

# Trends and way forwards in uncertainty analysis

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## Outline

- Why uncertainty analysis?
- Current state of play and issues
- Trends and ways forward
  - Identify
  - Explore
  - Communicate and manage

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## Why?

- Inform health care decisions
- Models
- Assumptions
- Multiple sources of uncertainty
- Synthesis of the evidence

**UNCERTAINTY!**

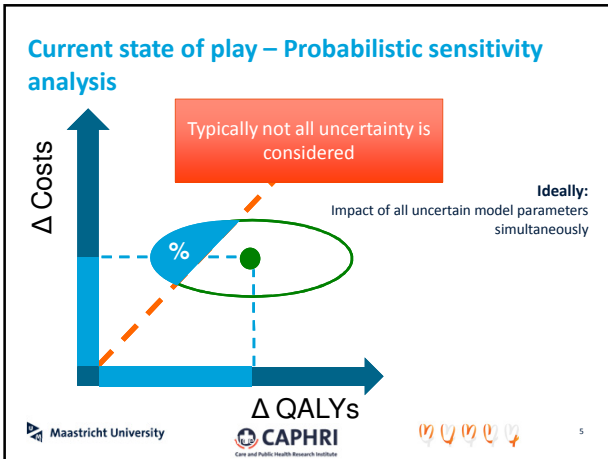
Lertjanyaku et al - 2018

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## Current state of play

- One way sensitivity analyses
- Tornado diagram

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- ### Sources of uncertainty related to empirical evidence
- Imprecision/statistical uncertainty
    - Wide confidence interval
  - Bias and indirectness
    - Difference in context between evidence and policy problem (e.g. population, intervention, outcome)
  - Unavailability
    - No observations (e.g. extrapolation to the long-term)
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## Trends and ways forward

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- ### Identification of uncertainty: TRUST
- TTransparent Uncertainty ASsessment (TRUST) Tool
    - Assessing uncertainties in economic models
    - Developed and validated based on:
      - published literature/taxonomies
- ORIGINAL RESEARCH ARTICLE
- Development and Validation of the TTransparent Uncertainty ASsessment (TRUST) Tool for Assessing Uncertainties in Health Economic Decision Models
- Sabine E. Grimm<sup>1</sup>, Xavier Pouwels<sup>1</sup>, Bram L. T. Ramaekers<sup>1</sup>, Ben Wijnen<sup>1</sup>, Saskia Knies<sup>2</sup>, Janneke Grutters<sup>2</sup>, Manuela A. Joore<sup>2</sup>
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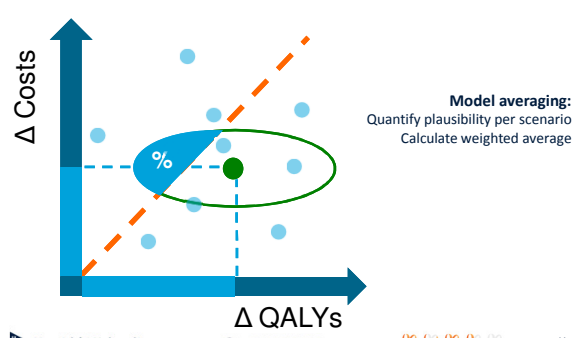
### Identification of uncertainty: TRUST

		SOURCES OF UNCERTAINTY				
		Transparency	Methods	Imprecision	Bias & indirectness	Unavailability
<b>A S S E S S M E N T</b>	Context / scope					
	Model structure					
	Selection of evidence					
	Effectiveness					
	Relative effectiveness					
	Adverse events					
	Utilities					
	Resource use & costs					
	Implementation					
	Outcomes					

### Exploring uncertainty

- Ideally: all uncertain parameters in PSA
- Challenge indirectness / unavailability
  - Expert elicitation
  - Scenario analyses and model averaging
  - Being explicit on uncertainty that is not included

### Scenario analyses in health economic evaluation



### Being explicit: communication of uncertainty using Assessment of Risk Table (ART)

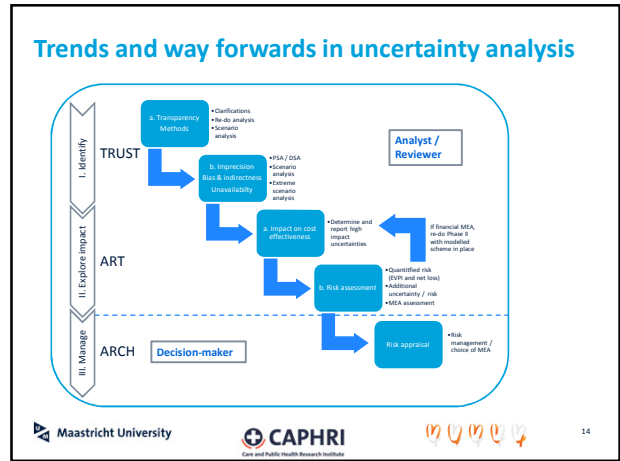
Summary of cost effectiveness results			
Threshold		ICER mean	
% cost-effective		ICER range	(of plausible scenarios)
Uncertainties with high impact on cost effectiveness as identified in TRUST tool			
In PSA			
Can be feasibly researched?			
Not in PSA			
Can be feasibly researched?			

### Managing uncertainty: Appraisal of Risk Chart (ARCH)

- NET BENEFIT**
  - POSITIVE RECOMMENDATION
  - RECOMMENDATION WITH RESEARCH (Research MEA / CED)
  - PRICE SCHEME (Financial MEA)
- NET LOSS**
  - NEGATIVE RECOMMENDATION
  - PRICE SCHEME (Financial MEA)
  - ONLY IN RESEARCH (Research MEA)
  - NEGATIVE RECOMMENDATION
  - PRICE SCHEME (Financial MEA)
  - ONLY IN RESEARCH (Research MEA)

LOW RISK HIGH RISK

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# Thank you

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