous Goods Class 9: Miscellaneous dangerous substances and articles, including environmentally hazardous substances. It is assigned the proper shipping name "Dry ice" or "Carbon dioxide, solid" and the UN number UN 1845.

5.6.4.3 Liquid nitrogen

Liquid nitrogen is also commonly used in the transport of infectious substances. It belongs to Dangerous Goods Class 2: Gases, and is assigned the proper shipping name "Nitrogen refrigerated liquid cryogenic liquid" and the UN number UN 1977. Liquid nitrogen is used when extremely low temperatures are required to maintain the integrity of the shipment. Hence, both the primary and secondary packaging will be able to withstand extremely low temperatures without damage.

5.6.4.4 Dry shippers

Dry shipper is a specialized outer packaging material that is insulated with a layer of liquid nitrogen fully absorbed into a porous material. This design ensures that liquid nitrogen is kept well contained inside the walls of the outer layer.

Liquid nitrogen contained in a dry shipper is not subject to any other dangerous goods requirements. Thus, the package is not subject to the detailed requirements of free liquid nitrogen, but nevertheless maintains the extremely low temperatures that liquid nitrogen can provide. The dry shipper will be appropriately marked and labelled to indicate the presence of infectious substances inside.

5.7 Basic triple packaging system

Triple Package System is a method of transporting diagnostic samples and biological agents for various testing, investigations and research purpose(s) from one site to other site or from in country to out of country based on the National and International regulation accepted system.

5.7.1 Primary receptacle

a) Contains a single sample;
b) Will be watertight and leak proof;
c) Will be appropriately labelled as to content;
d) Wrapped in enough absorbent material to absorb all fluid in case of breakage or leakage;

e) Whatever the intended temperature of the consignment, the primary receptacle or the secondary packaging will be capable of withstanding extreme pressure such impact in case accidents as well as temperatures in the range of -40°C to +55°C;
f) When the shipment is being carried at ambient temperature (or above), the primary receptacle will be glass, metal or plastic. A leak-proof seal will be provided (e.g. a heat seal, skirted stopper or metal crimp seal). If screw caps are used, they will be secured (e.g. paraffin sealing tape, tape etc.);
g) Lyophilized substances may also be transported in primary receptacles that are flame-sealed ampoules or rubber-stoppered glass vials fitted with metal seals.

5.7.2 Secondary packaging

a) Encloses and protects the primary receptacles;
b) Will be watertight and leak proof;
c) Several wrapped primary receptacles may be placed in a single secondary packaging;
d) Sample requisitions may be placed in plastic baggie and/or envelope and placed between secondary and outer container package to maintain patient confidentiality;
e) Whatever the intended temperature of the consignment, the secondary receptacle or the secondary packaging will be capable of withstanding extreme pressure as well as temperatures in the range of -40°C to +55°C.

5.7.3 Tertiary packaging

a) Protects secondary packaging from physical damage while in transit;
b) Contains sample data forms, letters, and other types of information that identify or describe the sample and identify the shipper and receiver, and any other documentation required. Place the documents in a sealed plastic bag to protect from moisture;
c) Outer packaging will be rigid with a latch or able to be taped shut;
d) The smallest dimension of the package will not be less than 100 mm;
e) An itemized list of contents will be enclosed between the secondary packaging and outer packaging, including the proper shipping name and technical name in brackets ("Infectious substance affecting humans, animals and environment". if the technical name is unknown) of the biological agent present in the infectious substance;
f) An example of triple packaging materials that may be used for Category A infectious substances **FIGURES 3, 4 & 5** refer;
g) Ship to and Ship From laboratory contact information is clearly marked on the outer shipping packaging;

h) Infectious substances will be labelled as "infectious substance." Care will be taken not to contaminate the outside of the container;
i) The packed sample will be labelled with name, address, phone number and signature of the shipper/responsible person and the name, address, phone number of the consignee;
j) Package orientation arrows will be shown on two sides;
k) Every sample container and request form will describe the nature of the sample, source, and patient information;
l) All samples will be placed in a designated secure collection area until ready for transportation;
m) Samples will reach the laboratory as soon as possible;
n) Prior to sending referral samples, the referral site will be informed;
o) Frozen samples will be transported on dry ice/ice pack. The following precautions will be observed:

    i. Place tubes in containers or wrap them in paper to protect them from dry ice. Direct contact with dry ice can crack glass tubes;
    ii. If the samples are not in leak proof containers, protect them from exposure to carbon dioxide by sealing the screw caps with tape or plastic film or by sealing the tubes in a plastic bag. Carbon dioxide will lower the pH of the transport medium and adversely affect the survival of organisms in the sample;
    iii. Ensure that the cool box is at least one-third full of dry ice.

p) According to their hazard classification and their composition dangerous goods are assigned UN numbers and proper shipping names. In this regard, infectious substances are classified to Category A and Category B. This proper shipping name is used to clearly identify the dangerous article or substance from one to the other. Such infectious substances include excreta, blood and its components, skin scrap, sputum as well as other tissues and body fluids. Diagnostic samples do not include live infected part.

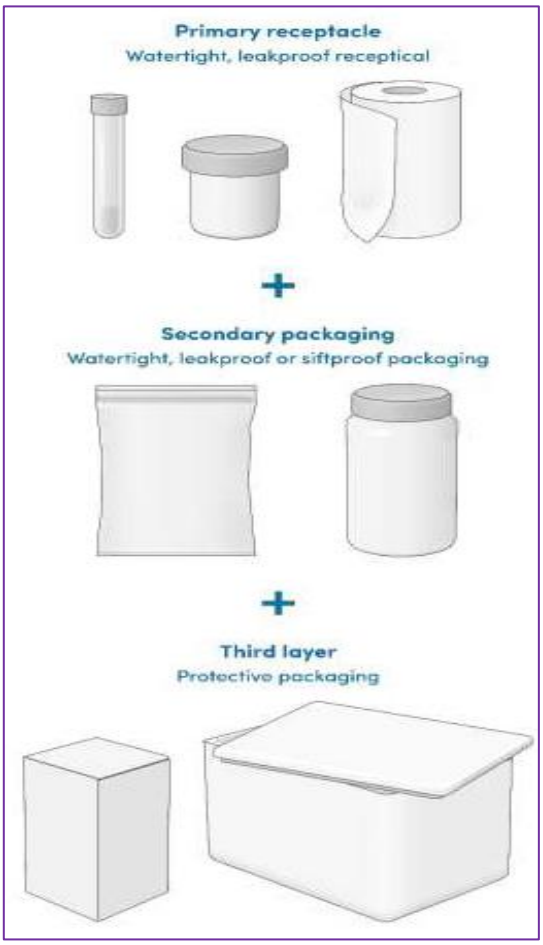


FIGURE 4: BASIC TRIPLE PACKAGING MATERIALS FOR SAMPLE TRANSPORTATION

Source: Guidance on regulations for the transport of infectious substances 2019–2020. Geneva: World Health Organization; 2019

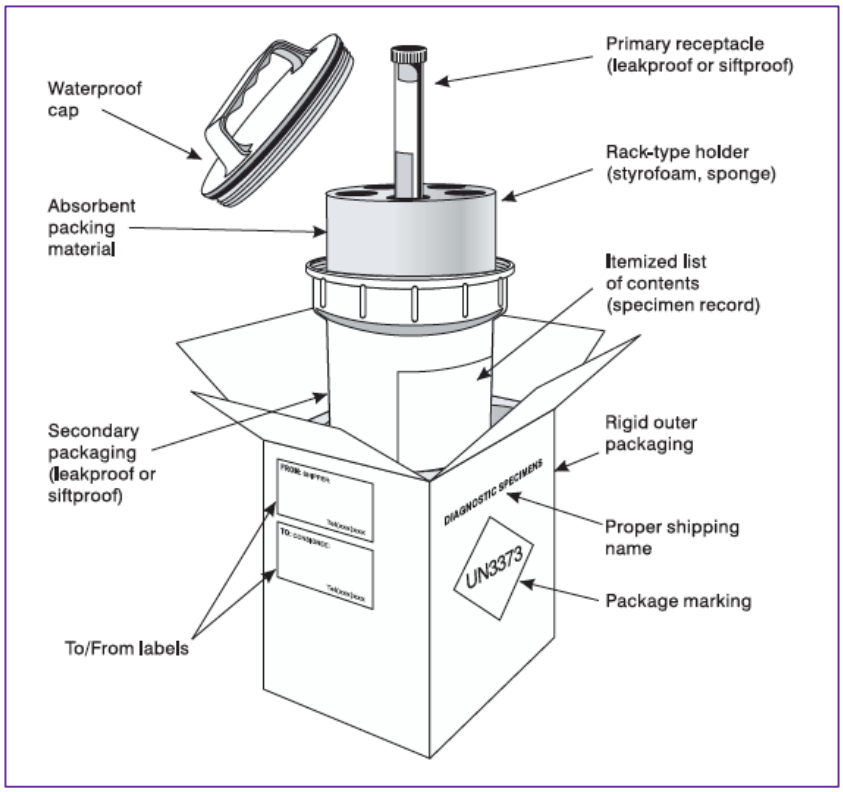


FIGURE 5: TRIPLE PACKAGING AND LABELLING FOR CATEGORY B INFECTIOUS SUBSTANCES

Source: WHO, Laboratory biosafety manual, Third edition, 2004

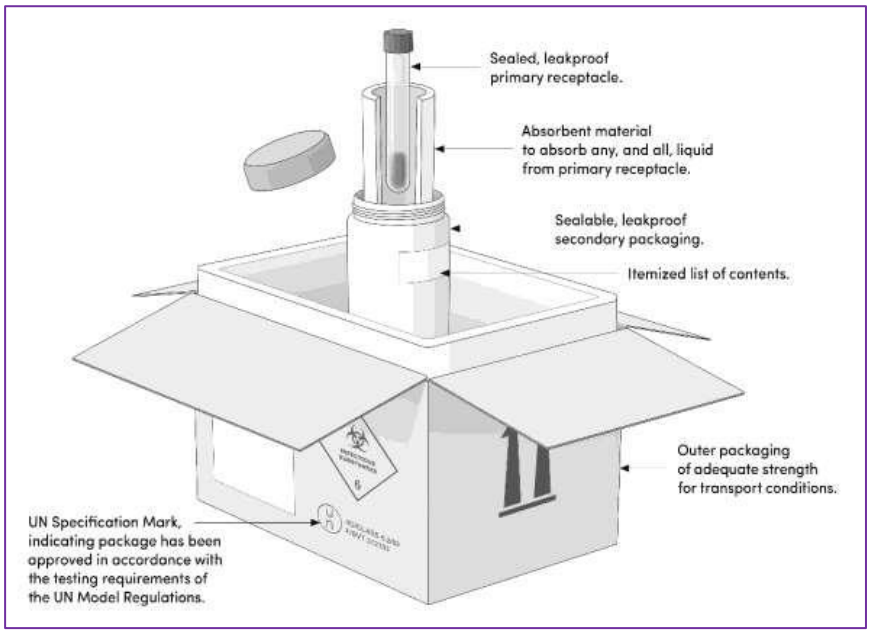


FIGURE 6: TRIPLE PACKAGING AND LABELLING FOR CATEGORY A INFECTIOUS SUBSTANCES

Source: Guidance on regulations for the transport of infectious substances 2019–2020. Geneva: World Health Organization; 2019

5.7.4 Reused packaging

Packaging materials can be returned or reused. Before empty packaging is returned to the consigner, or sent elsewhere, it will be decontaminated to nullify any potential hazard; also, previous labels or marking will be removed. If the packaging is being reused, the shipper will ensure that all marks and labels reflect the substances actually being shipped and not the substance the packaging was used for previously. Reused packaging will maintain its ability to comply with relevant quality testing procedures for Category A and Category B packaging. If packaging material becomes damaged or reduced in strength, it will no longer be used.

5.8 Reporting of SRS incidents

5.8.1 Identification of compromised sample integrity or unsafe packaging

In all instances where, upon receipt of a sample whose integrity was compromised or it has come to the attention of hub focal person or laboratory staff that sample packing or transportation practices could have or did jeopardize the safety of the courier or the general public, the laboratory will investigate the issue and contact the sender of the sample to inform them about measures to be taken to minimize or where possible, eliminate recurrence.

Depending upon the seriousness of the incident, hub focal person or laboratory staff may raise an incident report (e.g. spillage/leakage of sample in a public place) and communication with the sender will be either by telephone call or by way of a comment on the laboratory report (**ANNEX 4** refers).

5.8.2 Incident reporting

The various international regulations require the reporting of incidents to the relevant competent transport authorities in addition to the necessary health authorities. This applies to both categories of infectious substances (**ANNEX 9** refers).

Any adverse incident which occurs in the course of dispatching and transporting pathology samples to the laboratory will be recorded in the incident reporting system. Examples of types of incidents include but not limited to:

a) Leaking samples and associated contamination;
b) Serious delay in transportation of samples;
c) Breakdown of vehicles transporting samples;
d) Incorrect storage of samples prior to transportation.

NOTE 24: Documentation of the incidence should be in line with ISO 15189:2012 Medical Laboratories – Requirements for Quality and Competence (ISO 15189:2012 and Medical Laboratories – Requirements for Safety (ISO 15190:2020).

5.8.3 General roles and responsibilities in sample referral system

a) All those involved in sample collection are responsible for ensuring the safe transport of the samples to their intended destination;
b) All health care workers who handle or transfer samples are responsible for doing so in a safe, appropriate and confidential manner;
c) Procedures designed during the process, for transfer of samples, will be risk assessed formally by appropriate managers and recorded;
d) The policy document has been designed and edited by groups from the Laboratory Directorate, Procurement, Health & Safety Service, Transport Services and General Management.

5.8.4 Applicability

a) This procedure manual applies to collection of samples within collection point or community health facilities, their transport to testing laboratories, and their final disposal after examination;
b) While it is expected that everyone dealing with SRS will observe the procedure manual it is also recognised that, from time to time, circumstances or geographic restrictions or peculiarities may make certain parts of the procedure manual inapplicable. There may also be methods of transfer of samples, e.g. involving cryogenic materials, which will require special containers, heightened levels of difficulty or transfer conditions. SRS focal persons will assess risk of alternative procedures and make suitable, sufficient and safe adjustments to the procedure manual at a local level. Such alterations will be recorded and lodged with the National SRS Coordinator and the areas SRS focal persons.

5.8.5 Traceability

a) On occasion, where exceptionally invasive or uncomfortable techniques have been used, e.g. biopsy samples or where there is a medico-legal and/or forensic requirement for "chain of custody" a system of traceability is required. This will involve a detailed method of tracking the history of sample transfer from place to place and from person to person. Most of the manual transfer of samples within healthcare premises and to and from delivery/collection points is expected to be performed by courier;

b) Health facility focal persons with a responsibility for spokes will ensure a consistent approach across all areas. The process may be carried out using either paper or electronic means or a combination of both and will take cognisance of the principal consignor, transfer and recipient parties concerned. The success of such an operating procedure is dependent on the inclusion and co-operation of all of these parties;
c) Samples will be transported in such a way as to ensure the safety of the courier, the general public, hub/spokes and the testing laboratory

TABLE 22: PERSONS WHO NEED PROTECTION IN SRS

People	**Reason**
Courier	Samples will be packed for transport in a way that prevents cross contamination of forms or other samples when a sample leaks. As far as possible, all samples will be kept within a leak-proof container and be separate to their own request form.
General Public	General public will be issued with guidelines on the collection and transport of samples as required from their respective health facilities. Patients will be encouraged to use health facilities for transport of samples to laboratories and will be discouraged from bringing samples to the laboratories by their own means of transport.
Testing Laboratory	Sample containers that are visibly soiled will be dealt with as per SOP. The origin will be notified and sample retained, if this action is required.

