

STOP TB FOCUS GROUP ON AI-BASED IMAGING FOR TB (FG-AITB) WEBINAR 4

Implementing CAD AI and Ultra-Portable X-Ray - Experience from the TB REACH projects by Innovators In Health (IIH) & TB Alert India

To share and learn from early implementation experiences of using ultra-portable X-ray devices and computer-aided detection (CAD) AI software in high-burden countries, Stop TB Partnership is excited to invite you to this upcoming webinar: *CAD AI and X-ray in India - Implementation experiences and lessons learned from the TB REACH projects by: Innovators In Health (IIH) & TB Alert India*

Tuesday 21st June (8am Washington DC, 1pm Nigeria/DRC, 2pm Geneva, 3pm Kenya/Uganda, 5.30 pm India, 6pm Bangladesh, 7pm Vietnam, 8pm the Philippines)

ACCESS THE WEBINAR 4 [WEBPAGE](#)

| Presentation | Access recording below |
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| IIH: Implementing CAD AI in TB care - Experiences from Bihar, India https://docs.google.com/presentation/d/10im5a3HLbNWxCQZJMVgNGFG0UNTZQlea/edit?usp=sharing&oid=106144367183648595713&rtpof=true&sd=true | https://drive.google.com/file/d/115emahZ02ApZz5tvzF3NCyHQ7MrXrScz/view?usp=sharing |
| TB Alert India: TB AI Handheld X-ray Experience https://docs.google.com/presentation/d/11SHouJHPoW5k95pVMYTRg3ZAKKBwfVcQ/edit?usp=sharing&oid=106144367183648595713&rtpof=true&sd=true | |

This webinar aims to share the experiences of India in implementing Handheld Portable X-Ray and CAD AI, as well as lessons learned during implementation. There will also be the opportunity for attendees to ask questions and discuss any similar issues and experiences they may have faced in their own implementation journeys.

Wider objectives of this webinar and the Focus Group on AI-based Imaging for TB are:

- To facilitate south-south learning on early experiences and exchange lessons learned on CAD AI and X-ray implementation.
- For Stop TB, USAID, IDDS and manufacturers to understand challenges in planning and implementation and identify solutions.

BACKGROUND

To meet global demand for support in rolling out AI/CAD and digital X-ray, Stop TB launched the [Focus Group on AI-based Imaging for TB \(FG-AITB\)](#), the first global platform that brings together implementers of CAD AI and X-ray.

This is the 2nd webinar of a series of webinars hosted by the FG-AITB to share results, challenges faced, and lessons learned from implementers of CAD AI and X-ray from global country projects and beyond. Implementers will present their experiences in the webinar in the following thematic areas:

- Screening Algorithm involving CAD AI and X-ray
- Customs clearance & local radiation authority approval
- Digital X-ray image quality
- Product cost
- Experience with the selected X-ray and CAD AI vendor
- Threshold score setting
- Linkage to confirmation test and treatment
- X-ray CAD AI data storage and backup
- Interoperability with other health information system
- Data privacy and security measures
- Quality control
- Success Stories
- Scaling up
- Challenges
- Other lessons learned

Webinar 4 will focus on the TB REACH projects in India implemented by Innovators in Health (IIH) and TB Alert India.

[TB REACH](#) is an initiative of the Stop TB Partnership funded by the Government of Canada, the United States Agency for International Development, the UK's Foreign Commonwealth and Development Office (FCDO), the Bill & Melinda Gates Foundation, and the National Philanthropic Trust. TB REACH was created to test innovative solutions to improve TB case detection and care delivery. Since 2010, TB REACH has supported over 13 pilot projects using CAD/AI and digital x-ray which have successfully been implemented by various partners around the globe. TB REACH projects produced significant contributions to the global fight against TB, and have inspired partners, governments, TB affected communities and other TB stakeholders to adopt and develop new TB innovation.

AGENDA (1.5 HOUR)

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| Facilitators: Zhi Zhen Qin (Digital Health Specialist, Stop TB Partnership) | Time (CEST) |
| Welcome Remarks | 2:00 pm - 2:15 pm |

