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Should I Pay for Your Risky Behaviours? Evidence from London

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Should I Pay for Your Risky Behaviours? Evidence from London

Abstract

We investigate the extent to which respondents from a general population sample in London (July-August 2011) agree or disagree with the NHS covering the healthcare costs related to five risky health behaviours: overeating, unhealthy diet, sedentary life, excess of alcohol, and smoking. For each behaviour, we also directly explore the main factors associated with the likelihood to agree or disagree. Half of the respondents (*N=146*) manifest agreement with the idea. Wider agreement exists for covering the costs associated to smoking, heavy drinking, and sedentary lives than to overeating, or poor diets. With the exception of alcohol drinking and sedentaray life, there is an almost one-to-one relationship between the agreement that the NHS should pay the healthcare costs associated to a specific behaviour, and the respondents' actual engagement in that behaviour. Those at higher risk of depending on publicly funded healthcare, are more likely to agree.

Keywords: Risky Behaviour, Health Responsibility

1. Introduction

We present novel evidence on the extent to which respondents from a general population sample in London agree with the idea that the NHS should cover the healthcare costs related to five risky health behaviours: overeating, unhealthy diet, sedentary life, heavy drinking, and smoking. For each behaviour, we also directly explore the main factors associated with the likelihood to agree or disagree. Although at the core of the current health policy debate, especially in the UK, neither aspect has yet been systematically explored by the existing literature.

In a health system with universal coverage and healthcare free at the point of use, the lack of patients' financial responsibility can lead to moral hazard problems. By feeling only partly responsible for the financial costs of healthcare, people may pay too little attention to actively reduce the risk factors related to their lifestyle. Risky health behaviours are indeed the major drivers of a set of non-communicable diseases that explain the bulk of both mortality and healthcare expenditure in OECD countries (1, 2).

These trends pose a challenge to the sustainability of public healthcare expenditure, especially in the current economic crisis climate. Increasingly more governments are facing the choice between the two equally unpopular policies of either increasing fiscal pressure, or rationing healthcare. In particular, in publicly funded health systems, there is a recurrent debate on the possibility to ration healthcare treatments based on individual health behaviour (2-7).

The NHS in England is a publicly funded health system, primarily funded through general taxation. The services provided by the NHS are comprehensive and there is universal access with most services free at the point of use.

Policy discussions around '*lifestyle rationing*' date back to the inception of the NHS whose constitution states that as patients *'you should recognise that you can make a significant contribution to your own, and your family's, good health and well-being, and take some personal responsibility for it' (8)*. Since then there has been an increasing trend towards "lifestyle rationing" that has recently culminated with the new Health and Social Care Bill 2011 that explicitly places high emphasis on personal responsibility (9, 10). A recent survey conducted by Doctors.net found that 54% of UK doctors supported measures to deny treatments to smokers and the obese (11). With professional bodies such as the Royal College of Physicians worrying that *'lifestyle rationing is creeping more and more into the NHS'*, the debate remains, however, very controversial (11).

The possibility that, in the near future, patients might be called to bear a share of the healthcare costs related to their health behaviour opens up the discussion on to what extent do citizens actually agree to contribute towards covering the medical bills of others' risky behaviours. Despite the growing research on the relation between solidarity and personal responsibility (12-23) few studies have directly and systematically explored this question for a broad range of unhealthy behaviours.

Respondents in the Netherlands disagreed with the idea that people with unhealthy lifestyle should benefit from the healthcare system without a financial arrangement (24), and showed a significant difference in the willingness-to-pay if the health problem was related to unhealthy behaviour (25). Australian respondents gave a low priority in allocating healthcare resources to people perceived as "self-harmers" because smoking, or heavy drinking (26). The majority of US respondents believed that higher health insurance premia were appropriate for smokers (27). Concening weight control measures, US residents expressed a larger favour for reward-based over penalty-based programs, expecially among higher weight respondents (28).

In the UK, the highest priority for health services was given to treatments for children with life-threatening conditions (29). Among 68 respondents in Scotland, the most important attribute impacting healthcare decisions was a large health gain to many people (30). The majority of 52 respondents in North-East England believed that it was society's responsability to help people with smoking- and drinking-related diseases (31). This contrasts with earlier evidence of a general attitude to discriminate against patients who were partially responsible for their illness due to unhealthy lifestyle (32).

The paper is organized as follows. Section 2 describes the methods, while Section 3 reports the main results. Sections 4 concludes with a general discussion and some implications. An Appendix is available with full details on the questionnaire, sampling, and sample characteristics.

2. Methods

We collected data by administering a self-completion questionnaire to a sample of the general public in London. A brief description of variables is summarised in Table 1, while full detail of the questionnaire can be found in Appendix A.

