Improved methods and actionable tools for enhancing HTA

Advancing knowledge and MCDA tools to assist HTA agencies in evaluating medicines on a common basis

Work Package 7, Task 2, Deliverable 7.2

Monica Oliveira (IST), Ana Vieira (IST), Klára Dimitrovová (IST), Aris Angelis (LSE and LSHTM), Panos Kanavos (LSE), Carlos Bana e Costa (IST)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 779312. The results presented reflect the author's views and not those of the European Commission.

Contents

WP7, Task 2, Deliverable 7.2 Executive Summary

Motivation and objectives

At its inception, IMPACT HTA WP7 aimed at structuring sound multi-criteria evaluation models within a simple and common, but flexible, framework that would incorporate and reflect the views and value systems of a wide range of decision-makers and stakeholders concerning the evaluation of medicines in the context of HTA. In addition, it would test the use of such methodological framework to build context-specific models for a set of alternative health care interventions through case studies in collaboration with national HTA agencies, through a combination of participatory processes (Delphi panels and decision conferences) involving relevant stakeholders, experts and decision-makers.

Based on these objectives, the specific objective of WP7, Task 2, was twofold: first, to design an MCDA value framework to assess new medicines within the context of HTA on a common basis; this framework would reflect what is important for HTA agency stakeholders and decision-makers; and, second, to define techniques and questioning protocols to enable the implementation of the framework in the assessment of new medicines. The interaction with HTA stakeholders was set to be conducted through collaborative value modelling, i.e. combining non-face-to-face Web-Delphi with face-to-face decision conferencing so as to engage HTA stakeholders in the development and testing of the framework.

WP7 Task 2, resulting in deliverable 7.2 (D7.2), research was led by IST and developed as a collaboration between IST and LSE team members. The output was organized through 4 interlinked research articles (RA), briefly outlined below.

Research Article 1: A systematic review of MCDA in HTA literature

Prior to commencing research on the framework, it was deemed important to analyse existing literature in the area of MCDA in HTA for two reasons: first, to understand the methodological quality of published studies, and, second, to learn about the challenges and limitations identified in previous studies. Accordingly, within Task 2 a comprehensive systematic literature review was undertaken that led to the following article “Multi-criteria decision analysis for health technology assessment: addressing methodological challenges to improve the state of the art” (authors: Mónica Oliveira (IST), Inês Mataloto (IST), Panos Kanavos (LSE); open access article, available from

https://link.springer.com/article/10.1007%2Fs10198-019-01052-3). This article was published in 2019 in the European Journal of Health Economics, with the following abstract:

Multi-criteria decision analysis for health technology assessment: addressing methodological challenges to improve the state of the art

By

Mónica Oliveira, Inês Mataloto, Panos Kanavos

Abstract

Background: Multi-criteria decision analysis (MCDA) concepts, models and tools have been used increasingly in health technology assessment (HTA), with several studies pointing out practical and theoretical issues related to its use. This study provides a critical review of published studies on MCDA in the context of HTA by assessing their methodological quality and summarising methodological challenges.

Methods: A systematic review was conducted to identify studies discussing, developing or reviewing the use of MCDA in HTA using aggregation approaches. Studies were classified according to publication time and type, country of study, technology type and study type. The PROACTIVE-S approach was constructed and used to analyse methodological quality. Challenges and limitations reported in eligible studies were collected and summarised; this was followed by a critical discussion on research requirements to address the identified challenges.

Results: 129 journal articles were eligible for review, 56% of which were published in 2015–2017; 42% focused on pharmaceuticals; 36, 26 and 18% reported model applications, issues regarding MCDA implementation analyses, and proposing frameworks, respectively. Poor compliance with good methodological practice (<25% complying studies) was found regarding behavioural analyses, discussion of model assumptions and uncertainties, modelling of value functions, and dealing with judgment inconsistencies. The five most reported challenges related to evidence and data synthesis; value system differences and participant selection issues; participant difficulties; methodological complexity and resource balance; and criteria and attributes modelling. A critical discussion on ways to address these challenges ensues.

