VALUE IN HEALTH 19 (2016) 298–299

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EDITORIAL

Statistical Methods for the Analysis of Discrete-Choice Experiments: A Report of the ISPOR Conjoint Analysis Good Research Practices Task Force

The rapid growth in conjoint analyses in health applications attests to the value of this method for informing health choices [1,2]. From public health programs to regulatory decisions to the selection of clinical treatments, this methodology can provide powerful information on patient and public preferences and more closely align available choices with these expressed preferences. Preference measurement studies can inform the design of public health programs, regulatory considerations of risk-benefit trade-offs, and clinical choices relating to medications and treatments. The Centers for Disease Control and Prevention has commissioned a number of conjoint analyses to understand preferences for vaccinations because conjoint analysis allows for the inclusion of both treatment (vaccine) and administration (program) attributes. In the case of vaccines, understanding the trade-offs between vaccine-specific characteristics, such as vaccine efficacy or risk of adverse events, and administration-specific characteristics, such as travel time or type of provider, can provide critical information on how to define settings for vaccination programs that are designed to maximize uptake. For regulatory decisions, especially in the context of new drugs or devices, patients' values for trade-offs between the risks and benefits can help inform committees on the relative value of a new drug or device. For clinical interventions, information can be used to design health programs, such as the delivery of anesthesia for pediatric patients, again by incorporating the relative value of clinical attributes, level of shared decision making, and delivery attributes of the service [3]. Conjoint analysis has also been used in the development of decision aids for preference-sensitive decisions, such as the choice of treatment for newly diagnosed breast cancer patients to identify treatment regimens tailored to individual patient preferences.

The increasing number of publications using conjoint analysis has been accompanied by a plethora of estimation procedures [2]. The ISPOR Conjoint Analysis Statistical Analysis Good Research Practices Task Force makes an important contribution by providing guidance in the selection and reporting of alternative approaches for the analysis of data from one type of conjoint analysis study, discrete-choice experiments (DCEs). The report uses a simplified DCE to walk the reader through key elements of the analysis with clear examples of the data setup for dummy and effects coding as well as sample results using conditional logit, random-parameters logit, hierarchical Bayes, and latent class models. The material is presented in a clear and digestible format and will be an excellent and welcome addition for teaching methods of conjoint analysis. A major contribution of this task force report is the presentation of the ESTIMATE checklist, which provides a set of key questions for describing the rationale for the choice of the analytic method, description, and interpretation of results. Building on two previous task force reports, *Conjoint Analysis Applications in Health—A Checklist: A Report of the ISPOR Good Research Practices for Conjoint Analysis Task Force* and the *ISPOR Conjoint Analysis Experimental Design Task Force*, this report provides additional key guidance for the selection and execution of statistical analyses [4,5].

Given the wide range of potential consumers of conjoint analysis results, transparency in reporting is absolutely essential to ensure an understanding of the selected analytic approach and improve confidence in the presented results; this, in turn, will enhance their impact on real decision making. Key strengths of the task force report include the detailed presentation of the stylized example, an explanation of effects coding, and the detailed table summarizing advantages and limitations of alternative approaches. The only limitation of the task force report, and this is clearly acknowledged by the authors, is that the primary focus is on a single type of DCE, a two-alternative forced-choice DCE. Given the many examples of clinical or public health programs in which an opt-out option would not only be a feasible but a necessary and realistic alternative, the absence of an example with this design is a limitation. As new designs and formats are tested, new estimation approaches are also being developed and will continue to be introduced into the literature. The ESTIMATE checklist will provide a tool for ensuring comparison across many different types of methodologies.

This report focuses on DCEs, but it is worth noting that an alternative format, best-worst scaling, has been gaining ground in applications for health choices. In a best-worst scaling task, a respondent is asked to identify the attributes that they consider to be the "best" or "worst" in a list of available attributes or most and least important to a decision [6]. Best practices for the statistical analysis for best-worst scaling studies are still emerging. Because this method is especially attractive for decisions with more attributes than feasible for inclusion in a DCE, we would hope to look forward to a next report in this series that focuses on best practices for the conduct and analysis of best-worst scaling studies.

In summary, this most recent task force report from the ISPOR Conjoint Analysis series provides an extremely important tool for improving clarity and consistency in the reporting of statistical analyses for DCEs. This will be an important vehicle

for improving the usability of these studies for decision makers of all types: public health, regulatory, clinical, and, last but not least, patients and individuals themselves. The authors are to be commended for an important contribution to this series of task force articles providing guidance for the methodology of conjoint analysis.

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http://dx.doi.org/10.1016/j.jval.2016.05.002

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