MINISTRY OF HEALTH & CHILD CARE ZIMBABWE

INTEGRATED SAMPLE TRANSPORTATION SYSTEM (IST)

CONCEPT NOTE

1.0. Goal

The goal of the Integrated Sample Transportation (IST) is to ensure that the Ministry of Health & Child Care (MoHCC) has a strong, sustainable and documented universal Integrated Sample Transportation System for use by both partner and non-partner funded districts with a well-coordinated structure to manage the system.

2.0. Objectives

The specific objectives of the IST are to ensure that:

- All samples needing testing are moved in a coordinated, efficient and sustainable way, observing integrity and quality; and
- All results are equally and accurately transmitted timely to the originating health facilities.

3.0. Background

3.1. Introduction

Effective sample collection and transportation is key in disease diagnosis and in monitoring success or failure of treatment, as well as in supporting diagnosis and management of any attendant adverse effects of treatment, as required in a strong pharmacovigilance program. Zimbabwe has deployed conventional laboratory-based machines as well as Point of Care (POC) devices, especially to support HIV, TB and Malaria programs. There are benefits to using POC machines at district hospitals and clinics as results are received the same day or within few days when utilizing a hub and spoke model of POC machine deployment.

The National Viral Load Scale up Plan recommends a strategic mix of POC machines and high throughput conventional machines. For this reason, an efficient and a more reliable sample transportation system, that delivers samples to the laboratory and returns results to the facilities is required. More appropriate transportation conditions must be guaranteed to assure the quality of examinations and results generated thereof as well

as the timely transmission of the results to the facilities where the samples originated from.

3.2. Description of current Sample Transportation Systems and challenges

Zimbabwe currently has no harmonized approach to move samples and results between various collection and testing centres. It is paramount, therefore, that all existing samples and results transportation systems be harmonised into an overall integrated system with defined resources and responsibilities.

The current parallel systems were setup to enable implementing partners achieve their programmatic targets to their respective donors. The setup was due mainly to the existence of a void which had to be filled. The major partners in sample transportation in the country include PEPFAR (with special interest in Viral Load), Challenge TB (with special interest in TB) and FedEx courier services for EID and VL (with support from GF/UNDP).

The situation is such that, a viral load sample transportation system, being supported by PEPFAR through their implementing partner APHL, would collect only viral load specimens from facilities and transport them to the viral load laboratories. The radius for this service was within 100km of each of the viral load laboratories. The implementing partner used riders to move the samples and relay the results.

Similarly, an EID DBS sample collection system implemented by FedEx, with support from Global Fund, would move samples from 227 hubs - which pooled samples from the rest of the 1600 facilities - using a network supported by environmental technician riders.

The system used by Challenge TB, through The Union, was run by Riders for Health and this system was operational in six of the ten provinces and was responsible for moving TB samples only.

In many instances these systems overlapped at facility level, but each was responsible for a specific sample and were not designed to complement each other.

The main challenges with these systems include:

a) Lack of or ineffective coordination;
b) Lack of timely transmission of results to facilities; and
c) Increased costs of implementation as each system is run separately

Considering the challenges of the current parallel system, the MoHCC engaged its development partners to review the current system in order to come up with a more

efficient and cost-effective network to move samples to the appropriate testing laboratory and return results to facilities and to clients.

Some efficiency gains are expected to be realized through the operationalization of an IST system. The IST will help reduce turnaround time (TAT) of results and predictability of follow up within the public health system.

Section 4 of this Concept Note (CN) describes in detail the processes the MoHCC, in consultation with its key stakeholders, undertook to come up with the IST. It also describes the new system and how it will operates.

4.0. The Process of selecting an IST System

4.1. Resource Mapping

The MoHCC conducted resource mapping to better identify the various vertical systems, partners involved, their geographical spread and establish the infrastructural investments which have been made into parallel sample transportation systems by the different partners. The resource mapping findings were used to inform a comprehensive gap analysis for IST in the public health system that was conducted. In the instance of infrastructure, the mapping established availability of 95 partner usable motorbikes, distributed as:

- Challenge TB had 21 usable motorcycles; and
- APHL (now replaced by BRTI) had 74 usable motorcycles.

4.2. Workshops to brainstorm and agree on an IST model

Following the finalization of the resource mapping and after the findings had become available, the MoHCC, with support of their partners, convened stakeholders' meetings quarter 4 of 2018 to discuss and agree on a more suitable integrated sample transport system. The meetings were guided by the challenges of the current system and the strategic goal of the ministry of setting up a system that would ensure a more effective coordination and the timely relay of test results to health facilities. The workshop after extensive deliberations and considering all factors, including the country context, settled on a Hub and Spoke model.

