UNIVERSITY OF TWENTE.

COMPARING PATIENT PREFERENCES FOR MEDICAL TREATMENTS WITH PROMETHEE II: A PILOT STUDY

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OVERVIEW

- Our decision context and requirements
- Choice of MCDA method
- Pilot study with PROMETHEE II
  - Methods
  - Main results
  - Sensitivity analysis (esp. relevant!)
- Discussion
- Future work

OUR DECISION CONTEXT AND REQUIREMENTS

PROBLEM DEFINITION

- Decisions before drugs can be used:

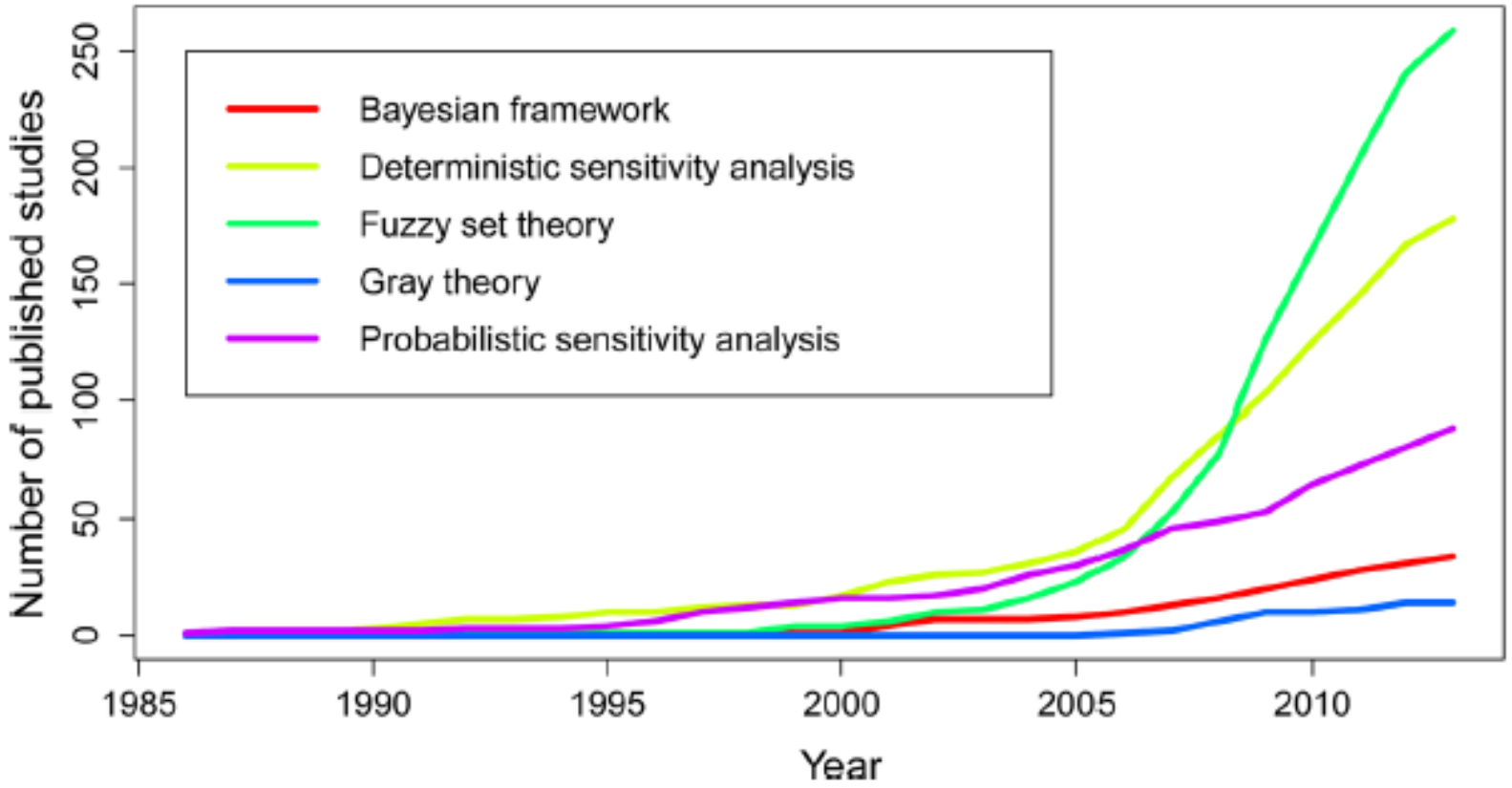
  Market Access → Reimbursement → Prescribe
- MCDA a structured and transparent method to guide process
  - Growing interest in health field (Diaby 2013, Marsh 2014, ISPOR taskforce)
- Patient perspective important, can be measured with stated preference methods → This yields probabilistic preference data

- **How can we transparently integrate these (probabilistic) preferences in a structured MCDA process?**

