Economic Model Choice, Validation and Sharing

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Today’s research for tomorrow’s health

Uncertainty for Decision Modeling Concepts and Terminology

<table>
<thead>
<tr>
<th>Preferred Term</th>
<th>Concept</th>
<th>Other Terms Sometimes Employed</th>
<th>Analogous Concept in Regression</th>
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</thead>
<tbody>
<tr>
<td>Stochastic uncertainty</td>
<td>Random variability in outcomes between identical patients</td>
<td>Variability; Monte Carlo error; first-order uncertainty</td>
<td>Error term</td>
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<tr>
<td>Parameter uncertainty</td>
<td>The uncertainty in estimation of the parameter of interest</td>
<td>Second-order uncertainty</td>
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<tr>
<td>Heterogeneity</td>
<td>The variability between patients that can be attributed to characteristics of those patients</td>
<td>Variability; observed or explained heterogeneity</td>
<td>Standard error of the estimate</td>
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<tr>
<td>Structural uncertainty</td>
<td>The assumptions inherent in the decision model</td>
<td>Model uncertainty</td>
<td>(or the extent to which the dependent variable varies by patient characteristics)</td>
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<td>The form of the regression model (e.g., linear, log-linear, etc.)</td>
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Approximations are unavoidable in modeling

• “Remember that all models are wrong: the practical question is how wrong do they have to be to not to be useful*”

• The search for ‘absolute accuracy’:
  - adds complexity
  - imposes costs (evidence gathering, computation time)
  - complicates communication
  - increases potential modeling errors
  - need to justify in terms of better decisions


Non-scientific factors influencing model choice

• Monopoly: complex models are more difficult to
  - develop or replicate
  - modify
  - adapt
  - submit
  - (validate)

• Preferable results for the sponsor
  - maximising the impact of product benefits
  - ignoring or minimising the impact comparative disadvantages of products
Economic model choice should be based on scientific rationale

Potential steps to justify model choice

1. Consensus on the research question
2. Review
   - Literature review of published models in related fields
   - Patient pathways
   - Economically meaningful outcomes
3. Draft conceptual modelling framework
4. Challenge meeting with relevant clinicians and health economists
5. Final conceptual modeling framework
6. Model building
7. Model validation
8. Publication and sharing models