

ADDIS: multi-criteria decision support for evidence-based medicine

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Evidence-based medical decision making should ideally be based on all available evidence from clinical trials. However, the relevant evidence is often hard to identify, and while most decisions involve multiple criteria with inherent uncertainty, the commonly used statistical methods allow only pair-wise comparisons in a single criterion, and decisions are made without explicit multi-criteria models.

To address these shortcomings, we develop the Aggregate Data Drug Information System (ADDIS), a decision support system for evidence-based medicine. ADDIS incorporates a database of clinical trials to automatically construct state of the art statistical models that robustly combine evidence from multiple studies comparing two or more treatment alternatives, known as network meta-analysis. In addition, ADDIS supports the decision maker in constructing multi-criteria decision models that take into account and quantify decision uncertainty.

To assist medical decision makers who may not have a lot of expertise in statistical methods or multi-criteria modelling, we offer analysis tools and decision models of varying complexity. The less complex models help the user understand the more complex ones. For two dimensional problems, for example, a simple stochastic simulation method that plots samples on a risk-benefit plane and generates an acceptability curve is provided. This enables insightful analysis of problems with two alternatives and two criteria, and can be a "stepping stone" toward understanding stochastic multi-criteria acceptability analysis (SMAA) based models for problems with more than two criteria. In addition, for those who do not understand or trust network meta-analysis models, simple pair-wise meta-analysis models are provided and can be used as a basis for decision models with only two alternatives.

We briefly describe the data model that underlies model generation in ADDIS. Then, we discuss the supported types of evidence synthesis and decision modeling. Finally, we discuss how ADDIS could positively change the way of thinking about and working with evidence-based medicine, and what needs to be done to achieve this vision.

ADDIS is open source and freely available from <http://drugis.org/>.

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