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

Moderator

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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

Country	Implementation Progress by Stakeholders	Source
Brazil	a. MCDA proposal for rare disease, Interfarma b. MCDA used for hospital investment, RJ Uni. Hospital	Brito et al, 2015 Nobre et al, 1999
Argentina	Incorporation of MCDA into the SUMAR Project, Ministry of Health	Pichon-Riviere, 2015
Colombia	Pilot completed in 2013 and MCDA implemented for healthcare prioritization, IETS	Jaramillo, 2013
Chile	Utilization of MCDA in considering tender offers, University of Chile Hospital	"Informe," 2014
Dominican Republic	Seeking insight from external consultants, Ministry of Public Health	Espinoza, 2015
Ecuador	Prioritization process for HTA utilizing MCDA recommended, Ministry of Public Health	Sotomayer et al, 2015

Deliberative MCDA for LA

Utilization of Multiple-Criteria Decision Analysis (*MCDA*) to Support Healthcare Decision Making
FIFARMA, 2016

FIFARMA

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[2] (partial) MCDA may be a more pragmatic, agile approach, especially when newly implemented.

Steps to Implementation	Description	
Define the objectives	**Identify type of decision, alternatives, and relevant stakeholders**	**Deliberative MCDA**
Select the criteria	**Influenced by scientific literature and specific local needs**	
Measure the alternative's performance	**Options must be able to incorporate qualitative and quantitative information. "performance matrix" to summarize**	
Score options and aggregate scores	Scoring helps produce an overall estimate of value pay-off for each alternative	
Apply scores and weights to rank alternatives	Multiply the alternatives' scores on the criteria by the weights and sum to get the total scores	
Explore and analyze uncertainty	Perform a scenario or sensitivity analysis	
Validate and interpret finds	Interpret outputs and align with decision maker priorities to support decision making	

Source: FIFARMA MCDA position paper, 2016

Table 4: MCDA implementation considerations. Deliberative MCDA highlighted

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

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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 *problematiques:*

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.

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**

MCDA case study - Medical device for intermittent catheterization in Brazil

- **Methodology:**

1. **Definition of the decision context:**
2. Selec
3. Scori
4. Crite
5. Overall evaluation
6. Sensitivity analysis

-**Choice *problematique***.
-**Decision makers:** CONITEC or State Secretaries of Health.
-**Decision agents:** Medical experts (n=5) and users (n=15).

15

MCDA case study - Medical device for intermittent catheterization in Brazil

- **Methodology:**

1. Definition of the decision context:
2. **Selection and structuring criteria**
3. Scori
4. Criteria weighting
5. Overall evaluation
6. Sensitivity analysis

- Literature review.

16

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. Crite
5. Overall evaluation
6. Sensitivity analysis

- Direct rating (Likert scoring scale: 1 to 7).

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. Overa
6. Sensitivity analysis

- Point allocation (100 points).

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. Sensi

- Additive value function (max: 700 points).

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. Overal

- Univariate deterministic sensitivity analysis.

6. **Sensitivity analysis**

MCDA case study - Medical device for intermittent catheterization in Brazil

- **Results:**

Criteria	Paraplegic patients	Quadriplegic patients	Experts
Performing catheterization	6.5	15	25
UTI	50	25	20
Comfort	12.5	15	15
Safety	8.5	10	10
Preparation	12.5	10	10
Learning	4	5	10
Hematuria	5	10	5
Innovation	1	10	5
Total	**100**	**100**	**100**

UTI: urinary tract infection

21

MCDA case study - Medical device for intermittent catheterization in Brazil

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Total	**100**	**100**	**100**

UTI: urinary tract infection

22

MCDA case study - Medical device for intermittent catheterization in Brazil

- **Results (paraplegic patients):**

Criteria	Weights	Hydrophilic coated catheter		Uncoated PVC catheter	
		Score	Weighted score	Score	Weighted score
Performing catheterization	6.5	6	39	5	32.5
UTI	50	5	250	4	200
Comfort	12.5	6	75	5	62.5
Safety	8.5	3	25.5	4	34
Preparation	12.5	6	75	5	62.5
Learning	4	6	24	5	20
Hematuria	5	4	20	2	10
Innovation	1	7	7	4	4
Total	**100**		**515.5**		**425.5**