TABLE 23: FACILITY ROLES AND RESPONSIBILITIES IN SRS

Level	Responsibility
Spoke (Dispensaries and Health Centres)	• Sample collection, packaging and transportation
Hub (District Hospital/Health Centres)	• Sample collection, packaging, processing, storage and transportation • Basic testing
Regional Hospitals	• Sample collection, packaging, processing, storage and transportation • Sample testing
Zonal/Specialised Hospitals	• Sample collection, packaging, processing, storage and transportation • Sample testing
National Level (NPHL, GCLA, TBS, TVLA, Forensic Bureau)	• Specialised testing • Quality Assurance

5.9 General safety precautions in SRS

5.9.1 Safety related to sample collection, preparation and storage

All staff involved in handling of biological materials will receive sample management training, waste management training and be covered by appropriate vaccinations:

a) Use personnel protective equipment when processing biological samples;
b) Take precautions to prevent injuries caused by needles, scalpels, and other sharp instruments;
c) Do not recap, bend or break needles by hand or remove needles from disposable syringes;
d) Discard all sharp instruments in puncture-resistant sharp containers located close to the work area;
e) Secure lids immediately to avoid spillage and contamination during transport;
f) Place all liquid samples in containers that will prevent leakage during transport;
g) Preferably use vacutainer tube with needle rather than ordinary (syringe with needle) do not overfill sample containers, as they can 'explode' upon opening;
h) If hands or other skin surfaces become contaminated with blood or other body fluids, wash them immediately and thoroughly with soap and water;
i) Remove gloves and wash hands with soap and water upon completion of processing after contact with each patient;
j) Use a biological safety cabinet for procedures that have a high potential for generating droplets;
k) Use mechanical pipette devices to manipulate all liquids in the laboratory.
l) Decontaminate laboratory work surface area daily and after any spill of potentially dangerous materials with a freshly prepared household bleach (0.5% NaClO) **ANNEXES 10-12** refer;
m) Disinfect refrigerators and centrifuge component primary by freshly prepared 1:10 dilution of household bleach, then clean with water finally wipe with 70% ethanol;
n) Autoclave or soak racks in 1:10 dilution of household bleach for Ten minutes and then rinse thoroughly with water;
o) Dispose biological waste & disinfect all non-disposable components with 1:10 dilution bleach and wipe with 70% ethanol;
p) Allow disinfectant to remain in contact with surfaces for at least ten minutes at an ambient temperature for optimal effectiveness against dried blood or serum;
q) If equipment needs maintenance, clean and decontaminate them in the laboratory before transporting to repair/maintenance;
r) Incinerate or autoclave all waste before disposal in a sanitary landfill. Solutions containing bleach may corrode the autoclave; therefore, these solutions may be poured down a drain connected to a sanitary sewer;

s) After decontaminating, carefully pour down a drain connected to a sanitary sewer bulk blood, suctioned fluids, excretions, and secretions. Decontaminate spills of blood and body fluids by wearing disposable gloves;
t) Cover visible blood or body fluids with paper towels and soak this with a 1:10 dilution of household bleach. Allow to stand for at least ten minutes. Discard contaminated towels in infective waste containers. Wipe down the area with clean towels soaked in a 1:10 dilution of household bleach.

5.9.2 Handler's instruction

Improper collection, transport, storage and handling of samples between the laboratories carry a risk of infection to the personnel involved and the environment. As a result, it is important to strictly follow the rules of general laboratory safety:

a) Ensure that containers are leak-proof with a screw cap so that no material remains on the outside of the container. To avoid cracking or bending this container, never use mechanical devices to tighten the cap;
b) Avoid spills and splashes during the opening and closing of tubes by using appropriate materials such as paper towel (absorbent pad), gauze, etc.;
c) When applicable, ensure that the outer part of triple package is large enough to hold the containers;
d) Label containers to facilitate identification; do not wrap request or specification forms around the containers;
e) To avoid accidental leakage or spillage, use secondary metal or plastic containers fitted with racks so that the containers remain upright. The secondary containers should be autoclavable or resistant to the action of chemical disinfectants and should be regularly decontaminated;
f) For laboratories that receive large numbers of samples, designate a particular ambient or area for this purpose;
g) Shipping cartons or carriers will be immediately unpacked in a designated area equipped with a discard container (infectious, non-infectious and sharps), alcohol swabs and paper towels;
h) Use a Class II biosafety cabinet to limit exposure of laboratory staff to potential pathogens;
i) If a biosafety cabinet is not available, use a clean workbench that can be easily disinfected using common laboratory disinfectants; this should be located away from areas used for other laboratory activities;
j) Open the package safely and record and maintain all related documents;
k) If there is linkage, broken container and contaminated paper manage it according to universal safety precaution;

l) For blood sample, ensure that appropriate safety measures are adopted to prevent laboratory infections; the handling of patient's blood and arthropods is particularly hazardous because the samples are suspected to contain infectious agents.

5.9.3 Handling externally contaminated containers and labels

a) Ensure that the container is free from contaminant;
b) Using gloved hands, close the cap tightly;
c) Detach the contaminated label, if there is one;
d) Wipe the container with a disposable paper towel or a piece of gauze soaked in appropriate disinfectant and let dry;
e) Decontaminate the area where the leak has occurred;
f) Copy all information on a new label and attach to the container;
g) Discard the contaminated label into the biohazard container for disposal;
h) Ensure sample placed in upright position by using rack;
i) When multiples are contaminated, ensure that they are correctly labelled and are readable;
j) For all non-conformities recorded in occurrence log sheet and communicate according to laboratory quality manual. Ensure that corrective actions taken accordingly.

NOTE 25: To prepare chlorine solutions to clean and/or disinfect spillage, refer to **ANNEXES 10-12.**

5.9.4 General safety for transportation of samples

Guidance on Regulations for the Transport of Infectious Substances (WHO 2019–2020) provide detailed procedures to be followed depending on the material to be transported:

a) When applicable, place dry ice between containers and the outer shipping container (outer part of triple package) to keep the temperature at 2 to 8^{o}C;
b) Ensure each container is individually protected by triple packaging to reduce shock or prevent breakage;
c) Transport as soon as possible to the testing laboratory.

CHAPTER SIX

6. Marking and labelling

Once the correct packaging materials have been assembled, they will be properly marked and labelled to provide information about the contents of the package, the nature of the hazard and the packaging standards that have been applied. All marks and labels will be placed in such a way that they are clearly visible and not covered by any other label or mark.

The following marks will be provided on the outer package of all infectious substances:

a) the shipper's (sender's or consigner's) name and address;
b) the receiver's (consignee's) name and address;
c) the United Nations (UN) number of the infectious substance, followed by the proper shipping name of the substance (technical names do not need to be shown on the package);
d) if a coolant (e.g. dry ice) is used, the UN number and the proper shipping name of the coolant, followed by the words "AS COOLANT". In addition, the net quantity of coolant present should be given.

6.1 Types of labels

There are two types of labels that may need to be used for packages of infectious substances – hazard labels and handling labels as discussed below:

6.1.1 Hazard labels

Hazard labels are always presented in the form of a square set at an angle of 45° (diamond shaped). The minimum dimensions are 100 mm. If the package is very small, the label size will be reduced proportionately, provided that all elements of the label are easily visible.

6.1.2 Handling labels

Handling labels have various shapes, and can be affixed either alone or in addition to hazard labels, depending on the nature and quantity of dangerous goods present. Figure 7 below shows an example of typical labelling of the outer shipment of biological materials.

NOTE 26: It is recommended that QR code be introduced in order to improve marking, labelling and tracking of samples by shipper, courier and receiver (health facility-TPC-testing laboratories).

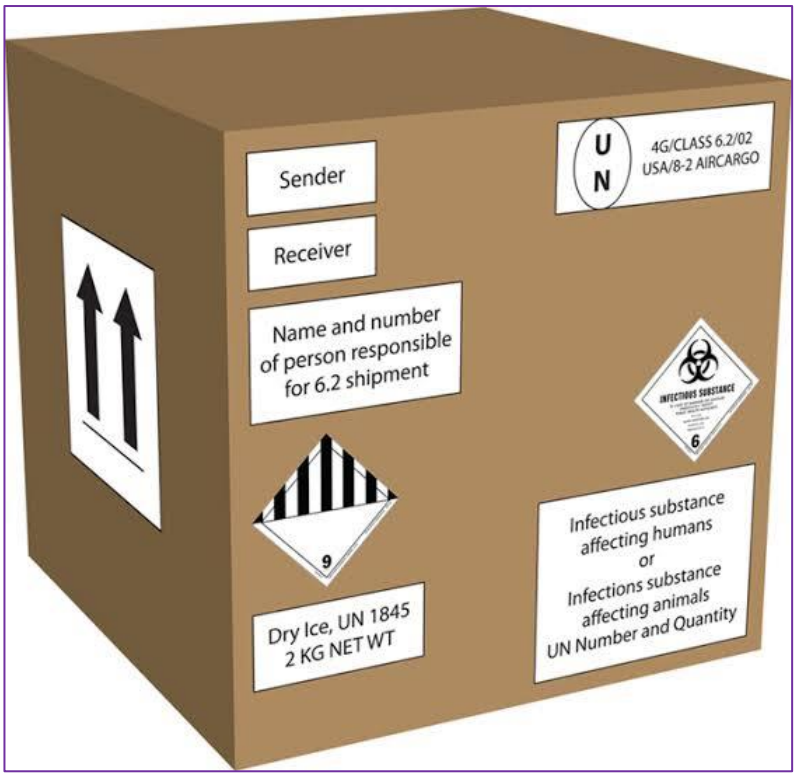


FIGURE 7: HAZARDOUS MATERIAL SAFETY SIGNS AND LABELS

FIGURE 8: TRANSPORT LABEL FOR INFECTIOUS SUBSTANCES

FIGURE 9: LABELS AND MARKING FOR TRANSPORTATION OF INFECTIOUS SUBSTANCES

FIGURE 10: LABELS AND MARKINGS FOR BIOLOGICAL SUBSTANCES

Source:

https://www.google.com/search?sxsrf=ACYBGNRdcol0x5Yz88j9z1ZQIFhVWgoqnA:1576311783524&q=UN+labels+and+markings+for+biological+substances&tbm=isch&source=univ&sa=X&ved=2ahUKEwin5aX_2rTmAhU4QxUIHWKCBW0Q7Al6BAgGECQ&biw=1062&bih=619#imgrc=3GgXSb3XeSUO0M

CHAPTER SEVEN

7. Training of SRS stakeholders

Before a consignment of dangerous goods is offered for transport, all relevant persons involved in its preparation, packaging and transportation will have received baseline and continuous annual training to enable them to carry out their responsibilities. Personnel will be trained in a manner that corresponds to their contractual responsibilities (CHW, Spoke and Hub staff, laboratory staff, health facility staff, couriers, national level coordinators, drivers, pilots). Therefore, the content of the training should be based on an examination of the recipient's assigned roles and responsibilities (as given in their job description). Directorate of curative services will be responsible for developing/reviewing and training of standardized national training materials for handling, packaging and transportation of samples countrywide. Only trained and competent individuals will prepare, package and transport samples. In addition, immediate supervisors will be responsible to supervise the competent staff for carrying out their duties.

7.1 Stakeholders requiring training

A wide range of stakeholders will have appropriate training for safe and compliant shipping of infectious substances. These stakeholders include: the people or organizations undertaking the responsibilities of the shipper; personnel of transport operators (e.g. drivers, pilots and captains); ground handling agencies that act on behalf of the operators/carriers to accept, handle, load and unload dangerous goods packages; individuals involved in the transferring, processing or screening of cargo or mail (e.g. security personnel); freight forwarders; and designated postal operators. The ICAO technical instructions provide a more detailed overview of the various aspects of dangerous goods transport that various types of personnel should be familiar with if they are to be considered competent to ship dangerous goods.

7.2 Awareness and familiarization training

This training should involve familiarization with the general provisions of dangerous goods transport requirements, including but not limited to:

a) description of the classes of dangerous goods;
b) labelling, marking and poster;
c) packaging;
d) waste segregation;

e) compatibility of dangerous goods;
f) purpose and content of dangerous goods documentation;
g) descriptions of available emergency response documents;
h) ethics;
i) confidentiality of patient information.

7.3 Safety training

MOHCDGEC will be responsible to develop/review standardized training materials for biosafety and biosecurity. The biosafety and bio-security training will be given to all personnel involved in handling, packaging, transporting and delivery of samples at all levels. Safety training will minimally cover the following:

a) methods and procedures for avoiding accidents (e.g. proper handling, including equipment use, and methods of storage);
b) hazard identification;
c) risk group classification;
d) reporting of incidents, injury, accidents and occupational illnesses;
e) emergency response information and how to use it;
f) general dangers and hazards of the various dangerous goods classes;
g) prevention of exposure to hazards, including the use of personal protective equipment;
h) procedures to be followed in the event of release or exposure to any dangerous goods.

7.4 Function-specific training

Function-specific training will depend on the specific job functions of the individual. For example, a shipper of a public health institution will need to be trained on the details of classification, packing, labelling, marking and documenting dangerous goods, whereas a carrier is more likely to require training on handling, stacking, storage and logistics procedures. Function-specific competencies should be appropriately supervised until competency is assured, which may require the completion of approved training courses or passing of examinations. All staff training will be documented in accordance with institutional Quality and safety Manual or specific Training SOP.

CHAPTER EIGHT

8. Information management

In order to keep track of all samples that are referred from one facility to another for testing and ensuring that the corresponding results are returned to the referring facility, it is imperative that all important information pertaining to the referred sample is documented and maintained throughout the referral cycle. This will involve both paper-based and electronic documentation.

8.1 Electronic Information management

In facilities where Laboratory Information System (LIS) exists, sample information will be captured in LIS. Where LIS is integrated with the electronic Sample Referral System (e-SRS), the sample information will be passed on to the e-SRS and will subsequently be downloaded at the testing laboratory. A sample manifest will be printed and submitted to the courier along with the samples. These documents will be used for verifying the information that is on the e-SRS. Both, the referring facilities and testing laboratories should document and maintain logs for dispatch and receiving of sample shipments.

The person preparing the sample(s) for shipment (i.e. the shipper, sender or consigner) will prepare required documents by applicable regulations, to inform those carrying the package about how the package was prepared and the dangerous goods that it contains. In case of air transportation, this person will be trained and certified by relevant authorities such as International Air Transport Association (IATA).

Tanzania Posts Corporation (TPC) is the sole mandated courier for transportation of samples in the country TPC has an electronic system dedicated for tracking shipment of samples. The system shall be integrated with the existing electronic Sample Referral System (e-SRS) in order to track the movement of each shipment and provide status. The system will encompass the following functions:

a) Registration of users on both e-SRS and TPC system that will interact with these systems;
b) The e-SRS user will notify the TPC system the shipment is ready for pickup;
c) TPC System will notify the e-SRS pickup of the shipment.
d) The e-SRS user at pickup point will notify the destination that the shipment is on transit to the destination;
e) The e-SRS will notify TPC system to update status from pickup to transit;

f) TPC system will notify the e-SRS that the shipment has arrived at the destination and wait for delivery;
g) Once the shipment has been accepted at the testing laboratory the TPC system will notify the e-SRS the status of delivery;
h) In case of rejection, the sender will be notified.

For purposes of integrating the TPC sample referral system and the existing electronic sample referral system, the flowchart below has been proposed to represent the integration architecture. This flowchart may change a little bit depending on how the programmers are going to figure out the best way to integrate the systems.

