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Lessons learned from a multicriteria decision analysis (MCDA) framework

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1

EVIDEM Collaboration*
A not-for-profit collaborative MCDA/HTA platform

Object: promote public health by developing efficient MCDA-based solutions to healthcare decisionmaking and priority setting.

Open source MCDA-based **decisionmaking framework** & toolkit

Open Web **Registry** of by-criterion HTA reports

Discussion **forum**

Board of Directors

Officers
- Initial developers at BioMedCom

Staff

Membership
- Policy makers
- Healthcare professionals
- Patients
- Researchers
- Health care industry
- Open source specialists

- **Tools** regularly **upgraded** based on academic research and feedback from users

- **Registry populated** with data generated by users

Community of MCDA practice

➔ **Researchers/users:** Development, adaptation and application of tools

➔ **Open source philosophy:** sharing, contributing and improving for benefit of all

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Priority setting and planning

Which interventions contribute the most to an equitable, efficient and sustainable healthcare system?

Identify what we should we do
➔ Normative criteria

Identify what can be done
➔ Feasibility criteria

➔ Develop a mechanism to compare a broad range of interventions across a broad range of criteria

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Disease severity

Patient reported outcomes

System capacity

Efficacy   Safety

Historical context   Unmet needs   Quality of evidence

Individual values

Cost   Ethics

Affordability   Population Priorities

Expert opinion

WWW

Which criteria define the most valuable healthcare interventions?   →MCDA

What is their relative importance?   EVIDEM

What is the available evidence?   →HTA

Baltussen & Niessen. Cost Eff Resour Alloc. 2006;4:14

4

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EVIDEM conceptual approach

Generic framework to assess & rank interventions

❖ **Based on an adaptable set of criteria***

    ❖ MCDA Core Model (universal)

    ❖ Contextual Tool (jurisdiction)

MCDA principles**

❖ criteria should be complete

❖ with minimum overlap

❖ mutually independent

❖ operationalizable

*Criteria identified from extensive analysis of literature and decisionmaking processes, feedback from stakeholders and selected to fulfill MCDA principles. Goetghebeur M, et al. BMC Health Services 2008; 8:270.; Goetghebeur M, et al. Cost-effectiveness and Resource Allocation. 2010:8:4.; Goetghebeur et al. Medical Decision Making. 2011 In press.

5

**National Economic Research Associated. Multi-criteria analysis manual 2005.
www.communities.gov.uk/pub/252/MulticriteriaanalysismanualPDF1380Kb_id1142252.pdf

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EVIDEM MCDA Core Model
What <u>should we do</u> for equitable, efficient and sustainable healthcare systems?

Includes 15 universal <u>normative</u> criteria and assumes that:

➜ **Highest rank/value or priority should be given to interventions**

❖ For severe disease (D1)

❖ For common disease (D2)

❖ For disease with many unmet needs (C2)

❖ Recommended in consensus guidelines by experts (C1)

❖ Conferring major improvement in efficacy/effectiveness over standard of care (I1)

❖ Conferring major improvement in safety & tolerability over standard of care (I2)

❖ Conferring major improvement of patient perceived health over standard of care (I3)

❖ Either conferring major risk reduction (T1) or major alleviation of suffering (T2)

❖ That results in savings in healthcare intervention expenditures (E1) as well as other medical and non medical expenditures (E3); *cost-effective (E2)**

❖ For which there is sufficient data (Q1), that is fully reported (Q2) and valid and relevant (Q3)

*Cost-effectiveness is a composite of some elements of other criteria and does not comply with the non-redundancy design requirement of MCDA. It may be included in the framework since many decisionmaking processes currently rely on this composite measure.