Following the selection of the Hub and Spoke model, an LabEQIP software was used to model the IST system envisaged by the country. GPS coordinates for all Health Facilities

were availed to assist with referral mapping. The referral mapping process was ratified by various stakeholders to make sure the proposed sample referral and results return system is practical.

4.3. The Hub & Spoke Model: A description of the System

A Spoke is a designated facility that only collects specimens from patients for onward submission to a Hub. A Hub is defined as a centre that received sample specimens from 4/5 Spokes for testing. In most cases, a designated Hub is a District or Mission hospital with laboratory facilities.

A LabEQIP software was used to model the IST. GPS coordinates for all Health Facilities were availed to assist with referral mapping. The referral mapping process was ratified by various stakeholders to make sure that the proposed sample referral and results return system is practical.

In total, 341 clusters were mapped and optimised using the LabEQIP software for collection of samples. District, Mission and some Rural Hospitals with labs were defined as hubs. As already described, the hubs are the testing centres for either TB, malaria, EID POC or VL. The hub and spoke model with 341 clusters would require 280 motorbikes and riders for full saturation and implementation of the system across the country.

4.4. How the Hub and Spoke model will work

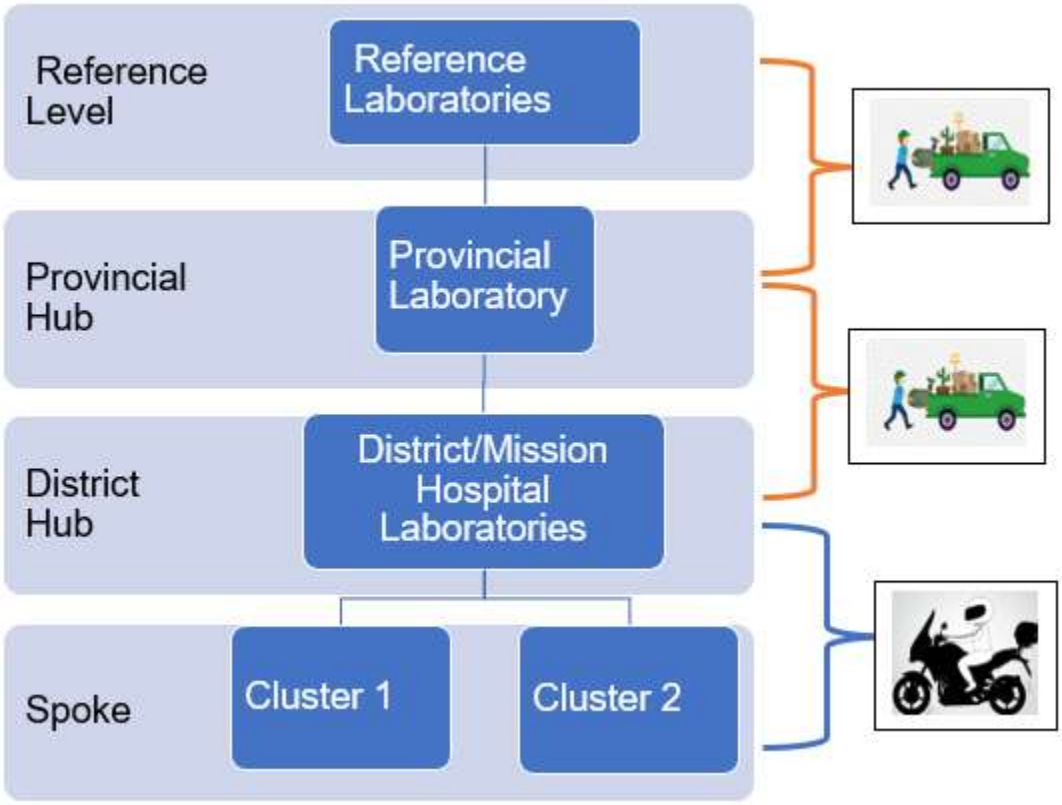
The country's health facilities have been divided within their respective districts; the spokes have been grouped into clusters of a maximum of 5 facilities per cluster. Therefore, the total number of clusters in every district was determined by the total number of clinics for each catchment Hub. The total number of operational districts in the country, in line with the setting up of the comprehensive IST, is 73, 10 more districts than the 63 administrative districts of the country. The ten additional districts were derived from the breakdown of Harare and Bulawayo provinces into districts to enable a more efficient management of the two big cities.

Noting the distances and the terrain involved, each rural rider is expected to visit only one or two sites per day. Each rural cluster has been planned to be serviced by a rider, at least twice every week. The rider will collect specimens from the spokes and deliver them to the hub, and at the same time collect results from the Hubs and deliver same to the submitting Spoke sites. In the urban provinces where distances are shorter, each cluster will be serviced by a rider on daily basis.