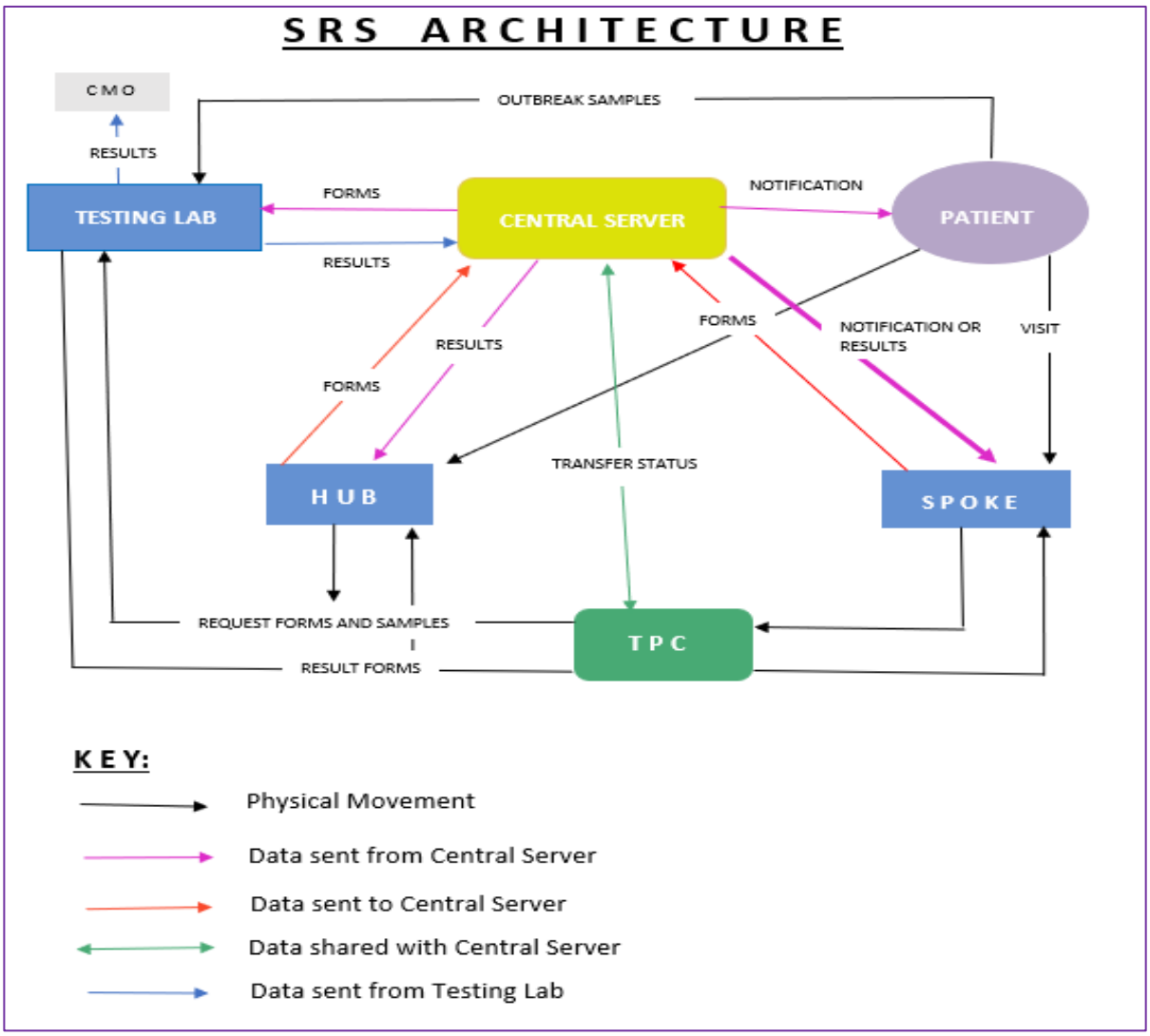


CHART 2: SRS ARCHITECTURE

SOURCE: MOHCDGEC 2019

8.2 Paper-based information management

Some of the processes of the sample referral shall involve paper-based information management. The paper-based information management shall include proper filling of registers and sample transportation accompanying documents. Information provided in transport documents will be:

a) easy to read (e.g. permanent ink that cannot be easily removed, preferably in water-resistant ink);
b) complete with correct destination address
c) all pages will be numbered;
d) copies of any transport documents will be shared between sender, TPC and receiver and retained for a minimum of 3 months following the shipment or as per sample management manual and/or Quality Manual;
e) if both dangerous and non-dangerous goods are being recorded on the same shipping document, the dangerous goods will always be listed first;
f) in some instances, shipping of an infectious substance requires certificates of approval from regulatory authorities;
g) for international shipments, consult with the relevant authorities at the national Level.

8.3 Emergency response information

a) The shipment of infectious substances (dangerous goods) will be accompanied with spill clean-up procedure;
b) For shipments of infectious substances in Category A will have the name and telephone number of a person responsible for the shipment marked on the package(s) and on the shipper's declaration (in the "Additional handling information" section);
c) For infectious substances in Category B, UN 3373, will have the name, address and telephone number of a responsible person marked on either the package or on the waybill;
d) In addition to emergency contact information, appropriate information will be immediately available for carriers/couriers to use in emergency response, to accidents or incidents involving infectious substances packages during transport. This will include contact information for public health authorities, medical or first aid requirements (e.g. prophylaxis for exposed person) or procedures for spill clean-up.

CHAPTER NINE

9. Monitoring and evaluation

The operation of the sample referral system shall be monitored and evaluated to ensure the planned activities are being implemented effectively and efficiently. Indicators shall be used to track and assess sample referral system performance. Below is a list of indicators.

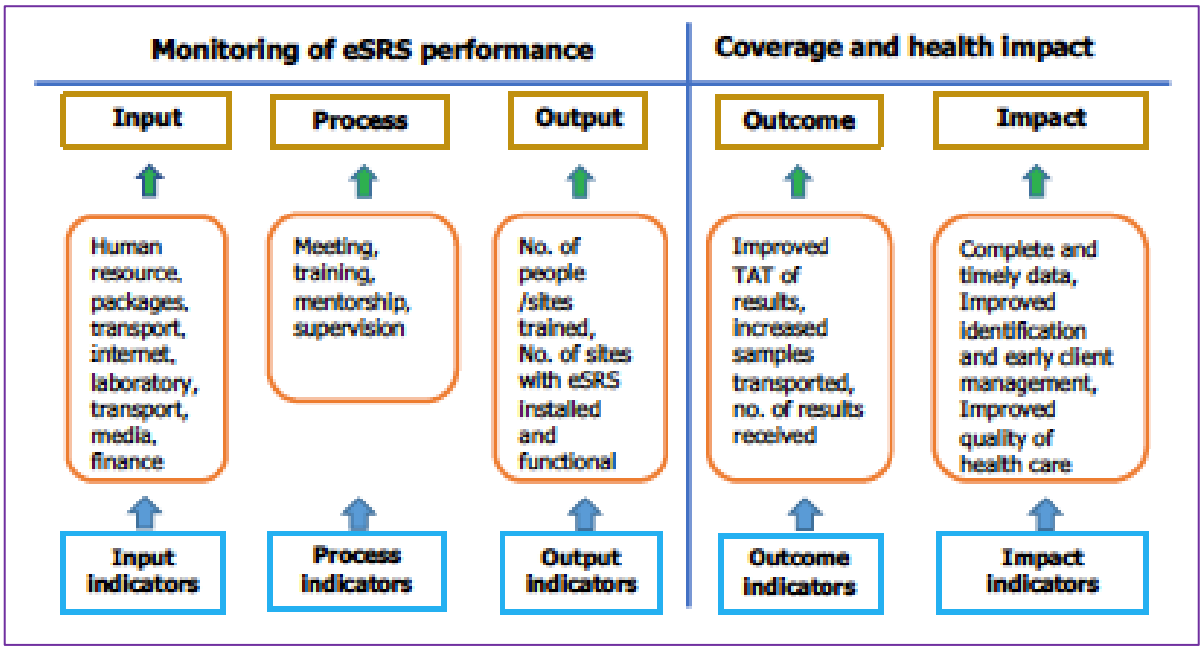


FIGURE 11: SRS LOGICAL FRAMEWORK SEQUENCE

9.1 List of indicators for a sample referral system

9.1.1 Facility indicators

a) Number of referring facilities;
b) Percentage of referring facilities with functional electronic sample referral and result tracking system;
c) Number of samples referred by the facility;
d) Number of samples referred from the facility that reached the testing laboratories;
e) Proportion of samples referred from the facility that reached the testing laboratories within required/targeted time;
f) Number of results received at the facility;
g) Proportion of results received at the facility within specified TAT.

9.1.2 Transporter indicators

a) Number of samples which were picked up by the transporter;
b) Proportion of samples which were picked up by the transporter within twenty-four hours;
c) Number of shipments by the transporter that arrived at the testing laboratory;
d) Proportion of shipments by the transporter that arrived at the testing laboratory within the specified transport time;
e) Number of results returned by the transporter.

9.1.3 Testing Laboratory indicators

a) Number of samples received at the testing laboratory;
b) Proportion of samples rejected at testing laboratory;
c) Number of tests performed from the referred samples at testing laboratory;
d) Number of results returned to the facility.

Performance indicators are determined and standardized to measure success of the sample referral system. Periodically, every facility needs to report on its referral indicators to the referral system monitoring or coordinating unit; this can be done on a monthly or quarterly basis. The reporting forms should be filled out as per indicator matrix (**ANNEX 1** refers). There are many indicators that could be tracked; however, a suggested minimum list of performance indicators to be monitored is shown in the list above.

Monitoring and evaluation tools will be used to capture information collected throughout the sample referral systems. Data will be collected using the standardized registers, forms and logs on a daily basis by the referring facilities and the testing laboratories. Recording of the data for sample referral system shall use the following tools:

1) Laboratory Investigation Request Form (**ANNEX 3** refers);
2) Sample Transportation Logs;
3) Sample Tracking Form (manifest);
4) Laboratory Registers;
5) Laboratory Referral Reporting Form;
6) Aggregate Referral Reporting Form;
7) Indicator Reporting Form;
8) Incident Reporting Form (**ANNEX 4** refers);
9) eTL;
10) eSRS;
11) Laboratory Information Systems.

ANNEXES

ANNEX 1: SAMPLE REFERRAL INDICATORS

Indicator	Level of priority	Reporting level	Indicator description	Numerator	Denominator	Disaggregation	Frequency	Source of data
FACILITY INDICATORS								
Number of referring facilities	Medium	National	Monitor number of referring facilities	N/A	N/A	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
Percentage of referring facilities with functional electronic sample tracking system referral and result	Medium	National	Monitor number of referring facilities	N/A	N/A	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
Number of samples referred by the facility	Medium	Facility, District	Monitor the number of samples referred by the facility	Number of sample referred	N/A	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
Number of samples referred from the facility that reached the testing laboratories	Medium	Facility, District	Monitor the number of samples referred by the facility	Number of sample referred	N/A	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS

Proportion of samples referred from the facility that reached the testing laboratories within required/targeted time	High	Facility, District	Monitor total number of samples reached testing laboratory within specified time	Number of samples that reached the testing laboratory within specified time	Number of samples picked	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
Number of results received at the facility	Medium	Facility, District, National	Monitor number of results received at the facility	NA	NA	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
Proportion of results received at the facility within specified TAT	High	Facility, District, National	Monitor time from date of sample collection to date results received at the facility	Number of results returned to the facility within specified TAT	Number of test performed at the testing laboratory	Testing category (by test type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
TRANSPORTER INDICATORS								
Number of samples which were picked up by the transporter	Medium	Permanent Secretary	Monitor the number of samples picked up by the transporter	N/A	NA	Testing category (by sample type)	Monthly	TPC sample referral system, Sample register book
Number of samples which were picked up by the transporter	Medium	Permanent Secretary	Monitor the number of samples picked up by	Number of samples which were picked up by	NA	Testing category (by sample type)	Monthly	TPC sample referral system, Sample

within twenty-four hours			the transporter within twenty-four hours	the transporter				register book
Number of shipments by the transporter that arrived at the testing laboratory	Medium	Permanent Secretary	Monitor the number of shipments reached testing laboratory	NA	NA	Testing category (by sample type)	Monthly	TPC sample referral system, Sample register book
Proportion of shipments by the transporter that arrived at the testing laboratory within the specified transport time	Medium	Permanent Secretary	Monitor the number of shipments reached testing laboratory within transport time	Number of shipments arrived at the testing laboratory within transport time	Number of shipments transported	Testing category (by sample type)	Monthly	TPC sample referral system, Sample register book
Number of results returned by the transporter	Medium	Permanent Secretary	Monitor the number of results returned by the transporter	Number of results returned by the transporter	Number of samples referred to the testing laboratory	Testing category (by test type, facility)	Monthly	TPC sample referral system, Sample register book
TESTING LABORATORY INDICATORS								
Number of samples received at the testing laboratory	High	Laboratory, Regional, National	Monitor the number of samples received at the testing laboratories	NA	NA	Testing category (by sample type)	Monthly	Laboratory register, Sample manifest, LIS, e-SRS

Proportion of samples rejected at testing laboratories	High	Laboratory, National	Monitor the quality of samples received at the testing laboratory	Number of samples rejected at the testing laboratory	Number of samples received and registered at the testing Laboratory	Testing category (by sample type)/Rejections reasons	Monthly	Laboratory register, Sample manifest, LIS, e-SRS
Number of tests performed from the referred samples at testing laboratory	Medium	Laboratory	Monitor the performance and workload of the Laboratory	NA	NA	Testing category (by sample type)	Quarterly	Laboratory register, Sample manifest, LIS, e-SRS
Number of results returned to the facility	Medium	Laboratory	Monitor the number of results returned to the facility	NA	NA	Testing category (by test type)	Quarterly	Laboratory register, Sample manifest, LIS, e-SRS
Proportion of results returned within specified TAT by testing laboratory.	High	Laboratory, National	Monitor the proportion of results returned within specified TAT by testing laboratory	Number of results returned within specified TAT by testing laboratory	Number of tests performed	Testing category (by sample type)	Monthly	Laboratory register, LIS

ANNEX 2: NUMBER OF HUBS AND SPOKES BY 2016

SN	Region	District	Spokes	Hub
1	Arusha	7	325	11
2	Dar es Salaam	3	474	6
3	Dodoma	7	394	17
4	Geita	6	165	12
5	Iringa	5	250	12
6	Kagera	8	294	18
7	Katavi	4	73	6
8	Kigoma	7	274	14
9	Kilimanjaro	7	397	9
10	Lindi	6	225	13
11	Manyara	6	193	10
12	Mara	8	295	10
13	Mbeya	10	426	27
14	Morogoro	7	375	15
15	Mtwara	7	216	10
16	Mwanza	7	367	15
17	Njombe	6	235	9
18	Pwani	7	295	13
19	Rukwa	4	215	11
20	Ruvuma	6	268	18
21	Shinyanga	6	213	9
22	Simiyu	5	172	6
23	Singida	6	213	6
24	Tabora	7	277	11
25	Tanga	10	390	13
26	Zanzibar	2	218	8
	Total	**164**	**7239**	**309**

Source: National Health Facilities & Laboratory Sample Referral System, First Edition 2016, MOHCDGEC

ANNEX 3: LABORATORY INVESTIGATION REQUEST FORM TEMPLATE

LABORATORY INVESTIGATION REQUEST FORM TEMPLATE

PATIENT DETAILS

HOSPITAL NUMBER:		
First Name:		
Middle Name:		
Surname:		
Residential Address:		
Ward/Unit:	**Telephone:**	
Gender	☐ Male ☐ Female	**Age**

REQUESTER DETAILS

Name of Clinician:
Date Requested:
Time:
Telephone:
Signature:
OTHERS:

SAMPLE DETAILS

Payment Mode: ☐ **Cash** ☐ **Insurance** ☐ **Exemption**
Urgency: ☐ **Normal** ☐ **URGENT**

Sample collection information
Collected by:_____
Signature_____
Date:_____ **Time:** _____

SAMPLE TYPE

☐ **BLOOD**	☐ **URINE**	☐ **SWABS**	☐ **TISSUE**
☐ **STOOL**	☐ **SPUTUM**	☐ **BODY FLUIDS**	☐ **CYTOLOGY**
☐ **OTHER, namely:**			
☐ **Anatomical site:**			

RELEVANT CLINICAL INFORMATION AND DIAGNOSIS

Clinical relevant information	
Diagnosis	

EXAMINATION REQUESTED

HAEMATOLOGY AND BT	SEROLOGY	CLINICAL CHEMISTRY	MICROBIOLOGY
☐ Hb Estimation ☐ Full Blood Count (Picture) ☐ ESR ☐ Blood Group + Rh Factor ☐ Blood Grouping + Cross-Match ☐ Peripheral Blood Film ☐ Sickling Test ☐ Bleeding Time ☐ Clotting Time ☐ Reticulocyte count ☐ Others (Specify): _____	☐ VDRL ☐Widal Test (Tube Method) ☐ H. pylori (RDT) ☐ HIV 1/2 ☐ CD4 ☐ Brucella Antibody ☐ RH Factor (Rheumatoid) ☐ ASO Titre ☐ HBsAg ☐ HCV ☐ Pregnancy Test (UPT) ☐ Others (Specify): _____	☐ Potassium (K^+) ☐ Sodium (Na^+) ☐ Calcium (Ca^{++}) ☐ Chloride (Cl^-) ☐ Phosphorus (P) ☐ Magnesium (Mg^{++}) ☐ Protein Total ☐ GGT ☐ HDL ☐ LDL ☐ FSH ☐ LH ☐ T3 ☐ T4 ☐ TSH ☐ PSA ☐ Progesterone ☐ Prolactin ☐ LDH (Lactate Dehydrogenase) ☐ Pleural fluid Protein/Glucose ☐ Ascitic fluid Protein/Glucose ☐ CSF for Protein/Glucose ☐ Fasting Blood Glucose (FBG) ☐ Random Blood Glucose (RBG) ☐ Alkaline Phosphatase ☐ CRP (Quantitative) ☐ Others (Specify): _____	☐ Urine c/s ☐ Sputum c/s for other bacteria ☐ Blood c/s ☐ Urethral Swab c/s ☐ Ear Swab c/s ☐ PUS Swab c/s ☐ Stool c/s ☐ HVS Wet ☐ HVS Gram stain ☐ Endocervical Swab for c/s ☐ Rectal Swab for Cholera ☐ Skin Scrapping for Fungus (KOH) ☐ CSF c/s ☐ Pleural fluid c/s ☐ Ascitic fluid c/s ☐ Synovial Fluid c/s ☐ Throat swab c/s ☐ Gram Stain ☐ India Ink ☐ Seminal Analysis ☐ Sputum for AFB (Microscopy) ☐ Sputum for GeneXpert ☐ CSF for GeneXpert ☐ Pleural fluid for GeneXpert ☐ Ascitic fluid for GeneXpert ☐ Cryptococcal Ag ☐ Skin Snip Smear ☐ Others (Specify): _____
PARASITOLOGY	**CLINICAL CHEMISTRY**		
☐ Urine Routine ☐ Urine Protein/Glucose/Ketone ☐ 24hrs Urine Protein ☐ Stool Routine ☐ B/S for Malaria parasites ☐ B/S or Blood for Microfilaria ☐ MRDT ☐ Others (Specify): _____	☐ Serum Creatinine ☐ Serum Urea ☐ Serum Uric Acid ☐ Bilirubin Total ☐ Bilirubin Direct ☐ AST (SGPT) ☐ ALT (SGPT) ☐Cholesterol total ☐Triglyceride ☐ Others (Specify): _____		

