# Preference measurement in health using experiments

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## Abstract

This contribution has three objectives. First, it seeks to justify the use of the economic criterion, "Provision of health care in accordance with the preferences of current and potential patients" for guiding decisions concerning the adoption of costly innovation in health. Next, it proposes the measurement of these preferences in the guise of willingness to pay (WTP) values through Discrete Choice Experiments (DCEs). Third, it purports to examine two popular arguments against accepting lay persons´ preferences, viz. that they are unwilling or unable to express preferences with regard to health and health care, and that their preferences are unstable, depending on the current state of health. Both of these arguments are refuted by the findings of four DCEs designed to measure WTP for attributes of health insurance and of the treatment of diabetes, respectively [Zweifel in J Regul Econ 29(3): 319–332, 2006; MacNeil Vrooman and Zweifel in Eur J Health Econ 12(1): 87–95, 2011; Sennhauser and Zweifel in: Jakovlijevic M (ed.), Health Economics and Policy Challenges in Global Emerging Markets. NOVA Publishers, Hauppauge NY, 2016].

## 1 Introduction and objectives

Health care is characterized by a rapid pace of technological change. This puts social health insurers (governments, respectively in the case of a National Health Service) under pressure to add new therapies to their benefit list. At the same time, they seek to limit healthcare expenditure (HCE) in the aim of avoiding a surge in contributions (taxation, respectively).[1] This raises an important issue addressed in this contribution: What criteria should be used to decide whether or not a (costly) innovation should be included in the benefit list? A crucial criterion from an economic perspective (which however is rarely mentioned in the context of health and health care) is the provision of goods and services in accordance with consumer preferences. In the

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next section, this criterion is argued to be an important determinant of the performance not only of an economic system but also of a healthcare system.

The challenge, however, has been to measure consumer preferences in the case of health and health care. Therefore, the section on Discrete Choice Experiments (DCEs) presents a way for determining preferences from repeated hypothetical choices. The following two sections deal with two criticisms that have been levelled especially by the medical profession, viz. that lay people lack the will and/or ability to express their preferences with regard to health care and that their preferences are unstable, varying with their current state of health. The paper is rounded off by a section containing concluding remarks and a suggestion for health policy.

## 2 Criteria for assessing the performance of a healthcare system

In the microeconomic approach to the theory of economic policy, five criteria are used for assessing the performance of an economic system (Fritsch et al. 2007). These criteria are (1) Provision of goods and services in accordance with consumer preferences; (2) Static efficiency (production at least cost); (3) Adaptability (to changes in demand and technology); (4) Dynamic efficiency (right mix of product and process innovation); and (5) Income distribution according to merit [meaning that producers do not achieve incomes in excess of what is necessary to make them act in accordance with criteria (1) to (4)].

These five criteria are applied to the healthcare sector, in contradistinction to the set applied e.g. by the World Health Organization for the ranking of healthcare systems (Tandon et al. 2003). The authors distinguish throughout between the levels (of achieved health, responsiveness of health care, and fairness of financing) and their distribution, which receives an emphasis far beyond criterion (5), "Income distribution according to merit" cited above. Yet the application of economic criteria can be justified in view of the fact that health care claims ten percent or more of the GDP in industrial countries (OECD 2020), making its performance an important determinant of an economy´s overall performance. In the present context, particular emphasis is put on criterion No. 1, which now becomes, "Provision of healthcare services in accordance with the preferences of current and potential patients". This emphasis serves to recall that the cost of health care is borne not by health insurers or the government but by the citizens through their contributions, fees, and taxes.

At this point, two clarifying remarks are appropriate. First, this criterion does not mean that preferences expressed "at the last minute" are to be respected; rather, it is to be applied to decisions regarding the structuring of health care, in particular the benefit list of social health insurance (of a National Health Service, respectively). Second, the preferences of *potential* patients (i.e. the majority of the insured and taxpayers who contribute to the financing) take precedence over those of current patients. In keeping with this point, the DCEs to be discussed below involved both respondents without and with a health condition.

In the healthcare sector, the crucial decision governing the provision of services is their reimbursement. While this is not deny the importance of ethical motivations, there is ample evidence suggesting that financial incentives do matter in health care

[see e.g. Baek et al. (2012); Burkhard et al. (2019); Hillman et al. (1989)]. Therefore, reimbursement decisions should be in accordance with the preferences of current and potential patients. In insurance-based systems (such as Germany, the Netherlands, and Switzerland) social health insurers should decide reflecting the preferences of their members. In National Health Service-based systems (such as the United Kingdom, Spain, and most developing countries), the government should decide reflecting the preferences of taxpayers.

**Conclusion 1**. The performance of the healthcare sector can be assessed using the same five criteria as those applicable to an economic system, among which "Provision of goods and services in accordance with consumer preferences" is particularly important. Therefore, preferences of potential patients in particular should guide reimbursement decisions.

