

Economic Evaluation of Healthcare Innovations

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Health(care) Economics, Business and Management

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What is economic evaluation?

“the comparative analysis of alternative courses of action in terms of both their costs and consequences”

Drummond (2005)

- The objective of economic evaluation is to compare the costs and effects between an existing and a new healthcare intervention:
 - The existing intervention can also be a policy of doing nothing – a common approach in (societal) cost benefit analysis.

Use of economic evaluation

- To be reimbursed through the *Health Insurance Act (Zvw)*, new – evidence based – healthcare interventions or pharmaceutical products need to be shown to be cost effective using the guideline (*Richtlijn*) of the Dutch *National Health Care Institute (ZiN)*:
 - Guideline stipulates state-of-art approaches to the measurement of costs and effects and provides guidance on the appropriate perspective and time frame of the evaluation.
 - Guideline is updated frequently in consultation with leading health economists in the Netherlands.

Use of economic evaluation

- In deciding on healthcare purchasing, municipalities and other responsible authorities rely partially on (societal) cost-benefit analysis of available interventions.
 - The *Netherlands Bureau for Economic Policy Analysis (CPB)* provides a guideline (*Leidraad*) for performing (societal) cost-benefit analysis in general.
 - Currently domain-specific manuals (*Werkwijzers*) are being developed:
 - The Social Domain manual was released recently.

Types of economic evaluation

Type of analysis	Measurement & valuation of costs	Identification of consequences	Measurement & valuation of consequences
Cost analysis (CA)	Monetary units	None	None
Cost-effectiveness analysis (CEA)	Monetary units	Single effect of interest	Health outcomes
Cost-utility analysis (CUA)	Monetary units	Single or multiple effects	Quality-adjusted life-years
Cost-benefit analysis (CBA)	Monetary units	Single or multiple effects	Monetary units

- The choice of analysis depends on objectives, data availability and policy guidelines.
- Cost-utility analysis is the preferred method in the Netherlands.
- (Societal) Cost-benefit analysis is gaining ground but additional research is required.

Steps in economic evaluation:



Determine perspective

- Patient perspective: Takes into account all costs and benefits accruing to the patient – including non-monetary costs such as suffering.
- Payer perspective: Takes the vantage point of the insurance company or whoever pays the bill – disregards non-priced services such as informal care.
- Societal perspective: Includes all society-wide monetary and non-monetary costs and benefits regardless of where and by whom they are received or paid – *preferred perspective*.

Steps in economic evaluation:



Costs

- Guidelines are generally accompanied by costing manuals, which indicate tariff prices for medical services.
- Costs arising due to decrease in labor force participation can be valued through foregone wages or the time it takes to replace a worker.
- Non-priced services such as informal care can be assessed through validated questionnaires such as the Care-related Quality of Life Instrument (CareQoL).

Steps in economic evaluation:

Costs



- Challenges:
 - Costs outside the healthcare sector (e.g., education or criminal justice) are generally hard to assess.
 - Prices used to assess costs can be sensitive to the intervention itself – if a disease is reduced due to the intervention, the cost of treatment may change.
 - Future costs need to be discounted to today to make them comparable – the choice of discount rate matters crucially for this.

Steps in economic evaluation: Effects



- Cost Analysis: Outcomes are ignored.
- Cost-Effectiveness Analysis: Outcomes are measured in terms of health outcomes such as changes in depression scores or improvement in self-sufficiency.
- Cost-Utility Analysis: Outcomes are measured with a common, non-disease specific, metric such as a Quality Adjusted Life Year (QALY).
- Cost-Benefit Analysis: A monetary value is attached to QALYs and added to other benefits.

Steps in economic evaluation: Effects

QALYs are assessed using validated questionnaires such:

- EuroQol EQ-5D-5L is the preferred Dutch option.
- Administered using a survey.
- Survey responses are combined to provide a score between 1 (perfect health) and 0 (death.)

MOBILITY

- I have no problems in walking about
- I have slight problems in walking about
- I have moderate problems in walking about
- I have severe problems in walking about
- I am unable to walk about

SELF-CARE

- I have no problems washing or dressing myself
- I have slight problems washing or dressing myself
- I have moderate problems washing or dressing myself
- I have severe problems washing or dressing myself
- I am unable to wash or dress myself

USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

- I have no problems doing my usual activities
- I have slight problems doing my usual activities
- I have moderate problems doing my usual activities
- I have severe problems doing my usual activities
- I am unable to do my usual activities

PAIN / DISCOMFORT

- I have no pain or discomfort
- I have slight pain or discomfort
- I have moderate pain or discomfort
- I have severe pain or discomfort
- I have extreme pain or discomfort

ANXIETY / DEPRESSION

- I am not anxious or depressed
- I am slightly anxious or depressed
- I am moderately anxious or depressed
- I am severely anxious or depressed
- I am extremely anxious or depressed

Steps in economic evaluation: Effects

- Challenges:
 - The preferred EQ-5D-5L tool is mainly aimed at adults:
 - Questionnaires for children, especially very young ones, currently don't exist.
 - Conversion of QALYs into monetary units is controversial:
 - There is no official Dutch conversion rate.
 - Outcomes

Steps in economic evaluation:

Compare costs and effects

- Let costs be C_O be the costs of the existing intervention and C_A that of the new one.
 - The change in costs is then given by:

$$C_A - C_O$$

- Similarly the change in the effectiveness is given by:

$$E_A - E_O$$

- Combining the two gives the Incremental Cost Effectiveness Ratio:

$$ICER = \frac{C_A - C_O}{E_A - E_O}$$

- ...indicates the costs required to achieve an additional unit of the desired effect.

