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Do people with private health insurance attach a higher value to health than those without insurance? Results from an EQ-5D-5L valuation study in Ireland

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DO PEOPLE WITH PRIVATE HEALTH INSURANCE ATTACH A HIGHER VALUE TO HEALTH THAN THOSE WITHOUT INSURANCE? RESULTS FROM AN EQ-5D-5L VALUATION STUDY IN IRELAND

Abstract

Background

Differences in healthcare use could relate to differences in the values assigned health as well as to differences in access. We sought to establish whether there existed evidence of differences in values assigned health states between individuals with and without insurance in Ireland.

Methods

Using the EuroQol Valuation Technology (EQ-VT), EQ-5D-5L valuation tasks were administered to a sample of 1160 residents of Ireland in 2015/16. Censored panel regression analyses were used to estimate the relationship between health states and the values assigned to these. Private insurance was entered among covariates that included age, gender, marital status, education and income to explain health preferences as a binary variable. A range of confirmatory analyses were undertaken

Results

In the primary analysis, possession of private health insurance was not a significant determinant of health preferences. Across a range of confirmatory analyses limited evidence of any difference in values related to health insurance emerged.

Conclusions

Insurance status has been shown to be a significant determinant of healthcare utilization in Ireland after need has been controlled for. Our analysis provides no compelling evidence that there exist material differences in the values accorded health between those with and without health insurance. In consequence, it is reasonable to assume that observed differences in healthcare use related to insurance status reflect differences in access rather than differences in preferences. In this context, the continued State subsidization of private health insurance appears contrary to explicit policy statements in Ireland regarding the pursuit of equity in access to care.

Keywords: Insurance status, health preferences, disparities, EQ5D, Ireland

Introduction

The EQ-5D-5L is a measure of self-reported health which contains the same 5 dimensions as EQ-5D-3L, but expands the number of levels for reporting problems from 3 to 5. The advantages of the 5L, in terms of superior discriminatory power and reduced ceiling effects, has been well documented (Janssen et al., 2013, Conner-Spady et al., 2015, Jia et al., 2014, Feng et al., 2015, Pattanaphesaj and Thavorncharoensap, 2015). The 5L is accompanied by value sets in a number of countries (Ludwig et al., 2018, Pattanaphesaj et al., 2018, Xie et al., 2016, Versteegh et al., 2016, Augustovski et al., 2016, Luo et al., 2017, Devlin et al., 2017, Purba et al., 2017, Hobbins et al., 2018)), as required for the use of 5L data to estimate QALYs. Because the value sets for the 5L are produced using a standard protocol, this offers opportunities to examine differences in health state preferences within and between countries (Devlin and Krabbe, 2013, Olsen et al., 2017).

Significant research effort has been devoted to the study of disparities in healthcare utilization. Whether related to ethnicity (Cook et al., 2012, Manuel, 2017, Kirby et al., 2006, Walsh and O'Neill, 2015)), socio-economic status (Telford et al., 2012, Carney et al., 2013a, Carney et al., 2013b), gender (Vaidya et al., 2012, Cameron et al., 2010), age (Bond et al., 2003, Schroyen et al., 2014), or body shape (Richard et al., 2014, Hernandez-Boussard et al., 2012), these studies are useful in identifying where disparities exist and what impact policies aimed at them have had (Chen et al., 2016, Walsh et al., 2016). To accurately assess the magnitude of disparities or evaluate the success of policy initiatives, however, one must be able to isolate those differences in use that might be considered “legitimate” - related to differences in need or preferences, for example - from those that might be considered

illegitimate – related, for example, to financial or non-financial barriers to access (Cook et al., 2012). In this regard, an examination of stated preferences for health and how these vary between groups among whom differential use has been observed can be instructive.

In many health care systems, a mixed public/private system of finance and delivery exists. In these systems, access to public insurance is often means tested while access to private insurance requires both an active decision to acquire cover and the financial ability to do so. In such circumstances and controlling for need, observed differences in service use between those with and without private insurance may be rooted in differences in preferences as well as differences in access. That is, individuals who choose to acquire insurance may place a higher value on health and other health seeking behaviours such as healthcare utilization (Walsh et al., 2012, Harmon and Nolan, 2001). It follows that in such contexts information on preferences for health may provide valuable insights into observed disparities in service use related to possession of private health insurance. Specifically, information generated in the construction of national value sets using the agreed EQ-5D-5L protocol may help distinguish between situations where there exist illegitimate sources of disparity and motivate policy responses where necessary.

