

INVESTIGATING THE PERFORMANCE OF ARTIFICIAL INTELLIGENCE IN RURAL TOWNS

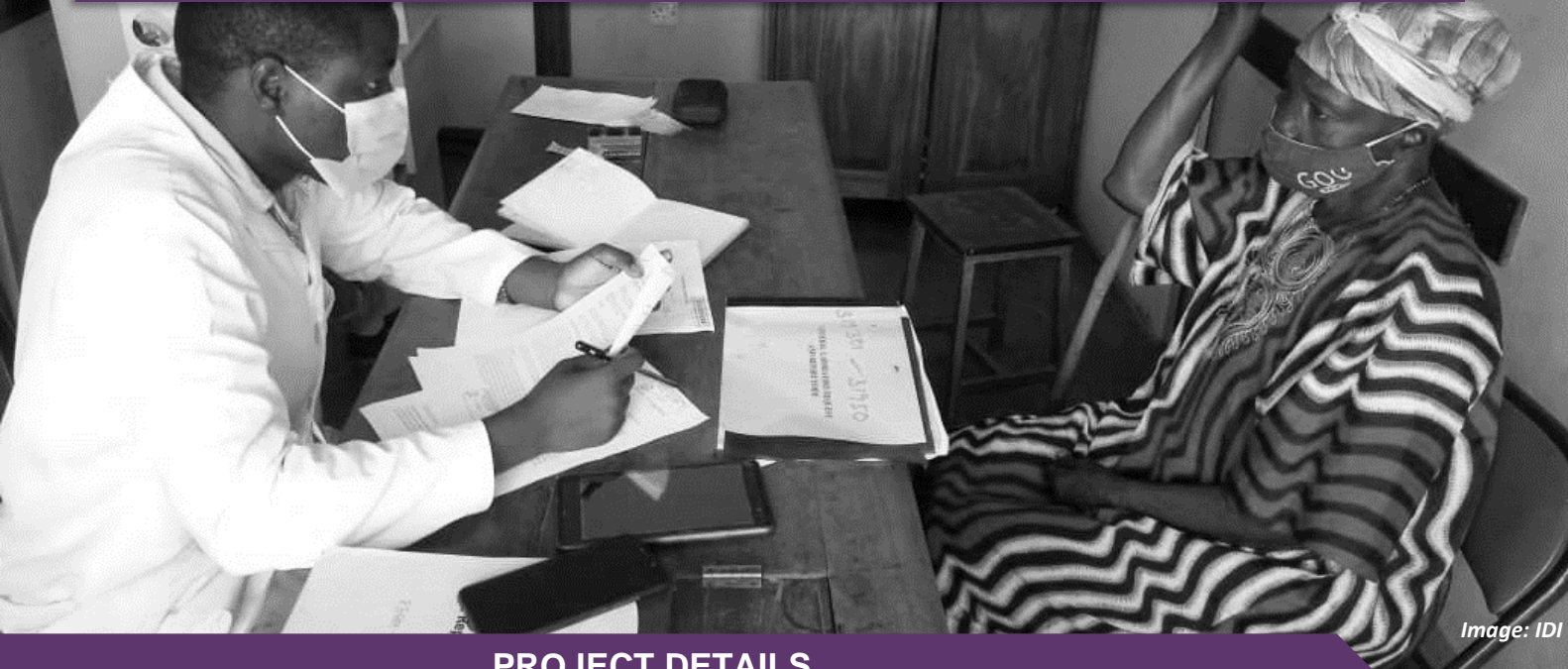


Image: IDI

PROJECT DETAILS



Gulu, Lira,
and Kitgum,
Uganda



October 2021-
present



CAD4TB (Delft
Imaging Systems)



Infectious
Diseases
Institute -
Makerere
University

AI INTERVENTION

In 2020 an estimated 90,000 people were ill with tuberculosis (TB) in Uganda, which has one of the highest burdens of the disease globally.^{1,2} Ugandans commonly seek care from private health facilities, such as private pharmacies, that have tended to offer a poor standard of care.³ However, the Infectious Diseases Institute of Makerere University (IDI) has recently made considerable progress in engaging private pharmacies in the Ugandan capital, Kampala, to provide better TB services. In this context, artificial intelligence (AI) promises to give vital clinical decision-making support to health workers who read chest X-rays in search of TB. In fact, there is **huge potential for the use of AI for TB in Uganda**, but it is yet to be validated in the country. TB REACH is therefore supporting IDI to test the efficacy of introducing these two interlinked innovations in rural Ugandan towns to accelerate case detection.