However, there are two popular counter-arguments against reimbursement decisions in accordance with lay people´s preferences:

- "The insured and patients lack the information and/or the will to express their preferences";
- "When healthy, individuals give a damn, but when sick, they are willing to sacrifice just about everything to recover their health".

These claims will be examined after presenting the Discrete Choice Experiment (DCE) as a way to measure preferences in the following section.

## 3 Discrete Choice Experiments (DCEs) for measuring preferences

Preferences amount to assigning weights to competing objectives. In the Operations Research literature, a popular approach has been the Analytical Hierarchy Process developed by Saaty (1982, 1994). In its decisive step No. 3, this process calls for the assignment of points depending on whether an objective is deemed very important (seven points) down to not important at all (zero points). Arguably, this already amounts to implicitly assigning (constant) preference weights, whereas in economic theory these weights vary with the quantities of goods (attributes, respectively), as will become evident in Fig. 1 below [for more details and axiomatic foundation, see e.g. Mas-Collel et al. (1995), ch. 3]. Also, being derived from utility, preference weights are necessarily subjective and therefore not comparable between individuals. However, what are comparable are willingness to pay (WTP) values expressed in money, which can be derived from indifference curves (see below).

Yet in health care, observed WTP is a poor guide to the determination of preference weights. A simple example may serve to illustrate this. Let Mr X be prepared to pay EUR 100 out of pocket for a prescription drug at the pharmacy. If copayment is 10%, the drug may cost as much as EUR 1000 at the counter– and Mr X will still buy it. The reason is that 10% of 1000 is exactly his true (unobserved) WTP.

**Fig. 1** Determining an indif-
ference curve through a DCE
$a_1$: Waiting time for access to
new therapies negatively valued
attribute, $a_2$ Freedom of choice
of physician (positively valued
attribute); $I_0$ Indifference curve
$Q$: Status quo; $Q'$: Alternative
status quo, *Source*: Author
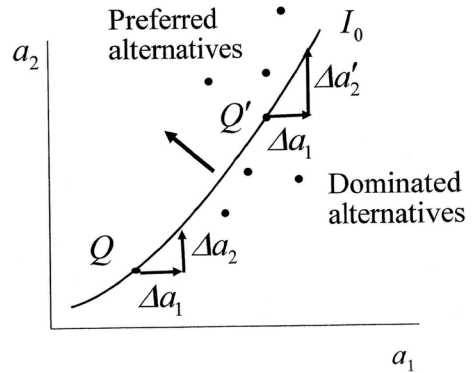
Evidently, patients´ observed WTP is inflated by health insurance coverage (almost complete subsidization in the case of a National Health Service).[2]

By way of contrast, on a competitive market the price paid is informative because the consumer´s true (marginal) WTP must be sufficient to cover the extra cost of supplying the product to him or her. Therefore, the market price reflects both the marginal WTP of the (marginal) consumer and the (marginal) cost of supply. In the healthcare sector, prices and fees paid reflect neither WTP nor marginal cost; the latter are negotiated or even set by the government.

In this situation, experimental evidence derived from hypothetical choices may serve as a second-best alternative. There are two main approaches for analyzing such choices. The traditional one is Contingent Valuation, which seeks to directly determine respondents´ WTP for a good or service with fixed attributes [see e.g. Carson (2012); Weatherly et al. (2014); Watson et al. (2020)]. The other approach, Discrete Choice Experiments (DCEs), permits to infer the respondents´ valuation of the several attributes that make up the good or service in question. Being less subject to biases notably due to an overemphasis on the price attribute, DCEs have become increasingly popular especially in Health Economics [Clark et al. (2014); for a recent survey, see Soekhai et al. (2019)].

In 2003, a DCE was performed in Switzerland with the objective to measure citizens´ preferences concerning attributes of so-called Managed Care, a variant of health insurance. A Managed Care policy typically imposes restrictions on patient choice in return for la lower contribution. Two of its attributes are selected to illustrate how a DCE can be used to estimate preference weights, *Waiting time for access to new therapies* ($a_1$), an important aspect of reimbursement decisions, and *Freedom of choice of physician* ($a_2$). They are depicted in Fig. 1, along with the positively sloped indifference curve $I_0$ symbolizing the locus along which the potential patient´s utility is held constant. The short arrow points in the direction of higher-valued combinations of the two attributes (shorter waiting time, more freedom of choice of physician).

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[2] See e.g. Zweifel and Manning (2020) for a more detailed discussion.

