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Health Economic Evaluation-Methods and Techniques

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Abstract: *Economic evaluation is the process of systematic identification, measurement and valuation of the inputs and outcomes, and the subsequent comparative analysis of these. The purpose of economic evaluation is to identify the best course of action, based on the evidence available. It is most commonly employed in the context of health economics.*

Keyword*: Health economic evaluation*

I. Economic Evaluation

Drummond et al (1997) defines economic evaluation as "the comparative analysis of alternative courses of action in terms of both their costs and consequences." It differs from other forms of analysis because it considers both costs and consequences and is comparative.

Allocating resources by setting priorities for formulating health policy is the purpose of doing Economic evaluation of health care programmes. But this is only an intermediate objective. The real purpose is to improve efficiency: by converting inputs (money, labour, capital etc.) into outputs (saving life, health gain, improving quality of life, etc.)

Economists often use two terms:

1) Allocative Efficiency – This efficiency deals with the choice of what health care to be provided for maximizing benefits within the available resources. So, from a given resource we should aim to get as much as benefits of health care programmes as possible. Allocative efficiency is about finding the optimal mix of services that deliver the maximum possible benefit in total. Resources will be directed to interventions that are relatively good (i.e. efficient) at converting inputs into health benefits and away from those that require larger input for relatively low health gain.

2) Technical Efficiency - This efficiency deals with the choice of how to provide health care with minimum input for a given output.

Example: we know tonsillectomies (what) on children is worthwhile (maximizing benefit) i.e it is an allocative efficient healthcare programme. Now comes how we do this. So, here the output is to successfully remove a child's tonsils then we might choose between, a day care procedure or an inpatient stay. This is an issue of technical efficiency since the output or 'outcome' is fixed but the inputs will differ depending on which policy we adopt. But the day care approach may perhaps require more intensive staff input and more follow-up outpatient visits. If this is the case then inpatient tonsillectomy may be the more technically efficient strategy.

Evaluation needs to be comparative to some benchmark or alternative and then it can be called as complete evaluation.

Partial evaluation can arise from the following conditions:

a) If an evaluation is not comparative and does not consider both costs and consequences, then it is only a partial evaluation. It is a description of either just the costs or just the benefits of one intervention. This is most uninformative since it is one-dimensional and the efficiency cannot be judged.
b) If both costs and consequences are considered but no comparator is provided, then the study is again only a partial evaluation, described as a cost-outcome study. It lacks context and is of limited use.
c) If alternatives are compared but only in terms of costs or benefits and not both then again it is a partial evaluation so it becomes an effectiveness study (cost analysis) and not an efficiency study. It would be comparative but only across one-dimension.

This can be more illustrative in the diagram below (Reproduced from Drummond et al., 1997)

Are both costs and consequences of the alternatives examined?

		NO		YES
Is there comparison of two or more alternatives?	NO	**PARTIAL EVALUATION**		**PARTIAL EVALUATION**
		Outputs only	Costs only	Cost outcome description
		Outcome description	Cost description	
	YES	**PARTIAL EVALUATION**		**FULL EVALUATION**
		Efficacy or effectiveness evaluation	Cost analysis	Cost Effectiveness Analysis Cost Utility Analysis Cost Benefit Analysis

II. Costs And Benefits

All types of economic evaluation deal with costs in the same unit i.e. monetary. Costs can be defined in many ways (see figure 2) but generally can be considered as direct, indirect and intangible.

I. Direct costs – immediate, staff time, consumables etc.
II. Indirect costs - patient's work loss due to treatment.
III. Intangible costs - pain, anxiety, quality etc.

Benefits can also be analyzed in three different ways based on economic analysis used in evaluation.

a) Direct benefit – immediate These are usually clinically defined units appropriate to the area of study, such as 'lives saved', 'reduction in tumor size', 'change in blood pressure' etc.
b) Indirect benefit - benefits valued in monetary terms. Patients have more working hours.
c) Intangible benefit – general well-being/ happiness/ satisfaction, these are more generally labeled as 'utilities'. The utility of an intervention to an individual is its benefit and can be quantified by quality adjusted life year (QALY).