OUR DECISION CONTEXT AND REQUIREMENTS

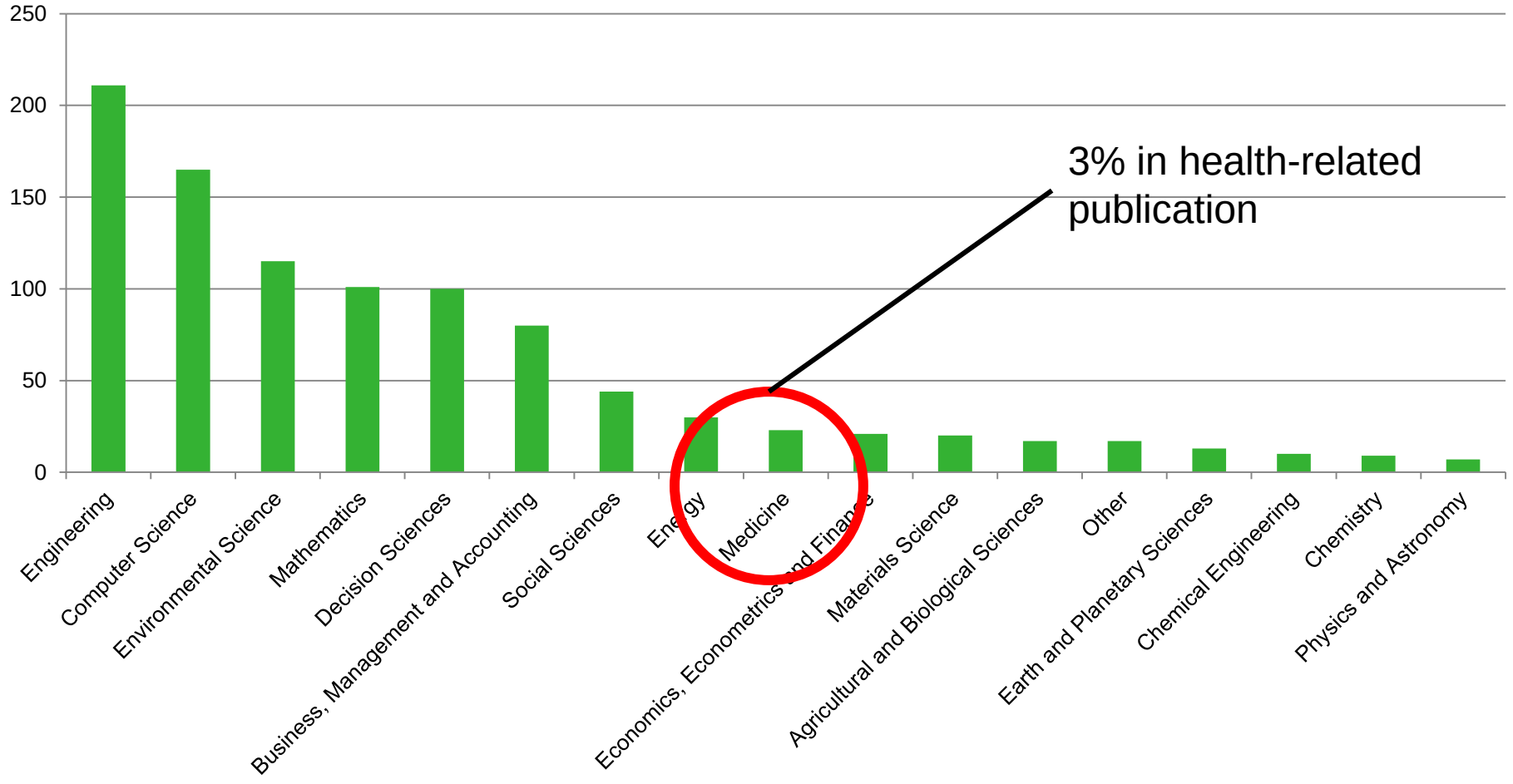
WHAT MCDA METHOD TO USE IN CONJUNCTION WITH PROBABILISTIC DATA?

- Broekhuizen 2015 review approaches to deal with uncertainty in MCDA (569 studies identified)



