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Individual responsibility and health-risk behaviour: A contingent valuation study from the ex ante societal perspective

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ABSTRACT

This study analyzes peoples' social preferences for individual responsibility to health-risk behaviour in health care using the contingent valuation method adopting a societal perspective. We measure peoples' willingness to pay for inclusion of a treatment in basic health insurance of a hypothetical lifestyle dependent (smoking) and lifestyle independent (chronic) health problem. Our hypothesis is that peoples' willingness to pay for the independent and the dependent health problems are similar. As a methodological challenge, this study also analyzes the extent to which people consider their personal situation when answering contingent valuation questions adopting a societal perspective.

513 Dutch inhabitants responded to the questionnaire. They were asked to state their maximum willingness to pay for inclusion of treatments in basic health insurance package for two health problems. We asked them to assume that one hypothetical health problem was totally independent of behaviour (for simplicity called chronic disease). Alternatively, we asked them to assume that the other hypothetical health problem was totally caused by health-risk behaviour (for simplicity called smoking disease). We applied the payment card method to guide respondents to answer the contingent valuation method questions.

Mean willingness to pay was 42.39 Euros (CI = 37.24–47.55) for inclusion of treatment for health problem that was unrelated to behaviour, with '5–10' and '10–20 Euros' as most frequently stated answers. In contrast, mean willingness to pay for inclusion treatment for health-risk related problem was 11.29 Euros (CI = 8.83–14.55), with '0' and '0–5 Euros' as most frequently provided answers. Difference in mean willingness to pay was substantial (over 30 Euros) and statistically significant (*p*-value = 0.000).

Smokers were statistically significantly more (*p*-value < 0.01) willing to pay for the health-risk related (smoking) problem compared with non-smokers, while people with chronic condition were not willing to pay more for the health-risk unrelated (chronic) problem than people without chronic condition. This suggests that sub groups of people might differ in terms of abstracting from their personal situation when answering valuation questions from a societal perspective.

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1. Introduction

Trying to guarantee equal access to health care has dominated health policy in Western countries [1]. Guaranteeing equal access to health care is likely to entail ex ante moral hazard defined as change in behaviour due to health insurance [2]. Ex ante moral hazard could crowd out caring externalities as citizen's might no longer be willing to pay

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for rising health care costs if they are a consequence of others' health-risk behaviour.

Health-risk behaviour can be defined as activities undertaken by people with a frequency or intensity that increases their morbidity and mortality risks [3]. Examples include tobacco and alcohol consumption, physical inactivity, unhealthy dietary habits and risky sexual practices. It has been argued that health-risk behaviour is leading cause of burden of disease in Western countries [4,5] likely resulting in increasing health care expenditures leading to rising premiums in case of social health insurance or taxes in case of tax based systems [6].

The extent to which health-risk behaviour is caused by health insurance is unknown. Kelly and Markowitz [7] and De Preux [8] give overviews of the literature on ex ante moral hazard. Mainly revealed preference data are used to test for ex ante moral hazard using differences between various levels of health insurance coverage or differences between cost-sharing and free-plans. De Preux [8] uses Medicare in the United States as a natural experiment and tests for anticipating behaviour of uninsured people approaching age of becoming eligible for Medicare insurance. Typical health-risks include differences in body-mass-index, smoking, excessive alcohol consumption and exercising. All in all, empirical evidence on the existence of ex ante moral hazard is mixed. In other markets, the evidence seems more firm. For instance, car insurance seems to increase accidents [9] and increased worker compensation increases risk of nonfatal injury rates [10]. Apart from technical considerations, the conceptual argument in health economics is that health insurance only covers health care utilization but does not compensate for utility losses from poor health. However, this argument seems just as valid in presented examples from other markets.

From a normative point of view there is a tendency to formalize decisions about what new interventions should and should not be funded from public money in an attempt to prevent rising health care expenditures [11]. A criterium to consider in funding decisions is individual responsibility towards health-risk behaviours [12]. Excluding (part of) reimbursement of care use from people taking health-risks could prevent rising health care expenditures and crowding out caring externalities from people perceiving their behaviour being responsible. Whether or not prevention of rising health care expenditures occurs is an empirical question that ultimately depends on evidence regarding ex ante moral hazard and on wheter or not health-risk behaviour results in increasing health care expenditures. Crowding out caring externalities mainly depends on citizen's perceptions and might even occor without empirical evidence regarding increasing health care expenditures due to ex ante moral hazard.

This paper aims to add to the literature by measuring people's preferences to individual responsibility in health care using the contingent valuation method (CVM). We use Dutch data. The Dutch health care system is based on principles of managed competition [13,14]. All inhabitants are obliged to purchase basic health insurance covering essential health care as defined by national government. Health insurers must set a single flat rate premium for each type of health plan they offer. They are forbidden to vary pre-

miums with respect to age, sex or health risks and they are obliged to accept all applicants. To reduce incentives for risk selection, health insurers compensate each other for predictable health care expenditures related to sex and health from a risk equalization fund. Strictly speaking, this system of managed competition formally enforces caring externalities by means of the flat rate premium and the risk equalization fund.