This can be more illustrative in the diagram below (Reproduced from Drummond et al., 1997)

COSTS (C)	EFFECTS (E)	UTILITIES (U)	BENEFITS (B)
C1 : Direct costs	Health effects in natural units	Health effects in QALYs	B1 : Direct benefits
C2 : Indirect costs			B2 : Indirect benefits
C3 : Intangible costs			B3 : Intangible benefits

III. Evaluating Costs And Benefit

In any evaluation, which costs and benefits to be included in the study, must be determined first. The identification of relevant benefits and costs will define the variables in the study. All relevant cost and benefit variables must be i) identified, ii) quantified and iii) valued. . Variables can be presented in terms of 'natural' quantities (i.e. hours worked or clinical units) These can be broadly classified into changes in resource use, changes in productive output and changes in health state. The next stage is to measure changes in these variables brought about by the intervention in question.

Resources in terms of land, labour, capital and raw materials or consumables must be quantified. Labour, the most important element of most health care, is often expressed in units of time (i.e. hours worked). Raw materials e.g. amount of drugs, dressings, appliances, can be quantified as these are counted and costs can be estimated. Labour and consumables are less problematic but quantifying a specific intervention share of 'shared resources' such as capital stock and land (equipment, overheads, and buildings) is more of a tricky issue and there are various accountancy techniques to resolve this.

There are several issues to consider in the assessment of costs and benefits. Externality costs and/or benefits may arise since interventions do not just affect the patient receiving care. For example, if I receive treatment for a contagious disease you will benefit as well as me, since your chances of contracting the disease will be reduced. Any evaluation needs to account for this.

The differential timing of costs and benefits must also be considered in an evaluation. The effects of health treatments do not always occur at the same point in time. Costs may be incurred today but the benefit may not arrive until next year (i.e. preventative treatments, health promotion), part of this future benefit might be that future costs will be avoided. Rs.100 spent today may not have the same value as Rs.100 spent next year because of inflation, interest on savings and not least a positive rate of time preference.

IV. Types Of Economic Evaluation

There are four main types of economic evaluation.

1. Cost-Minimization Analysis (CMA)
2. Cost-Effectiveness Analysis (CEA)
3. Cost-Utility Analysis (CUA)
4. Cost-Benefit Analysis.
5. Input-Output Analysis

Although they employ similar methods to define and evaluate costs, they differ in the methods used to estimate the benefits from a programme or intervention.

*** Cost-Minimization Analysis**

Cost-minimization analysis (CMA) compares the costs of different interventions that are assumed to provide equivalent benefits. A good example would be a comparison between a generic drug and its branded equivalent. If the assumption of equal effectiveness is substantiated, the decision hinges on finding the least expensive way of obtaining that health benefit — only the costs are compared and not the benefits. The decision rule is therefore simple because the cheapest intervention will provide the best value for money. However, in practice, there are relatively few CMAs because it is rare for two health care interventions to provide exactly the same benefits.

*** Cost-Effectiveness Analysis**

It is a technique where unit cost is compared with measurable effect (qualitative). It is similar to cost benefit analysis except that benefit instead of being expressed in monetary terms is expressed in terms of result achieved, e.g. number of lives saved or number of days free from disease or the number of years by which life is extended as a result of the intervention. Quality of life scores are also used. These can be obtained from Health Related Quality of Life (HRQoL) that measure the quality of life of the patient with respect to physical, emotional and social perspective and provide scores for each.

CEA is concerned with technical efficiency issues as regards to the best way of achieving a given goal or the best way of spending a given budget. Comparisons can be made between different health programmes in terms of their cost effectiveness ratios: cost per unit of effect. Under CEA effects are measured in terms of the most appropriate uni-dimensional natural unit. So, for an example: what is the best way of treating renal failure? Then the most appropriate ratio with which to compare programmes might be 'cost per life saved'. In deciding whether long-term care for the elderly should be provided in nursing homes or the 'cost per disability day avoided' might be the most appropriate measure.

The advantage of the CEA approach is that it is relatively straightforward to carry out and is often sufficient for addressing many questions in health care.

