What is an economic appraisal?

An economic appraisal is the comparative analysis of alternatives in terms of their costs and consequences. It is used as an aid in decision making because of rising expectations of health services, new technologies, demographic changes and health sector inflation. Essentially, there are not enough resources to satisfy all demands and needs. Available resources are finite. Human wants are infinite. There is a wide range of techniques but the most common forms are:

- Cost minimisation analysis
- Cost effectiveness analysis
- Cost benefit analysis
- Cost utility analysis

It is important that with all costings that the data are up-to-date and that each piece of cost information relates to the same time period. Cost information should also be comparable between sampling units. Costs of disease and other health conditions include direct costs (treatment programmes and services) and indirect costs of the loss of productivity in all aspects of an individual's life (and can also include patient expenses and informal care). Time horizon costs can occur and there is uncertainty in cost estimates (can use confidence intervals). Cost data (i.e. total cost per patient resource use) should show mean, variability (standard deviation) and precision of estimate (confidence intervals).

Economic analysis is concerned with the pursuit of efficiency and equity. This involves the allocating of resources among competing uses in public health. There is almost always a trade off between efficiency and equity in allocating resources. Priority needs to be given to those treatments which provide the greatest benefit per unit of cost.

There is a cost-consequences analysis (cost analysis) which differs from the others in that the range of costs and consequences are reported without attempting to aggregate the costs or the health benefits into a single measure. It is somewhat similar to cost effectiveness but it is applied to evaluate interventions with more than one multidimensional outcome.

**Cost Minimisation Analysis**

This is used to choose the cheapest intervention by comparing the costs of achieving a given outcome (e.g. generic versus non-generic drugs for pain). The outcomes of the intervention have to be known to be the same. This makes it possible to focus on identifying the least cost option without having to worry about measuring and comparing outcomes.

**Cost Effectiveness Analysis**

This compares the cost per unit of outcome among alternative interventions that produce the same or similar effect. A cost-effective intervention is one where there are more positive outcomes than alternative interventions. It is calculated by dividing the net cost of an intervention by its net effectiveness. In this ratio, the denominator represents positive outcomes from an intervention while the numerator represents the cost of obtaining these outcomes. The results can be displayed in a league table. A league table rank-orders interventions by their cost effectiveness rates. As one goes from least effective intervention (top of the list) to most effective (at bottom of the list), costs increase. (If costs decrease between two treatments, drop the least effective). A league table can be used to see if a number of interventions can be covered in a budget. Sometimes CEA will compare the
outcome of an intervention to no intervention. In the case of prevention, effectiveness is the avoidance of adverse outcomes.

**Disadvantages**
1. It is a narrow measure as only one outcome is being measured.
2. It is not useful in assessing a single programme.
3. It cannot be used to compare more disparate alternatives.

CEA asks "is an intervention worth the time, trouble and incurred costs relative to other alternatives?"

**Cost Benefit Analysis**

When outcomes of preventive interventions are viewed as benefits, a monetary value is assigned to each outcome. If benefits exceed costs, then the programme should be implemented. If not, it should be rejected. In other words, in CBA, an intervention is considered beneficial if the value of benefits exceeds the value of costs. Cost benefit is expressed as a ratio with the benefits as numerator and the costs as denominator. CBA is the gold standard for economists because it shows net benefit. Comparisons are more straightforward and it can tell both the absolute and relative efficiency. However, use of CBA in health is controversial. This is because the benefits of preventive interventions include improved quality of life and avoidance of pain, which are difficult to measure in monetary terms. This can be overcome somewhat by using 'willingness to pay'. This can be in the form of open ended questions (e.g. "what is the maximum you would be prepared to pay...?") or discrete choice experiments (e.g. a list of different treatment choices with the question "which would you prefer?")

**Disadvantages**
Use is limited by need to place monetary valuations on health outcomes. Cost utility analysis is more widely used as results are presented in terms of cost per QALY.

CBA asks "is the intervention worth it?"