FOR LABORATORY USE ONLY:

Received by: _____ **Signature:** _____ **Date:** _____

Time: _____

Quality of sample: ☐ **Accepted** ☐ **Rejected** **Laboratory number:**

_____

© XXX Hospital Laboratory Effective Date: 01/07/2019

ANNEX 4: INCIDENT REPORTING FORMAT

Use this form to report accidents, injuries, medical situations, or student behaviour incidents. (Incidents involving a crime or traffic incident should be reported directly to the Campus Public Safety office.) If possible, the report should be completed within 24 hours of the event. Submit completed forms to the President's Office.			
INFORMATION ABOUT PERSON INVOLVED IN THE INCIDENT			
Full Name			
Home Address			
Student	Employee	Visitor	Vendor
Phone Numbers	Home	Cell	Work

INFORMATION ABOUT THE INCIDENT		
Date of Incident	Time	Police Notified · · Yes · · No
Location of Incident		
Description of Incident (what happened, how it happened, factors leading to the event, etc.) Be as specific as possible (attached additional sheets if necessary)		

Were there any witnesses to the incident? · · Yes · · No If yes, attach separate sheet with names, addresses, and phone numbers.
Was the individual injured? If so, describe the injury (laceration, sprain, etc.), the part of body injured, and any other information known about the resulting injury(ies).
Was medical treatment provided? · · Yes · · No · · Refused If yes, where was treatment provided: · · on site · · Urgent Care · · Emergency Room · · Other

REPORTER INFORMATION
Individual Submitting Report (print name)
Signature
Date Report Completed

FOR OFFICE USE ONLY

Report Received by _____ Date _____

FOR OFFICE USE ONLY

Document any follow-up action taken after receipt of the incident report.

Date	**Action Taken**	**By Whom**

Source: NHLQATC, NIMR Building, Plot No. 3, Barak Obama Drive, Dar es Salaam.

ANNEX 5: WORK RELATED INJURY REPORT

1. Full Name (of injured person: _____
2. Address: _____
3. Date of Birth _____
4. Date Hired _____
5. Male or Female _____
6. Date of Injury _____
7. Date of report _____
8. What Happened (Describe how injury occurred):

_____

_____

_____

9. Action taken (Describe any remedial or corrective action taken):

_____

_____

_____

10. Conclusion

_____

_____

_____

11. Name of person making report _____
12. Signature of person making report _____

Source: NHLQATC, NIMR Building, Plot No. 3, Barak Obama Drive, Dar es Salaam.

ANNEX 6: STANDARD CASE DEFINITIONS

Diseases	Age	Standard case definition
Yellow fever	All ages	Sudden fever, jaundice within 2 weeks, history of traveling from endemic area
Viral Haemorrhagic Fever e.g. Ebola, Marburg, RVF, Lassa fever, Crimean Congo, etc.	All ages	Mild/ severe fever, bleeding from nose, gums, vagina, skin or eyes and vomiting blood, impaired consciousness
Typhoid	All ages	Long-standing fever (excluding malaria), abdominal pain ± skin rash, constipation, or diarrhoea
Tick borne relapsing fever	All ages	Any person with acute fever, Headaches, Mylagia, General body malaise, at late stage abortion, still birth and complications with meningoencephalitis do occur.
Severe pneumonia	2 months to 5 years	Cough, difficult breathing ± chest in drawing, stridor, unable to drink/ breastfeed, vomiting, convulsions, lethargy or unconsciousness
Severe Malaria	All ages	High fever +/- altered consciousness, behavioural change, convulsions, passing black urine, extreme body weakness, severe pallor, jaundice. For infants: also, inability to drink or breastfeed, or vomiting everything
Rabies	All ages	History of animal bite ± fever, mental confusion, fear of drinking water, altered consciousness or death
Pneumonia	2 months to 5 years	Cough, rapid/ difficult breathing (2 to 12month = ≥50/min; 2 month to 5yr = ≥40/min)
Plague	All ages	Sudden onset of fever, headache, painful swelling of inguinal/ axillary lymph nodes, or cough with blood stained sputum.
Neonatal tetanus	New-born + 2-28 days	New-born suddenly unable to suck/feed between 2nd and 28th day of age, ± stiffness, convulsions
Measles	All ages	Fever and rash ± cough, running nose, or red eyes
Malaria	All ages	High fever ± joint pains, sweats, nausea, chills, vomiting

Human influenza caused by new subtypes	All ages	a) Suspected nCOVID-19 infection: An individual traveling from Far-East especially China presenting at Port of Entry with influenza-like-illness; b) Any person presenting with unexplained acute lower respiratory illness with fever (>38°C) and cough, shortness of breath or difficulty breathing **and** one or more of the following exposures within the 7 days prior to symptom onset: i). Close contact (within 1 meter) with a suspected, probable or confirmed person or animal (e.g. caring for, speaking with, or touching) ii). Confirmed case: A person meeting the criteria for a suspected case AND positive laboratory results from a certified laboratory. c) Suspected pandemic (H1N1) 2009 virus infection: An individual presenting with influenza-like-illness (sudden onset of fever >38°C and cough or sore throat in the absence of another diagnosis) with a history of exposure to a pandemic (H1N1) 2009 virus; d) Confirmed pandemic (H1N1) 2009 virus infection: An individual with a laboratory-confirmed pandemic (H1N1) 2009 virus infection by one or more of the following tests: • PCR, viral culture, 4-fold rise in pandemic (H1N1) 2009 virus-specific neutralizing antibodies. e) Individual with suspected with Severe Acute Respiratory Syndrome (SARS); f) Individual especially from Middle-East with suspected with Middle East Respiratory Syndrome (MERS), nCOVID-19
Epidemic Viral Keratoconjuctivities ("*Nairobi Red Eye*")	All ages	Sudden onset of redness of both eyes, soreness, photophobia and excessive tearing with history of contact with a person with red eyes

Diarrhoea with blood	All ages	Any person with diarrhoea and visible blood in the stool.
Diarrhoea + some dehydration + severe dehydration	2 months to 5 years	Diarrhoea plus 2 or more of the following: restless/irritable, sunken eyes, drinks eagerly, skin pinch goes back slowly. Diarrhoea plus 2 or more of the following: unconscious, sunken eyes, unable to drink, skin pinch goes back very slowly
Cholera	≥2 years	Any person ≥2 years of age or more with lots of watery diarrhoea.
Cerebral Spinal meningitis (CSM)	All ages	Sudden fever ± neck stiffness, intense headache, nausea and vomiting, altered consciousness and convulsions, bulged anterior fontanelle (in infants)
Anthrax	All ages	**Suspected case** Acute onset illness, characterized by several clinical forms. a) Localised form: cutaneous: skin lesion evolving from a papular through a vesicular stage, to a depressed black eschar invariably accompanied by oedema that may be mild to extensive. b) Systemic forms: (sporadic): i). gastro-intestinal: abdominal distress characterized by nausea, vomiting, anorexia and followed by fever. ii). Pulmonary (inhalation): brief prodrome resembling acute viral respiratory illness, followed by rapid onset of hypoxia, dyspnoea and high temperature, with X-ray evidence of mediastinal widening. iii). Meningeal: acute onset of high fever possibly with convulsions, loss of consciousness, meningeal signs and symptoms; commonly noted in all systemic infections. iv). **Confirmed case:** Laboratory confirmation of Bacillus anthracis from a clinical sample
Acute flaccid paralysis	<15 years	Sudden lameness (including *Guillain Barre Syndrome)* or any person of any age in whom the clinician suspects polio

Source: IDSR, MOHCDGEC

ANNEX 7: DISEASE CONDITIONS AND SAMPLES FOR REFERRAL

Disease	Sampling Strategy	Samples Required	When to Collect	Type of Test	Referral Levels
Acute flaccid paralysis	All cases (2 samples separately collected within 24 hours)	Stool sample separately collected within 24 hours	Within 14 days during onset of paralysis	Viral culture isolation of Poliomyelitis virus (type 1 – 3)	National
Anthrax	All suspected cases	Skin exudate, sputum, stool, CSF in Stuart's or Amies' TM	Acute phase (≤7 days after symptom onset)	**Skin testing:** Gram Stain and polychrome methylene blue (M'Fadyean) or Malachite Green for spores. Gram-positive, square-ended rods in pairs or short chains). For signs of cutaneous anthrax. **Stool testing:** To diagnose gastrointestinal anthrax **Sputum testing; Spinal tap (lumbar puncture):** To confirm a diagnosis of anthrax meningitis.	District, Regional, National (Peripheral Intermediate Central/reference)
	All suspected cases	Blood for cultures: Collect 10 mL of blood aseptically into appropriate blood culture bottles	An acute sample (≤7 days after symptom onset)	Culture and sensitivity testing	National

		Blood for serology Collect 10 mL of blood aseptically; this will yield approximately 5 mL of serum.	An acute sample (≤7 days after symptom onset) and a convalescent-phase sample (14 to 35 days after symptom onset) sample. **NOTE 27:** • It is recommended that the convalescent-phase sample be taken 2 weeks after the acute sample • An acute serum sample for lethal factor (LF) toxin testing can be collected from 0 to 18 days after suspected exposure or the onset of symptoms	**Blood testing:** For Lethal factor (LF) toxin testing	National
Bacillary dysentery	Confirm first 5 cases then each 10th Cases	Stool in Acute stage of illness before administration of antibiotics.	Culture for studies susceptibility testing specific.	Confirm genus and Species of the isolated typing	National
Cerebral spinal meningitis	Confirm first 5 cases then sample every 10th patient	CSF	In acute stage before administration of antibiotics	Gram stain (other stains); Susceptibility;	District, Regional, Zonal, National

				Latex Slide Agglutination.	
Cholera	Confirm first 10 cases then sample every 10th patient	Stool/ rectal swab	Sample in Acute stage of illness	• Direct hanging drop microscopy for characteristic darting movement; • Culture Specific Antiserum susceptibility.	District, Regional, Zonal, National
Malaria	All suspected cases admitted to HF for Management	Peripheral blood for smear	Immediately during admission or reporting	• MRDT; • Blood film for presence of parasites; • Species identification in epidemics	Dispensary, Health Centre, District, Regional, Zonal, National
Measles	First cases in an outbreak	Serum blood	During illness, especially 3rd to 4th day of the rush	• Measles IgM antibodies	
Plague	In each suspected case	Aspirate Blood Sputum Throat Swab Serum Autopsy materials	In acute stage before administration of antibiotics. Obtain both acute and convalescent serum	Simple (Wayson) stain for bipolar organism**;** Culture of aspirate, blood; sputum or swab susceptibility • F1 antigenic detection;	Regional, Zonal, National

				• *Y. Pestis* antibodies in patient serum	
Pneumonia	All cases	Sputum, Pleural Fluid, Blood	During acute stage of illness before taking antibiotics	ZN on sputum (to rule out TB), culture	District, Regional, Zonal, National
Rabies	All human rabid cases, suspected animals and post mortems cases	Brain tissue, CSF, Saliva, Skin Blood	During illness with rapid signs and symptoms	• Isolation of rabies virus from clinical (human/animal case; • PCR identification of viral antigens; • Conformation of rabies antigens by direct fluorescent Antibody test (FAT).	Regional, Zonal, National
Typhoid	First 5 cases in an outbreak	Blood stool	a) Culture susceptibility b) Antisera agglutination c) Serological test	In acute stage of illness	District, Regional, Zonal, National
Viral haemorrhagic fever	All suspected cases	Blood, serum, plasma post-mortem tissue (liver)	During febrile period. As soon as possible following death	Virus detection (PCR propagation) IgM antibody IgG antibody	National
Yellow fever	Sylvatic all suspected cases at the beginning first cases, then every 10th case	Blood, serum, plasma post-mortem tissue (liver)	Within the first 3 to 5 days of Illness. **NOTE 28:** For serum two separate samples in two weeks' interval	Virus detection (PCR propagation IgM antibody IgM detection.	National

			autopsy as may be Possible following death.		

ANNEX 8: COMMON TRANSPORT MEDIA USED FOR SAMPLE REFERRAL

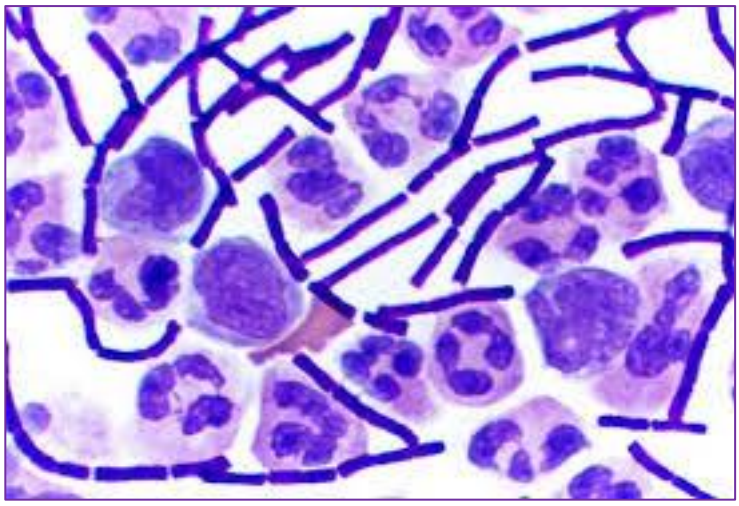
Transport media is used to prolong the viability of suspected organism causing a disease and/or infection in human, while suppressing overgrowth of the normal flora. The most common media used are:

1. Stuart's Transport Media;
   - Stuart powder 4 gm
   - Distilled water 250 mL
2. Amies (Charcoal) Transport Media;
   - Amies powder 5.2 gm
   - Distilled water 250 mL
3. Cary-Blair Transport Media
   - Cary-Blair powder 3.4 gm
   - Distilled water 250 mL

FIGURE 12: AMIES TRANSPORT MEDIUM IN TUBE

Source: https://microbeonline.com/amies-transport-medium/

FIGURE 13: GRAM STAIN OF *B. ANTHRAX* IN CSF



Source: Reference No. 32

NOTE 29: For Stuart's and Amies Transport Media follow SOP and manufacturer's instructions to prepare, autoclave at 121°C for 15 minutes.

NOTE 30: **Stuart's Transport Medium** is a non-nutritional semi-solid medium for the preservation of *Neisseria* species and other fastidious organisms during transport from collection point to testing laboratory. Originally formulated for the conservation of *Neisseria gonorrhoeae* and *Trichomonas vaginalis*, and also used for *Haemophilus influenzae, Streptococcus pneumoniae, Streptococcus pyogenes* and *Corynebacterium diphtheriae*. It may also be used for the transport of other bacteriological samples.

NOTE 31: **Amies Transport Medium** is a widely used and effective semisolid medium for the transportation of swab samples to the microbiology laboratory. Placing swabs in a moist container or transport medium prevents drying and death of bacteria.

NOTE 32: Amies is a modification of Stuart's medium in which glycerophosphate is replaced by an inorganic phosphate buffer and activated charcoal is added to neutralize fatty acids. This modification prolongs the viability and thus increases the isolation of anaerobes, delicate bacterial pathogens like *Neisseria gonorrhoeae*, *Haemophilus influenzae*, *Neisseria meningitidis*, and *Haemophilus ducreyi*. For delays, as long as 24 hours, Amies medium with charcoal can be used.

