IP9: Multi-Criteria Decision Analysis (MCDA) in Latin America

Moderator

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Latin America HTA & Reimbursement Policy Lead
Roche Pharma

Multi-Criteria Decision Analysis (MCDA) in Latin America

MCDA

- decision-making tool with increasing use in the health care sector and HTA
- explicit approaches involving multiple criteria and stakeholders
- improvement of quality of the decision-making process
- ISPOR Task Force
- In LA increasing adoption, from specific projects up to HTA bodies and regional HTA networks
MCDA in LA

<table>
<thead>
<tr>
<th>Country</th>
<th>Implementation Programs by Stakeholders</th>
<th>Source</th>
</tr>
</thead>
</table>
| Brazil        | a. MCDA proposal for rare disease, Interferon;  
b. MCDA used for hospital investment, RJ Uni. Hospital | Boto et al., 2015       |
| Argentina     | Incorporation of MCDA into the JUNAR Project, Ministry of Health                                      | Prada-Broner, 2015      |
| Colombia      | Pilot completed in 2013 and MCDA implemented for healthcare prioritization, ETS                       | Jarrahi, 2013           |
| Chile         | Utilization of MCDA is considering tender offers, University of Chile Hospital                         | "Informe," 2014        |
| Dominican Republic | Seeking insight from external consultants, Ministry of Public Health                               | Espinosa, 2015          |
| Ecuador       | Prioritization process for HTA utilizing MCDA recommended, Ministry of Public Health                 | Sotomayor et al., 2015  |

Deliberative MCDA for LA

Utilization of Multiple-Criteria Decision Analysis (MCDA) to Support Healthcare Decision Making

FIFARMA, 2016

Key Points for Decision Makers
MCDA is a decision-making tool with increasing use in the healthcare sector, including HTA (Health Technology Assessment). By using multiple criteria in a comprehensive, structured and explicit manner, MCDA fosters a transparent, participative, consistent and legitimate decision-making process. A deliberative (partial) MCDA may be a more pragmatic, agile approach, especially when newly implemented.

Deliberative MCDA

1. Define the objectives: Identify type of decision, alternatives, and relevant stakeholders.
2. Select the criteria: Influenced by scientific literature and specific local needs.
3. Measure the alternatives’ performance: Options must be able to incorporate qualitative and quantitative information, “performance matrix” to summarize.
4. Score options and aggregate scores: Scoring helps produce an overall estimate of value pay-off for each alternative.
5. Apply scores and weights to rank alternatives: Multiply the alternative scores on the criteria by the weights and sum to get the total scores.
7. Validate and interpret results: Interpret outputs and align with decision maker priorities to support decision making.

Table 4: MCDA implementation considerations. Deliberative MCDA highlighted.

Source: FIFARMA MCDA-position paper, 2016
Deliberative MCDA
Opportunities in LA

HTA

- Multiple criteria: Holistic approach
- Multiple stakeholders: Participative process

Multi-Criteria Decision Analysis (MCDA)
in Latin America

MCDA for HTA

- Laura Murta
- Martina Garau
- Jaime Caro

Project Manager
Principal Economist
Chief Scientist
McGill University Professor
MCDA

- MCDA as an umbrella term to describe a collection of formal approaches which seek to take explicit account of multiple criteria in helping individuals or groups explore decisions that matter.
  - A variety of methods (ELECTRE, MAUT, AHP/ANP, MACBETH, TODIM, PROMETHEE, ...)

- Four different *problématiques*:
  - Choice
  - Sorting
  - Ranking
  - Description

- Why MCDA?

Source: Valerie Belton & Theodor J Stewart, 2002.
MCDA case study - Medical device for intermittent catheterization in Brazil

- Objectives:
  - Primary: To assess hydrophilic coated catheter and uncoated PVC catheter use for intermittent catheterization in Brazilian patients with urinary retention due to spinal cord injury, from the perspective of users and medical experts using a MCDA model.

