

**Policy Brief
to
Health Committee of the Parliament
of
The Republic of Uganda**

**Apply the Buy Uganda Build Uganda
(BUBU) Policy to Reduce Costs for
Tuberculosis Healthcare Management**



Tuberculosis: Working to Empower the Nations' Diagnostic Efforts (TWENDE)

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1. Statement of the Issue

With a tuberculosis (TB) prevalence rate of 253/100,000 among its population or a country TB incidence rate of 87,000 cases annually (Ministry of Health 2017), Uganda has a high TB burden. Worse still, according to the Uganda national TB Survey (Ministry of Health 2017), a significant proportion of pulmonary TB (PTB) patients in Uganda are unaware that they are in fact afflicted with an airborne disease that is highly infectious and which they continue to spread. This is because thousands of suspected PTB patients in Uganda are not getting tested for they are not proactively seeking PTB diagnostic services. Even when PTB patients are tested and are confirmed with PTB, it is reported that a large number of confirmed PTB patients in Uganda are not proactively seeking treatment services. Health experts (Bwambale 2018), for example, estimate that as high as 40 percent of Ugandans that were confirmed to be TB infected in 2016, an estimated 41,000 people, did not seek TB medical care services.

A major reason as to why suspected PTB patients and confirmed PTB patients are not proactively seeking diagnostic and treatment services is the costs involved. This is among the emerging findings of a comprehensive qualitative investigation into PTB healthcare management in Uganda that was conducted by CPAR Uganda Ltd (2017)¹. The CPAR Uganda PTB Study noted two major categories of PTB test costs. The first category is the costs incurred from the user's perspective and the second category is the costs incurred from the healthcare system perspective.

From a user's perspective, Ugandans incur significant costs accessing healthcare services for they spend significantly on travel costs in order to access healthcare facilities – public and otherwise. Emerging findings from the CPAR Uganda PTB Study, in fact, concur with the finding of the Ministry of Health (2010) that although 72 percent of households in Uganda live within five kilometres from a health facility, lower level healthcare facilities generally have inadequate infrastructure, medicines, supplies and human resources; hence, users travel long distances in order to access services in more 'functional' facilities located farther away.

Findings of a University Research Co., LLC Study (2016) support the assertion that there is inadequate utilisation and service provision at some healthcare facilities in Uganda. The study, conducted in April 2016, found that five healthcare facilities in Northern Uganda had a TB notification rate of only 6.7 percent; a rate below the Ministry of Health expected notification rate of 32.2 percent from such facilities. A major reason for such a low notification rate from the five healthcare facilities, according to the findings of the University Research Co. LLC Study, was the low utilisation of GeneXpert TB testing machines at those five facilities.

The five healthcare facilities that the University Research Co., LCC studied are located in the districts of Kitgum, Nwoya, Apac, Amolatar and Lamwo; which five districts combined, according to the most recent Uganda population census that was conducted in 2014 (Uganda Bureau of Statistics 2016), host a population of nearly 982,000 people. Emerging findings from the CPAR Uganda PTB Study, moreover, indicate that the Uganda national average ratio of GeneXpert machines to the population is 1:353,000. It is probable, therefore, that the GeneXpert machines that were located in the healthcare facilities that were studied by the University Research Co., LLC are the only ones in each of the respective districts in which they are located.

Seemingly, therefore, one of the major reasons as to why thousands of TB patients in Uganda are not getting tested is because there are few GeneXpert machines in the Country and, worse still, these few machines are being underutilised. Deducing from the CPAR Uganda PTB Study finding that Uganda has a disproportionate ratio of population to GeneXpert machines, it is valid to surmise that the situation for users of public healthcare facilities in Uganda is not improving. This is because, for example, in order to access GeneXpert TB testing machines, users seemingly must travel long distances to the only healthcare facility with a functional machine in their district or in some cases their region. And if they find the machine that is located in their district or their region is non-functional, which is highly probable, they may give up and go home; or are forced to seek services from farther afield in another district or even in another region of the Country.

¹ Read more on the scope of the CPAR TB Study (2017) in its report "*Research Activity Report on Qualitative Investigation into Tuberculosis in Uganda*" that is submitted with this policy brief.

From the healthcare system perspective, in order for the Government of Uganda (GOU) to provide TB testing services at no cost to users of public health facilities, the GOU must incur costs. Emerging findings from the CPAR Uganda PTB Study, indeed, confirm that the GOU, for example, albeit with support from some of its development partners, is incurring extra costs of operating “*hub systems*”, in order to collect sputum specimens from suspected TB patients; to transport the specimens to laboratories at public health facilities; and to transport the results from the laboratories back to the patients.

At the level of laboratories that are located in Uganda’s public healthcare facilities, Hasiang et al (2017) calculated the unit cost² for a single TB test using GeneXpert machines to range from an estimated cost of Shs. 61,000 to Shs. 236,000. The wide range in the GeneXpert TB testing unit cost within the same country is occasioned by varied utilisation of the machines that are installed in different locations in Uganda. Hasiang et al (2017) found that when the machines are utilised to full capacity the unit cost for testing is less; and when utilised at minimum capacity the unit cost is high. This is because there are costs that are incurred whether the machine is being used or not, such as: the equipment, the building space, the salaries of the technical staff that operate the machine and more.