As Dutch people are used to paying health insurance premiums, the contingent valuation method is a natural way to measure citizens'preferences e.g. how much extra insurance premium they would be willing to pay (WTP) for additional insurance coverage [15]. The Dutch Health Insurance Board advises the minister of health every year about what new medicines, techniques or interventions should be included in or withdrawn from the basic package. This obviously generates media attention, especially when items are withdrawn from the package. Therefore, we think that our approach is quite realistic.

Perspectives that can be used to measure preferences are debatable [16,17]. We apply the societal perspective framed in a way whereby any self-interest is detached [16]. This because we try to answer research questions about caring externalities, i.e. the concern for others' well-being [16,18,19]. As a methodological aside regarding use of perspectives to measure preferences, we analyze whether (sub-groups of) people's self-interest is totally detached when they are asked questions adopting a societal perspective.

In sum, this paper tries to answer two research questions; (1) What are peoples' societal preferences regarding individual responsibility in health care? and (2) What is the influence of peoples' personal situation in expressing their societal preferences in health care?

2. Method

The CVM was employed to directly measure individuals' societal *maximum* WTP. As explained, CVM is straightforward within managed competition, because people are used thinking in terms of paying insurance premiums [15]. We adopt the ex ante societal perspective: a treatment for *other* people is necessary and available but not included in the basic health insurance package.

Two questions measure people's WTP. First, we asked respondents to assume that *a hypothetical health problem arose totally independent of behaviour* (for simplicity called chronic disease and in the rest of this paper called *independent health problem*). Second, we asked them to assume that *a hypothetical health problem was totally caused by health-risk behaviour* (for simplicity called smoking disease and in the rest of this paper called *dependent health problem*).

We applied the payment card method to guide respondents to answer the contingent valuation method questions. In both occasions, we asked them to assume that 120,000 people (but not themselves) were in moderate health. Treatment could immediately and with certainty change their health from moderate to excellent. After treatment, these people would live about 20 years in excellent health. Without treatment they would live in moderate health for about 15 years. All other things were assumed

Table 1
Variable list.

Variable name	Definition
Background characteristics:	
Chronic condition	Chronic condition = 1, no chronic condition = 0
Smoking	Does respondent smoke? Yes = 1, no = 0
Female	Sex of respondent: 1 = female; 0 = male
Age	Age of respondent in years
Children	Does respondent have children? Yes = 1, no = 0
Education	Education of respondent in years
Income low	Income of respondent: 1 = low income, 0 = otherwise
Income average	Income of respondent: 1 = average income, 0 = otherwise
Income high	Income of respondent: 1 = more than average or high income, 0 = otherwise
Health bad & moderate	Respondents' self-assessed health: 1 = bad and moderate health, 0 = otherwise
Health good	Respondents' self-assessed health: 1 = good health, 0 = otherwise
Health very good and excellent	Respondents' self-assessed health: 1 = very good and excellent health, 0 = otherwise
Reasons:	
Benefit for people[*]	Reason for WTP answer: 1 = benefit for people, 0 = otherwise
Improve health	Reason for WTP answer: 1 = it will improve health, 0 = otherwise
Promote equal access	Reason for WTP answer: 1 = I promote equal access to health care, 0 otherwise
Attitudes:	
Users pay more	People have to pay more, if they use more care = 1, everyone have to pay the same, instead of their health use = 0
Satisfied	I am satisfied with the current Dutch health care policy = 1, I am not satisfied with the current Dutch health care policy

[*] Reasons 1–3 (I/household member might benefit friends/family might benefit, a lot of Dutch people might benefit) are merged into one reason: 'benefit for people'.

equal between both treatments and other characteristics of the groups of people concerned.

It was also stressed that characteristics, which are not appointed in the question, were similar between both groups of people. Respondents had to assume that treatments were not included in the basic health insurance package. Consequence of not including the treatment in basic health insurance package was that people who needed treatment could purchase it themselves for 1000 Euro.

From available CVM formats we opted for the payment card, because it enables respondents to directly compare their WTP. Respondents could choose from 9 answering categories; 0, 0–5, 5–10, 10–20, 20–30, 30–50, 50–100, 100–200 and 200 Euros or more per year (inspired by Shackley and Donaldson [20]). We reminded respondents that mean premium of basic health insurance is around 1100 Euro per year and that their stated WTP would add to this amount. The obvious critizism is that there is overlap between response categories, but this seems a minor issue as we asked respondents to compare two CVM questions. We created the relatively broad range of response categories based on the stated hypothetical treatment costs of 1000 Euros per treatment per person.

We also asked peoples' reasons for stated WTPs. Answering categories included: (1) I/a household member might benefit; (2) friends/family might benefit; (3) a lot of Dutch people might benefit; (4) my choices might improve health; and (5) I promote equal access to health care. Reasons were based on Olsen and Donaldsen [21], encompassing three streams of thinking: (1) reasons 1–3 point at thinking in terms of paying for insurance because of expected benefits; (2) reason 4 points at preference for health improving health; and (3) reason 5 points at preference for promoting equal access. The reason 'I/household member might benefit', 'a lot of friends/family might bene-

fit' and 'a lot of Dutch people might benefit' is merged into one reason: 'lot of people might benefit'. These and other survey questions are presented in Table 1.