REVIEW OF APPROACHES TO DEAL WITH UNCERTAINTY

RESULTS: RESEARCH AREAS



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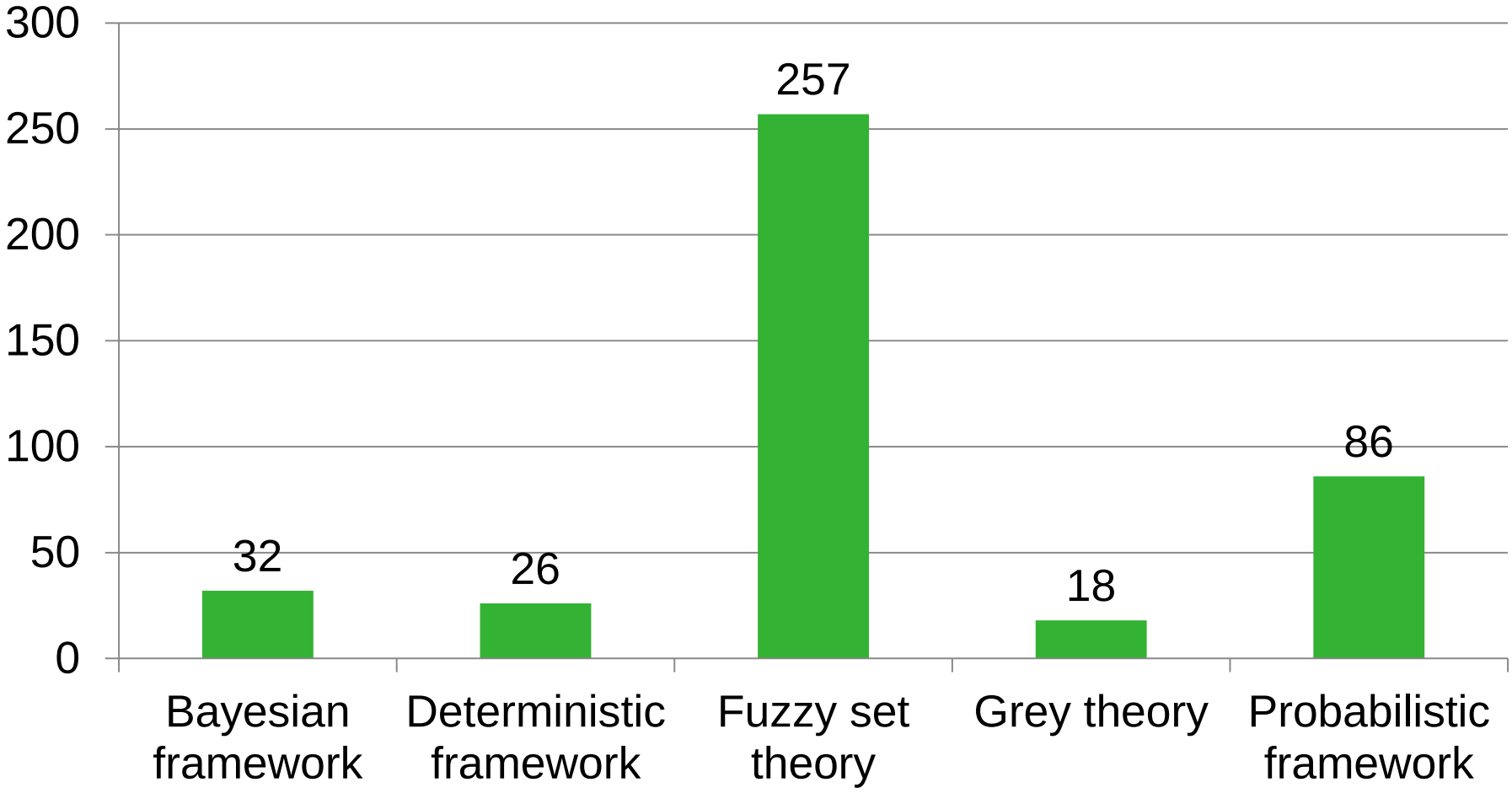
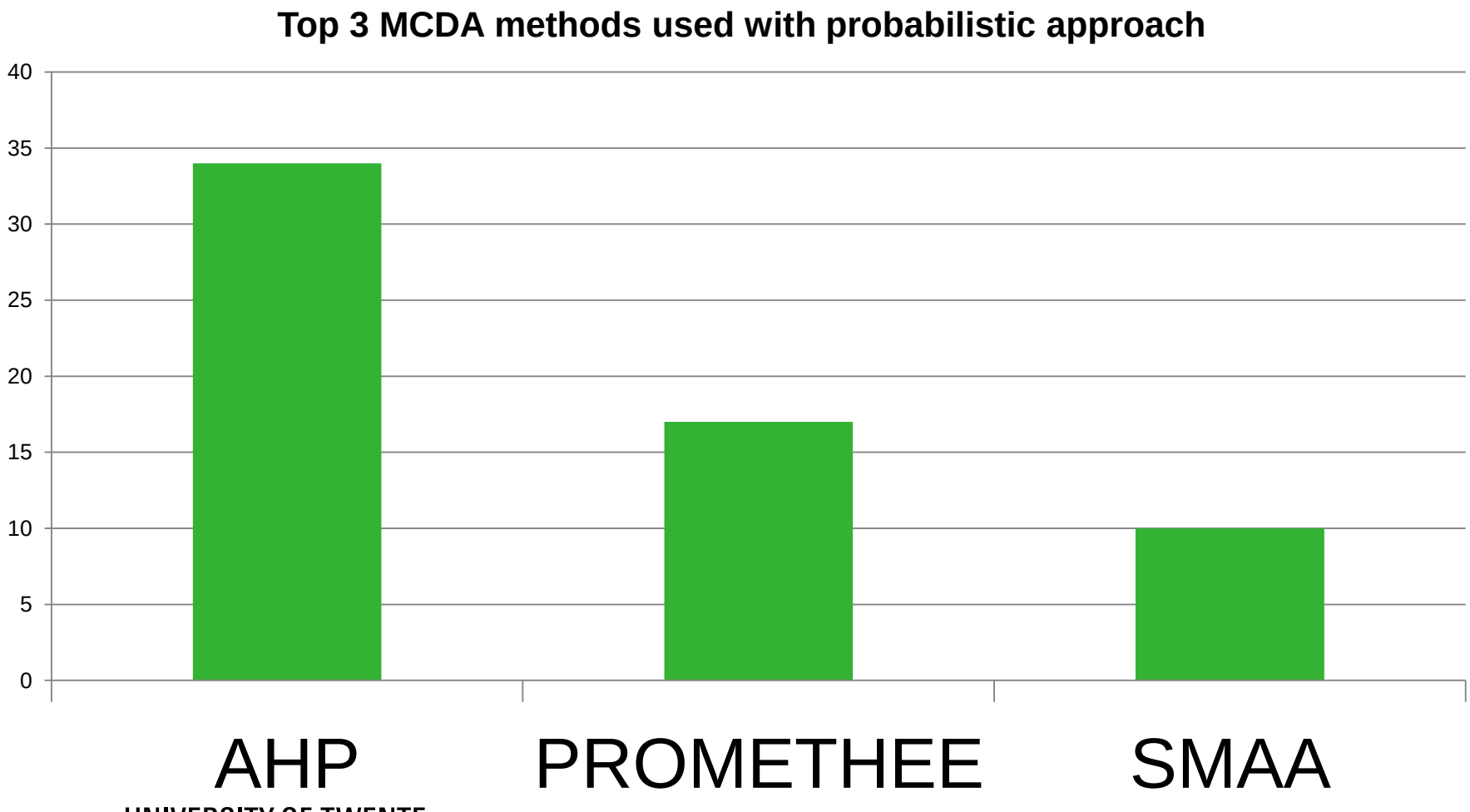
RESULTS: UNCERTAINTY APPROACHES