Three major reasons stand out from the emerging findings of the CPAR Uganda PTB Study, among others, as to why GeneXpert TB testing machines are not being used to optimal capacity in Uganda. The three major reasons are: insufficient electricity power supply from the national grid; long periods of machine downtime due to inadequate maintenance and servicing; and stock-outs of vital consumable materials.

In addition to specialised kits, such as cartridges that are GeneXpert machine specific, other vital consumable materials are required for conducting TB tests. They include: gloves, lab coats, masks, boots, specimen containers, permanent marker pens, lab request forms, plastic bags for disposing waste, tissue paper, glass slides, direct smear applicator sticks, buckets for disposing waste and slide racks. Hasiang et al (2017) calculated the cost of consumables required for one TB test using the GeneXpert machine to range from an estimated cost of Shs 2,500 to Shs 3,000.

Assuming that all the 87,000 Ugandans infected with TB annually are tested at least once, the annual minimum expenditure for the GOU on consumables could range from 210 million shillings to 235 million shillings. Assuming, furthermore, that 46,000 TB patients sought medical care in 2016 and were, in addition, tested three more times in order to confirm success in treatment, it would mean that in 2016 the GOU incurred another cost on TB test consumables ranging from approximately of Shs. 333 million to Shs. 373 million. A conservative estimate, therefore, of the GOU’s annual expenditure on consumables for TB tests could range from Shs. 543 million to Shs. 608 million.

These annual cost estimates on consumables of TB tests using GeneXpert machines are very conservative indeed for they assume perfect test results each time. The estimates, for example, do not take into consideration the cost of re-running tests which are aborted because of electricity power interruption, due to unscheduled load shedding that is common in Uganda. Emerging findings from the CPAR Uganda PTB Study, moreover, confirm that in a number of public healthcare facilities the uninterruptible power supply (UPS) gadgets that are part of the required installation for GeneXpert machines were either non-existent or non-functional. In cases where the UPS is non-existent or is non-functional, lab technicians apparently are sometimes forced to connect the GeneXpert machines direct to the power grid.

When the power goes off and the machines are connected direct to the power grid and not through a UPS, the machines stop and the tests running at the time the power goes off are instantly aborted and are thus rendered useless. It seems like the majority of GeneXpert machines in Uganda are of the four-module design; they run four tests in one go. This means that if there is a power interruption, four tests are aborted and consumables valued as high as Shs. 12,000 are wasted; alongside other TB test inputs valued as high as Shs. 932,000.

² Hasiang et al calculated the costs in US dollars, which for the purposes of this policy brief, are converted to Uganda shillings at an exchange rate of Shs. 3,599 (3,600???) to the dollar.

It is prudent for this policy brief to assume that, in general, on average, GeneXpert machines in Uganda are being utilised at minimum capacity. It is particularly so, if the periods of machine downtime are factored in. Emerging findings from the CPAR Uganda PTB Study, moreover, confirm that in some cases, in addition to insufficient electricity supply from the national power grid, laboratories in some public healthcare facilities are either not equipped with a sufficient electricity power generator; or if equipped with one, it does not function fully all the time when it is needed to generate substitute electricity.

According to the emerging findings from the CPAR Uganda PTB Study, the reasons for generators in some healthcare facilities to be not fully functioning all the time when they are needed, relate to poor maintenance and inadequate supply of fuel. The practice of inadequate maintenance and servicing of machines at public health facilities is not limited to electricity power generators, it also affects GeneXpert machines. Emerging findings from the CPAR Uganda PTB Study indicate that re-running of TB tests is sometimes necessitated when tests are unsuccessful due to machine error, which comes as a result of insufficient maintenance and servicing of GeneXpert machines that are located at public healthcare facilities. If the servicing of the GeneXpert machines is overdue and lab technicians continue to use the machines the chances increase for machine errors to occur.

The participants of the CPAR Uganda PTB Study indicated that it is the practice that maintenance and servicing of GeneXpert machines at public health facilities is highly centralised and that the procurement of GeneXpert machine maintenance and servicing contractors is done at the Central GOU level and not at the level of the District Local Governments nor that of the healthcare facilities. This status quo, according to the participants of the CPAR Uganda PTB Study, causes unnecessary delays in repair and servicing of GeneXpert machines and therefore long machine downtime periods – hours, days, weeks, months, even years.

Re-running of tests that were aborted due to power outage can take long to be done as laboratory technicians have to wait for restoration of power from the national grid and or for the generator of their respective healthcare facility to become functional again. Re-running of tests may also take long or may never be done at the particular healthcare facility that they were first done, due to non-functioning of the GeneXpert machine, due to poor maintenance and servicing. TB tests at some public health facilities, in addition, are also sometimes delayed due to stock-outs of consumable materials, which renders GeneXpert TB testing machines non-functioning, emerging findings from the CPAR Uganda PTB Study reveal.