UTI: urinary tract infection

MCDA case study - Medical device for intermittent catheterization in Brazil

- **Results (quadriplegic patients):**

Criteria	Weights	Hydrophilic coated catheter		Uncoated PVC catheter	
		Score	Weighted score	Score	Weighted score
Performing catheterization	15	6	90	4	60
UTI	25	4	100	1	25
Comfort	15	7	105	6	90
Safety	10	3	30	4	40
Preparation	10	6	60	5	50
Learning	5	6	30	6	30
Hematuria	10	4	40	3	30
Innovation	10	7	70	3	30
Total	**100**		**525**		**355**

UTI: urinary tract infection

MCDA case study - Medical device for intermittent catheterization in Brazil

- **Results (experts):**

Criteria	Weights	Hydrophilic coated catheter		Uncoated PVC catheter	
		Score	Weighted score	Score	Weighted score
Performing catheterization	25	7	175	6	150
UTI	20	3	60	1	20
Comfort	15	6	90	6	90
Safety	10	4	40	5	50
Preparation	10	6	60	5	50
Learning	10	6	60	6	60
Hematuria	5	4	20	4	20
Innovation	5	6	30	3	15
Total	**100**		**535**		**455**

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?

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?

29

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?

30

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

Country	Decision maker	Local or national?	Systematically applied or pilot?	MCDA method	Stakeholders involved	Relevant publication
Belgium	Drug Reimbursement Committee (DRC)	National	Meant to be applied formally from 2016	Discrete choice survey	General public	Castro et al. (2017)
England	NHS England for specialised commissioning	National	Methods paper published in Dec 2016	Simple framework with criteria and scoring system	Decision makers (via Committee members)	NHSE (2016)
Germany	HTA (IQWiG)	National	Two pilots	DCE and AHP	Patients	Danner et al., 2011 Thokala et al., 2016
Hungary	Health care financing agency (OEP) and HTA body (GYMESZI)		Formally introduced in 2010	Ad-hoc value framework and point system	Decision makers	Endrei and Agoston (2014)
Italy	Payer	Local, Lombardia Region	Systematically applied	EVIDEM	Decision makers	Radaelli et al. (2014) Castro et al. (2017)
Spain	Payer	Catalonia region	Pilot	EVIDEM	*Not stated*	Gilabert-Perramon (2016)

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

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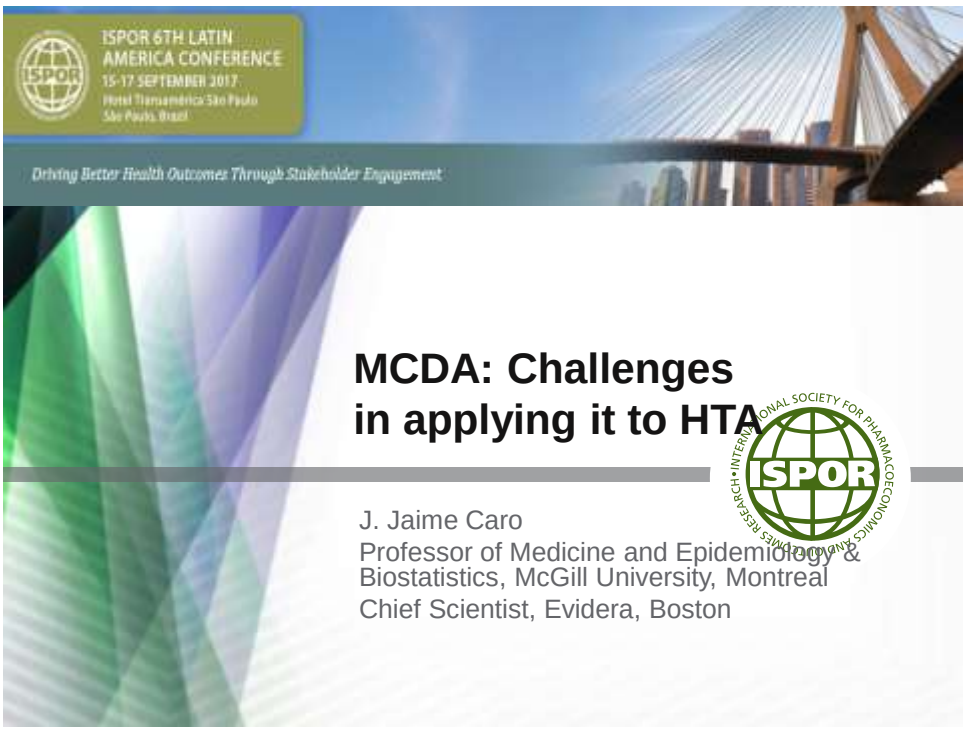
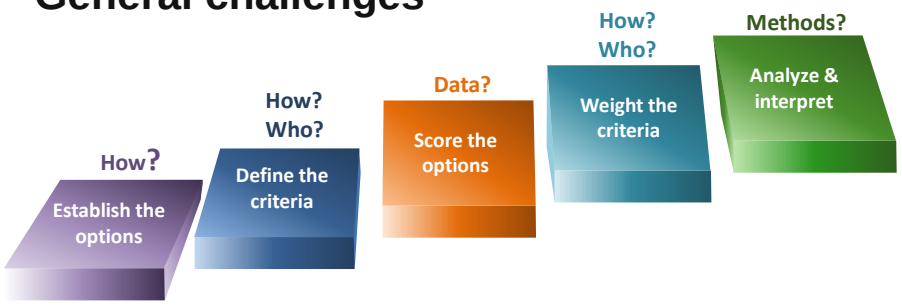