The slope of the indifference curve indicates how much additional waiting time $\Delta a_1$ this particular individual would be willing to accept in return for greater freedom of choice. Its convexity shows that the subjective trade-off between the two attributes depends on the situation. While at the status quo point $Q$, the two attributes have approximately equal preference weights, the increasing steepness of the indifference curve makes clear that a further increase in waiting time would have to be compensated with progressively more freedom of choice to keep utility constant (e.g. if the status quo point were $Q'$). Evidently, the preference weights would shift in favor of a shorter waiting time for access to new therapies. An important general insight is that the structure of preferences depends on the status quo; an objective that is far from being reached is more highly valued than another one that is satisfied to a high degree.

An individual´s indifference curve is of course not known. However, it can be at least locally determined by making participants in a DCE repeatedly choose between the status quo and a hypothetical alternative containing a changed mix of attributes.[3] Six such alternatives are symbolized by points in Fig. 1. If the participant says to prefer one of them to the status quo, that point must lie above the (unobserved) indifference curve in attribute space; conversely, the indifference curve $I_0$ through $Q$ must lie below it. If the participant says to prefer the status quo over the proposed alternative, the point in question must lie below the (again unobserved) indifference curve passing through $Q$; conversely, $I_0$ must lie above that point. In sum, by making participants repeatedly choose between alternatives and the fixed status quo, their preference structure can be determined in the course of a DCE.

Finally, let the attribute *Freedom of choice of physician* ($a_2$) be replaced by another positively valued attribute, *Net income after payment of the contribution to social health insurance*. In that event, $\Delta a_2$ shows how much more net income (a reduction in the health insurance contribution paid, respectively) it would take to make an increase in waiting time by $\Delta a_1$ acceptable. Conversely, one can turn the direction of the two arrows around to conclude that the depicted individual is willing to sacrifice $\Delta a_2$ of his or her income (pay a higher contribution) for a shortening of waiting time by $\Delta a_1$. Clearly, this is a WTP for the attribute $a_1$ expressed in money. Although determined by subjective preferences, it can compared between individuals and aggregated across individuals to estimate a societal WTP.

Two things are noteworthy. Contrary the Contingent Valuation approach, respondents are never asked to directly indicate their WTP; they merely have to opt for the alternative or the status quo, with WTP values inferred from their repeated choices. And if a WTP value can be ascertained for one attribute, this can be done for all attributes defining a product and service, resulting in a WTP value for the whole good or service (a health insurance policy in the present context).

**Conclusion 2**. The slope of an individual´s indifference curve around the status quo indicates how much he or she is willing to give up of one attribute of a good or

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[3] It is important to keep the status quo point fixed. Otherwise, one does not determine the slope of a given indifference curve and hence a preference structure but a mix of several indifference curves, which is not informative (Mühlbacher et al. (2016).

**Table 1** WTP estimates of Managed Care attributes (1 CHF = 0.9 EUR; standard errors in parentheses)
*Source*: Zweifel et al. (2006)

| Socio-economic charact-eristics | Physician list according to cost criteria (1) | Access to new therapies & drugs delayed by 2 years (2) | Reimbur.-sement of generics only (3) | No reimbur-sement of drugs for minor ailments (4) |
|---|---|---|---|---|
| Total sample | − 103 (13.2) | − 65 (7.9) | − 3 (5.5) | + 6 (5.3) |
| Female | − 117 (24) | − 68 (13.3) | − 4 (9.2) | + 12 (9.1) |
| Male | − 93 (15.5) | − 63 (9.9) | − 1 (6.8) | + 3 (6.7) |

service in order to obtain more of the other, which establishes preference weights. If one attribute is income after payment for the good or service, this slope reflects the marginal willingness to pay for the attribute.

Claim No. 1: Inability or unwillingness to express preferences

This claim is examined in the light of the DCE cited in the previous section. Before the start of it, participants were briefed with a description of the status quo, which in 2003 was free physician choice, access to new therapies with six months´ delay on average, and a very comprehensive list of pharmaceutical benefits with few exclusions for minor ailments, as well as the average monthly contribution to social health insurance.[4]

Since the available information on participants is never complete, their choices contain a random element to the observer, calling for the application of Random Utility Theory (McFadden 1973, 1974) and Probit estimation with two-way random effects. One component of the error term in the regression is individual-specific so does not vary between choices; the other is a classical error term that varies with choices [see e.g. Wooldridge (2002), 25–265].

The estimates based on 1000 respondents and ten choices (an eleventh choice served as consistency check) are presented in Table 1, along with WTP values for four of the attributes. Evidently respondents required the highest compensation for accepting the most stringent restriction, i.e. a *Physician list based on cost criteria only*. This means that the health insurer has the right to select physicians who engender low average treatment cost, adjusted for their patient intake; however, there is no cap on HCE during a specific treatment episode. The (negative) WTP value attains CHF103 per month (1 Swiss franc = 0.9 EUR), i.e. some 38% of average countrywide monthly premium at the time. With a standard error of 13.2 CHF, this value is clearly different from zero. The other three attributes relate to the reimbursement decisions that were invoked in the Introduction section. *Access to new therapies and drugs delayed by 2 years* would also have to be highly compensated, by CHF 65 or 24% of average premium, respectively. This is intuitive because there may be instances where access to an innovative (often pharmaceutical) therapy can be

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[4] In Switzerland, competing (but heavily regulated) social health insurers charge a premium in Swiss francs (CHF).

