

Implementation readiness for low-dose computed tomography lung cancer screening in Japan, Malaysia, and Thailand: a scoping review

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BACKGROUND & OBJECTIVE

Lung cancer is the most commonly diagnosed cancer and the leading cause of cancer death worldwide. Asia accounted for **65.6% of incident cases and 64.3% of deaths** globally (2024).

As lung cancer is often diagnosed at advanced stages, screening offers an opportunity for earlier detection. In the National Lung Screening Trial (NLST), low-dose computed tomography (LDCT) **reduced lung cancer mortality by 20%** compared with chest radiography among smokers.

The World Health Organization (WHO) emphasizes coordinated pathways from population identification through diagnosis and treatment. The 2025 World Health Assembly resolution called for evidence-based, cost-effective early detection within universal health coverage.

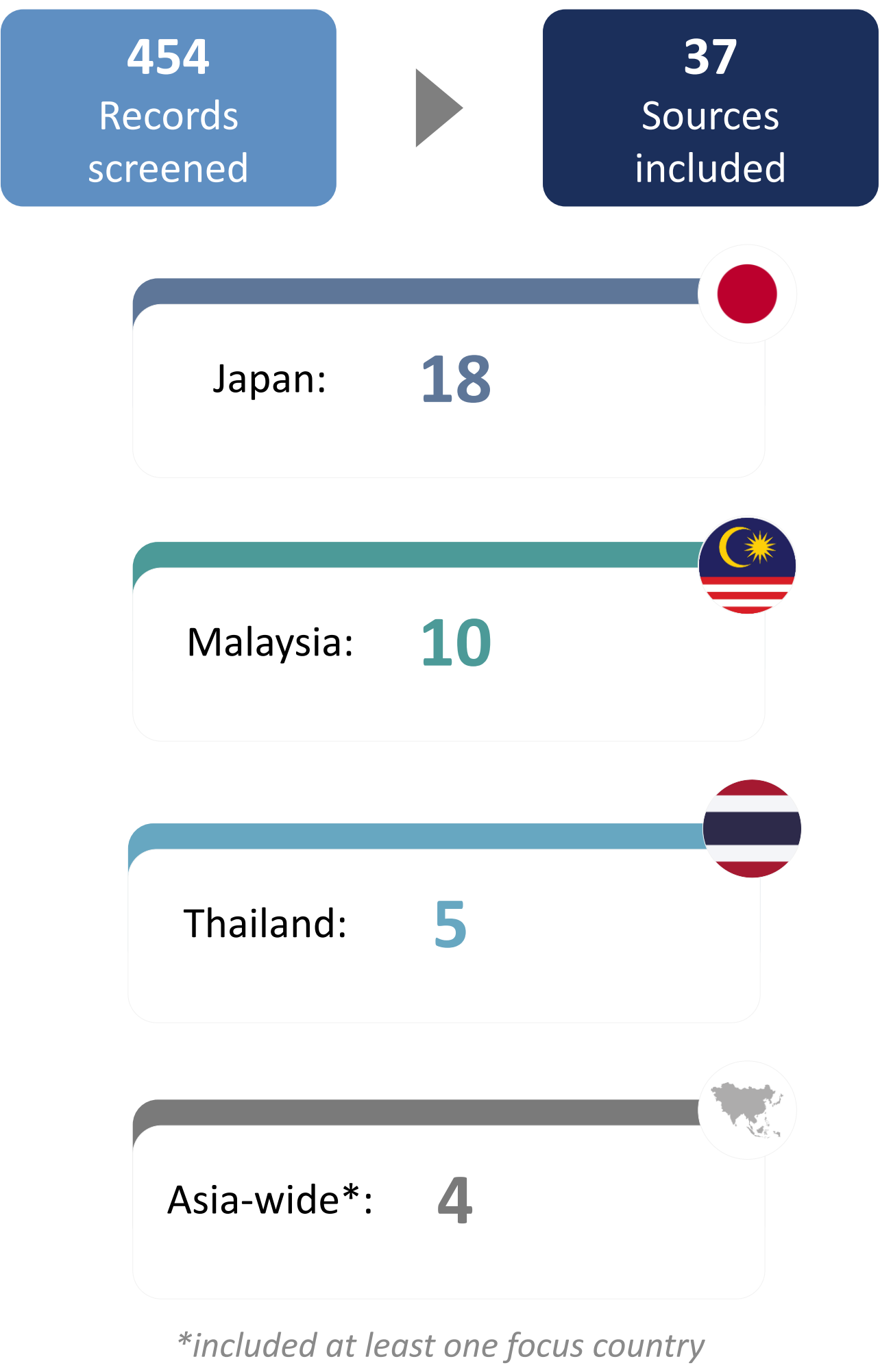
Despite growing policy momentum, LDCT screening in Asia faces challenges related to **never-smoker eligibility, tuberculosis (TB)-related abnormalities, and health-system constraints. Japan, Malaysia, and Thailand were selected for this review to compare these issues across differing socioeconomic and health-system contexts and stages of screening development.**

This review aimed to

- Compare LDCT screening policy, evidence, and implementation across Japan, Malaysia, and Thailand.
- Identify shared and country-specific priorities for equitable access across the three countries.

