



Decision Analysis: Where Do We Go From Here?

A Medical Decision Making Perspective

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The field of medical decision making

- Modeling to aid diagnostic and therapeutic choice by physicians and treatment choice by patients
- Cost-effectiveness modeling to inform public policy
- Decision psychology: Understanding/ predicting patient and physician choices

Influences

Welfare
Economics

Statistics

Behavioral
Decision
Making

Medical
Decision
Making

Decision
Analysis

Public
Health

Artificial
Intelligence

Decision analysis perspective in MDM

Bayesian principles accepted but not always practiced.

(+) Bayes rule for diagnostic tests

(+) Probabilistic sensitivity analysis

(-) Statisticians want hypothesis tests

(-) In C-E analyses, statisticians want to estimate $E[\Delta C/\Delta E]$ rather than $E[\Delta C]/E[\Delta E]$

(-) Controversial procedures such as AHP accepted without question

Medical decision analyses

- Are becoming routine and accepted to determine generic treatment policy
- Now tend to be published in focused clinical journals rather than *Medical Decision Making*
- Do not yet have a prominent bedside presence

Medical decision analysis tools

- Uncertainty modeled by decision trees, sometimes with Markov chains at terminal nodes
- Preference modeling: The quality-adjusted life year (QALY)
- Preference assessment: Visual analog scale, time trade-off, standard gamble, health-status questionnaire (SF-36, EuroQol, HUI, ...)

... Medical decision analysis tools

- Multiattribute utility
- Sensitivity analysis
- Decision tree software incorporating Markov chains (Data, SMLTree, Decision Maker, StoTree)
- Basic tools accepted and used
- Sophisticated tools (e.g. utility models) not practical or not understood

Do MDM applications drive advances in decision analysis methodology?

- QALYs (Pliskin, Shepard & Weinstein 1980)
- Black pills and white pills (Howard 1984, ...)
- Probabilistic similarity networks (Heckerman 1991)
- Stochastic trees (Hazen 1996)
- Other ... ? ANSWER: NOT MUCH

Do MDM applications drive advances in behavioral decision psychology?

- YES! Active and ongoing research
- Medical decision psychology
- Medical preference assessment
- Evaluation of interventions

Examples of current issues

- Why do those currently experiencing a poor health state evaluate its quality higher than healthy individuals?
- Can we infer utility scores from responses on standard health-status questionnaires (SF-36, EuroQol, HUI...)?
- How can we measure the effectiveness of decision-aiding interventions?
- How does risk communication affect patient choice?

Where do we go from here?

- MDM applications will continue to stimulate research in decision psychology
- MDM applications may spawn advances in DA methodology (e.g., bedside DA), but empirical evaluation of success must draw from behavioral decision psychology