The use of HTA and other information in drug reimbursement recommendations

A stated preferences study of stakholders in drug review

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HEALTH TECHNOLOGIES ASSESSMENT
Multi-disciplinary
Multi-information

CRITERIA
Clinical; Economic; Social; Organizational; Ethical

RESEARCH QUESTION

- How do stakeholders in the drug selection processes weigh criteria?
- Which criteria are most important and which play a lesser role in drug selection?

APPROACH

- Stated Preferences Elicitation
- www.cancerdrugfunding.ca

RESPONDENT POPULATION

- Stakeholders involved in or affected by the selection of drugs for public reimbursement.

RECRUITMENT

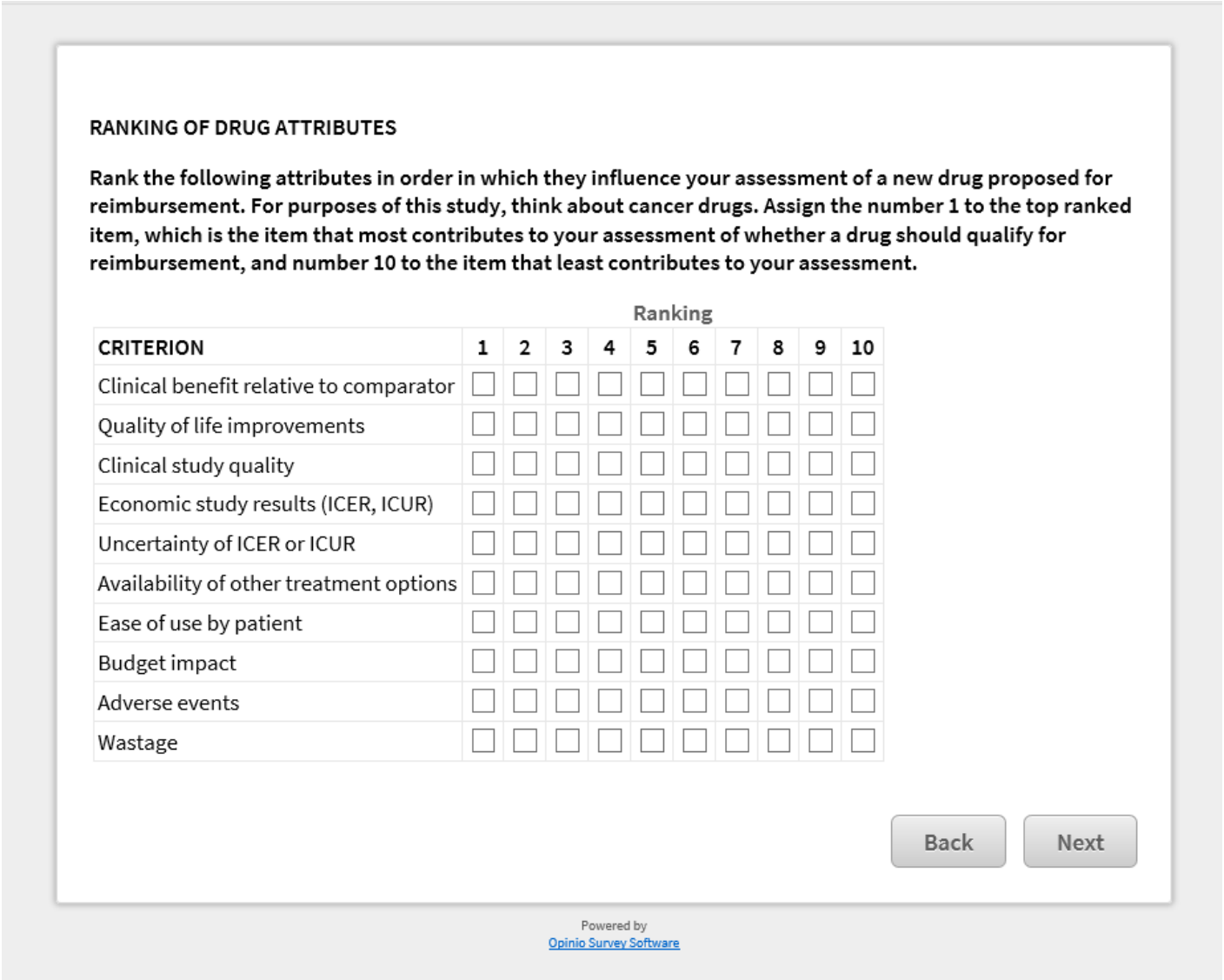
- Email invitation and snowball method.
- Members of drug appraisal committees in Canada, England, Poland, Germany, Netherlands, Australia, and elsewhere.
- Scholars whose research relates to HTA processes.
- Patient and other organizations with a mandate related to HTA and/or drug reimbursement.

