TB Innovations and TB REACH

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TB REACH and Stop TB – Incubating Innovation

- In 2013 a TB REACH Wave 2 project was awarded to ZAMBART in Zambia and tested the first AI product to read CXR images for outpatients at a clinic in Lusaka. (CAD4TB v1.08)
- The results were promising and AI for CXR could address several barriers to optimal TB care
- In 2014 Wave 3 projects in Pakistan (IRD) and Bangladesh (icddr,b) worked on large scale implementation of AI and CXR using v3 technology as part of private sector engagement strategies. Bangladesh published the first independent paper on AI results
- TB REACH projects in Tanzania, Nepal, and Cameroon also used CAD4TB in different screening approaches.
- WHO convened an expert group in 2016 to review data and decided there was not enough evidence to consider a recommendation.

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The Sensitivity and Specificity of Using a Computer Aided Diagnosis Program for Automatically Scoring Chest X-Rays of Presumptive TB Patients Compared with Xpert MTB/RIF in Lusaka Zambia

Monde Muyoyeta[1]*, Pragnya Maduskar[2], Maureen Moyo[1], Nkatya Kasese[1], Deborah Milimo[1], Rosanna Spooner[1], Nathan Kapata[3], Laurens Hogeweg[2], Bram van Ginneken[2], Helen Ayles[1,4]

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An evaluation of automated chest radiography reading software for tuberculosis screening among public- and private-sector patients

Md Toufiq Rahman[1], Andrew J. Codlin[2], Md Mahfuzur Rahman[1], Ayenun Nahar[1], Mehdi Reja[1], Tariqul Islam[3], Zhi Zhen Qin[2], Md Abdus Shakur Khan[4], Sayera Banu[1] and Jacob Creswell[2]

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Screening for pulmonary tuberculosis in a Tanzanian prison and computer-aided interpretation of chest X-rays

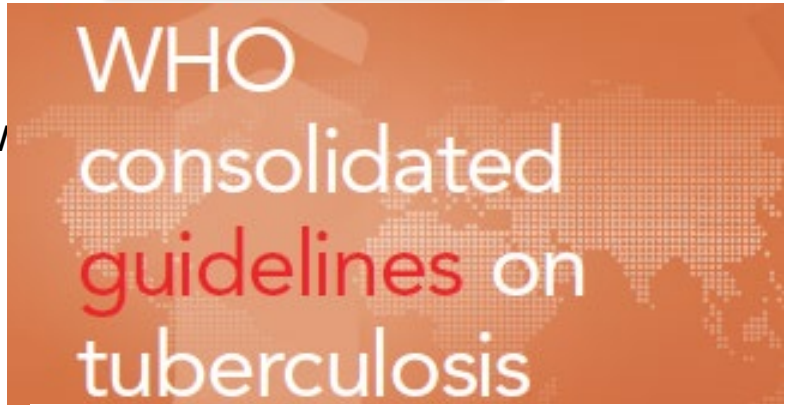
A. Steiner,[1–3] C. Mangu,[4] J. van den Hombergh,[5] H. van Deutekom,[6] B. van Ginneken,[7] P. Clowes,[4,8] F. Mhimbira,[1–3] S. Mfinanga,[9] A. Rachow,[8,10] K. Reither,[1,3] M. Hoelscher[4,8,10]

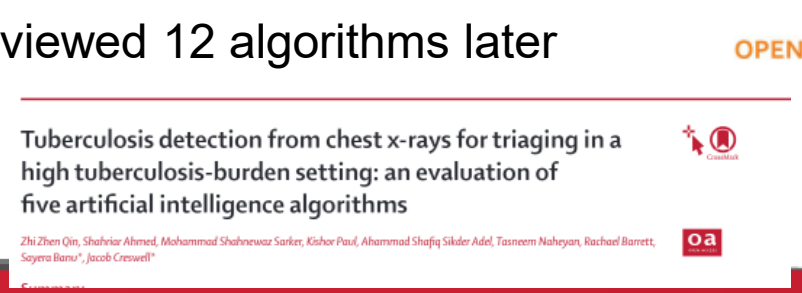
CHEST RADIOGRAPHY IN TUBERCULOSIS DETECTION

Summary of current WHO recommendations and guidance on programmatic approaches

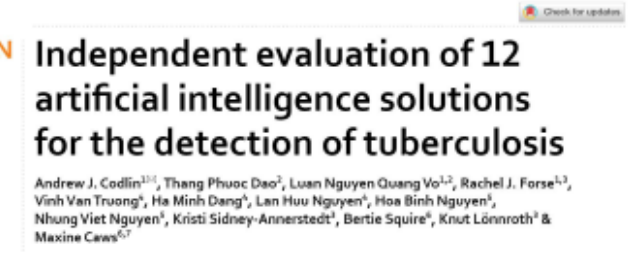
TB REACH and Stop TB – Incubating Innovation

- IRD in Pakistan expanded AI use in large scale screening activities conducting 100,000s of screens.
- New software entered the market and in 2018 TB REACH conducted the first comparative study and first evaluation from multiple populations in Nepal and Cameroon. (Lunit, Qure.ai and Delft)
- New software performed significantly better than human radiologists
- WHO was conducting a review and update of the 2013 screening GL and FIND and Stop TB/TB REACH were asked to contribute to a review of AI solutions and data, leading to the first ever WHO recommendations on the use of AI for any disease in 2021 using three software.
- Stop TB published a review of 5 AI software packages in last year with icddr,b
- Another TB REACH grantee in Vietnam reviewed 12 algorithms later last year




