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 fictive example. The aim of this assignment is to identify which of the following screening strategy is the most cost effective.

Required package

1. `rstudioapi`: for loading the data in case the working directory is not at the same location as the source file `Assignment_start_discounting.R` for performing the assignment

Instuctions

1. Download the `Assignment_start_CEAF.R` and `data_CEAF.rds` files from the Canvas page and save them in the same folder.

2. Open the `Assignment_start_CEAF.R` file. In this file, the instructions from below are copied and objects names are already define for you to perform the assignment and to structure your code.

3. Load the data for this assignment (`data_CEAF.rds`) using the readRDS() function, and assign it to an object called `df_thx`.

4. When performing the assignment, please document your code (using R markdown for instance)

5. Please keep your answers for the discussion

`df_thx` object

This object contains 4 variables and 9 observations (the strategies to compare):

- 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?