3. Research questions and hypotheses

3.1. Research question 1: individual responsibility

The first research question is: *What are peoples' social preferences regarding individual responsibility in health care?* Our hypothesis is that peoples' WTP for the independent and the dependent health problems are similar. This because health policy is based on preference for equity, as was explained in the introduction. In health policy this value implies guaranteeing equal access to health care irrespective of e.g. peoples' socio-demographic characteristics and their history including behaviour. Underlying reasons for peoples' WTP could provide additional support. For example, people who listed the reason 'I promote equal access to health care' are less likely to differentiate in their WTP answer between the independent and dependent health problems. This because differentiating in WTP could involve unequal access to health care for both groups.

3.2. Research question 2: societal perspective

The second research question is: *What is the influence of peoples' personal situation[1] in expressing their societal preferences in health care?* People may or may not consider their personal circumstances when answering questions measuring the societal perspective [16]. From a slightly

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[1] Dolan et al. [16] use the term self-interest. The American dictionary denotes self-interest as one's own interest or advantage. We prefer to use personal circumstances or personal situation. The term 'interest' is part of our broader terms personal circumstances or situation.

less normative point of view, one could interpret this research question as an empirical test of a utility theoretic framework developed by Labelle and Hurley [18]. They distinguish e.g. between non-patient (interdependent) utility derived from the treatment of patients and patient (interdependent) utility derived from the treatment of other patients. Our application distinguishes between the interdependent utility of people without chronic condition/smokers versus the interdependent utility of people with chronic condition/smokers. There is not yet much empirical evidence about this topic. Therefore, we did not formulate a hypothesis and this part of our research is mainly explorative. Here, underlying reasons could differ between sub groups. People, evaluating their own personal situation, might be more likely to list reason 'benefit for people'.

4. Data and statistical analyses

4.1. Data

Between the first of June 2008 and the first of September 2008, Dutch inhabitants were invited to answer the questionnaire without being offered a monetary compensation. Respondents were approached in two different ways: (1) Distributing 1000 written questionnaires (divided on 10 cities and towns (every place 100 questionnaires) in the North and Western parts of the Netherlands) with a return envelope in letter boxes. Recipients were asked to return questionnaire within four weeks. Houses were randomly chosen; more than one door was between another (inspired by Harris et al. [22] (2) Spreading an email with the link of the questionnaire to family, friends, colleges and several companies with the request to fill in the questionnaire. Further, this link was also posted on two internet sites.

4.2. Statistical analyses

4.2.1. Research question 1: individual responsibility

We test for individual responsibility by analyzing difference between WTP for independent and dependent health problems using Fisher Exact test (frequency distribution in payment card answering categories) and t-test (means calculated by using the centres of the answering categories). Further, linear regression will be employed. Our dependent variable is difference in WTP between independent and dependent health problems: the centres of the WTP dependent health problem are subtracted from the centres of the WTP independent health problem. For instance, a respondent answered 10–20 Euros (centre = 15) for the independent health problem and 5–10 Euros (centre = 7.5) for the dependent health problem, the difference WTP variable is 7.5. Therefore, the dependent variable 'WTP difference' is continuous.

4.2.2. Research question 2: societal perspective

We test if people abstract from their personal circumstances when asked to state their societal preferences by detecting possible differences in WTP answers between people without and with a chronic condition (for the independent 'chronic' disease) and between non-smokers and

smokers (for the dependent 'smoking' disease). Fisher Exact tests and t-tests are employed to check for differences. Further, Fisher Exact tests are done to analyse differences in given underlying reasons between people without and with a chronic condition, and between non-smokers and smokers.

To correct for potential confounders (Table 1) in the association between WTP for independent health problem (dependent health problem) and having a chronic condition (being a smoker), ordered probit (OP) regressions will be employed. In short, OP analyses an underlying latent variable. In our case, answers on WTP questions are assumed to be proxies for the underlying latent variable individual responsibility. See for details [42,43]. Two OP regressions are employed; OP for independent health problem and OP for dependent health problem, both using the original nine answering categories of the payment card (0, 0–5, 5–10, 10–20, 20–30, 30–50, 50–100, 100–200 and 200 or more Euros). As estimated coefficients of OP are difficult to interpret, we also present marginal effects calculated using standard approach [23].

5. Results

5.1. Sample

529 questionnaires were returned, of which 16 questionnaires were not totally completed. These were not used resulting in net sample of 513. 410 respondents answered via the internet, but we cannot give a response rate, because we do not know the total number of visitors that visited the internet sites where the questionnaire was posted. Response rate for postal questionnaires was 10.3%; 103 of the 1000 people. This is relatively low. In general, postal questionnaires have response rates above 40% (see overview of Nakash et al. [25]). It has been argued that Dutch people are less willing to respond postal questionnaires compared with e.g. Americans [26]. We also did not send reminders or follow up phone calls which seem strong incentives for response rates [25].

A low response rate does, however, not imply that collected data are not valid [27]. Despite the low response, our data seems representative for the Dutch population based on the indicators of Table 2 column 5. Only people with self assessed bad and moderate health and smokers are somewhat underrepresented. However, this can be explained by statistically significant differences (p-value < 0.05, Fisher's exact test) between answers of the postal and internet questionnaire; 10.7% of the respondents of the postal questionnaire answered bad and moderate health compared with 5.6% for the internet questionnaire. The same holds for smoking as 16.5% in postal questionnaire smokes compared with 11.5% smokers in the internet questionnaire.