The Hub and Spoke sample transportation system will pool samples at District-level Hubs, which in many instances are testing laboratories, and some of which have GeneXpert instruments, for EID and MTB/RIF testing. The riders will be responsible for linking clusters with testing Hubs. Samples requiring tests which are not offered at the Hub will be further referred to provincial testing laboratories, such as VL specimens to provincial VL labs, once every week using the same motorcycle riders. Samples requiring further referral testing at the country's Reference laboratories, such as TB specimens for culture/drug susceptibility testing (DST) and EID conventional testing, will be sent via drivers employed by the IP once every week as per need, e.g. TB culture samples, Polio suspect samples and measles samples among others. Provision has been made for 4 special single cabs to be procured to transport samples from the Hubs to the reference labs.

Figures 1 and 2 illustrate the operations of the proposed IST and the TAT.

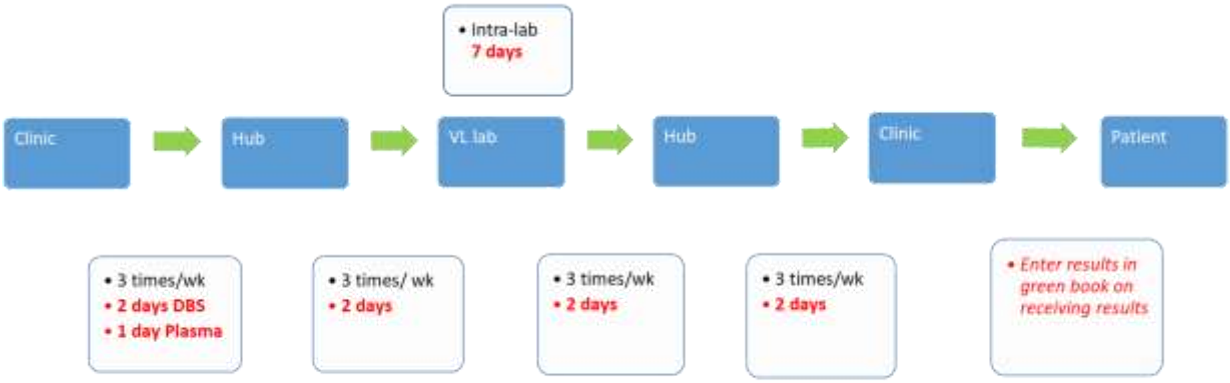
Figure 1: IST modes of transport from Spoke to Reference laboratories



The schematic diagram above (Figure 2) demonstrates the critical role of the IST system in determining total VL and conventional EID testing TAT, for example. The frequency of

sample pick-up from the clinic to the Hub is directly related to the overall TAT. In urban areas where the specimens are picked daily, the overall TAT target is 7-10 days. In rural areas, the recommended frequency of specimen pickup is twice a week, and this translates to a TAT of up to 15 days. Depending on the nature of the specimen, the intra-lab TAT varies from less than 1 day to 5 days for routine samples. Specimens requiring specialized testing e.g. TB culture and DST, histology may take a longer time.

Figure 2: Schematic demonstration of Turn Around Time



4.5. Justification for the Hub and Spoke approach for IST

In selecting the IST system, the MoHCC was guided by its policy direction in ensuring a more efficient and coordinated system which considers the following:

Ownership: The element of ownership will be fully embraced by the MOHCC, thus there is room to monitor, evaluate and improve the system with time.

Sustainability & Capacity Building: The MOHCC retains full oversight of IST through its own structures with implementing partners responsible for running the system at operational level to assure sustainability beyond the lifespan of development partner support.

Accountability: Responsibility and accountability for managing the IST will be assigned to implementing partners (IPs) who will be reporting to the Directorate of Laboratory Services (DLS) in MOHCC.

4.6. Operational Setup of IST

For accountability of the IST system implementation and to ensure that the system is well established and coordinated, in the short to medium term, the MoHCC proposes to outsource the operational implementation of this critical activity and takes responsibility

for the coordination of the system. As part of this arrangement, a conscious effort will be made to strengthen the capacity of the MoHCC, including mentorship, to eventually take over the management of the IST system.

Note: The setup of the IST system in all districts in the country will be fully functional in July 2020. The additional procurement needs have been completed and motorbikes and vehicles delivered. The riders of the bikes will be trained between March and June 2020. Since there is no IP for the 23 non-PEPFAR supported districts and if the Global Fund approves resources for the operational cost of these districts, UNDP will go through a competitive process to select an IP to manage IST in these 23 districts, in line with the strategic direction of the MoHCC. It is expected that, all these processes will be completed by the end of June 2020. UNDP will seek the Global Fund approval to maintain the current system of sample transportation till the end June 2020 to help avoid any disruption of services.