Discussion and implications: Results highlight the need for advancement in robust methodologies, procedures and tools to improve the methodological quality of MCDA in HTA studies. Research pathways include developing new model features, good practice guidelines, technologies to enable participation and behavioural research.

The research work developed in Task 2 highly benefited from the insights and results of this literature review.

Research Article 2: A framework to assist the identification of HTA agency stakeholder groups

An initial attempt at analysing stakeholder involvement in medicines evaluation processes revealed that it was not clear from the literature which stakeholders and experts should be involved in HTA participatory processes and why. In order to address this, research was developed to design and test a new framework to provide a rationale and identify for a given country or context which stakeholders should be involved in HTA agency participatory processes.

This research led to the manuscript entitled "Understanding stakeholders' roles and involvement in national Health Technology Assessment agency evaluation processes: A new framework based on Critical Systems Heuristics" – authored by Ana Vieira (IST), Mónica Oliveira (IST), Aris Angelis (LSHTM and LSE), Panos Kanavos (LSE) and Carlos Bana e Costa (IST) – which has been submitted for publication. A summary of this study is shown below:

Understanding stakeholders' roles and involvement in national Health Technology Assessment agency evaluation processes: A new framework based on Critical Systems Heuristics

By

Ana Vieira, Mónica Oliveira, Aris Angelis, Panos Kanavos, Carlos Bana e Costa

Abstract

Objectives: To understand stakeholders' roles and involvement in national Health Technology Assessment (HTA) agency evaluation processes. Emphasis is placed on stakeholders' interests, concerns and values in the assessment of new medicines.

Methods: The original Critical Systems Heuristics (CSH) 12 questions were adapted for the HTA context to understand medicines evaluation processes by focusing on four basic aspects, notably, 'boundary issues' (motivation, control, knowledge and legitimacy), each sub-divided into three categories (social roles, specific concerns and key problems). The adapted CSH framework was then applied through an expert consultation with HTA agencies, using a questionnaire. Primary data were collected from

eleven study participants having a current or previous affiliation with six HTA agencies (NICE, SMC, HAS, TLV, IQWiG, AOTMiT).

Results: The application of the adapted CSH framework revealed two main types of findings. First, it identified seven stakeholder groups as being relevant in HTA new medicines evaluation processes: (a) patients and carers, (b) general population, (c) industry, (d) payers and policymakers, (e) HTA agencies, (f) healthcare professionals, and (g) scientific experts and methodologists. Second, a conceptual model enabled the understanding of the rationale for involving different stakeholder groups in such processes by analysing the motivation, power, knowledge and legitimacy aspects driving evaluation processes in HTA agencies.

Conclusions: The adapted CSH framework can be used for analysing the rationale of HTA organisations in terms of stakeholder engagement. It enables a reflection of current stakeholder roles within HTA evaluation processes while being aligned with the promotion of legitimacy, representativeness and accountability in medicines evaluation.

Information on HTA agency stakeholder groups generated in this study was used both in the consultation processes to inform the building of the HTA framework, as well as in the analysis of Web-Delphi processes.

Research Article 3: The IMPACT HTA value framework

The core of Task 2 was research undertaken to create a value framework that can be used to evaluate medicines from different disease specificities and with variable evidence and data, that would be of assistance to HTA agencies and healthcare decision-makers. From a literature standpoint, earlier research indicated that there were, indeed, difficulties in having such a framework, which respects context-specific deliberative processes (e.g., in the context of an HTA committee practice), therefore, the added value of this part of Task 2 was the development of a proposal for "The IMPACT-HTA multicriteria value framework to assist HTA agencies in the evaluation of new medicines on a common basis". The proposed the IMPACT HTA framework has the following key features:

1. It entails a general and novel multicriteria value frame model structure, which is adjusted for distinct therapeutic indications, and set by the HTA agency; and the HTA agency then sets guidelines for committees making evaluations on a structured but flexible format, accounting for the value aspects and their relevance for each therapeutic indication;

2. Uses collaborative value modelling to build and use the IMPACT HTA value framework: a large number of HTA agency stakeholders and experts are involved in setting the general value frame and adjusting the value frame for the distinct therapeutic indications; and then HTA agency committee members can work within a structured format and prior to the meeting, interact through a Web-Delphi process designed to collect the group judgments on difference of value between specific medicines in the relevant evaluation criteria, so as to build a MACBETH value model.

