The Cost-Effectiveness of Prostate Health Index for Prostate Cancer Detection in Chinese men

Jeremy Yuen-Chun TEOH[1*], Chi-Ho LEUNG[1*], Maggie Haitian WANG[2], Peter Ka-Fung CHIU[1], Chi-Hang YEE[1], Chi-Fai NG[1], Martin Chi-Sang WONG[2]

[1] S.H. Ho Urology Centre, Department of Surgery, [2] The Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Hong Kong, China.

+ INTRODUCTION

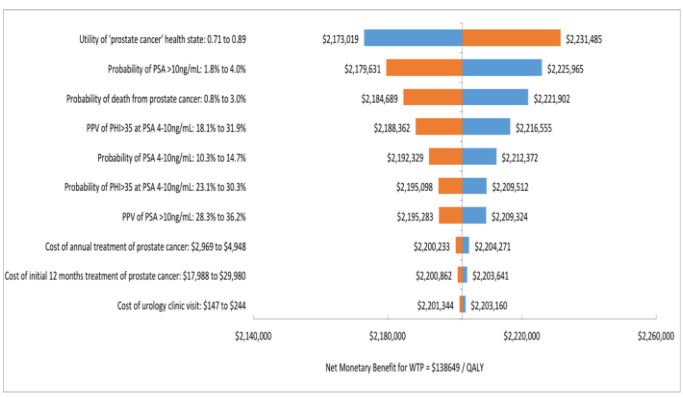
Prostate-specific antigen (PSA) and prostate health index (PHI) have been used as biomarkers for prostate cancer detection. We evaluated the cost-effectiveness of PHI for prostate cancer detection in Chinese men.

+ METHODS

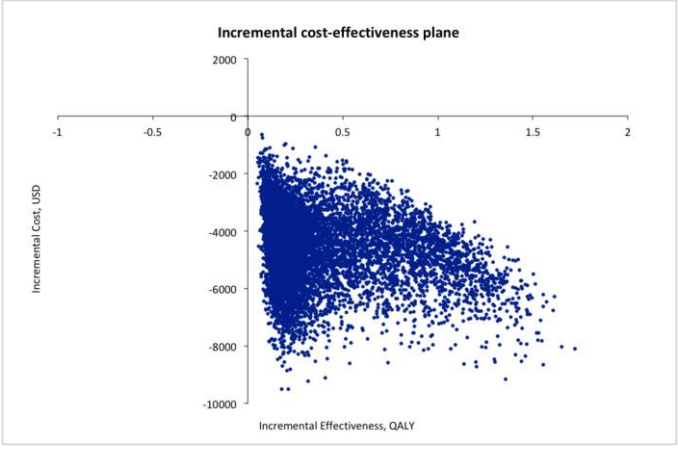
We developed a Markov model for Chinese male patient aged 50-75 years with elevated PSA of 4-10ng/mL and normal Digital Rectal Examination (DRE). The PSA strategy was to offer TRUS-PB for all patients with elevated PSA of 4-10ng/mL. The PHI strategy was to offer PHI for patients with elevated PSA of 4-10ng/mL. TRUS-PB would only be offered for patients with PHI >35.0. Model inputs were extracted from local data. The cost per quality-adjusted life years (QALYs) gained for both strategies were calculated. The incremental cost-effectiveness ratio (ICER) in relation to the willingness-to-pay (WTP) threshold of the PSA and PHI strategies were compared. One-way sensitivity analysis and probabilistic sensitivity analysis were performed. Cost-effectiveness acceptability curves were constructed.

+ RESULTS

With a Markov model of 25 screening cycles from age 50-75 years, the mean total costs per man were estimated to be US$27439 in the PSA strategy and US$22877 in the PHI strategy. The estimated effects were estimated to be 15.70 in the PSA strategy and 16.05 in the PHI strategy. The PHI strategy was associated with an expected decrease in cost of US$4562 and an expected gain of 0.35 QALY, resulting in an ICER of US$-13056.56. The results of our Markov model were shown to be robust upon one-way sensitivity analysis. Upon Monte Carlo simulation, the PHI strategy was more cost-effective for 100% of the iterations. The PHI strategy demonstrated dominance over the PSA strategy regardless of what WTP threshold we use.



One-way sensitivity analysis



Cost-effectiveness plane showing dominance of the PHI strategy

+ CONCLUSION

The PHI strategy is more cost-effective than the PSA strategy for prostate cancer detection in Chinese men, highlighting its potential to be adopted in clinical practice.