Table 2 also shows that majority of sixty percent of respondents stated that they are satisfied with the Dutch health care system and almost eighty percent answered that everyone should pay the same nominal health insurance premium (irrespective of their health care utilization). Only a minority (20%) believe that people using more health care, should have to pay either higher insurance premiums or co-payments.

Table 2
Characteristics of respondents ($n = 513$).

Characteristic		n	Percentage	Percentage Dutch population (CBS, 2008)
Background characteristics:				
Chronic condition	No	448	87.3	
	Yes	65	12.7	10–13%
Smoking	No	449	87.5	28% (15 + years old)
	Yes	64	12.5	
Sex	Male	227	44.3	49.4
	Female	286	55.7	50.6
Age				
11-20		13	2.6	24.0
21-40		247	48.1	26.0
41-65		223	43.5	35.2
66-80		25	4.9	11.0
81-90		5	0.9	3.8
Children	No	243	47.4	
	Yes	270	52.6	
Education (years)				
4		32	6.2	
5		41	8.0	
6		33	6.4	
7		24	4.7	
8		71	13.8	
9		196	38.2	
10		116	22.6	
Income				
Low		87	6.6	22.4
Average		237	52.2	39.5
High		189	41.1	38.1
Self assessed health				
Bad & moderate		34	6.6	18.8
Good		268	52.2	55.0
Very good and excellent		211	41.1	26.2
Reasons:				
Benefit for people		198	38.6	
Improve health		165	32.2	
Promote equal access		150	29.2	
Attitudes:				
Users pay more	No	113	22.0	
	Yes	400	78.0	
Satisfied	No	205	40.0	
	Yes	308	60.0	

5.2. Research question 1: individual responsibility

Figure 1 shows the frequencies of respondents' WTP for the independent and dependent health problems in the basic health insurance package. The category '5–10 Euros' (17.5%) is the most frequently answered category for the WTP for the independent health problem,

followed by '10–20' (15.2%). In case of WTP for the dependent health problem, 63.6% answered '0 Euros' followed by 10.7% answering '0–5', 8.4% answered '5–10 Euros' and few respondents gave answers in categories above 10 Euros.

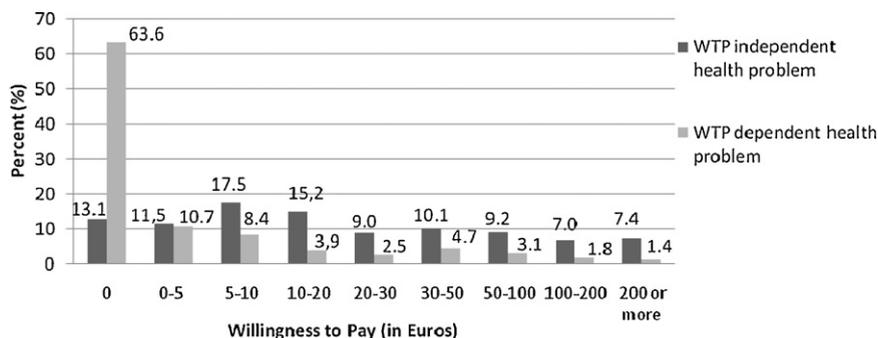Table 3 presents mean WTP, Standard Deviation (SD), and Confidence Interval (CI) for the independent and

Fig. 1. WTP answers of independent and dependent health problems.

Table 3
WTP results (in Euros) for independent health problem and dependent health problem ($n = 513$).

	n	Mean	SD	CI (95%)
Total WTP independent health problem	513	42.39	59.41	37.24–47.55
People without chronic condition	448	42.29	59.26	36.79–47.79
People with chronic condition	65	43.08	60.93	27.98–58.17
Difference in mean between people with and without a chronic condition		0.79		
Non-smokers	449	42.65	2.85	37.05–48.25
Smokers	64	40.59	6.56	27.48–53.69
Difference in mean between non-smokers and smokers		2.06		
Total WTP dependent health problem	513	11.69	32.96	8.83–14.55
People without a chronic condition	448	11.81	32.92	8.75–14.86
People with a chronic condition	65	10.85	33.51	2.54–19.15
Difference in mean between people without and with a chronic condition		0.96		
Non-smokers	449	9.91	31.55	6.98–12.83
Smokers	64	24.18	39.64	14.28–34.08
Difference in mean between smokers and non-smokers		14.27		
Differences between WTPs of independent health problem and dependent health problem		30.70		

dependent health problems. Mean WTP was 42.39 Euros (CI = 37.24–47.55) for inclusion of the independent health problem in basic package instead of a mean WTP of 11.69 Euros (8.83–14.55) for the dependent health problem. This suggests that people are WTP almost four time as much (30.70 Euros more) for including the treatment for the independent health problem compared with the treatment for the dependent health problem.