The main restriction in CEA is that it is one dimensional and is not comprehensive. Only one domain of benefits can be explored at a time. So it becomes difficult to choose which single outcome best represents the intervention. One possibility is to conduct a cost-consequence analysis. This is a particular type of CEA that evaluates multiple outcomes and reports costs and benefits in a disaggregated form, leaving the analyst to decide on which benefit to select.

The following case study shows how cost-effectiveness analysis may be used in practice.

Case Study 1 : A Cost-effectiveness study – Treatment therapy for Cholera

Background. Cholera or the diarrheal disease is common in the infant population and a major cause of mortality in the village areas. The cost of this disease is high. In addition to costs arising directly from symptoms and treatment of cholera patients suffering with cholera have significantly higher medical costs for a range of other conditions which crop up with it such as :(respiratory, cardiovascular, gastrointestinal, neurological, psychiatric conditions and general medical care). Thus the economic burden of this disease is high.

Treatments. The main treatment we follow is ORT, nutrition supplements, and immunization. Safe water and sanitation though may be a more favorable alternative but is very costly if thought in India’s economic perspective. Reaching out safe water to each and every person in all corner of the country is very much next to impossible, as it is very cost intensive.

Costs. Three main categories of cost were included in this analysis: Direct treatment costs incurred by the treatment programme. Cholera related medical costs (hospital and community). Cholera related costs to patients and family related to accessing health services.

Results. The following table gives the idea of cost effective analysis.

	Programme	Per capita expenditure (in Rs.)	Reduction of mortality (IMR) (in %)
1	Immunization (full coverage)	25	10
2	Oral rehydration therapy	35	10
3	Nutrition supplement	65	10
4	Safe water and sanitation	145	10

In the figure we can see that the mortality can be reduced by immunization, ORT, nutrition supplement and safe water sanitation. Each of these programmes can reduce IMR by 10%.

In a country like India where money is the main constraint, immunization should be considered based on per capita expenditure analysis – least cost for same effect. So therefore we can measure effect by controlling cost.

But, safe water and sanitation programme though it is of high cost but it is permanent. Immunization is very much cost effective but on short term basis, but safe water programme is cost effective in long term basis.

*** Cost-Utility Analysis**

CUA is concerned with technical efficiency and allocative efficiency (within the health care sector). It can be thought of as a sophisticated form of CEA, since it also makes comparisons between health programmes in terms of cost-effect ratios. In cost-utility analysis (CUA), the benefits are measured in healthy years, to which a value has been attached. Unlike CEA, CUA is multidimensional and incorporates considerations of quality of life as well as quantity of life gained as a result of a health programme using a common unit.

Valuing healthy years reflects that a preference has been expressed for being in one health state rather than another. In health economics, a "utility" is the measure of the preference or value that an individual or society places upon a particular health state. It is generally a number between zero (representing death) and one (perfect health). These utility values are then combined with survival data to derive quality-adjusted life years (QALYs) for different health programmes. Utilities can be measured using direct methods such as the "standard gamble" or "time trade off".

The standard gamble is a technique widely used in economics. It is based on the idea that something is only of value if we are prepared to give another thing up in order to get it. The respondent is asked to make a trade-off between the certainty of having a chronic disease for a period (t) and a gamble that has two possible alternatives: staying in good health for the same period or death. Finding the point where the respondent is indifferent between being in the chronic condition and the gamble provides us with a value that reflects the quality of life that the respondent attaches to the chronic condition.

Time trade off techniques is based on concepts similar to the standard gamble. The respondent is asked how many years of life in a health state with a disease, he or she would be willing to give up to be in full health but for a shorter period. For example, the respondent may be asked if he or she would prefer to live five years in health state with a specified chronic condition, or three years in perfect health. The process goes on until the point at which the respondent is indifferent between the two health states is found.

Because these techniques are complex, simpler methods have been devised to obtain health state utilities. Generic health state questionnaires (eg, Euroqol) ask respondents a number of simple, health-related questions and then convert the results into utilities using pre-scaled responses obtained by standard gamble or time trade off, from a relevant reference group. Health state utilities can be elicited directly from patients, but when this is not possible significant family members, caretakers or health professionals may be also be asked to respond.