This work is reported in a manuscript entitled "The IMPACT-HTA multicriteria value framework to assist HTA agencies to evaluate new medicines on a common basis" authored by Mónica Oliveira (IST), Ana Vieira (IST), Klara Dimitrovová (IST), Aris Angelis (LSHTM, LSE), Panos Kanavos (LSE), Carlos Bana e Costa (IST)) that is currently being refined for submission to peer review, based on comments and feedback received. The abstract below, outlines the content of this work.

The IMPACT-HTA multicriteria value framework to assist HTA agencies to evaluate new medicines on a common basis

by

Monica Oliveira, Ana Vieira, Klara Dimitrovová, Aris Angelis, Panos Kanavos, Carlos Bana e Costa

Abstract

Health Technology Assessment (HTA) agencies make several decisions, which require the evaluation of new medicines on a common basis and the consideration of multiple criteria. These decisions are not always made using structured formats, nor are they supported by analytical tools. Multi-Criteria Decision Analysis (MCDA) is increasingly explored as an option to address these gaps, as it enables evaluations on a structured basis, involving stakeholders and experts, and considering multiple evaluation dimensions. However, MCDA models to evaluate health technologies available in the literature have mostly been developed for specific contexts, for instance, with specific model structures and sets of weights, and do not equip HTA agencies and the relevant committees with tools to evaluate distinct medicines on a structured basis and based on a common value frame.

In this study we outline the development and testing of the IMPACT HTA socio-technical framework to assist HTA agencies in valuing medicines across multiple dimensions of benefit, across diseases and on a common basis. Technically, the framework combines the (MCDA) MACBETH approach with

concepts of the swing weighting matrix such that (a) a common value frame is determined by the HTA agency for groups of therapeutic indications, and (b) committees can evaluate medicines on a structured basis departing from the value set defined by the agency. Socially, the framework is developed through a collaborative modelling approach in which key HTA stakeholders and members of evaluation committees are involved in a sequence of Delphi and decision conferencing processes, to (a) develop both the value frame for different therapeutic indications, and (b) determine the MACBETH value models for the evaluation of specific medicines.

From the perspective of an HTA agency, the framework entails two phases: first, through a consultation with relevant stakeholders and experts, a general (multicriteria) value frame structure is built, which is adjusted for features of distinct therapeutic indications; based on that, guidance is prepared for evaluation committees to enable evaluations on a structured but flexible format; and, second, evaluation committees make structured assessments with the MACBETH value measurement approach while considering the relevant value aspects set for the therapeutic indication under consideration.

The paper shows how phase 1 has been implemented and tested with the views of a large number of European HTA stakeholders and experts and depicts the views of experts of the INAMI HTA Belgium agency.

The IMPACT HTA framework was successfully tested in a sequence of enriching Delphi and decision conferencing processes, showing its potential for use, as well as contributing to the validation of the framework features. Out of the several Delphi processes carried out to consult HTA agency stakeholders, a significant amount of information was generated on (a) the aspects that should be considered in the evaluation of new medicines in general and for distinct therapeutic indications, and (b) obtaining qualitative insights from participants. Web-Delphi processes, used to generate this information and elicit participant preferences and insights, have shown to be an effective form to capture the views of multiple HTA stakeholders and experts. Statistical analysis carried out in one of the Web-Delphi processes has led to research work 4, outlined below.

Research Article 4: Exploring HTA stakeholder views on value aspects in the evaluation of new medicines

When developing the IMPACT HTA multicriteria value framework, six groups of HTA agency stakeholders and experts were invited to participate in six parallel Web-Delphi processes whose Delphi question was whether the participants considered a list of value aspects relevant for the evaluation of new medicines. In order to develop an understanding on the perspectives of HTA agencies' stakeholders and experts, a manuscript entitled "Exploring HTA stakeholders' views on value aspects in the evaluation of new medicines", authored by Klara Dimitrovová (IST), Ana Vieira (IST), Monica Oliveira (IST), Aris Angelis (LSHTM, LSE), Panos Kanavos LSE), Carlos Bana e Costa (IST)) was prepared and submitted for publication. The manuscript abstract is provided below:

