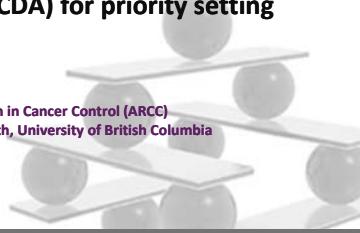


International experiences using Multi Criteria Decision Analysis (MCDA) for priority setting

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MCDA beginnings

- Late sixties / early seventies: general dissatisfaction with decision aiding techniques that relied on a single figure of merit (e.g. B/C analysis, NPV, IRR, etc.)
- Some early thinkers: Roy (1968); Zeleny (1974); Keeney and Raiffa (1976)
- We only have a decision problem in front of us once we have to deal with at least two (conflicting) criteria, or else we may have a problem of getting the right information

Two main stages in MCDA

1. **Problem structuring:** generating a set of alternatives and a set of criteria against which the alternatives are to be evaluated and compared
2. **Model building:** constructing some form of model which represents decision-makers' objectives and their value judgements

Key methodological considerations:

- methods used to describe decision-makers preferences and elicit importance weights for decision-making criteria
- type of aggregation model used to combine criteria scores

A simple MCDA Model

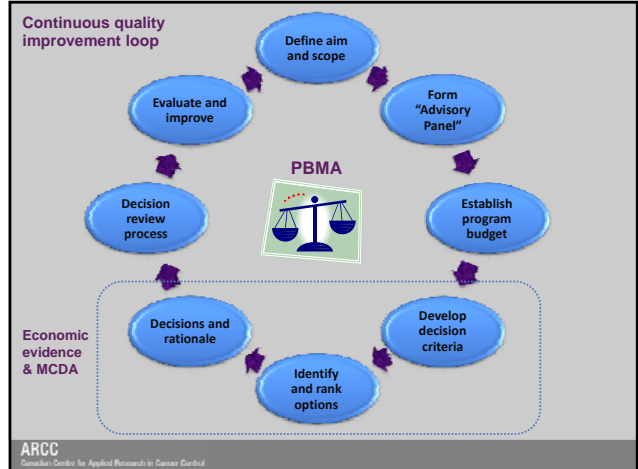
$$WBS_j = \sum_{i=1}^n w_i s_{ij}$$

$i = 1, \dots, n$ criteria
 w_i = criteria weights
 j represents alternatives
 s_{ij} = scores for alternatives for different criteria
 WBS = Weighted Benefit Score

MCDA in priority setting

- PBMA: a practical economic method for priority setting used in >100 studies
- Based on economic principles for priority setting
 - need to consider opportunity costs
 - need for marginal analysis of costs and benefits
 - existence of a fixed budget - some services must be contracted if others are to be expanded
- Unlike economic evaluation, PBMA considers the budget constraint
- Is compatible with sustainability and deficit financing

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MCDA in priority setting

- Literature review
 - searched PUBMED, ECONlit, grey literature since 2001
 - hand searches of references and contacting key authors
 - 14 PBMA applications using MCDA
 - 21 PBMA methods papers
 - much of grey literature 'not accessible' or embargoed
 - MCDA examples go back to the early 90s and maybe earlier
 - earlier literature review identified 109 published papers on PBMA, with 90 applications in 70 health organizations

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Decision criteria

- 52 different criteria listed in 14 studies
- Most common:

Criteria	Frequency
Accessibility	10
Reducing inequalities	10
Effectiveness	8
Alignment with strategic plan/policies	7
Value for money	7
Affordability	7
Integration with other programs	7

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Criteria Domains

Domain	Frequency
Acceptability	4
Affordability	7
Alignment with policy	10
Availability of alternatives	1
Burden of disease	11
Effectiveness	18
Equity	26
Feasibility	14
Partnerships	10
Prevention	3
Public/patient centredness	16
Quality of evidence	5
Quality of intervention	5
Research and development	2
Value for money	18

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Criteria weights

- 4 studies did not report weights
- 7 studies used allocation of points (direct rating)
- 2 studies used a combination of ratio estimation and direct rating
- 1 study used indifference methods (DCEs)
- Previous studies have also used swing weights (hybrid of indifference method)
- No studies have used gambles – all choices riskless

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Aggregation rule

- Where the aggregation rule was presented almost all applications (9) used an additive functional form
- 3 did not state the functional form used
- 1 used an exponential function
- 1 used a variant of the multiplicative function
- Choice of functional form was rarely justified

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What's useful about MCDA?

- Primary aim of MCDA is to develop models of decision-maker objectives and their value trade-offs so that alternatives under consideration can be compared with each other in a consistent and transparent manner
- Process is often more important than the numbers
- Value focussed thinking and values clarification
- MCDA practice suggests preferences are constructed as part of the decision-making process, not endowed
- Consistent with deliberative-analytic methods

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What are some of the challenges?

- Some methodological challenges
 - who's criteria count – society, patients, decision-makers etc.
 - methods used to elicit and describe decision-makers preferences, including the relationship between objectives and criteria
 - methods used to elicit importance weights for decision-making criteria
 - type of aggregation model used to combine criteria scores

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Common ground?

- Economics has often focussed on prescriptive behavioural rules, based on utility maximisation and game theory
- Psychology has sought to explain actual individual behaviour, and why it can deviate from prescriptive rules
- Decision analysis – including MCDA - tries to **combine prescriptiveness with practicality** (to a greater or lesser extent)
- All share common heritage from von Neumann and Morgenstern

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