



ZRx MCDM (Multiple-Criteria Decision Making) Tool

What is the Multiple-Criteria Decision Making?

- Multiple-criteria decision-making (MCDM) or multiple-criteria decision analysis (MCDA) comprises a set of methods, techniques or approaches that explicitly consider multiple criteria in decision-making environments and allow them to be combined in a single appraisal. Thus, MCDA allows the synthesis of multiple sources of information on the performance of particular programs or technologies against a set of established criteria. The criteria need to be weighted by decision-makers in terms of relative importance. Once this has been done MCDM methods can then be used to generate an overall estimate of value (or rank) for each of the alternatives being compared.
- In certain complex decision-making environments, such as with formulary listing decisions or project prioritization decisions, there is likely to be significant benefit in formally structuring the decision problem and explicitly defining and evaluating the multiple criteria (sometimes conflicting) that need to be weighted in making a particular decision. It can be challenging even for the most experienced decision-makers to systematically weigh options where significant amounts of information need to be considered. Structuring complex problems appropriately and considering multiple criteria explicitly is expected to lead to more informed, transparent and consistent decisions.
- The aim of MCDM methods is to help decision-makers explore the problem with which they are faced and eventually to decide on a preferred course of action. It is important to recognize that MCDA helps decision-makers to structure their exercise of judgement but the methods do not remove the need for judgement itself. In applying MCDM decision-makers will learn more about the objectives, preferences and values of their stakeholders i.e. those whose subjective judgements are required in relation to criteria, scores and weights for the analysis. There may be substantial disagreement within a group of stakeholders and so it may be necessary to analyze more than one formulation of a decision problem.

How can MCDM be applied in the health care?

Application of MCDM

Description



Health technology assessments

MCDA may be used for communicating product value to payers and clinicians, in particular in areas such as orphan drug indications or oncology where generating a cost per QALY that falls within a generally acceptable threshold can be difficult and where criteria other than cost-effectiveness may play a key role in value assessment and thus reimbursement decisions



Priority setting and resource allocation decisions

MCDA can be used by payer groups to support coverage decisions where budget restrictions are in place



Benefit risk assessments

MCDA may be used to support benefit risk assessment, for example by medicines licensing agencies such as the EMEA



Portfolio optimization

MCDA may be used by pharmaceutical or other companies or agencies to help prioritize pipeline or project investments



Prioritization of access to health care

MCDA may be used for prioritizing access to health care, for example in the case of patients awaiting elective surgery or transplantation

What are the key steps in applying MCDM?

↓ The key steps in applying MCDM are as follows :



1. Defining the decision problem

1. Decision-makers (typically some form of stakeholder decision-making group such as a formulary or portfolio committee) are initially required to define the decision problem, including the objectives of the analysis and the alternatives being compared.



2. Selecting the criteria for comparison

2. As a second step the criteria (or attributes) among which to compare the alternatives needs to be defined. The scientific literature as well as any specific local needs will influence the choice of criteria. Criteria should ideally capture all important factors related to the decision problem and should be as independent as possible.



3. Defining how the criteria are to be measured

3. The third step is to define how each of the criteria is to be measured. Options include direct rating methods such as with a visual analogue scale (VAS) or the use of indirect methods such as conjoint analysis. Scales used may be discrete (Likert scale) or continuous (e.g. price) and thus MCDA is able to incorporate both qualitative and quantitative information.



4. Measuring the performance

4. The fourth step involves measuring, on the scales selected, the performance of each of the alternatives against the criteria selected. In the case of health technology assessments this would usually be done first of all with reference to the scientific literature. In the absence of hard data it may require collecting the ratings of individual experts with surveys (and taking their aggregate mean scores, including distributions) or via achieving group consensus.

What are the key steps in applying MCDM?

↓ The key steps in applying MCDM are as follows:



5. Weighting the criteria and scoring the alternatives

5. As a fifth step each of the performance criteria needs to be weighted according to their relative importance to the overall decision (inter-criteria weightings). Again this may be done via collecting the ratings of individual stakeholders with surveys or via group consensus. The final weights are usually normalized so that they add up to 1.

The individual performance measurements also need to be weighed against the criteria selected (intra-criteria weightings) to generate some form of performance score. Performance measures are typically converted into scores on a common scale, often a 0-100 scale.



6. Aggregating the scores

6. In step 6, the scores need to be combined or aggregated - as per the different MCDA calculation methods - to generate an overall estimate of value (pay-off or aggregate score) or rank for each alternative.



7. Characterizing the uncertainty

7. Testing the sensitivity of the scores and weights to relevant variations is a key step in helping to interpret the overall findings.



8. Validating the findings

8. It is important to verify that the aggregate scores reflect the expectations of stakeholders.



9. Using the outputs to support a decision

9. Finally, the outputs of the analysis should be used to support the defined decision.

What is the ZRx MCDM tool?

- The ZRx MCDM tool has been developed as a highly flexible, user-friendly and powerful decision support tool. The tool has been designed to facilitate the application of local MCDM in health care and has been developed based on published and established MCDM methods.

What are the key steps in applying the ZRx MCDM tool?

- The key information relevant to the decision problem, including the defined alternatives, criteria and weightings needs to be manually added to the ZRx MCDM tool by the registered user. Once this has been done various analyses can easily be generated as output.

How can I purchase a ZRx MCDM subscription?

- ZRx Outcomes Research Inc. aims to sell an annual subscription to the ZRx MCDM tool. The subscription entitles purchasers to updates of the tool, when further improvements or new functionalities have been added. Furthermore a subscription entitles purchasers to access to training and helpdesk facilities when needed. A single subscription allows for up to four individual users. Currently, access to the ZRx MCDM tool is online only.

How can ZRx Outcomes Research Inc. further support me in the use of the ZRx MCDM tool?

- In addition to supporting the software subscription, ZRx Outcomes Research Inc. is able to offer professional advice to those interested in applying MCDA methods across all stages of the MCDM process. This includes problem definition and criteria measurement through to communication and dissemination of the findings of the evaluation.

MCDM ISPOR Taskforce

- ➔ The use of MCDA in health care is steadily increasing. As a consequence, an ISPOR Task Force - MULTI-CRITERIA DECISION ANALYSIS IN HEALTH CARE DECISION MAKING EMERGING GOOD PRACTICES TASK FORCE – was established in 2014 and is due to report in early 2016 their guidance on the use of MCDA in health care. Draft recommendations are available for downloading at: <http://www.ispor.org/TaskForces/Multi-Criteria-Decision-Analysis-GRP.asp>

How can I obtain further information?


- ➔ Additional information about the ZRx MCDM tool and the application of MCDM in health care can be obtained from:

Aleksandra Stojanović, MSc

 +1 (647) 272-0170

Email: aleksandra@outcomesresearch.ca

Prof. Vladimir Zah, DPhil, ACIM, CPIAPD

 +1 (416) 953-4427

Email: vzah@outcomesresearch.ca