It is no wonder that the University Research Co., LLC Study found that on average the GeneXpert machines at the five public healthcare facilities that they studied in April 2016 were operating at a capacity of only 22 percent; each running on average 25 samples per week, instead of the optimum of 112 samples per week. The emerging findings from the CPAR Uganda PTB Study concur that it is the case that GeneXpert machines in Uganda, in general, were not operating to the optimum at the time of the study.

2. Policy Recommendations

The Health Committee of Parliament should liaise with the Committee on Tourism, Trade and Industry of the Parliament of Uganda in order to ensure efficient application of the Buy Uganda Build Uganda policy (Ministry of Trade, Industry and Cooperatives 2014) within the health sector. Specifically, with the view of building local capacity and utilising locally produced materials, the Health Committee of Parliament should:

- a) Review TB the testing “*hub system*” currently in operation in Uganda. While applauding the GOU for the TB testing “*hub*” initiative, on the basis of the emerging findings from its PTB Study, CPAR Uganda Ltd advises of the need for the GOU to closely study the TB testing “*hub system*”, in order to ameliorate the seemingly dangerous inefficiencies associated with its implementation.
 - Are the extra financial costs of operating the “*hub system*” truly generating value for money?
 - Might it not be more efficient to build the capacity of lower level healthcare facilities to be able to conduct TB testing and other tests for other diseases as well?

- There are other costs that result from the inevitable delays in collecting samples from suspected PTB patients and in returning the test results to the suspected patients. One such cost is that while an infected person waits for their results to return, they continue to live freely within their respective families and communities; during which time there is a high possibility that they infect others. CPAR Uganda Ltd therefore advises the GOU to look into reviving other more community based systems, such as the use of part-time paid village health teams, that can potentially reduce the turnaround times, so that infected TB patients are confirmed and are informed quickly.
 - Studies show that the costs that are incurred by Ugandans on healthcare services are in fact disproportionate to their incomes. The MOH, for example, in a situational analysis that formed the basis for the Second National Health Policy (2010), noted that 4.8 percent of households in Uganda have ‘catastrophic’ expenditure on healthcare; while 2.3 percent of households are pushed into impoverishment because of medical bills. Community based healthcare systems for TB management would likely go a long way in reducing at least the cost of travel for Ugandans seeking TB diagnostic and treatment services.
- b) Optimise usage of GeneXpert machines that are currently installed in Uganda. It is reasonable to postulate that stock-outs of consumable materials are precipitated by the need for test- re-runs, such as those re-runs that are needed when tests are aborted because of electricity power outages; or that are rendered invalid due to machine error that derives from insufficient maintenance and servicing of the machines. There is need for the GOU to:
- Review policy and practice for provision of electricity power supply to laboratories at public healthcare facilities.
 - Ensure that laboratories in which GeneXpert machines are installed are each equipped with a functional UPS for use with the GeneXpert machine.
 - Ensure that laboratories in which GeneXpert machines are installed are equipped with a functional electric power generator.
 - Explore local potential to manufacture power back up systems that can ensure that interruptions in power supply from the national grid do not affect the operations of GeneXpert machines. If such local potential exist, nurture and support it to hopefully produce the systems cheaper; or if no potential exists, negotiate with external manufacturers to make them or assemble them locally in Uganda at a lower cost.
 - Explore the local potential to manufacture electric power generators. If such local potential exists, nurture and support it to hopefully produce generators cheaper; or if none exists, negotiate with external manufacturers to make them or assemble them locally in Uganda at a lower cost.
 - Decentralise the procurement of services for maintaining and servicing GeneXpert machines and give autonomy to District Local Governments, at least, or even better to the healthcare facilities to ensure that the GeneXpert machines are serviced, managed and are fully utilised. This could mean investing in training citizens and building their capacity to become local service providers for servicing and maintenance of GeneXpert machines.
 - Decentralise procurement of consumables that are required for TB testing to District Local Governments, at least, or even better to the healthcare facilities.
 - As much as possible, consumables that are required for TB testing that can be produced in Uganda, such as specimen containers, plastic bags, applicator sticks and plastic buckets, should be

made in Uganda; and the made in Uganda consumables should be preferred for use at public healthcare facilities.

- Provide incentives for local manufacturers, such as Nice House of Plastics, to invest in manufacturing consumables that are required for TB testing; and hopefully at a lower cost.

3. Appendices

The following documents are submitted together with this policy brief:

- Research Activity Report on Qualitative Investigation into Tuberculosis in Uganda (CPAR Uganda Ltd 2017)
- Financing TB Management – Costs of Conducting TB Tests in Uganda

4. Recommended Sources for More Information

Bwambale, Taddeo. “US agency unveils Sh72b project to end TB by 2022.” *New Vision*, 02 January 2018: 12.

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Puri, Lekha, Collins Oghor, Claudia M Denking, and Madhukar Pai. “Xpert MTB/RIF for tuberculosis testing: access and price in highly privatised health markets.” *thelancet.com*, 2016: 94-95, Vol 4, February.

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University Research Co., LLC. *Case Study: Improving Utilisation of GeneXpert Testing at Five Lab Hubs in Northern Uganda*. Research, Kampala: University Research Co., LLC, 2016.

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