

A Novel Framework for Conducting Meta-Analysis of Patient Preference Studies

Matteo Bracco⁽¹⁾, Emanuele Pietropaolo⁽¹⁾, Martina di Blasio⁽¹⁾, Ileana Baldi⁽²⁾, Alessia Visconti⁽¹⁾, Paola Berchiolla⁽¹⁾

 Matteo Braccio 0009-0001-2135-3070

(1) Center for Biostatistics, Epidemiology, and Public Health, Department of Clinical and Biological Science, University of Turin, Italy

(2) Department of Cardiac Thoracic Vascular Sciences and Public Health, University of Padua, Padua, Italy

CORRESPONDING AUTHOR: Matteo Bracco, Center for Biostatistics, Epidemiology, and Public Health, Department of Clinical and Biological Science, University of Turin, Italy. E-Mail: matteo.bracco@unito.it

INTRODUCTION

Information about patients' priorities and treatment preferences is essential to guide decision-making processes along medical product life cycles. Discrete choice experiments (DCEs) are one of the most common methods to elicit patient preferences. Through the use of a robust methodology rooted on random utility theory, DCEs estimate patients utility functions defined by a set of coefficients called Preference Weights (PWs). PWs are used to reconstruct complex preference patterns such as benefit-risk trade-offs and the relative importance of treatment attributes. DCEs are, however, expensive and time-consuming, highlighting the need for evidence synthesis via meta-analysis.

OBJECTIVES

Currently, meta-analytic approaches are limited to trade-offs parameters, as PWs estimated from different DCEs are not directly comparable due to methodological and design heterogeneity.

However, these require the identification of at least two trading attributes across pooled studies, hence limiting the possible therapeutic areas of application as well as the DCEs pool's size. Here we construct the first systematic framework to synthesize DCEs quantitative information at the higher level of PWs, addressing how to re-scale PWs from different DCEs to allow comparisons and aggregation.

METHODS

We develop a novel methodology stemming from network theory to rescale PWs across pooled DCEs. By anchoring

PWs through common attributes, we are able to define DCEs networks. Sampling spanning trees through an Markov-Chain MonteCarlo (MCMC) procedure, we can set common scales across PWs from different DCEs, hence producing a sample of re-scaled PWs.

RESULTS

From the sample or re-scaled PWs sets, we are able to produce flexible meta-analytic outputs as distribution of preference parameters. Importance rankings allow to create a comprehensive picture of patients priorities across pooled DCEs. Besides standard trade-offs parameters, our approach also allows constructing non-linear trade-off curves between two or multiple attributes, to better capture real patients' trade-off patterns.

CONCLUSIONS

Our framework represents a key step towards more robust and resource-efficient modelling of patients' preferences. The production of multiple aggregated preference parameters outputs defines a comprehensive picture of patients preferences and priorities across different therapeutic areas, to guide development of new pharmaceutical products and regulatory decision making processes to account for patients real needs.