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| <p>Dr Jacob Creswell, TB REACH (Stop TB Partnership)</p> <p>Dr. B.K. Mishra, <u>State TB Officer, Bihar, NTEP India</u>: Is currently the State TB Officer of Bihar and is responsible for the National TB Elimination Program for the entire state of Bihar having a population of ~120 million. For a long time, Dr. Mishra was the nodal officer for Drug Resistant TB care in the state of Bihar. In the past, he has also served in the World Health Organization and has keen interest in community approach to health management.</p> <p>Dr Rajeswari, <u>District TB Control Officer</u> – is the District TB Control Officer (DTCO) of Sanga Reddy District, Telangana state in India. This is a new district formed and Dr Rajeswari’s leadership had enabled good testing and treatment outcomes, in a hard to reach but highly TB vulnerable industrial population.</p> | <p>15 mins</p> |
| <p>Experience sharing from the India: Implementing CAD - Experiences from Bihar, India: IIH</p> <p>Smriti Ridhi - led the deployment and evaluation of an AI-based X-ray screening solution for TB care while working as a Project Manager at Innovators in Health, India. She holds a Master of Public Health from the Johns Hopkins University and is trained as a Doctor of Dental Surgery. Smriti has worked extensively in global health research, advocacy, and program implementation with a focus on TB care.</p> <p>TB AI Handheld X-ray Experience: TB Alert India</p> <p>Vikas Panibatla - Is the Chief Executive of TB Alert India. Vikas holds a Master’s Degree in Social Work & Environmental Sciences. He is a research scholar of Applied Psychology, studying the mental health needs of TB patients on treatment. Vikas has 17 years of experience in Strategic Planning, Organizational Development and Liaison & Coordination.</p> | <p>2:15 - 3:00 pm 45 mins</p> |
| <p>Q&A</p> | <p>3:00 - 3:25pm 25 mins</p> |
| <p>Closing remarks</p> | <p>3:25 - 3:30 pm 5 mins</p> |

INVITED PARTICIPANTS

- National TB Programmes,
- Implementers of digital X-ray with / without AI
- Delft Imaging Systems, Fujifilm
- AI developer
- Stop TB,

- USAID

Q/A SESSION

Q1: Dr Ferdous Wahid (Bangladesh): Great work. Want to know about the reaction of local radiologist if possible regarding AI application.

A: Answered in session

Q2: Dr. Brenda Mungai (Kenya): Thanks for the presentation. Were you able to validate Qure.ai for other non TB abnormalities?

A2.1: Ammar, Qure.ai: Hi Brenda, Smriti and the IIH team have only been evaluating the TB finding so far.

A2.2: Zhi Zhen, Stop TB: Hi Brenda, some independent and peer-reviewed data on any CAD's performance on non-TB abnormalities.

Pattern of abnormalities amongst chest X-rays of adults undergoing computer-assisted digital chest X-ray screening for tuberculosis in Peri-Urban Blantyre, Malawi: A cross-sectional study. Hussein H. Twabi, Robina Semphere, Madalo Mukoka, Lingstone Chiume, Rebecca Nzawa, Helena R. A. Feasey, Trancizeo Lipenga, Peter MacPherson, Elizabeth L. Corbett, Marriott Nliwasa. <https://onlinelibrary.wiley.com/doi/full/10.1111/tmi.13658>

Engle E, Gabrielian A, Long A, Hurt DE, Rosenthal A (2020) Performance of Qure.ai automatic classifiers against a large annotated database of patients with diverse forms of tuberculosis. PLOS ONE 15(1): e0224445. <https://doi.org/10.1371/journal.pone.0224445>

Using artificial intelligence to risk stratify COVID-19 patients based on chest X-ray findings. Diego A.Hipolito Canario, EricFromke, Matthew A.Patetta, Mohamed T.Etilib, Juan P.Reyes-Gonzalez, Georgina CornelioRodriguez, Valeria A.Fusco Cornejo, SeymourDuncker, Jessica K.Stewart.

<https://www.sciencedirect.com/science/article/pii/S2666521222000023?via%3Dihub>

There is one peer-reviewed study on AI for covid detection from Italy

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7499014/>

Q3: Lam Vu (Vietnam - Lunit): I have a question, have you had experienced of Chest Lunit AI, and how about between Lunit AI and qure.ai

A: Ammar, Qure.ai: Hi Lam, The TB Reach group has evaluated and compared the performance of qXR with other algorithms in Nepal, Cameroon and Bangladesh.

Q3.2: Lam Vu (Vietnam - Lunit): Hi Ammar, how could I get the result?

A: Zhi Zhen, Stop TB: <https://www.sciencedirect.com/science/article/pii/S2589750021001163>
one of the many papers

Q4: Dr. Sayeed Rahman (Bangladesh): Does threshold level differ with different countries?

A: Smriti, IIH: Hi Dr. Sayeed! Threshold scores should be program/geography specific to ensure the best possible use.

Q5: Moe Thaw Ko (Vietnam): What is the performance of CAD in childhood TB? Any age limitation, Miliary TB and Pleural effusion?

