THE REPUBLIC OF UGANDA
Ministry of Health

Supranational Reference Laboratory

NATIONAL TB REFERENCE LABORATORY (NTRL)

ANNUAL PROGRESS REPORT

1ST OCTOBER 2018 TO 30TH SEPTEMBER 2019

LIST OF ACRONYMS

AFB	Acid Fast Bacilli
BSC	Biological safety Cabinets
BSL	Biosafety level
CDC	Centers for Disease Control and Prevention
NTRL	National Tuberculosis Reference Laboratory
NTLP	National Tuberculosis and Leprosy Program
DST	Drug Susceptibility Testing
EQA	External Quality Assessment
FM	Fluorescence Microscopy
IQC	Internal Quality Control
ISO	International Organization for Standardization
LJ	Lowenstein Jensen
LPA	Line Probe Assay
LIMS	Laboratory Information Management System
LQMS	Laboratory Quality Management System
MDR-TB	Multi Drug Resistant Tuberculosis
MGIT	Mycobacteria Growth Indicator Tube
MoH	Ministry of Health
MTB	Mycobacterium tuberculosis
NALC	N-acetyl-L-cysteine
NGO	Non-Governmental Organization
NTLP	National Tuberculosis and Leprosy Programme
NTM	Nontuberculous mycobacteria
QA	Quality Assurance
SOP	Standard Operating Procedures
SRL	TB Supranational Reference Laboratory
SANAS	South African National Accreditation System
TB	Tuberculosis
KOFIH	Korea Foundation for International Health Care
WHO	World Health Organization
XDR-TB	Extensively drug-resistant tuberculosis
Xpert	Xpert MTB/RIF assay (Cepheid, Sunnyvale Ca, USA)
ZN	Ziehl Neelsen Stain

1.0 INTRODUCTION

The national TB services delivery platform in Uganda is composed of the National TB and leprosy programme (NTLP) which is mandated to oversee the overall TB service delivery in the Country. The national TB Reference laboratory (NTRL) is mandated to oversee the TB laboratory service delivery in the country. The laboratory is a main pillar in the End-TB strategy and a strong TB laboratory network is key towards TB control. The Uganda NTRL has a well-organized functional network of laboratories made of 1521 intermediate and peripheral laboratories. Laboratory services are arranged with support supervision from the NTRL and intermediate labs to the peripheral labs. NTRL provides leadership and technical guidance to all laboratories in the national TB laboratory diagnostic network so they can provide quality laboratory services that contribute to the reduction of the TB and leprosy burden in the country. Additionally, NTRL provides laboratory services for TB diagnosis, surveillance and monitoring. The NTRL is a WHO designated supranational TB laboratory (SRL), one of only three SRL in the WHO-AFRO region to receive that status. The intermediate and peripheral labs offer GeneXpert testing smear microscopy services. The NTRL Uganda is one of the few countries globally that managed to implement a functional External quality assessment (EQA) for smear microscopy since 2005 through blinded rechecking. With the introduction of GeneXpert, the country established a hub system where by sites without Xpert machines refer samples to sites with Xpert machines for testing.

1.1 EXECUTIVE SUMMARY

During 2018/2019 NTRL Uganda has shown remarkable improvement in TB service delivery system through quality smear microscopy and Xpert testing systems, the country laboratory network, Laboratory Quality Management systems (LQMS) owing to attainment of ISO 17043 accreditation, maintenance of ISO 15189 accreditation. Improved TB data Recording and information Reporting, sample referral system and EQA for smear and Xpert.

Uganda started implementing Xpert testing strategy in 3 sites with 3 machines (i.e. NTRL, Murchison Bay and Lira) and currently has 237 Xpert testing sites (with 259 machines) among the 1,521 TB diagnostic centers. This difference in number of sites indicates that these two testing methods are still complementary for some time before full implementation of Xpert for all strategy.

NTRL Uganda conducted training and capacity building national refresher trainings in ZN microscopy for 205 peripheral lab staff in Masaka and Bukomansimibi.

In May 2019, AHD Data call was made to 706 Health facilities (HFs) across all health regions, covering the period of Jan-June 2019. Data was received from approximately 85% (604/706) of the HFs. Of these, 62% (373/604) reported that they had completed a training of health workers in Advanced HIV Disease management, 55% (206/373) health facilities reported data on Urine TB LAM.

Through its role as a regional SRL, the lab conducted various activities towards achieving its mandate including: Trainings of Quality Management systems, Bio safety and Bio security, TB data management, developing of TB lab National Strategic plans, providing External Quality Assurance panels for all 18 project countries, support and mentorship for Drug Resistant and TB prevalence surveys and in 4 countries, Benchmarking visits at SRL for 63 staff across ECSA subregion , supported the adoption and integration of TB Laboratory Information Management

Systems in 4 countries, training of NTRLs in WHO recommended TB diagnostics, supporting the TB lab capacity assessments across 6 African countries.

