

Sensitivity analysis in economic evaluation: What policy impact? What do policy makers say?

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Definitions

Sensitivity analysis (SA):

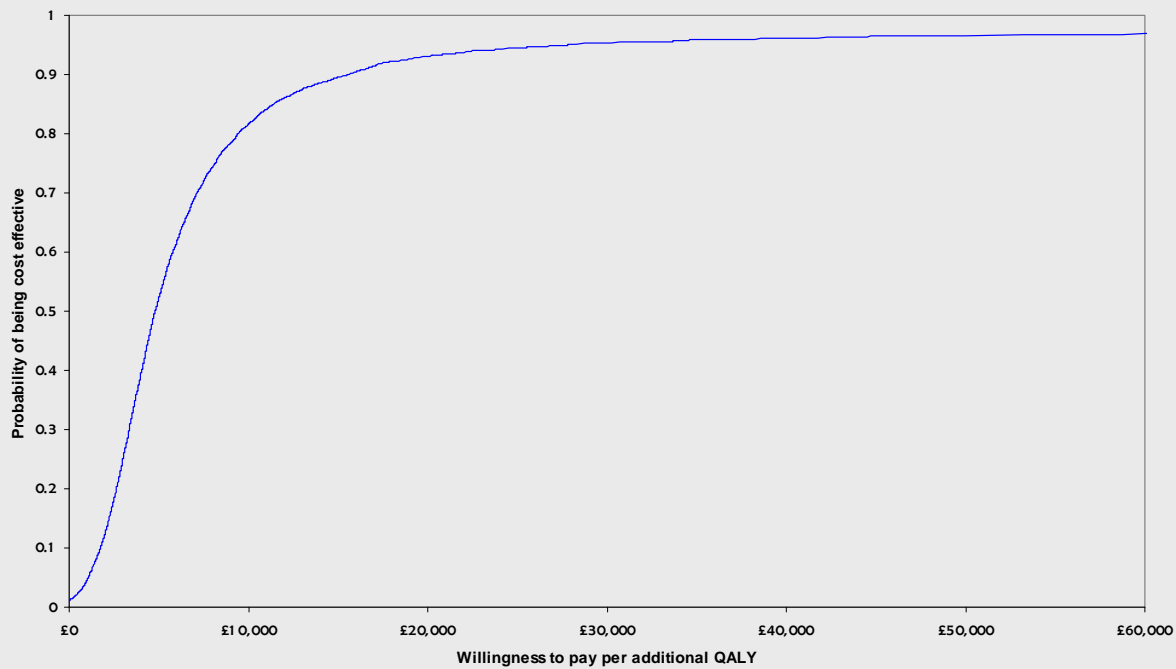
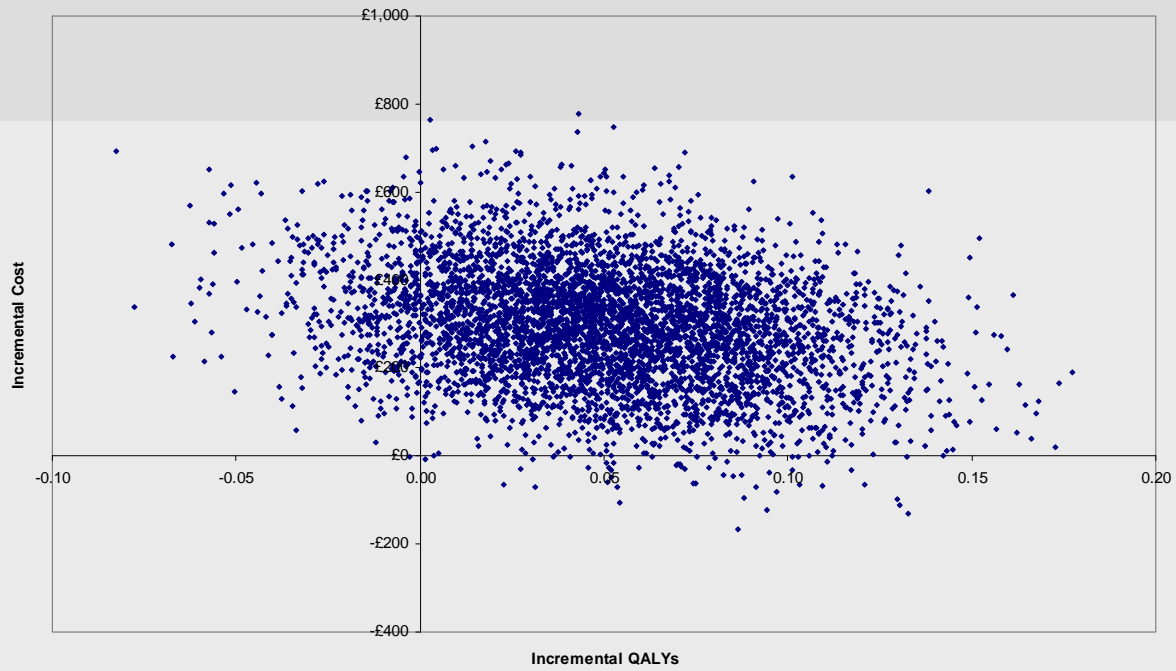
- Analysis that aims to assess and determine the influence of input parameters on the outcomes of an economic evaluation

