

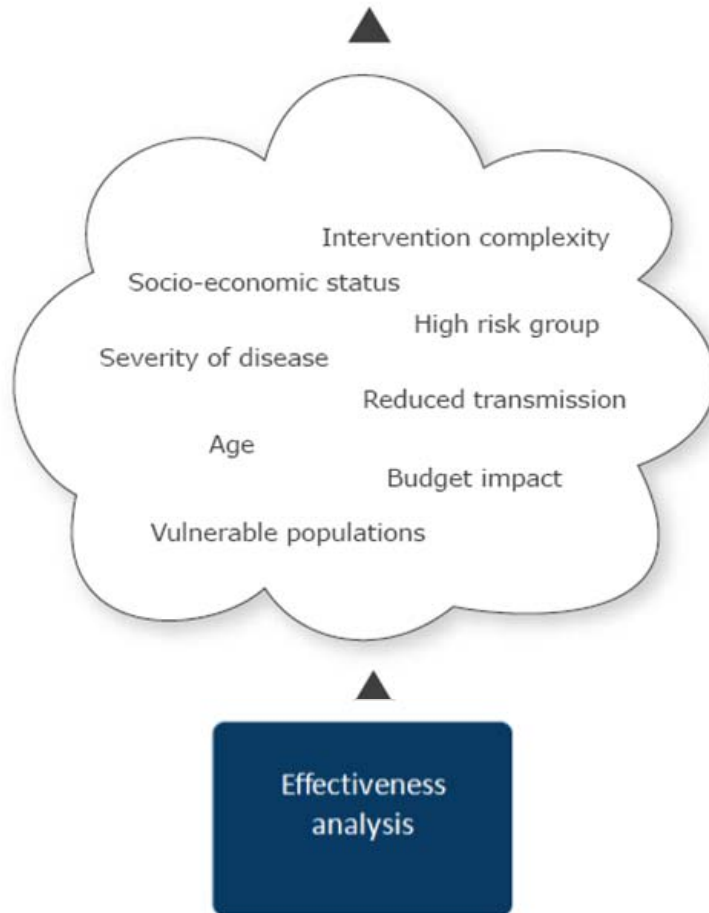
The use of MCDA for priority setting

Benefits and limitations

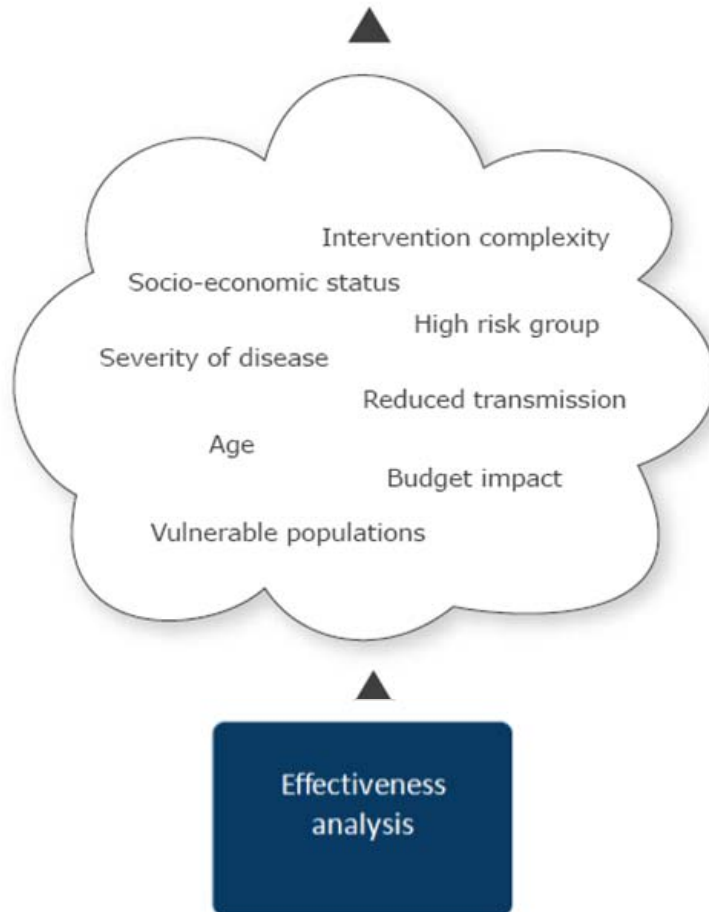
Prof Rob Baltussen, Radboudumc
Tokyo, 11-12-2017