2.1 MICROSCOPY NETWORK

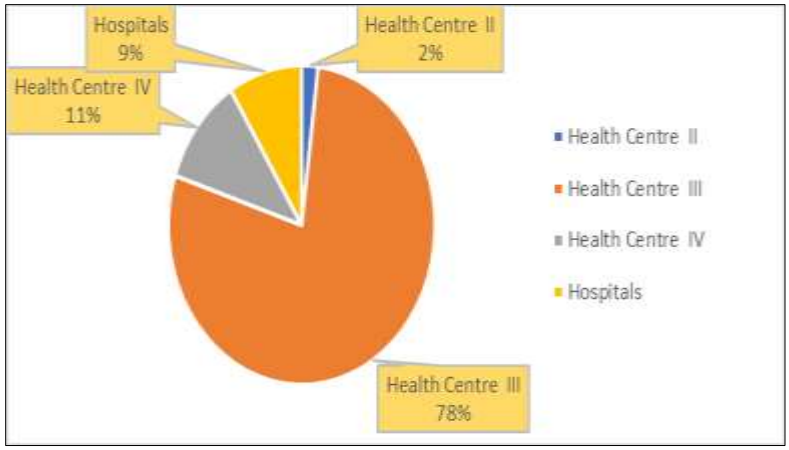
Smear microscopy using Ziehl Nielsen (ZN) microscopy remains the first diagnostic test for most presumptive TB patients. District laboratories performing ZN increased from 1,521 in Implementation year 2017/18 to 1667, during the Implementation year 2018/2019, with over 1,000 of the facilities with ZN smear microscopy services owned by the government and 230 by private not-for-profit organizations. An estimated 15% (of diagnostic facilities have microscopes that are semi/none functional or monocular. The national TB microscopy network remains the more accessible diagnostic means to the TB Patients to as low as Sub county levels. The Microscopy network has more than doubled in the last 10 years from 839 Diagnostic units in 2009 to 1667 by the end of 2018. The Uganda TB Microscopy network is currently 90% light microscopy and about 10% Fluorescent Microscopy.

Table 1: Summary of Microscopy TB diagnostic Health Facilities by Level

Level of Health Facility	Number of Microscopies
Health Centre II	33
Health Centre III	1301
Health Centre IV	184
Hospitals	149
Total	**1667**

More than 80% of the smear microscopy for diagnostics is currently done at the Health center II(s) and III(s). Majority Health Center IV and Hospitals are focused Genexpert sites and mostly do microscopy for treatment follow-up.

Graph 1: Summary of Microscopy TB diagnostic Health Facilities by Level



Smear Microscopy for diagnostics is currently mostly done at the Health center II(s) and III(s) and those sites above Health centre III without GeneXpert part machines. All the other sites currently mostly do microscopy for treatment follow-up

Key Achievements in the Microcopy network:

- 10 Microscopy sites upgraded from Light Microscopy to Fluorescent Microscopy, for example Arua region which received 4 Fluorescent machines from one of the implementing partners (GLRA). The sites that were identified for this upgrade included Lodonga HCIII in Yumbe

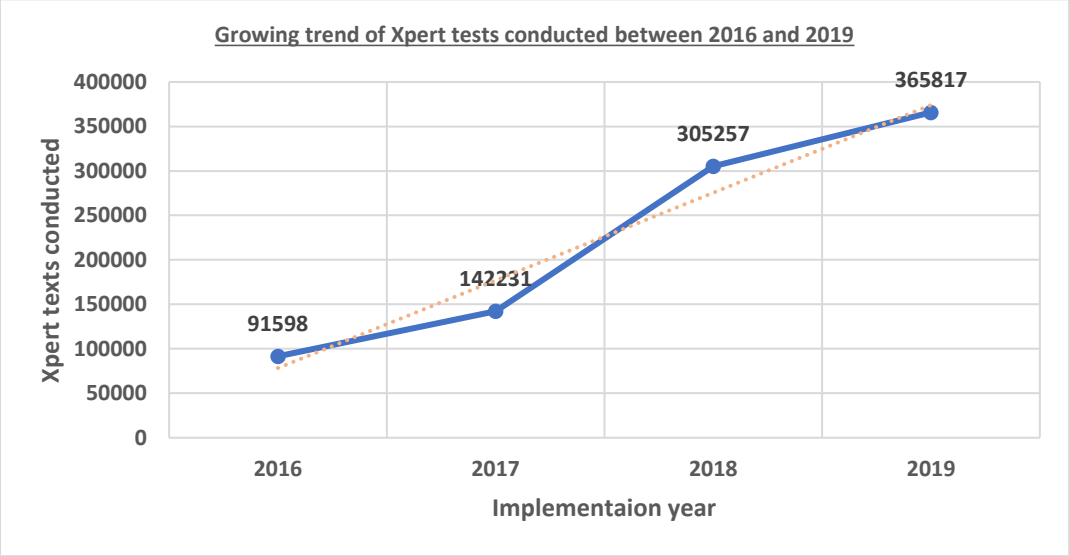
district, Moyo mission HC III, Adumi HC IV in Arua district, and Nyapea Hospital in Zombo district.

- The Regional Equipment maintenance teams have had their capacity enhanced and have been able to do repairs in 98 Microscopy sites that had faulty and nonfunctional Microcopies.

2.2 GENEXPERT NETWORK

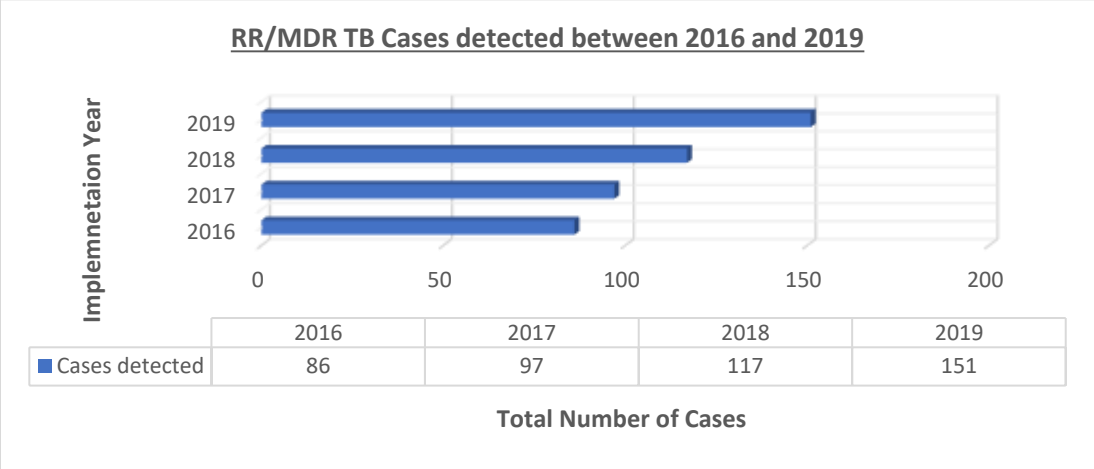
The GeneXpert network has developed between 2018 and 2019, there are currently 253 GeneXpert machines installed in 237 health facilities to improve access to early and rapid diagnosis of TB and DR-TB, this however accounts for only 16% coverage, 83 HCIVs are still operating without GX machines. 97% of the machines, and 93% of the modules within the GeneXpert Network are functional.

