GxAlert

BANGLADESH: A CASE STUDY

FROM DATA TO IMPACT

Implementation Summary

Country	Bangladesh
Instruments	39
Diseases	TB
Assays	GeneXpert MTB/RIF
Funding Partner	USAID
Implementing Partners	KNCV, MSH and IRD
Implementing Project	Challenge TB
Local Heroes	Dr. Pronab Kumar Modak, DPM Training and Lab Focal Person, NTP, DGHS, MOH & FW. Ebne Sayeed Md. Imtiaz Senior Technical Advisor, mHealth, Management Sciences for Health. Sarder Tanzir Hossain, Senior Technical Advisor - TB Laboratory, Management Sciences for Health.

Implementation of GxAlert by Bangladeshi team

BACKGROUND

Bangladesh is one of the most densely populated countries in the world, with a population of 163 million people (World Bank, 2016). It is also one of the world's 30 high TB burden countries with an estimated incidence of 360,000 cases in 2017 (WHO Global TB Report).
To help address the high burden of disease, the GeneXpert MTB/RIF was introduced into Bangladesh in 2012 to diagnose TB and MDR-TB.

THE CHALLENGE

In Bangladesh, GeneXpert instruments are operated in challenging laboratory environments due to temperature, dust, variable laboratory infrastructure and lack of human resources. At the start of the GeneXpert program, numerous issues hampered effective use of these diagnostic machines. With no maintenance capabilities, no monitoring, no calibration expertise and no way to know which machines were working at which diagnostic testing facilities, the program ended up having a high number of non-functional instruments or instruments that were not effectively being used. "Of 39 GeneXpert machines, 9 machines were not functioning at the beginning," said Sarder Tanzir Hossain, Senior Technical Advisor TB Laboratory, Challenge TB Bangladesh Project, Management Sciences for Health (MSH).

Further challenges included:

- Monthly reports from GeneXpert machines were still being reported on paper, requiring active data collection.
- 25% of instruments were non-functional at any given time.
- The module failure rate was 10.4%.
- The system was plagued by low instrument utilization rates.
- Error rates were collected but the lack of error code data made it difficult to determine the sources of errors and rectify them.
- As in other countries, test results were not being sent back to referring clinicians, resulting in low linkage to care for patients diagnosed with TB and MDR-TB.
- Instrument calibration and maintenance schedules were difficult to track.

THE SOLUTION

Ebne Sayeed Md. Imtiaz (MSH), Sarder Tanzir Hossain (MSH) and Dr Pronab Kumar Modak from the Bangladesh National Tuberculosis Program (NTP) performed a landscape assessment and worked with the USAID-funded Challenge TB Program to select the most appropriate connectivity solution. Challenge TB funded SystemOne to connect its diagnostic connectivity solution GxAlert to 39 GeneXpert instruments (which were procured by USAID) between November 2016 and February 2018. GxAlert enabled a solution to address the following gaps:

- Device management, monitoring and reporting
- Calibration, maintenance and procurement planning
- Lab technologist capacity, availability and training
- Real-time results notification to respective stakeholders
- Acceleration of time to treatment for patients.

During the 6 months after the initial GxAlert training, the Bangladesh NTP trained a core group of staff who immediately began working with the data generated from GxAlert to identify rapid ways to improve the GeneXpert device management, set appropriate alerts and ensure that TB results moved quickly from the testing devices to the right clinicians.

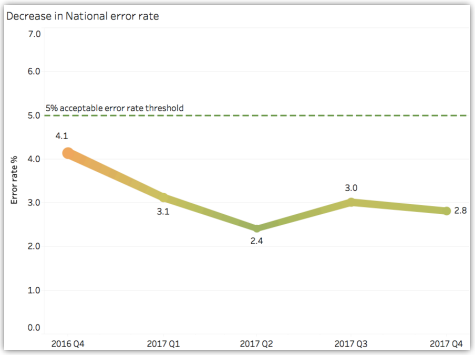
SUCCESSES AND MOVING FORWARD

As of June 2018, a total of 189,484 GeneXpert test results have been uploaded onto GxAlert. Due to GxAlert's real-time monitoring and immediate feedback capabilities, the data these tests generated led the NTP to take action and yield the following improvements:

- National error rates have decreased by 46%; from 6.09% in 2015 to 2.81% in 2017.
- The most common test errors and sources, by testing site and user, have been identified. The NTP learned that specimen processing errors were occurring frequently, which prompted retraining efforts for staff.
- Being able to manage cartridge stock, including expiry dates for cartridges on GxAlert, has resulted in the NTP being proud to report that stock-outs have been eliminated.
- Cepheid's local distributor can remotely monitor the module status (failures) and take preventive actions that have led to a significant drop in module replacement time, from 5-14 months in 2015 to only 2 weeks in 2017.
- From experiencing numerous machine and module failures, the program now has 100% machines operational with 90% of modules operational at any given time.

Bangladesh Deep Dive training

"The SystemOne Data Deep Dive helped us uncover extremely useful data, which enabled us to improve our referral system and see which mutations were prevalent in which regions," said Sarder Tanzir Hossain. "This alone has helped us ensure we can distribute the right treatment to the right locations."



The NTP intends a national expansion from 200 to 615 machines. As with many countries, NTP staff recognize that eventually the system would benefit from a full-time position to monitor the network and follow up on actionable items, whether these are offline machines, broken modules, or ensuring that referring clinicians are initiating treatment.