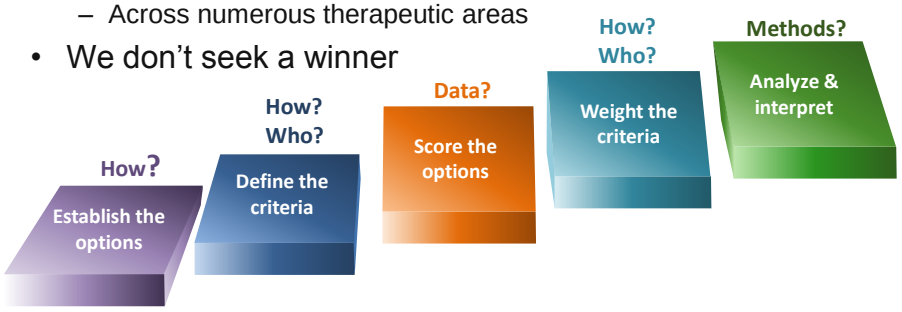
MCDA: steps

General challenges



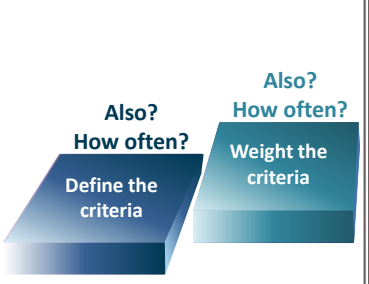
Challenges specific to HTA

- Decisions are recurrent
  - Across numerous therapeutic areas
- We don't seek a winner



- What do we do with costs?
- Weights are not independent.

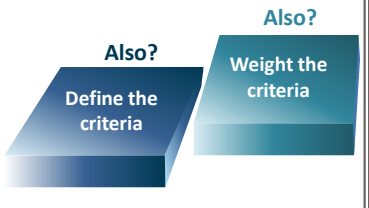
Decisions are recurrent



2017 afatinib, alectinib, pembrolizumab, alectinib, atezolizumab, ceritinib, cimavax, crizotinib, dabrafenib, durvalumab, tremelimumab, afatinib, rociletinib, rovalpituzumab
2016 ceritinib, crizotinib, necitumumab, osimertinib, ramucirumab
2015 gefitinib + erlotinib, nintedanib, paclitaxel + carboplatin
2014 afatinib
2012 denosumab
2011 erlotinib
2010 gefitinib
2009 pemetrexed, topotecan
2008 bevacizumab