- Methodology:
  1. Definition of the decision context:
  2. Selection and structuring criteria
  3. Scoring Treatment Performance
  4. Criteria weighting
  5. Overall evaluation
  6. Sensitivity analysis
MCDA case study - Medical device for intermittent catheterization in Brazil

- Methodology:
  1. Definition of the decision context:
  2. Selection and structuring criteria:
     - Choice problema
tique.
     - Decision makers: CONITEC or State Secretaries of Health.
     - Decision agents: Medical experts (n=5) and users (n=15).
  3. Scoring Treatment Performance
  4. Criteria weighting
  5. Overall evaluation
  6. Sensitivity analysis

MCDA case study - Medical device for intermittent catheterization in Brazil

- Methodology:
  1. Definition of the decision context:
  2. Selection and structuring criteria
     - Literature review.
  3. Scoring Treatment Performance
  4. Criteria weighting
  5. Overall evaluation
  6. Sensitivity analysis
MCDA case study - Medical device for intermittent catheterization in Brazil

- **Methodology:**
  1. Definition of the decision context:
  2. Selection and structuring criteria

3. **Scoring Treatment Performance**
   - Direct rating (Likert scoring scale: 1 to 7).

4. **Criteria weighting**
   - Point allocation (100 points).

5. Overall evaluation

6. Sensitivity analysis

MCDA case study - Medical device for intermittent catheterization in Brazil

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MCDA case study - Medical device for intermittent catheterization in Brazil

- **Methodology:**
  
  1. Definition of the decision context:
  
  2. Selection and structuring criteria
  
  3. Scoring Treatment Performance
  
  4. Criteria weighting
  
  5. Overall evaluation
  
  6. Sensitivity analysis
     - Additive value function (max: 700 points)

    - Univariate deterministic sensitivity analysis.

    Sensitivity analysis
## Results:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Paraplegic patients</th>
<th>Quadriplegic patients</th>
<th>Experts</th>
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</thead>
<tbody>
<tr>
<td>Performing catheterization</td>
<td>6.5</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>UTI</td>
<td>50</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Comfort</td>
<td>12.5</td>
<td>15</td>
<td>15</td>
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<tr>
<td>Safety</td>
<td>8.5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Preparation</td>
<td>12.5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Learning</td>
<td>4</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Hematuria</td>
<td>5</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Innovation</td>
<td>1</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
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</table>

UTI: urinary tract infection
### MCDA case study - Medical device for intermittent catheterization in Brazil

#### Results (paraplegic patients):

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
<th>Hydrophilic coated catheter</th>
<th>Uncoated PVC catheter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Score</td>
<td>Weighted score</td>
</tr>
<tr>
<td>Performing catheterization</td>
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<td>6</td>
<td>39</td>
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<td>250</td>
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<tr>
<td>Comfort</td>
<td>12.5</td>
<td>6</td>
<td>75</td>
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<td>25.5</td>
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<td>24</td>
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</tbody>
</table>

UTI: urinary tract infection

### MCDA case study - Medical device for intermittent catheterization in Brazil

#### Results (quadriplegic patients):

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
<th>Hydrophilic coated catheter</th>
<th>Uncoated PVC catheter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Score</td>
<td>Weighted score</td>
</tr>
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<td>Comfort</td>
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<td>7</td>
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<td>6</td>
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<tr>
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</table>

UTI: urinary tract infection
MCDA case study - Medical device for intermittent catheterization in Brazil

▪ Results (experts):

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weights</th>
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<td>7</td>
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<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Innovation</td>
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<td>6</td>
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<tr>
<td>Total</td>
<td>100</td>
<td>535</td>
<td>455</td>
</tr>
</tbody>
</table>