OUR DECISION CONTEXT AND REQUIREMENTS

WHAT MCDA METHOD TO USE IN CONJUNCTION WITH PROBABILISTIC DATA?



THE PILOT STUDY
DESCRIPTION

- *Goal*: choose an antidepressant
- *Alternatives*: Venlafaxine, Bupropion, Duloxetine
- *Criteria*:
  1) Response to treatment
  2) Achieve remission
  3) Minor side effects
  4) Major side effects
- *Weights* AHP panel session with 12 patients

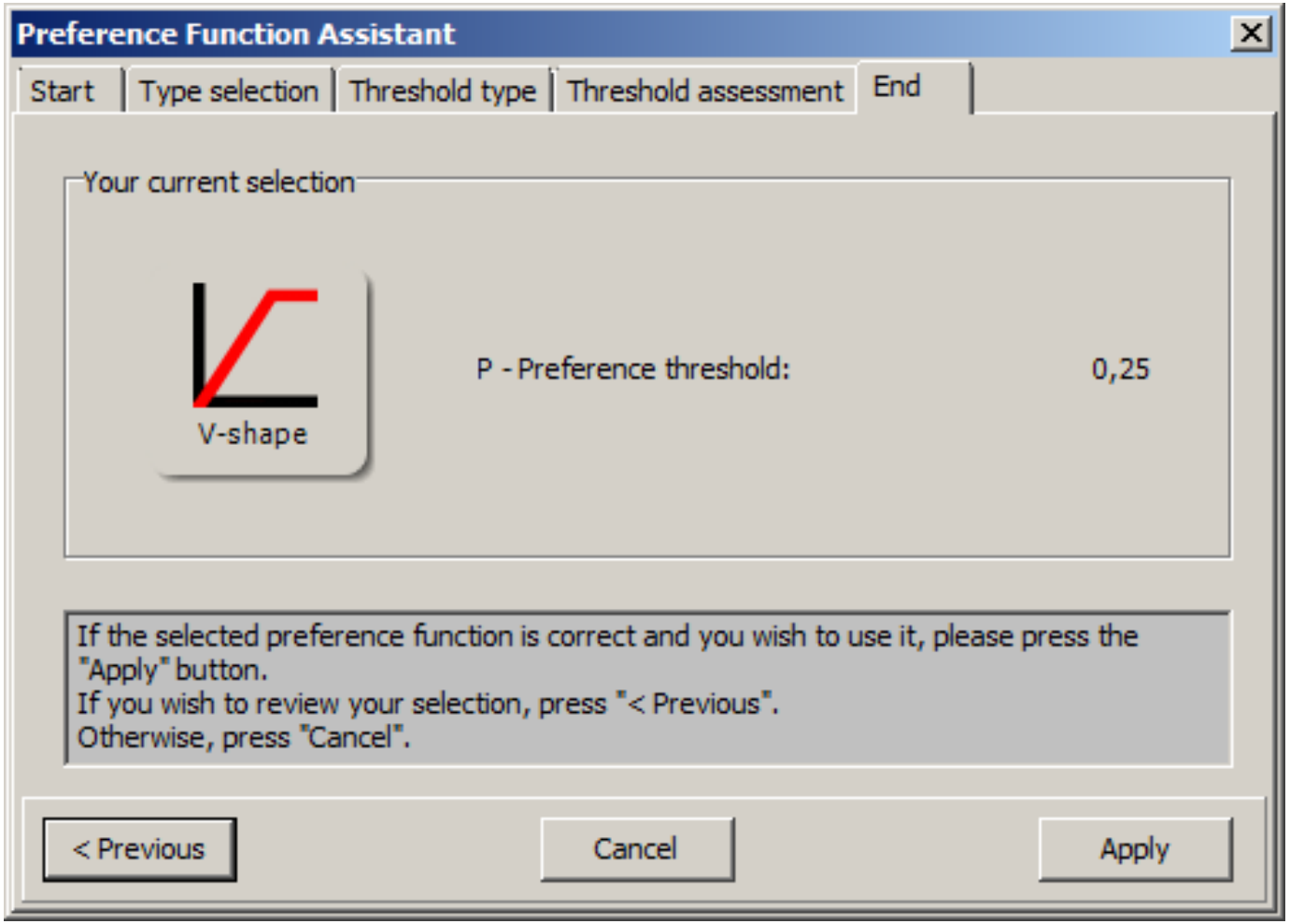
  But method would readily extend to larger sample sizes
- *Performance scores* derived from clinical trials that compared the drugs with placebo.
- Modeled in *Visual PROMETHEE (academic edition)* and *R*