Currently, a partner, BRITI, is managing the IST system in the 40 PEPFAR supported districts, using Hub and Spoke. A process will be conducted to select an implementing partner to manage the remaining 23 districts, using the same approach as in the 40 PEPFAR supported districts.

The motorbikes and other infrastructure properties procured by donors for the MoHCC will remain properties of MoHCC and selected IPs will have temporary custodies of them. The partners will be responsible for maintenance and fuelling of the motorbikes to ensure that they are always functional to deliver on the IST.

In support of the IST system, the MoHCC received funding commitment of USD$820,000 from PEPFAR as contribution towards operational costs in the 40 PEPFAR (50 operational districts) supported districts in the country under COP 19 budget. While PEPFAR is operating in these 40 districts/50 operational districts and will support operational costs for the running of the integrated sample transportation system in these districts, they have indicated that MoHCC should meet the funding gap identified (refer to gap analysis) to setup infrastructure in the remaining Hubs and Spokes within the PEPFAR districts which will enable them saturate all Hubs and Spokes. The MoHCC will also seek funding for the remaining 23 non-PEPFAR supported districts to ensure scale up of IST countrywide.

Setup costs include capital procurement of infrastructure, including motorbikes and related operational packages, such as helmets, riding gear, carrier boxes, motor vehicles and other related infrastructure, as well as initial training and sensitisation of riders and other system users (health care workers and laboratory personnel). In addition, triple packaging materials will be included for the different sample types e.g. secondary containers and adaptors for blood collection tubes, urine, sputum and stool specimen

containers. Operational costs include service maintenance and repairs of motor vehicles and bikes, fuel costs, motor vehicle and bike tracking mechanisms, remuneration for riders, refresher training, sample packaging materials among others.

In line with these establishments and commitments, the MOHCC will therefore lobby for resources to meet the set-up costs as well as the operational costs for the remaining districts from development partners including the Global Fund.

4.7. Gap Analysis and infrastructural Setup

Infrastructure - Motorbikes: For full saturation of motorbikes to service all the public sector facilities, a total of 280 motorbikes are required to set up the IST system to operate fully countrywide. Currently, a total of 95 usable motorbikes are available as at December 2019, distributed as 21 (Challenge TB), and 74 (BRTI), leaving a gap of 185. In addition to the motorbikes and its accessories, the gap analysis also established infrastructural gaps for 10 coordination vehicles and 4 specialised vehicles as well as alternative power supply for the 120 labs.

Infrastructure – Alternative Power: In view of the current power crises in the country, most sites receive power from the national grip for 6-8 hours a day, in most cases between the hours of 2300hrs-0600hrs. A power backup or alternative power that will ensure reliable electricity e.g. solar, is urgently needed at the labs. Of the 120 public health sector labs in the country, about 83 currently have either alternative power/solar or provision has already been made, leaving 37 without any form of alternative power. Provision has been made in this request to prioritise the 37 labs with 40 kWs solar systems.

Non-Infrastructure – Trainings, Sensitizations and HR: Other non-infrastructure gaps identified include training of riders, sensitization of PMDs and health workers (HW) in the catchment areas and additional support for HR, particularly lab scientists. Addressing these gaps will ensure that power and HR will be available to test the samples sent to the Hubs for the results to be timely relayed to the sending facilities.

Non-Infrastructure – Operational/Maintenance and fuelling of bikes: Further gap exists for the operationalization of the IST system, including cost of fuel, maintenance of bikes, HR cost for the coordinators and the management fee for the IPs. ***Detailed costed gap analysis is attached.***

Confirmed Funding: As part of the reprogrammed savings endorsed by the CCM and submitted to the Global Fund in Dec 2018, the Global Fund approved in January 2019 about USD890k for the funding gap for the setup of IST. UNDP has since procured and delivered the 123 motorbikes, and 4 vehicles (for transporting samples to referral labs).

PEPFAR, through its IP, has also procured additional 62 motorbikes as part of COP 19, and thus all the infrastructural gaps for motorbikes have been filled. The bundled items for setup for the 62 motorbikes procured by PEPFAR has been covered under the Global Fund savings.

The existing fleet of MoHCC motorbikes being utilized by the environmental health Department has been excluded from the gap analysis, as these bikes are already allocated for specific activities. To avoid disruption of the operation of the IST, dedicated motorbikes and riders are required.

Noted: As already highlighted, the existing and newly procured motorbikes will be the property of MoHCC and implementing partners will have temporary custody of the assets to operate the IST.

5.0. Roles and Responsibilities in the IST Framework

5.1. Directorate of Laboratory Services (DLS)/ MOHCC

- To enhance service delivery, MoHCC, in liaison with laboratories, collection facilities, implementing partners, donors and other stakeholders. will develop/review or issue policies and guidelines within MoHCC
- Develop the framework for monitoring and evaluating the performance of the IST
- Advocate for resource mobilization and funding for the overall IST implementation
- Facilitate coordination of donor and implementing partner activities in support of the IST network
- Will own all assets for IST and will assign temporary custody to the implementing partners.

