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Expert Judgment Applications within Public Health

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Outline

- Background
  - Health Technology Assessment
  - The stakeholders within public health
- Reasons for expert elicitations
- Types of methods being used
- Expert judgment applications within public health
- Conclusions

Background (HTA)

- Health Technology Assessment group assesses medical, social, ethical and economic implications of health technology
- HTA is well known for its role in RCTs and cohort studies, but also as a means to strengthen evidence based selection and rational use of health technologies and increase efficiency when introducing and using these technologies in health care (WHO)

Background (Stakeholders)

- Patients and/or Health Consumers
- Practitioners and Health Producers
- Health financers e.g. Insurers
- Health assurers e.g. goverment or regulatory bodies

Reasons for Expert (Stakeholder) Elicitation

- Health Consumers
  - Health states elicitation
  - Preference elicitation
  - Willingness to pay
- Health Producers
  - Parameter estimations
  - Assessing unknow knowns
  - Preference elicitation
  - Cost Benefit Analysis
- Health Assurers
  - Policymaking
  - Decisionmaking

Expert Judgment Methods

- Surveys (Preference Elicitation)
- Discrete choice experiments (Preference Elicitation)
- Point estimates
- Parameter fitting for uncertainty models (Uncertainty Analysis)
- Delphi
- Classical model

Estimating unknown parameters in haemophilia using expert judgment elicitation

- Increasing attention for cost effectiveness of health care intervention
- Quantitative data needed to assess the cost effectiveness of haemophilia interventions
- Information is sparsely available
- EJE used to estimate the uncertainty of 5 parameters for modelling (natural bleeding frequency, treatment of bleeds, time to control bleeding after second prophylaxis, dose required for second prophylaxis, life expectancy)

Estimating unknown parameters in haemophilia using expert judgment elicitation

- Level of agreement was quite different for the 5 quantities
- After calibration only the experts judgment of 2 experts from the 19 could be included
- Instead used equal weighting of the PDE

Insight in ‘Calculated Risk’: An Application to the Prioritization of Emerging Infectious Diseases for Blood Transfusion Safety

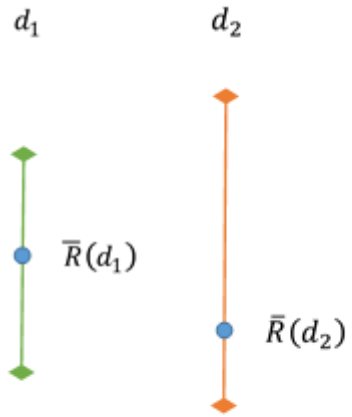
- What is the risk do EID pose
- Lack of information and high uncertainty of disease characteristics
- How do health professionals balance the uncertainty present in the disease characteristics

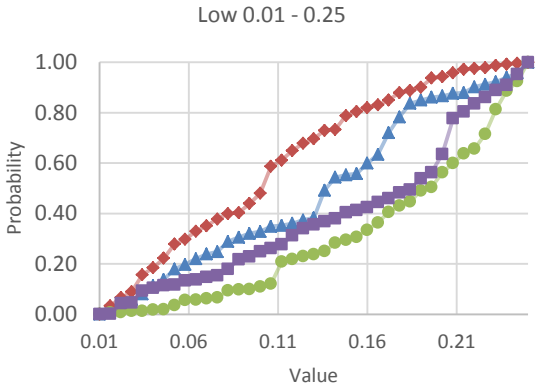
Insight in 'Calculated Risk': An Application to the Prioritization of Emerging Infectious Diseases for Blood Transfusion Safety