RESPONDENTS – SAMPLE CHARACTERISTICS

NUMBER OF RESPONDENTS	
Started the questionnaire	214
Completed the ranking question only	**144**
Completed the experiment	**110**
Canada	32
Poland	38
U.K.	18
Germany	8
Australia	11
Other Countries	9
Clinical Experts	27
Economic Experts	30
Patient Perspective	7
Public Payer Perspective	7
Members of appraisal committees	24

NUMBER OF OBSERVATIONS (CHOICE TASKS)		
	n	~ %
All respondents	**1246**	
Respondents from Canada	373	30
Respondents from Poland	426	34
Respondents from the U.K.	216	17
Respondents from Germany	79	6
Respondents from Australia	26	2
Responents from Other Countries	96	8
Clinical Experts	168	13
Economic Experts	326	26
Patient Perspective	24	2
Public Payer Perspective	72	6
Members of appraisal committees	282	22

RANKING QUESTION



RANKING OF DRUG ATTRIBUTES

Rank the following attributes in order in which they influence your assessment of a new drug proposed for reimbursement. For purposes of this study, think about cancer drugs. Assign the number 1 to the top ranked item, which is the item that most contributes to your assessment of whether a drug should qualify for reimbursement, and number 10 to the item that least contributes to your assessment.

	Ranking									
CRITERION	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Clinical benefit relative to comparator	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Quality of life improvements	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Clinical study quality	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Economic study results (ICER, ICUR)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Uncertainty of ICER or ICUR	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Availability of other treatment options	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ease of use by patient	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Budget impact	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Adverse events	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wastage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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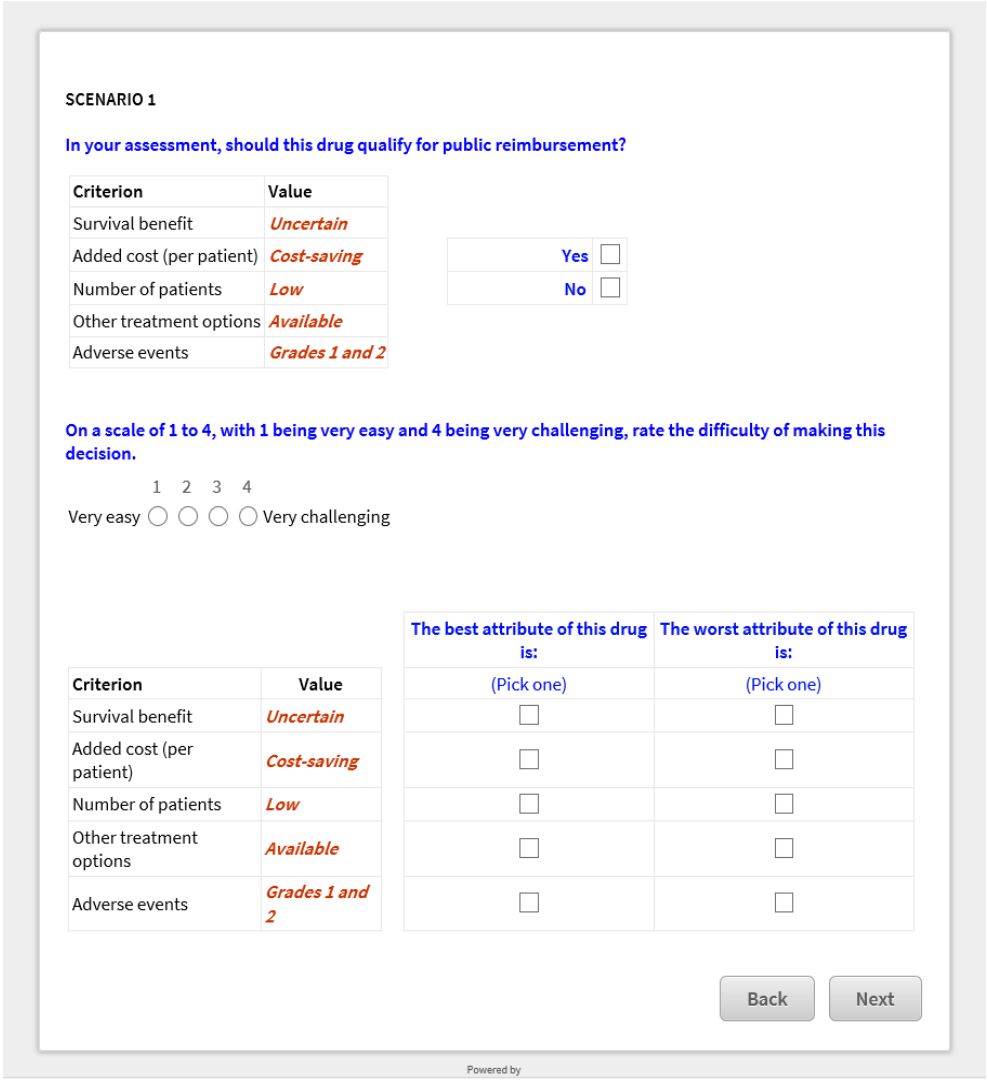
SAMPLE CHOICE TASK