In addition to Tables 3 and 4 presents regression results. The variable 'WTP independent health problem' is associated with difference in WTP. Coefficient suggests that after controlling for background characteristics, reasons and attitudes, people are WTP 16 euro more for the independent health problem compared with the dependent health problem. This difference in WTP is statistically significant and confirms the findings presented in Table 3. There is no apparent association between people with a chronic condition and difference in WTP and a negative association between being a smoker and difference in WTP. This confirms the finding from Table 3 that smokers are WTP more for the dependent health problem compared with non-smokers although both sub-groups were WTP for the independent health problem. Also variables 'age' and 'age × age' seem associated with difference in WTP. More precise there seems a parabolic relationship between age and difference in WTP. It might be that the decreasing association between age and difference WTP at younger ages could be explained by health-risk behaviour being more common under younger people although we asked for WTP for others. Likewise, the increasing association between age and difference WTP at older ages might be related to the increasing risk of getting a chronic condition. Risk of getting a chronic condition in the Netherlands at age 65–74 is 50% and at age 75 and above is 57.5% [24]. We would like to stress that this interpretation is speculative because the survey question asked for WTP for others. However, it could be that the discussed relation holds because social networks (obviously including family relations) are partly age related.

People who answered the reason 'promote equal access' seem to have a smaller difference in WTP of six euro compared with people who answered the reason 'improve health' although this difference is not statistically signifi-

cant. All in all, our results seem to suggest that people might prefer more individual responsibility in health care.

5.3. Research question 2: societal perspective

Table 3 also presents mean WTP, standard deviation (SD) and confidence interval (CI) separate for people with and without a chronic condition and for smokers and non-

Table 4
Linear regression results; dependent variable 'difference WTP' ($n = 513$).

Variables	Coefficient	Standard error
WTP independent health problem	16.479***	0.677
Background characteristics:		
Chronic condition	0.581	5.725
Smoking	−17.689***	4.962
Female	−0.952	3.426
Age	−1.310*	0.739
Age × age	0.015**	0.008
Children	−0.173	4.923
Education	−1.767	2.627
Education × education	0.039	0.219
Income low (referent category)		
Income average	−4.28 1	4.996
Income high	4.726	5.698
p-Value F-test income average and income high[a]	0.025	
Health bad and moderate	−2.411	7.558
Health good (referent category)		
Health very good and excellent	1.372	3.601
p-Value F-test health good and health very good[a]	0.636	
Reasons:		
Benefit for people	1.558	3.933
Promote equal access	−5.931	4.266
Improve health (referent category)		
p-Value F-test reason benefit for people and reason promote equal access[a]	0.068	
Attitudes:		
Users pay more	−3.235	4.139
Satisfied	−1.172	3.340
Constant	−1.121	1.693
Adjusted R2	0.571	

Notes: ***, ** and * indicate statistical significance at 1%, 5% and 10% levels. Please note that dependent variable was ≥ 0 for 98.4% of this sample.

 [a] Null hypothesis is that coefficients on both explanatory variables are jointly equal to zero.

Table 5

Ordered probit regression results & marginal effects; dependent variable 'WTP independent health problem divided into 9 categoriesĭ (n = 513).

Variables	Coefficient	Marginal effects								
		WTP = 1 (0 Euros)	WTP = 2 (0–5 Euros)	WTP = 3 (5–10 Euros)	WTP = 4 (10–20 Euros)	WTP = 5 (20–30 Euros)	WTP = 6 (30–50 Euros)	WTP = 7 (50–100 Euros)	WTP = 8 (100–200)	WTP = 9 (200 or more)
Background characteristics:										
Chronic condition	0.115 (0.162)	−0.020	−0.012	−0.010	−0.002	0.002	0.006	0.009	0.011	0.019
Smoking	0.100 (0.140)	−0.018	−0.011	−0.010	−0.002	0.002	0.005	0.008	0.009	0.016
Female	−0.042 (0.097)	0.008	0.004	0.004	0.000	−0.001	−0.002	−0.003	−0.004	−0.006
Age	0.036* (0.021)	−0.006	−0.004	−0.003	−0.000	0.001	0.002	0.003	0.003	0.005
Age × age	0.000 (0.000)	0.000	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000	−0.000
Children	0.061 (0.140)	−0.011	−0.007	−0.006	−0.001	0.001	0.003	0.005	0.006	0.009
Education	0.062 (0.075)	−0.011	−0.007	−0.006	−0.001	0.001	0.003	0.005	0.006	0.000
Education × education	−0.004 (0.006)	0.001	0.000	0.000	0.000	−0.000	−0.000	−0.000	−0.000	−0.001
Income low (reference category)	–	–	–	–	–	–	–	–	–	–
Income average	−0.306** (0.141)	0.069	0.031	0.021	−0.004	−0.011	−0.020	−0.025	−0.026	−0.036
Income high	−0.232 (0.161)	0.050	0.024	0.017	−0.001	−0.008	−0.015	−0.019	−0.020	−0.028
p-Value F-test income average and high[a]	0.510	–	–	–	–	–	–	–	–	–
Health bad and moderate	0.143 (0.213)	−0.025	−0.015	−0.014	−0.003	0.002	0.007	0.011	0.013	0.023
Health good (reference category)	–	–	–	–	–	–	–	–	–	–
Health very good and excellent	0.192* (0.102)	−0.032	−0.020	−0.019	−0.005	0.003	0.009	0.015	0.018	0.032
p-Value F-test health good and very good[a]	0.829	–	–	–	–	–	–	–	–	–
Reasons:										
Benefit for people	−0.260** (0.110)	0.046	0.027	0.025	0.005	−0.005	−0.013	−0.021	−0.024	−0.041
Promote equal access	−0.178 (0.121)	0.030	0.019	0.018	0.005	−0.003	−0.009	−0.014	−0.017	−0.029
Improve health (reference category)	–	–	–	–	–	–	–	–	–	–
p-Value F-test benefit for people and promote equal access[a]	0.482	–	–	–	–	–	–	–	–	–
Attitudes:										
Users pay more	−0.218* (0.117)	0.047	0.023	0.016	−0.001	−0.007	−0.014	−0.018	−0.019	−0.027
Satisfied	0.096 (0.094)	−0.017	−0.010	−0.009	−0.002	0.002	0.005	0.008	0.009	0.015
Pseudo R2	0.0121									
Log likelihood	−1088.665									

