Basic Economic Analysis

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Contents

- Introduction
- Resource use and costs
- Health Benefits
- Economic analysis
- Conclusions
Introduction

- **What is economics?**
  - Choices under scarcity
  - In health care, to allocate available resources to maximise health benefits

- **Why conduct an economic evaluation alongside your clinical trial?**
  - Inform decision making by quantifying expected health benefits and costs and the uncertainty around them
Example: RITA-3 trial

- Randomised intervention for treatment of angina
- Patients with unstable angina or non-ST-elevation MI
- Routine early angiography with myocardial revascularisation as indicated versus a conservative strategy
- $N_t = 895; N_c = 915; 5$ years
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Resource use

- Costs per patient are volume of resource x unit cost of each resource
- Which resource use? Identify ‘cost drivers’
  - Angiography, revascularisation procedure, days in ward, ITU and CCU
  - Acute cardiac medication during admission
  - Long term cardiac medication
  - GP and other primary care
  - Hospitalisation for other events
  - What else? Non-cardiac related? Private costs? days lost from work? (Perspective)
Collecting resource use

- **Patient specific**
  - Trial case record forms
  - Patient questionnaires: Postal? Face-to-face interview?
  - Hospital notes, GP notes
  - Administration system records
  - Resource use diaries

- **Other**
  - Questionnaire completed by trial coordinator at each centre
  - Collecting resource use on a sample of patients
Unit costs

- Try and obtain local costs if possible
  - Hospital administration / finance dept
  - NHS reference costs (detail available on CD from Quarry House)
  - Questionnaire
  - Expert opinion

- National sources
  - Drugs - BNF and PPA website
  - Other trial reports, HTA reports and NICE appraisals (adjust for inflation)
  - PSSRU website
  - Manufacturers list prices (rarely disclose discounts!)
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Health Benefits

- Disease-specific measures *versus* generic measures *versus* utility measures
  - Disease specific (e.g., blood pressure) easier to collect but do not easily relate to mortality or health-related quality of life
  - *Generic measures* may be measured on several dimensions e.g., SF36
  - *Utility measures* create a single index number scaled between full health (1) and death (0), and can be worse than death
The EQ-5D

Values of sample of 3400 members of the general public
Expressing Health Benefit in QALYs

Health Related Quality of Life (weights)

Health state duration (yrs)

With programme
Without programme

QALYs gained

Death 1  Death 2

Health state duration (yrs)
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What not to do...

- Don’t use cost minimisation analysis
  - Costs and health benefits have a joint distribution, so t-tests of health benefits alone are not valid

- Don’t use average cost-effectiveness ratio

This only compares A with “do nothing” and B with “do nothing”. We want to compare A with B.
Economic Evaluation Potential Results

- New intervention more costly and less beneficial
- New intervention more costly and more beneficial
- New intervention less costly and less beneficial
- New intervention less costly and more beneficial

Difference in Costs vs. Difference in Benefits
Economic Analysis

- Use incremental cost effectiveness ratio

Decision Rule: $\frac{\text{Difference in mean costs}}{\text{Difference in mean benefits}} < \text{Societal valuation of health outcome}$

- In previous example ICER = $\frac{6000 - 3000}{3 - 2} = £3000$ per QALY

- Usually compared with other funded treatments, benchmark around £20-£40000 per QALY gained
### RITA-3 Results at 4 years

<table>
<thead>
<tr>
<th></th>
<th>Intervention arm n=895</th>
<th>Conservative arm n=915</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td>60 deaths</td>
<td>80 deaths</td>
</tr>
<tr>
<td><strong>Mean HRQol (change)</strong></td>
<td>0.08</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Total costs</strong></td>
<td>£7593</td>
<td>£6000</td>
</tr>
<tr>
<td><strong>Total QALYs</strong></td>
<td>2.579</td>
<td>2.500</td>
</tr>
</tbody>
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**Incremental cost effectiveness ratio = £1593 / 0.079 = 20170**

Results are not yet published, therefore illustrative values given instead.
Other considerations

- Discount health benefits and costs if >1 year
- Do sensitivity analyses: test robustness of conclusions to changes in assumptions made
- Is the length of the trial ‘sufficient’? Consider extrapolation.
- If follow up time is of different lengths between patients (censoring) special analytical techniques are needed
Conclusions

- Economics is not about saving money.
- It is about trying to do the most good within available resources.
- We all make choices, economic evaluation makes those choices explicit.