For more details, see e.g. Kreier and Zweifel (2010).

Fig. 2 Instability of observed valuation due to state dependence of the feasible set C: Consumption services (require consumption goods and healthy time; $ET_h$: Expected value of healthy time, normalized to $[0,1)$; h: Boundary of feasibility set when healthy; s: Boundary of feasibility set when sick; $I_0, I_1, I_2$: Indifference curves *Source*: Zweifel et al. ([2009](#)), ch. 3.4
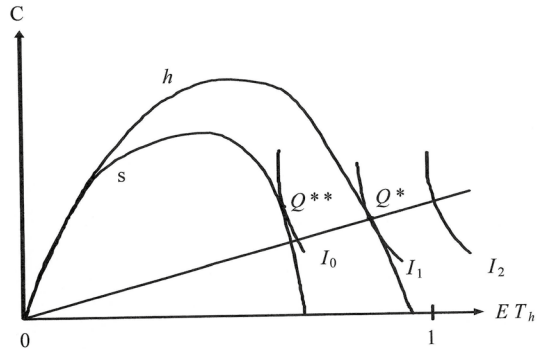


a life-and-death issue. However, whether a drug is a generic or not matters far less, which is in accordance with the nonsignificant WTP value of the attribute, *Reimbursement of generics only*. The attribute, *Exclusion of preparations for the treatment of minor ailments* even seems to trigger a positive WTP.[5]

Most research suggests that women are more concerned about their health than men. The WTP values displayed in Table 1 are in line with this expectation as well. However, they substantially overlap in view of their standard errors, rendering their differences nonsignificant. More importantly, the ranking of the attributes in terms of WTP values is the same for both genders, with the restriction on physician choice requiring the highest compensation and removing drugs for the treatment of minor ailments from the benefit list, none at all.

**Conclusion 3**. The WTP estimates derived from a DCE are in line with the severity of restrictions imposed by a Managed Care-type health insurance policy; they do not differ between the genders. This evidence does not support the claim No. 1, stating that lay people cannot or will not express their preferences with regard to health and health care.

Claim No. 2: Instability of lay people´s preferences

To recall, a popular argument advanced by the health professions is, "When healthy, individuals give a damn, but when sick, they are willing to sacrifice just about everything to recover their health". This argument claims that there is status dependence of preferences; however, according to microeconomic theory observed behavior is the resultant of preferences and feasibility sets usually bounded by income [see e.g. Varian ([1992](#)), ch. 7]. In the case of health, the feasibility set typically depends on health status; therefore, the alleged instability inferred from observed behavior may well derive from a state dependence of the feasibility set rather than preferences.

This is shown in Fig. 2, which has two feasibility sets, one for the state of good health labeled *h* and the other, for the state of sickness labeled *s*. The other element

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[5] The findings of this DCE were confirmed by the huge success of a popular referendum in 2011 against a bill proposed by the federal government that would have made Managed Care the default option in Swiss social health insurance [see Zweifel ([2013](#)) for a detailed description].

are three indifference curves labeled $I_0$, $I_1$, and $I_2$ representing preferences. Both are in terms of consumption services $C$(which require healthy time) and the expected value of healthy time $ET_h$, with a maximum of 1 (=healthy through an entire year). A particularity of both feasibility sets is that at first, the slope of their boundaries are positive, indicating that more consumption services and more healthy time are simultaneously achievable. The reason is that additional time in good health allows to attain higher income by working more, which finances more consumption goods and hence consumable services.

Obviously, this holds in particular when the individual is healthy, resulting in the comparatively steep positive initial slope of the boundary labeled $h$. But beyond some point, more healthy time can only be had by investing more in health (e.g. exercising and/or working less), causing the slope of the boundary to turn negative.

In the sick state, income drops to a level determined by social security out of which medical care must be paid at least in part. Therefore, the boundary labeled $s$ reaches its maximum at a lower level of consumption services $C$. A crucial (but credible) assumption is that that the maximum of expected healthy time is lower than in good health, causing the boundary labeled $s$ to fall off at a faster rate than the boundary $h$ almost everywhere.[6]

As to the indifference curves $I_0$,$I_1$, and $I_2$, note that their slope is held constant along the ray originating from the origin, indicating that the individual´s preferences do not depend on his or her position in the $(C, ET_h)$-space of Fig. 2. In particular, this means that the individual´s preference weights do not vary with the state of health. The optimum allocation when healthy is given by point $Q*$, where the highest-valued indifference curve is reached. Since this is a point of tangency, the slope of the indifference curve is the same as the slope of the boundary of the feasible set.

