Hypothetical bias and the role of information in discrete choice experiments

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Introduction & Background

- measure social preferences for health care interventions
- discrete choice experiments usually use hypothetical scenarios
- respondents might not be familiar with the topic in question
- assess the sensitivity of estimated utility weights to the level of information offered to respondents

Methods

- online survey with 1,501 respondents in Switzerland in 2017
- preference formation phase (PFP)
  - participants are asked about their general attitude towards the main topics of the study
  - trade-offs in prioritizing health services (age of patients, severity etc.)
  - forming preferences to reduce cognitive burden in discrete choice experiment
- discrete choice experiment (DCE)
  - health insurance contracts offering different coverage of new treatments for chronic diseases
  - participants need to choose 10 times between a standard treatment and a new treatment
  - conditional logit model to estimate the utility function
- supplementary questions related to the experiment and the respondent

DCE

- standard treatment and new treatment are characterized by five attributes and each attribute has a set of attribute levels
- prevalence of the disease ranging from 0.002% (ultra-rare disease) up to 5% (common disease)
- health states were described using the EQ-5D-5L scale
- 1,440 potential choice situations (3×4×10×3×4)
- fractional factorial design based on the D-efficiency criterion to reduce the number of choices to a manageable level
- design with 30 choice situations
  - divided into 3 blocks
  - 10 choice situations per respondent

Attributes & Levels

Attribute	Standard Treatment	New Treatment
Age of patients	mainly children, on average 10 years old mainly adults, on average 40 years old mainly elderly, on average 70 years old	
Prevalence	1 in 20, i.e. about 400,000 people in Switzerland 1 in 200, i.e. about 40,000 people in Switzerland 1 in 2,000, i.e. about 4,000 people in Switzerland 1 in 50,000, i.e. about 160 people in Switzerland	
Health State	slightly impaired moderately impaired moderately impaired severely impaired severely impaired severely impaired very severely impaired very severely impaired very severely impaired very severely impaired	slightly impaired slightly impaired moderately impaired slightly impaired moderately impaired severely impaired slightly impaired moderately impaired severely impaired very severely impaired
Life Expectancy (age of patients)	45 (10), 60 (40), 75 (70)	52 (10), 64 (40), 76 (70) 66 (10), 72 (40), 78 (70) 80 (10), 80 (40), 80 (70)
Cost	no extra cost	60 CHF per year 120 CHF per year 360 CHF per year 600 CHF per year

Example of decision card

Would you be willing to pay a higher insurance premium for the inclusion of the **new treatment** in the benefit package?

	standard treatment	new treatment
Who is affected by the disease?	mainly children, on average 10 years old	
How many people are affected by the disease?	1 in 2,000, i.e. about 4,000 persons in Switzerland	
Quality of life of patients	fair / impaired	good
Life expectancy of patients	45 years	64 years
How much is your **health insurance premium** increasing?	no increase	360 Swiss francs per year (= 30 Swiss francs per month)

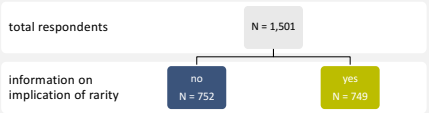
Click on the info button in the table to display information about the properties.

no | yes

Subsample

- information on implications of rare diseases
- additional question at the end of preference formation phase

Subsamples



We assign the survey participants randomly in two groups. About half of the participants receive an additional question with information on rare diseases at the end of preference formation phase and before the DCE.

Additional questions in the preference formation phase

Rare Diseases
Another example is the case of rare diseases. Some people believe that we should not pay more for treatment of patients with rare disorders, whereas others believe that we should be prepared to pay more. The reason is that the cost of development of new medicines and the risk of failure of research programs can be very high. Thus, in the absence of acceptance of a higher cost per person treated, many patients with rare and ultra-rare disorders might have no access to effective treatments – simply because of their sometimes high or very high costs in relation to small or very small patient numbers.

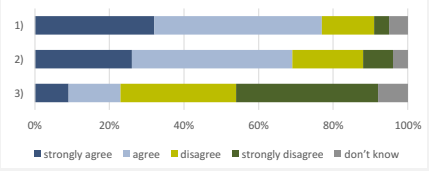
In the following, you can see three statements. Please indicate respectively, if you agree strongly, rather agree, rather disagree or disagree strongly with the statement.