NOTE 33: For Cary-Blair Transport Media follow SOP and manufacturer's instructions, steam at 115^{o}C for 15 minutes (**DO NOT AUTOCLAVE**).

NOTE 34: Cary-Blair Transport Medium is a semisolid medium recommended for use in the transportation and preservation of clinical samples, primarily stool and rectal swabs.

ANNEX 9: INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A

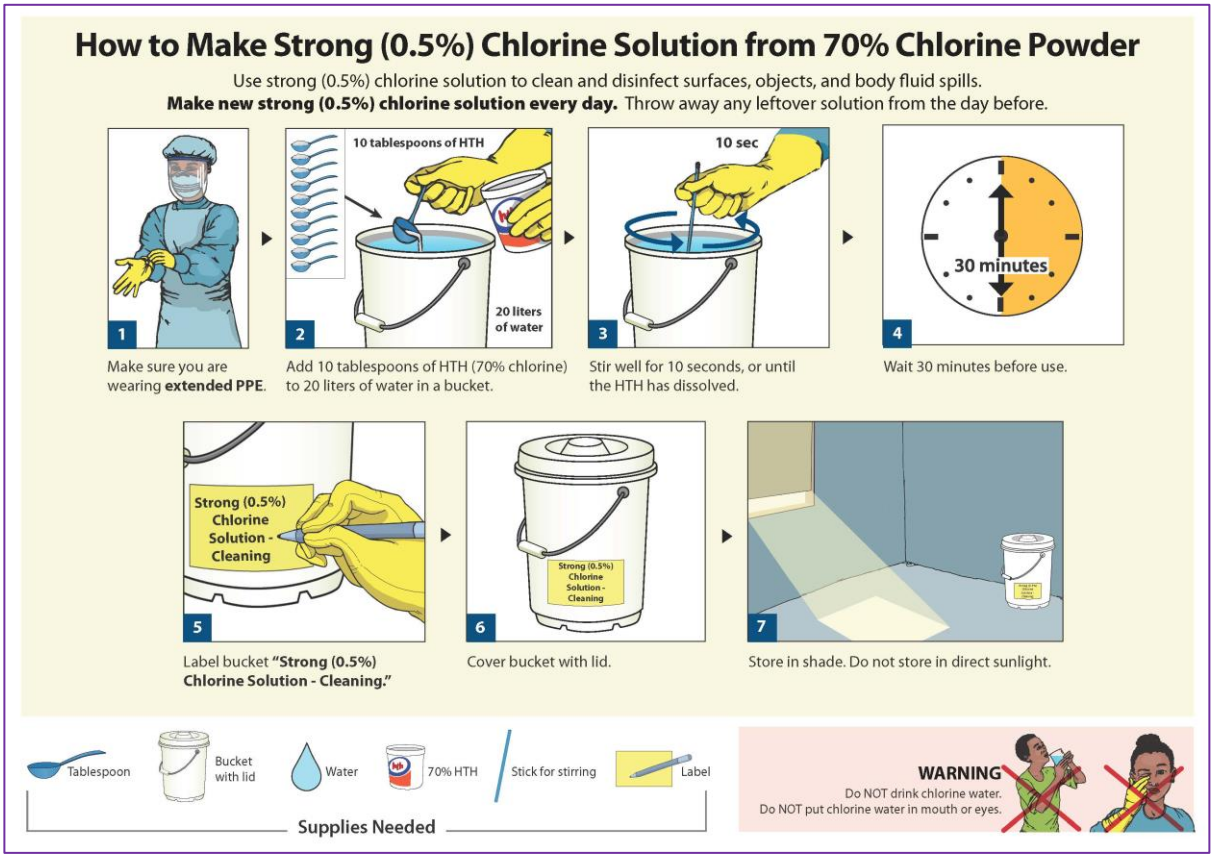
UN number and proper shipping name	infectious substances
UN 2814 Infectious substance, affecting humans	• African swine fever virus (cultures only) • Avian paramyxovirus Type 1 – Velogenic Newcastle disease virus (cultures only) • *Bacillus anthracis* (cultures only) • *Brucella abortus* (cultures only) • *Brucella melitensis* (cultures only) • *Brucella suis* (cultures only) • *Burkholderia pseudomallei* – *Pseudomonas* • *Chlamydia psittaci* – avian strains (cultures only) • Classical swine fever virus (cultures only) • *Clostridium botulinum* (cultures only) • *Coccidioides immitis* (cultures only) • *Coxiella burnetii* (cultures only) • Crimean-Congo haemorrhagic fever virus • Dengue virus (cultures only) • Eastern equine encephalitis virus (cultures only) • Ebola virus • *Escherichia coli*, verotoxigenic (cultures only) • Flexal virus • Foot and mouth disease virus (cultures only) • *Francisella tularensis* (cultures only) • Glanders (cultures only) • Goatpox virus (cultures only) • Guanarito virus • Hantaan virus • Hantaviruses causing haemorrhagic fever with renal syndrome • Hendra virus • Hepatitis B virus (cultures only) • Herpes B virus (cultures only) • Highly pathogenic avian influenza virus (cultures only) • Human immunodeficiency virus (cultures only)

	• Japanese Encephalitis virus (cultures only) • Junin virus • Kyasanur Forest disease virus • Lassa virus • Lumpy skin disease virus (cultures only) • Machupo virus • Marburg virus • Monkeypox virus • *Mycobacterium tuberculosis* (cultures only) • *Mycoplasma mycoides* – Contagious bovine pleuropneumonia (cultures only) • Nipah virus • Omsk haemorrhagic fever virus • Peste des petits ruminants' virus (cultures only) • Poliovirus (cultures only) • *pseudomallei* (cultures only) • Rabies virus (cultures only) • *Rickettsia prowazekii* (cultures only) • *Rickettsia rickettsii* (cultures only) • Rift Valley fever virus (cultures only) • Rinderpest virus (cultures only) • Russian spring-summer encephalitis virus (cultures only) • Sabia virus • Sheep-pox virus (cultures only) • *Shigella dysenteriae type 1* (cultures only) • Swine vesicular disease virus (cultures only) • Tick-borne encephalitis virus (cultures only) • Variola virus • Venezuelan equine encephalitis virus (cultures only) • West Nile virus (cultures only) • Yellow fever virus (cultures only) • *Yersinia pestis* (cultures only)

ANNEX 10: APPLICATION OF CHLORINE SOLUTIONS IN CLEANING AND DISINFECTING

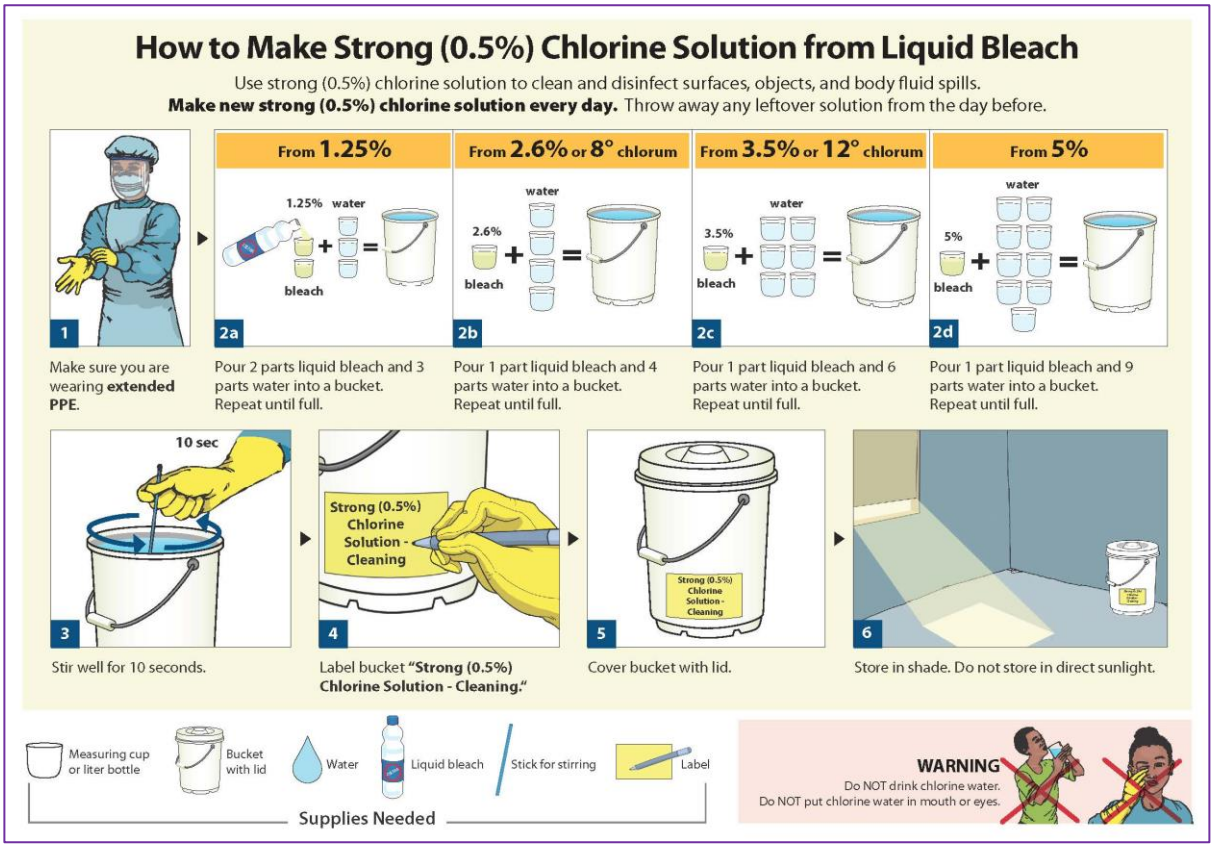
Solution	Use	Prepare using bleach (5%)	Prepare using powder (65-70%)
0.05%	Bare hand and skin, Floors and equipment, Clothing, Bedding, Vehicles.	0.1 litre bleach + 9.9 litre of water	7 grams/ 0.5 tablespoon + 10 litre of water
0.5%	Excreta, Vomit, Body fluids.	0.1 litre bleach + 0.9 litre of water	7 grams/ 0.5 tablespoon + 1 litre of water
2%	Dead body	0.4 litre bleach + 0.6 litre of water	30 grams/ 2 tablespoons + 1 litre of water

ANNEX 11: HOW TO MAKE 0.5% CHLORINE SOLUTION FROM 70% CHLORINE POWDER



Source: WHO (2004) ISBN 92 9022 238 7: Practical Guidelines for Infection Control in Health Care Facilities

ANNEX 12: HOW TO MAKE 0.5% CHLORINE SOLUTION FROM LIQUID BLEACH



Source: WHO (2004) ISBN 92 9022 238 7: Practical Guidelines for Infection Control in Health Care Facilities

ANNEX 13: REGIONALISED IMPLEMENTING PARTNERS

No.	Implementing Partner	Regions
1	AGPHAI	Mwanza
		Shinyanga
		Mara
2	MDH	Dar es Salaam
		Kagera
		Tabora
		Geita
		Pwani
3	THPS	Above Site
4	UMB	TA and Above Site
5	BORESHA AFYA - SOUTHERN	Morogoro
		Iringa
		Njombe
		Mtwara
		Lindi
		Ruvuma
6	BORESHA AFYA - NORTHERN	Arusha
		Kilimanjaro
		Singida
		Manyara
		Dodoma
7	HJF-DOD	Mbeya
		Katavi
		Rukwa
		Songwe
8	AMREF HEALTH AFRICA	Tanga
		Simiyu
		Zanzibar

KEY:

TA = Technical Assistance
Above Site = Support to all regions
Source: PEPFAR/CDC 2020

NOTE 35: Implementing partner's regionalisation is not permanent.

TABLE 24: MAPPING OF FUNCTIONAL HUBS BY MARCH 2020

NO	REGION	DISTRICT	HUB NAME	FACILITY TYPE	NACP	NTLP	NBTS	IDSR	EQA	OTHERS
1	Mara	Musoma MC	Musoma RRH	H	Y	Y	Y	Y	Y	Y
2	Mara	Butiama DC	Butiama DH	H	Y	Y	N	Y	Y	Y
3	Mara	Bunda DC	Bunda DDH	H	Y	Y	N	Y	Y	Y
4	Mara	Bunda DC	Kibara Hospital	H	Y	Y	N	Y	Y	Y
5	Mara	Serengeti DC	Natta HC	HC	Y	Y	N	Y	Y	Y
6	Mara	Serengeti DC	Nyerere DDH	H	Y	Y	N	Y	Y	Y
7	Mara	Tarime DC	Nyangoto HC	HC	Y	Y	N	Y	Y	Y
8	Mara	Tarime DC	Tarime DH	H	Y	Y	N	Y	Y	Y
9	Mara	Rorya DC	Kowak Hospital	H	Y	Y	N	Y	Y	Y
10	Mara	Rorya DC	Shirati Hospital	H	Y	Y	N	Y	Y	Y
11	Mara	Rorya DC	Kinesi HC	HC	Y	Y	N	Y	Y	Y
12	Mara	Bunda DC	Nyasho HC	HC	Y	Y	N	Y	Y	Y
13	Mara	Bunda DC	Ikizu HC	HC	Y	Y	N	Y	Y	Y
14	Mara	Musoma DC	Murangi HC	HC	Y	Y	N	Y	Y	Y
15	Mara	Rorya DC	Utegi HC	HC	Y	Y	N	Y	Y	Y
16	Mwanza	Nyamagana MC	Nyamagana DH	H	Y	Y	N	Y	Y	Y
17	Mwanza	Nyamagana MC	Igoma HC	HC	Y	Y	N	Y	Y	Y
18	Mwanza	Magu DC	Magu DH	H	Y	Y	N	Y	Y	Y
19	Mwanza	Ukerewe DC	Nansio DH	H	Y	Y	N	Y	Y	Y
20	Mwanza	Ukerewe DC	Muriti HC	HC	Y	Y	N	Y	Y	Y
21	Mwanza	Ukerewe DC	Bwisya HC	HC	Y	Y	N	Y	Y	Y
22	Mwanza	Sengerema DC	Nyakaliro HC	HC	Y	Y	N	Y	Y	Y
23	Mwanza	Sengerema DC	Mwangika HC	HC	Y	Y	N	Y	Y	Y

24	Mwanza	Sengerema DC	Sengerema DDH	H	Y	Y	N	Y	Y	Y
25	Mwanza	Sengerema DC	Katunguru HC	HC	Y	Y	N	Y	Y	Y
26	Mwanza	Misungwi DC	Misungwi DH	H	Y	Y	N	Y	Y	Y
27	Mwanza	Misungwi DC	Misasi HC	HC	Y	Y	N	Y	Y	Y
28	Mwanza	Kwimba DC	Ngudu DH	H	Y	Y	N	Y	Y	Y
29	Mwanza	Kwimba DC	Mwamashimba HC	HC	Y	Y	N	Y	Y	Y
30	Mwanza	Nyamagana DC	Bugando MC	H	Y	Y	N	Y	Y	Y
31	Mwanza	Ilemela DC	Buzuruga HC	HC	Y	Y	N	Y	Y	Y
32	Mwanza	Kwimba DC	Sumve Hospital	H	Y	Y	N	Y	Y	Y
33	Mwanza	Misungwi DC	Bukumbi Hospital	H	Y	Y	N	Y	Y	Y
34	Mwanza	Nyamagana MC	Makongoro HC	HC	Y	Y	N	Y	Y	Y
35	Mwanza	Nyamagana MC	Sekou Toure RRH	H	Y	Y	Y	Y	Y	Y
36	Shinyanga	Shinyanga DC	Salawe HC	HC	Y	Y	N	Y	Y	Y
37	Shinyanga	Shinyanga DC	Nindo HC	HC	Y	Y	N	Y	Y	Y
38	Shinyanga	Shinynga MC	Shinyanga RRH	H	Y	Y	Y	Y	Y	Y
39	Shinyanga	Shinyanga DC	Tinde HC	HC	Y	Y	N	Y	Y	Y
40	Shinyanga	Ushetu DC	Bulungwa HC	HC	Y	Y	N	Y	Y	Y
41	Shinyanga	Msalala DC	Lunguya HC	HC	Y	Y	N	Y	Y	Y
42	Shinyanga	Kahama TC	Kahama DH	H	Y	Y	N	Y	Y	Y
43	Shinyanga	Kishapu DC	Mwadui Hospital	H	Y	Y	N	Y	Y	Y
44	Shinyanga	Kishapu DC	Dr. Jakaya Kikwete Hospital	H	Y	Y	N	Y	Y	Y
45	Simiyu	Bariadi TC	Bariadi RRH	H	Y	Y	Y	Y	Y	Y
46	Simiyu	Busega DC	Mkula Hospital	H	Y	Y	N	Y	Y	Y
47	Simiyu	Maswa DC	Maswa DH	H	Y	Y	N	Y	Y	Y
48	Simiyu	Meatu DC	Meatu DH	H	Y	Y	N	Y	Y	Y
49	Simiyu	Iltilima DC	Ikindilo HC	HC	Y	Y	N	Y	Y	Y

