

Optimising Colorectal Cancer Screening with Decision Programming

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Background

- Colorectal cancer (CRC) is the second most common malignancy in both women and men in Finland
- In 2019, there were 3600 new cases and 1400 diseasespecific deaths and its incidence is increasing rapidly
- The regular cancer screening has been proved to be effective in reducing CRC incidence and mortality by detecting asymptomatic pre-cancer lesions and earlystage cancers





Background

- CRC screening is implemented with the feacal immunochemical test (FIT), which measures the hemoglobin level (blood) in the stool sample
- Programme pilot in volunteering municipalities began in 2019 and the programme became nationwide in 2022 in Finland
 - The screening is conducted every 2 years for 65-74 year-old men and women
 - The threshold value for the hemoglobin level in the sample is 25 μ g/g for both genders, regardless of age
 - Patients with higher values will be directed to further examinations (colonoscopy)







The aim of this study is to optimise the threshold value for feacal immunochemical testing used in CRC screening in Finland.





Limits

- Study population only includes patients who are eligible for screening e.g. 65-74 year olds
- Every age group will be analysed separately
- Genders will be analysed separately
- The FIT threshold will be presented as a discrete variable for easier calculations
 - Continuous variable may be implemented later





Methodology

- The decision programming model will be constructed to optimise the problem
 - The decision programming framework combines stochastic programming and decision analysis
 - Influence diagram can be formulated into a mixed integer linear programming (MILP) problem
- Model will be implemented using Julia language and DecisionProgramming.jl package





Methodology

• Influence diagram of the model







Schedule

- 2-3/2023, studying decision programming
- 4-5/2023, model formulation
- 5/2023, presentation of topic
- 5-6/2023, solving the model and analysing results
- 6-7/2023, writing thesis
- 6/2023, presentation of results
- 7/2023 finished thesis





References

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