

ECONOMIC EVALUATION IN HEALTH SERVICES RESEARCH

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This issue reviews basic concepts of economic evaluation. **Economic Evaluation** compares two or more healthcare programmes in terms of their costs and outcomes. The alternative programme could be an existing practice. The four types of economic evaluation (Table 1) are differentiated by the way in which outcomes are measured and valued. Table 2 explains the two types of economic efficiency: Technical efficiency and Allocative efficiency.

Table 1: Types of Economic Evaluation

Analyses	Measure of costs	Measure of outcomes	Efficiency
Cost-benefit analysis	Money	Money	Allocative and technical
Cost-utility analysis	Money	Health status (Quality adjusted life years)	Restrictively allocative and technical
Cost-effectiveness analysis	Money	Natural units (Life years saved)	Technical
Cost-minimisation analysis	Money	Any of the above	Technical

Table 2: Economic Efficiency

Efficiency	Definitions	Examples
Technical	Whether an objective is worthwhile achieving?	Nurse-led primary care clinic for COPD patients vs. Doctor-led primary care clinic for COPD patients
Allocative	How best to achieve an objective?	Nurse-led primary care clinic for COPD patients vs. Outpatient rehab centre for asthma patients

Cost-benefit analysis

Cost-benefit analysis (CBA) is the broadest type of economic evaluation. The outcomes in CBA are measured in monetary units. This is useful for deciding between different healthcare programmes (allocative efficiency). Unlike a financial analysis, a CBA takes into account indirect and intangible costs and benefits. An opportunity cost concept that values the resource to be used in the next best alternative is used for CBA. This extends beyond just financial costs.

Example of CBA: Table 3

A health institution has to decide between opening a nurse-led Chronic Obstructive Pulmonary Disease (COPD) primary care clinic for COPD patients and outpatient rehab centre for asthma patients. A cost-benefit analysis produces an overall net benefit of \$9,000. In this situation, the preferred option is opening the nurse-led COPD clinic.

Monetising the outcomes in healthcare can be a major challenge. Ethical dilemmas and analytical difficulties can arise from monetising health benefits. Because of these difficulties, CBA is less common in healthcare.

Table 3: Cost-benefit analysis

Alternatives	Nurse-led primary care clinic for COPD patients	Outpatient rehab centre for asthma patients	Difference
Costs (\$)	\$25,000 (C ₁)	\$30,000 (C ₂)	-\$5,000
Benefits (\$)	\$34,000 (B ₁)	\$30,000 (B ₂)	\$4,000
Net benefits (B ₁ - B ₂) - (C ₁ - C ₂)			\$9,000

Cost-utility analysis

Cost-utility analysis (CUA) measures the outcomes of healthcare programmes using health benefits such as quality adjusted life years (QALY). QALY measures not only the life years saved of a programme but also the quality of survival. This method allows for the comparison between healthcare programmes (restrictively allocative efficiency).

Example of CUA: Table 4

The result of CUA is often compared with a threshold cost per QALY. Various international standards are often considered. Using the National Institute for Health and Clinical Excellence (NICE) threshold of \$30,000 per QALY, the nurse-led COPD clinic with an incremental cost-effectiveness ratio (ICER) of -\$25,000 per QALY will be considered favourable.