Graph showing a growing trend of GeneXpert tests conducted between 2016 and 2019



During the implementation period, there was a growing trend of RR/ MDR cases detected, the graph below shows an increasing trend between 2016 and 2019, which can be attributed to the increasing utilization of GeneXpert technology from 52% in 2016 to 77% in 2019.

Graph showing RR/MDR case Detected between 2016 and 2019

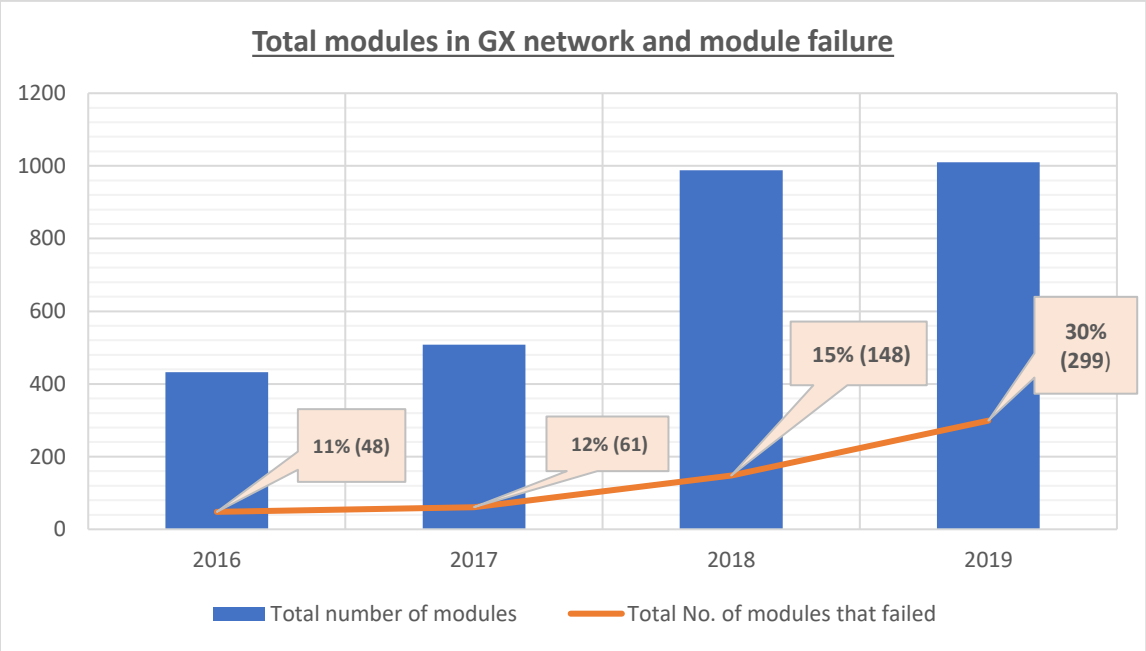


GeneXpert Module functionality and Replacement

During this reporting period, a total of 344 modules were replaced. 31% of modules were replaced within 5 working days and 49 % within 10 working days. There is sharp reduction in in GeneXpert equipment repair turnaround time, and evidently shows very limited equipment down time due to non-functional modules, largely attributed to signing the comprehensive service agreement between MOU and Cepheid Inc.

However, this being the first MoU signed by the company globally, there was a learning process which continued to improve over the year, for instance 92% of faulty modules in August 2019 and 100% of faulty modules in September 2019, were replaced within 5 working days, thereby reducing down time.

Graph showing GeneXpert functional modules and module failure rate:



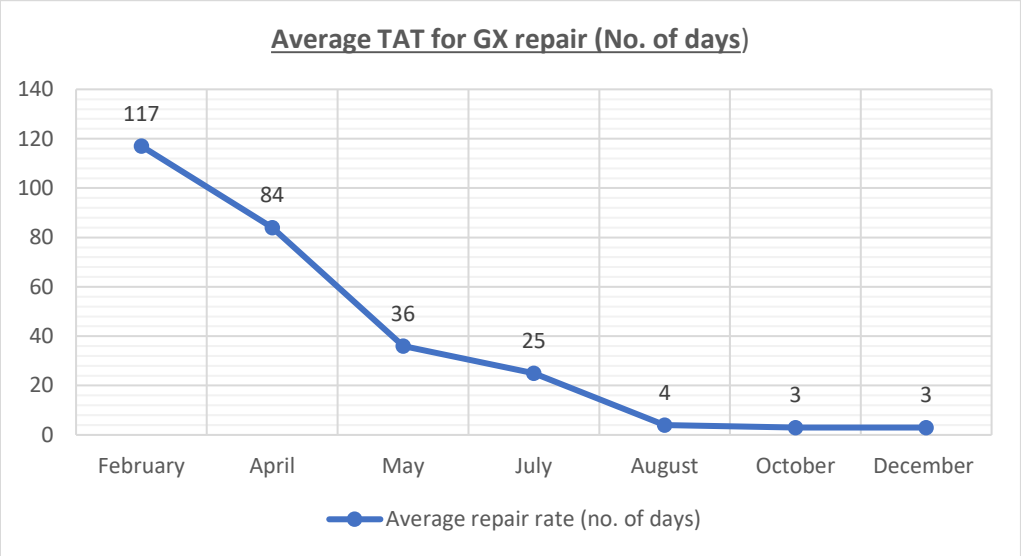
GeneXpert Turn Around Time for machine repairs and servicing

