Of the 1.5 million people around the world who died from tuberculosis (TB) in 2020, almost 10% were children. Bangladesh has one of the highest burdens of TB, with a significant proportion of cases missed – both undiagnosed and unreported – particularly in younger age groups. Artificial intelligence (AI) is increasingly used to detect TB on the chest X-rays of adults. But its ability to detect TB in children has never been rigorously tested, a critical gap in knowledge about the cutting-edge tool.

TB REACH supported IRD Bangladesh to deploy an army of trained health workers in public and private clinics in Mymensingh division (population roughly 11 million) to find and treat children with TB, as well as their families. IRD Bangladesh will soon have sufficient data to resolve fundamental questions about the accuracy of AI-powered TB detection in children.

Project health workers screened children and their accompanying family members in the outpatient departments of more than 50 public and private health facilities. Those with symptoms of TB were offered a free chest X-ray to look for signs of the disease in the lung. Any sign of TB then triggered a highly accurate molecular test (Xpert). Anybody with a confirmed positive diagnosis was then treated for TB.
A library of chest X-rays from children taken in selected health facilities was read by the AI tool (qXR) and each result was compared to the corresponding diagnosis generated by the trusted molecular test. This will allow IRD Bangladesh to see how well AI can identify TB in children's lungs.

In June 2019, Shipon (aged 12 years) fell sick with a severe cough and fever. A local pharmacist misdiagnosed him as having a respiratory infection and provided some antibiotics. These proved ineffective. With Shipon’s health worsening, his mother Selina took him to see a physician, whose diagnosis was no better.

Then a neighbour noticed the sick boy and suggested his mother take him to Mymensingh medical college hospital. There, an IRD screener straight away recognized the symptoms of TB. Shipon was evaluated, diagnosed accurately, and started on TB treatment.

Looking back, Selina, Shipon’s mother, regrets how long it took to get a proper diagnosis. “I wanted to tell my son’s story so that others can understand that child TB is no joke and can happen to anyone”.

Though formal analysis and publication of the results is pending, this will be a landmark study and could justify the much-needed addition of AI to the toolkit for detecting childhood TB. However, to make implementation in Bangladesh more feasible, the cost of AI products needs to be reduced, and there is a need to build awareness of the value of AI first. Going forward, IRD Bangladesh are keen to work with AI outside of the research environment, recognizing it has potential in rural settings where there are no trained radiologists to read chest X-rays from children and adults alike.
REFERENCES


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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