Now turn to the sick state, which entails the lower-valued point $Q**$ as the optimum. Clearly, this tangency point cannot lie on the ray from the origin because the boundary of the feasible set labeled $s$ has a more marked negative slope than that labeled $h$. The equality of slopes for tangency therefore requires that the indifference curve $I_0$ at $Q**$ runs steeper than $I_1$ at $Q*$. However, recalling the discussion of Fig. 1, this implies that the individual is now willing to give up more consumption services in return for a given amount of extra time in good health – a sign of higher relative valuation of health. The upshot is that this apparent change in valuation need not reflect an instability of preferences (recall that they are held constant in Fig. 2) but rather the state dependence of the feasibility set. The problem is that only the resultant of the interaction of the two components determining the tangency condition for an optimum is observed.

The DCE cited in the previous section also furnishes some evidence on the issue of preference instability because respondents indicated whether or not they were in treatment (see Table 2). There, the ´healthy´ respondents do seem to require less compensation for accepting the Managed Care-type restrictions than the ´sick´ ones (i.e. those currently in treatment and those having been in hospital during the last 12 months). This is partially true of the attribute, *Access to new therapies and drugs*

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6  For a mathematical formulation, see Zweifel et al. (2009), ch. 3.4.

**Table 2** WTP estimates according to health status (1 CHF = 0.9 EUR; standard errors in parentheses)[a] *Source:* Zweifel et al. (2006)

| Socio-economic charact-eristics | Physician list according to cost criteria (1) | Access to new therapies & drugs delayed by 2 years (2) | Reimbur.-sement of gener-ics only (3) | No reimbur-sement of drugs for minor ailments (4) |
| --- | --- | --- | --- | --- |
| Total sample | 103 (13.2) | 65 (7.9) | 3 (5.5) | 6 (5.3) |
| Healthy | 99 (14.1) | 60 (8.3) | 0 (6.1) | 11 (6.0) |
| In treatment | 117 (33) | 63 (9.9) | – 1 (6.8) | 3 (6.7) |
| Hospitalization last 12 months | 160 (81) | 82 (21.7) | 28 (28.0) | – 24 (25.5) |

[a]Positive values indicate the amount of compensation required for acceptance, the negative ones, positive WTP

*delayed by 2 years*. But in view of the large standard errors, not even the maximum difference between 99 and 160 CHF per month for accepting the attribute, *Physicians selected on cost criteria* can be said to be statistically significant.

Two DCEs performed in Germany (2005) and the Netherlands (2006, after a major health reform) also revolved around attributes of health insurance; it had 1000 (763, respectively) respondents. They distinguished between individuals without a chronic condition and those with one, reflecting respondents´ own assessment (MacNeil Vrooman and Zweifel 2011).[7] A first difference between the two DCEs was the status quo: Whereas the insured in Germany had (and still have) free choice of physician, The Netherlands had introduced a variant of Managed Care (attribute *Gatekeeper*) similar to attribute No. 1 of Table 1, *Physician list according to cost criteria*.

Second, pretests revealed that contrary to the situation in Germany (where a possible requirement to obtain a second opinion prior to hospitalization was being discussed, see Table 3), waiting for admission to a hospital was a big issue in the Netherlands (see the attribute *NLHosp* in Table 4). Accordingly, the regressor *GESecop* is a dummy variable which interacts the nationality of the respondent (*GE*=0 if German,=1 if Dutch) with the dummy variable representing the attribute *Secop* (second opinion,=1 if part of the policy,=0 otherwise), while *NLHosp* has a value of one if the respondent was Dutch and zero otherwise. A third difference concerns the attribute levels. Since the status quo in the Netherlands was gatekeeping, one of the levels for physician choice had to be *NLPhysfree*, indicating free choice of physician. Finally, contribution rates were more strictly regulated than in Germany, strongly suggesting to reduce the range of *GEContrib* of $\pm$ 200 to $\pm$ 500 to a range of $\pm$ 300 to $\pm$ 500 EUR/year for *NLContrib* Table 5.

Starting with the German sample, the WTP values for attributes *Network* (2) and *Bonus for healthy behavior* (3) obviously do not differ between ´healthy´ respondents (without a chronic condition) and ´sick´ ones (with a chronic condition). However, this also holds for attributes *Deductible* (1) and *Gatekeeping* (4) because the differences in WTP values are insignificant in view of their standard errors.