In Ireland a mixed public/private system of healthcare finance and delivery exists (McDaid et al., 2009). Public insurance is provided to a section of the population under what is referred to as a medical card system. Those without a medical card (entitlement to which, is means-tested (HSE, 2015)) must pay a contribution for visiting primary care physicians and for hospital inpatient stays as well as the full costs of prescription medications (McDaid et al.,

2009). Most hospitals, including those that are publicly funded, offer private care and at any stage, patients can transfer from public to private care. Approximately 37% of the population have a medical card (Dept. of Health, 2016) just under half have private health insurance (Health Insurance Authority, 2016) and approximately 6% have both private and public insurance (CSO, 2010). Differences in service use between those with and without private insurance have been observed in Ireland. These include preventive services (Walsh et al., 2012, Fleming et al., 2014) primary care (Nolan et al., 2007) and tertiary hospital services (Harmon and Nolan, 2001, Van Doorslaer et al., 2006, Layte, 2007, Wiley, 2001). As noted and as argued in some of these studies, (Harmon and Nolan, 2001, Walsh et al., 2012) differences in use, however, may relate to differences in preferences rather than differences in access; the extent to which difference is indicative of disparity being open to question. The construction of the first value set for health preferences in Ireland in 2015/16 permits detailed examination of health preferences among Irish residents and the comparative analysis of preferences between those with and without private health insurance. In this paper we use this data to test the hypothesis that preferences are different between those with and without private health insurance.

Methods

Sample

A representative sample of Irish residents was drawn using a two stage stratified clustering process. First, a sample of 54 small areas stratified by income and urban/rural classifications developed by the Central Statistics Office in Ireland were drawn at random. As shown in figure 1 these were distributed throughout the country albeit reflective of population concentrations such as the nation's capital, Dublin. Second, within each small area a sample of approximately 20 houses were selected. Random selection of households was achieved by using a random starting point in each small area and inviting a resident in every third house to participate in the survey. Each house was visited up to three times at various times of day. Where the householder was absent, fliers were left at the house with the survey team's contact details to help establish contact. Within each household any adult capable of giving informed consent could volunteer to complete the survey, one volunteer per household being chosen at random. Preferences were elicited in a fashion consistent with the EQ-5D-5L protocol by a 7 strong team of trained surveyors, comprised of 3 males and 4 females. Weekly quality assurance reports were provided by EuroQol to monitor compliance with the protocol. 1160 surveys were completed between March 2015 and September 2016, survey effort being expended equally over the two years. Purposive sampling related to age and gender was used to augment the random sample where toward the end of the survey it was found there was over-representation of older persons and females. 102 purposive surveys were completed. These individuals were identified initially through personal contacts including work associates with subsequent snowball sampling. Full details of the sampling procedure are reported in Hobbins et al. (Hobbins et al., 2018).

Data

Values were elicited using 10 time trade-off exercises in which a composite time trade-off approach was adopted (Oppe et al., 2016). While small areas were selected based in part on socio-economic characteristics, socio-demographic data and rural/urban status were collected as part of the survey. Details included the respondent's age, gender, highest educational qualification, income, marital status and the number of dependent children in the household. 1131 respondents provided full details of their socio-demographic characteristics including income. The respondent's assessment of their own health was also elicited using a visual analogue scale and the EQ-5D-5L instrument. Of relevance to the current paper, whether the respondent possessed private medical insurance was also elicited.

Modelling

Valuations from the time trade-off (TTO) exercises were used as the dependent variable in a model estimated using a generalised least squares tobit regression analysis in which health insurance status was included as a covariate. Consistent with the literature responses were censored at -1 to reflect the censoring of TTO data for states worse than dead (Devlin et al., 2013, Purba et al., 2017, Ferreira et al., 2019) and the tobit model used to account for this censoring. An OLS model in which insurance was entered as a covariate was also run for comparative purposes. A panel approach was used to account for multiple valuations by the same respondent. Instances where uncertainty as to the valuation given was indicated by the respondent (signalled in a feedback module employed as part of the quality assurance process) were noted and used to identify observations for removal from the analysis. The health state valued in the TTO was represented in the regression equation using four

