



Impact of Artificial Intelligence (AI) on Tuberculosis (TB) Detection in Mobile Chest X-ray Bus Screening Programs in Bangkok

Poster No.: C-28268

Congress: ECR26

Authorblock: H. Yoshioka¹, A. Choppin², L. Kaewwilai³, G. Wongpanich³, P. Permsirivanich³, C. Brukesawan³, T. Palakawong Na Ayuthaya³, N. Isarankura³, O. Kaewboonchoo³; ¹Irvine/US, ²Tokyo/Jp, ³Bangkok/TH

Disclosures:

Hiroshi Yoshioka: Nothing to disclose

Antoine Choppin: Nothing to disclose

Lalita Kaewwilai: Nothing to disclose

Gun Wongpanich: Nothing to disclose

Panithi Permsirivanich: Nothing to disclose

Chantapat Brukesawan: Nothing to disclose

Thitisant Palakawong Na Ayuthaya: Nothing to disclose

Nattinee Isarankura: Nothing to disclose

Orawan Kaewboonchoo: Nothing to disclose

Keywords: Artificial Intelligence, Lung, CAD, Plain radiographic studies, CAD, Diagnostic procedure, Screening, Infection

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Purpose or Learning Objective:

Tuberculosis (TB) is one of the deadliest infectious diseases worldwide, particularly in the South-East Asian region. To eliminate TB, it is crucial to screen as many patients as possible and initiate treatment at the earliest possible stage. Mobile X-ray units can be an effective tool for this purpose; however, they have not been fully utilized due to limited resources—particularly the shortage of radiologists—as well as financial constraints and a lack of information or education among residents.

In this context, in 2014, the World Health Organization (WHO) announced the End TB Strategy, which aims to reduce TB incidence by 90% and TB-related deaths by 95% by 2035[1]. In March 2021, the WHO updated its guidelines, recommending the use of computer-aided TB screening software as a substitute for human readers in the interpretation of digital chest radiographs[2,3].

Therefore, the aim of this study was to prospectively incorporate an in-house diagnostic imaging AI system into a mobile chest X-ray (CXR) TB screening workflow in Bangkok and to evaluate whether AI-assisted screening improves efficiency and TB detection compared with a conventional workflow without AI[4,5].

Methods or Background:

Residents from 21 districts in Bangkok prospectively participated in this institutional review board approved study in 2025, while data in 2024 were used as a retrospective comparison. In the prospective study, routine mobile bus TB screening CXR images were analyzed for potential TB using an in-house AI-assisted diagnostic system.



Tuberculosis (TB) screening bus in Bangkok and its x-ray machine

Fig 1: Tuberculosis (TB) screening bus in Bangkok and its x-ray machine

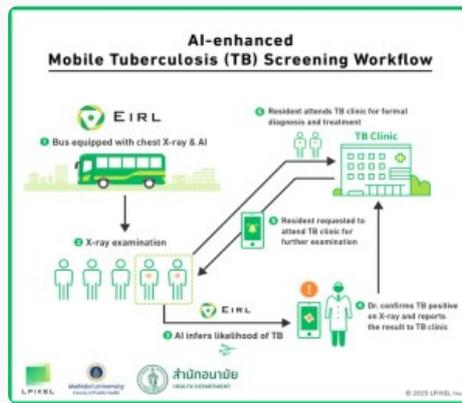


Fig 2: AI-assisted mobile tuberculosis TB bus screening workflow

The AI results (positive or negative for TB) were uploaded to Google spreadsheet. Simultaneously, only AI-positive TB cases were automatically notified to radiologists in the reading room via LINE Messaging API and uploaded to an online viewer using a commercial pocket WIFI on the bus. These cases were immediately reviewed by radiologists and diagnosed as either TB or non-TB.

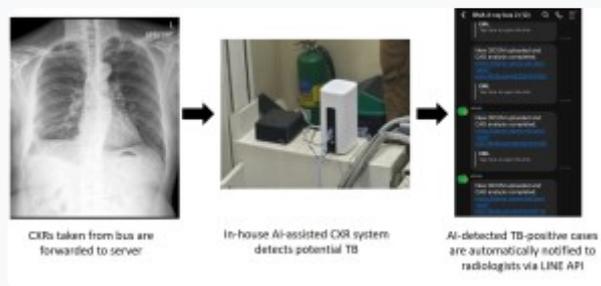


Fig 3: AI-positive TB cases automatically notified to radiologists via LINE API

Online viewer subject list

ID	Name	Study Date	Modality	Body Part	URL Status	Top	More
100	THONGKONGKONG	2025/05/11 10:01	DR	CHEST	Selection 0	+	+
101	COMBODI	2025/05/11 10:06	DR	CHEST	Selection 0	+	+
102	ERTHO	2025/05/11 10:06	DR	CHEST	Selection 0	+	+
103	THONGKONGKONG	2025/05/11 10:06	DR	CHEST	Selection 0	+	+
104	THONGKONGKONG	2025/05/11 10:06	DR	CHEST	Selection 0	+	+
105	THONGKONGKONG	2025/05/11 10:07	DR	CHEST	Selection 1	+	+

Fig 4: Online viewer subject list

AI-negative TB, AI-positive/radiologist-negative TB, and AI-positive/radiologist-positive TB cases were recorded on the Google spreadsheet. These results were monitored on site in real time.



Fig 5: AI detection results and radiologists' readings uploaded to a Google Spreadsheet in real time

Additionally, the final number (rate) of active TB cases was compared between the prospective and retrospective studies.

Results or Findings:

A total of 2309 subjects (mean 52.6 years, M/F=815/1494) participated in the prospective study, while 2277 subjects (mean 60.3 years, M/F=790/1486) were analyzed in the retrospective comparison.