SCENARIO 1

In your assessment, should this drug qualify for public reimbursement?

Criterion	Value
Survival benefit	*Uncertain*
Added cost (per patient)	*Cost-saving*
Number of patients	*Low*
Other treatment options	*Available*
Adverse events	*Grades 1 and 2*

Yes ☐
No ☐

On a scale of 1 to 4, with 1 being very easy and 4 being very challenging, rate the difficulty of making this decision.

1 2 3 4
Very easy ◯ ◯ ◯ ◯ Very challenging

Criterion	Value	The best attribute of this drug is: (Pick one)	The worst attribute of this drug is: (Pick one)
Survival benefit	*Uncertain*	☐	☐
Added cost (per patient)	*Cost-saving*	☐	☐
Number of patients	*Low*	☐	☐
Other treatment options	*Available*	☐	☐
Adverse events	*Grades 1 and 2*	☐	☐

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Attributes and levels included in the choice experiment		
Attribute	Variable Name	Levels
Survival Benefit	SB	1 – Uncertain 2 – Small 3 – Large
Added cost per patient	AC	1 – High 2 – Low 3 – Cost-Saving
Numer of patients	NP	1 – Low 2 – High
Other treatment options	ALT	1 – Available 2 – Not Available
Adverse Events	AE	1 – High (grade 3 or 4) 2 – Low (grade 1 or 2)

RANKING OF ATTRIBUTES (n=144)

	Clinical Benefit	Quality of Life	Clinical Study Quality	Economic Resuts (ICER/ ICUR)	Availability of other treatment	Adverse Events	Budget Impact	Uncertainty of ICER/ ICUR	Ease of Use	Wastage
MEAN RANK-SCORE	**2.796**	**4.442**	**4.540**	**4.968**	**5.021**	**5.182**	**6.191**	**6.322**	**7.132**	**8.401**
SD	3.024	2.408	2.422	2.328	2.167	2.234	2.172	2.224	2.568	2.855
CORRELATIONS										
Clinical Benefit		**0.437**	0.384	0.016	-0.375	0.054	-0.324	-0.375	**-0.614**	**-0.842**
Quality of Life			-0.044	-0.127	-0.191	0.049	-0.336	-0.322	-0.163	**-0.405**
Clinical Study Quality				-0.022	0.060	-0.060	-0.388	-0.132	-0.374	**-0.463**
Economic Results					-0.228	-0.387	0.063	**0.503**	**-0.464**	-0.251
Availability of other						-0.065	-0.032	-0.232	-0.158	-0.166
Adverse Events							-0.200	**-0.501**	0.038	0.042
Budget Impact								0.071	0.012	0.258
Uncertain ICER/ICUR									0.004	0.171
Ease of Use										**0.662**
Wastage										