5.2. Organisational and management structures

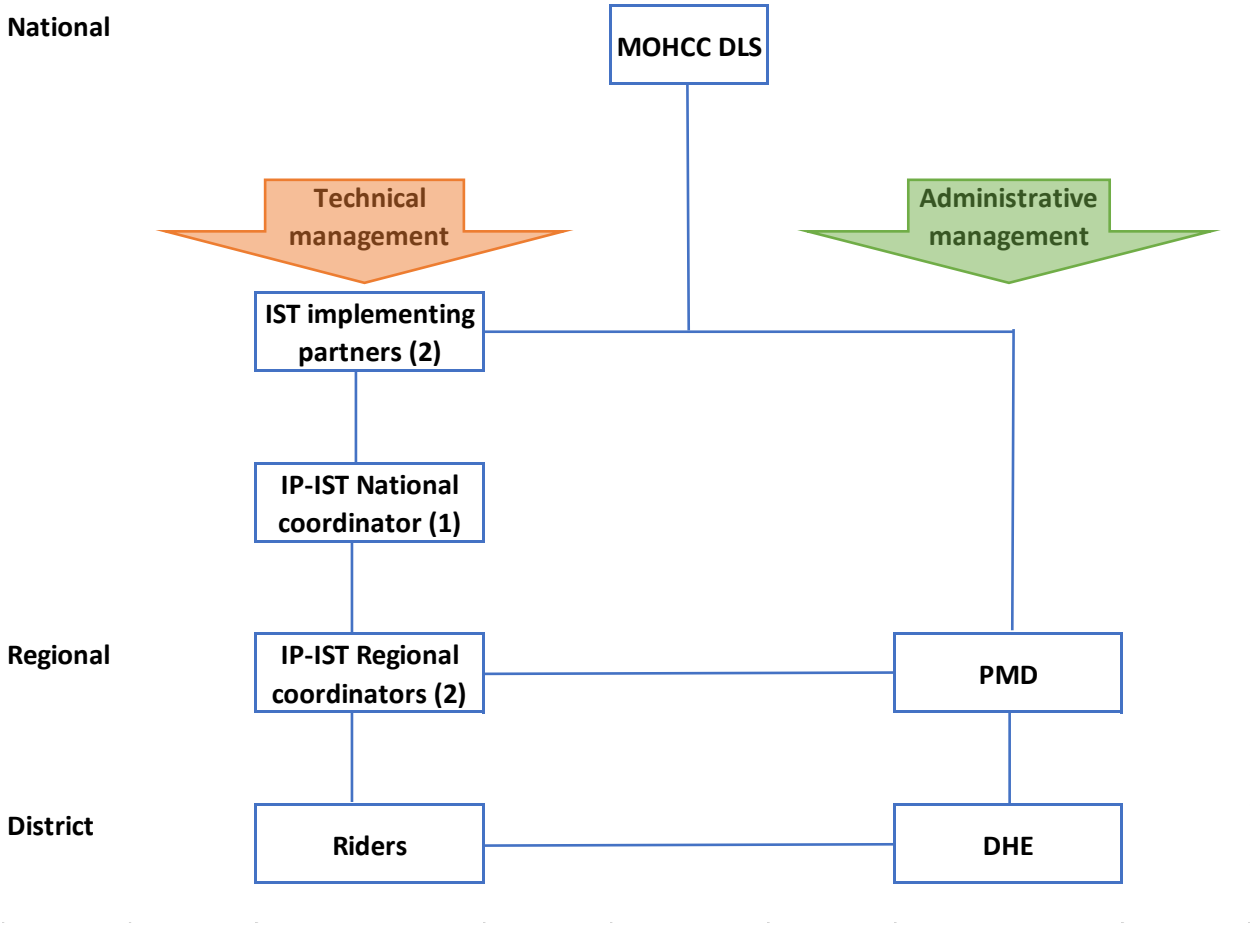
The strategic policy direction of the MoHCC, in the long-term, is to integrate IST into the existing MoHCC structures at all levels.

For accountability of IST implementation, and during the infancy of the system, MoHCC proposes that funding partners procure the services of an IP to execute operational

implementation of this critical activity. Currently PEPFAR has contracted BRTI as their implementing partner for the 40 PEPFAR supported districts since October 2019. We propose that UNDP also procure the services on an IP in the 23 non-PEPFAR supported districts, starting from July 2020. PEPFAR support is being implemented at 40% saturation within the 40 districts. With the procurement for additional motorbikes and accessories, PEPFAR will extend the IST to all Hubs and Spokes in the 40 supported districts.