Exploring HTA stakeholders' views on value aspects in the evaluation of new medicines

By

Klara Dimitrovová, Ana Vieira, Monica Oliveira, Aris Angelis, Panos Kanavos, Carlos Bana e Costa

Abstract

Introduction: Comprehensive stakeholder engagement has been recognised as being key for increasing legitimacy in Health Technology Assessment (HTA) decision processes, with different HTA agencies involving a range of stakeholders in distinct ways. This study collects and analyses the views of *all* relevant stakeholder groups on which value aspects should be considered in the evaluation of new medicines.

Methods: Six parallel two-round web-Delphi panels were conducted to elicit the views of six stakeholder groups and determine their level of agreement on 24 previously identified value aspects potentially relevant for the evaluation of new medicines, using a five-point Likert scale. The most relevant value aspects for each stakeholder group were identified based on the rating agreement percentages. Inter-rater agreement and heterogeneity in the views between the six stakeholder groups were also estimated.

Results: A total of 153 participants (78.5% response rate) completed the web-Delphi process. More than half of the 24 value aspects were considered relevant for the evaluation of new medicines. Inter-rater agreement (Gwet's coefficient) suggests a substantial agreement ($0.60 < K_\gamma \leq 0.80$) within participants of two stakeholder groups (i.e., payers & policy-makers and healthcare professionals) and a moderate agreement ($0.40 < K_\gamma \leq 0.60$) within participants of four stakeholder groups (i.e., industry,

HTA agencies, scientific experts, and patients & carers). Heterogeneity in opinions was found for 9 out of the 24 value aspects between stakeholder groups.

Conclusion: HTA agencies can gain valuable insights from stakeholder involvement; such insignts may be relevant in decision-making. Stakeholder involvement requires the adoption of methods to promote consensus in technology assessment. Results suggest that health technology assessments should consider a wide range of value aspects.

Key messages from this study, from the viewpoint of the framework, are as follows: first, there seems to be a consensus across HTA agency stakeholder groups regarding the relevance of a large number of value aspects in the evaluation of medicines (going beyond aspects currently made explicit by HTA agencies); and, second, consensus and divergencies between groups concerning some aspects were found (e.g., divergences between patients and carers on one hand and other stakeholders on the other, regarding some aspects), highlighting both similarities as well as differences in the perception of certain value aspects by individual stakeholders.

Key insights from WP7 Task 2

Task 2 has succeeded in proposing (a) a framework to help identify HTA agency stakeholders and their roles, and (b) the IMPACT HTA framework, which was tested in WP7 Task 3, thus validating the proposal in Task 2.

The process of building the IMPACT-HTA multicriteria value framework was designed to generate a sequence of participatory Delphi processes to collect the views of a large number of HTA-related stakeholders, including health care professionals, patients, regulators, payers, methodology experts, and industry, in collaboration with HTA agencies so as to reflect their value concerns. Web-Delphi processes were found to be successful in engaging a significant number of HTA stakeholders and experts from different geographies while promoting consensus (N=153).

The IMPACT HTA multicriteria value framework includes a set of protocols, techniques and methods enabling its implementation at the HTA agency level in Task 3, through a series of realistic and product-specific case studies.

The research developed as part of Task 2 was conscious of the costs and feasibility issues to HTA agencies of implementing the IMPACT HTA value framework. First, the framework is suitable for health care systems and HTA agencies who (a) recognise that several criteria and objectives (beyond the traditional health gains and costs) need to be considered in the evaluation of new medicines, and (b) perceive the need to align evaluation committees with the views of the HTA agency in considering these objectives, so as to avoid inconsistencies in assessments across committees that have been identified in HTA literature.

Second, in a first stage, implementing the IMPACT HTA value framework requires that HTA agencies engage their stakeholders and experts in a process of identifying which value aspects are relevant for distinct therapeutic indications (classifying value aspects by relevance). Although this requires time and cost (e.g. to design and implement Web-Delphis and workshops), this is needed so that both the agency and the respective evaluation committee(s) have better guidance on which evaluation aspects are essential, influential or complementary in the evaluation of medicines in distinct therapeutic contexts. In so doing, the HTA agency will define its value frame and this is a process that occurs once, with periodical adjustments.

