

Evaluating the Expected Incremental Cost-Effectiveness of Multicomponent Healthcare Interventions

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Clinical guidelines often recommend multi-component interventions, which combine two or more single interventions. When an economic evaluation alongside a trial cannot be conducted, methods to evaluate the expected combined cost-effectiveness of multicomponent programs are underdeveloped.

Research question

How can multicomponent interventions be evaluated on cost-effectiveness when only data on the effectiveness of the single interventions is available?

$$\text{Intervention A} = \frac{\Delta \text{Effect of A}}{\Delta \text{Costs of A}} = \text{€X per QALY}$$

$$\text{Intervention B} = \frac{\Delta \text{Effect of B}}{\Delta \text{Costs of B}} = \text{€X per QALY}$$

$$\text{Intervention A + Intervention B} = \frac{\Delta \text{Effect of A+B}}{\Delta \text{Costs of A+B}} = \frac{???}{???}$$

Methods

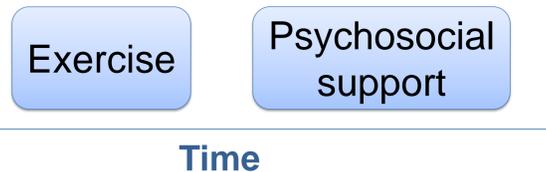
- Analysis of the content of an exemplary guideline (the Dutch guideline for cancer rehabilitation), to identify the requirements for a new method.
- Literature review, to identify the existing methods for similar decision problems, that can be used as a starting point in the methods development.
- Development of a new method.

Results

Requirements:

- Be efficient, as several combinations of interventions need to be evaluated.
- Able to take the timing and sequencing of interventions into account, as this affects costs and effectiveness:

Effect and costs when a patient follows 2 guideline recommended interventions subsequently...



...are unlikely to equal the effects and costs when following these 2 interventions simultaneously



Headroom analysis was identified as the most suitable starting point for developing a new method.

Headroom analysis can be used for:

- Calculating the maximum allowable incremental costs of an intervention, given its expected incremental effectiveness and the WTP threshold.
- Calculating the minimum required additional effectiveness of an intervention, given its expected incremental costs and the WTP threshold.

New method

Step 1: Choose the willingness-to-pay (WTP) threshold

E.g. €30.000 per quality-adjusted life year (QALY).

Step 2: Estimate the incremental costs of offering the interventions together

Take into account which costs potentially increase or decrease when the interventions are offered together, as well as the intervention sequence over time.

Step 3: Estimate the minimum required combined effect

If:

$$\text{WTP} = \frac{\text{Combined incremental costs of interventions A and B}}{\text{Combined incremental QALYs of A and B}}$$

Then:

$$\text{Minimum required combined incremental effect of A and B} = \frac{\text{Combined incremental costs of A and B}}{\text{WTP}}$$

Step 4: Estimate if the minimum required combined incremental effect can realistically be achieved

By

1) Using literature data on:

- The symptom burden at baseline
- The natural course of the symptoms
- The interventions' expected life-prolonging effect
- Effectiveness of similar interventions a/or the same intervention in a similar patient population a/or the intervention on other (intermediate) outcome measures

2) Analyzing to what extent a particular sequence and/or timing of the combined interventions influences their expected combined incremental effectiveness

3) Consulting experts, including patients and care providers.