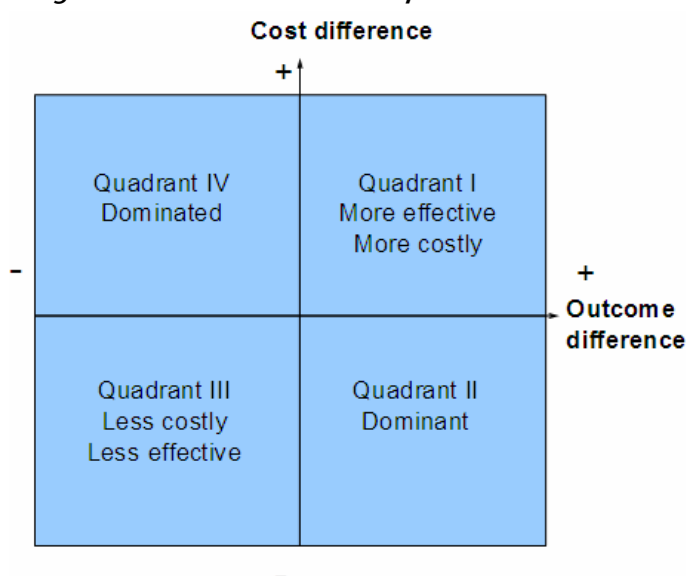
Table 4: Cost-utility analysis

Alternatives	Nurse-led primary care clinic for COPD patients	Doctor-led primary care clinic for COPD patients	Difference
Costs (\$)	\$25,000 (C ₁)	\$30,000 (C ₂)	-\$5,000
Outcomes (QALY)	0.8 (O ₁)	0.6 (O ₂)	0.2
ICER (C ₁ - C ₂) / (O ₁ - O ₂)	-	-	-\$25,000 per QALY

Cost-effectiveness analysis

Cost-effectiveness analysis (CEA) involves measuring outcomes in natural units such as life-years saved. It provides an answer to how much the decision makers are prepared to pay to improve health outcome (technical efficiency). CEA is recommended when the alternative programmes have a distinct outcome measure (example: life years saved).

Fig. 1: The cost-effectiveness plane



Example of CEA: Table 5

A CEA is conducted between COPD patients who attended the nurse-led COPD outpatient clinic and COPD patients who seek consultations at the doctor-led primary care clinic. The ICER estimate of -\$2,500 per life year saved suggests nurse-led COPD clinic is more effective and also less costly (Quadrant II of Figure 1). Since a CEA cannot answer question on allocative efficiency, the decision to fund the home care programme requires a value judgement.

Table 5: Cost-effectiveness analysis

Alternatives	Nurse-led primary care clinic for COPD patients	Doctor-led primary care clinic for COPD patients	Difference
Costs (\$)	\$25,000 (C ₁)	\$30,000 (C ₂)	-\$5,000
Outcomes (Life years saved)	15 (O ₁)	13 (O ₂)	2
ICER (C ₁ - C ₂) / (O ₁ - O ₂)	-	-	-\$2,500 per life year saved

Cost-minimisation analysis

Cost-minimisation analysis (CMA) is used when outcomes of the alternative programmes are identical. Identical outcomes may come from primary or secondary data. CMA answers the question on technical efficiency.

grammes have proven to be equally effective. CMA shows it is \$5,000 cheaper to provide COPD consultations at the nurse-led COPD clinic.

Equivalence in health outcomes is rare. If health outcomes are ignored or assumed to be identical, this gives rise to a costing analysis, which is not a full economic evaluation. A costing analysis does not answer the question on technical efficiency since we do not know if lower cost is at the expense of worse, better or equivalent outcomes.

Example of CMA: Table 6

For example, the life years saved between the two pro-

Table 6: Cost-minimisation analysis

Alternatives	Nurse-led primary care clinic for COPD patients	Doctor-led primary care clinic for COPD patients	Difference
Costs (\$)	\$25,000 (C ₁)	\$30,000 (C ₂)	-\$5,000
Outcomes (Life years saved)	13	13	0
Cost-difference (C ₁ - C ₂)	-	-	-\$5,000

Conclusion

We have outlined basic concepts of economic evaluation. Healthcare resources are limited and all the demands for it cannot be met. Depending on the objective of the decision making body, the appropriate economic evaluation method can be used.

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Kelvin, Research Analyst, is currently involved in economic evaluation and financial feasibility projects. Prior to joining NHG, he was furthering his studies in the US and served as an Adjunct Lecturer of Microeconomics at SUNY Albany, NY. He also worked briefly with the Workers' Compensation Board of New York State. His research interests include economic evaluation and the use of econometric methods in health services research.