1) We should be prepared to pay higher treatment costs for a rare disease patient, because otherwise these patients will not have access to effective treatment because it is very expensive to develop specific treatments for small groups of patients.

2) We should be prepared to pay higher treatment costs for a patient with a rare disease if this does not or only slightly increase the monthly health insurance premium.

3) We should not accept higher treatment costs per rare disease patient, because we could use this money to help more patients with diseases that are more common instead.

Respondents' answers to the rarity question

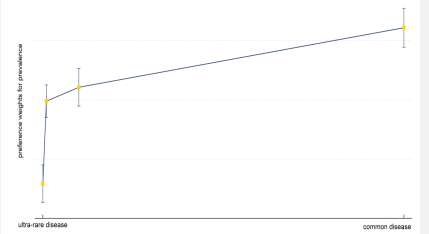


The majority of the participants is prepared to accept higher costs for treatments of rare disorders.

Results

- all coefficient show the expected sign and are statistically significant
- marginal utility for an additional year of life is decreasing with the total number of years
- nonlinear relationship for the attribute prevalence
  - We used a linear term and a dummy for lowest prevalence value (ultra-rare diseases) in the main model

Preference weights for prevalence of disease with confidence intervals



While there seems to be a linear relationship for the higher levels of prevalence, the lowest level (0.002%) showed a substantial mark down. Therefore we used a linear term for prevalence and a separate dummy for ultra-rare disease in the main model.

Results

- respondents who had been informed about the connection between rare diseases and high costs per patient showed no statistically significant mark down for the lowest prevalence rate
- differences between groups

- Model 1
  - small positive coefficient for prevalence of disease
  - negative coefficient for ultra-rare diseases (prevalence 0.002%)
- Model 2
  - respondents who received information on rarity have a higher coefficient for ultra-rare diseases
    -0.353 vs. -0.128 (= -0.353 + 0.225)
  - respondents who received information on rarity have a higher coefficient (statistically not significant) for prevalence
    0.056 vs. 0.079 (= 0.056 + 0.023)
- Model 3
  - divide the respondents who received information on rarity into those who agree strongly or agree (77%) and those who disagree strongly or disagree or do not know (23%) with the first statement about rare diseases in the PFP (accept higher treatment costs for rare disease patients)
  - those who agree show no negative markdown for ultra-rare diseases compared to the group without information
    -0.357 vs. 0.087 (= -0.357 + 0.444)
  - those who disagree show a larger markdown for ultra-rare diseases compared to the group without information
    -0.357 vs. -0.862 (= -0.357 -0.505)
  - respondents grouped according to their answers to statement 2) and 3) show similar results, although a little less pronounced

Coefficients conditional logit model	Model 1	Model 2	Model 3
constant (new treatment)	-0.222***	-0.222***	-0.227***
40 year old patients (0/1)	-0.188***	-0.188***	-0.190***
70 year old patients (0/1)	-0.682***	-0.681***	-0.683***
remaining life years	0.090***	0.090***	0.091***
remaining life years squared	-0.0016***	-0.0016***	-0.0016***
quality of life (scale 0-10)	0.131***	0.130***	0.132***
insurance premium per year in CHF	-0.002***	-0.002***	-0.002***
ultra-rare disease (0/1)	-0.243***	-0.353***	-0.357***
ultra-rare disease # info rarity		0.225**	
ultra-rare disease # info rarity & agree			0.444***
ultra-rare disease # info rarity & disagree			-0.505***
prevalence in %	0.068***	0.056***	0.056***
prevalence in % # info rarity		0.023	
prevalence in % # info rarity & agree			0.063***
prevalence in % # info rarity & disagree			-0.101***
LL	*-9777.4*	*-9770.1*	*-9711.0*
Observations	*30,020*	*30,020*	*30,020*

*** p<0.01, ** p<0.05, * p<0.1

Model 1 with full sample; Model 2 interaction with subgroup that received information on rarity; Model 3 interaction with subgroup that has received information on rarity, divided into those who agree and disagree with statement 1) about rarity in PFP.

Coefficient with 95% conf. interval for ultra-rare disease – model 3

Conclusion

- raising participants' awareness of certain topics can influence their choices in the DCE
- important for unfamiliar topics where respondents first must form their preferences

- results add information about social value of health care interventions for rare and ultra-rare disorders for different groups of the population

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