In 2018/19 all GeneXpert machines with the network were serviced during a comprehensive equipment service campaign that was conducted, the campaign will be moved into a 2nd phase of servicing for the machines which will be done along with on-going site interventions.

All machines were calibrated, except those at 3 sites, including Kangurumira HCIV, Kalagala HCIV and Kanoni HCII whose computers were reported lost or stollen. It should however be noted that the local vendor initially faced delays in receiving XpertCheck kits from Cepheid to start the calibration process, however by end of April 2019, 95% of GeneXpert machines had been calibrated.

Software updates and upgrade carried out in all sites. This supported to ensure that all facilities transitioned to Xpert MTB/RIF Ultra.

Graph showing the average turn around time for repair of GeneXpert Machines
(considering no. of days between when the break down is reported to when the machine is repaired)



NTRL provided timely remote technical support to GeneXpert users, which involved trouble shooting, resolving potential functional jams, and data reporting concerns through phone calls, e-mails and social media plat forms. Onsite training of users in GeneXpert sample processing and maintenance was conducted during site supervision visits. Overall the error rate reduced from 6% in 2018 to 3% in 2019, whilst increase in test workload, reduced equipment breakdown time.

Data Connectivity
All facilities have GxAlert software. However, due to challenges in implementation, only 9 Xpert sites are currently using the system. The NTRL is currently piloting a new software called LabXpert, this software is currently installed in 12 health facilities and 9 are very active. There is need to support the development and pilot of LabXpert software.

Challenges faced and Gaps identified in the GeneXpert Network:

1. Lack of computer anti-virus installed in all sites, thus the need for routinely scanning and cleaning the operation system.
2. The need to conduct further capacity improvement for regional Biomedical engineers to carry out GeneXpert servicing.
3. Lack of an online software or connectivity solution to monitor GeneXpert repairs. Therefore, NTRL is only able to manually track the cases that have been reported by users either through watsup, email or phone call.

2.3 TB DIAGNOSIS USING URINE TB LAM

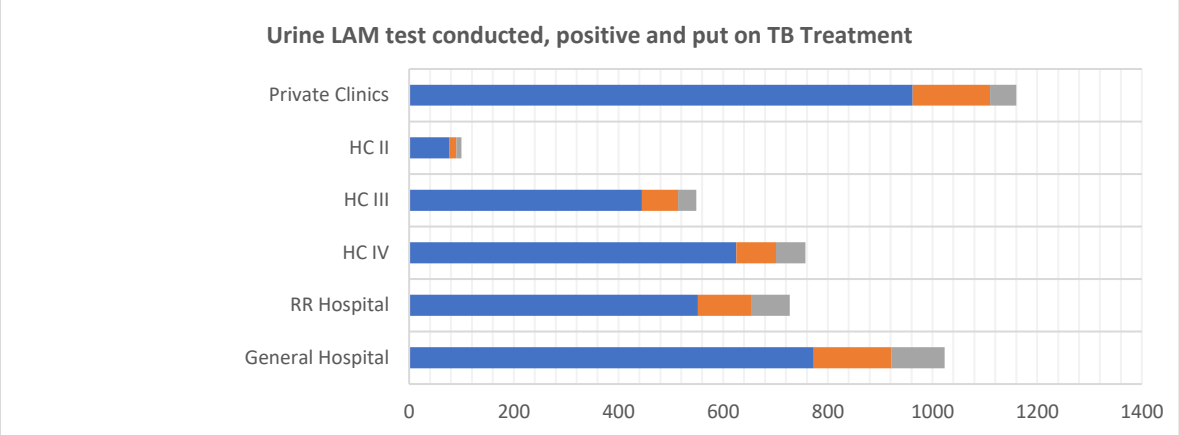
Uganda received a donation of 5000 Urine TB LAM test kits from ALERE in May 2016 and a pilot study was done in 2 NRHs and 14 RRHs in 2016. Following the pilot, Uganda adopted the use of LF- LAM in June 2017 and recommended its use among adult HIV positive presumptive TB patients with CD4 cell counts ≤ 100 or very ill HIV positive presumptive TB patients regardless

of CD4 cell counts. Since then the TBLAM test has been distributed to all RRH and District Hospitals and a limited number of HCIVs.
In October 2018, the MoH NTLP conducted an evaluation of the first year (June 2017 – June 2018) of Urine LAM implementation in order to guide countrywide scale up. Following this evaluation, Uganda incorporated Urine TB LAM testing into Uganda National guidelines for Advanced HIV Disease (AHD) Management in May 2019 and recommended its use among; (1) Adults and adolescent People Living with HIV (PLHIV) with CD4 ≤ 200 cells/μL regardless of TB signs and symptoms (2) TB symptomatic PLHIV children with CD4 ≤ 200 cells/μL (3) Seriously ill PLHIVs (including adults, adolescents and children) regardless of TB signs and symptoms and CD4 count or if CD4 count is unknown. The use of Urine TB LAM does not eliminate the need for other diagnostic tests such as GeneXpert MTB/RIF Ultra, culture or sputum-smear microscopy.