DISCRETE CHOICE EXPERIMENT (DCE)

Logit model used to estimate the impact of each attribute-level on the probability of a „YES" vote

The Logit estimation

- Linearly additive indirect utility function is assumed.
- Probability of YES = S curve function of Overall Utility

What can be inferred

- Level 1 of each attribute normalized as zero utility
- The importance of „Level 1" cannot be estimated with DCE alone (best-worst scaling added later)

Modelling Approach

- Non-significant ($p<0.05$) variables are removed;
- Interactions are tested in the second phase;

DISCRETE CHOICE EXPERIMENT (DCE) – RESULTS (NO INTERACTIONS)

Attribute / Level	All data (n=1246)	
	Coefficient	Odds Ratio
Constant	-3.37	prob=3.3%
SB = 2	n.s.	-
SB = 3	3.80	44.7
AC = 2 (low added cost)	1.37	3.9
AC = 3 (cost-saving)	2.27	9.7
NP = 2 (many patients)	n.s.	-
ALT = 2 (no alternatives available)	1.27	3.6
AE = 2 (grade 1/2)	0.96	2.6

Attributes and levels included in the choice experiment		
Attribute	Variable Name	Levels
Survival Benefit	SB	1 – Uncertain 2 – Small 3 – Large
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DISCRETE CHOICE EXPERIMENT (DCE) – RESULTS (WITH INTERACTIONS)

Attribute / Level	All data (spec A)	All data (spec B)
Constant	-3.79	-2.71
SB = 3	4.69	3.65
AC = 2 (low added cost)	1.53	1.11
AC = 3 (cost-saving)	2.41	1.34
ALT = 2 (no alternatives available)	1.33	1.24
AE = 2 (grade 1/2 adverse effects)	1.45	
SB = 3 & AE = 2 (high benefit X low AE)	-1.57	
AC = 3 & AE = 2 (cost-saving X low AE)		1.62

Derived Budget Impact (BI) Variable

1 if high cost & many patients
2 if few patients or low cost
3 if cost-saving & many patients

Not statistically significant

Competing Specifications (A and B)

A. The low adverse events and high survival benefit are substitutes;
B. The low adverse events and cost-savings are complements (low risk or harm).

The idea behind Best-Worst Scaling (BWS)

- Part of utility from each attribute (U = U1 + U2 + … + U5)
- Probability i selected as best: exp(Ui) / (exp(U1) + … exp(U5))
- Probability i selected as worst: exp(-Ui) / (exp(-U1) + …)