UTI: urinary tract infection

Concluding remarks

▪ Transparent decisions.
▪ Multiple criteria and multiple decision agents/decision makers.
▪ Applying MCDA: a complementary tool for the HTA process.
  ➢ an aid to decision making.
▪ Study limitations.
▪ Use in specific diseases and technologies (e.g. rare diseases and orphan drugs).
▪ How to integrate different methodologies within the MCDA?
MCDA in HTA: current uses, opportunities and challenges

Martina Garau
Principal Economist
Office of Health Economics

Agenda

- Why do we need MCDA in HTA?
- How is MCDA being used in HTA?
  - Examples in Europe
- Future of MCDA in HTA
  - What are the key opportunities and challenges?
- Conclusions
Introduction

- Many countries have /are developing collectively-funded health care systems to ensure universal coverage and access to health care
- HTA can be used to allocate health care budgets efficiently
- Efficiency = the allocation of resources which maximises the achievement of aims
- Fundamental questions: what are the aims? What are we maximising?

Is there a role for MCDA in HTA?

- Health care systems face multiple objectives
- HTA systems vary in how explicit and consistent they consider them
- Policy initiatives tackling this:
  - value based pricing proposals in the UK
  - increasing interest in ‘value frameworks’ in the US
- Increasing interest in stakeholders’ (e.g. patients) involvement in HTA
  - How can stakeholders views be taken into account and weighed up against other types of evidence?
Why use MCDA to structure deliberative HTA processes?

• Weighing up complex information is cognitively demanding
  • Literature shows that individuals are subject to various biases
  • Deliberative processes are influenced by group dynamics

→ “the preferred options identified by MCDA are likely to out-perform the use of intuitive judgement alone” (Devlin and Sussex, 2011)

• Transparency and accountability are enhanced by being explicit about criteria and the trade offs between them

Landscape of MCDA applications in EU

<table>
<thead>
<tr>
<th>Country</th>
<th>Decision maker</th>
<th>Local or national?</th>
<th>Systematically applied or pilot?</th>
<th>MCDA method</th>
<th>Stakeholders involved</th>
<th>Relevant publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>Drug Reimbursement Committee (DRC)</td>
<td>National</td>
<td>Meant to be applied formally from 2016</td>
<td>Discrete choice survey</td>
<td>General public</td>
<td>Castro et al. (2017)</td>
</tr>
<tr>
<td>Germany</td>
<td>HTA (IQWiG)</td>
<td>National</td>
<td>Two pilots</td>
<td>DCE and AHP</td>
<td>Patients</td>
<td>Danner et al., 2011 Thokata et al., 2016</td>
</tr>
<tr>
<td>Hungary</td>
<td>Health care financing agency (OEP) and HTA body (GYMESZI)</td>
<td>Formally introduced in 2010</td>
<td>Ad-hoc value framework and point system</td>
<td>Decision makers</td>
<td>Endrei and Agoston (2014)</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>Payer</td>
<td>Local, Lombardia Region</td>
<td>Systematically applied</td>
<td>EVIDEM</td>
<td>Decision makers</td>
<td>Radaelli et al. (2014) Castro et al. (2017)</td>
</tr>
<tr>
<td>Spain</td>
<td>Payer</td>
<td>Catalonia region</td>
<td>Pilot</td>
<td>EVIDEM</td>
<td>Not stated</td>
<td>Gilabert-Perramon (2016)</td>
</tr>
</tbody>
</table>
MCDA in Italian region Lombardia

• For the implementation of new health technologies, there is a system combining elements of the EUnetHTA Core model (for the assessment) and of an MCDA approach (EVIDEM) as a decision-making aid

• The MCDA framework includes 9 broad dimensions and 20 criteria, including disease-, treatment-, financial- and social-related aspects