Performance progress on Implementation of Urine TB LAM in Uganda-(Data call Results)
In Uganda, 917 health facilities have been mapped and prioritized to offer a comprehensive package of care to all PLHIVs presenting with Advanced HIV Disease (AHD). These were selected based on the patient workload and accessibility of CD4 equipment.
In May 2019, AHD Data call was made to 706 Health facilities (HFs) across all health regions, covering the period of Jan-June 2019. Data was received from approximately 85% (604/706) of the HFs. Of these, 62% (373/604) reported that they had completed a training of health workers in Advanced HIV Disease management, 55% (206/373) health facilities reported data on Urine TB LAM. The overall training coverage on Advanced HIV Disease Management among priority HFs is 41% (373/917), as of July 15, 2019. Regional Implementing partners should prioritize AHD trainings across all health regions so as to bridge this huge gap.

Utilization of Urine TB LAM
The utilization of Urine TB LAM in Uganda is still suboptimal. Results from the Jan-June 2019 data call indicated that 40% (3,453/8,597) of the PLHIV clients with CD4 ≤ 200 cells/μL receive Urine TB LAM. Of the 40% AHD patients that received a urine TB LAM test, 16% (556/3,453) tested positive, and 59% (327/556) of these received TB treatment.
The low utilization of Urine TB LAM could be due to limited stocks of Urine TB LAM commodities nationally, knowledge deficiencies among clinicians regarding the eligibility criteria for Urine TB LAM and limited coverage of Urine TB LAM across all DTUs among others. The reasons for low treatment coverage among TB LAM positive patients need to be investigated and mitigation measures implemented. In addition, there is an urgent need to scale up Urine TB LAM training to cover all the 917 AHD priority sites Furthermore, the quality of AHD trainings that were conducted across all health regions need to be assessed by NTRL/NTLP, and conduct targeted mentorships to all DTUs implementing Urine TB LAM

Graph showing Urine TB LAM tests conducted, rate of positivity and patients that receive treatment thereafter by level of care.



	General Hospital	RR Hospital	HC IV	HC III	HC II	Private Clinics
No. of patients that received TB LAM test	773	552	625	445	77	962
No. of patients with +ve TB LAM test	148	101	76	69	13	148
No. of TB LAM+ patients started on TB Tx	102	74	56	35	10	50

Out of 8597 HIV patients with a CD4 count of less than 200, 40% (3453) were subjected to a Urine TB LAM test, of whom 16% (556) patients were found to be positive for TB and 59% (327) were started on TB treatment.

3.0 EXTERNAL QUALITY ASSURANCE

There are 3 methods of External Quality assessment; Blinded Rechecking, Proficiency testing and Onsight supervision. Uganda as a country implements 3 methods concurrently; Blinded Rechecking for the Microscopy diagnostic network on a quarterly basis, Proficiency panel testing for the GeneXpert sites biannually and onsite evaluation (supervision) for both networks either as targeted for sites identified or the scheduled annual supervisions at whenever resource allow.

3.1 Blinded Rechecking EQA Scheme

Blinded Rechecking EQA, a WHO recommended system for External Quality assessment for Laboratories with functional microscopy networks was first introduced in the country in 2006 as a pilot in selected regions. The Microscopy network gradually increased and by the end of 2009, at least 810 of the 839 diagnostic facilities nationwide were participating in the scheme at the end of 2018 a total of 1255 facilities out of 1667 were enrolled on the scheme.
The average Regional Blinded Rechecking Participation during this period Oct 2018- Sept 2019 was 61% (National Target 80% per quarter). Regions like Fort Portal, Arua and Hoima and Kampala Central were able to achieve the 80% participation for one than one quarter in 2018. Regions Jinja, Gulu and Mbale registered the least participation rates.
An analysis of the National annual EQA data for the year 2018 shows that at 83% percent of all sites TB Microscopy participated in blinded rechecking for at least once as shown in Table 2

Table: Summary of Blinded Rechecking EQA Performance

Summary of Blinded rechecking EQA

COUNTRY	Uganda	Year	2018
		Number	Percentage
Number of operational laboratories		1,666	
Number of those rechecked (%)		1,389	83%
Number of positive slides rechecked		3,529	
Number of negative slides rechecked		27,957	
Overall percentage positives in the laboratories' routine		7%	
Number (%) of laboratories with more than 1 HFP		37	3%
Number (%) of laboratories with 100% true positives		140	74%
Number (%) of laboratories with more than 1 FN		22	1%
Number (%) of laboratories as good as controllers at detecting positives (>=95%)		755	89%

Feedback Reports were sent to all Participatory Laboratories through with the CPHL Hub System or through the respective Regional Implementing Partners.

Achievements

- The Microscopy network has continued to grow from 1587 to 1667 Health facilities in 2018.
- More sites have continued to enroll and participate.