In the case of the Dutch sample, equality of WTP of ´healthy´ and ´sick´ respondents evidently holds w.r.t. the attribute *Deductible* (1) but also *Network* (2) and *Free physician choice* (5) in view of their standard errors. Interestingly, participants without a chronic condition seem to put a small positive value on the attribute *Bonus for healthy behavior* (3), contrary to those with such a condition. However, neither value is significantly different from zero, which is also true of their difference.

If at all, the citizens of the two (neighboring) countries seem to differ in their preferences regarding health insurance regardless of health status. Notably, the same EUR 500 deductible is more strongly resisted in Germany than in the Netherlands. A possible reason is the fact that the Dutch (but not the German) government promulgated a reform the country´s disability scheme in the early 1990s which was

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[7] The author may be forgiven for discussing only DCEs he was involved in. Most of the health-related studies collected by Soekhai et al. (2019) have only patients as respondents so are silent about a possible instability of health preferences between the ´sick´ and the ´healthy´ state.

**Table 3** Attributes in the German DCE *Source*: MacNeil Vrooman and Zweifel (2011)

| Attribute | Label | Levels |
|---|---|---|
| Physician choice | GEPhyslist<br>GEGatekeep<br>GENetwork | *Status quo*: Free choice of physician Physician list based on cost and quality criteria<br>Gatekeeper model Integrated physician network |
| Second opinion | GESecop | *Status quo*: Fee for initial physician visit and a specialist visit without referral<br>Second opinion without additional fee |
| Additional services | GEService | *Status quo*: No particular services provided by insurer<br>Patient coach/case manager provided by insurer |
| Incentives | GENoclaimsR<br>GEDeduct<br>GEBonus | *Status quo*: No incentive system<br>Contribution rebate for no claims of EUR 500/year<br>Deductible of EUR 500/year<br>Bonus for health-conscious behavior |
| Insurance contribution | GEContrib | *Status quo*: No change Change in contribution of ±200, 300, 400, and 500 EUR/year |

**Table 4** Attributes in the Dutch DCE  *Source*: MacNeil Vrooman and Zweifel (2011)

| Attribute | Label | Level |
|---|---|---|
| Physician choice | NLPhysfree<br>NLPhyslist<br>NLNetwork | *Status quo*: Gatekeeper model<br>Free choice of physician<br>Choice of physician based on cost and quality criteria<br>Integrated network supply |
| Hospital wait | NLHosp | *Status quo*: Undefined waiting period for hospital treatment<br>Waiting period 4 weeks max. guaranteed |
| Incentive system | NLNoclaimsR<br>NLDeduct<br>NLBonus | *Status quo*: Bonus for no claims of EUR225 maximum<br>Contribution rebate for no claims of EUR 500/year<br>Deductible of EUR 500/year<br>Bonus for health-conscious behavior |
| Insurance premium | NL Contrib | *Status quo*: No change<br>Change in contribution of EUR $\pm$ 100, 200, 250, and 300/year |

designed to reduce absences due to sickness from the 10% of the labor force pre-vailing in the 1980s. This reform mandated employers to regularly check on their workers´ disability status, thus indirectly exposing workers to the risk of discontinu-ation of payments (OECD 2007). This means that a deductible would expose the Dutch to an accumulation of risks, one emanating from health insurance, the other, from disability insurance. But as shown by Eeckhoudt and Schlesinger (2006), risk-averse individuals seek to avoid an accumulation of risks, causing them to strongly opt against a deductible in the present context.

A second difference is that acceptance of being constrained to adhere to a physi-cian network would have to be compensated by a reduction of the contribution to health insurance of about EUR 200 annually in Germany but of only EUR 65 (EUR 116, respectively among respondents with a chronic condition) in the Netherlands. This likely reflects the fact that the Dutch were already used to restrictions in the guise of gate-keeping, contrary to the Germany. Thie explanation is supported by the observation that the Dutch would have a WTP for returning to free physician choice amounting to only EUR 86 (EUR 58 for those with a chronic condition), while the Germans would have to be compensated to the tune of EUR 107 (156, respectively) for giving up free physician choice.

**Conclusion 4**. Two DCEs support the notion that in Germany and the Nether-lands, WTP values concerning attributes of health insurance do not significantly dif-fer between the ´healthy´ and the ´sick´. They do differ between the citizens of the two countries, but in ways that are amenable to explanation.