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EVIDEM Contextual Tool
What is <u>our context</u> and what <u>can be done?</u>

6 criteria

➔ **Define objectives & population priorities – <u>2 contextual normative</u> criteria**

❖ Alignment with scope and mission of health care system/plan (Et1)
❖ Defining country/jurisdictional priorities for populations & access (Et2)

➔ **<u>4 Feasibility</u> criteria**

❖ Exploring opportunity costs (forgone interventions) and affordability (Et3)
❖ Verifying system capacity (e.g., infrastructure, skills) and appropriate use of intervention (O1)
❖ Assessing political/historical context (e.g. cultural acceptability, precedence) (O2)
❖ Realizing pressures/barriers from healthcare stakeholders (O3)

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EVIDEM framework structure
Clustering criteria

MCDA core model

Universally normative criteria (quantitative)

Disease impact
- Disease severity (D1)
- Size of population affected by disease (D2)

Context of intervention
- Clinical guidelines (C1)
- Comparative intervention limitations (C2)

Intervention outcomes
- Improvement of efficacy/effectiveness (I1)
- Improvement of safety and tolerability (I2)
- Improvement of patient reported outcomes (I3)

Type of benefit
- Public health interest (e.g., prevention, risk reduction) (T1)
- Type of medical service (e.g., symptom relief, cure) (T2)

Economics
- Budget impact on health plan (cost of intervention only) (E1)
- Impact on other spending (e.g., hospitalization, disability) (E2)
- Cost-effectiveness of intervention (E3)

Quality/uncertainty of evidence
- Adherence to requirements of decisionmaking body (Q1)
- Completeness and consistency of reporting (Q2)
- Relevance and validity of evidence (Q3)

Contextual tool

Context & feasibility criteria (qualitative)

Ethical framework*
- **Utility -** Goals of healthcare (Et1)
- **Fairness -** Population priority & access (Et2)
- **Efficiency -** Opportunity costs & affordability (Et3)

Other system-related criteria
- System capacity and appropriate use (e.g., infrastructure, skills) (O1)
- Stakeholder pressures (O2)
- Political/historical context (e.g. precedence) (O3)

*Based on three principles; since often conflicting, clearly identify trade-offs and legitimize decision by engaging a broad range of stakeholders & explaining decision; legitimizing decision is key to provide accountability for reasonableness (A4R)

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Framework overview
Policy applications

FRAMEWORK
MCDA CORE MODEL - CONTEXTUAL TOOL

Adaptation to context*

CONTEXTUALIZED MCDA MODEL
- •Core criteria
- • Priorities criteria
- •Mandate criteria

TAILORED CONTEXTUAL
- •System capacity
- •Political/historical context
- •Stakeholder pressures/barriers
- •Affordability and opportunity costs (financial feasibility)

Criteria Weights

Interventions Scores

Applying the tools

By-criterion HTA report

Ranking interventions
Max value: 1

- A
- B
- C
- D

No value : 0

Impact of context

A
B

C
D

Financial Exercise

B=$0.01M
A=$1M

C=$0.01M

D=$1M

Invest

AND

Disinvest

What should we do?
Normative criteria

What can we do?
Feasibility criteria

Recommendation

Decision

9

*A number of subcriteria are available to facilitate adaptation to context

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Web registry

(Prototypes - open source software Tiki wiki CMS)

http://www.evidem.org/evidem-collaborative.php

Demo: Interactive prototype*

https://www.evidem.org/tiki/?page=DEMO-main

*Based on : Goetghebeur M, et al. Cost-effectiveness and Resource Allocation. 2010:8:4.

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Example of populated tool & scoring process

By-Criterion HTA Report
Highly synthesized evidence

Intervention Scores

...ns syndrome.