Challenges in Implementation of Blinded Rechecking EQA

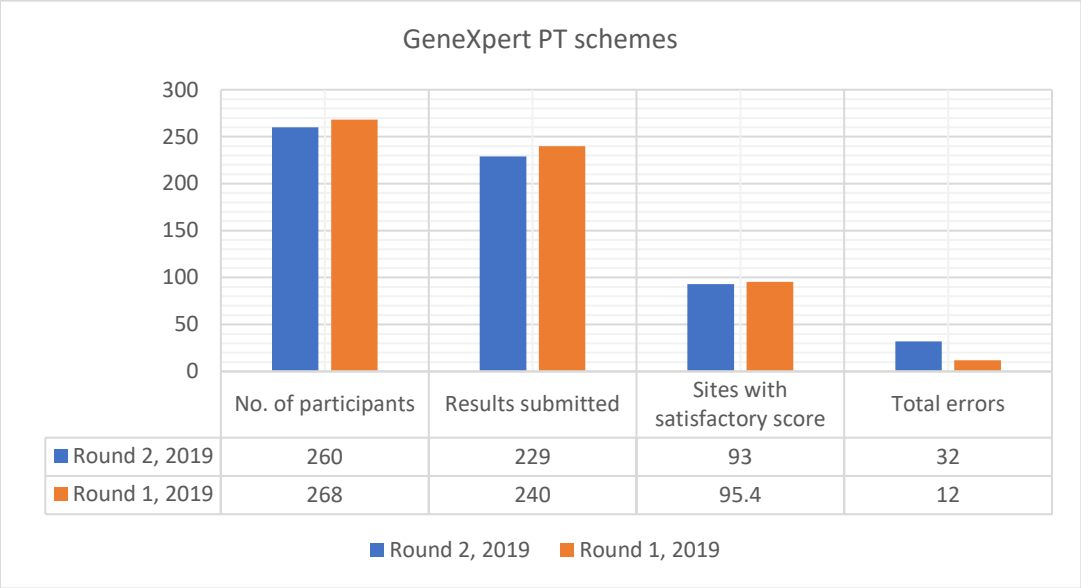
- Non timely sampling of Slides by the District TB Leprosy Supervisors
- Non timely rechecking of slides by the DLFPS
- Non timely return of feedback especially those sent through the CPHL Hub system
- Intermittent facilitation of district personnel to do targeted supervisions for Labs identified with errors at rechecking.

3.2 GeneXpert External Quality Assurance:

The Uganda National Tuberculosis Reference Laboratory-NTRL/ Supra-national Reference laboratory (SRL-Uganda) has strongly instituted an ISO 17043:2010 accredited GeneXpert External Quality Assurance (EQA) scheme as a mechanism of ensuring quality, reliable and accurate testing from GeneXpert diagnostic centers across Uganda. The proficiency testing (PT) is a snapshot in time and a brief view of how patient samples are tested. The main objective of this scheme is to develop an Xpert® MTB/RIF and Xpert® MTB/RIF Ultra PT program utilizing equipment and supplies available in most National TB Reference Laboratories to produce PT items that are; safe, stable up to 36°C, feasible for use in resource limited settings and precise in efforts to aid Xpert® MTB/RIF Xpert® MTB/RIF Ultra quality assurance programs. These programs include two separate challenges during the calendar year i.e. (February and August). Each round is composed of a panel including five (5) dried tube specimens (DTS). Prior to analysis, each

specimen requires rehydration with Xpert® Sample Reagent (SR). Subsequent steps are conducted as per participants' internal standard operating procedures. Each panel is accompanied by complete instructions and participants are expected to return test results within 44 days from the shipment date.

Summary of GeneXpert PT scheme round one and two:



Round 1 2019 performance

A total of 268 panel sets were dispatched to all functional GeneXpert testing laboratories. At time of analysis a total of the two hundred twenty (220) sites were able to submit results, three (3) participants could not provide results due to non-functional machines and twenty-five sites never submitted any response. Ten sites scored below 80%. These included; Anyeke HC IV Mengo Hospital, Bugono HCIV, Bwindi Community Hospital, Bwizibwera HC IV, Masaka R.R. Hospital, Serere HC IV, Entebbe General Hospital Laboratory Kasambya HC IV.

Round 2 2019 Performance

Two hundred forty (240) sites participated in this round. At the time of analysis (closing date for receipt of feedback from participants), a total of two hundred twenty-nine (209) sites were able to submit test results putting the result return rate at 88.1%. Six (6) participants (2.3%) could not provide results due to non-functional machines (computer missing) and twenty-five (25) sites (9.6%) never submitted any response. Sites missing computers included; Kangulumira HC IV, Kalagala HC IV, Kanoni HC IV, Lwengo HC IV, Kisenyi HC IV (was down by the time of the shipment) and Buvuma HC IV (machine was not yet installed).

There was slight decline of (1.8%) results return rate. This was attributed to a back-to-back shipment of the panels and a reduction in number of respondents. Sites with unacceptable scores are not routinely followed up for support

Challenges

- Some testing personnel have not yet appreciated the significance of PT panels. This is noticeable on their attitude towards the scheme.

- There were technical challenges with some personnel at sites to generate required data from the GeneXpert machines to submit to the PT provider.
- There was noticeable delay in result submission from a number of sites with some not even responding.
- Results returned through the hub system were received late and others were completely misplaced.
- Data analysis still remain a challenge since there is no electronic system.

4.0 TARGETED SUPPORT SUPERVISIONS FOR THE NATIONAL NETWORK

As a requirement NTRL does targeted support supervisions to all the 12 regions with sites identified with challenges in both Microscopy and GeneXpert testing in the different regions. The supervisions usually done at least once a year are meant to help in trouble shooting of reasons and finding solutions to challenges like errors in both blinded rechecking and GeneXpert PT panels tested at those sites, additionally those that may not be participating in the schemes to find out what the reasons for their no participation may be. These visits are done together with the Lab focal persons and District TB Leprosy supervisor in the respective districts and in each district the activity commence with a visit and discussion with the District Health department leadership, the DHOs

During this reporting period, targeted support Supervisions were only done in 5 (Gulu, Fort Portal) Mbarara, of the planned 12 Regions during the period. 25 Health facilities in seven Districts were targeted in Fort Portal Region, 18 Sites in 8 districts were targeted in Mbarara Region, and 5 Sites in Gulu Region

5.0 CENTRAL TB REFERENCE LABORATORY-CTRL

During this Period the former NTRL in Wandegeya was designated as the Central TB Reference Laboratory (CTRL) as the only public TB culture and drug susceptibility testing other than the National Tuberculosis Reference Laboratory-NTRL in Butabika. This facility is currently housed at the former NTRL site located at the National Tuberculosis and Leprosy Control Programe premises in Wandegeya. All the staff and support for supplies and consumable are currently coordinated from the NTRL.