dummy variables, the base category being the highest level of functioning (no problems) relative to which each subsequent level was measured. This “main effects” model thus characterized the health state values using 20 dichotomous variables comprised of four dummy variables for each of the five dimensions contained in the EQ-5D system. In subsequent models, health insurance status was included (i) as an interaction effect with main effects model and (ii) with additional covariates included in the model related to the respondent’s age, gender, marital status, location (rural/urban), education, whether s/he had dependent children in addition to private health insurance status. The face validity of the model was assessed by reference to the sign, magnitude and significance of estimated relationships and in particular those of the main effects. Focus was given to the significance or otherwise of the estimated coefficient on private health insurance in the main analysis i.e. the main effects model with insurance status included as a covariate. (The value set for main effects only published (Hobbins et al., 2018)).

Results

In Table 1 socio-demographic characteristics of the sample are presented together with those for the population based on CSO data. As can be seen, our sample is broadly representative of that of the population with respect to gender and age, albeit we have fewer persons aged under 45 and more aged over 45 in our sample. With respect to education again our sample had more with third level education and fewer with only primary level education than the population at large. Our sample also has a slightly larger representation of those with private health insurance. With respect to marital status while our sample appears to have a slightly higher representation of those who are married, this may reflect differences in the definitions used or the readiness to report co-habiting in official surveys compared to ours where entitlement to benefits might be affected.

In Table 2, the results of the regression analysis in which the main effects and insurance status only are controlled for are presented. With respect to main effects, as the health state posited deteriorates so preferences decline with the level of disutility increasing consistently as might be expected. As can be seen private health insurance is not statistically significant.

In Table 3 a model in which insurance status is interacted with measures of the health state valued is presented. As can be seen while interaction terms between insurance and the most extreme level of usual activity are significant, insurance status itself and all other interactions fail to achieve statistical significance.

In Table 4, model 3 is augmented to include a range of additional covariates. As can be seen while interaction terms with the most extreme levels of mobility and usual activities are significant as are age, marital status and income, insurance is not, nor are the other 18 health variable interacted with it.

In Table 5 (see supplement), models partitioned on health insurance status are presented for the main effects with 95% confidence intervals for estimated coefficients. As shown, confidence intervals for each level of each dimension overlap suggesting the absence of a statistically significant difference between the groups.

In Table 6 (see supplement), an OLS model in which the main effects and insurance status only are controlled is presented for comparative purposes.

In Table 7 the results of a simple comparison of means for a health state valued by all individuals (the “pit state”) are also shown. As can be seen there was no significant difference between those with and without insurance.

In Table 8 a further sensitivity analysis is reported in which a series of dummy variables are used to reflect a given level of severity in any dimension (1 if yes at level 2 in any dimension and zero otherwise, 1 if yes at level 3 in any dimension and zero otherwise etc.). These are and their interactions with private health insurance are reported together with other covariates are reported. As can be seen private health insurance and its interactions remain insignificant.

Discussion

In only one of our analyses, that in which we interacted insurance status with each level of each health dimension did we find statistically significant differences between those with and those without private health insurance. In this one analysis, those with insurance had significantly different valuations to those without insurance in at most two of twenty instances – the most extreme level of mobility and the most extreme level of usual activities (Table 5). In a range of sensitivity analyses and in comparison of values for the same state (55555) there was no significant differences in the values of those with and those without private health insurance. Our results do not therefore provide compelling evidence that different values are assigned health states by those with and without private health insurance in Ireland. In models that examined the significance of insurance as a covariate and in models where the sample is partitioned based on insurance status, significant differences in values related to insurance are not evident. With respect to results obtained with interaction effects in a sizeable majority of instances interaction terms failed to achieve statistical significance. That significance was attained at the most extreme levels of two dimensions could be interpreted as indicative of differences in valuations at this level. The results in this regard are consistent with those obtained by Wang et al., (Wang et al., 2015) in their comparison of Singaporean and mainland Chinese. It is probable that such states would be rarely encountered, however, in reality, meaning that for the majority of dimensions and the vast majority of health states there is no evidence of any difference in valuations between those with and without insurance. In consequence, we contend that our study provides no compelling evidence for the existence of different values being associated with health states among those with and without health insurance in Ireland. That the

study was consistently able to detect such differences in respect of other socio-demographic variables such as age, marital status and income gives further credence to this conclusion.