Third, the IMPACT HTA value framework requires a change in (a) the way HTA agencies provide guidance to HTA evaluation committees and (b) the way new medicines' dossiers of evidence and data are gathered. Implementing the IMPACT HTA value framework requires that dossiers with information on medicines to be relayed to evaluation committees (prepared by the HTA agency or by the sponsor) will include more comprehensive evidence and data, including expert views. Although this potentially entails a cost related to evidence collection, evaluation committees will access a more comprehensive set of information than they currently do and, as a result, will be better informed.

Fourth, by following the IMPACT HTA value framework, evaluation committees will assess new technology submissions based on more comprehensive information, which include multiple value aspects; unavoidably, submission dossiers following the IMPACT HTA value framework may require more time to study and prior to the HTA evaluation committee meeting, committee members may need to interact and provide their views in a non-face to face process (e.g. a web-Delphi), which is an additional step compared with current practice. Nevertheless, adhering to such a structured and consensus-building format, the work of evaluation can be delivered more effectively and efficiently.

Fifth, given that it is not common for HTA agency members to have knowledge on MCDA, there may be a need for MCDA training. Agencies could either introduce a facilitator to the work of evaluation committees, or assign that role to a member of the evaluation committee.

Sixth, for an expedited implementation of the IMPACT HTA value framework, it would be important to make available a fit-for-purpose Web-Delphi platform and decision conferencing facilities so that any HTA agency and the respective evaluation committee can adapt the platform and involve the relevant stakeholders and experts in the HTA process.

Seventh, provisions of the IMPACT HTA value framework can be applied in the context of an EU approach to technology assessment to inform recommendations that could be of use to national stakeholders and HTA agencies operating at Member State level.

Hence, the IMPACT HTA value framework potentially changes the paradigm of assessing/appraising medical technologies and arriving at coverage recommendations. Although its adoption requires some initial investment in refining evaluation processes and guidance to evaluation committees, undertaking staff training, and installing new, but inexpensive, infrastructure, it offers a way for evaluation committees to work in more structured and efficient format.

Overall, the objectives set in the IMPACT HTA proposal for WP7, task 2, were met in full. Small adjustments took place given the flow and the results of the research.

Structure of the complete WP7 Deliverable 7.2 report

The complete version of WP7 Deliverable 7.2 (D7.2) report includes this executive summary and the following research papers:

- Part I: “Multi-criteria decision analysis for health technology assessment: addressing methodological challenges to improve the state of the art” (published article);
- Part II: “Understanding stakeholders’ roles and involvement in national Health Technology Assessment agency evaluation processes: A new framework based on Critical Systems Heuristics” (article submitted for publication);
- Part III: Draft article “The IMPACT-HTA multicriteria value framework to assist HTA agencies to evaluate new medicines on a common basis” (article in preparation for submission);

- Part IV: “Exploring HTA stakeholders' views on value aspects in the evaluation of new medicines” (article submitted for publication); and
- Part V: Key underlying materials produced in Task 2, which support the information reported in draft articles, and which can be used for further research.
    - Appendices:
        - Reports sent to participants of the first web-Delphi process with an international panel of HTA agency stakeholders and experts, composed by six parallel Web-Delphi processes from six HTA agency stakeholder and expert groups:
            - Report to payers and policy makers
            - Report to industry
            - Report to patients and carers
            - Report to scientific experts and methodologists
            - Report to health care professionals
            - Report to HTA agencies
        - Report sent to participants of the second web-Delphi with an international panel of HTA agency stakeholders and experts; and
        - Report summarising Web-Delphi results for INAMI on the relevance of value aspects for the evaluation of new medicines in five disease contexts.

The articles mentioned in this executive summary are included in draft format in the full deliverable D7.2 and are currently being considered for publication in the peer review literature (with the exception of the first article, which has already been published and has been made available on the project website). As the review process is ongoing, the full D7.2 will be made available on the IMPACT-HTA website (www.impact-hta.eu) in January 2023, once the peer review process has been completed and the papers have been published.