Roadmap to formulate a Multicriteria Decision Analysis (MCDA)

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Abstract

Multicriteria desicion analysis (MCDA) is a tool used to perform quantitative benefit-risks assessment (BRA) anlysis in drugs, procedures and devices in health. It allows comparisons in the same indication, that allows quantitative BRA balances, is useful to shows results in a transparency and consistency manner and also to communicate easily to the stakeholders.

MCDA has emerged as a promising tool in the decision context for drugs, although its use has been relegated to assess drugs in the context of medicine reimbursment and a few for benefits, risks and others assessments in medicines for a particular indication. One of the major advantages of MCDA is the inclusion of criterian weights that is "preferences". this roadmap to formulate a MCDA compile the recomendations of IMI-PROTECT and ISPOR task force to easy, explicit and transparent election of criteria included in a MCDA.

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Guidelines

IMI-PROTECT Benefit-Risk Group RECOMMENDATIONS REPORT; Recommendations for the methodology and visualisation techniques to be used in the assessment of benefit and risk of medicines

Multiple Criteria Decision Analysis for Health Care Decision Making—An Introduction: Report 1 of the ISPOR MCDA Emerging Good Practices Task Force

Multiple Criteria Decision Analysis for Health Care Decision Making—Emerging Good Practices: Report 2 of the ISPORMCDA Emerging Good Practices Task Force

Protocol

planning (focus on critical issues)

Step 1.

This stage encourages stakeholders to focus on critical issues related to benefit-risk assessment,

including the purpose and context of the assessment. Clear documentation of discussions allows future analyses and updates to utilise the same foundations.

evidence gathering, and data preparation (data sources and extracts)

Step 2.

This stage identifies data sources and extracts evidence relevant to the benefit-risk assessment, and may include aggregation of multiple sources of evidence, which may require the use of estimation techniques. It encourages the systematic handling of missing data and requires engagement of clinical, statistical, epidemiological, and database expertise.

analyses (quantification of magnitudes)

Step 3.

- **For the selection of definitive criteria to include in BRA (According to Belton and Stewart) is necessary to take the following consideration:**

1. ***Value relevance: it must be ensured that each criterion is relevant for and linked to the higher level goals.***
2. ***Understandability: it is important that there is a shared understanding of each criterion***
3. ***Measurability: MCDA implies some degree of measurement of the performance of each option against the specified criteria, and it must thus be possible to specify this in a consistent manner***
4. ***Non-redundancy: it must be addressed whether there is more than one criterion measuring the same factor. As a general rule, it is better to combine similar criteria in a single concept***
5. ***Judgmental independence: it must be assured that all criteria are mutually preference independent, i.e. the scores that are assigned on one criterion are unaffected by the scores on the other criteria. For example, although a correlation exists in the real world between the overall incidence of adverse effects and the incidence of serious adverse effects, a score can be given for the incidence of serious adverse effects without knowing the overall inci- dence of adverse effects***
6. ***Balancing completeness and conciseness: conciseness:it is important that all critical aspects of the problem are captured, but also that the model is concise, i.e. keeping the level of detail to the minimum required***
7. ***Operationality: associated with the need to achieve a balance between completeness and conciseness in terms of the criteria being selected, it is import- ant that the model is usable with reasonable effort.***

- The creation of a value tree with criteria finally included
- finally data are evaluated, quantifying the magnitudes of benefits and risks, and perhaps weighing and/or integrating favourable and unfavourable effects as required by a given approach.

explorations (robustness and sensitivity)

Step 4.

This stage assesses the robustness and sensitivity of the main results to various assumptions and sources of uncertainties, considers impact or added value of risk minimisation measures, and likely requires both statistical and clinical input.

Useful methodologies include ITC/MTC, utility survey techniques (DCE, AHP, Swing-weighting, MACBETH), PSM, and SMAA. Preferred visualisation techniques include the box, distribution, scatter, and forest/interval plots; tornado diagram; and most importantly, techniques that are interactive with the user.

conclusions (conclusion reached)

Step 5.

This is the point at which, after considering all the information in the previous four stages, a conclusion is reached. The results and consensus from the benefit-risk assessment are then explicitly communicated to a wider audience, providing a transparent audit trail of the whole assessment process and bringing all aspects together in a holistic fashion. The content of the communication and visualisation methods used should match the needs of the intended audience