Figure 3 illustrates how the IST will be managed from a technical and administrative perspective.

Figure 3: Organisational Structure for IST



The major roles and responsibilities by entity have been listed (Sections 5.2 – 5.7) and these will be further detailed in the proposed specimen referral guidelines currently under development.

5.3. Funding partners

- Support the MOHCC through Implementing partners
- Mobilise financial resources for implantation of IST
- Sign the agreements with Implementing Partners
- Monitor the performance of the Implementing partner

5.4. Implementing Partner (IP)

The selected Implementing partners will be tasked with the following responsibilities:

- Recruitment and HR management of motorbike riders, with support from the DHEs
- Strengthen/build the capacity of riders and their refresher trainings
- Manage rider movements and route scheduling
- Fleet management, including fuelling, service and maintenance of motor vehicles and motorbikes to ensure interruption in service provision, at the Hubs, Spokes and Reference Laboratories
- Strengthen/build capacities of staff in hubs for efficient management of samples
- Oversee the movement of samples, and timely relay of results to submitting spokes; and
- General capacity strengthening/building for the MoHCC to manage and coordinate the IST in the long-term.

Note: Agreed performance indicators will be incorporated into the Agreement with IP to monitor its performance in delivering an efficient IST to the satisfaction of the MoHCC and all stakeholders. The performance indicators will be reviewed at an agreed time period by the MoHCC and stakeholders to ensure compliance

5.5. Collection Facilities (Spokes)

- Request and effectively manage supplies for specimen collection, packaging, storage and transit, and documentation tools
- Ensure proper specimen collection, initial processing, storage and packaging for safe transportation. A designated dispatch area should be created in the laboratory with a sample management SOP and dispatch checklist. The DHE should assist to make sure that these are place at every spoke facility

- Ensure proper documentation of all processes to provide data that can be used to monitor quality as well as the efficiency and effectiveness of the network using the agreed list of indicators (discussed later in section 7.1)
- Provide reports of network functions to the DHE in a timely manner
- Utilize specimen referral data for continuous quality improvement
- Designate a person for coordinating the management of specimen referral services at the facility with the support of the DHE
- Where applicable, ensure that the necessary payments for referral tests are made, including the cost of specimen transfer, and transfer of the appropriate funds made to the hub

5.6. Hubs

- Perform all the roles of the referring facilities and, in addition, supporting the laboratories of the referring/ spoke facilities
- Prepare the laboratory tests menu, with specimen requirements, costs (where tests are not offered free-of-charge), and turnaround times, and distributing the same to clinicians and the referring facilities in the network
- Receive referred specimens and performing the required tests, if applicable, assuring quality of analysis and reporting results or referring specimens to a higher level
- Maintain a separate register for referral tests to be used for tracking the activity. Standard information should be captured in the register, including date, number of specimens received, whether acceptable or rejected and reason for rejection, if applicable, name and designation of person delivering the specimens, and mode of transport used.
- Provide reports of network functions to the DHE in a timely manner
- Ensure regular data analysis is done and communicated to the spoke facilities to provide information that will guide supportive supervision of spoke sites on pre-analytical processes, where necessary

5.7. District Health Executive (DHE)

- Support IP with recruitment of HR
- Provide IST oversight administrative activities at district level
- Ensure that spokes are set up for successful implementation of IST. Have a designated dispatch area should be created in the laboratory with a sample management SOP and dispatch checklist
- Receive regular updates from spokes and hubs on the functionality of IST

5.8. Testing laboratories (Provincial and Referral)

- Receive/send feedback from lower level referral sites on the efficiency and effectiveness of the IST for continual performance improvement
- Maintain and regularly update a national directory of referral laboratories and relevant collection, packaging, storage and transport SOPs for each, particularly those for highly specialized tests, which should be provided to all collection facilities and hubs

5.9. PHEs

- Have oversight of IIST at provincial level
- Receive reports from DHEs, Provincial Labs and the regional coordinators on functionality of the system
- Convene meetings at provincial level to discuss and manage the IST system at provincial level
- Ensure that DHEs/Hubs and Spokes are set up to implement the IST

6.0. Coordination of National IST

MOHCC will have oversight of the IST through the Director of Laboratory Services (DLS), through the official formation of an IST Technical Working Group (TWG), the IST TWG will be chaired by DLS and co-chaired by Programs (AIDS and TB, Malaria, etc.) in the MoHCC. The IST TWG will provide coordination and communication among the various stakeholders. The group will be comprised of stakeholders working in the technical areas of specimen referrals within the government and supporting partners and donors. Its mandate will focus on coordination of activities and funding with the goal of improving the performance of the specimen referral network. The IST TWG will provide strategic direction, national policy recommendations and guidance, discuss performance of the IST and improvement initiatives to ensure services are implemented in a coordinated and

efficient manner. The main responsibility of the IST TWG is to identify priorities to help strengthen the overall specimen referral network and correspondingly to coordinate partners' support in the following key strategic and operational areas:

- Review, develop and adopt guidance related to specimen referrals
- Develop and monitor the implementation of the National Integrated Specimen Referral Policy or Guidelines
- Inform decision makers and practitioners about specimen referral issues
- Coordinate technical assistance and partners' investments to align with national priorities and make optimal use of resources
- Explore opportunities for innovation
- To Plan and to make timely and efficient decision-making of specimen referral activities
- Review the progress of specimen referral activities and performance of implementing partners and make relevant recommendations

7.0. Key Performance Indicators for Implementing Partners

As part of the agreement with the partner managing the IST, some performance indicators will be agreed upon and included in the Agreement, and these will be used to measure the performance of the partners. The indicators in Table 2 will measure IST system performance.

Table 1: Proposed Summary of Key Performance Indicators for an Integrated Sample Transportation System for the IP

		Indicators	**Target**	**Frequency of reporting**
Coverage	**a**	Number of patient samples transported this month to the laboratory disaggregated by sample type		Weekly
	b	Proportion of facilities in a cluster with at least 2 visits per week (rural)	100%	Weekly
	c	Proportion of facilities in a cluster with at least 5 visits per week (urban)	100%	Weekly
Bike Functionality	**a**	Proportion of functional motorbikes this month	100%	Monthly
Turnaround time	**a**	Average TAT: Specimen collection to Receiving at hub	2 days	Monthly

	b	Average TAT: Specimens from hub to lab	2 days	Monthly
	c	Average TAT: Receiving of specimens at lab to Release of results	7 days	Monthly
	d	Average TAT: Release of results from lab to receiving at hub	2 days	Monthly
	e	Average TAT: Dispatching of Results from hub to receiving of Results at clinic	2 days	Monthly
Specimen Quality and Integrity	**a**	Number of samples rejected at the hub this month		Monthly
	b	Number of samples rejected at the referral lab this month		Monthly

The proposed performance indicators are mostly output/coverage and outcome indicators, which will be used for routine monitoring and when they are analysed, help identify where inputs/process investments are needed and the potential impact of the system on health outcomes. Additional process indicators, such as the completeness of documentation (e.g., use and completeness of registers, logs, forms) or adherence to standard operating procedures (SOPs) and packaging standards are not included but would be assessed during supervisory visits.

The key indicators will be monitored routinely (on a weekly and monthly basis) by the sites and IP and reported to the district or provincial focal person. Other indicators will be more useful for monitoring trends, investigating specific issues or as quality checks during supervisory visits; thus, they will be collected on a less frequent or ad-hoc basis as needed for these specific purposes.

8.0. Handling of Emergency Samples

The Integrated Sample Transport system is to function in a way that has precise schedules for days that specimens are to be collected. The current concept has a frequency of 2 days per week for routine specimens collected from the Spokes (facility) to the Hubs, and once a week as necessary for the transportation of the samples to the provincial and/or national laboratories. However, in the event of outbreaks e.g. Cholera, Dysentery, Typhoid, Polio, Measles and any related diseases as classified under outbreaks, the samples will require speedy transportation and will be treated as an emergency. These samples are required to have appropriate packaging to mitigate infection risk and maintain sample integrity, and the rider's safety will need to be ensured

during transporting of such specimens. The routine route schedules may be changed and customized to address these outbreak situations; this, however, requires effective communication amongst health practitioners in the affected facilities including the rider, the targeted health facilities in collaboration with the Epidemiology and Disease Control unit, and the testing laboratories.

9.0. Back Up Processes

The implementation approach has accounted for back-up processes, given that it is operating within existing MoHCC infrastructure, which already has systems. In the event of motorbike breakdown, the IP will be responsible to provide back-up, most likely in conjunction with the DHEs, who may provide alternative/relief motorbikes and riders from their existing pool of motorbikes and riders to bridge the gap. This will also apply to fuel gaps and in cases where a bike has gone for servicing.

For non-functional Hubs, the IP will be responsible for referring samples to the next testing Hub in the shortest possible time. Non-functionality of a Hub can arise from power outages or lack of backup power, equipment breakdown, non-availability of reagents or laboratory personnel, among other reasons.

10.0. Motorbike and Accessories Replacement Plan

The IP is responsible for maintaining the fleet inventory and be able to give an indication of bike fleet replacement plan to the MOHCC for further action including operational accessories replacement. To this end, the IP is expected to have a comprehensive asset register of all IST assets and equipment and periodically update the MOHCC on the status of these assets.