One could argue that up to this point the evidence concerns preferences for health insurance rather than health care directly. This concern is addressed by another DCE which sought to measure WTP for a new preparation for the treatment of diabe-tes. Performed in 2007, it involved some 1,100 members of German social health insurance (GKV) and distinguished four categories: (i) Non-diabetics, (ii) Type 1 diabetics, (iii) Insulin-naïve type 2 diabetics, and (iv) Insulin-treated type 2 diabet-ics. Arguably, category (i) is the ´healthy´ one whereas category (iv), the definitely ´sick´ one. The six attributes characterizing both the conventional and the novel

**Table 5** Selected WTP values in EUR/year for attributes of health insurance (standard errors in parentheses)[a] *Source*: MacNeil Vrooman and Zweifel (2011)

| Attribute Country | Health state | Deduct-ible (1) | Network (2) | Bous f. healthy beh. (3) | Gate-keeping (4) | Free phys.choice (5) |
|---|---|---|---|---|---|---|
| Germany | **No** chron.condition | − 237 (37) | − 207 (32) | + 196 (42) | − 107 (32) | n.a |
|  | **With** chron.condition | − 278 (78) | − 217 (69) | + 213 (87) | − 156 (69) | n.a |
| Netherlands | **No** chron.condition | − 404 (30) | − 65 (32) | + 12 (31) | n.a | + 86 (24) |
|  | **With** chron.condition | − 410 (61) | − 116 (50) | -23 (62) | n.a | + 58 (47) |

[a]For the remaining attributes, see Tables 3 and 4. Their WTP values do not differ significantly either between respondents with and without a chronic condition

**Table 6** Attributes in the DCE concerning diabetes treatment *Source*: Sennhauser and Zweifel (2016)

| Attribute | Label | Status quo | Alternatives |
|---|---|---|---|
| Overall risk of hypoglycemia | *Hypo* | 100% | 100% / 75% / 50% |
| Weight change | *Weight* | +2.5 kg | +2.5 kg / ±0 kg / -1.0 kg |
| Swinging | *Swing* | Necessary | Necessary / Not necessary |
| Time of injection | *Flexibility* | Predetermined | Predetermined / Not predetermined |
| Copayment | *Copayment* | None | None / €50 / €150 €300* |
| Health insurance contribution | *Contribution* | No change | No change / +0.5% / +1.0% / +2.0% |

*1 € = 1.16 US$ at 2020 exchange rates

**Table 7** Estimates of WTP for attributes of diabetes treatment, financing through copayment, in EUR/year (standard errors in parentheses) *Source*: Sennhauser and Zweifel (2016), Table 6

| Attribute | Non-diabetics | Diabetics type 1 | Diabetics type 2 | |
|---|---|---|---|---|
| | | | Insulin- naïve | Insulin-treated |
| Hypoglycemia | 38.53 (3.59) | 27.95 (6.13) | 43.98 (7.73) | 29.25 (7.28) |
| No weight gain | 71.80 (6.39) | 37.49 (11.06) | 50.16 (13.59) | 71.53 (13.37) |
| No swinging | 56.62 (8.49) | 48.28 (14.72) | 25.85 (18.08) | 72.17 (17.91) |
| Flexibility (timing) | 25.22 (8.41) | 24.37 (14.77) | 46.46 (18.08) | 50.71 (17.55) |
| Constant | 597.47 (44.0) | 106.90 (19.44) | 26.55 (44.63) | 94.62 (23.19) |
| Sum[a] | 789.63 | 244.99 | 318.29 | 427.14 |

[a]Only significant values

treatment are displayed in Table 6. Note that the hypothetical out-of-pocket copayment attains the very high value of € 300 per year; this was necessary to "make respondents jump forth and back across the indifference curve" as it were (see Fig. 1 again) in order to obtain sufficiently precise WTP estimates. Also, in addition to the copayment, there is a change in the contribution rate (calculated as a deduction from workers' take-home pay rather than from gross labor income) as a second price attribute for a consistency check.

Estimates of WTP derived from Probit regressions with two-way random effects are displayed in Table 7 for all four subgroups. The one pertaining to the attribute, *Hypoglycemia* is calculated for the risk reduction by 30% by the new preparation and *No weight gain*, for avoiding the increase by 2.5 kg, both found in the relevant medical literature.[8] Interestingly, the preference weight of the non-medical attribute *No weight gain* exceeds that of *Hypoglycemia* across all four respondent categories, a difference that is statistically significant in categories (i) and (iv). Another surprise is the finding that the attribute, *No swinging*

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[8] Note that these values do not correspond to these chosen for the DCE (see Table 6). There, attribute levels are spread out to make respondents ´jump their indifference curve´, as discussed in the context of Fig. 1.

is also more highly valued than *Hypoglycemia*, again to a statistically significant degree in categories (i) and (iv). Upon reflection, however, this becomes understandable because at least for insulin-treaded diabetics (iv), who have experience with the injection of insulin, the need to swing the preparation.

constitutes a risk they are glad to avoid since both excessive and insufficient swinging could result in lack of effectiveness. By the same token, this subgroup also assigns a higher preference weight to the attribute *Flexibility* (*timing*), which means that the injection does not have to be performed at dinner time bet within a time window of two hours.