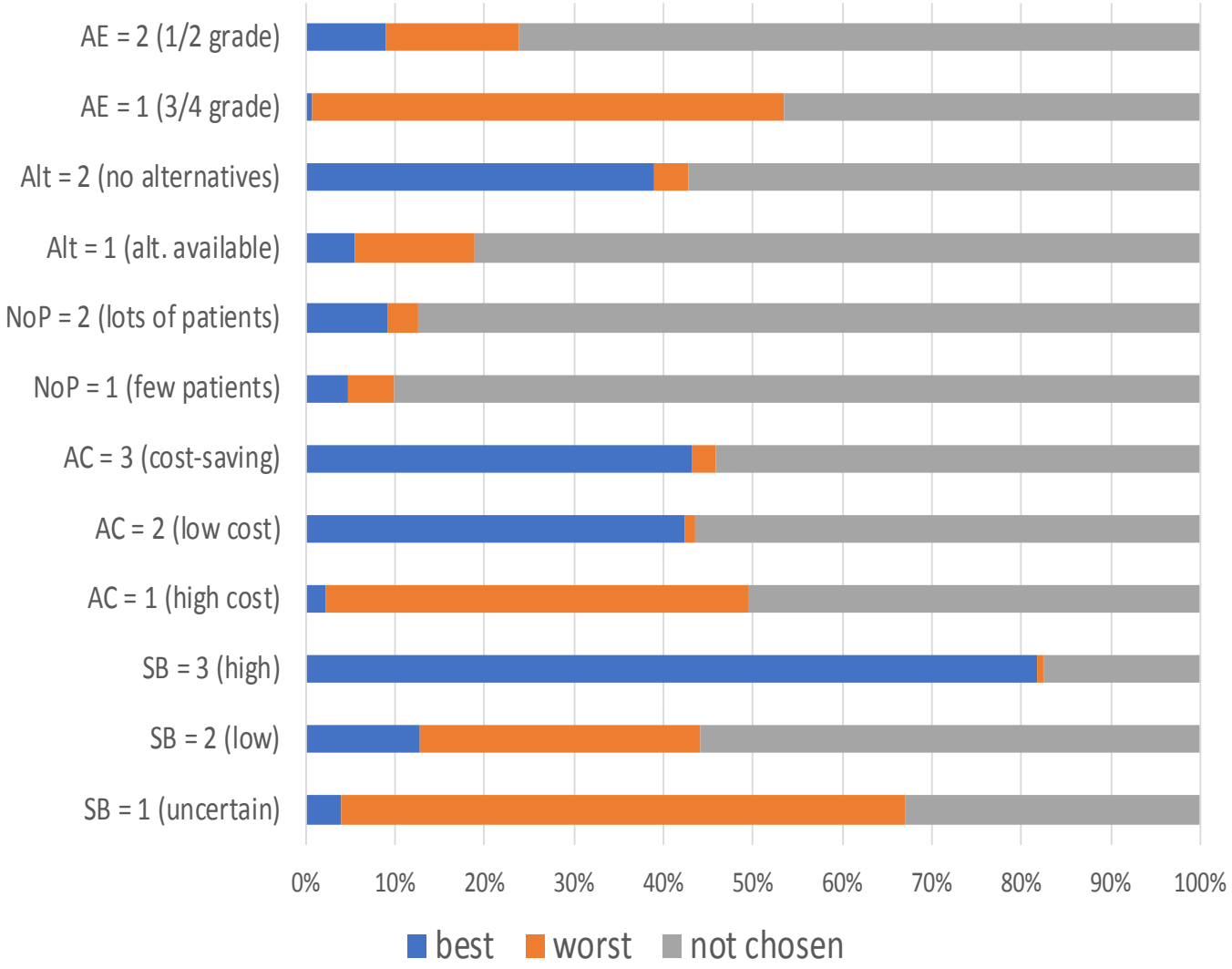
How does it compare to DCE alone?

- Allows us to estimate the contribution of base levels (e.g. which is best, when all set to 1), except for one
- No interactions can be tested

Hybrid Modeling – Joint estimation of DCE and BSW data

- Single set of preferences observed in two types of experiments;
- Assumption of identical respondents (fixed effects) for now.

RESULTS OF BEST-WORST SCALING



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RESULTS OF HYBRID MODEL (DCE & BWS)

Attribute / Level	Contribution
SB = 1 (uncertain)	0.00
AE = 1 (3/4 grade)	0.13
AC = 1 (high cost)	0.53
SB = 2 (low survival benefit)	1.60
ALT = 1 (available alternatives)	1.80
AE = 2 (1/2 grade)	2.31
NP = 1 (few patients)	2.51
NP = 2 (many patients)	2.61
AC = 2 (low cost)	3.77
ALT = 2 (no alternatives)	4.30
AC = 3 (cost-saving)	4.62
SB = 3 (high survival benefit)	6.57

Attributes and levels included in the choice experiment		
Attribute	Variable Name	Levels
Survival Benefit	SB	1 – Uncertain 2 – Small 3 – Large
Added cost per patient	AC	1 – High 2 – Low 3 – Cost-Saving
Numer of patients	NP	1 – Low 2 – High
Other treatment options	ALT	1 – Available 2 – Not Available
Adverse Events	AE	1 – High (grade 3 or 4) 2 – Low (grade 1 or 2)

FINAL REMARKS

- Survival benefit contributes the most to the probability of a positive appraisal, followed by cost, and the availability.
- When survival benefit is high, low adverse events increase the probability of approval even more.
- When adverse events are low, and costs are low, the probability of approval increases, likely because approval has low risk of harm.

TO BE CONTINUED …

- Sub-group analysis by country and by respondent types;
- Cluster analysis;
- …

THANK YOU !

Please share your feedback with us at wwrani@sgh.waw.pl