11.0. Complementary System Strengthening Activities for Consideration

A fully operational IST requires complementary system strengthening activities to be addressed in order to achieve the desired outcomes and meet the set operational KPIs. The success of an IST depends on clinical demand, a functional laboratory which has good power supply systems, including back-up, good water supply systems, and

adequate human resources for carrying out the required tests, and a strong laboratory-clinical interface to ensure the results get back to the clients in a timely manner and appropriate clinical actions are taken.

Below are some of the areas which need attention for the proper operation of an effective IST:

- Equipment service and maintenance of laboratory machines
- Adequate human resources in the laboratory for carrying out the testing
- Strengthening of the Laboratory Management Information Systems for tracking, management and dissemination of related data and results
- Waste Management for testing laboratories
- Quality Assurance
- Availability of reagents and related commodities
- Demand creation for tests at collection spokes
- Results return to submitting sites and results utilisation for clinical management
- Availability of reliable clean water

These essential areas will need to be put in place to ensure IST implementation is successful; otherwise, the full potential impact of the IST will not be achieved. A full framework of the national IST guidelines that is costed will need to be developed under the guidance of a TWG focused on IST. More details on these areas to be addressed are as follows:

11.1. Waste Management

There is poor waste management across all laboratories: for example, liquid waste is often poured down in the sink without proper disinfection. Treatment capacities for the treatment of chemical waste from health facilities are not available. The treatment methods of pharmaceutical waste are insufficient and not widely implemented. If future waste from HIV/AIDS, TB and other healthcare related activities should be treated and disposed of in a safe and environmentally friendly way, major efforts and larger investments are needed. There is need for a collection of waste and disposal budget to reduce risks and possible negative environmental impact from hazardous waste.

11.2. Human Resources strengthening and workforce reforms

A stronger human resources workforce will be essential for all activities, including data capturing across the entire IST system to be executed efficiently in support of the M&E framework. All healthcare workers and transporters will also need training on packaging and transportation of samples.

For the envisaged scale up, additional Laboratory scientists will be needed for full laboratory capacity utilization to enable successful implementation.

11.3. Power back-up

The country has been facing major power shortages affecting electricity supply to the laboratories, which do not always have adequate back-up systems. To reach target testing turn-around-times, it is critical that all testing laboratories have a reliable power supply and back-up system, protected from power fluctuations, an effective surge protection plan and an uninterruptible power supply maintenance plan.

11.4. Quality Assurance

Ensuring quality of testing is a high priority to ensure patients testing is accurate and correct results are delivered on time to the client. The key components to be supported include Proficiency testing, continuous quality improvement towards accreditation, supportive supervision and quality control test provision for all tests. Training on proper collection, packaging, storage, handling and transportation will also be key to maintaining the quality of specimens received at the testing laboratory.

11.5. Clinic Laboratory Interface

In order to comprehensively address the continuum of care, demand creation and result utilization for patient management, the Clinic Laboratory Interface will need to be strengthened in collaboration with community organizations, clinical partners and laboratory partners. These activities will be led by the MOHCC in all the 63 administrative districts.

11.6. Data Management Systems

Laboratories across the country have a good data management system but this is heavily reliant on paper records that may be prone to human error. An assessment of current practices should be undertaken to identify needs before setting up a fit-for purpose electronic system for reporting, monitoring, evaluation, specimen and result tracking.

11.7. Ancillary equipment and services

Sample preparation at Hubs will need ancillary equipment such as fridges, centrifuges and pipettes; this equipment needs to be budgeted for within the IST framework. Other collection, packaging and transportation equipment that will be necessary includes tubes (primary containers), plastic bags (secondary containers) and boxes (tertiary containers) among others. Motorbikes will also need cold chain equipment, such as temperature data loggers, as well riding gear for the riders.

All vehicles used in the IST will need servicing and replacement periodically and will be supported from the grant.

11.8. Biosafety training

All testing sites across Zimbabwe should be supported to improve biosafety and biosecurity, to ensure the safety of laboratory staff and protection of the public. The level of support required will vary depending on the baseline level of the site, but all laboratories should be equipped, and staff trained, to function at Biosafety Level 2.

11.9. Availability of Reliable water supply

Most facilities in the country are facing acute shortage of water, and where this is available, the quality is questionable. For the labs to function effectively to deliver quality services, a more reliable quality water should be available. In view of the current water situation, dedicated boreholes fitted with solar power and overhead plastic tanks should be provided for all the labs with acute water problems

12.0. Conclusion

The proposed Integrated Sample Transportation (IST) system if implemented nationwide, will help mitigate the challenges being experience with the current system and ensure significant improvement in sample referral and testing efficiencies and above all improvement in the Turn-Around Time (TAT) for results. It is expected that operational efficiencies be realized through the setting-up of the IST.