As noted differences in healthcare use between those with and without private health insurance in Ireland have been highlighted in a number of studies reported in the literature. These include studies related to cancer screening (Walsh et al., 2012), cancer care, GP use (Nolan et al., 2007, McNamara et al., 2013) and hospital services (Harmon and Nolan, 2001, Van Doorslaer et al., 2006, Layte, 2007, Wiley, 2001, McNamara et al., 2013). Studies have also drawn attention to the greater likelihood of healthcare needs having gone unmet among those without insurance relative to those with. This is far from being unique to Ireland - differences in service use related to health insurance status have been reported in other contexts. In Ireland, however, equity has been espoused not just as an important policy goal but as one of the guiding principles in the national health strategy that operated at the time our survey was undertaken (Dept. of Health, 2013). The existence of inequalities, one might reasonably infer from this, would warrant a policy response. As noted were the differences in use to originate in differences in preferences for health (and by extension healthcare) the argument for a policy response could be countered (Walsh et al., 2012, Harmon and Nolan, 2001). The evidence presented here, however, suggests this is not the case and that differential use is grounded in the differential access afforded by insurance.

Almost half of the population in Ireland hold private health insurance. Studies examining the factors that explain insurance uptake suggest this is because it is perceived as affording

faster access to public services and may actually afford faster access to services (Harmon and Nolan, 2001, Colombo and Tapay, 2004, Wiley, 2001)). Given that with respect to preventive services such as colorectal, breast and prostate cancer screening, between approximately 22% and 60% of the pro-rich pattern in service uptake as measured by a concentration index has been directly related to possession of private medical insurance (Walsh et al., 2012) its effects are clear. These findings are perhaps all the more stark given that the state subsidizes private health insurance through tax relief on premiums and charges insurers less than the full economic cost of private beds in public hospitals. It is difficult to reconcile these policy actions with stated equity goals and suggests that a more coherent policy response is warranted.

Strengths and Limitations

The analysis presented has a number of strengths and limitations. That ours was a large (over 1000 respondents) detailed survey of preferences conducted to an international protocol with stringent quality controls provides assurance as to the quality of the data collected. Our results have face validity in the sense that (with one exception) higher disutility is accorded poorer health states consistent with intuition. That results with respect to the role of health insurance are largely supported by confirmatory analyses again provide assurance as to the nature of estimated relationships. That our sample does not precisely match that of the population in respect of its age profile is an issue but given the manner in which the sample was drawn and our ability to control for socio-demographic characteristics make it unlikely that our findings would differ had our survey produced greater representation from younger age cohorts. While we accept that our sample was not specifically powered to detect differences related to socio-demographic variables and that

collinearity among covariates may have served to reduce significance for example in respect of income and insurance, it was nevertheless able to detect these, suggesting that where they exist they could be found. As with many analyses there exists the potential for endogeneity in our models. Insurance status may relate, for example, to previous experience of the health system personally or as a friend/relative of another which is unobserved. While we have controlled for a range of range of covariates we have not controlled for every potential candidate though this will inevitably be the case.

Conclusion

Disparities in healthcare use are a source of concern for policy makers and the focus of considerable research effort. Disparities in service use related to private health insurance status have been observed in Ireland with respect to preventive, primary and tertiary services. Our analysis provides no compelling evidence that there exist differences in the preferences for health among those with and without private health insurance in Ireland. It follows that observed differences in use between those with and without insurance more likely relate to the differential access private health insurance affords than to differences in preferences. Our findings suggest that the current position in Ireland, where the state subsidizes the acquisition of insurance through the provision of tax relief and charges less than the full economic cost of publicly provided services runs counter to the pursuit of equity and may accentuate unwarranted disparities in service use. The study demonstrates the value of the EuroQol EQ-5D-5L protocol not just in generating value sets or supporting the generation of patients-related outcome measures but in supporting the analysis healthcare systems and their operation. As value sets for more countries emerge, the protocol will create a rich environment for similar comparative analysis within and across healthcare systems.