Notes: Standard errors are in brackets. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels. The marginal effect for the continuous independent variable is the derivative of the predicted probability variables and the marginal effect for discrete independent variable is the shift in probability when placing the person in the group represented by the variable versus the reference group (0 and 1). In calculating the marginal effects, all other continuous independent variables are kept at their mean values and the discrete independent variables are kept at the value zero [23].

[a] Null hypothesis is that coefficients on both explanatory variables are jointly equal to zero.

Table 6

Ordered probit regression results and marginal effects; dependent variable 'WTP dependent health problem divided into nine categories' ($n = 513$).

Variables	Coefficient	Marginal effects								
		WTP = 1 (0 Euros)	WTP = 2 (0–5 Euros)	WTP = 3 (5–10 Euros)	WTP = 4 (10–20 Euros)	WTP = 5 (20–30 Euros)	WTP = 6 (30–50 Euros)	WTP = 7 (50–100 Euros)	WTP = 8 (100–200 Euros)	WTP = 9 (200 or more)
Background characteristics:										
Chronic condition	−0.298 (0.191)	0.118	−0.001	−0.013	−0.011	−0.010	−0.024	−0.022	−0.017	−0.019
Smoking	0.695*** (0.152)	−0.223	−0.038	−0.011	0.006	0.010	0.041	0.055	0.056	0.104
Female	−0.032 (0.116)	0.012	0.001	−0.001	−0.001	−0.001	−0.003	−0.003	−0.002	−0.003
Age	0.139*** (0.030)	−0.053	−0.002	0.004	0.004	0.004	0.011	0.011	0.009	0.012
Age × age	−0.002*** (0.000)	0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
Children	−0.210 (0.157)	0.082	0.001	−0.008	−0.008	−0.007	−0.017	−0.016	−0.012	−0.015
Education	0.068 (0.094)	−0.026	−0.001	0.002	0.002	0.002	0.005	0.005	0.004	0.006
Education × education	−0.002 (0.008)	0.001	0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
Income low (reference category)	–	–	–	–	–	–	–	–	–	–
Income average	−0.283 (0.176)	0.111	−0.001	−0.012	−0.011	−0.009	−0.023	−0.021	−0.016	−0.019
Income high	−0.307 (0.196)	0.121	−0.001	−0.014	−0.012	−0.010	−0.025	−0.023	−0.017	−0.020
p-Value F-test income average and income high[a]	0.854	–	–	–	–	–	–	–	–	–
Health bad and moderate	0.093 (0.248)	−0.035	−0.002	0.002	0.003	0.003	0.007	0.008	0.006	0.009
Health good (reference category)	–	–	–	–	–	–	–	–	–	–
Health very good and excellent	−0.224* (0.120)	0.088	0.000	−0.009	−0.008	−0.007	−0.018	−0.017	−0.013	−0.015
p-Value F-test health good and health very good[a]	0.229	–	–	–	–	–	–	–	–	–
Reasons:										
Benefit for people	−0.072 (0.135)	0.029	−0.002	−0.005	−0.003	−0.003	−0.006	−0.005	−0.003	−0.003
Promote equal access	0.332** (0.139)	−0.131	0.002	0.015	0.013	0.011	0.027	0.025	0.018	0.021
Improve health (reference category)	–	–	–	–	–	–	–	–	–	–
p-Value F-test benefit for people and promote equal access[a]	0.003***	–	–	–	–	–	–	–	–	–
Attitudes:										
Users pay more	−0.213 (0.146)	0.083	0.001	−0.008	−0.008	−0.007	−0.017	−0.016	−0.013	−0.015
Satisfied	0.061 (0.112)	−0.023	−0.001	0.001	0.002	0.002	0.005	0.005	0.004	0.005
Pseudo R^2	0.0581									
Log likelihood	−645.053									

Notes: Standard errors are in brackets. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels. The marginal effect for the continuous independent variable is the derivative of the predicted probability and the marginal effect for discrete independent variable is the shift in probability when placing the person in the group represented by the variable versus the reference group (0 and 1). In calculating the marginal effects, all other continuous independent variables are kept at their mean values and the discrete independent variables are kept at the value zero [23].