Stability

Across many therapeutic areas

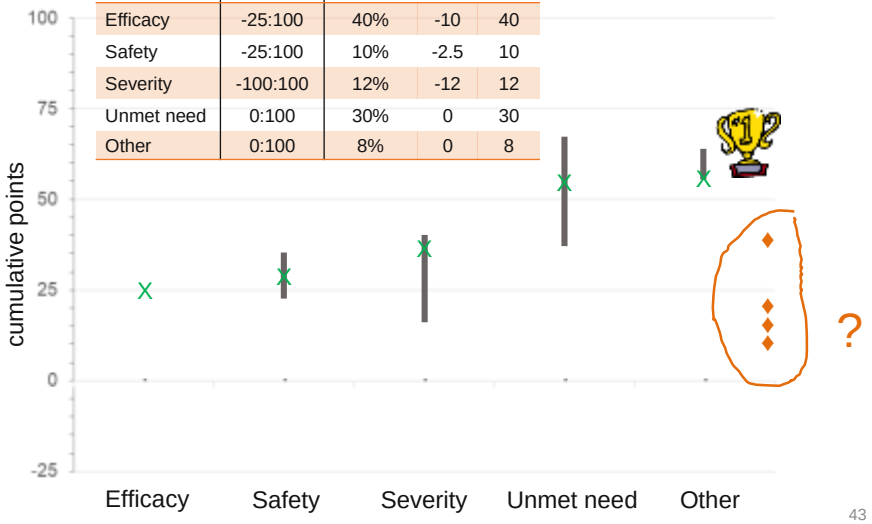


Possibility of cure
HCV
Thalassemia beta
Highly effective but not curative
Cystic fibrosis
HIV
Symptom relief only
Ebola, Dengue
Anesthesia

Stability

We don't seek a winner

Criterion	Range	Weight	Min	Max
Efficacy	-25:100	40%	-10	40
Safety	-25:100	10%	-2.5	10
Severity	-100:100	12%	-12	12
Unmet need	0:100	30%	0	30
Other	0:100	8%	0	8



What do we do with costs?

Criterion	Range	Weight	Min	Max
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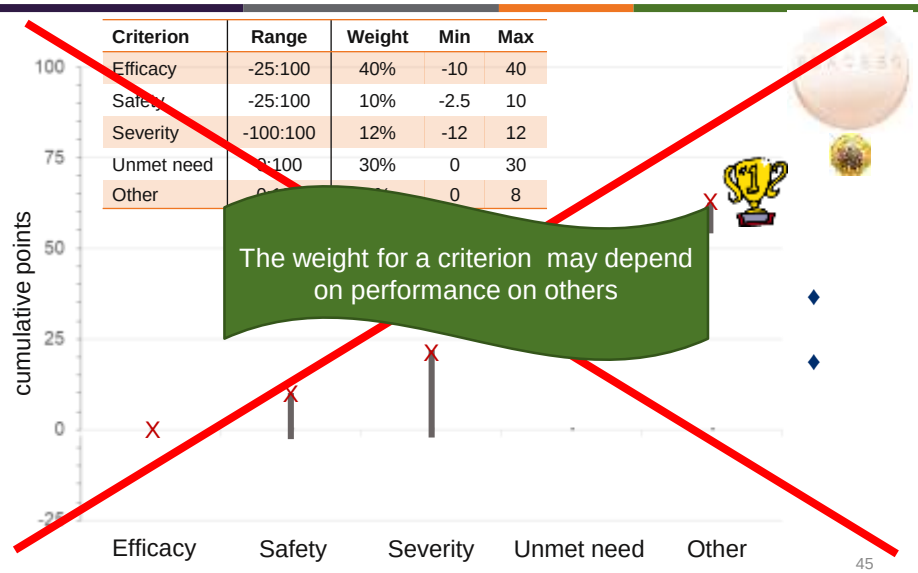
Safety	-25:100	10%	-2.5	10
Severity	-100:100	12%	-12	12
Unmet need	0:100	30%	0	30
Other	0:100	8%	0	8
Costs	?	?	?	?

Weights are not independent

Criterion	Range	Weight	Min	Max
Efficacy	-25:100	40%	-10	40
Safety	-25:100	10%	-2.5	10
Severity	-100:100	12%	-12	12
Unmet need	[illegible]:100	30%	0	30
Other	[illegible]	[illegible]	0	8



Use "costs" as the weight?

Criterion	Scale			WTP	Min	Max	Product
Efficacy	-25*	0	+100				[illegible]
Safety	-25†	0	+100				-25
Severity	-100	0	+100				[illegible]
Need‡		0	+100				+100
Others#		0	+100				0
Total							$100

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