THE INTRODUCING NEW TOOLS PROJECT (iNTP)

Expansion and Strengthening of the LabXpert Connectivity Solution for TB Diagnostic Sites in Uganda

Country in Focus: Uganda

Background

The Uganda National Strategic Plan (NSP) for Tuberculosis and Leprosy Control has identified the adoption of new technologies and approaches as a key strategic focus area for 2020/21-2024/25 to strengthen diagnostic and treatment services, including the use of digital technologies for information management.[1]

Despite the development of various digital health information systems in the country, including laboratory data connectivity solutions, these systems have faced numerous challenges. To address this, one of the outcome targets of the NSP's objective «To increase access to timely and quality laboratory services» is to ensure that 100% of testing sites using rapid molecular diagnostics can transmit results electronically to clinicians, the National TB Reference Laboratory (NTRL) and the National TB and Leprosy Program (NTLP) using a diagnostics connectivity system. Such systems also enable real-time remote monitoring of instrument network performance and facilitate reagent forecasting and stock management. Since 2016, the World Health Organization (WHO) and the Stop TB Partnership's Global Laboratory Initiative (GLI) have been urging countries to connect all molecular diagnostic instruments that produce digital data, as part of the Framework of Indicators and Targets for Laboratory Strengthening under the End TB Strategy.[2]

[1] Ministry of Health of the Republic of Uganda (2020). National Strategic Plan for Tuberculosis and Leprosy Control 2020/21 - 2024/25. Available at: https://www.health.go.ug/cause/national-strategic-plan-for-tuberculosis-and-leprosy-control-2020-21-2024-25/

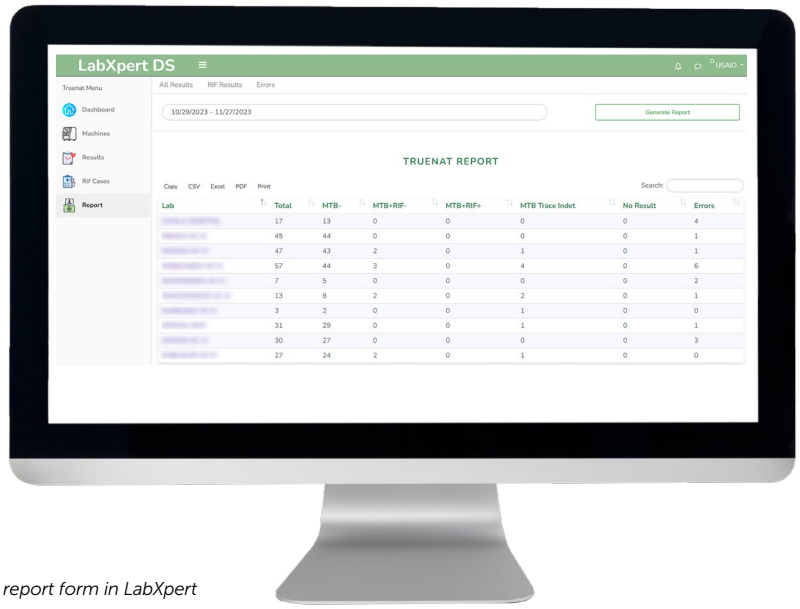
[2] World Health Organization (2016). Framework of indicators and targets for laboratory strengthening under the End TB Strategy. Available at: https://www.who.int/publications/i/item/9789241511438

Continue reading...

Project Description

Under the Stop TB Partnership/USAID *introducing New Tools Project (iNTP),* Makerere University Joint AIDS Program (MJAP) expanded and strengthened the use of the LabXpert connectivity solution in Uganda. The software automatically sends results and performance data from diagnostic instruments to clinicians and aggregates the data on national online dashboards. LabXpert has been developed as an integrated connectivity solution for GeneXpert and Truenat rapid molecular diagnostic instruments as well as for CAD4TB software, which is used with digital X-ray systems to detect abnormalities suggestive of TB.

LabXpert is a software solution that works as an online end-to-end laboratory information management system to enable the management of the diagnostic testing process and patient management with minimum human intervention. LabXpert reduces turnaround times and the likelihood of data inaccuracy as it eliminates paper-based data collection through its automated interface. Before LabXpert, there was not any form of electronic results' dispatch. Results used to be sent back to the referring sites in hard copy. This used to take, in some cases, more than a week. With LabXpert, results are sent via Short-Message Service (SMS) to requesting clinicians as soon as they are available, and they can also be sent to patients, notifying them when results are ready. Test results can also be exported as a PDF for printing.



An example of a Truenat report form in LabXpert

The platform also offers diagnostic network performance-related data for timely action on instrument utilization, stock consumption rate, equipment downtime, and service and maintenance needs. It also has a multidrug-resistant (MDR) management module, which will be used to support tracking and monitoring diagnosed patients. LabXpert was owned by MedX International Ltd (Kampala, Uganda) when this project started in March 2022. However, MedX sold their intellectual property and implementation rights for Uganda's version of the software (LabXpert DS) to GenLab Solutions International Ltd (Kampala, Uganda) in July 2022. The NTLP can use it without paying license fees, and other public health programs in Uganda can also benefit from the license waiver.

Continue reading...