○ 1
○ 2
○ 3 Major

☐ Low
- specif

	MCDA Core Criteria	By-Criterion HTA Report	Intervention Scores	
	Intervention outcomes			
I1	Improvement of efficacy/ effectiveness	**4 placebo controlled RCTs** (2-year (toddlers) to 11-year treatments; N=42 to 104, 1 in Canada, 3 in USA): Final height of treated patients = 147 cm to 150 cm; difference with untreated = 7 cm **Observational studies** (2-year to 8-year treatments, N=26 to 123, 1 in Germany, 1 in Greece, 1 in Israel, 3 in Italy): : Final height of treated patients = 148 cm to 151 cm; difference with controls = 2.1 to 6.8 cm. See details	○ 0 Lower efficacy/effectiveness than comparators presented ○ 1 ○ 2 ○ 3 Major improvement in efficacy/effectiveness	☐ Low - specif
I2	Improvement of safety & tolerability	**Common AEs (from RCTs –frequency at least twice of placebo)**: Surgeries (50%), ear problems (6 % to 47 %), joint (13.5%) and respiratory (11%) disorders, sinusitis (18.9%) **Serious AEs (from registries, no control data)**: Intracranial hypertension (0.2%), slipped capital femoral epiphysis (0.2 - 0.3%), scoliosis (0.7%), pancreatitis (0.1%), diabetes mellitus (0.2 to 0.3%), cardiac/aortic events (0.3%), malignancies (0.2%) **Warnings**: Scoliosis, slipped capital femoral epiphysis, intracranial hypertension, ear disorders, cardiovascular disorders, autoimmune thyroid disease, insulin resistance.	○ 0 Lower safety / tolerability than comparators presented ○ 1 ○ 2 ○ 3 Major improvement in safety / tolerability	☐ Low - specif
I3	Improvement of patient reported outcomes	Inconclusive data: **1 RCT** (2-year treatment data, N=28, Canada): higher rating on questionnaire by GH treated patients versus untreated for some domains but not for others **2 observational studies**: no significant differences on SF-36 dimensions in one study (5-year treatment, N=568, France) and significant differences in another (7-year treatment, N=29, Holland); other questionnaires, non significant differences **Convenience**: Subcutaneous injection 3 days a week or daily.	○ 0 Worse patient reported outcomes than comparators ○ 1 ○ 2 ○ 3 Major improvement	☐ Low - specif
	Type of benefit			
T1	Public health interest	No data on **risk reduction** with GH treatment.	○ 0 No risk reduction	

Users & applications

Users	Applications
❖Decisionmakers	
Policy (macro/meso)	➢Priority setting (e.g., New Zealand) ➢Regulatory ➢Reimbursement (e.g., Canada, Italy, South Africa)
Physicians & healthcare professionals	➢Clinical practice guidelines (CPGs) (e.g. Prader-Willi Syndrome) ➢Seamless access to evidence
Patients	➢Access to digested & validated information
❖HTA developers	➢By-criterion HTA report ➢Web-based multilevel evidence
❖Research	➢Identify research questions/data needs ➢Research planning ➢Explore the decisionmaking process
❖Developers of new healthcare interventions/programs	➢Development ➢Positioning ➢Data gap analysis
❖All	➢Communication (evidence and values) ➢Knowledge translation

Strengths and challenges

Strengths	Challenges
Utility to policymakers	
• Adaptable to local context • Systematize decision process • Quantitative and qualitative aspects combined • Identify criteria and perspectives at play in decisionmaking • Priority setting based on wide range of criteria (beyond cost-effectiveness) • Transparency	• Perception of complexity • Integration into existing processes • Risk of using MCDA as a formula rather than as a support to decisionmaking/priority setting
Methodology	
• Pragmatic, user-oriented and modular • Detailed instructions • Open source (benefit from others' experience)	• Criteria selection • Weighting process
Data requirements	
• Comprehensive but modular • Open web registry (benefit from others' work)	• Data synthesis by criteria • Web registry in its infancy
Capacity/training requirements	
• Testing package available in the toolkit • Community of users and developers building up	• Limited MCDA expertise in healthcare

Priority setting & planning for chronic disease control programs

v MCDA-based frameworks provide a mechanism for priority setting

v Helps identify the interventions that contribute the most to sustainable and efficient control of chronic diseases

v Transparent and consistent process

➔ **Potential to optimize resources, decisions, priority-setting and health of populations**

14

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Thank you

www.evidem.org

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