50	Geita	Geita MC	Geita RRH	H	Y	Y	Y	Y	Y	Y
51	Geita	Geita DC	Katoro HC	HC	Y	Y	N	Y	Y	Y
52	Geita	Nyang'hwale	Kharumwa HC	HC	Y	Y	N	Y	Y	Y
53	Geita	Chato DC	Chato DH	H	Y	Y	N	Y	Y	Y
54	Geita	Chato DC	Bwanga HC	HC	Y	Y	N	Y	Y	Y
55	Geita	Chato DC	Kibehe Dispensary	D	Y	Y	N	Y	Y	Y
56	Geita	Mbogwe DC	Masumbwe HC	HC	Y	Y	N	Y	Y	Y
57	Geita	Mbogwe DC	Iboya HC	HC	Y	Y	N	Y	Y	Y
58	Geita	Geita DC	Nzera DH	H	Y	Y	N	Y	Y	Y
59	Geita	Bukombe DC	Bukombe DH	H	Y	Y	N	Y	Y	Y
60	Geita	Bukombe DC	Uyovu HC	HC	Y	Y	N	Y	Y	Y
61	Pwani	Kibaha TC	Mkoani HC	HC	Y	Y	N	Y	Y	Y
62	Pwani	Kibaha TC	Tumbi RRH	H	Y	Y	Y	Y	Y	Y
63	Pwani	Kibaha DC	Mlandizi HC	HC	Y	Y	N	Y	Y	Y
64	Pwani	Kibaha DC	Chalinze HC	HC	Y	Y	N	Y	Y	Y
65	Pwani	Bagamoyo DC	Bagamoyo DH	H	Y	Y	N	Y	Y	Y
66	Pwani	Bagamoyo DC	Miono HC	HC	Y	Y	N	Y	Y	Y
67	Pwani	Kisarawe DC	Kisarawe DH	H	Y	Y	N	Y	Y	Y
68	Pwani	Kisarawe DC	Manerumango HC	HC	Y	Y	N	Y	Y	Y
69	Pwani	Mkuranga DC	Mkuranga DH	H	Y	Y	N	Y	Y	Y
70	Pwani	Kibiti DC	Mchukwi Hospital	H	Y	Y	N	Y	Y	Y
71	Pwani	Rufiji DC	Muhoro HC	HC	Y	Y	N	Y	Y	Y
72	Pwani	Rufiji DC	Utete DH	H	Y	Y	N	Y	Y	Y
73	Pwani	Mafia DC	Mafia DH	H	Y	Y	N	Y	Y	Y
74	Pwani	Mkuranga DC	Kisiju HC	HC	Y	Y	N	Y	Y	Y
75	Pwani	Mkuranga DC	Irene Kilimahewa HC	HC	Y	Y	N	Y	Y	Y

76	Pwani	Kibiti DC	Kibiti DH	H	Y	Y	N	Y	Y	Y
77	Pwani	Rufiji DC	Ikwiriri HC	HC	Y	Y	N	Y	Y	Y
78	Kilimanjaro	Hai DC	Hai DH	H	Y	Y	N	Y	Y	Y
79	Kilimanjaro	Siha DC	Siha DH	H	Y	Y	N	Y	Y	Y
80	Kilimanjaro	Siha DC	Kibong'oto IDH	H	Y	Y	N	Y	Y	Y
81	Kilimanjaro	Moshi MC	Mawenzi RRH	H	Y	Y	Y	Y	Y	Y
82	Kilimanjaro	Moshi DC	Himo HC	HC	Y	Y	N	Y	Y	Y
83	Kilimanjaro	Rombo DC	Huruma DDH	H	Y	Y	N	Y	Y	Y
84	Kilimanjaro	Mwanga DC	Kisangara HC	HC	Y	Y	N	Y	Y	Y
85	Kilimanjaro	Mwanga DC	Usangi DH	H	Y	Y	N	Y	Y	Y
86	Kilimanjaro	Same DC	Same DH	H	Y	Y	N	Y	Y	Y
87	Kilimanjaro	Same DC	Gonja Hospital	H	Y	Y	N	Y	Y	Y
88	Kilimanjaro	Hai DC	Machame Hospital	H	Y	Y	N	Y	Y	Y
89	Kilimanjaro	Moshi DC	Kibosho Hospital	H	Y	Y	N	Y	Y	Y
90	Singida	Singida MC	Singida RRH	H	Y	Y	Y	Y	Y	Y
91	Singida	SingidaDC	St. Carolus Hospital	H	Y	Y	N	Y	Y	Y
92	Singida	Mkalama DC	Nduguti HC	HC	Y	Y	N	Y	Y	Y
93	Singida	Iramba DC	Kiomboi HC	HC	Y	Y	N	Y	Y	Y
94	Singida	Dung'unyi DC	Ikungi HC	HC	Y	Y	N	Y	Y	Y
95	Singida	Manyoni DC	Manyoni DH	H	Y	Y	N	Y	Y	Y
96	Singida	Manyoni DC	Itigi HC	HC	Y	Y	N	Y	Y	Y
97	Singida	Mkalama DC	Iambi Hospital	H	Y	Y	N	Y	Y	Y
98	Singida	Manyoni DC	St. Gaspar Hospital	H	Y	Y	N	Y	Y	Y
99	Singida	Singida DC	Queen of Universe Hospital	H	Y	Y	N	Y	Y	Y
100	Singida	Singida DC	Makiungu Hospital	H	Y	Y	N	Y	Y	Y
101	Tabora	Igunga DC	Igunga DH	H	Y	Y	N	Y	Y	Y

102	Tabora	Igunga DC	Nkinga Hospital	H	Y	Y	N	Y	Y	Y
103	Tabora	Nzega DC	Nzega DH	H	Y	Y	N	Y	Y	Y
104	Tabora	Nzega DC	Busondo HC	HC	Y	Y	N	Y	Y	Y
105	Tabora	Uyui DC	Ilolangulu HC	HC	Y	Y	N	Y	Y	Y
106	Tabora	Tabora MC	Kitete RRH	H	Y	Y	Y	Y	Y	Y
107	Tabora	Urambo DC	Urambo DH	H	Y	Y	N	Y	Y	Y
108	Tabora	Kaliua DC	Kaliua Hospital	H	Y	Y	N	Y	Y	Y
109	Tabora	Kaliua DC	Ulyankulu HC	HC	Y	Y	N	Y	Y	Y
110	Tabora	Sikonge DC	Sikonge CDH	H	Y	Y	N	Y	Y	Y
111	Tabora	Sikonge DC	Mazinge HC	HC	Y	Y	N	Y	Y	Y
112	Tabora	Sikonge DC	Kitunda HC	HC	Y	Y	N	Y	Y	Y
113	Tabora	Nzega DC	Bukene HC	HC	Y	Y	N	Y	Y	Y
114	Tabora	Nzega DC	Ndala Hospital	H	Y	Y	N	Y	Y	Y
115	Manyara	Babati TC	Manyara RRH	H	Y	Y	Y	Y	Y	Y
116	Manyara	Hanang DC	Tumaini DDH	H	Y	Y	N	Y	Y	Y
117	Manyara	Babati DC	Dareda Hospital	H	Y	Y	N	Y	Y	Y
118	Manyara	Babati DC	Magugu HC	HC	Y	Y	N	Y	Y	Y
119	Manyara	Mbulu DC	Haydom Hospital	H	Y	Y	N	Y	Y	Y
120	Manyara	Mbulu TC	Mbulu TC Hospital	H	Y	Y	N	Y	Y	Y
121	Manyara	Simanjiro DC	Mererani HC	HC	Y	Y	N	Y	Y	Y
122	Manyara	Simanjiro DC	Orkesumet KKT CDH	H	Y	Y	N	Y	Y	Y
123	Manyara	Simanjiro DC	Emboreet HC	HC	Y	Y	N	Y	Y	Y
124	Manyara	Simanjiro DC	Nyumba ya Mungu Dispensary	D	Y	Y	N	Y	Y	Y
125	Manyara	Kiteto DC	Kibaya DH	H	Y	Y	N	Y	Y	Y
126	Dodoma	Bahi DC	Bahi HC	HC	Y	Y	N	Y	Y	Y
127	Dodoma	Bahi DC	Mundemu HC	HC	Y	Y	N	Y	Y	Y

128	Dodoma	Bahi DC	Mtitaa HC	HC	Y	Y	N	Y	Y	Y
129	Dodoma	Chamwino DC	Mvumi CDH	H	Y	Y	N	Y	Y	Y
130	Dodoma	Chamwino DC	Haneti HC	HC	Y	Y	N	Y	Y	Y
131	Dodoma	Mpwapwa DC	Rudi HC	HC	Y	Y	N	Y	Y	Y
132	Dodoma	Dodoma CC	Hombolo HC	HC	Y	Y	N	Y	Y	Y
133	Dodoma	Dodoma CC	Dodoma RRH	H	Y	Y	Y	Y	Y	Y
134	Dodoma	Kongwa DC	Kondoa DH	H	Y	Y	N	Y	Y	Y
135	Dodoma	Kondoa DC	Kisese HC	HC	Y	Y	N	Y	Y	Y
136	Dodoma	Kongwa DC	Kongwa DH	H	Y	Y	N	Y	Y	Y
137	Dodoma	Kongwa DC	Mlali HC	HC	Y	Y	N	Y	Y	Y
138	Dodoma	Kongwa DC	Mkoka HC	HC	Y	Y	N	Y	Y	Y
139	Dodoma	Dodoma CC	Makole HC	HC	Y	Y	N	Y	Y	Y
140	Dodoma	Mpwapwa DC	Mpwapwa DH	H	Y	Y	N	Y	Y	Y
141	Arusha	Arusha CC	Mt. Meru RRH	H	Y	Y	Y	Y	Y	Y
142	Arusha	Meru DC	Meru DH	H	Y	Y	N	Y	Y	Y
143	Arusha	Arusha DC	Oltrumet HC	HC	Y	Y	N	Y	Y	Y
144	Arusha	Longido DC	Longido HC	HC	Y	Y	N	Y	Y	Y
145	Arusha	Monduli DC	Monduli DH	H	Y	Y	N	Y	Y	Y
146	Arusha	Monduli DC	Kirurumo HC	HC	Y	Y	N	Y	Y	Y
147	Arusha	Karatu DC	Mang'ola HC	HC	Y	Y	N	Y	Y	Y
148	Arusha	Longido DC	Engarenaibor HC	HC	Y	Y	N	Y	Y	Y
149	Arusha	Karatu DC	Karatu DDH	H	Y	Y	N	Y	Y	Y
150	Arusha	Ngorongoro DC	Wasso Hospital	H	Y	Y	N	Y	Y	Y
151	Arusha	Ngorongoro DC	Digodigo RC HC	HC	Y	Y	N	Y	Y	Y
152	Kagera	Bukoba DC	Kishanje HC	HC	Y	Y	N	Y	Y	Y
153	Kagera	Bukoba DC	Izimbya CDH	H	Y	Y	N	Y	Y	Y

154	Kagera	Bukoba DC	Kanazi HC	HC	Y	Y	N	Y	Y	Y
155	Kagera	Biharamulo DC	Biharamulo CDH	H	Y	Y	N	Y	Y	Y
156	Kagera	Biharamulo DC	Nyakanazi HC	HC	Y	Y	N	Y	Y	Y
157	Kagera	Misenyi DC	Bunazi HC	HC	Y	Y	N	Y	Y	Y
158	Kagera	Misenyi DC	Mugana CDH	H	Y	Y	N	Y	Y	Y
159	Kagera	Muleba DC	Kimeya HC	HC	Y	Y	N	Y	Y	Y
160	Kagera	Muleba DC	Kaigara HC	HC	Y	Y	N	Y	Y	Y
161	Kagera	Muleba DC	Rubya CDH	H	Y	Y	N	Y	Y	Y
162	Kagera	Kyerwa DC	Nkwenda HC	HC	Y	Y	N	Y	Y	Y
163	Kagera	Kyerwa DC	Isingiro Hospital	H	Y	Y	N	Y	Y	Y
164	Kagera	Karagwe DC	Nyakahanga CDH	H	Y	Y	N	Y	Y	Y
165	Kagera	Karagwe DC	Kayanga HC	HC	Y	Y	N	Y	Y	Y
166	Kagera	Karagwe DC	Nyakaiga Hospital	H	Y	Y	N	Y	Y	Y
167	Kagera	Ngara DC	Nyamiaga Hospital	H	Y	Y	N	Y	Y	Y
168	Kagera	Ngara DC	Rulenge Hospital	H	Y	Y	N	Y	Y	Y
169	Kagera	Bukoba MC	Zamzam HC	HC	Y	Y	N	Y	Y	Y
170	Kagera	Bukoba MC	Rwamishenye HC	HC	Y	Y	N	Y	Y	Y
171	Kagera	Bukoba MC	Bukoba RRH	H	Y	Y	Y	Y	Y	Y
172	Tanga	Handeni DC	Handeni DH	H	Y	Y	N	Y	Y	Y
173	Tanga	Handeni DC	Kabuku HC	HC	Y	Y	N	Y	Y	Y
174	Tanga	Korogwe DC	Korogwe Hospital	H	Y	Y	N	Y	Y	Y
175	Tanga	Korogwe DC	Mombo HC	HC	Y	Y	N	Y	Y	Y
176	Tanga	Bumbuli DC	Bumbuli Mission CDH	H	Y	Y	N	Y	Y	Y
177	Tanga	Lushoto DC	Lushoto DH	H	Y	Y	N	Y	Y	Y
178	Tanga	Korogwe DC	Magoma HC	HC	Y	Y	N	Y	Y	Y
179	Tanga	Muheza DC	Muheza DDH	H	Y	Y	N	Y	Y	Y

180	Tanga	Tanga CC	Bombo RRH	H	Y	Y	Y	Y	Y	Y
181	Tanga	Mkinga DC	Mkinga HC	HC	Y	Y	N	Y	Y	Y
182	Tanga	Pangani DC	Pangani DH	H	Y	Y	N	Y	Y	Y
183	Tanga	Mkinga DC	Maramba HC	HC	Y	Y	N	Y	Y	Y
184	Tanga	Tanga CC	Ngamiani HC	HC	Y	Y	N	Y	Y	Y
185	Tanga	Kilindi DC	Songe CDH	H	Y	Y	N	Y	Y	Y
186	Tanga	Muheza DC	Burua HC	HC	Y	Y	N	Y	Y	Y
187	Songwe	Mbozi DC	Vwawa Hospital	H	Y	Y	Y	Y	Y	Y
188	Songwe	Mbozi DC	Isansa HC	HC	Y	Y	N	Y	Y	Y
189	Songwe	Mbozi DC	Itaka HC	HC	Y	Y	N	Y	Y	Y
190	Songwe	Mbozi DC	Iyula HC	HC	Y	Y	N	Y	Y	Y
191	Songwe	Ileje DC	Itumba Hospital	H	Y	Y	N	Y	Y	Y
192	Songwe	Ileje DC	Isoko Hospital	H	Y	Y	N	Y	Y	Y
193	Songwe	Momba DC	Kamsamba HC	HC	Y	Y	N	Y	Y	Y
194	Songwe	Momba DC	Ndalambo Dispensary	D	Y	Y	N	Y	Y	Y
195	Songwe	Momba DC	Tunduma HC	HC	Y	Y	N	Y	Y	Y
196	Songwe	Momba DC	Chitete Dispensary	D	Y	Y	N	Y	Y	Y
197	Songwe	Songwe DC	Mbuyuni HC	HC	Y	Y	N	Y	Y	Y
198	Songwe	Mbozi DC	Mlowo HC	HC	Y	Y	N	Y	Y	Y
199	Katavi	Tanganyika DC	Karema HC	HC	Y	Y	N	Y	Y	Y
200	Katavi	Mpanda DC	Katavi RRH	H	Y	Y	Y	Y	Y	Y
201	Katavi	Mlele DC	Usevya HC	HC	Y	Y	N	Y	Y	Y
202	Katavi	Mlele DC	Inyonga HC	HC	Y	Y	N	Y	Y	Y
203	Katavi	Nsimbo DC	Katumba HC	HC	Y	Y	N	Y	Y	Y
204	Katavi	Nsimbo DC	Nsimbo Dispensary	D	Y	Y	N	Y	Y	Y
205	Rukwa	Kalambo DC	Mwimbi HC	HC	Y	Y	N	Y	Y	Y