Key points:

- There is evidence of preference heterogeneity for health in Ireland related age, marital status and income
- There is no compelling evidence that those with health insurance have different preferences for health to those without health insurance in Ireland
- Disparities in health and healthcare use in Ireland related to insurance status are more likely to reflect disadvantage than differences in preferences

Tables

Table 1

Socio demographic	Sample N=1,160		General population of Ireland 2011	Pearson chi1	p value
	n	%	%		
Marital status			i	121.78	0.000
Married/living as married	701	60	50		
Never Married	271	23	39		
Divorced/Separated	96	8	6		
Widowed	92	8	5		
Gender				64.75	0.000
Male	431	37	49		
Female	729	63	51		
Location				6.77	0.009
Urban	677	58	62		
Rural	483	42	38		
Dependents Under 18 years				3.62	0.057
Living with Dependents under 18 years	455	39	42		
not living with Dependents under 18 years	705	61	58		
Age				99.85	0.000
18-25	91	8	12		
25-34	166	14	22		
35-44	226	19	20		
45-54	233	20	17		
55-64	190	16	13		
65-74	163	14	9		
75+	91	8	7		
Education			ii	145.36	0.000
Primary	88	8	14		
Second Level or less	429	37	37		
Third level	643	55	43		
Not stated/no formal education	0	0	6		
Private Insurance	708	61 iii	47		
Household income €	1,131	iv			
€0 - €10,000	48	4			
€10,000 - €20,000	157	14			
€20,001 - €30,000	175	15			
€30,001 - €40,000	139	12			
€40,001 - €50,000	119	11			
€50,001 - €60,000	111	10			
€60,001 - €75,000	123	11			
€75,001 - €100,000	127	11			
€100,001 - €200,000	111	10			
€200,000 <	21	2			
i = The full population of Ireland (4,588,252) married not including living as married in CSO figures (adult population, 3,439,565)					
ii = Total population = 3,003,490 (Population aged 15 years and highest level of education completed)					
iii = PHI= Has PHI now or had it in the last 3 years.(in CSO only has PHI now)					
iv= The number of individuals who reported their household income.					

Table 2**GLS Tobit censored at -1 excluding feedback**

Independent Variables		Coefficients		SE
Mobility (MO)		.		
	Slight problems	0.082	***	(0.016)
	Moderate problems	0.094	***	(0.016)
	Severe problems	0.209	***	(0.018)
	Unable	0.281	***	(0.016)
Self-care (SC)				
	Slight problems	0.070	***	(0.016)
	Moderate problems	0.114	***	(0.017)
	Severe problems	0.220	***	(0.018)
	Unable	0.262	***	(0.016)
Usual activities (UA)				
	Slight problems	0.091	***	(0.016)
	Moderate problems	0.119	***	(0.017)
	Severe problems	0.225	***	(0.017)
	Unable	0.192	***	(0.016)
Pain/discomfort (PD)				
	Slight	0.074	***	(0.014)
	Moderate	0.106	***	(0.018)
	Severe	0.345	***	(0.016)
	Extreme	0.437	***	(0.017)
Anxiety /depression (AD)				
	Slight	0.066	***	(0.017)
	Moderate	0.176	***	(0.019)
	Severe	0.467	***	(0.017)
	Extreme	0.550	***	(0.016)
Private Insurance		0.008		(0.032)
Constant		0.003		(0.030)
Akaike's information criterion (AIC)		17889.15		
Bayesian information Criterion (BIC)		18064.87		
Observations		11,177		

Base/Reference category = No Problems in each EQ-5D dimension;

Private Insurance (PHI)= Has PHI now or had it in the last 3 years.

Dependent variable = Value (1-Quality of life value i.e. disutility)

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

Standard Error (SE)