	# of cases	Mean age (range) years	Female/Male	X-ray report turnaround time	# of active TB cases	AI sensitivity	AI specificity
with AI (2025)	2309	52.6 (20-96)	1494/815	0 (AI-positive) / 1 (AI-negative) days	23 (1.0%)	0.96	0.70
without AI (2024)	2277	60.3 (14-96)	1486/790	average 6.4 (1-52) days	8 (0.35%)	NA	NA

Table 1: Summary of study results

The radiology report turnaround time was 0 day for AI-positive cases and 1 day for AI-negative cases in the prospective study, compared with an average of 6.4 days in 2024. The numbers of AI-negative, AI-positive/radiologist-negative, and AI-positive/radiologist-positive cases were 1607, 520, and 182, respectively. Active TB was detected in 23 subjects (1.0%) with AI-assisted screening, compared with 8 subjects (0.35%) without AI. There was one subject who was AI-negative and radiologist-positive with confirmed active TB.

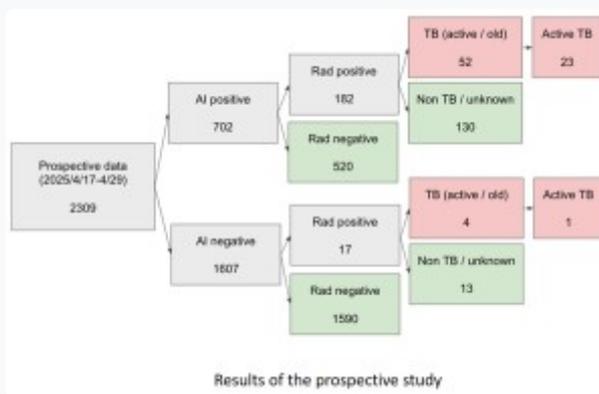


Fig 6: Results of the prospective study

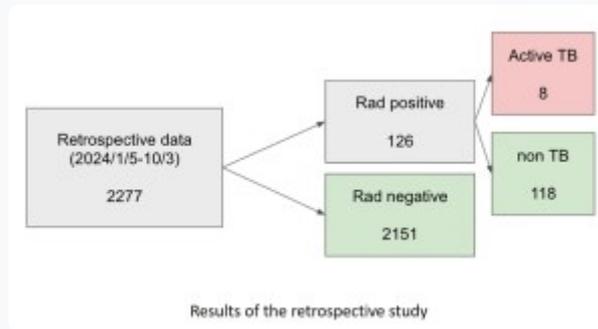


Fig 7: Results of the retrospective study

The average AI sensitivity and specificity were 0.96 and 0.70 for active TB, compared with 0.99 and 0.76 for radiologist-positive TB. AI-positive/radiologist-positive and AI-negative/radiologist-positive CXR images are shown in Figures 8 and 9, respectively.



Fig 8: CXR: AI-positive/Radiologist-positive with confirmed active TB



Fig 9: CXR: AI-negative/Radiologist-positive with confirmed active TB

Conclusion:

The use of AI in mobile TB screening reduced the time to radiologist interpretation and increased the number of diagnosed active TB cases, demonstrating that AI is a powerful tool for improving the efficiency of mobile TB screening.

Personal Information:

This study was funded by Japan External Trade Organization (JETRO) and approved by ethics committee of Bangkok Metropolitan Administration.

University of California, Irvine (Hiroshi Yoshioka), LPIXEL Inc. (Antoine Choppin, Koichi Takeuchi), Bangkok Metropolitan Administration (Gun Wongpanich, Panithi Permsirivanich, Akarapong Teera-akaravipas, Chantapat Brukesawan, Thitisant Palakawong Na Ayuthaya, Nattinee Isarankura), Mahidol University (Lalita Kaewwilai, Orawan Kaewboonchoo) - nothing to disclose

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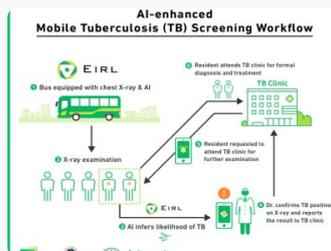


Fig 2: AI-assisted mobile tuberculosis TB bus screening workflow

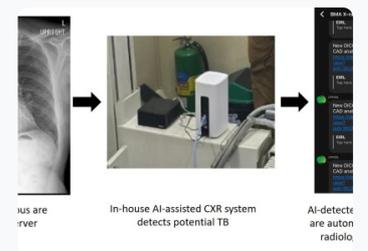


Fig 3: AI-positive TB cases automatically notified to radiologists via LINE API

Fig 4: Online viewer subject list

Fig 5: AI detection results and radiologists' readings uploaded to a Google Spreadsheet in real time

Summary of study results

Age (years)	Female/Male	X-ray report turnaround time
15-19	1494/815	0 (AI-positive)/ 1 (AI-negative) days
20-24	1486/790	average 6.4 (1-12) days

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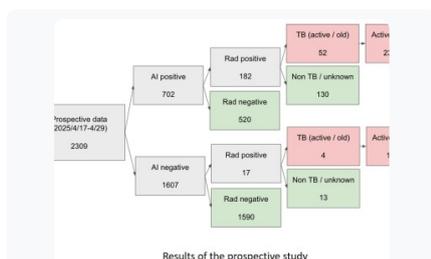


Fig 6: Results of the prospective study

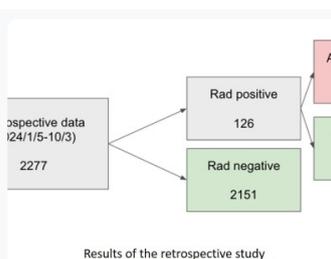


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