RESULTS

Evidence landscape



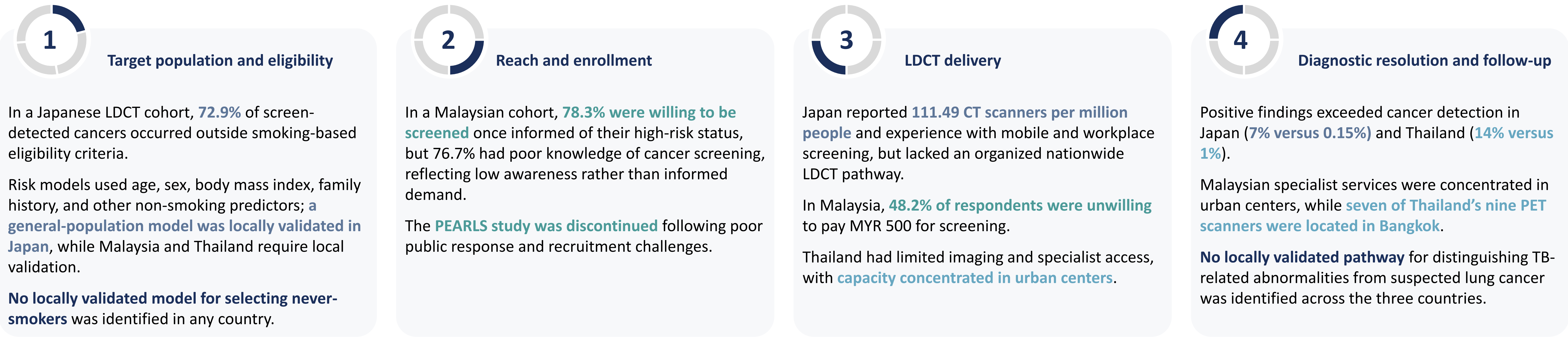
Comparative LDCT screening readiness

Japan, Malaysia, and Thailand differed in policy position, evidence maturity, delivery capacity, and risk-model status (Table 1).

Table 1. LDCT screening readiness across Japan, Malaysia, and Thailand

Readiness dimension	Japan	Malaysia	Thailand
Policy position	Population screening remains based on chest radiography and sputum cytology for high-risk individuals.	No national LDCT program. Availability is limited to selected private facilities and research settings.	No national program or guideline was identified. LDCT use is limited to research and pilot settings.
Evidence maturity	Extensive observational evidence and established quality and training structures.	A national multicenter pilot study (PEARLS) was discontinued. Local outcome evidence remains limited.	Evidence is limited to a single-center cohort and a small pilot. No national effectiveness or economic evidence was identified.
Delivery readiness	High reported CT density and experience with mobile and workplace screening. No organized nationwide LDCT pathway.	Services are limited to selected urban centers. Constraints related to affordability, awareness, and recruitment were reported.	Geographic, workforce, and infrastructure constraints were reported. Capacity is concentrated in urban centers.
Risk-model status	A general-population lung cancer risk model was locally validated but was not designed for never-smoker LDCT selection.	External models were appraised. Local validation and adaptation were recommended.	External models were tested in a pilot. Local applicability remains uncertain.
Implementation position	LDCT remains mainly opportunistic despite established evidence and technical infrastructure.	Pre-implementation research and evaluation stage.	Early feasibility and pilot stage.

Implementation findings across the LDCT screening pathway



KEY TAKEAWAYS

- Japan had the strongest evidence and technical foundations**, but translation into an organized nationwide LDCT pathway remained incomplete, with unresolved questions about overdiagnosis and optimal screening interval.
- Malaysia and Thailand sit at earlier stages**, in pre-implementation and pilot phases, respectively.
- Smoking-based eligibility may exclude at-risk never-smokers**, while the local applicability of available risk models remains uncertain.
- High stated willingness may not translate into participation** when screening knowledge, public response, and recruitment are limited.
- CT availability alone does not ensure equitable delivery**. Affordability, geographic access, and specialist capacity also influence implementation.
- Many positive LDCT findings may require further investigation**, although only a small proportion result in a cancer diagnosis. This could place substantial pressure on follow-up services, particularly where diagnostic capacity is concentrated and no locally validated pathway exists for distinguishing TB-related abnormalities from suspected lung cancer.

METHODS

- Framework and scope:**
 - Scoping review guided by the Arksey and O'Malley framework
 - Countries in scope were Japan, Malaysia, and Thailand
 - Focus on LDCT evidence, policy status, and implementation barriers
- Literature search:**
 - PubMed and Web of Science databases were searched on August 6, 2025
 - MeSH and free-text terms covering lung cancer, LDCT, and each focus country
 - Supplementary checking of reference lists
- Eligibility and selection:**
 - Empirical LDCT studies, economic evaluations, evidence syntheses, guidelines, health technology assessment (HTA) reports, national cancer-control documents, and country-specific commentaries on policy or implementation
- Data charting and synthesis:**
 - Data charted in Microsoft Excel by one reviewer, verification by a second reviewer
 - Descriptive evidence summary and thematic comparison across countries