Table 3

GLS Tobit censored at -1 excluding feedback

Independent Variables		Coefficients		SE
Mobility (MO)	Slight problems (Mo2)	0.084	***	(0.025)
	Moderate problems (Mo3)	0.069	***	(0.026)
	Severe problems (Mo4)	0.218	***	(0.028)
	Unable (Mo5)	0.320	***	(0.026)
Self-care (SC)	Slight problems (Sc2)	0.084	***	(0.025)
	Moderate problems (Sc3)	0.114	***	(0.028)
	Severe problems (Sc4)	0.245	***	(0.028)
	Unable (Sc5)	0.240	***	(0.025)
Usual activities (UA)	Slight problems (Ua2)	0.078	***	(0.025)
	Moderate problems (Ua3)	0.153	***	(0.028)
	Severe problems (Ua4)	0.252	***	(0.027)
	Unable (Ua5)	0.248	***	(0.025)
Pain/ discomfort (PD)	Slight (Pd2)	0.053	**	(0.023)
	Moderate (Pd3)	0.110	***	(0.028)
	Severe (Pd4)	0.360	***	(0.025)
	Extreme (Pd5)	0.458	***	(0.027)
Anxiety / depression (AD)	Slight (Ad2)	0.059	**	(0.027)
	Moderate (Ad3)	0.147	***	(0.030)
	Severe (Ad4)	0.431	***	(0.028)
	Extreme (Ad5)	0.525	***	(0.026)
Private Insurance (PHI)		0.028		(0.046)
	PHI*Mo2	-0.004		(0.032)
	PHI*Mo3	0.041		(0.033)
	PHI*Mo4	-0.014		(0.036)
	PHI*Mo5	-0.066		(0.034)
	PHI*Sc2	-0.021		(0.032)
	PHI*Sc3	-0.001		(0.035)
	PHI*Sc4	-0.042		(0.036)
	PHI*Sc5	0.037		(0.032)
	PHI*Ua2	0.021		(0.033)
	PHI*Ua3	-0.057		(0.036)
	PHI*Ua4	-0.044		(0.035)
	PHI*Ua5	-0.095	***	(0.032)
	PHI*Pd2	0.032		(0.030)
	PHI*Pd3	-0.004		(0.036)
	PHI*Pd4	-0.021		(0.032)
	PHI*Pd5	-0.035		(0.035)
	PHI*Ad2	0.010		(0.034)
	PHI*Ad3	0.046		(0.039)
	PHI*Ad4	0.057		(0.035)
	PHI*Ad5	0.045		(0.033)
	Constant	-0.009		(0.036)
Akaike's information criterion (AIC)		17880.06		
Bayesian information Criterion (BIC)		18202.21		
Observations		11,177		

Base/Reference category = No Problems in each EQ-5D dimension;

Dependent variable = Value (1-Quality of life value i.e. disutility)

Standard Error
(SE)

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

PHI= Has PHI now or had it in the last 3 years.

Table 4

GLS Tobit censored at -1 excluding feedback				
Independent Variables		Coefficients		SE
Mobility (MO)	Slight problems (Mo2)	0.084	***	(0.025)
	Moderate problems (Mo3)	0.066	**	(0.026)
	Severe problems (Mo4)	0.217	***	(0.029)
	Unable (Mo5)	0.328	***	(0.027)
Self-care (SC)	Slight problems (Sc2)	0.084	***	(0.025)
	Moderate problems (Sc3)	0.116	***	(0.028)
	Severe problems (Sc4)	0.248	***	(0.028)
	Unable (Sc5)	0.244	***	(0.026)
Usual activities (UA)	Slight problems (Ua2)	0.080	***	(0.026)
	Moderate problems (Ua3)	0.154	***	(0.028)
	Severe problems (Ua4)	0.260	***	(0.027)
	Unable (Ua5)	0.255	***	(0.025)
Pain/ discomfort (PD)	Slight (Pd2)	0.060	**	(0.023)
	Moderate (Pd3)	0.105	***	(0.028)
	Severe (Pd4)	0.362	***	(0.025)
	Extreme (Pd5)	0.460	***	(0.027)
Anxiety / depression (AD)	Slight (Ad2)	0.054	**	(0.027)
	Moderate (Ad3)	0.149	***	(0.031)
	Severe (Ad4)	0.428	***	(0.028)
	Extreme (Ad5)	0.519	***	(0.026)
Private Insurance (PHI)		0.059		(0.050)
	PHI*Mo2	-0.007		(0.032)
	PHI*Mo3	0.040		(0.034)
	PHI*Mo4	-0.018		(0.037)
	PHI*Mo5	-0.071	**	(0.034)
	PHI*Sc2	-0.026		(0.032)
	PHI*Sc3	-0.007		(0.036)
	PHI*Sc4	-0.043		(0.037)
	PHI*Sc5	0.035		(0.033)
	PHI*Ua2	0.016		(0.033)
	PHI*Ua3	-0.064		(0.036)
	PHI*Ua4	-0.052		(0.035)
	PHI*Ua5	-0.107	***	(0.033)
	PHI*Pd2	0.022		(0.030)
	PHI*Pd3	-0.007		(0.036)
	PHI*Pd4	-0.029		(0.032)
	PHI*Pd5	-0.039		(0.035)
	PHI*Ad2	0.016		(0.035)
	PHI*Ad3	0.050		(0.039)
	PHI*Ad4	0.068		(0.036)
	PHI*Ad5	0.054		(0.033)
	Age Group (years)	25-34	-0.056	(0.071)

