



Title	Avoiding and Identifying Errors in Health Technology Assessment Models
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Aim

To provide a basis for further research on improving modeling for HTA decision support; and to describe the model development process as perceived by practitioners in the HTA community.

Conclusions and results

Four primary objectives are to: (1) describe the current understanding of errors in HTA models; (2) understand current processes for avoiding errors in developing, debugging, and critically appraising models for errors; (3) develop taxonomy of model errors; and (4) explore methods and procedures to reduce the occurrence of errors in models.

There was no common language in the discussion of modeling errors, with inconsistency in the perceived boundaries of what constitutes an error. Asked about the definition of model error, interviewees tended to exclude matters of judgment from being errors and focus on "slips" and "lapses", but this comprised less than 20% of the discussion on errors. Interviewees focused primarily on the softer elements of the modeling process, eg, defining the decision question and conceptual modeling, mostly the realms of judgment, skills, experience, and training. The original focus concerned model errors, but it may be more useful to refer to modeling risks. Several interviewees discussed concepts of validation and verification, with notable consistency in interpretation. The HTA error classifications were compared against existing classifications of model errors in the broader literature. Interviewees discussed examples of all major error types. Clarity and mutual understanding were identified as key issues for avoiding errors in HTA models. However, the implementation of techniques and processes for ensuring clarity is not framed within any overall strategy for structuring complex problems.

Recommendations

Published definitions of model validation and verification are consistent with the views expressed by the HTA

community and are recommended as the basis for further discussions of model credibility. Such discussions should focus on risks, including errors of implementation, errors in matters of judgment, and violations. Research on modeling risks should recognize the complex network of cognitive breakdowns that lead to errors in models; existing research on the cognitive basis of human error should be included in an examination of modeling errors. There is a need to improve understanding of the skills needed to develop, operate, and use HTA models. Model credibility is the central concern of decision-makers using models. Interaction between modeler and decision maker in developing a mutual understanding of a model establishes that model's significance and its warranty. Hence, it is crucial not to externalize the concept of model validation from decision-makers and the decision-making process.

Methods

Qualitative study including in-depth interviews and methodological review.

Further research/reviews required

Further research on the theory of model verification and validation is required to provide a solid base for model development and processes for producing evidence-based policy and guidance. Research is required in the model development process, specifically (1) techniques and processes for structuring complex HTA models and (2) the model design and specification process and techniques reporting. Research is required to define, implement, and evaluate modifications to the modeling process with the aim to prevent errors and improve identification of errors in models.