Guidelines Take-home exam HEVAL5130 – Fall 2022

General requirements

A take-home exam gives the student an opportunity to show his/her analytical skills, and ability to synthesize information and marshal facts for a clearly articulated argument. Furthermore, a take-home exam tests if the student knows where and how to look up information and what to do with it. A take-home exam requires that references to literature and materials used in the text are correct and consistent.

Assessment guidelines

The report should be no more than 3000 words (not including tables, figures and reference list)

The grading will be based on two main categories (40%/60% valuation split):

1. Structure (understand what should be included in each section) **(40%)**
   – Follow the recommended structure
   – Content within each section was correct (For example, introduction did not include methods, results did not methods or theory, discussion did not present new results)
   – Comprehensive tables and figures with legends that include necessary information
   – Include reference category in tables for regression analysis
2. Content and interpretation (show understanding of the theory and application of methods) **(60%)**

The take-home exam will be assessed on the following guidelines:
- The take-home exam addresses the problem stated in a clear and consistence manner. Choices and delimitations made are clarified and substantiated, and the method chosen is presented, justified, and discussed.
- The application of methods meets scientific criteria (is methodologically correct).
- Discussion and analysis: Relevant empirical evidence is presented and critical discussed against the theoretical framework.
- The take-home exam should include reference to relevant peer-reviewed literature.
- Format: the take-home exam fulfill format requirements, is written in English and meets the academic standards with regard to style, structure and deepening of the subject.

What determines the grade?
- Structure and length of the take-home exam must meet the formal requirements;
- The application of methods must be methodologically sound;
- Concepts, theories and empirical knowledge are presented correctly, and used in the discussion of the problem stated;
- The student must be capable of arguing in a logical and clear manner;
- There must be originality and critical reflection: the student must be able to indicate what he or she has learned or what he or she would do differently in a next study (note: this is not a matter of personal experiences but of academic insights);

- The student uses an approved reference style, without any errors;
- Layout of exam in academic style (appropriated titled figures and tables, and use of complete sentences and paragraphs;
- Result tables should not be copied directly from output files from STATA or other statistical programs.

Special requirements and evaluation criteria:

All reports **MUST** include the following sections (sub-sections may vary by exam topic):
1. Introduction/Background
   o Motivate need for analysis (why is it important to conduct this specific analysis); define objective and the relevance (in addition, relevant background information that would be important for understanding of the home exam topic). Analysis methods (such as model structure) should not be described in this section.
   o Topic 1: The objective needed to integrate the student's selection approach but should include the motivation for a CEA and for stratified/sub-group analysis.
   o Topic 2: The objective needs to capture both evaluation of the cost-effectiveness of treatment A (CEA) as well assessment of the decision uncertainty and potential need for further research (VOI).
2. Theory (presentation of the theory relevant for the chosen topic; peer-reviewed papers and/or book citations required)
   o Methods should not be presented here (no sentences such as, "in this analysis I assumed…".
   o All methods/approaches used in the analysis should be explained in this section from a theoretical perspective.
   o Topics 1 and 2: Theory on economic evaluation (and ICERs) and decision modeling to estimate outcomes should also be included, including validation of decision-analytic models, and uncertainty in decision modeling (i.e., probabilistic analysis and preferably the other types of uncertainty should be mentioned).
   o Topic 1: Requires a presentation of survival- and hazard functions, censoring, time-dependency, functions could be defined non-parametric versus parametric. The student should include the importance of smoothed hazard plots, test for proportional hazard assumption, visual inspection and goodness of fit (AIC and BIC). Theory on heterogeneity and LUC (citing Coyle et al).
   o Topic 2: Explanation of Net Monetary Benefits. Theory on value of information, define and explain the theory (EVPI, popEVPI and EVPPI), distinguish between gold standard method to estimate EVPPI and the approximation method used in SAVI tool. Theory on how to scale to population level, and design of trials (e.g., grouping parameters for EVPPI).
3. Methods (depends on the topic)
   o Theory and results should not be in this section (equations should generally be in the theory section). Definitions of concepts should be in theory, not generally in methods.
   o Topics 1 and 2: In this section, it is required that the candidate describes the decision-analytic model including health states and all important assumptions (e.g., any important assumptions associated with transitions between health states, strategies considered, model outcomes), and presents the data used for

the analysis, defines the variables used in the analysis. All other assumptions made in the analysis must be specified, including time horizon, discount rate and perspective (analysis transparency). Could include impact inventory.