[a] Null hypothesis is that coefficients on both explanatory variables are jointly equal to zero.

smokers. People without and with a chronic condition stated similar WTPs (*p*-value = 0.674, Fisher's exact test) for the independent health problem. The same holds for non-smokers and smokers (*p*-value = 0.507, Fisher's exact test). People without and with a chronic condition also stated similar WTPs for the dependent health problem (*p*-value = 0.812, Fisher's exact test). Contrary, non-smokers and smokers WTPs for the dependent health problem differed remarkably: non-smokers WTP was 9.91 Euros and smokers WTP was 24.18 Euros, a difference of more than 14 Euros. This difference was statistically significant (*t*-test *p*-value = 0.001) (*p*-value = 0.000, Fisher's exact test). This suggests that smokers related their societal WTP to their personal situation, whereas people with a chronic condition do not make this comparison.

In order to correct for potential confounders, Tables 5 and 6 present estimated coefficients, standard errors in parentheses, and marginal effects of OP with WTPs of the dependent and independent health problems as dependent variables. In case of the dependent health problem, smokers are ceteris paribus statistically significantly WTP more compared with non-smokers. Marginal effects show that smokers have a much lower probability of answering WTP category '0–10 Euros' than non-smokers. In contrast, smokers had especially a higher chance to answer WTP category '30–200 Euros'.

Pattern of reasons seems also stable. Reason 'benefit for people' has a significant negative influence on the WTP for the independent health problem compared with the reason 'improve health'. For dependent health problem, reason 'promote equal access' has a positive influence on WTP. People who promote equal access seem WTP more for the dependent health problem confirming their preference for promoting equal access.

Additional analyses suggests no difference in stated reasons between people with and without chronic condition (*p*-value = 0.409, Fisher's exact test). However, stated reasons of non-smokers and smokers (people who compared with their personal situation) differed. Smokers answered statistically significant less often reason 'improve health' than non-smokers. On the other hand, smokers stated statistically significant more often the reason 'promote equal access' compared with non-smokers. No difference was found in listing reason 'benefit for people'.

Based on the WTP results, it seems fair to conclude that smokers compare with their personal situation when answering questions adopting a societal perspective, whereas people with a chronic condition do not. This suggests that sub groups of people might differ in terms of abstracting from personal situation in answering CVM questions adopting societal perspective.

6. Discussion and conclusion

Almost eighty percent of our sample states that everybody has to pay the same insurance premium irrespective of health care utilization. A majority (60%) reports to be satisfied with current Dutch health care policy. However, based on our CVM results it seems fair to conclude that our sample (obviously we do not claim our results to be valid for the Dutch population) seems to prefer more individual responsibility in health care. Our first research question is; '*What are peoples' preferences regarding more individual responsibility in health care?*' People seem WTP almost four times more for inclusion in basic health insurance package of treatment for the disease which arose totally independent of health-risk behaviour (mean WTP 42.39 Euros) compared with the disease which caused totally dependent by health-risk behaviour (mean WTP 11.69 Euros). Striking is that smokers are more WTP for people with chronic condition compared with smokers. This is likely because there is a certain degree of control in taking health-risks.

We do not claim that our preliminary results point at a preference to more individual responsibility in the Netherlands because of our relatively small sample, but within our sample there seems a preference to more individual responsibility. However, it should be mentioned here that one could interpret our findings different. The mean WTP of 11.69 Euros would be enough to include the treatment for the dependent health problem in the basic health insurance package. One could argue that based on this finding Dutch people do not prefer more individual responsibility. We would like to stress here that this is strictly speaking correct. However, the consumer surplus of including the treatment for independent health problem is much higher compared with the dependent treatment pointing at a preference for more individual responsibility.

Our finding that points at a preference for more individual responsibility in health care seems consisted with findings of two other studies that measured preferences regarding ex ante moral hazard in the United Kingdom. Dolan and Tsuchiya [28] used the person-trade-off method and found that people taking health risks got half as much weight compared with people who have cared for their health. Also respondents were not willing to reduce inequalities in health resulting from smoking. Covey et al. [29] used to contingent valuation method and showed that respondents put a lower value on preventing deaths from people whose behaviour was irresponsible although compared with preventing deaths that resulted from exogenous factors although the results were less marked in case of children behaving irresponsible compared with adults.

Second research question is: *What is the influence of peoples' self-interests in expressing their societal preferences in health care?* Results suggest that smokers compare with their personal situation (*p*-value = 0.000, Fisher's exact test), also after correction for confounders in the OP regressions, but people with a chronic condition do not (*p*-value = 0.694, Fisher's exact test). This suggests that sub groups of people might differ in terms of abstracting from their personal situation in answering CVM questions adopting a societal perspective. Therefore, it might not be possible to measure people's societal preferences without getting involved in their personal situations. Our findings seem in contrast with Dolan et al. [16] who described the social perspective as an elicitation whereby any self-interest is detached. However, it should be mentioned here that we did not ask respondents to state their WTP without detaching from their personal circumstances. Future research could compare question explicitly asking respondents to abstract from their personal situation with the

type of questions we asked. Our results could also be interpreted as an empirical test of Labelle and Hurley's [18] model of interdependent utility functions. Our application distinguished between the interdependent utility of people with and without chronic condition/smokers versus with other people with chronic condition/smokers. These interdependencies are usually excluded from economic evaluations of health care interventions.[2] Our results suggest that utility interdependencies are important and there seems variation between sub-groups of people's interdependent utilities which should be taken into account to avoid that economic evaluations involved biased policy implications. We encourage more research in this area. Interesting questions include; can peoples' personal circumstances be totally detached? Do various sub groups differ in this respect? If so, results of studies that measure societal preferences could be biased when certain sub groups do and others do not abstract from their personal circumstances.