206	Rukwa	Kalambo DC	Matai HC	HC	Y	Y	N	Y	Y	Y
207	Rukwa	Nkasi DC	Namanyere DH	H	Y	Y	N	Y	Y	Y
208	Rukwa	Nkasi DC	Kirando HC	HC	Y	Y	N	Y	Y	Y
209	Rukwa	Nkasi DC	Kilangala HC	HC	Y	Y	N	Y	Y	Y
210	Rukwa	Sumbawanga DC	Milepa Dispensary	D	Y	Y	N	Y	Y	Y
211	Rukwa	Sumbawanga DC	Muze Dispensary	D	Y	Y	N	Y	Y	Y
212	Rukwa	Sumbawanga MC	Sumbawanga RRH	H	Y	Y	Y	Y	Y	Y
213	Rukwa	Sumbawanga DC	Mpui HC	HC	Y	Y	N	Y	Y	Y
214	Rukwa	Sumbawanga DC	Laela HC	HC	Y	Y	N	Y	Y	Y
215	Ruvuma	Mbinga DC	Mbinga DH	H	Y	Y	N	Y	Y	Y
216	Ruvuma	Mbinga DC	Ruanda HC	HC	Y	Y	N	Y	Y	Y
217	Ruvuma	Mbinga DC	Mapera HC	HC	Y	Y	N	Y	Y	Y
218	Ruvuma	Mbinga DC	Kigongesera HC	HC	Y	Y	N	Y	Y	Y
219	Ruvuma	Namtumbo DC	Namtumbo DH	H	Y	Y	N	Y	Y	Y
220	Ruvuma	Namtumbo DC	Lusewa HC	HC	Y	Y	N	Y	Y	Y
221	Ruvuma	Namtumbo DC	Hangga HC	HC	Y	Y	N	Y	Y	Y
222	Ruvuma	Nyasa DC	St. Anne's Hospital	H	Y	Y	N	Y	Y	Y
223	Ruvuma	Nyasa DC	Tingi Dispensary	D	Y	Y	N	Y	Y	Y
224	Ruvuma	Nyasa DC	Mbambabay HC	HC	Y	Y	N	Y	Y	Y
225	Ruvuma	Nyasa DC	St. Elizabeth Lituhi Hospital	H	Y	Y	N	Y	Y	Y
226	Ruvuma	Songea DC	St. Joseph Peramiho Hospital	H	Y	Y	N	Y	Y	Y
227	Ruvuma	Songea DC	Songea RRH	H	Y	Y	Y	Y	Y	Y
228	Ruvuma	Songea MC	Tunduru DH	H	Y	Y	N	Y	Y	Y
229	Ruvuma	Tunduru DC	Nakapanya HC	HC	Y	Y	N	Y	Y	Y
230	Ruvuma	Tunduru DC	Mbesa Hospital	H	Y	Y	N	Y	Y	Y

231	Ruvuma	Tunduru DC	Kiuma HC	HC	Y	Y	N	Y	Y	Y
232	Ruvuma	Tunduru DC	Matemanga HC	HC	Y	Y	N	Y	Y	Y
233	Ruvuma	Songea DC	Madima HC	HC	Y	Y	N	Y	Y	Y
234	Mbeya	Chunya	Chunya DH	H	Y	Y	N	Y	Y	Y
235	Mbeya	Chunya	MwambaniI HC	HC	Y	Y	N	Y	Y	Y
236	Mbeya	Chunya	Lupatingatinga HC	HC	Y	Y	N	Y	Y	Y
237	Mbeya	Kyela DC	Matema Hospital	H	Y	Y	N	Y	Y	Y
238	Mbeya	Kyela DC	Kyela DH	H	Y	Y	N	Y	Y	Y
239	Mbeya	Kyela DC	Ipinda HC	HC	Y	Y	N	Y	Y	Y
240	Mbeya	Mbalali DC	Mbarali DH	H	Y	Y	N	Y	Y	Y
241	Mbeya	Mbalali DC	Chimala Hospital	H	Y	Y	N	Y	Y	Y
242	Mbeya	Mbalali DC	Madibira HC	HC	Y	Y	N	Y	Y	Y
243	Mbeya	Mbeya CC	Mbeya Zonal Referral Laboratory	L	Y	Y	N	Y	Y	Y
244	Mbeya	Mbeya CC	Mbeya RRH	H	Y	Y	Y	Y	Y	Y
245	Mbeya	Mbeya DC	Ifisi/Mbalizi DH	H	Y	Y	N	Y	Y	Y
246	Mbeya	Mbeya DC	Igoma HC	HC	Y	Y	N	Y	Y	Y
247	Mbeya	Mbeya DC	Ilembo HC	HC	Y	Y	N	Y	Y	Y
248	Mbeya	Rungwe DC	Tukuyu Hospital	H	Y	Y	N	Y	Y	Y
249	Mbeya	Rungwe DC	Kyimo Dispensary	D	Y	Y	N	Y	Y	Y
250	Mbeya	Rungwe DC	Kiwira Govt. Dispensary	D	Y	Y	N	Y	Y	Y
251	Mbeya	Busokelo DC	Itete Hospital	H	Y	Y	N	Y	Y	Y
252	Mbeya	Busokelo DC	Mwakaleli HC	HC	Y	Y	N	Y	Y	Y
253	Iringa	Iringa DC	Tosamaganga CDH	H	Y	Y	N	Y	Y	Y
254	Iringa	Iringa DC	Ismani HC	HC	Y	Y	N	Y	Y	Y
255	Iringa	Iringa DC	Kimande HC	HC	Y	Y	N	Y	Y	Y

256	Iringa	Iringa DC	Idodi HC	HC	Y	Y	N	Y	Y	Y
257	Iringa	Kilolo DC	Ilula DDH	H	Y	Y	N	Y	Y	Y
258	Iringa	Kilolo DC	Mtandika HC	HC	Y	Y	N	Y	Y	Y
259	Iringa	Mufindi DC	Mdabulo HC	HC	Y	Y	N	Y	Y	Y
260	Iringa	Mufindi DC	Usokami HC	HC	Y	Y	N	Y	Y	Y
261	Iringa	Iringa MC	Iringa RRH	H	Y	Y	Y	Y	Y	Y
262	Iringa	Iringa MC	Dream Molecular Laboratory	L	Y	Y	N	Y	Y	Y
263	Iringa	Kilolo DC	Kilolo dispensary	D	Y	Y	N	Y	Y	Y
264	Iringa	Mafinga DC	Kiponzelo HC	HC	Y	Y	N	Y	Y	Y
265	Iringa	Mafinga DC	Mafinga DH	H	Y	Y	N	Y	Y	Y
266	Iringa	Mufindi DC	Mgololo HC	HC	Y	Y	N	Y	Y	Y
267	Iringa	Mufindi DC	Nyololo HC	HC	Y	Y	N	Y	Y	Y
268	Iringa	Mufindi DC	Lugoda Hospital	H	Y	Y	N	Y	Y	Y
269	Lindi	Lindi MC	Sokoine RRH	H	Y	Y	Y	Y	Y	Y
270	Lindi	Lindi DC	Nyangao DDH	H	Y	Y	N	Y	Y	Y
271	Lindi	Lindi DC	Kitomanga HC	HC	Y	Y	N	Y	Y	Y
272	Lindi	Nachingwea DC	Nachingwea DH	H	Y	Y	N	Y	Y	Y
273	Lindi	Nachingwea DC	Mnero Hospital	H	Y	Y	N	Y	Y	Y
274	Lindi	Liwale DC	Liwale DH	H	Y	Y	N	Y	Y	Y
275	Lindi	Liwale DC	Kibutuka HC	HC	Y	Y	N	Y	Y	Y
276	Lindi	Kilwa DC	Kinyonga DH	H	Y	Y	N	Y	Y	Y
277	Lindi	Kilwa DC	Njinjo HC	HC	Y	Y	N	Y	Y	Y
278	Lindi	Kilwa DC	Kipatimu Hospital	H	Y	Y	N	Y	Y	Y
279	Lindi	Ruangwa DC	Ruangwa DH	H	Y	Y	N	Y	Y	Y
280	Lindi	Kilwa DC	Tingi Dispensary	D	Y	Y	N	Y	Y	Y
281	Morogoro	Morogoro MC	Morogoro RRH	H	Y	Y	Y	Y	Y	Y

282	Morogoro	Kilombero DC	St. Francis Hospital	H	Y	Y	N	Y	Y	Y
283	Morogoro	Simorjiro DC	Turiani Hospital	H	Y	Y	N	Y	Y	Y
284	Morogoro	Simorjiro DC	Dumila Dispensary	D	Y	Y	N	Y	Y	Y
285	Morogoro	Gairo DC	Gairo HC	HC	Y	Y	N	Y	Y	Y
286	Morogoro	Kilosa DC	St. Kizito Hospital	H	Y	Y	N	Y	Y	Y
287	Morogoro	Kilombero DC	Illovo Hospital	H	Y	Y	N	Y	Y	Y
288	Morogoro	Mvomero DC	Melela HC	HC	Y	Y	N	Y	Y	Y
289	Morogoro	Ulanga DC	Mahenge DH	H	Y	Y	N	Y	Y	Y
290	Morogoro	Ulanga DC	Lugara Hospital	H	Y	Y	N	Y	Y	Y
291	Morogoro	Kilombelo DC	Mlimba HC	HC	Y	Y	N	Y	Y	Y
292	Morogoro	Morogoro DC	Ngeregere HC	HC	Y	Y	N	Y	Y	Y
293	Morogoro	Kilosa DC	Kilosa DH	H	Y	Y	N	Y	Y	Y
294	Morogoro	Kilombero DC	Mngeta HC	HC	Y	Y	N	Y	Y	Y
295	Morogoro	Morogoro DC	Duthumi HC	HC	Y	Y	N	Y	Y	Y
296	Mtwara	Mtwara DC	Nanguruwe HC	HC	Y	Y	N	Y	Y	Y
297	Mtwara	Tandahimba DC	Tandahimba DH	H	Y	Y	N	Y	Y	Y
298	Mtwara	Newala DC	Newala DH	H	Y	Y	N	Y	Y	Y
299	Mtwara	Newala DC	Kitangari HC	HC	Y	Y	N	Y	Y	Y
300	Mtwara	Mbulu DC	St. Benedict Ndanda Hospital	H	Y	Y	N	Y	Y	Y
301	Mtwara	Masasi DC	Mkomaindo DH	H	Y	Y	N	Y	Y	Y
302	Mtwara	Mtwara DC	Mahurunga HC	HC	Y	Y	N	Y	Y	Y
303	Mtwara	Nanyumbu DC	Mangaka HC	HC	Y	Y	N	Y	Y	Y
304	Mtwara	Masasi DC	Chiwale HC	HC	Y	Y	N	Y	Y	Y
305	Mtwara	Mtwara MC	Likombe HC	HC	Y	Y	N	Y	Y	Y
306	Mtwara	Mtwara MC	Ligula RRH	H	Y	Y	Y	Y	Y	Y
307	Mtwara	Nanyumbu DC	Nanyambu HC	HC	Y	Y	N	Y	Y	Y

308	Njombe	Njombe TC	Njombe RRH	H	Y	Y	Y	Y	Y	Y
309	Njombe	Njombe TC	Kibena Hospital	H	Y	Y	Y	Y	Y	Y
310	Njombe	Makambako TC	Makambako DH	H	Y	Y	N	Y	Y	Y
311	Njombe	Wangingi'mbe DC	Ilembula DH	H	Y	Y	N	Y	Y	Y
312	Njombe	Wangingi'mbe DC	Makoga HC	HC	Y	Y	N	Y	Y	Y
313	Njombe	Makete DC	Makete DH	H	Y	Y	N	Y	Y	Y
314	Njombe	Ludewa DC	Ludewa DH	H	Y	Y	N	Y	Y	Y
315	Njombe	Ludewa DC	Lugarawa Hospital	H	Y	Y	N	Y	Y	Y
316	Njombe	Ludewa DC	St. Luke Milo Hospital	H	Y	Y	N	Y	Y	Y
317	Njombe	Njombe DC	Uwemba HC	HC	Y	Y	N	Y	Y	Y
318	Njombe	Njombe DC	Lupembe HC	HC	Y	Y	N	Y	Y	Y
319	Kigoma	Kibondo DC	Kibondo DH	H	Y	Y	N	Y	Y	Y
320	Kigoma	Buhingwe DC	Heri Mission Hospital	H	Y	Y	N	Y	Y	Y
321	Kigoma	Kigoma DC	Bitale HC	HC	Y	Y	N	Y	Y	Y
322	Kigoma	Uvinza DC	Uvinza HC	HC	Y	Y	N	Y	Y	Y
323	Kigoma	Uvinza DC	Nguruka HC	HC	Y	Y	N	Y	Y	Y
324	Kigoma	Uvinza DC	Ilagala HC	HC	Y	Y	N	Y	Y	Y
325	Kigoma	Uvinza DC	Buhingu HC	HC	Y	Y	N	Y	Y	Y
326	Kigoma	Kasulu DC	Kasulu Hospital	H	Y	Y	N	Y	Y	Y
327	Kigoma	Kigoma MC	Maweni RRH	H	Y	Y	Y	Y	Y	Y
328	Kigoma	Kakonko DC	Kakonko HC	HC	Y	Y	N	Y	Y	Y
329	Kigoma	Kakonko DC	Nyanzige HC	HC	Y	Y	N	Y	Y	Y
330	Dar es Salaam	Ilala MC	Amana RRH	H	Y	Y	Y	Y	Y	Y
331	Dar es Salaam	Ilala DC	Pugu Kajiungeni HC	HC	Y	Y	N	Y	Y	Y
332	Dar es Salaam	Kinondoni MC	Mwananyamala RRH	H	Y	Y	Y	Y	Y	Y
333	Dar es Salaam	Kinondoni MC	Mwenge Dispensary	D	Y	Y	N	Y	Y	Y

334	Dar es Salaam	Temeke MC	Temeke RRH	H	Y	Y	Y	Y	Y	Y
335	Dar es Salaam	Kigamboni DC	Vijibweni Hospital	H	Y	Y	N	Y	Y	Y
336	Dar es Salaam	Ilala MC	Mnazi Mmoja Hospital	H	Y	Y	Y	Y	Y	Y

KEY	DESCRIPTIONS
CDH	Council Designated Hospital
D	Dispensary
DC	District Council
DDH	District Designated Hospital
DH	District Hospital
EQA	External Quality Assessment
FUNCTIONAL HUBS	336
HC	Health Centre
IDSR (OUTBREAKS)	A sudden increase in occurrence of a disease in a particular time and place
IDH	Infectious Diseases Hospital
L	Laboratory
MC	Municipal Council
N	Programme Hub not available
NACP	National AIDS Control Programme
NBTS	National Blood Transfusion Service
NON-FUNCTIONAL	26
NTLP	National Tuberculosis and Leprosy Programme
OTHERS	Samples that are not part of programmes (NACP, NTLP, NBTS, EQA, Outbreak)
PHEIC	Public Health Event of International Concern including Outbreaks and Surveillance
RRH	Regional Referral Hospital
TC	Town Council
Y	Programme Hub available

SOURCE: Hub mapping revised using MOHCDGEC, Health Facility Register (January 2020)