A5.1: Ammar, Qure.ai: Hi Moe, currently the WHO recommendation is for 15 years and above for the use of AI algorithms in the absence of human readers. But qXR can interpret CXRs > 6 years and above.

A5.2: Zhi Zhen, Stop TB: Hi Moe Thaw, currently there is no independent and peer-reviewed evidence on the performance of any CAD software, any one of them, in children under 15 for TB like in adults.

Q6: Brenda Mungai (Kenya): Did the panel stand come with the Fuji film machine?

A: Daisuke (Fuji): Hi, thank you for the questions. Fujifilm will supply panel holders and stands together. Stand for Xair will be supplied as well.

Q7: Aung Phyo Kaing: Can qXR interpret PA and lateral views?

A: Somesh Pathak, Qure.ai: Hi Aung, it can interpret PA and AP views

Q8: Lydia Kamau (Kenya): From the photos, I didn't see 5 meters distance and other people are very near. How do you deal with scatter radiation? Also the safety of those near the opened door?

A: Vikas, TB Alert : Thanks for the question. We ideally tried to keep a 6 feet distance (which will be approximately 2 meters) between the detector and camera. However, we have to work on the field level possibilities. It depends on the space availability. As mentioned, the radiation was very little as assured by FujiFilm. Taking this as a benchmark we need not have to bother much about the scatter radiation. Machine is completely safe.

Q9: Brenda Mungai (Kenya): The assessment by the board, please clarify, you did it virtually? Was actual radiation measured by the board in the country?

A: Vikas, TB Alert: Hi Brenda, machine setup and operation was observed virtually in the first call. Board had asked us to send the TLD device which was used in a virtual meeting to them to check the radiation measures. These seem to be within the permissible limits. Second meeting was a sought of confirmation of the finding and TLD device was sent and were within the permissible limits.

Q10: Lorraine Mugambi Nyaboga (CHS Kenya): How many radiographs were you doing per day, and what sort of radiation reading did you capture per day of X-rays for the technician?

A: Vikas, TB Alert: Hi Lorraine, the number of radiographs per day varied between 40-80. This depended on how extensive the mobilization was all about. On an average per camp or day screenings were around 60. We did not measure the day-wise radiation. For every three months we are mandated to send the TLD device for validation of the radiation readings. We didn't get any question meaning the radiation was within permissible limits.

Q11: Aung Phyo Kaing: I also would like to know the minimum space requirements for radiation safety.

A: Vikas (TB alert, in session): 6-7 feet between patient and XRay

Q12: Lorraine Mugambi Nyaboga (CHS Kenya): Which AI solution did you use for these Fujifilm X-rays?

A: Vikas, TB Alert (in session): Qure.ai

Q12: Kyaw Phyo: How about the toughness of the X-ray machine? and any regular maintenance cost. Is it compact with Quar ai? any difficulties in connection?

A: Daisuke (Fujifilm): Regarding the battery, the improved model of Xair can be charged during the exposure and can take around 300 shoots right now. We also have a simple type of stand for easier mobility.

Vikas, TB Alert: X-ray machine is compact and no maintenance costs are involved. It was compact with Quar.ai and we didn't have any connection issues.

Q13: Brenda Mungai (Kenya): The number clinically diagnosed at 41%, is that comparable to the national data? Or would use of CXR lead to higher rates of clinically diagnosed

A: Answered in session

Q14: Dr. Austin Ihesie (Nigeria): Did any of the pilots experience equipment faults with the machines? If yes, what were the commonest equipment component faults experienced?

A: Vikas, TB alert (in session): No problems with equipment and no faults throughout the screening camps. The only issue was the battery power.

Q15: Nana Zarkua: Any experience of using it under 15 y/o?

A: Vikas, TB Alert: Thanks for the question Nana. We had experiences of using it with children below 15 years. We followed the same procedures as we were following with the adult PTS. Around 50-100 children were screened using the X-ray machine.

Q16: Ngoc Anh Le Thi (Viet Nam): Can you provide information on the age group of all TB patients identified through project screening activities?

A: Vikas, TB Alert: Hi Ngoc, We had a range of age groups who were screened below 15 years, 16-36 year, 36-56 years and 56-76 years. However, the percentage of people diagnosed in the last two age groups was more than the first two age groups. One of the key lessons here is that the day, date and time of the screening camp is very important to get all age groups. Otherwise, we need to plan camps focusing on a specific age group.

Q17: Aung Phyo Kaing: Are the batteries replaceable?

A: Daisuke (Fujifilm): Xair battery cannot be replaced. You can connect both plug or power bank to charge the battery during the screening.

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