A few weaknesses should be mentioned. First, using only smoking as an example might have biased results. However, we also asked for other health-risk behaviours like alcohol[3] and results were quite similar. We also would like to stress that main aim of our though experiment was to measure peoples' preferences regarding individual responsibility in health care and not developing health policy. More important in terms of weaknesses might be that our scenario allowed people to purchase the care themselves when it would not be reimbursed for 1000 euro per person per treatment. It could be that people might be willing to pay more for others in case of health-risk behaviour if they had to pay much more themselves for treatment in case it would not be reimbursed by health insurance. The 1000 euro seems affordable, although this might not be true for people with very low income, whereas 15,000 euro or even more might be much less affordable for a more substantial number of people. This could be tested in future research. Also other characteristics that might be important were kept constant like e.g. age while Covey et al. [29] found that age matters in this context suggesting that older people taking risks seem to matter more compared with younger people taking risks.

Second, despite of CVM being a natural way to measure preferences within managed competition, is has also limitations. It has been argued that ordering effects could influence WTPs [30]. We first asked WTP for the independent health-risk behavioural disease and then WTP for the dependent health-risk behavioural disease. It could be that respondents receive moral satisfaction or warm glow from simply contributing to a publicly financed good. Usually the first programme in the sequence is likely to capture the bulk of this satisfaction [30]. As a result, it can be that respondents answered more zero values for the second question. As we did not vary the order of the questions we are not able to test for order effects.

Third, despite our sample seems representative for the Dutch population based on observed characteristisc

(Table 1), and despite we do not claim that are reults can be generalised to the Dutch population, it could be that people WTP zero to include anything extra in the basic health insurance package did not respond. As a result, the zero answers could be underpresented and our mean WTPs are overestimations. We claim that we avoid this problem because we focus on WTP differences and not on absolute WTPs. Another reason for focussing on WTP differences and not on absolute WTPs is the range of the payment card scale. It has been argued that the payment card leads to valid results [31,32]. However, it also has been suggested that the presented range influences results, involving overestimation of consumer surplus [33]. As payment cards on both WTP questions were identical we claim to avoid this problem. A fourth weakness could be sample selection via internet. Internet respondents report better self assessed health and are less often smokers. Although we correct for these factors in OP regressions one should be careful with translating our findings in national figures. Postal recruitment potentially seems to be a better alternative. In order to get a higher response one should make an effort in making the questionnaire personal and being able to approach people for phone reminders [34].

Fifth, income has answering categories: my income is low, average or high. This, because it has been argued that item non-response is relatively high on income questions (10–15%) [35,36]. Solution was successful in sense of low item non-response; however we might have introduced measurement error as people might have different perceptions about low, average and high income. This might also explain that income was not statistically significant associated with WTP.

Our findings could have potential implications for health policy. The ultimate question that should be answered in this respect is for which types of behaviour (variables) people are responsible; see Schokkaert and Devooght [37] for excellent overview. Obviously the answer on this question might differ between cultures. Germany seems the first country with an explicit policy regarding individual responsibility. In an attempt to control rising health care expenditures, bonuses are introduced as incentives or rewards for health-related behaviour. Another aim of their policy is to promotie individual responsibilty. There seems still lack of empirical evidence about the effectiveness of the German bonus system [40]. Schmidt [40] also described some possibilities for more individual responsibility by reimbursement of care use from people taking health-risks. Opting for a bonus system instead of a sanction system is justified because disease development in addition to behaviour is affected by a highly complex range of factors that includes genetic predispositions, biological processes, and environmental conditions. Till now, there is insufficient information of which factor has the largest influence on getting the disease. It is therefore difficult to design a relevant sanction system [40]. Implications of our results for developing health policy seem straightforward. As our results point at a preference towards more individual responsibility in health care, even if the German type of incentive system would be ineffective it might be important to implement in order to prevent crowding out of people's WTP for others.

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[2] Exceptions include Basu and Meltzer [38] and Van den Berg et al. [39].
[3] Results not presented in this paper.

How to create incentives in practice is obviously complicated because many health problems are both genetic and affected by lifestyle. It is beyond the scope of our paper to discuss how to develop health policy in which case one might argue it is crucial to disentangle health-risks from other factors determining health problems. Although this distinction is not necessary in case one could target policy on the inputs in the health-risk production function; see for example Waterlander et al. [41]. Unfortunately we only asked whether or not the respondents agreed on the statement "everybody has to pay the same insurance premium irrespective of health care utilization". We also should have asked whether or not the respondents agreed on the statement "health insurers should be allowed to vary premium according to client's health-risk behaviour". This is prohibited in Dutch health care but one could argue that this could be a solution to avoid crowding out caring externalities (people becoming less willing to pay for others) within a system of managed competition like the Netherlands has implemented.

This relatively small scale preliminary study seems to have a few interesting features. We hope that this paper accelerates new research in this area as we think it is one of the crucial challenges for developing and reformulating health policy for the next decades. We fully acknowledge practical difficulties and possible normative objections against introducing incentives for individual responsibility in health policy. This only makes a greater challenge!

Acknowledgements

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