Deterministic sensitivity analysis (DSA):

- A form of SA in which the values of input parameters are varied

Probabilistic sensitivity analysis (PSA):

- A form of SA in which probability distributions are applied to input parameters and parameter values drawn at random from these distributions



Background / Objectives

CEAs are increasingly guiding health care decisions, hence the importance of methodological rigour

- And rigour requirements extend to ‘uncertainty’

Our research sought to:

- Define ‘good practice’ in SA
- Audit current SA practice at NICE
- Understand the policy impact of SA
- Elicit policy maker views on SA

Research approach

Sample

- 15 CEAs undertaken to inform recent NICE technology appraisals (e.g. cardiac resynchronisation for heart failure, stapled haemorrhoidopexy for haemorrhoids)

Methods

- Review of technical reports to document SA methods
- Review of NICE policy/guidance documents for reference to SA and for assessment of 'policy impact'
- Analysis of interview data from NICE appraisal committee members to understand policy use and value of SA

Results: Audit of current practice

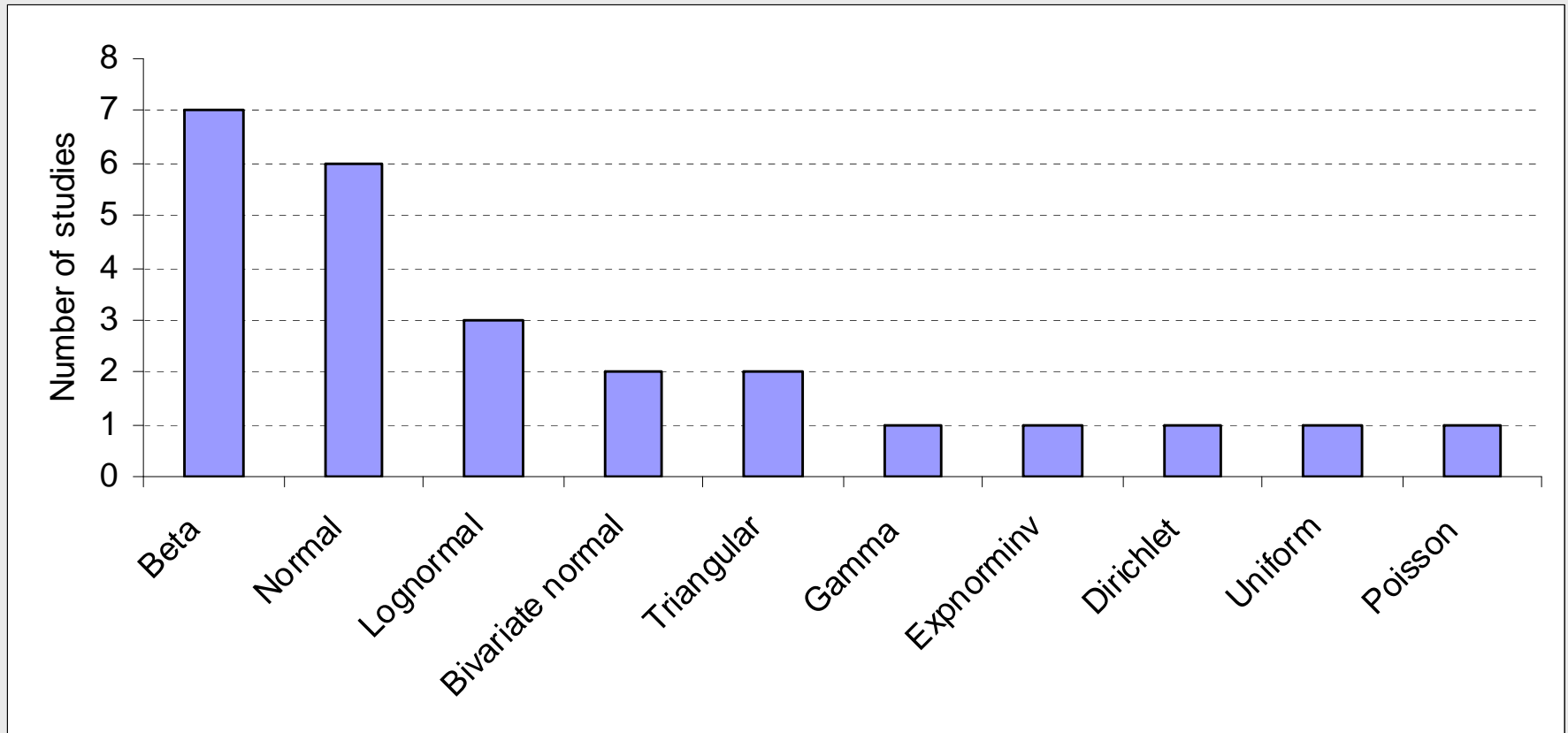
SA practice was highly variable and often not reported clearly

