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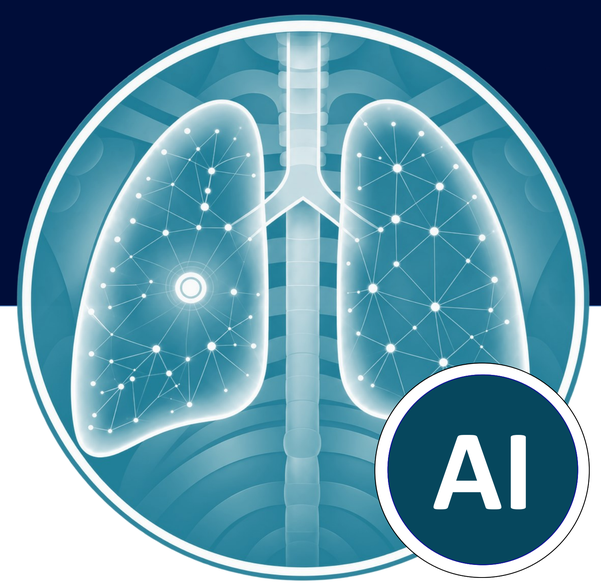
PT8

Estimating the Costs and Benefits of AI-Supported Detection of Pulmonary Malignancies on Routine Chest X-Rays Using Real-World Data



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Can AI-supported interpretation of routine chest X-rays enable earlier detection of pulmonary malignancies and deliver meaningful clinical benefits at reasonable cost?

THE OPPORTUNITY: AI CAN SUPPORT RADIOLOGISTS TO IMPROVE DETECTION



1. Routine chest X-ray
Performed for non-oncologic indications

2. AI + radiologist interpretation
AI-supported identification of suspicious findings at time of reading

3. Fewer missed cases
Earlier identification of potentially missed malignancies

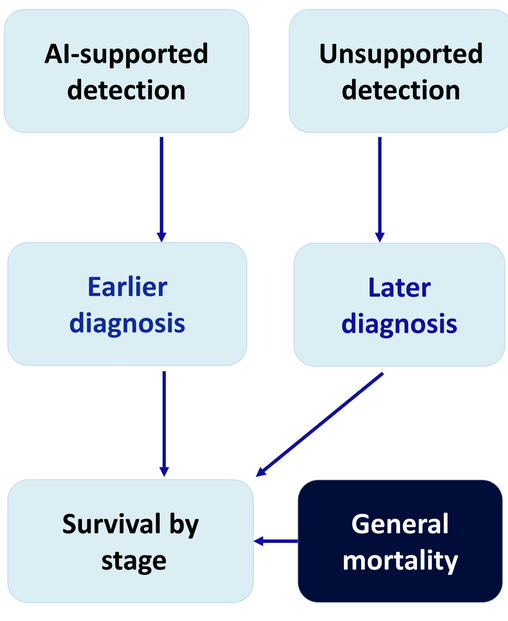
4. Clinical benefit for patients
Life-years gained (LYG)
Quality-adjusted life-years gained (QALY)

5. Economic value
Acceptable incremental cost Cost per QALY gained within reimbursement threshold?

METHODS & DATA SOURCES

MODEL OVERVIEW

Decision-analytic model comparing AI-supported early detection vs. delayed clinical diagnosis of pulmonary malignancies



Outcomes: Life-years gained (LYG), QALY gained, diagnostic cost per additional detected malignancy, ICER (CZK/QALY gained)

Costs and outcomes discounted at 3% per annum (Czechia standard)

REAL-WORLD DATA (RWD) PILOT IMPLEMENTATION

AI-based chest X-ray analysis system implemented in routine clinical practice (pilot deployment)

- **Diagnostic pathways**
- **Real-world detection performance**

+

CZECH NATIONAL CANCER REGISTRY (SVOD.CZ)

Population-based data to inform survival by stage and estimate diagnostic delay

- **Stage-specific 1–5y relative survival**
- **Stage duration (delay estimate)**
- **Demographic characteristics**

+

COST INPUTS

- **AI-assisted diagnostic procedures**
- **Treatment costs of patients whose deaths were avoided through earlier diagnosis**

- **Utility estimation (literature based)**
- **Health-state utilities were mapped by disease stage, applied to both model arms, and adjusted for age**

VALIDATION OF KEY MODEL INPUTS

Diagnostic delay estimate and rate of additional detected malignancies are key inputs. Rate of additional detection was validated against published literature, while diagnostic delay was conservatively derived from stage-specific typical age at diagnosis. Further refinement of these parameters using real-world data would be valuable.

WHY RWD MATTERS

Using real-world evidence from routine practice and national registry survival ensures that the model reflects actual clinical pathways and outcomes in the Czech healthcare setting.

RESULTS (BASE-CASE ANALYSIS)

INCREMENTAL LIFE-YEARS GAINED (LYG)

+1.73
discounted LYG per patient

increase vs. delayed diagnosis
+58.8%

INCREMENTAL QUALITY GAINED

+1.27
incremental QALY per patient

INCREMENTAL COST-EFFECTIVENESS RATIO (ICER)

< €50,000
per QALY gained

Within the usual threshold for reimbursement approval in Czechia

KEY LIMITATIONS

- **Not a randomized evaluation; benefit inferred from RWD + registry survival**
- **Implementation limited to 9 Czech hospitals; generalisability may be limited**
- **Evidence largely based on individual examinations, not longitudinal patient-level data**
- **Additional-detection rate is a modelling proxy with important uncertainty**
- **Stage migration is not modelled; downstream effects are therefore, not explicitly captured**

SCAN FOR POSTER
SUPPLEMENT

SENSITIVITY ANALYSIS

Results were robust across plausible parameter ranges.

CONCLUSION

RWD-informed modelling suggests that AI-supported interpretation of routine chest X-rays may provide meaningful clinical benefits through earlier detection of pulmonary malignancies while representing an approach with reasonable costs.

The RWE implementation study and the development of the health economic model were funded by the study sponsor.