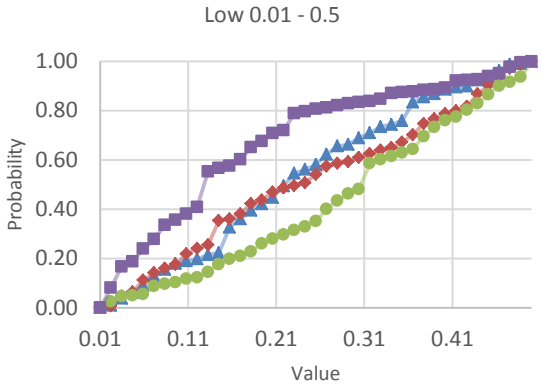
- Four disease characteristics identified through previously held EJE (transfusion transmissibility, asymptomatic phase, prevalence, disease impact) that determine the risk
- Each characteristic was given six levels of uncertainty namely unknown 0.5(0.01-0.99), Likely 0.75(0.5-0.99), Unlikely 0.25(0.01-0.5), Very likely 0.875(0.75-0.99), Possible 0.5(0.25-0.75), Very unlikely 0.125(0.01-0.25)

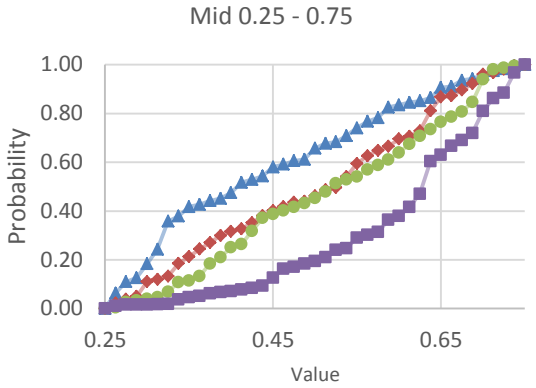
Insight in 'Calculated Risk': An Application to the Prioritization of Emerging Infectious Diseases for Blood Transfusion Safety

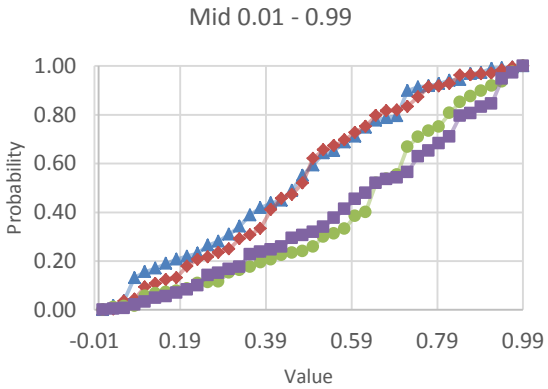
- $R = T \times A \times P \times I$
- Experts were asked to rank hypothetical diseases solely on the combination of characteristic uncertainty

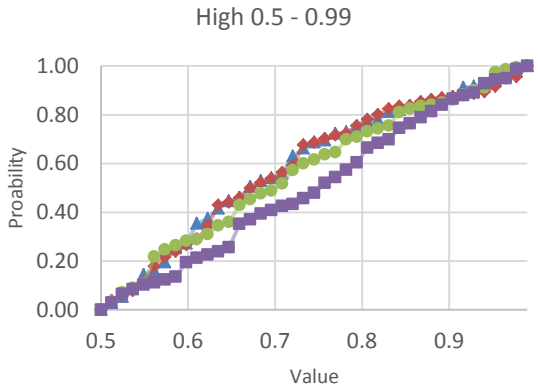



Low 0.01 - 0.25
Probability
1.00
0.80
0.60
0.40
0.20
0.00
0.01
0.06
0.11
0.16
0.21
Value


Low 0.01 - 0.5
Probability
1.00
0.80
0.60
0.40
0.20
0.00
0.01
0.11
0.21
0.31
0.41
Value


Mid 0.25 - 0.75
Probability
1.00
0.80
0.60
0.40
0.20
0.00
0.25
0.45
0.65
Value


Mid 0.01 - 0.99
Probability
1.00
0.80
0.60
0.40
0.20
0.00
-0.01
0.19
0.39
0.59
0.79
0.99
Value