The intention or scope of work for this facility is to act as TB culture lab for Kampala and the central TB regions as well as act as a backup laboratory for the NTRL. This facility is also expected to coordinate External Quality Assurance activities as well as support supervision for Kampala and the central TB region.

Currently the following tests are performed at this lab:

1. Xpert MTB/Rif-Ultra
2. Both LED and bright field microscopy
3. Both Solid/LJ and Liquid/MGIT culture
4. MGIT Drug susceptibility Testing
5. Both 1st and 2nd Line Probe Assay

Test Workload from October 2018 to September 2019

CATEGORY	TEST OUTCOMES
MTB NOT DETECTED	6274
MTB DETECTED	939
RR DETECTED	23
ERRORS	29

The table above indicates a low positivity rate of 12.9% due to the fact that the catchment area for the laboratory is inclusive of multiple private clinics in Kampala as well as a lot of outreaches that are conducted that have a low positivity rate.
All the 23 Rifampicin resistant cases could be verified as having been referred to the Mulago National Referral Hospital for MDR TB management.
The error rate of 0.4% is a good sign that the samples processing technique or instrument maintenance is good that facilitates such good outcomes.

Microscopy and culture

The laboratory only re-initiated LJ and MGIT culture in August and September 2019 respectively mainly serving Mulago MDR TB treatment site. On average 30 sputum samples are received every week to the laboratory for routine culture follow up. A total of 231 samples have were received during these 2 months-better analyses of this indicator will be done during the subsequent reporting periods.

Other tests-LPA and DST

These were initiated in November 2019 and reporting on these will happen in the subsequent reporting period.

6.0 SUPRA REFENCE LABORATORY (SRL UGANDA) ACTIVTIES

COUNTRY TECHINICAL SUPPORT

During the implementation period January to March 2019, SRL Uganda with support from ECSA-HC conducted three trainings including: development of a lab specific National Strategic Plan, administering of Lab Network assessment tool, and data management for TB labs. One short term Technical Assistance visit was conducted to Malawi to support implementation of QMS and provide support to the ongoing Drug Resistance Survey (DRS). Zimbabwe attended a bench marking visit on preparation of GeneXpert PT panels.

Country	Date of Activity	Details of TA Support Provided	Comments/Recommendations
Malawi	28th Jan –9th Feb 2019	1.Follow up of previous DRS recommendations 2.Strengthen the quality of sample collection 3.Strengthen sample transport TAT 4.Strengthen sample processing TAT	The lab management to develop a TBLIS job aid and have all technical staff oriented on its use The NTP management is strongly recommended to procure router for wireless internet to enable TBLIS accessed in the BSLIII lab and microscopy lab by respective technical personnel.

Mozambique	29th AprIL-10th, May 2019	1. Follow up on the previous recommendations for the visit made in December 2017 2. Technical assistance in the interpretation of 2nd line LPA results as well as review place of LPA in the lab TB diagnostic algorithm.	Always follow the SOP for the follow up of positive cultures since a procedure for the preparation of blood agar is available as well as the materials required can easily be accessed at the laboratory.
Mauritius	18th June to 21st June 2019	1. review progress in implementing 2nd line LJ DST 2. To follow-up actions from previous technical assistance	Equipment service, calibration and maintenance needs to be explored for all critical equipment
Kenya	3rd – 14th June 2019	1. Provide technical support 1st and 2nd line liquid medium DST (MGIT) 2. Provide mentorship in species identification (microscopically through cell morphology)	To validate the use of 2nd line drug powders at NTRL and resume the provision of 2nd line phenotypic DST services to its clients

TRAINING ON LAB SPECIFIC NATIONALS STRATEGIC PLANNING

SRL Uganda with support from external strategy consultants conducted a one-week training for the managers of NTRL ad key SRL staff on strategic planning for laboratory services from January 21-25, 2019 in Entebbe, Uganda.

During the project MTR in 2017, a recommendation towards attaining project sustainability was made, as a way of bridging the critical gap of lack of proper and implementable laboratory focused strategic plans for all the NRLs in the target countries.

The training aimed at equipping participants with knowledge on principles, concepts and approaches to development of effective laboratory strategic plans, supporting the country participants to develop their country-specific roadmaps to develop new or update existing national laboratory strategic plans, developing draft/review country strategic framework for their laboratory strategic plans with an aim of strengthening in-country system, and developing long-term technical assistance needs in areas of laboratory strategic planning for the countries for governments and partners to take up beyond the ECSA-HC support. The training was attended by 24 participants (14 male and 10 female), 17 were country representatives and 7 were from SRL Uganda. A preliminary assessment of the exposure to strategic planning processes and related training indicated that 4.5% (only one participant) had ever received any training in similar area but a high 59.1% had participated in any strategic planning process. More training details can be found in the training report attached.

TRAINING ON TB LAB NETWORK ASSESTMENT TOOL

The network Assessment training was conducted between 11th and 15 February 2019 in Kampala, Uganda, and involved participants from all the 17 countries including Uganda under the Global fund ECSA-HC project. During the steering committee meeting held in Mozambique between 28th to 31st November 2018, there was a concern of having country's TB lab networks functional and monitored for proper diagnosis and management of MTB respectively.