Radboudumc

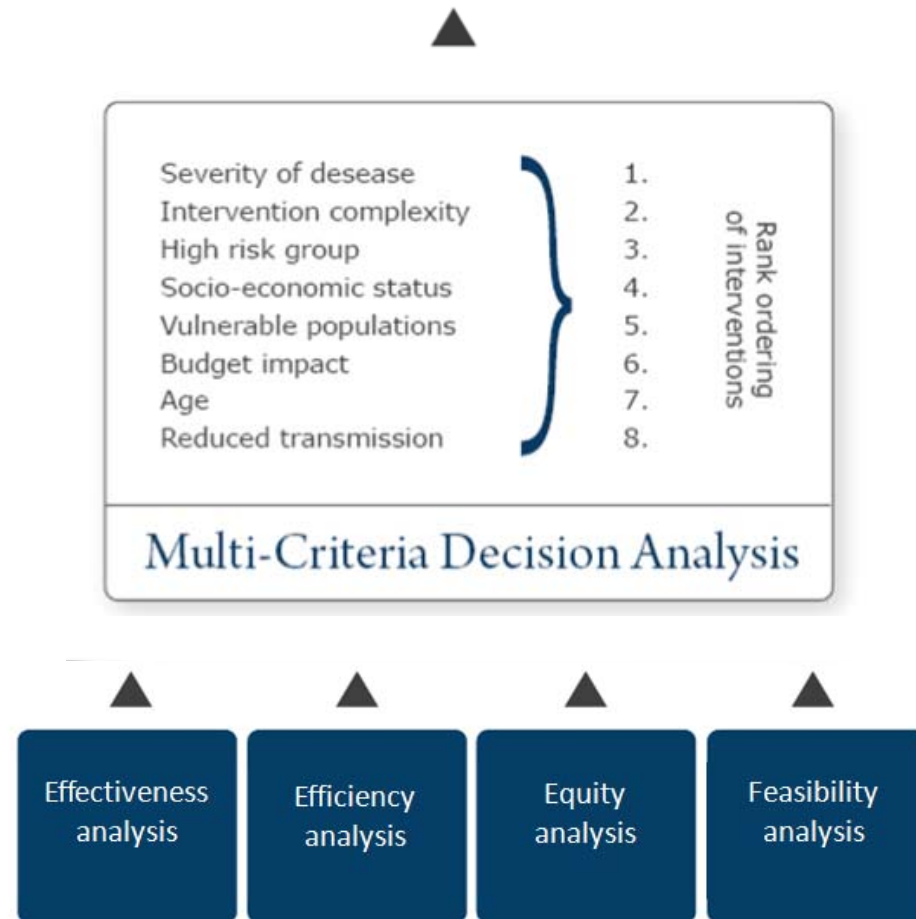
Decision-maker



Decision-maker



Decision-maker



Background

- MCDA allows the interpretation of multiple criteria
- MCDA can improve
 - Quality: taking into account all relevant criteria
 - Consistency: doing this in same way for all interventions
 - Transparency: showing to the outside world how decision is made

Background

- Working on MCDA for > 10 years, now I am concerned
 - Popular with academics, focus on algorithms
 - But low uptake by HTA agencies
 - Disqualify MCDA as ‘entirely mechanistic’
- Still believe MCDA can be highly relevant for HTA
 - Now need ‘best practice’
 - On basis of review 1990-2017