The most widely used measure of benefit in CUA is the quality adjusted life year (QALY), but other measures include disability adjusted life years (DALYs) and healthy year equivalents (HYEs).

The results of cost-effectiveness and cost-utility analyses can be expressed in several ways. If benefits are shown to be equivalent, then the analysis is really a CMA and the intervention with the lowest cost should be chosen. If one intervention is both cheaper and more effective than its comparator, the intervention is said to be dominant and should be chosen, since it will provide larger benefits at a lower cost than its comparator. However, most commonly, an intervention will be found to be more effective but will also be more costly than the comparator. In order to make a decision on which treatment to select, the incremental cost-effectiveness ratio (ICER) should be calculated. This is done as follows:

$$\text{ICER} = \frac{(\text{Cost of A - cost of B})}{(\text{Effectiveness of A — effectiveness of B})}$$

This ratio tells us the cost per extra unit of effectiveness of A over B.

The difficulty with economic evaluations is that there is no magic cut-off number that establishes whether or not an intervention is cost-effective. In fact, the cost-effectiveness of an intervention will depend on what is termed the decision maker's "ceiling ratio". This ceiling ratio can be inferred from the amount that decision-makers are willing to pay for health interventions. For example, if the incremental cost of treatment A is Rs.10,000 per QALY compared with treatment B and the decision-maker recommends it, then we can infer that the ceiling ratio is at least Rs.10,000 per QALY. Although we do not have an exact figure for this ceiling ratio, a study of the decisions made by NICE showed that interventions seemed to be recommended for values at or below Rs.3 0,000 per QALY.'

The following example shows how cost-utility analysis may be used in practice.

Case Study 2

For example, assume that a patient who receives no treatment has a life expectancy of 3 years and their quality of life has a value 0.45. Now, if this patient receives a certain intervention then it is expected that life expectancy will be 8 years and the quality of those years will have a value of 0.70. The multidimensional gain from the intervention can then be summarized. With no treatment 1.35 QALYs (3 x 0.45) are produced, with treatment 5.60 QALYs (8 x 0.70) are produced, thus the gain is 4.25 quality adjusted life-years.

*** Cost-Benefit Analysis**

In CBAs, the decision rule on whether to fund an intervention is simple: if the benefits of implementing the programme are greater than the costs, then the programme should be funded. Theoretically, CBAs can provide information on whether a health programme is worthwhile funding from the point of view of society, in comparison to other health programmes, but also in comparison with other areas of social policy such as the environment and transport. However in practice, CBAs are rarely used in health care because of the difficulties of expressing health benefits directly in monetary terms.

In this method the economic benefits of any programme are compared with the total cost of that programme. The benefits are expressed in monetary terms to determine whether a given programme is economically sound and to select the best out of several alternate programmes. The final result is expressed as a net monetary gain (or loss) or as a cost: benefit ratio But the main problem with the CBA approach in health care is to 'convert' benefits from health programmes into monetary values. In this method generally two techniques are applied for determining the monetary valuation of benefits: the 'human capital' and the 'willingness to pay' approaches.

- Cost Benefit Ratio (CBR) - 'human capital' approach method
- Cost Benefit Index (CBI) - 'willingness to pay' approach method i.e by creating motivation

The human capital approach values a health improvement on the basis of future productive worth to society from being able to return to work or increase, their productive output. Productive output can be easily valued using actual wage rates. Values have to be added for activities that are outside traditional definitions of paid work, such as staying at home, being retired or unemployed, so this approach suffers from problems of how to value a number of health improvements. Clearly this approach will not always be appropriate especially in the case of children or the elderly.

The willingness to pay approach assumes that the utility an individual gains from an intervention is valued by the maximum amount they would be willing to pay for to obtain the benefits or avoid the costs of illness (out of their own pocket!). The willingness to pay technique simply presents people with hypothetical scenarios where they must decide the maximum amount of their own income they would give up in order to receive a benefit or avoid a cost. Moreover linking between willingness to pay and ability to pay is also a problem , so this approach is also relatively rare

CBA is concerned with allocative efficiency because once benefits have been converted into monetary terms then the net economic impact of different activities can be compared. Whilst the other forms of economic evaluation deal with relative efficiencies, CBA can be used to evaluate health programmes in a more absolute way. CBA can reveal the net economic impact of an activity: gain or loss.