Tuberculosis detection from chest x-rays for triaging in a high tuberculosis-burden setting: an evaluation of five artificial intelligence algorithms

Zhi Zhen Qin, Shahriar Ahmed, Mohammad Shahnewaz Sarker, Kishor Paul, Ahammad Shafiq Sikder Adel, Tasneem Naheyan, Rachael Barrett, Sayera Banu*, Jacob Creswell*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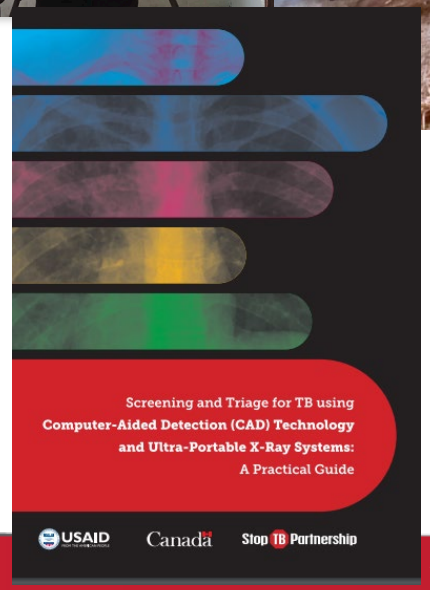
Independent evaluation of 12 artificial intelligence solutions for the detection of tuberculosis

Andrew J. Codlin[1,7], Thang Phuoc Dao[2], Luan Nguyen Quang Vo[1,2], Rachel J. Forse[1,3], Vinh Van Truong[4], Ha Minh Dang[4], Lan Huu Nguyen[4], Hoa Binh Nguyen[5], Nhung Viet Nguyen[6], Kristi Sidney-Annerstedt[1], Bertie Squire[6], Knut Lönnroth[1] & Maxine Caws[6,7]

TB REACH and Stop TB – Incubating Innovation

- Wave 6 and 7 TB REACH projects in Pakistan and Cambodia began to use ultra-portable x-ray devices for the first time for TB (and Covid-19)
- Based on the TB REACH experience with the ultra-portable x-rays, Stop TB and USAID developed an implementer guide for AI and the new machines
- The C19 RM from Global Fund led to an outpouring of support for the procurement of AI and ultra portable x-ray.
- This was not a donor driven initiative, it emerged from in country partners who identified a need, and potential tools
- TB REACH was able to support early implementation, evaluation and then was able to provide expertise on how to use the tools after WHO recommendations allowed for widescale funding.
- TB REACH allows our partners chose the innovations. Not all are successful, but the early evaluations help de-risk other larger investments and impactful interventions can be scaled.



TB REACH Update

- Grant Agreement Development Process with Unitaid on a proposal with LSTM – (USD ~14m) expected to be signed in June to evaluate new screening and diagnostic tests (including UP-CXR and pooling) in 7 countries in coordination with FIND
- Despite the COVID-19 pandemic, 44% of Wave 7 grantees were able to **increase** notifications by 20% or more.
- Overall, TB notification in TB REACH supported areas dropped by only 5% compared to widespread reductions globally
- The Wave 7 documentation of work empowering women and girls is being completed
- Wave 8 grants on private sector engagement are ending shortly
- Wave 9 grants on improving DR-TB linkages to care, uptake of all oral regimens, and improving treatment outcomes are underway

Wave 10

- Supported by Global Affairs Canada, FCDO and USAID
- Launched on 31 March 2022, Wave 10 has two areas of focus
  - TB Preventative Treatment
  - Integrated Service Delivery
- Wave 10 is a two-stage application process and closed on May 11
- Will work closely with Global Fund mechanisms to link to sustainable interventions
- Countries were eligible based on criteria on Global Fund's Strategic Initiative countries, WHO HBC, and USAID priority countries
- A separate call for proposals for M&E support is open now and closes 1 June

Wave 10 Initial Results

- 481 registered applicants from 34 countries
- After initial proposal screening, 209 applications will be reviewed by the Proposal Review Committee. USD 120 million in requests
- ISD Proposals include new approaches for TB screening with Covid-19, mental health, lung cancer, COPD, smoking cessation, diabetes, nutrition, MCH, vaccines and others
- Lots of interest to use CXR as a gateway for lung health and AI, new multiplexing diagnostic platforms for TB and other diseases, and GIS for targeting efforts
- TPT Proposals propose scaling up in children, adult contacts, 1HP, 3HP, evaluation of new tests for infection, and evaluations to inform country policy

Next steps for TB REACH

- Stage 1 decisions are expected in early July
- Final funding recommendations to the EC of the Board will be in September
- TB REACH partners closely involved with Unitaid project evaluating new diagnostic combinations in 2023
- Wave 9 projects will continue in 2022-23
- Working closely with Global Fund to ensure strong linkages with Wave 10 projects
- Fundraising – long term agreements

No funding commitment after Wave 10

Thank you