TB or not TB

Kun-Woo R. Kim

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Instruction: PDF with necessary text response and figures along with your code

a) Considering every 5 years from age 0 to age 50 (i.e., age 0, 5, 10, 15, 20, etc.), what is the age at which a one-time screen will maximize life expectancy, and what is the life expectancy gain compared to no program?

Strategy	Life Years
No screening	11.5265
screening at age 0	11.5265
screening at age 5	11.5268
screening at age 10	11.5266
screening at age 15	11.5265
screening at age 20	11.5265
screening at age 25	11.5265

Having a one-time screen at age 5 maximizes life expectancy. Compared to no program, it increases life years by 0.0003

b) Assuming testing costs of $10 and treatment costs of $200, report the incremental cost-effectiveness of non-dominated strategies (assume no discounting, and a lifetime analytic horizon). For a WTP of $1000 per life-year (LY) saved, what is the optimal strategy based on the information given? (Note, it is also an option to have no program).

Strategy	Life Years	Costs	ICER
screening at age 15	11.5265	0.20	-
screening at age 0	11.5265	20.20	24155503.85
screening at age 5	11.5268	33.12	48308.63

For a WTP of $1000/LY saved, having a one-time screening at age 15 is the most optimal strategy.

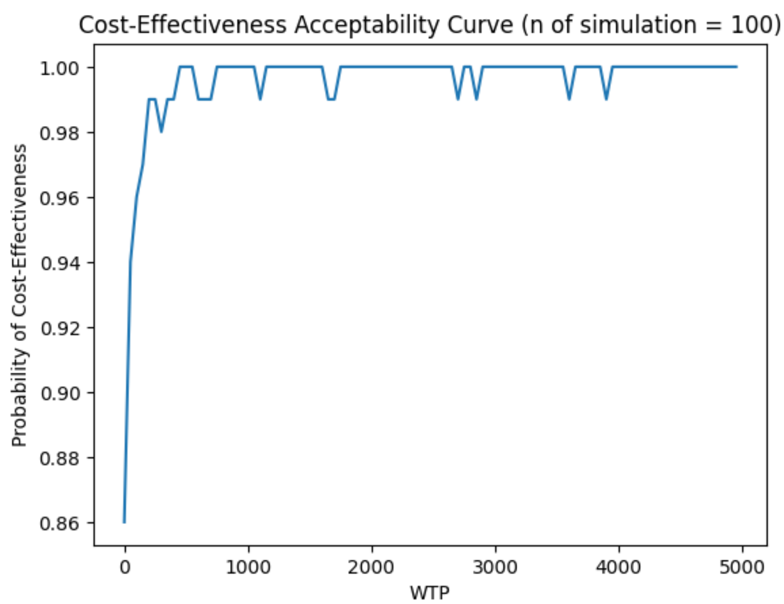
c) Revise your analysis to include uncertainty in the following variables (note that these priors have the same mean as the original point estimates). Based on these prior distributions, report a mean estimate and a 95% uncertainty interval for the life expectancy gain calculated in part (a). Does the mean equal the point estimate calculated in (a)? Why/why not?

Strategy	Life Years	Cost
No screening	11.5265, 95% CI: (11.5265, 11.5265)	0.1962, 95% CI: (0.1950, 0.1974)

screening at age 0	11.5265 (11.5265, 11.5265)	19.2363, 95% CI: (18.8003, 19.6723)
screening at age 5	11.5268, 95% CI: (11.5268, 11.5267)	32.8291, 95% CI: (32.4264, 33.2318)
screening at age 10	11.52655, 95% CI: (11.5265, 11.5266)	36.9828, 95% CI: (36.6335, 37.3321)
screening at age 15	11.5265, 95% CI: (11.5265, 11.5266)	0.1969, 95% CI: (0.1956, 0.1981)
screening at age 20	11.5265, 95% CI: (11.5265, 11.5265)	0.1962, 95% CI: (0.1949, 0.1974)
screening at age 25	11.5265, 95% CI: (11.5265, 11.5265)	0.1963, 95% CI: (0.1950, 0.1976)

Mean value equals the point estimate calculated in a). Parameters used for prior distributions have the same mean as the original point estimates. With the Law of Large Numbers, increasing the number of simulations can bring the sample values closer to the population value.

d) Report the uncertainty in your cost-effectiveness results as a cost-effectiveness acceptability curve. At a WTP of $1000 per LY saved, what is the probability that the strategy identified in (b) is optimal?



The strategy identified in (b) (having a one-time screening at age 15) has the probability of 99.7% of being cost effective at the WTP of $1000/LY with 1000 simulation runs.