Economic Analysis of the Screening Strategy for Lung Cancer with Liquid Biopsy from a Brazilian Perspective

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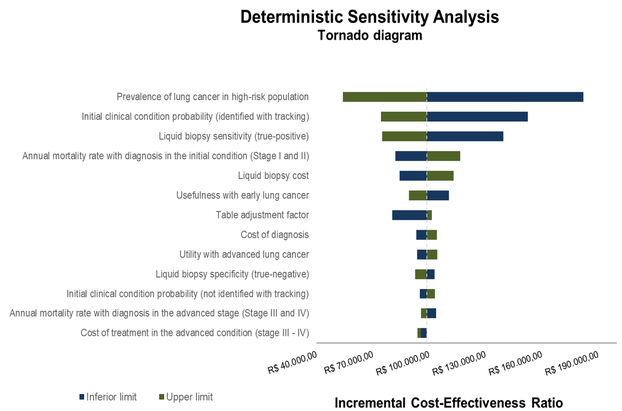
Cost-utility analysis of a liquid biopsy screening strategy to early detection of lung cancer in high-risk population

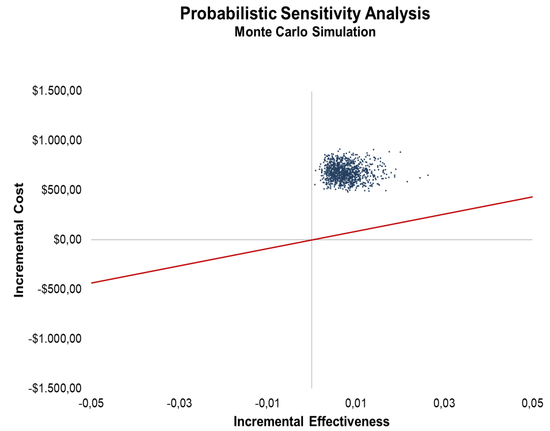
BACKGROUND

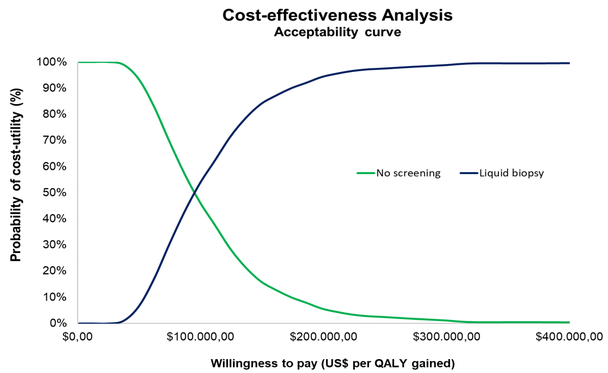
- Lung cancer is a health condition with a high lethality and low overall survival rate, worldwide.
- A disease without symptoms at an early stage leading to a late detection. Five-year survival can reach 60% when early detected.

METHODS

- A decision-analytic model captured the number of lung cancer detected in advanced and early stages, based on the immunological biomarker test (EarlyCDT® Lung).
- Then a Markov shows the long-term outcomes from lung cancer throughout lifetime, captured by five health states with one year length for each cycle.
- Direct costs were collected from the Brazilian health data system of medical procedures corresponding to 2019 Brazilian currency and were converted to U.S. dollars (US$) at the rate of 4,03 Brazilian reais/1 US$ (12/31/2019).
- The effectiveness was measured in quality-adjusted life years gained (QALY).
- Probabilities like sensitivity and specificity of the diagnostic test, transitions to each health state and utilities were derived from existing literature.
- Discount rate of 5% for both cost and effectiveness and the model was constructed using the Microsoft Excel® (2019) software.







RESULTS

- A hypothetic cohort of 1,000 individuals, an ICER of U$ 98,647.89/QALY was obtained and deterministic analyses showed the variables with greatest impact on the results.
- Despite the impact of these three first parameters, showed in deterministic analysis, the model proved to be robust against an ICER range of U$ 54,011.28 to U$ 182,075.69/QALY.
- In all simulated scenarios from probabilistic sensitivity analysis the results were concentrated above of U$ 8,592.22/QALY, equivalent to 1 Brazilian gross domestic product (GDP) per capita/QALY in 2019.

CONCLUSION

- All results were concentrated above Brazilian GDP per capita, indicating that this strategy was not cost-effective in Brazil.
- The screening with liquid biopsy would only become cost effective if the Brazilian lung cancer prevalence context was greater than 15%.

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