High 0.5 - 0.99
Proability
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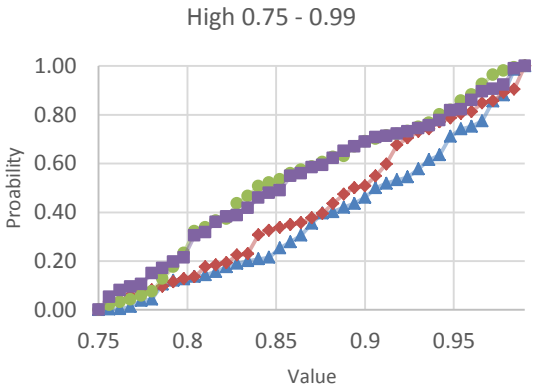
0.60
0.40
0.20
0.00
0.5
0.6
0.7
0.8
0.9
Value


High 0.75 - 0.99
Proability
1.00
0.80
0.60
0.40
0.20
0.00
0.75
0.8
0.85
0.9
0.95
Value

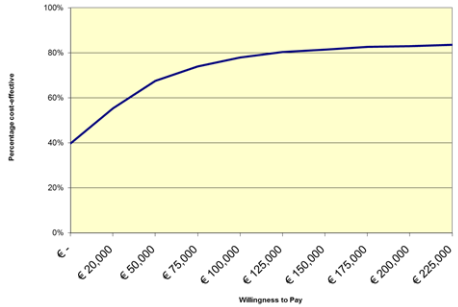

Transfusion transmissibility
Asymptomatic Phase
Prevalence
Disease Impact

Utrecht Periodical Risk Identification and Monitoring

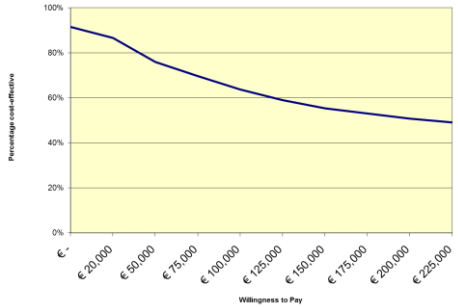
What are the effects of:

- Applying **U-PRIM (Utrechste Periodieke Risico Identificatie en Monitoring)**
- Applying **U-PRIM** followed up by **U-CARE** on the **self-reliance** of eldery?

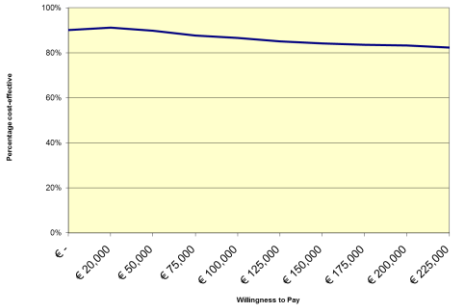
Results (Acceptability curve)



CE-Plane U-PRIM+U-Care vs U-PRIM



CE-Plane U-PRIM vs Usual Care



CE-Plane U-PRIM+U-Care vs Usual Care

CEA and my PhD Research

- Pairwise compare the treatments
- Which treatment is preferred for a given WTP?
- There exists a distribution $f(u(A), u(B), u(C))$ if and only if

$$1 \leq P(A > B) + P(B > C) + P(C > A) \leq 2$$

- $P(A > B)$ translates to probability that A is cost-effective in comparison to B
- A=U-Prim, B=U-Prim+U-Care, C=Usual Care

CEA and my PhD Research

- WTP of 20000 euros

Scenario	P(B>A)	P(A>C)	P(B>C)	$P(A > B) + P(B > C) + P(C > A)$
Societal Perspective	0.55	0.87	0.91	1.49
Subgroup 60 -74	0.04	0.98	0.85	1.83
Subgroup 75+	0.95	0.18	0.81	1.68
Scenario	$\bar{u}(A)$	$\bar{u}(B)$	$\bar{u}(C)$	**Ranking**
Societal Perspective	0.61	0.64	0.33	B>A>C
Subgroup 60 -74	0.75	0.48	0.30	A>B>C
Subgroup 75+	0.32	0.70	0.52	B>C>A

Conclusion

- Expert judgment is widely used within public health
- Subjective information elicited is very useful
- Expert judgment use is not structured
- Bias also an issue within public health when applying expert judgment
- Still confusion between knowledge and uncertainty