REFERENCES

1. ISO 15190:2020. Medical laboratories — Requirements for safety. WHO, https://www.iso.org/standard/72191.html;
2. Guidance on regulations for the transport of infectious substances 2019–2020. Geneva: World Health Organization; 2019 (WHO/WHE/CPI/2019.20). Licence: CC BY-NC-SA 3.0 IGO;
3. Sadiki Materu, Rodgers Dena, Noel Odhiambo, Jane Carter, Guidelines on Specimen Collection, Storage and Transportation, 2nd Edition, ISBN: 978-9966-798-29-9, Amref International University, 2019;
4. National GeneXpert Rollout Plan and Implementation Guideline (Final Draft), October 2019;
5. MOHCDGEC: National Guideline for Laboratory Sample Referral System, August 2019;
6. Guidelines for Blood Donors Notification and Referral to HIV Services, First Edition, November, 2018;
7. Emergency Preparedness and Disaster Response Plan for Blood Transfusion Services, Version 1.0, October 2018;
8. Packaging Requirements to Transport Biological Substances & Hazardous Materials, Manual Revision Date: 04/18/18, https://ehs.umich.edu/wp-content/uploads/2017/03/Pack-Req-BioSub-Manual.pdf;
9. Guideline for Sample Referral in Ethiopia, Ethiopian Public Health Institute, Federal Ministry of Health, First Edition, January 2018;
10. Needs Assessment for Sample Referral System, Arusha And Kilimanjaro Regions, 27th-31st March, 2017;
11. MOHCDGEC, Framework for Establishment of Sample Referral System in Mainland Tanzania, June, 2017 (Draft);
12. MOHCDGEC: National Standard for Medical Laboratories, 2017;
13. Guidelines for Collection of Biological Samples for Clinical and Forensic Toxicological Analysis (https://www.tandfonline.com/doi/full/10.1080/20961790.2016.1271098);
14. Guidance for Obtaining Post Mortem Samples for Toxicology Analysis (https://www.nbt.nhs.uk/sites/default/files/Obtaining%20Post%20Mortem%20Samples%20for%20Toxicological%20Analysis.pdf);
15. Swaziland Health Laboratory Service, National Sample Transportation System (NSTS), Policy and Procedure Manual, *04 January 2016;*
16. The Health Sector Strategic Plan June 2015 – June 2020 (HSSP IV);
17. K Steingart, "GeneXpert TB assay for pulmonary tuberculosis and rifampicin resistance in adults," Cochrane Database Syst Rev, 2014;
18. Biological Sample Transportation Within the National Laboratory Network, Rwanda Biomedical Center National Reference Laboratory, April 2012;

19. CC Boehme, "Feasibility, diagnostic accuracy, and effectiveness of decentralized use of the GeneXpert TB test for diagnosis of tuberculosis and multidrug resistance: a multicenter implementation study," The Lancet, vol. 377, no. 9776, pp. 1495--1505, 2011;
20. The National Integrated Disease Surveillance and Response (IDSR) Guidelines, 2nd edition, July 2011;
21. International Organisation for Standardization ISO-15189, Third Edition 2012-11-01; Medical Laboratories - Requirement for Quality and Competence;
22. MOHSW: National Infection Prevention and Control Guidelines for Healthcare Services in Tanzania 2004;
23. WHO (2004) ISBN 92 9022 238 7: Practical Guidelines for Infection Control in Health Care Facilities;
24. WHO/EMC/97.3: Guidelines for the Safe Transport of Infectious Substances and Diagnostic Samples;
25. Sample Collection, Handling and Transport to the Laboratory, Q-Pulse Document No. Q-SOP-10, Pathology Department, Northern Devon Healthcare NHS Trust
26. Sample Transportation Manual for TB Laboratory Network, National Reference Laboratory, National Tuberculosis Program, Pakistan;
27. Transport of samples Guidance, Health & Safety Management Manual, NHS, Greater Glasgow and Clyde;
28. https://www.youtube.com/watch?v=2FUlphI5PoU;
29. https://bwosi.com/products/tempmate-m1;
30. https://www.who.int/bloodsafety/Manual_on_Management,Maintenance_and_Use_of_Blood_Cold_Chain_Equipment.pdf;
31. https://www.cdc.gov/anthrax/specificgroups/lab-professionals/cdcspecimens.html;
32. https://www.google.com/search?q=anthrax+in+gram+stain&sxsrf=ACYBGNQ0bToPuSCoIzOnx0iWR8kGoY9bVw:1579965570957&tbm=isch&source=iu&ictx=1&fir=35azuUsu3cn7yM%253A%252CBHovRBZ6aXhVPM%252C_&vet=1&usg=AI4_-kQPVNvwBBOZAs-xVJbGXiV0S1RSfw&sa=X&ved=2ahUKEwjk3_S0hp_nAhW_QkEAHTCJBOEQ9QEwAHoECAoQAw#imgrc=2wXCf4v5B0GUwM:&vet=1;
33. https://www.google.com/search?sxsrf=ALeKk027Wf9tKxiqdIGBwCAeVQtbSewZYQ:1585590877917&q=cartoon+motorcycle+rider+with+backpack&tbm=isch&source=univ&sa=X&ved=2ahUKEwi47qWo4sLoAhUZThUIHQhQAKwQ7Al6BAgKECk&biw=1276&bih=589#imgrc=7Kh6nH0O7H0GRM

ANNEX 14: LIST OF TWG PARTICIPANTS WHO DEVELOPED THIS DOCUMENT

S/N	Name of Participant	Position	Duty Station	E- Mail Address	Mobile No
1	Dr. Alex Magesa	ADDS	MOHCDGEC	amagesa@yahoo.co.uk	754 575 981
2	Dr. Dennis M Lyakurwa	MDRTB Expert	KILIMANJARO	denismodestlykurwa46@gmail.com	754 942 949
3	Dr. Grace Magembe	DCS	MOHCDGEC	gracemagembe@afya.go.tz	767 300 234
4	Peter Torokaa	HLS	MOHCDGEC	petertorokaa@gmail.com	763 833 147
5	Dr. Isack Lekule		NTLP	lekule228@gmail.com	754 946 216
6	Dr. Katura M. Mathias	Ag. ADDS	MOHCDGEC	mathiaskatura@gmail.com	752 462 755
7	Dr. Pendael Sifueli	NBTS, Zonal Manager	MTWARA	sifuel@yahoo.com	713 633 258
8	Dr. Solomon Mwaigwisya		MDH	smwaigwisya@mdh.tz.org	716 229 923
9	David Ocheng	Facilitator	DSM	ochengdavid17@gmail.com	754 274 355
10	Adelaide Emmanuel	P/Secretary	MOHCDGEC	adelakemilemebe@yahoo.com	656 153 394
11	Albertho Chengula	Technical Assistance	LSCA GHSL	albertho.chengula@tz-ghse.com	767 363 654
12	Alex Ntamatungiro	Laboratory Scientist	HLI	ajntamatungiro@gmail.com	785 421 404
13	Alfred Mwenda	EQA Programme Officer	NHLQATC	fransalfred60@gmail.com	769 531 103
14	Alice Kyalo	Quality Officer	Tarime Hospital	kyaloalice@yahoo.com	765 657 010
15	Ambele Mwafulango	Ag. Director	NHLQATC	ambeleeliah@yahoo.com	762 170 454
16	Anna Samaka	Senior Legal Officer	TPC	annasamaka@gmail.com	718 468 868
17	Anyelwisye Kabuje	National HVL Coordinator	MOHCDGEC	anyelwisye.kabuje@afya.go.tz	764 199 906
18	Bahati Mfaki	Assistant Registrar	PHLB	bmfaki@gmail.com	752 210 389
19	Boniphace Sylvester	Ag. HLS Tamisemi	DODOMA	sylivesterbis@gmail.com	742 146 174
20	Chacha Gibutu	Laboratory Scientist	NHLQATC	chiagibu@gmail.com	657 819 706
21	Charles Kagoma	Laboratory Team Lead	THPS	ckagoma@thps.or.tz	683 988 575

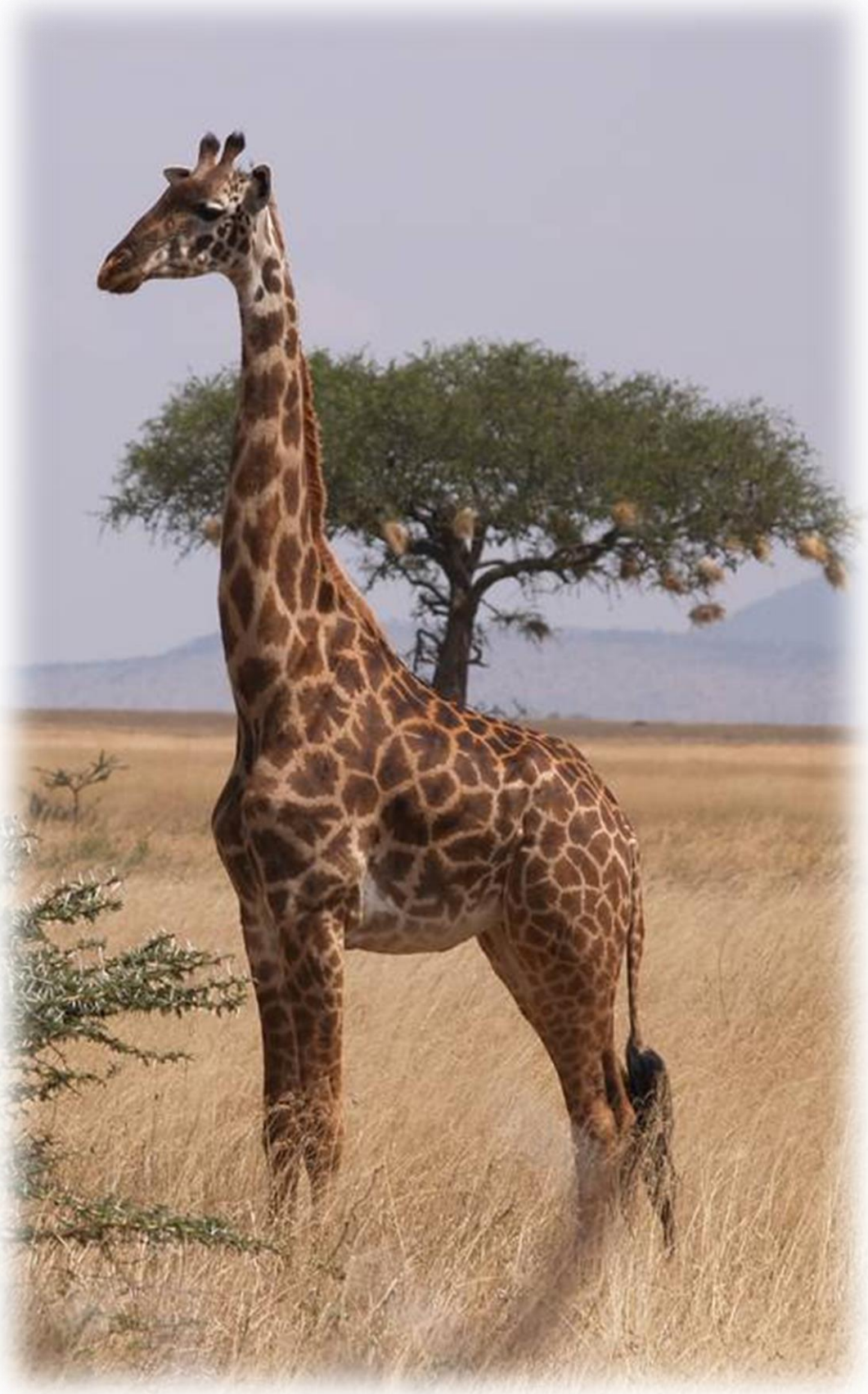
22	Charles Laurent	M&E	MOHCDGEC	chalas252002@yahoo.com	754 999 807
23	Danny Temba		MOHCDGEC	danny.temba@afya.go.tz	744 221 090
24	Daudi Baldwin Ocheng	ICT Specialist	DSM	daudi16@gmail.com	755 021 111
25	David Temba	Laboratory Team Lead	MDH	dtemba@mdh.tz.org	754 374 842
26	Dickson Kananda	Legal Officer	MOHCDGEC	kananda.thejr@gmail.com	765 420 938
27	Edgar Luhanga	Laboratory Scientist	CTRL DAR	edgarlhanga@gmail.com	754 340 084
28	Edith Bakari	HS	MOHCDGEC DODOMA	edith.kafuru@afya.go.tz	784 237 443
29	Elice Mesanga	SRS Coordinator	HLI	elicemesanga20@gmail.com	684 171 115
30	Elida Mwandiga	MA	MOHCDGEC	mwandigaelida2019@gmail.com	719 766 872
31	Erick Ml Wambalala	TPC	Cooperation Society	erick.maximillian@posta.co.tz	684 454 306
32	Felician Msigwa	Laboratory Scientist	NHLQATC	felicianmsigwa@gmail.com	753 284 867
33	Frimath Massawe	Procurement Officer	DIHAS	frimathpaul@gmail.com	755 454 154
34	Gerald Mosha	IT TECH	UBUNIFU SOLNS	geraldmosha2015@gmail.com	755 517 076
35	Godfrey Odinga	LSCA	NACP	binaisa4@gmail.com	769 847 181
36	Inspector Reuben Komba	ICT Manager	TPC	reuben.komba@polisi.go.tz	746 700 052
37	Isack Kaneno	SHS	MOHCDGEC	ikaneno@gmail.com	754 999 400
38	Janeth Msofe	Sample Manager	TPC	jansofe@hotmail.com	784 691 464
39	Japhet Shigella	DRRH	Laboratory Scientist	shigellaj@gmail.com	754 315 346
40	Joakim John Chacha	Laboratory Technologist	DED Ruangwa	chachatzdsm@gmail.com	787 051 903
41	Johanes Rwenyagira	Laboratory Scientist	MRRH	rwenyagilajohanes@gmail.com	784 421 081
42	Johnson Meela	Principle Legal Officer	PO-RALG	jjmeela4@gmail.com	713 610 789
43	Joseph Luganha		NBTS TZ	luganha@yahoo.com	784 850 905

44	Junior Shao	Laboratory Scientist		shaojunior@gmail.com	757 077 763
45	Lawrence Mapunda	Laboratory Scientist	NHLQATC	amonlawrence68@gmail.com	676 085 701
46	Magreth Mlyomi	Regional Manager	TPC	magreth.mlyomi@posta.co.tz	754 445 645
47	Mbarouk Sasilo	Ag. Manager EMS	TPC	sasilo@posta.co.tz	699 614 801
48	Msafiri Lissu	LIS PO	MOHCDGEC	msafiri.lissu@gmail.com	754 402 281
49	Mura Ngoi	NPO-Laboratory	WHO TZ	ngoim@who.int	758 404 235
50	Mwajuma Almasi	Laboratory Technologist	Dodoma RRH	almasmwajuma@gmail.com	713 207 228
51	Mwanaisha Ali Said	TPC	Manager Biashara	mwanaisha.said@posta.co.tz	738 795 415
52	Mwanaisha Hassan	HS	MOHCDGEC	ishamngwale@gmail.com	754 575 981
53	Ndilanha Sayi	Laboratory Scientist	NHLQATC	ndilanhasayi@gmail.com	686 895 988
54	Nuru Mkazi	Senior Legal Officer	TPC	sheria@posta.co.tz	786 978 978
55	Oscar Mwashiuya	Laboratory Scientist	NBTS	oscar.mwashiuya@afya.go.tz	767 726 275
56	Peter Mashosho	Laboratory Scientist	DED, KOROGWE	petermashosho@gmai.com	764 238 754
58	Pudensiana Mrema	Parliamentary Drafting	OAG	pudensiana.mrema@agctz.go.tz	757 691 211
59	Regnald Julius	NLQO	MOHCDGEC	regjulius@gmail.com	767 235 389
60	Richard Buretta		MDH	rburetta@mdh.tz.org	757 894 894
61	Rodriges Ngailo	National HEID Coordinator	MOHCDGEC	rodngailo@gmail.com	753 771 701
62	Rudia Magoma	P/Sec	MOHCDGEC	rudia.rugomba@afya.go.tz	755 653 577
63	Said M. Ngovi	MOHCDGEC	Driver		712 888 696
64	Saida Murugwa	Ag. HVL Coordinator	NHLQATC	murugwasa@gmail.com	783 715 228
65	Samwel Massawe	Quality Officer	TMDA	samwel.fortunatus@tmda.go.tz	789 707 294
66	Shabani R. Mziray	Laboratory Scientist	KIDH	shabanimziray@yahoo.com	754 942 949
67	Viola Msangi	Laboratory Consultant	ASM	violaswai@yahoo.com	783 399 668
68	Vulstan Shedura	Laboratory Scientist	Ligula RRH	vulstanshedura@gmail.com	659 808 713

69	Zaynab Mfaume	Principle Laboratory Technologist	PHLB	zmfaume@gmail.com	767 313 837

NOTE PAD

NOTE PAD



Serengeti Giraffe, Northern Tanzania

FOR FURTHER INFORMATION CONTACT:

PERMANENT SECRETARY (HEALTH)

Ministry of Health, Community Development, Gender, Elderly and Children,

Government City, Afya Road/Street, Mtumba,

PO Box 743,

40478 Dodoma, Tanzania.

Landline: +255 (0)26 232 3267

Email: ps@afya.go.tz

Website: www.moh.go.tz