

Economic Model Choice, Validation and Sharing

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Uncertainty for Decision Modeling Concepts and Terminology

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

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Ref: Briggs A H et al. *Med Decis Making* 2012;32:722-732

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

**Schulpher M. ISPOR, Athens 2008 based upon Box and Draper (1987) Empirical Model-Building and Response Surfaces p.424 Wiley*

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

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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

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