SRL Uganda with support from ECSA-HC and USAID developed a concept for the development of capacity of personnel to assess National TB diagnostic networks and systems by training specific personnel on using the TB Diagnostic Network Assessment Tool (TB-Net Tool) for strengthening TB lab networks

within the countries. A total of 24 lab personnel (17 from other countries and 7 from SRL Uganda) were oriented on the tool and participated in a hands-on field assessment of the TB lab network in Uganda that included National, intermediate, peripheral and private not for profit labs. The information captured was aggregated and used to provide recommendations and key actions for MOH and relevant stakeholders on how to improve the network functions or reallocation of resources respectively.

TRAINING ON DATA MANGEMENT FOR TB LABS

As a recommendation of Midterm Review (MTR) conducted in 2017, towards strengthening the data management and reporting function within participant country NTRLs. SRL Uganda with support from ECSA -HC conducted a three-day training in data management for lab data managers, between March 12th – 14th, 2019 in Kampala, Uganda. The training aimed at imparting knowledge skills and competency in data collection, handling, analysis, presentation and dissemination, familiarizing trainees in the use of the basics tools and frameworks used in developing and monitoring data management systems and Introducing trainees to the fundamentals of Data Demand and Use within the Laboratory.

A total of 19 participants attended the training (4 females and 15 males) among whom were three representatives from SRL Uganda, a post training evaluation indicated that 56% participants of the participants in attendance rated the training very good in attaining and accomplishing the objectives of the training, while 31% score the training at good, it is therefore evident that majority of participants felt that the objectives of the training were met and minority felt otherwise.

Participants were tasked with conducting a data quality assessment for the systems and processes used in TB lab data management and there after developing a action measures to bridge gaps identified.

PROFICIENCY TESTING MICROSCOPY

A total of 26 laboratories were sent panels in this round of Microscopy PT. This round also covered the 19 National TB Reference Laboratories supported by the regional Global Fund, The East Central and Southern Africa Health Community (ECSA HC) and Uganda Supranational Reference Laboratory (SRL) grant. The 26 labs in 20 countries Swaziland, Somalia, Somaliland, Botswana, South Sudan, Seychelles, Burundi, Rwanda, Eritrea, Mauritius, Malawi, Uganda (2 labs), Zimbabwe (2 labs), Namibia, Tanzania (2 labs), Kenya, Mozambique (2 labs), Zambia (3 labs), Lesotho and Liberia.

Only 25 laboratories participated in this round and 25 submitted results within the stipulated deadline. Therefore, only results for the 25 labs were analyzed. Three participants (12%) performed both ZN and FM, eight participants (32%) performed ZN and fourteen participants (56%) performed FM. The number of participants performing ZN & FM has increased from one in Aug-2018 to three in Feb-2019.

Table 1. Showing comparison of staining techniques

Technique	Aug-2018	%	Feb-2019	%
ZN	9	36	8	32
FM	15	60	14	56
ZN&FM	1	4	3	12
TOTAL	25	100	25	100

PROFICIENCY TESTING GENEXPERT

A total of 268 panel sets were dispatched targeting 268 functional GeneXpert testing laboratories. 247 of the sites were within Uganda and 21 were NRL laboratories and research institutions under the Uganda-SRL network. At time of analysis (closing date for receipt of feedback from participants), a total of the two hundred forty sites were able to submit results putting the result return rate at 89.6%, three participants (1.2%) could not provide results due to non-functional machines and twenty-five sites (9.3%) never submitted any response as shown below in the table;

Summary of feedback from participants

Response rate	Non-functional at time of analysis	No response
89.6% (240/268)	1.2%(3/268)	9.3% (25/268)

BENCHMARKING ACTIVITIES

Country:	ZIMBABWE	**Date of Activity:**	28th January – 8th February, 2019
Details of TA provided: A benchmarking visit was organized for the laboratory manager of NTRL Zimbabwe, to visit Uganda SRL as an avenue for knowledge exchange between the two laboratories particularly with regards to on GeneXpert PT preparation using the Dry Tube Specimen (DTS) method. The participant did not have any prior knowledge on preparation of DTS panels.			
Comments/ Recommendations from the benchmarking visit: It is however recommended that a follow-up visit to Zimbabwe National TB reference laboratory should be carried out by the Uganda SRL in order to help set up the DTS preparation scheme and ascertain whether the lessons learned during the training are being practiced by the staff. Communication with participants should be more often for continuous discussion on the Assay trained on. participant needs to give feedback to SRL on the progress of implementation of the DTS technique that was trained on. Participants to develop SOPs and any form related to DTS GeneXpert PT preparation. SRL to provide on-site mentorship DTS GeneXpert PT preparation for to Zimbabwe NTRL			
Country:	NAMBIA	**Date of Activity:**	28th January – 8th February, 2019
Details of TA provided: A benchmarking visit was organized for the laboratory manager of Namibia NTRL, to visit Uganda SRL as an avenue for knowledge exchange between the two laboratories particularly with regards to on GeneXpert PT preparation using the Dry Tube Specimen (DTS) method. The participant did not have any prior knowledge on preparation of DTS panels.			
Comments/ Recommendations from the benchmarking visit: It is however recommended that a follow-up visit to Namibia National TB reference laboratory should be carried out by the Uganda SRL in order to help set up the DTS preparation scheme and ascertain whether the lessons learned during the training are being practiced by the staff. Communication with participants should be more often for continuous discussion on the Assay trained on. participant needs to give feedback to SRL on the progress of implementation of the DTS technique that was trained on. Participants to develop SOPs and any form related to DTS GeneXpert PT preparation. SRL to provide on-site mentorship DTS GeneXpert PT preparation for to Namibia NTRL			