THE PILOT STUDY

SOURCE DATA

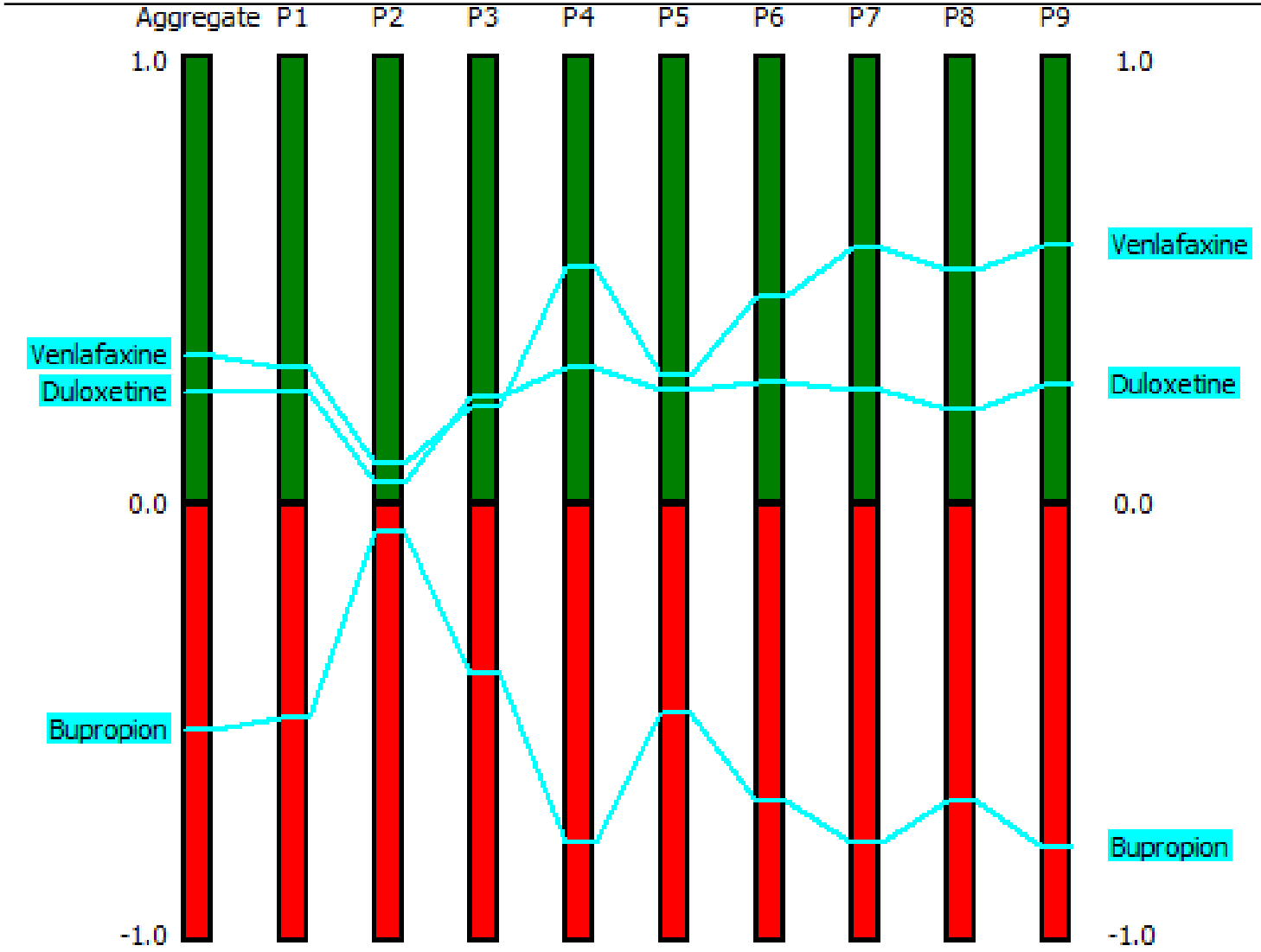
	Benefits		Risks	
	Response	Remission	Adverse events	Severe adverse events
Median weight (range)	0.62 (0.36 to 0.78)	0.16 (0.07 to 0.34)	0.04 (0.01 to 0.23)	0.19 (0.02 to 0.25)
Odds ratio (95% CI)				
Dul vs Plc	1.95 (1.61 to 2.36)	1.91 (1.56 to 2.34)	1.91 (1.50 to 2.43)	0.96 (0.39 to 2.35)
Ven vs Plc	2.04 (1.74 to 2.39)	1.97 (1.64 to 2.36)	1.80 (1.28 to 2.53) ⌗	1.27 (0.81 to 2.00)
Bup vs Plc	1.48 (1.20 to 1.82)	1.46 (1.17 to 1.81)	1.55 (1.10 to 2.18) ⌗	0.39 (0.16 to 0.95)