Resources might be reallocated based on the results of CBA until the point when any further reallocation of resources cannot make anyone better off without making at least someone else worse off. This is the point known as 'Pareto efficiency', named after a famous economist Vilfredo Pareto.

It is very difficult to identify CBI. The ideal scientific and simple method is CBR.

The following case study shows how cost-benefit analysis may be used in practice.

Case Study 3: A Cost-benefit study – Community Health Services Background.

Most large private organizations choose to provide an Community service (CHS). Whilst the input costs (labour, capital, etc) of CHS are very clearly identifiable the outputs are not always directly observable since benefits may be multidimensional and sometimes inherently intangible.

Consequently it is unclear whether the benefits of these activities outweigh their costs. In an environment of competition for resources lack of evidence on cost-effectiveness is likely to be regarded the same as activities demonstrated not to be cost-effective, whereas those activities that can demonstrate cost-effectiveness will be supported

V. Results.

CBR of some of the health programmes are given below:

	Programmes	Expected Cost (Rs.)	Expected Benefit (Rs)	Cost Benefit Ratio (CBR)
1	Small pox vaccination	10,000	1,10,000	1:11
2	Mother & child health (MCH)	35,000	2,10,000	1: 6
3	Primary schooling	12,000	50,000	1: 4
4	Antismoking	10,000	60,000	1: 6

So, most beneficial programme is small pox vaccination Programme.
Cost Benefit Index
CBI = E.I x (B/N – C/N); Where
E.I = Effective Index (E.I. = P2 – P1/100 – P1)
B = Potential Benefit (it is the benefit expected from the programme i.e. survival or recovery, death or disability)
C = Cost of the Programme; N = Target Population (suffering from the disease)
P1 = Motivation before the programme; P2 = Motivation after the programme
P2 – P1 = actual change after motivation
100 – P1 = Potential change after motivation

*** Input-Output Analysis**

Another way of economic evaluation is input and output analysis. Any programme basically has two indicators, input and output. In the health field input refers to all health service activities which consume resources i.e. manpower, money, material, and time.
Output refers to useful outcome, such as cases treated, lives saved, or recovered.
When input is greater than output the programme is not beneficial and vice-versa.
Procedure:
1) aim or objective
2) consideration of various alternative
3) various activity
4) directing and controlling for implementation
5) assessing the results
6) adjusting of results (if any)

Example:

INPUT	Whooping cough	Diphtheria	poliomyelitis
% of children immunized under 1 year	79	81	80
OUTPUT			
Number of cases reported	1988	2004	2005

All the inputs are money oriented within the money output is the result. Here in the above case of immunization the coverage (input) is almost same, but the output i.e. what is expected from the programme – the output is not same. Number of cases reported i.e. number of cases found suffering from the disease is not same.
In case of whooping cough out of 79% coverage 1988 number of cases are found to be suffering from whooping cough but in case of diphtheria and polio the number is 2004 and 2005 respectively.
Comments
- Based on the figures and findings it is found that for diphtheria and polio the programme is beneficial.
- Whooping cough programme should be withheld until and unless the epidemiological status of the disease is found out.
- In case of diphtheria and polio they are effective.
- Professor Gordon says that as soon as the socio-economic, dwelling and nutritional status is improved the incidence or occurrence of whooping cough is declined. Whooping cough in European countries is still debatable, that whether whooping cough can be treated by immunization or not. But in India whooping cough is included in immunization schedule because the socio-economic condition cannot be improved to a reasonable level instantly.

Other Types Of Economic Evaluation

Burden of disease and cost-of-illness studies quantify the burden of a disease in monetary terms. For example, for osteoporosis, the number of fractures occurring and their total cost to the NHS would be evaluated. However, what is relevant is the relative costs and benefits of different treatments for the condition, rather than the overall cost of the disease to society. Because these types of studies only look at the costs associated with a condition and not at the benefits, they are not true economic evaluations. Indeed, allocating resources to the diseases with the highest burden will not necessarily result in an efficient use of resources, if the interventions available for that disease or condition are not cost-effective..

