

The Role of Probabilistic Sensitivity Analysis in NICE Technology Appraisal

Mark Sculpher, PhD

Centre for Health Economics

University of York, UK

SMDM Symposium on Probabilistic Sensitivity Analysis, 18th October 2004

The NICE Task Group on Economic Evaluation

- NICE provides guidance on whether new technologies are cost-effective for use in the NHS
- Task Group recommend appropriate methods for economic evaluation to inform appraisal
- General approach
 - What is required for decision making?
 - Methods driven by the requirements of decision making
- Embraced concept of 'reference case'
 - Fulfil needs of decision making
 - Promote consistency between and within appraisals

The Task Group on uncertainty

“...it is important for the Appraisal Committee to know about the uncertainty associated with clinical and cost effectiveness information”

(NICE Methods Guidance 2004; p. 20)

- Probabilistic sensitivity analysis required to assess parameter uncertainty

But why...?

Two decisions for new health care technologies

Is the technology cost-effective based on existing evidence?

Is additional research cost-effective?

		Yes	No
Yes	Adopt Demand additional evidence Revisit decision	Do not adopt Demand additional evidence Revisit decision	
No	Adopt Do not demand extra evidence Review decision if other evidence emerges	Do not adopt Do not demand extra evidence Review decision if other evidence emerges	

The adoption decision at NICE

- NICE's aim: to maximise health gain from available resources
- Implications for analysis: maximise a health-focussed objective function subject to a budget constraint
- Adoption decision based on *expected cost-effectiveness*
- No role for traditional rules of statistical inference

The research decision at NICE

- A failure to consider the need for future research would lead to new technologies being adopted on the basis of minimal evidence
- The need for future research is addressed in several ways:
 - Adoption within a clinical trial or register study
 - Adoption conditional on results
 - Commissioned research
 - A review date is always stated in guidance

A focus on *decision* uncertainty

- Individual parameter uncertainty is of no direct relevance of itself
- The joint contribution of parameter uncertainty on decision uncertainty is the focus
- The probability that, in reimbursing this technology, we are making the wrong decision (error probability)
- Structural uncertainty needs to be dealt with
 - Some structural assumptions can be parameterised
 - Assign priors to alternative structural assumptions
 - Alternative scenarios

Assessing the consequences of decision uncertainty

- Some form of assessment of the consequences of decision uncertainty needed
- Formal methods available to address value of additional research: expected value of perfect information
- These are recommended in the guidance but not as part of the reference case
 - Should be based on the most appropriate model
 - Current pilot study on use of VOI using probabilistic models submitted to NICE
- Informal assessment of what the consequences of the error probability mean for future research

Either way, NICE needs probabilistic sensitivity analysis

Conclusion

- Decision making about reimbursement has to be based on addressing two related questions: adoption and research
- To reject traditional rules of inference as a basis for decision making does not mean uncertainty is irrelevant
- Need to characterise decision uncertainty and its consequences to assess whether additional research is required
- Hence probabilistic sensitivity analysis needs to be part of NICE's reference case