Adaptation of a method for developing a preference-based measure from a descriptive health-related quality of life measure (HRQOL): a confirmatory versus exploratory approach for the cancer-specific QLQ-C30

Daniel S. J. Costa, Madeleine T. King, Psycho-oncology Co-operative Research Group (PoCoG), School of Psychology, Sydney, Australia; Neil K. Aaronson, Netherlands Cancer Institute, Amsterdam, The Netherlands; John E. Brazier, Health Economics and Decision Science, Sheffield, United Kingdom; David F. Cella, Department of Medical Social Sciences, Northwestern University, Chicago, IL, United States; Peter M. Fayers, Department of Public Health, Aberdeen Medical School, Aberdeen, United Kingdom; Julie S. Pallant, University of Melbourne, Shepparton, Australia: Stuart Peacock, Canadian Centre for Applied Research in Cancer Control, Vancouver, Canada; Simon Pickard, Department of Pharmacy Practice. University of Illinois at Chicago, Chicago, IL, United States; Donna Rowen, Health Economics and Decision Science, University of Sheffield, Sheffield, United Kingdom; Galina Velikova, St James's Institute of Oncology, Leeds, United Kingdom; Tracey Young, Health Economics and Decision Science, University of Sheffield, Sheffield, United Kingdom

Aims: Preference-based measures have been derived from various condition-specific descriptive HRQOL measures. A general 2-stage method has evolved: 1) an item from each domain of the HRQOL measure is selected to form a health state classification system (HSCS); 2) a sample of health states is valued and an algorithm derived for estimating the utility of all possible health states. Building on preliminary work with the cancer-specific QLQ-C30, the aim of this analysis was to further adapt the first stage, in particular to incorporate confirmatory rather than exploratory factor analysis (CFA, EFA).

Methods: Data were collected with the QLQ-C30v3 from 356 patients receiving radiotherapy for recurrent or metastatic cancer (various primary sites). The dimensional structure of the QLQ-C30 was tested with EFA and CFA, the latter based on a conceptual model (the established domain structure of the QLQ-C30: physical, role, emotional, social and cognitive functioning, plus several symptoms) and clinical judgment. The dimensions determined by each method were then subjected to statistical scrutiny, including Rasch analysis.

Results: CFA results generally supported the proposed conceptual model, with residual correlations suggesting minor adjustments (namely, introduction of two cross-loadings) to improve model fit (increment chi-squared(2) = 77.78, $p < .001$). Although EFA revealed a structure similar to the CFA, some items had loadings that were difficult to interpret. Further assessment of dimensionality with Rasch analysis aligned the EFA dimensions more closely with the CFA dimensions. Three items exhibited floor effects (>75% observation at lowest score), 6 exhibited misfit to the Rasch model (fit residual > 2.5), none exhibited disordered item response thresholds, 4 exhibited DIF by gender and cancer site, and 3 symptoms were considered relatively less clinically important than the remaining 9.

Conclusions: CFA is more appropriate than EFA in this case, given the well-established structure of the QLQ-C30 and its clinical relevance. Further, the confirmatory approach produced more interpretable results than the exploratory approach. Other aspects of the general method remain largely the same. The revised method will be applied to a large number of pooled data sets as part of the international and interdisciplinary multi-attribute utility instrument in cancer (MAUCa) project