VI. Summary

A summary of the different economic analysis tools available for the decision-maker is appended below:

Cost Effectiveness Analysis

- Consequences measured in the most appropriate natural or physical unit e.g. 'years of life gained' or 'mmHg' etc.
- Depends on objectives of intervention comparability
- Not a question of 'should we do this intervention?' more 'how much?'

Cost Benefit Analysis

- values consequences in terms of money (same unit as costs)
- interventions can be valued absolutely
- (Do the benefits outweigh the costs?)
- potentially broadest form of evaluation
- comparable by net gain
- BUT - measurement problems

Cost Utility Analysis

- Consequences are measured in time units adjusted by health utility weights
- states of health are valued relative to one another
- includes both quantity and quality of life
- morbidity as well as mortality
- common currency ('utility') enables comparison of alternatives

How do these aid decision-making?

- CMA - the most technically efficient way to achieve an objective (given limitations)
- CEA - the cost per unit of outcome, without valuing different outcomes (O.K. within like areas)
- CBA - whether or not an intervention is worth while (measurement?)
- CUA - provide a framework for priority setting - QALY

Economic Evaluation: Actually Doing It!

Till now the different types of economic evaluation has been discussed at a conceptual level. An illustrative example on comparing data collected from three projects (A, B, C) would help us to understand the different methods of Economic evaluation in a easier way.

A note on comparing projects

	Project A (Current Practice)	Project B	Project C
Effect	10	11	30
Cost	Rs.50	Rs.60	Rs.200
Monetary valuation of effect i.e. Benefit	Rs.54	Rs.59	Rs.162
CBA - net benefit	Rs.4	-Rs.1	-Rs.38
Avg. cost-effectiveness ratio(Cost / Effect)	Rs.5	Rs.5.5	Rs.7
Incremental cost effectiveness ratio ICER = change in cost / change in effect		(Rs.10/1) = Rs.10	(Rs.150/20) = Rs.7.5

* Costs in thousands

The three projects can be compared in many ways.

1. In terms of their effects : effects may be 'lives saved', 'reduction in pain', 'blood pressure', 'satisfaction' or 'utility', etc. In this example project C has the largest effect (30).
2. In terms of their costs: projects compared in terms of cost to individuals, the health service, or society. In this example project A has the lowest cost (Rs.50, 000).
3. In terms of a cost-benefit analysis: impact is calculated by value of benefits minus the value of costs, which is net economic impact or net benefit. In this example only project A (Rs.54,000 - Rs.50,000) has a positive net benefit (the others generate a loss for society).
4. In terms of the average cost-effectiveness ratio: This is simply cost divided by effect. Effect may be defined in terms of QALYs, which is cost-utility analysis. In this example project A has the lowest average cost per unit of effect.

These are all possible ways of presenting data on these three projects but the ultimate aim is to aid decision-making. In this example we already have an existing strategy, project A is current practice. Decision-makers need to know what is the change in cost and effect in project B and C compared with project A. It is therefore very important that the incremental cost-effectiveness ratio (ICER) is presented. This is the additional cost of achieving an additional unit of benefit (change in cost divided by change in effect). In this example project C is Rs.150,000 more expensive than project A but generates 20 more units of effect, the ICER is lower than for project B.

A useful way of presenting incremental cost-effectiveness analyses is by use of the cost-effectiveness plane. Using this graph we can plot the change in costs and benefits brought about by the new intervention On this graph

i)) The origin (0, 0) represents the existing intervention (treatment) with which a new intervention is being compared. .