$$V_j = \sum_{i=1}^n S_{ij} \cdot W_i$$



Table A1. Typology of reviewed studies

Study	Year	Country	Type of MCDA
Gales et al. (1)	1990	France	Mixed
Baltussen et al.(2)	2007	Nepal	Algorithmic
Jehu-Appiah et al. (3)	2008	Ghana	Algorithmic
Goetghebeur et al. (4)	2010	Canada	Mixed
Diaby et al. (5)	2011	Ivory Coast	Algorithmic
Tony et al. (6)	2011	Canada	Algorithmic
Defechereux et al.(7)	2012	Norway	Algorithmic
Goetghebeur et al.(8)	2012	Canada	Mixed
Miot et al.(9)	2012	South Africa	Mixed
Youngkong et al. (10)	2012a	Thailand	Deliberative
Youngkong et al. (11)	2012b	Thailand	Mixed
Aenishaenslin et al.(12)	2013	Canada	Algorithmic
Cox et al. (13)	2013	Canada	Algorithmic
Marsh et al.(14)	2013	United Kingdom	Algorithmic
Osterwalder et al.(15)	2014	Ethiopia	Mixed
Aenishaenslin et al.(16)	2015	Switzerland	Algorithmic
Ghandour et al. (17)	2015	Palestine, Syria, Tunisia, Turkey	Algorithmic
Wahlster et al. (18)	2015	Germany	Algorithmic
Diaby et al.(19)	2016	United States / France	Algorithmic
Hongoh et al. (20)	2016	Canada / Burkina Faso	Algorithmic
Hongoh et al. (21)	2016	Canada	Algorithmic
Iskrov et al. (22)	2016	Bulgaria	Algorithmic
Jaramillo et al. (23)	2016	Colombia	Mixed
Kolesa et al. (24)	2016	Poland	Algorithmic
Marteli et al. (25)	2016	France	Mixed
Mobinizadeh et al. (26)	2016	Iran	Algorithmic
Gilabert-Perramon et al.(27)	2017	Spain	Algorithmic
Kwon et al. (28)	2017	South Korea	Algorithmic
Wagner et al. (29)	2017	France / Italy / Spain	Mixed

Structured deliberation

- Policy makers makes judgement on value of interventions through deliberation

Options	Cost-effectiveness	Severity of disease	Disease of the poor	Age
Antiretroviral treatment in HIV/AIDS	US\$200 per DALY	●●●●	√	15 years and older
Treatment of childhood pneumonia	US\$20 per DALY	●●●●	√	0–14 years
Inpatient care for acute schizophrenia	US\$2000 per DALY	●●		15 years and older
Plastering for simple fractures	US\$50 per DALY	●		all

- Benefits – shows all information
- Limitations - difficult with many interventions

Algorithmic MCDA

- Analyst replaces judgment by algorithmic model
- Weights are combined with scores to get overall score

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Plastering for simple fractures	US\$50 per DALY	●		all

Table 2: Scoring the options.

Options	Cost-effectiveness	Severity of disease	Disease of the poor	Age	Total
Antiretroviral treatment in HIV/AIDS	50	100	100	0	70
Treatment of childhood pneumonia	100	100	100	100	100
Inpatient care for acute schizophrenia	0	50	0	0	5
Plastering for simple fractures	100	25	0	50	48
Weights	40	10	40	10	

Algorithmic MCDA

- Benefits
 - Criteria weights are made explicit
 - > improves the consistency and transparency of decisions

- Limitations

- Studies are restricted to consideration of quantifiable criteria
- Studies assume weights are identical across interventions

Expert committee NICE 2012: "The majority of participants agreed that once the committee has decided what the plausible ICER is, the decision-making process should remain deliberative and flexible, rather than moving towards a fully quantitative (or algorithmic) approach (..).

- Studies ignore principle of opportunity costs

Mixed-design MCDA

- Combines the use of algorithmic MCDA with deliberation

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Mixed-design MCDA

- Deliberative component cannot fully compensate
 - > decision maker places much credibility on algorithmic results
 - > decision maker difficult to correct unjustified assumptions

Summary of review

Structured deliberation

- Summarizes information, difficult with many interventions

Algorithmic MCDA

- Makes weights explicit, but oversimplifies with strong assumptions

Mixed-design MCDA

- Cannot fully compensate for problems of algorithmic MCDA

Note: algorithmic MCDA can still be useful in underdeveloped HTA context

Moving forward with MCDA

Conclusion from review: keep deliberation and avoid algorithms

-> MCDA as structured deliberation with simple decision rules

- First step
 - identify knock-out criteria, and evaluate interventions against these
 - e.g. safety, effectiveness
- Second step
 - evaluate interventions against all other criteria
 - e.g. cost-effectiveness, severity of disease, own responsibility etc
 - quantify where meaningful, otherwise deliberate

Moving forward with MCDA

- As NICE in UK & ZIN in the Netherlands
 1. Knock-out criteria: safety and effectiveness
 2. Trade-off all other criteria
 - > cost-effectiveness threshold as central criterion
 - varies by severity of disease, end of life etc (quantifiable)

Maximum cost (€) per QALY	Severity of disease
Up till €20,000 per QALY	0.1- 0.4
Up till €50,000 per QALY	0.41 – 0.7
Up till €80,000 per QALY	0.71 – 1.0

-> deliberation for non-quantifiable criteria



Summary

- Various forms of MCDA
 - structured deliberation, algorithmic, mixed-design
- Best practice depends on context
 - Structured deliberation with decision rules in developed HTA context
 - Algorithmic in underdeveloped HTA context, as stepping stone