• This approach has been deemed successful and now applied systematically

Growing interest in MCDA in HTA but resistance still exists

- Many examples of one-off uses or pilots
  However..
- HTA organisations may have some discomfort with a requirement to be fully explicit about the basis for its decisions
- Fundamental misunderstandings that MCDA replaces deliberation, rather than structuring it
- The cost per QALY system is practical and well accepted; moving away from it causes nervousness
- Important methodological challenges to work through specifically in relation to use of MCDA in HTA
Opportunities | Challenges | Unresolved HTA issues
--- | --- | ---
Established HTA systems to increase their accountability - “show the quality and rigor of its work to others” (Walker, 2016) | Balance between deliberation and more structured approaches - avoid asking committees “to rubber-stamp” decisions (Walker, 2016) | How is the budget constraint reflected in the process? What does the threshold mean? (Garau and Devlin, 2017)
Countries developing new HTA systems to avoid issues/limitations of existing systems | Benefits, in terms of improved decision making, vs cost of implementing any given approach - would that minimise “wrong” decisions? | Whose value to derive criteria and weights remains a normative question
Align objectives across health care decision makers (eg budget holders and HTA bodies) | Reconciling divergent views of multiple stakeholders | How to deal with uncertainty?

Concluding remarks

- MCDA can offer a coherent/unifying framework for healthcare decision making
- MCDA does not aim to replace the judgement of HTA committees – but to help committees exercise judgements in an explicit way
- What specific approaches are best will depend on the characteristics of the health care system – ‘one size does not fit all’
- Consideration of cost and opportunity cost in a systematic way remains a methodological challenge
- Need to move beyond tendency of current pilots to focus on feasibility (‘can we do it?’) to wider questions (‘do decision makers find it acceptable? What would ‘success’ look like?’)
- Partial use of MCDA may still improve decision making processes
References


MCDA: Challenges in applying it to HTA

J. Jaime Caro
Professor of Medicine and Epidemiology & Biostatistics, McGill University, Montreal
Chief Scientist, Evidera, Boston
General challenges

• Decisions are recurrent
  – Across numerous therapeutic areas
• We don’t seek a winner

• What do we do with costs?
• Weights are not independent.
Decisions are recurrent

Stability

Across many therapeutic areas

Possibility of cure

HCV
Thalassemia beta
**Highly effective but not curative**
Cystic fibrosis
HIV
**Symptom relief only**
Ebola, Dengue
Anesthesia
We don’t seek a winner

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Range</th>
<th>Weight</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficacy</td>
<td>-25:100</td>
<td>40%</td>
<td>-10</td>
<td>40</td>
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<tr>
<td>Safety</td>
<td>-25:100</td>
<td>10%</td>
<td>-2.5</td>
<td>10</td>
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<tr>
<td>Severity</td>
<td>-100:100</td>
<td>12%</td>
<td>-12</td>
<td>12</td>
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<tr>
<td>Unmet need</td>
<td>0:100</td>
<td>30%</td>
<td>0</td>
<td>30</td>
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<tr>
<td>Other</td>
<td>0:100</td>
<td>8%</td>
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</table>

What do we do with costs?

<table>
<thead>
<tr>
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### Weights are not independent

<table>
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<tr>
<th>Criterion</th>
<th>Range</th>
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<tr>
<td>Other</td>
<td>0</td>
<td>8%</td>
<td>0</td>
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</table>

The weight for a criterion may depend on performance on others.

### Use “costs” as the weight?

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<thead>
<tr>
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<th>Scale</th>
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<tr>
<td>Need$^‡$</td>
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<tr>
<td>Others$^♯$</td>
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| Total     | 0     | +100 |     |     |

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$108,400
Conclusion

- MCDA is an appealing technique for HTA
- But, it presents some special challenges
  - Decisions are recurrent
  - Across numerous therapeutic areas
  - We don’t seek a winner
  - Weights are not independent
  - What do we do with costs?
- Not a reason to abandon it but rather to increase efforts to meet the challenges.

Multi-Criteria Decision Analysis (MCDA) in Latin America

Panelists

Laura Murta  Martina Garau  Jaime Caro

Deliberation & Judgement in place