PREFERENCE FUNCTION USED



MAIN RESULTS

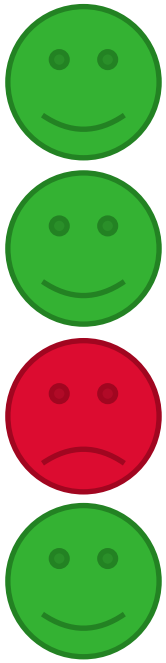
GLOBAL FLOWS AT AGGREGATE (GROUP) LEVEL AND FOR 9 PATIENTS



SENSITIVITY TO VARIATION IN WEIGHTS

RANK STABILITY INTERVALS

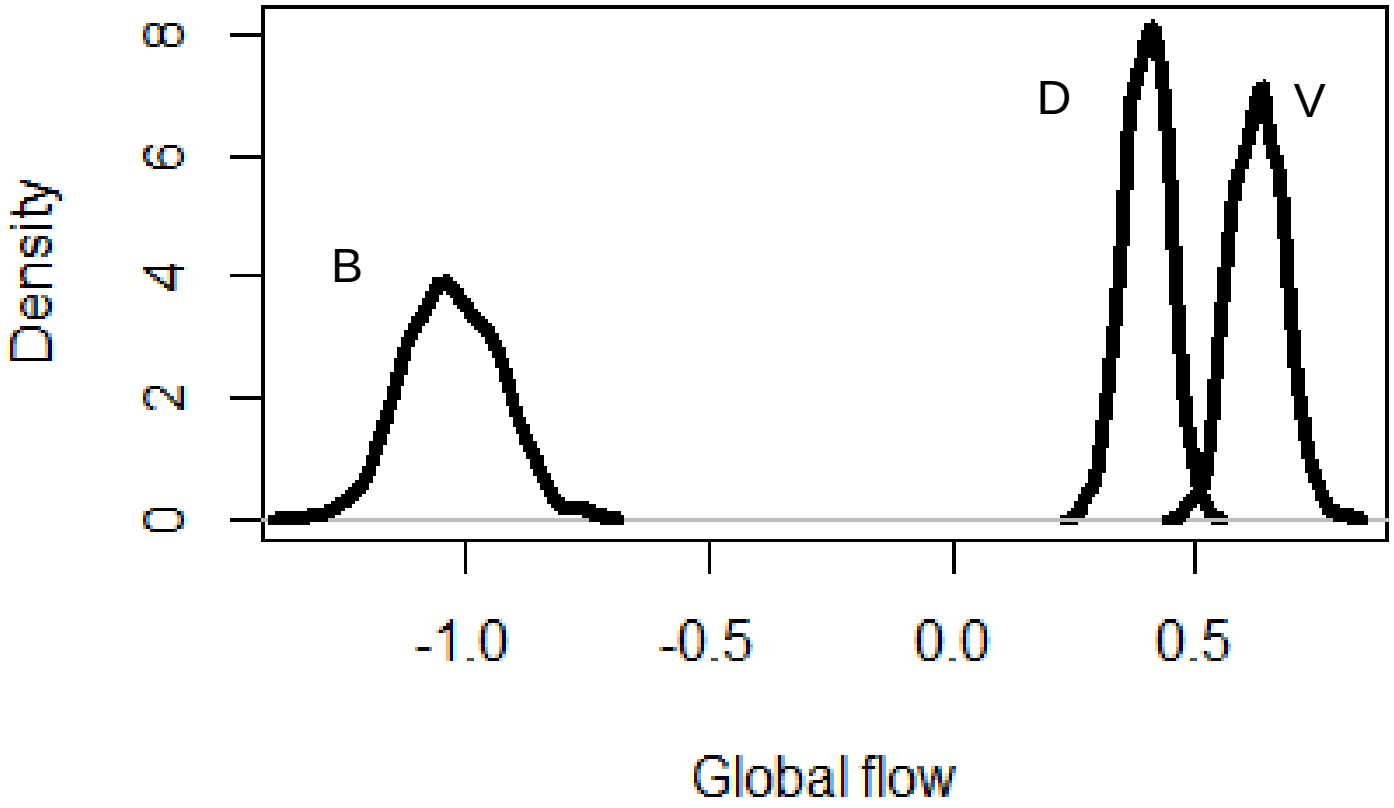
- Response: [22%;100%],
  median = 62%, range 36% to 78%
- Remission: [0%;100%],
  median = 16%, range 7% to 34%
- Side effects: [0%;23%],
  median = 4%, range 1% to 23%
- Severe side effects: [0%;46%],
  median = 19%, range 2% to 25%