In October 2021, IDI installed AI software known as CAD4TB in tertiary hospitals in Gulu, Lira, and Kitgum, serving a combined population of more than one million people. As part of the project, 55 private pharmacies now provide reduced-price TB services and refer anyone thought to have TB to these hospitals. Meanwhile, project community health workers screen communities for TB and follow up with the contacts of anybody diagnosed with the disease to see if they also show signs of infection.



“

I THINK SPEED IS AI'S MOST ATTRACTIVE FEATURE. THE SHEER SPEED, KNOWING WHAT TO DO WITHIN A MINUTE, IS QUITE REVOLUTIONARY.

”

– DR. STELLA
ZAWEDDE MUYANJA
PROJECT LEAD, IDI

Training healthcare workers to use AI. Image: IDI

Everyone arriving at the hospitals with TB symptoms receives a digital chest X-ray, read by both AI and trained human readers, and a highly sensitive molecular diagnostic test (Xpert). The outcomes are recorded, with **the aim of comparing the results from the trusted molecular test to those from AI** to analyse its accuracy and identify the best settings to operate on.

CAD implementation is ongoing, and this study will pave the way for its future use by IDI and inform its broader application in Uganda, particularly **in rural towns**.

PROJECT IMPACT

- ✓ **23,010 people screened for TB and 7,529 tested, so far.**
- ✓ **249 people received an X-ray read by AI.**
- ✓ **406 people with TB currently receiving treatment.**

If the results of the validation are favourable, AI output could be relied upon to decide whether someone being screened is likely to have TB and should receive further diagnostic tests. **AI could therefore save time and resources spent on expensive molecular diagnostics (Xpert)** by ensuring that only people likely to have the disease receive the follow-up test. IDI hopes in the near future to apply AI within this project to **ramp up TB detection among the close contacts of anybody who has the disease**. Further, the outcomes of this research will empower IDI to use AI in other places in Uganda where TB is prevalent but access to care is limited.

“ *AI HAS HELPED US A LOT. IF YOU HAVE MANY PATIENTS, THE ONLY THING YOU NEED TO DO IS SEND THE IMAGES TO THE AI BOX. YOU CAN WORK ON MANY PATIENTS IN THE SHORTEST POSSIBLE TIME.*

”

– MICHAEL ODIT
PROJECT RADIOGRAPHER, IDI



Contact tracing in village. Image: IDI

REFERENCES

1. WHO Country TB profile – Uganda. Accessed November 25, 2021. https://worldhealthorg.shinyapps.io/tb_profiles/?_inputs_&entity_type=%22country%22&lan=%22EN%22&iso2=%22UG%22
2. Stop TB Partnership – High Burden Countries. Accessed April 7, 2021. <http://www.stoptb.org/countries/tbdata.asp>
3. Nshuti L, Neuhauser D, et al. Public and Private Providers' Quality of Care for Tuberculosis Patients in Kampala, Uganda. *International Journal of Tuberculosis and Lung Disease*. 2001 Nov; 5(11): 1006–1012. Accessed November 25, 2021.

ABOUT THIS DOCUMENT

This document is one of a series spotlighting the experiences of these early implementers when using artificial intelligence (AI) / computer-aided detection (CAD), to highlight the added value of CAD for TB programmes and inspire prospective implementers to innovate. Funding of this project was provided by the Stop TB Partnership's TB REACH initiative, launched in 2010 by Global Affairs Canada. In 2012, TB REACH first worked with implementing partners to pilot CAD software. Since then, it has implemented 3 different CAD products in 13 different countries in Sub-Saharan Africa, Latin America, Eastern Europe, and South and South-East Asia.

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