Practical assignment cost-effectiveness acceptability frontier

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Aim

This assignment aims to familiarise you with the concept of the cost-effectiveness acceptability frontier (CEAF), by constructing one yourself, based on a fictious example. The aim of this assignment is to identify which of the following screening strategy is the most cost effective.

Instuctions

1. Download the folder `Practical_CEAF` from the Canvas page and save it on your computer
2. Open the `Assingment.R` file
3. Load the data for this assignment (`data_CEAF.rds`) using the readRDS() function
4. When loaded, the object `df_thx` should appear in your environment
5. When performing the assignment, please document your code (using R markdown for instance)
6. Please keep your answers for the discussion

`df_thx` object

This object contains 4 variables:

- Treatment = the integer identifying the screening strategy
- Name = the name of the screening strategy
- Costs = the total costs of the screening strategy
- QALYs = the total QALYs gained through the screening strategy

Assignment and questions

1. Create a cost-effectiveness plane for the outcomes of interventions 0-8
   1.a. Question: based on this graph, can you already tell which intervention is (extendedly) dominated?

2. Calculate the fully incremental ICERs of these screening strategies against each other
   2.a. *To do so, use the method described in the paper from Paulden (literature list). Using for loops may be required. You can also perform this exercise using a pen and a paper.*

3. Which interventions are dominated?

4. Which interventions are extendedly dominated?

5. Which strategies are on the cost-effectiveness acceptability frontier?

6. Which intervention is optimal if the WTP threshold is equal to €20,000/QALY?

7. Which intervention is optimal if the WTP threshold is equal to €40,000/QALY?

8. Which intervention is optimal if the WTP threshold is equal to €100,000/QALY?

9. At which WTP threshold would intervention 4 be the optimal intervention?

10. At which WTP threshold would intervention 7 be the optimal intervention?

11. Calculate the Net Monetary Benefit (NMB) for each intervention for a WTP threshold of €20,000/QALY. Which intervention has the highest NMB? Does this correspond with your answer to question 6?