SENSITIVITY TO VARIATION WEIGHTS

PROBABILISTIC ANALYSIS

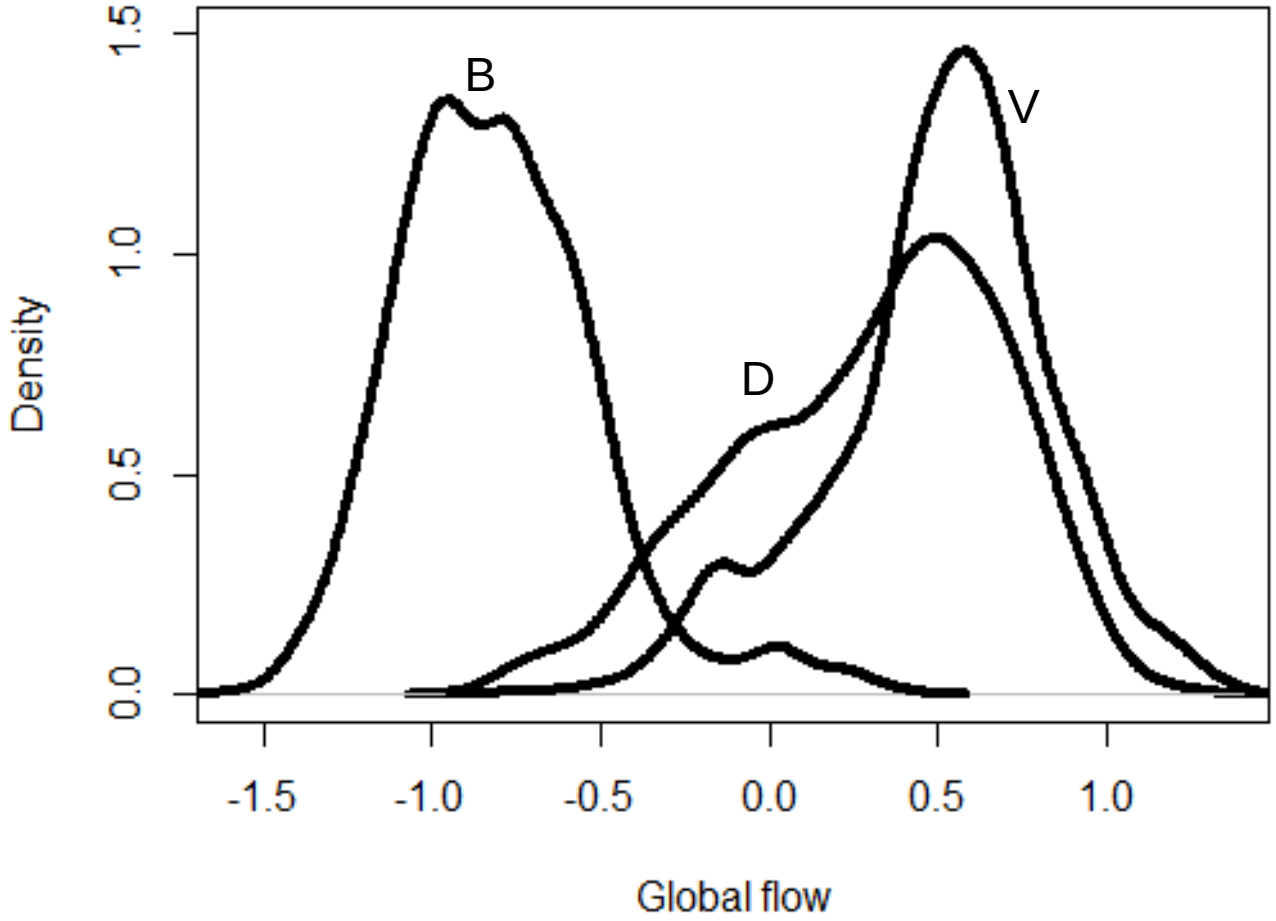
- Bootstrapping weights, repeat 1000 times