- o Topic 1: Describe pancreatic cancer dataset, and the variables used in the analysis. Analysis needed to convert monthly health outcomes from the model, i.e., monthly quality of life into years in order to estimate quality-adjusted life years; otherwise, the "ICER" for a yearly WTP will not be in the same units. Needs to describe approach to decision-analytic modeling validation. Adjust time horizon to be lifetime (not based on Treatment A only but improved Treatment B). Methods should include a very brief presentation of the model and the input parameters, including estimating of Weibull Model (testing for PHs, and AIC/BIC to determine inclusion of covariates). Adding Oslo as a covariate did not improve model fit, so one specification could have involved only age and stage. State assumptions about selecting model cohort ages for the sub-group anlaysis (e.g., age 60 and 70) that reflects the two different age-subgroups (in order to also capture changing background mortality).
- o Topic 2: Present input parameters and the assumed probability distributions. Provide all assumptions made in VOI analysis, including data used to inform input parameters, grouping of input parameters and justification, estimation of the population to benefit from research, discount rate, WTP, proposed research studies and assumed expected costs of research studies. The grouping of input parameters to perform EVPPI should be presented and justified in this section. It should include information about input parameters, assumed research/study design and expected costs (preferably a table outlining these assumptions).

4. Results (assessment includes review of calculations/coding in Excel/Do files)
- o Both topics: Clear presentation of the findings in a logical order, and according to questions asked in the home-exam (if statistical analysis/methods were defined in this section, it is a negative with regard to structure, but not to content).
- o Topic 1: Needed to adjust incident death calculations (upon which cost calculations were based on) for the new survival analysis estimation, rather than leaving the default constant transition probability (e.g., 'Model_Treatment_A' worksheet column L). Time-dependent survival was affecting both treatment groups; therefore, models needed to adjust both Treatment A and B for time-dependent stage- and age-specific survival. Cumulative number of cancer deaths should be presented as a cumulative risk, or the report needed to state their own assumption about cohort size. Model should have correctly incorporated sub-group indicator variables, and presented the groups for which Treatment B was considered cost-effective for the varying WTP thresholds. Selection of sub-group for PSA could be based on the subgroup with the ICER closest to the WTP threshold. PSA and CEAC/CEAF should be presented correctly.
- o Topic 2: Presentation of the deterministic and probabilistic results including: QALYs, costs, incremental QALYs, incremental costs, and the incremental cost-effectiveness ratio (ICER). Interpretation of the results assuming that your WTP is NOK 450 000 per QALY. If deterministic results differ from the probabilistic results, elaboration on why it can be the case and indicate and on whether the decision should be based on the deterministic or probabilistic results. Visualization of the CEAC and CEAF results and interpretation of these results. Interpretation of the population EVPI results, assuming that the

expected research costs are between NOK 10-100 million depending on the research study design, and that your WTP threshold is of NOK 450 000 per QALY. Interpretation of the population EVPI results assuming WTP threshold of NOK 150 000 per QALY. Interpretation of the population EVPPI results. Visualization of all VOI results and/or presentation in form of a table. Elaboration on whether it is possible to determine whether collecting additional evidence would be worthwhile or if the decision maker should make the decision based on the currently available evidence, and on what would be the next steps in the decision-making process. Elaboration on whether the decision maker should make an immediate decision or collect additional evidence and explain the next steps, such as EVSI and ENBS (briefly that EVSI and ENBS would be needed to determine whether further research is worthwhile). There should be no statements that further research is worthwhile based on pEVPI or pEVPPI alone, only that it is potentially worthwhile/might be worthwhile.

5. Discussion
   o Discuss the results, refer to other literature when relevant was a bonus, how general are the findings, etc. Limitations.
   o Topic 1 could have discussed ethical implications of LUCs based on age.
6. Conclusion
   o Should be in line with the objective, defined in the introduction of the home exam
7. References
   o Consistently referenced and styled
8. Appendix
   o Must include do file code (Topic 1) as an appendix, and completed Excel model (both topics) as the additional file.