**Cost Utility Analysis**

This is an adaptation of cost effectiveness analysis. It measures an intervention's effect on both quantitative and qualitative aspects of health (morbidity and mortality). CUA focuses on increased quality of life. It is often expressed as cost per quality-adjusted life years (QALY). QALY is a tool used to measure outcome or benefit of interventions (other measures besides monetary). It produces a number that indicates the size of health gain from an intervention. It is calculated by multiplying the estimate of length of life by the estimate of quality life (from users' perspectives or measured by health status instruments or by methods grounded in utility theory such as time trade off and standard gamble). QALYs can be estimated at individual, group or population level and permits outcomes from different health care services or interventions to be measured in common terms (so you can compare apples with pears). The net benefit is derived from calculating the number of life years saved, adding morbidity reduced and subtracting side effects reduced. There is also disability adjusted life years (DALY). This is an internationally standardised measurement which expresses years of life lost due to premature death and years lived with a disability. The advantage CUA has
over CBA and CEA is that it can be applied to more disparate interventions and it combines more than one aspect of health. However, like CEA, CUA can be applied in circumstances were the available budget is fixed and maximum benefits are sought or when the objective is fixed and the minimum cost method of achieving the objective is sought. Cost utility analysis is also used in the measurement of immediate intervention outcomes such as patient satisfaction.

Efficiency can be displayed in a league table which ranks interventions according to the extra cost per extra QALY. Activities that generate more gains for every pound of resources take priority over those that generate less. Independent interventions can be compared e.g. hip replacements versus breast screening. Incremental cost-effectiveness ratios (ICERs) can be computed for adjacent interventions. These specify how much it costs for each additional infection/condition averted by the more effective intervention relative to the less effective. ICER is calculated by dividing (cost of treatment A minus cost of treatment B) by (effects of treatment A minus effects of treatment B). Do note that when combining studies, costs may differ in the base year. Convert all costs to a common base year for comparison. Purchasing power parities (PPP) are often used to overcome the difficulties of using exchange rates to compare countries. PPP relate to the prices of the same basket of goods in different countries. Ideally, a league table should include marginal incremental cost-effectiveness data by having separate entries for different sub-groups. Besides this clinical margin, an intensity margin may also be identified, i.e. interventions may be offered at different levels of intensity to the same patient groups, e.g. annual or biannual breast screening. ICERs should be calculated along the intensity margin, e.g. comparisons of screening every 3 years to no screening, 2 years to 3 years screening and 1 year to 2 year screening. Size of population affected should also be considered and costs and QALYs may need to be disaggregated for a better comparison.

**Disadvantage**

It is not helpful in assessing a single programme.

CUA asks "what is the difference in costs and effects of intervention A compared to B and so on?"

<table>
<thead>
<tr>
<th>Cost Effectiveness Analysis</th>
<th>Cost Benefit Analysis</th>
<th>Cost Utility Analysis</th>
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</thead>
<tbody>
<tr>
<td>Benefits expressed in non-monetary terms</td>
<td>Benefits expressed in monetary terms</td>
<td>Benefits expressed in QALYs or DALYs</td>
</tr>
<tr>
<td>If an intervention is both more expensive and more effective than an alternative, than the criterion for efficiency becomes ICER</td>
<td>CBA determines if intervention offers an overall net welfare gain and how the welfare gain from that intervention compares with that from alternative interventions</td>
<td>An intervention is deemed productivity efficient relative to an alternative if it results in higher or equal benefits at a lower cost</td>
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<tr>
<td>Outcomes are measured in life years saved/gained or improvements in functional status. Can also be additional</td>
<td>Outcomes are resource savings</td>
<td>Outcomes are improvements in health status</td>
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**Cost Offset**

This is used a lot in relation to public health services. It refers to the provision of preventive interventions resulting in reduced utilization of other health or social services (i.e. cost of prevention offsets treatment or other costs incurred if a problem is not prevented). An example of this would be for every pound spent on promoting safe sex, eleven pounds are saved in STI treatment costs. However, there can be a time lag between the health behavioural change and cost reductions related to health improvements. It is recommended that you don't overemphasize financial incentives as a means to increase availability of preventive interventions or services.

**Further readings**


