Practicals Day 1 Morning Session

PhD course: Causal prediction for medical decision making

Exercise 1

Consider the CVD risk prediction tool for type 1 diabetes (Steno Diabetes Center Copenhagen): `https://steno.shinyapps.io/T1RiskEngine/`

Answer the following questions:

1. Who is eligible to use this calculator?
2. At what occasion can people use this calculator (i.e., what is time zero)?
3. How many predictor variables are used to predict the 5-year risk of CVD?
4. In what direction does the 5-year risk change when you change any of the predictor variables keeping the other predictor variables at a fixed value?

Think about and discuss the following with your nearest neighbors:

5. What possible applications does this medical risk prediction model have?
6. Which of the risk factors may change over time?
7. How old (relative to time zero) are the measurements of these risk factors allowed to be?
8. Which of the risk factors are modifiable?
9. Correspondingly what would be possible interventions?

10. Decision making (for versus against an intervention) could be based on comparing the predicted 5-year risk to a fixed threshold, e.g., 10%. How would one incorporate lower and upper limits for the predicted risks to guide a person's decision?

Answer the following questions regarding the statistical methods behind the risk engine by reading the section Statistical Analysis in the article and the model formula in the supplementary material (below Supplemental Table 3).
https://www.ahajournals.org/doi/full/10.1161/CIRCULATIONAHA.115.018844

11. How large was the sample size of the derivation cohort? How long was the follow-up? What is the interpretation of the probability 18.4%?

12. What variable selection methods were applied in the two steps of the analysis?

13. How many parameters were used to model the baseline hazard function in the final model formula?

14. Which results of step 1 of the analysis had an influence on the linear predictor?

15. How does the ignorance of competing risk of death without CVD affect the interpretation of the results?

16. Is the interpretation of the c-statistic clear?