	35-44		-0.060	(0.071)
	45-54		0.022	(0.069)
	55-64		0.170	** (0.073)
	65-74		0.181	** (0.077)
	75+		0.189	** (0.084)
Male			0.040	(0.031)
Urban			-0.041	(0.031)
Living with dependents under 18 years			-0.037	(0.041)
Married/Living as married			-0.124	*** (0.037)
Education	Second Level		-0.032	(0.064)
	Third Level		-0.074	(0.068)
Household Income	€15,000		0.021	(0.062)
per person (annual)	€25,000		0.017	(0.066)
	€35,000		0.011	(0.067)
	€45,000		-0.030	(0.083)
	€55,000		-0.060	(0.101)
	€67,500		-0.097	(0.087)
	€75,000		-0.115	(0.103)
	€87,500		0.008	(0.108)
	€100,000		0.458	** (0.217)
	€150,000		0.118	(0.117)
Constant			0.065	(0.103)
				Standard Error (SE)
Dependent variable = Value (1-Quality of life value i.e. disutility)				
Base/Reference category = No Problems in each EQ-5D dimension; Education Primary;				
PHI= Has PHI now or had it in the last 3 years.				
Age Group 18 to 24 Years , Household Income per person = €5000 to €15,000				
Akaike's information criterion = 17327.34 Bayesian information Criterion = 17808.88				
Observations = 10,895				*** p<0.01, ** p<0.05

Table 5 GLS Tobit sample divided by having Private Insurance now or in the last 3 years
Censored-1 and feedback excluded.

Independent variables	With Private Insurance				Without Private insurance			
	Coef.	SE	[95% Conf.	Interval]	Coef.	SE	[95% Conf.	Interval]
Mobility (MO)								
Slight problems	0.080	0.019	0.042	0.118	0.083	0.026	0.033	0.134
Moderate problems	0.110	0.020	0.070	0.149	0.068	0.027	0.015	0.121
Severe problems	0.204	0.022	0.160	0.247	0.218	0.029	0.160	0.276
Unable	0.254	0.021	0.214	0.294	0.321	0.027	0.268	0.375
Self-care (SC)								
Slight problems	0.063	0.019	0.025	0.101	0.084	0.026	0.034	0.134
Moderate problems	0.114	0.022	0.071	0.156	0.115	0.029	0.059	0.171
Severe problems	0.202	0.022	0.159	0.246	0.247	0.029	0.190	0.304
Unable	0.276	0.020	0.238	0.315	0.241	0.026	0.190	0.292
Usual activities (UA)								
Slight problems	0.099	0.020	0.059	0.138	0.078	0.026	0.026	0.129
Moderate problems	0.096	0.021	0.054	0.138	0.155	0.029	0.098	0.212
Severe problems	0.207	0.021	0.165	0.249	0.252	0.028	0.198	0.307
Unable	0.153	0.020	0.114	0.193	0.249	0.026	0.199	0.300
Pain/discomfort (PD)								
Slight	0.086	0.018	0.051	0.121	0.054	0.024	0.007	0.101
Moderate	0.106	0.022	0.063	0.149	0.110	0.029	0.053	0.167
Severe	0.339	0.020	0.300	0.378	0.361	0.026	0.310	0.411
Extreme	0.422	0.021	0.380	0.464	0.460	0.028	0.405	0.514
Anxiety /depression (AD)								
Slight	0.069	0.021	0.028	0.110	0.060	0.028	0.005	0.114
Moderate	0.192	0.023	0.146	0.238	0.146	0.031	0.085	0.208
Severe	0.487	0.021	0.445	0.529	0.432	0.029	0.376	0.488
Extreme	0.569	0.020	0.530	0.608	0.527	0.026	0.475	0.579
Constant	0.019	0.028	0.037	0.075	0.010	0.036	0.080	0.060
Observations	4361				6816			

Dependent variable = Value (1-Quality of life value i.e. disutility)

Base/Reference category = No Problems in each EQ-5D dimension

Standard Error (SE) Coef. = Coefficients

Table 6 OLS feedback excluded.