Project Implementation and Interim Results

96%

LabXpert was successfully installed on 259/270 (96%) of GeneXperts and 37/38 (97%) of Truenat instruments in the country

1,300,000+

results for TB, HIV, SARS-CoV-2 and HPV have been successfully uploaded

75%

connectivity uptime has been achieved for GeneXpert

The central focus of this project was to set up a robust network infrastructure through which TB diagnostic platforms can be interconnected countrywide through LabXpert.

LabXpert was successfully installed on 259 (96%) GeneXperts and 37 (97%) Truenat instruments in the country. Since GeneXperts are used for multi-disease testing in Uganda, LabXpert has provided integrated dashboards for TB, HIV, SARS-CoV-2, and HPV results. Since the installation of LabXpert, 1,213,239 TB results, 72,104 HIV (EID & Viral Load), 13,817 SARS-CoV-2, and 48,250 HPV results have successfully been uploaded as of January 2024. Throughout project implementation, the project team made intensive efforts to ensure that all sites equipped with LabXpert were functioning optimally, including remote follow-up of inactive sites (those that have not reported any run tests in over four days).

Furthermore, the team developed and customized the LabXpert dashboard to include a module that rates performance of facilities based on conducted and uploaded tests to encourage real-time reporting for the sites. To support real-time reporting, the project team conducts quality assurance visits to identify reasons for inactivity and provide onsite support. These visits have provided useful information at both the national level and facility levels.

Additionally, the team completed a pilot integrating the LabXpert system with ultra-portable X-ray equipment with computer aided detection (CAD) software. The full integration of this system is currently underway.

The project team also piloted the development of a module to track and monitor individuals diagnosed with multidrug-resistant TB (MDR-TB) at NTRL and facility level. When fully developed at a treatment center level, it will allow tracking, monitoring, and verifying that all diagnosed patients are enrolled in treatment. LabXpert prompts laboratory technicians to submit patient details, and an alert is sent to a responsible person at a MDR-TB treatment facility and the NTP with uniquely identifiable patient information that may be used to track and ensure that the patient is enrolled in treatment. The patient information that is sent through SMS are the patient's ID and the test results. The access to the other patient information is restricted and is available to view only through authorized accounts.

Despite challenges faced by some facilities in attaining reliable data transfer through cellular networks, a connectivity uptime of 75% was achieved for GeneXperts. LabXpert has provided valuable information at both national and facility levels to encourage real-time reporting for GeneXpert and Truenat instruments, with a 71% real-time reporting rate achieved for GeneXpert instruments and 63% for Truenat instruments.

Support visit of the NTLP Assistant Commissioner to Mityana for GeneXpert and CAD, accompanied by MJAP Executive Director and the staff of the connectivity project

Continue reading...

Conclusion and Next Steps

The expansion of LabXpert has allowed for further strengthening and improvement of the country's TB diagnostic network using its homegrown connectivity system. The project has achieved real-time reporting for most GeneXpert and Truenat instruments in the country. Whilst there is still more work to be done to fully utilize LabXpert, real-time data reporting at facilities has undoubtedly improved the overall laboratory programmatic management and planning capacities. The integration of LabXpert with the District Health Information Software 2 (DHIS2) and the Electronic Case-Based Surveillance System (eCBSS) will further enhance data management and monitoring of case notifications and treatment outcomes. LabXpert has secured ongoing commitment and support from the Uganda National Health Laboratory Services, National TB and Leprosy Program and National TB Reference Laboratory leadership for the project's sustainability efforts, and ongoing efforts are being made to secure supplementary funding and resources for further use and development of the LabXpert solution. Following the end of iNTP support, the USAID local partner Infectious Diseases Institute (IDI) of Makerere University has been able to continue supporting data transfer from GeneXpert and Truenat instruments and supporting developers to help in maintenance of the system. The LabXpert project has provided a useful model for improving the country's laboratory diagnostic network and will undoubtedly have a positive impact on TB control efforts.

Acknowledgements

Makerere University Joint AIDS Program (MJAP)

Dr. Fred C. Semitala | *Executive Director*
Moses Adengo | *Finance Manager*
Edward Otim | *Laboratory Coordinator*

National TB and Leprosy Program

Dr. Stavia Turyahabwe | *Assistant Commissioner*
Aldomoro Burua | *TB Case Finding Advisor*
Dr. Raymond Byaruhanga | *Senior Technical Advisor, Global Fund projects*

Uganda National TB Reference Laboratory

Prof. Moses Joloba | *Director NTRL/SRL Uganda*
Denis Oola | *Operations Manager*
Kenneth Musisi | *NTRL Laboratory Manager*
Julius Tumwine | *Project Systems Administrator*
Dorothy Nabulobi | *Project Monitoring and Evaluation Officer*
Abdunoor Nyombi | *National GeneXpert Coordinator*
Edson Tumwine | *Software Developer*
Daudi Asiimwe | *Software Developer*
Job Chepkurui Sayekwo | *Software Developer*
Dihfahsih Mugoya | *Software Developer*

Photos courtesy of Makerere University Joint AIDS Program (MJAP)

For more information on the introducing New Tools Project, visit:

https://www.stoptb.org/accelerate-tb-innovations/introducing-new-tools-project