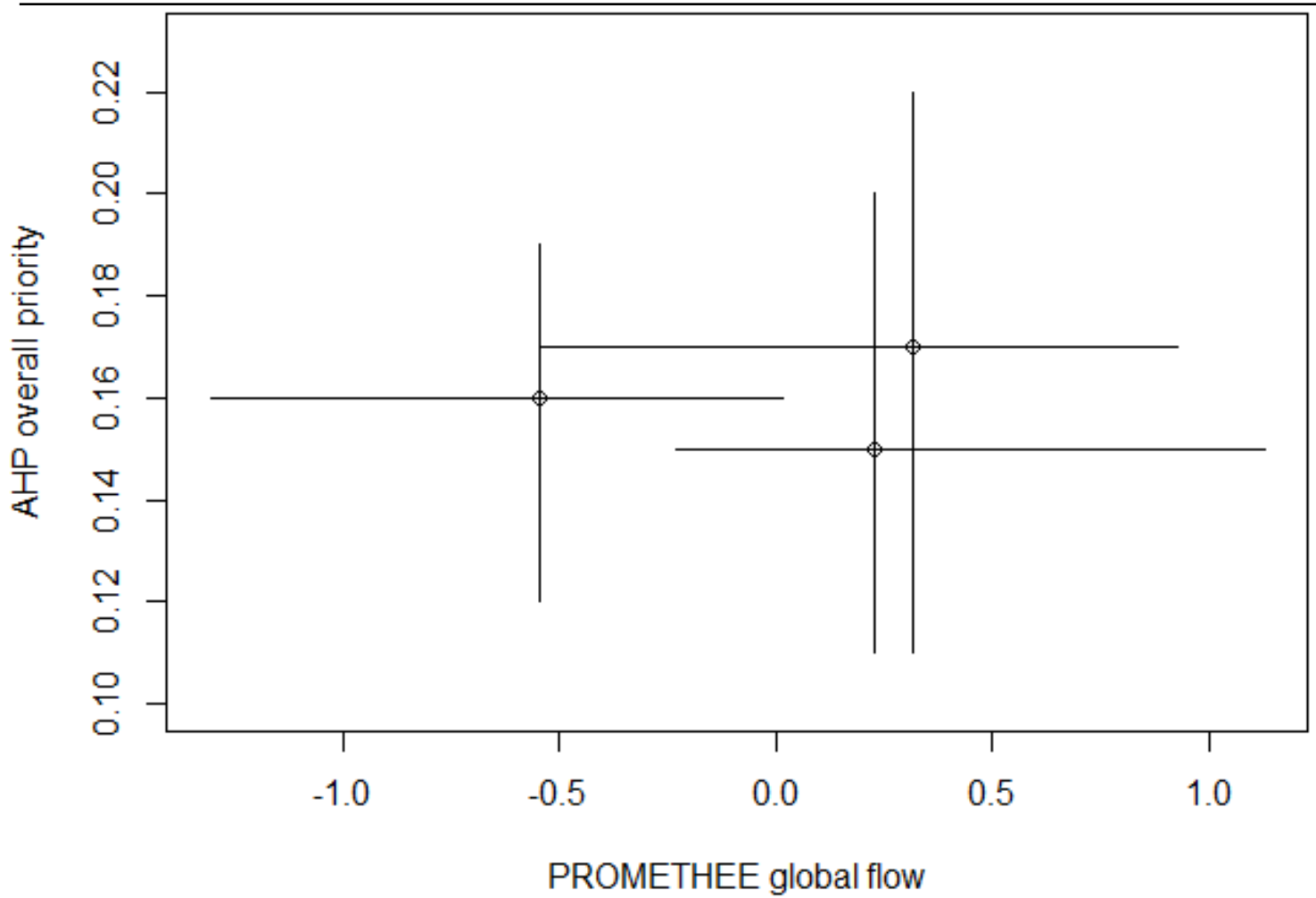
SENSITIVITY TO VARIATION WEIGHTS *AND SCORES*

PROBABILISTIC ANALYSIS

- Sample odds ratios from lognormal distribution 1000 times



COMPARISON WITH AHP RESULTS



DISCUSSION

- It is possible to compare the preferences of a large group of patients with PROMETHEE
  - Group preferences and individual preferences can be contrasted
  - Results similar to AHP results
  - Problem: Visual PROMETHEE limited to 9 scenarios
- The meaning of weights?
  - Can AHP weights really be used for PROMETHEE?

FUTURE WORK

- Supporting decision in early stages of health technology
  - Case: novel imaging modalities for non-small cell lung cancer
  - Klaske Siegersma (MSc student) will elicit from group of clinical experts:
    - Relevant criteria
    - Criteria weights
    - Performance scores / preference functions
- Piloting weights elicitation for PROMETHEE among patients
  - Problem: low numerical & health literacy
  - Incomparability? Veto?

THANK YOU!

- More information:
  - H.broekhuizen@utwente.nl
  - http://www.utwente.nl/bms/htsr/Staff/broekhuizen/
- Some references:

- V. Diaby, K. Campbell, and R. Goeree, “Multi-criteria decision analysis (MCDA) in health care: A bibliometric analysis,” *Oper. Res. Heal. Care*, vol. 2, no. 1–2, pp. 20–24, 2013.
- K. Marsh, T. Lanitis, D. Neasham, P. Orfanos, and J. Caro, “Assessing the Value of Healthcare Interventions Using Multi-Criteria Decision Analysis: A Review of the Literature,” *Pharmacoeconomics*, vol. 32, no. 4, pp. 1–21, 2014.
- H. Broekhuizen, C. Groothuis-Oudshoorn, J. van Til, M. Hummel, and M. IJzerman, “A review and classification of approaches for dealing with uncertainty in multi-criteria decision analysis for healthcare decisions,” *Pharmacoeconomics*, p. forthcoming, 2015.
- H. Broekhuizen, C. Groothuis-Oudshoorn, A. Hauber, and M. IJzerman, “Integrating patient preferences and clinical trial data in a quantitative model for benefit-risk assessment.,” in *25th Annual EuroMeeting of the Drug Information Association*, 2012.