

00391 Cost Effectiveness of a Screening Program for Glaucoma Patients in Singapore: A Hybrid Markov and DES Modeling Approach

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Aims: Incorporating transitional probabilities obtained from a Discrete Event Simulation (DES) Modelling of glaucoma in a Hybrid Markov model for comparing the Cost Effectiveness Analysis (CEA) of screening vs. no screening for primary glaucomas among Singaporeans.

Methodology: DES modelling was conducted for Primary Open Angle (POAG) and Primary Angle Closure (PACG) Glaucomas (age > 40 years) in estimating the life time burden of the disease. Validation of the models were conducted using mean deviation (MD) slope estimates and Two one sided Tests on actual POAG data (n=1042) and PACG (n=97) representing Singapore Glaucoma profiles, estimating treatment effects, blindness, Quality-Adjusted Life Years (QALYs) and costs. Transition probabilities from the DES models were used to construct a hybrid Markov Model for comparing the Cost Effectiveness Analysis (CEA) of screening vs. no screening for Primary glaucomas using Tree Age Pro 2014. A community screening method for POAG and PACG was utilized. We evaluated the incremental cost-effectiveness ratios (ICER) in Singapore dollars per QALYs, Willingness to Pay (WTP) threshold, medication effectiveness (ME) and eligible age for screening (EAS).

Result: A statistically acceptable difference was noted for model validation between actual vs. simulated MD slopes (Equivalence TOST for POAG p=0.003; PACG p=0.02). In a base case scenario, where our assumptions of the model are likely to be met at EAS age 50 years cohort, a population-wide screening illustrated greater ICER over non-screening (WTP < S\$65,000). Screening enrolment at age range of 40-55 years was found to be cost-effective for an annual risk of pre-glaucoma progressing to glaucoma at 1.9%.

Conclusion: A hybrid Markov modelling framework for the comparison of screening vs. no screening for primary glaucoma suggests, a population-wide screening is cost-effective at age range from 40 to 55 years. Modelling using different annual risk scenarios from the pre-glaucoma stage may provide further insights.