

Cost effectiveness analysis of a polygenic risk tailored breast cancer screening programme in Singapore

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STUDY AIM

To evaluate the cost-effectiveness of a breast cancer screening programme that incorporates genetic testing using breast cancer-associated single nucleotide polymorphisms (SNPs), against the current biennial mammogram-only screening.

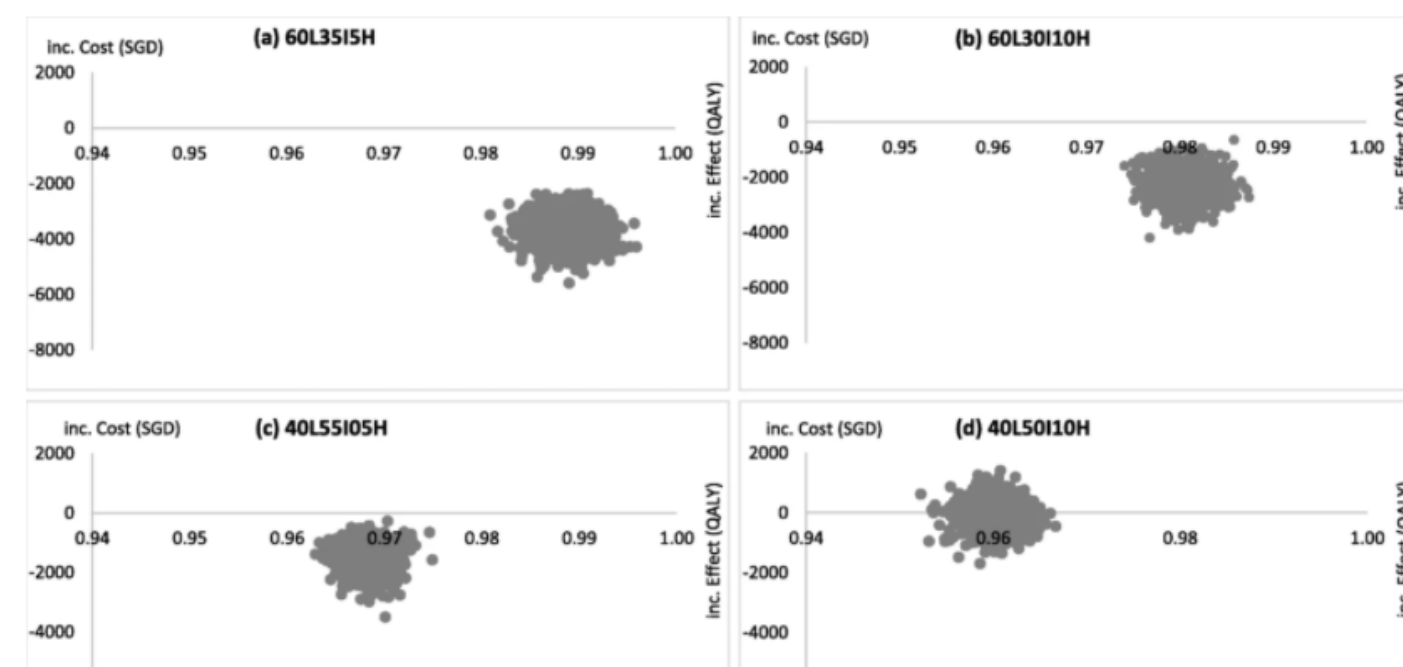
METHODS

A Markov model was used to compare the costs and health outcomes of the current screening programme, against a polygenic risk-tailored screening programme, which can advise a long-term strategy depending on the individual's risk.

The model took the perspective of the healthcare system, with a time horizon of 40 years, following women from the age of 35 to 74. Epidemiological and cost data were taken from Asian studies, and an annual discount rate of 3% was used.

The model outcome was the incremental cost-effectiveness ratio (ICER), calculated from the difference in costs per quality-adjusted life year (QALY). Scenarios with varying risk thresholds for each polygenic risk group were examined.

Cost effectiveness planes for probabilistic sensitivity analysis for all four scenarios



In the 40 L-50I-10H scenario (d), approximately 57% of the ICERs for tailored screening will be cost effective when WTP is at 1SGD /QALY, compared to the mammogram arm. All ICER points for the three other scenarios ((a), (b), (c)) remain in the south-east quadrant, indicating that tailored screening is more cost effective than mammogram-only screening

CONCLUSION

- Polygenic risk-tailored screening is cost effective with an ICER of - 3713.80 SGD/QALY.
- Tailored screening remains cost effective even across varying percentile cutoffs for each risk group.
- While the results look promising, further studies should be conducted to address various limitations.

RESULTS

The ICER for a polygenic risk-tailored breast cancer screening programme, compared with the current screening programme, was - 3713.80 SGD/QALY, with incremental costs < 0 and incremental effects > 0.

The scenario analysis of different polygenic risk cutoffs showed that the ICERs remain negative, indicating that tailored screening is more cost-effective than mammogram-only screening, while causing no additional harm to women.

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