

Mapping EORTC QLQ-C30 and QLQ-H&N35 scores onto EQ-5D-5L utility values in head and neck cancer

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Topic: Health Technology Assessment. Presentation format: PhD students/Young Research Fellow

Background Mapping is a useful tool to calculate patient-level utility values in studies that do not collect any generic preference-based quality of life measures. Over the last few years, several mapping functions have been developed from cancer-specific tools for deriving EuroQol (EQ-5D) utilities to be adopted in cost-effectiveness analyses using quality-adjusted life years. However, the published algorithms do not cover the full spectrum of malignancies and most use the 3-level version of EQ-5D and basic statistical techniques.

Objectives This study develops a set of functions mapping from the European Organisation for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire Core-30 (QLQ-C30) and Head and Neck-35 (QLQ-H&N35) onto the EuroQol 5-dimensions 5-levels (EQ-5D-5L) in head and neck cancer.

Methodology The available EQ-5D-5L country tariff sets (i.e. English, Dutch, Canadian, Uruguayan, Korean, Japanese, and Chinese) at the time of analyses are used to generate utility values from data collected over an ongoing clinical study (HETeCo; ClinicalTrials.gov Identifier: NCT02262221). Several regression techniques including the linear mixed-effects model, the random-effects Tobit model, and the adjusted limited dependent variable mixture model (ALDVMM) are applied to obtain mapping algorithms from QLQ-C30 and QLQ-H&N35 scales/items, separately. In the interest of

developing a parsimonious mapping, backward elimination with a significance level of 0.05 is used to select variables entering the final models, except for ALDVMM where some variables may be significant in one component and not in the other(s). The goodness-of-fit of each model is assessed through the Akaike information criterion (AIC)/Bayesian information criterion (BIC), the mean absolute error (MAE) and the root mean squared error (RMSE). Scatterplots of observed versus predicted values are also displayed to investigate how goodness-of-fit varies across the EQ-5D-5L utility distribution.

Main (expected) results From a sample of 97 patients attending follow-up clinics after curative treatment for HNC, 229 individual pairs of EQ-5D-5L and QLQ-C30/-H&N35 questionnaires are available by pooling data at different time points. Average EQ-5D-5L values range between 0.785 and 0.905 according to the tariff set used. Overall, the linear mixed model presents the highest goodness-of-fit. Among QLQ-C30 scales/items, global health status, physical functioning, pain, diarrhoea, and financial difficulties are most strongly associated with EQ-5D-5L utility. In models with QLQ-H&N35 scales/items, the variables most significantly affecting the utility value are pain, trouble with social contact, and felt ill; age and gender have no significant impact on the utility score. The developed algorithms enable the estimation of preference-based EQ-5D-5L utility values in head and neck cancer studies where only QLQ-C30/-H&N35 data are available. Overall, mapping from the general QLQ-C30 provides a better fit than using the cancer-specific QLQ-H&N35 module and can be extended to other cancer localizations. Further research is encouraged on this topic, as new tariff sets valuing EQ-5D-5L and sophisticated regression techniques for mapping are being rapidly developed.