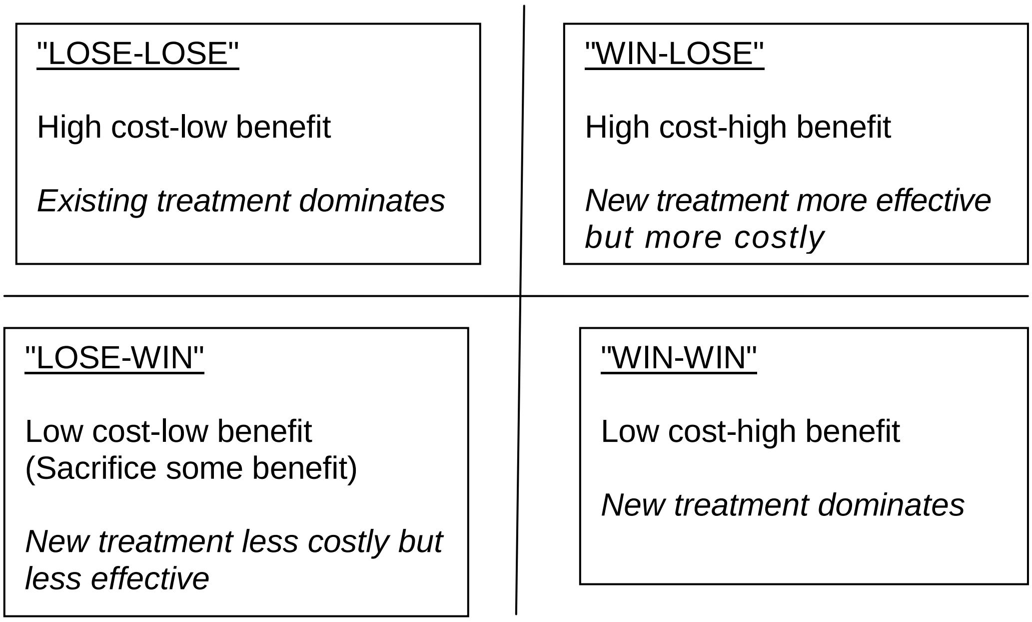
ii) The four quadrants have different policy implications.

Now if new intervention is located in

a) The north-west quadrant (lose-lose) it has higher costs and lower benefits than the existing intervention and thus the existing intervention dominates.
b) The south-east quadrant (win-win) it has lower costs and higher benefits than the existing intervention and thus the new treatment dominant.
c) The north-east (win-lose) quadrant have more benefit if they are prepared to pay more. New treatment more effective but more costly.
d) The south-west quadrant (lose-win) has low cost and low benefit (sacrifice some benefit). New treatment is less costly but less effective. The decision-maker can save resources if they are prepared to give up some benefit

If these trade-offs are considered worthwhile the new intervention can still be labeled as cost-effective.

The Cost Effective Plane



VII. Measures Of Benefits

Quality Adjusted Life Years

A quality adjusted life year (QALY) is a common measure of benefit that combines quantity and quality of life. It is calculated by estimating the total number of life-years gained from treatment and weighting each year with a quality of life score (or utility) to reflect the quality of life in that year.

For example, a patient living for 10 years but with a quality of life of say, 0.7 on a scale of 0 to 1 (with 0 as death and 1 as perfect health), would live for seven (0.7 x 10) QALYs (this simplified example assumes no improvement or deterioration in the quality of life of the patient during these 10 years). How the utility score has been obtained is described in the text above

Disability Adjusted Life Years

A disability adjusted life year (DALY) is another indicator, similar to QALYs, that was developed by the World Bank and the World Health Organization to quantify the global burden of disease. Like a QALY, it incorporates both quantity and quality of life in a common measure. The main difference is that it measures losses of healthy life rather than life-years gained. However, DALYs have been subject to a number of criticisms as a measure of health status and as a tool for setting health priorities and are not encountered often in economic evaluations published in the United Kingdom

Healthy Year Equivalents

Healthy year equivalents (HYEs) also provide a measure of quantity and quality of life. Whereas QALYs weigh each year lived in a health state independently, HYEs consider a sequence of health states and their duration and then ask respondents how many healthy years of life this scenario is equivalent to. For example, a respondent could be asked the following: if you live with a disabling hip fracture for three years, how many years of healthy life would this be equivalent to? In contrast a QALY approach would ask the respondent to rate one year lived with a disabling hip fracture, irrespective of whether he or she had the condition for one year or 10 years. In practice, HYEs have not been used often because of the complexities involved in their measurement.

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