Independent variables		Coefficients		SE
Mobility (MO)	Slight problems (Mo2)	0.086	***	(0.019)
	Moderate problems (Mo3)	0.105	***	(0.020)
	Severe problems (Mo4)	0.210	***	(0.022)
	Unable (Mo5)	0.256	***	(0.020)
Self-care (SC)	Slight problems (Sc2)	0.072	***	(0.018)
	Moderate problems (Sc3)	0.116	***	(0.021)
	Severe problems (Sc4)	0.225	***	(0.021)
	Unable (Sc5)	0.216	***	(0.020)
Usual activities (UA)	Slight problems (Ua2)	0.090	***	(0.020)
	Moderate problems (Ua3)	0.134	***	(0.020)
	Severe problems (Ua4)	0.210	***	(0.021)
	Unable (Ua5)	0.153	***	(0.020)
Pain/discomfort (PD)	Slight (Pd2)	0.078	***	(0.018)
	Moderate (Pd3)	0.101	***	(0.022)
	Severe (Pd4)	0.305	***	(0.019)
	Extreme (Pd5)	0.400	***	(0.021)
Anxiety/depression (AD)	Slight (Ad2)	0.080	***	(0.020)
	Moderate (Ad3)	0.178	***	(0.022)
	Severe (Ad4)	0.451	***	(0.020)
	Extreme (Ad5)	0.502	***	(0.020)
Private Insurance (PHI)		0.002		(0.011)
Constant		0.004		(0.021)

Observations

11,177

R-squared

0.346

Dependent variable = Value (1-Quality of life value i.e. disutility)

Base/Reference category = No problems in each EQ-5D dimension

Standard errors (SE) in parentheses

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

Akaike's information criterion = 19844.31 Bayesian information Criterion = 20005.38

Table 7 Comparison of mean Value on the pit state (55555) by Private insurance status

Value	Private Insurance		Total
	No	Yes	
0	9	10	19
0.05	3	2	5
0.1	3	2	5
0.15	0	1	1
0.2	2	3	5
0.25	1	1	2
0.3	3	5	8
0.35	0	3	3
0.4	3	6	9
0.45	1	1	2
0.5	20	22	42
0.55	5	2	7
0.6	5	11	16
0.65	2	5	7
0.7	7	26	33
0.75	0	4	4
0.8	10	24	34
0.85	3	7	10
0.9	11	37	48
0.95	17	27	44
1	31	48	79
1.05	4	6	10
1.1	8	13	21
1.15	2	2	4
1.2	2	5	7
1.25	1	4	5
1.3	4	12	16
1.35	3	4	7
1.4	2	3	5
1.45	0	6	6
1.5	5	15	20
1.55	12	6	18
1.6	10	27	37
1.65	7	7	14
1.7	12	15	27
1.75	1	5	6
1.8	5	12	17
1.85	0	2	2
1.9	7	15	22
1.95	8	10	18
2	223	292	515
Total	452	708	1,160
Pearson	chi2(40) =		49.3845
Pr = 0.147			

Table 8 GLS Tobit with interaction any individual level out of the EQ-5D-5L five levels with Insurance status - censored at -1 excluding feedback

Independent variables	Coefficients		SE
Any_level_2 (slight problems)	-0.341	***	(0.021)
Any_level_3 (moderate problems)	-0.139	***	(0.020)
Any_level_4 (severe problems)	0.277	***	(0.020)
Any_level_5 (extreme/unable)	0.579	***	(0.020)
Pinsurance (private Insurance)	-0.028		(0.045)
Pinsurance_Any_level_2	0.031		(0.027)
Pinsurance_Any_level_3	-0.008		(0.026)
Pinsurance_Any_level_4	0.012		(0.025)
Pinsurance_Any_level_5	-0.009		(0.026)
2.AgeGr	-0.185	***	(0.070)
3.AgeGr	-0.205	***	(0.066)
4.AgeGr	-0.104		(0.066)
5.AgeGr	0.098		(0.068)
6.AgeGr	0.141	**	(0.070)
7.AgeGr	0.155		(0.079)
Sex	0.041		(0.033)
Location	-0.031		(0.032)
Constant	0.700	***	(0.069)
Observations	11,177		
Number of participants	1,160		

Dependent variable = Value (1-Quality of life value i.e. disutility)

Standard errors in parentheses

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

Akaike's information criterion = 21621.49 Bayesian information Criterion = 21767.93

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