Steps in economic evaluation: Compare costs and effects

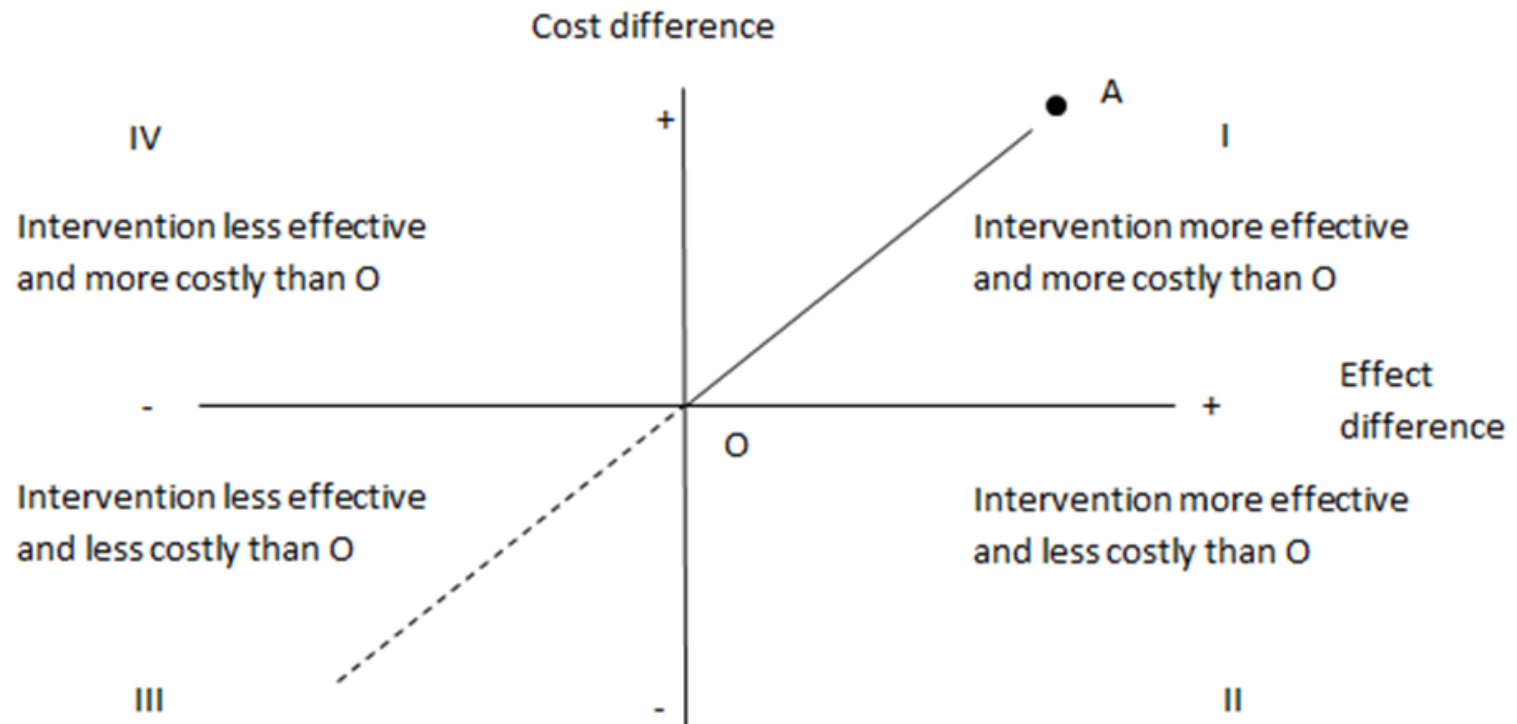


Figure 1: Comparing an existing intervention (O) to its alternative (A) in terms of cost and effect allows us to draw a cost-effectiveness plane.

Steps in economic evaluation:

Compare costs and effects

- In a societal cost benefit analysis effects are monetarized:
 - ...allows us to determine the *cost-benefit balance*,
 - ...positive indicates a gain, negative a loss.
- Often not all benefits can be measured or monetarized properly:
 - ...in that case a *reciprocal cost-benefit* analysis can help,
 - ...it indicates how much value we would have to attach to a non-measured concept for the balance to be positive.

Summary

“the comparative analysis of alternative courses of action in terms of both their costs and consequences”

- Used for reimbursement and procurement decisions.
- Different options: Cost Analysis, Cost Effectiveness Analysis, Cost Utility Analysis, Cost Benefit Analysis.
- Requires explicit choice of perspective.
- Identify costs and benefits in line with perspective using validated methods to determine the Incremental Cost Effectiveness Ratio.
- Be aware of the challenges!

Further reading

- Drummond, M. (2015). *Methods for the economic evaluation of health care programmes* (4th ed.). Oxford: Oxford University Press.
- ZiN (2015) *Richtlijn voor het uitvoeren van economische evaluaties in de gezondheidszorg*.
- CPB (2013) *Algemene leidraad voor maatschappelijke kosten-batenanalyse*.
- CPB (2016) *Werkwijzer voor kosten-batenanalyse in het sociale domein*