We began a project in June 2013 to look at the use of GeneXpert in resource-limited settings, to assess the predictive value of current WHO guidelines that are predictive of MDR-TB. The World Health Organization (WHO) recently recommended that GeneXpert be used to screen all patients suspected of TB in resource-limited settings. Even at the reduced rate of $5.80 USD per GeneXpert cartridge, the cost and the infrastructure necessary to effectively utilize GeneXpert remain a challenge.

In early 2013, the AIDS Prevention Initiative Nigeria (APIN) Center (Fig. 4) with a grant from the Centers for Disease Control (CDC) installed a GeneXpert (Fig 1) at Jos University Teaching Hospital (JUTH) to initiate earlier treatment except in the case of detected rifampicin resistance.

The APIN Center can better utilize the faster turnaround from GeneXpert to initiate earlier treatment by more proactively contacting patients and having them return sooner.

We found that implementation of the GeneXpert has been challenging for several reasons:

- Cartridge supply to the clinic is highly unreliable resulting in frequent periods of a week or longer where GeneXpert is not operational.
- The clinic staff do not utilize the quicker results from GeneXpert to initiate earlier treatment except in the case of detected rifampicin resistance.
- GeneXpert reports TB levels as very low, low, medium, high, or very high. Some clinic staff interpret different levels as a positive result.
- The APIN clinic is expected to relocate to the JUTH permanent site (Fig 4c) in the next few years, 12 km away from the city, which will make it more difficult for patients to attend the clinic.
- The civil unrest in recent years has also greatly impacted many patients who relocated and who have been lost to follow-up or who lost their ability to come to clinic appointments as a result of the fighting.

Of the 117 patients tested using GeneXpert prior to our project start:
- 28 tested positive for TB with GeneXpert.
- 1 of those positive with Genexpert had rifampicin resistance.
- 16 were positive with smear microscopy.

Of note, no microscopy results were on record for 9 of the patients who tested positive with GeneXpert.

Our overall project examining MDR-TB prevalence and predictors is ongoing with completion of enrollment expected by January 2014.

We began this project in June 2013 with a plan to enroll a convenience sample of 500 HIV-infected patients suspected of having TB at an outpatient clinic visit.
- We collect data on demographics, prior TB infection, and risk factors for MDR-TB from each patient (Figure 3).
- Each patient provides two sputum samples, one for smear microscopy testing and another for GeneXpert testing.
- Additional data on HIV disease and treatment are extracted from the APIN electronic medical record.
- We collect data on demographics, prior TB infection, and risk factors for MDR-TB from each patient (Figure 3).
- We found that implementation of the GeneXpert has been challenging for several reasons.
- Cartridge supply to the clinic is highly unreliable resulting in frequent periods of a week or longer where GeneXpert is not operational.
- The need for uninterrupted power by GeneXpert required the installation of a costly inverter system to power it.
- The clinic staff do not utilize the quicker results from GeneXpert to initiate earlier treatment except in the case of detected rifampicin resistance.
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Constitution and Recommendations

- It appears from our preliminary analysis that GeneXpert has the potential to increase TB detection by as much as 75% (28 vs. 16).
- GeneXpert can provide much earlier diagnosis of TB and MDR-TB, which is important given that MDR-TB treatment in Nigeria requires travel and lengthy hospitalization.
- The APIN clinic can better utilize the faster turnaround from GeneXpert to initiate earlier treatment by more proactively contacting patients and having them return sooner.
- The APIN clinic should ensure that all staff is using the same standard in interpreting GeneXpert results.
- The future of the funding for GeneXpert in Jos is also uncertain.

The Nigerian government has not committed to funding the machine though it has been asserted that the ability of GeneXpert to provide early diagnosis would make adoption of it less costly than current diagnostic methods.

References