Admittedly, WTP values differ somewhat between the four categories; in particular, the constant of EUR 579.47 shows a very high preference for moving away from the status quo treatment among the Non-diabetics. Yet this is understandable: This group, being healthy, knew that it faced but a small risk of actually having to come up with a copayment. Indeed, when the new treatment was to be financed through an increased contribution rate (which affects current and potential patients in the same way), the difference between category (i) and the other three in the constant disappears [see Sennhauser and Zweifel (2016), Table 6]. In this financing mode, the WTP values pertaining to the four attributes are generally lower than in Table 7, with the exception of those among the insulin-treated type 2 diabetics, where they are (nonsignificantly) higher.

Crucially, the structure of preferences as measured by relative WTP values is very similar across the four categories. For instance, *Hypoglycemia/No weight gain* has a relative value of 0.54 ($=38.53/71.80$) among the ´healthy´ Non-diabetics. The relative value is 0.41 ($=29.25/71.53$) among the ´sick´ type 2 diabetics who need insulin. These findings justify.

**Conclusion 5.** Claim No. 2, "When healthy, individuals give a damn, but when sick, they are willing to sacrifice just about everything to recover their health" does not necessarily imply an instability of lay people´s preferences. Moreover, it is not supported by three Discrete Choice Experiments designed to measure preferences for health insurance and for the treatment of diabetes involving ´healthy´ and ´sick´ respondents.

Finally, preferences expressed in terms of WTP values can be compared to cost, enabling a true benefit–cost analysis, the gold standard of evaluation. When the WTP values shown in Table 7 are summed up over the attributes and the constant, they tend to exceed the extra cost of the preparation, which was €276/ year at the time; the one exception are Type 1 Diabetics (both summed benefits and cost are subject to unknown standard errors, however).Still the experimental measurement of preferences in the guise of WTP values can provide guidance for the decision whether or not to include an innovation in the benefit list of social health insurance (a National Health Service, respectively). Indeed, it makes little sense to deprive the citizenry of a good or service they are willing to pay for at a tune that covers the extra cost of providing it.

## 4 Conclusion

The point of departure of this contribution is the increasing pressure costly medical innovation is putting on social health insurance (a National Health Service, respectively). This pressure calls for criteria for deciding whether or not an innovation should be included in the benefit list in the interest of enhancing the performance of the healthcare system. In the theory of economic policy, the provision of goods and services in accordance with consumer preferences figures as an important determinant of system performance (What good is provision at minimum cost if the service is not valued by consumers?). However, when applying this criterion to health care, one faces the challenge of how to measure the preferences in particular of potential patients, who finance the healthcare system through their insurance contributions and taxes.

Since observed choices regarding health care do not inform about preferences since patients´ willingness to pay (WTP) is inflated by health insurance coverage (almost complete subsidization by the government, respectively), hypothetical choices may be of value as a second-best alternative. One method for measuring preference weights that has become increasingly popular is the Discrete Choice Experiment (DCE). It makes participants repeatedly choose between a status quo and an alternative with varying attribute levels. If one of these attributes is the price to be paid for the good or service in question, WTP values can be inferred from choices using econometric methods.

The first DCE presented suggests that Swiss respondents were quite capable of choosing between health insurance contracts that differed w.r.t. reimbursement attributes. It undermines the popular claim No. 1," The insured and patients lack the information and/or the will to express their preferences regarding health and health care". The second and third DCE enlisted individuals from Germany and the Netherlands, respectively. They also revolved around health insurance but distinguished between respondents with and without chronic conditions (the ´sick´ and the ´healthy´, respectively). Their WTP values are found not to differ with regard to several attributes. A fourth DCE was designed to measure WTP values with regard to the treatment of diabetes. Its results suggest that the preference weights of the 'healthy' (Non-diabetics) and the 'sick' (in particular Type 2 diabetics who need Insulin) do not differ substantially. This evidence undermines claim No. 2, "When healthy, individuals give a damn, but when sick, they are willing to sacrifice just about everything to recover their health". Theoretically, the alleged instability of observed valuation can be traced to a state dependency not of preferences but of feasibility sets.

While this evidence is derived from hypothetical decisions, the DCEs are realistic in that they do not ask respondents to indicate their willingness to pay. Rather, they simply have to opt for the status quo or an alternative, a choice which amounts to an everyday decision (To buy? Yes or No?).

This work has clear implications for policy. Social health insurers should be allowed to offer two types of benefit lists. Type 1 is uniform, failing to reflect consumer preferences. It serves as a fallback option for those insured who do

not wish to bear the cost of decision-making. Type 2 reflects the preferences of the clientele of the particular health insurer. Under the pressure of competition, health insurers would have to structure their benefit lists in accordance with the preferences of their members. They (as well as governments in the case of a National Health Service) could retain those therapies with the best willingness-to-pay-to-cost ratio–thus applying true benefit–cost analysis, the gold standard of economic evaluation.

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