Parameter ranges in DSA, and parameter distributions in PSA, were rarely justified

Correlation between parameters was considered in only one analysis

In PSA, the choice of distribution for similar parameters varied between analyses

Distributions for patient progression parameters



Review of policy documents (1)

Parameter uncertainty frequently cited

- *“The committee considered that there were significant uncertainties relating to the assumptions in the models, most notably about long-term disease progression and stabilisation while responding to TNF- α inhibitors and conventional DMARDs in patients with established disease.” (130)*

SA results cited in policy documents came mainly from DSAs

Review of policy documents (2)

The search for sub-groups

- *“The Committee noted that the ICER ... was £23,100 per QALY gained in the subgroup of patients in whom 90% or more tumour resection had been achieved. It concluded that carmustine implants would be cost effective for this subgroup of patients.” (121)*

High levels of uncertainty tended to be associated with negative decisions

- *“Given the uncertainty around the range of ICERs for this scenario ... the Committee agreed that ezetimibe coadministered with a statin should not be recommended.” (132)*

Views of policy makers (1)

Support for both DSA and PSA

- *“The most useful thing about the economic analysis is it focuses the discussion on what actually matters. ... What is it that can actually switch a decision on this?” [3]*
- *“I think it’s very good to have probabilistic sensitivity analysis to include uncertainty around your parameter estimates, rather than just take point estimates ... and then do sensitivity analysis around that.” [2]*

Views of policy makers (2)

Partial coverage of uncertainty

- *“I don't always necessarily believe the confidence intervals that come up from the modelling ... I think sometimes they're too narrow because they don't take into account all the uncertainties ... I think the health economist don't take enough cognisance of uncertainty.” [6]*

Sub-optimal communication of results

- *“...they do the sensitivity models but it's very difficult to get your head around that, I think, as a non-health economist.” [7]*
- *“The other area which ... has come up in the past - and people do struggle with - is uncertainty. And I don't think anybody quite knows how to handle cost-effectiveness acceptability curves at the moment. For some people it's a technical problem of understanding what they are. For those who understand what they are, they still don't understand what they should do with it.” [4]*

Conclusions

SA practice was highly variable and often not reported clearly

Both DSA and PSA have their place; the former being particularly helpful in the sub-group search

The association between high levels of uncertainty and negative decisions requires further discussion

Effective communication between analysts and policy makers remains a challenge