[Table 1 here]

In general, the final content and wording of the questions reflected as much as possible analogous items in existing surveys in the UK, such as the British Households Panel Survey (BHPS) now Understanding Society (www.understandingsociety.org.uk); the Health Survey for England (www.esds.ac.uk/government/hse/); and the Survey of Health, Ageing and Retirement in Europe (SHARE: www.share-project.org). A limited number of closed responses were provided, either as binary options (e.g. '*Yes*' or '*No*'), or with numerical Likert scale mostly ranging from 0 to 10, with

an option for "*Not sure*".

The survey was a pen-and-paper self-compiled questionnaire, divided into 5 main sections: Target (T), Socio-Demographic (SD), Health Status (HS), Economic (E), and Behaviour and Psychological Attitudes (BPA).

Section T collected information on the main dependent variables, namely the agreement with the idea that the NHS should cover the healthcare costs related to: overeating, unhealthy diet, sedentary lives, excess of alcohol, and smoking. For each behaviour, respondents ticked either a '*Yes*' or a '*No*' box.

Section SD collected information on the respondents' age, gender, educational qualification, marital status, number of children, religion and employment status, accommodation expense andfinancial situation, using closed questions with binary or ordered options. Similarly, section HS recorded details regarding self-assessed height, weight, physical and mental health status, while section E elicited information on expenditure for public and private health services and risk attitudes. Finally, section BPA collected information on respondents' health behaviour and lifestyle, such as alcohol consumption, physical activity, dietary and smoking habits.

Ethical approval and informed consent

We completed the checklist for research ethics approval from Imperial College London. As the interviews were conducted in public places among respondents from the general population, the study involved no risk or harm to any respondent, no link with clinical data took place, and no

incentives were paid to respondents, the study fitted all criteria in the first stage checklist, with no further formal application to the Imperial College Research Ethics Committee.

At the beginning of the interviews, interviewers showed credentials as research assistants at Imperial College, informed respondents that their answers were anonymous and would remain strictly confidential, and that all responses and data were going to be processed statistically for the purposes of scientific research only. Informed consent by respondents was then given before each interview.

Sample and data collection

A sample size of 140 respondents was targeted to test the null hypothesis of no significant correlation between the dependent variable (T) and a typical normally distributed respondent's characteristic (SD, HS, E, BPA variables) (33). The envisaged minimum sample size target was readily achieved, since only 85 subjects who were initially approached refused to take part in the survey, corresponding to a final response rate of 63%. Due to interviews taking place in parallel, interviewers ended up with 146 respondents, slightly above the envisaged minimum sample size.

We administered a self-filled questionnaire to a sample of people living or working in seven boroughs of London between July and August 2011. We used a random location quota sampling by selecting seven boroughs within a radius of ten miles from the 'centre' of London. Within each borough, we randomly selected two postal codes within which interviewers administered the questionnaire door-to-door to every three addresses starting from an initial randomly selected house number in order to achieve ten interviews within gender-defined quotas. Full sampling details are in Appendix B.

Data analysis

Besides presenting descriptive statistics for the variables (Table 2), we conduct a multiple regression analysis to explore the determinants of the likelihood to agree or disagree with the NHS covering the costs associated with several risky health behaviours (Tables 3-7).

In particular, we model the dependent variable T for overeating, unhealthy diet, sedentary life, excessive alcohol, and smoking as five separate binary variables taking values of either 1 or 0 for the respondents who reported to agree or disagree, respectively, on the NHS paying the costs associated with that behaviour. We estimate five separate uni-variate *logit* models (34), where the explanatory variables are the SD, H, E, and BPA characteristics defined above.

In our estimates we present the exponentiated coefficients for the logit model, together with the standard errors and significance levels. We have conducted thorough robustness checks and replicated the analysis using the alternative *probit* specification, with the various sets of regressions providing estimated consistent with the results presented here (all available upon request).

3. Results

Overview

Descriptive statistics of all variables can be found in Table 2. Appendix C contains a discussion of the key characteristics of our sample andhow these relate to the analogous characteristics of the London, and UK, population (35, 36).

[Table 2 here]

Our respondents almost split in half between those who agree and who disagree with the NHS paying the costs related to risky health behaviours. In particular, the highest rate of agreement is espressed to cover treatments associated to smoking (0.54). Moreover, rates of agreement are slightly higher for sedentary life (0.49), and alcohol abuse (0.48) than for unhealthy diets (0.46), and overeating (0.43).

Regression analysis

Over-eating and unhealthy diets

We model these attitudes separately as *unhealthy diet* has broader health implications (e.g. hypertension, diabetes) than *overeating*. Results present both analogies and differences between these two behaviours.

[Table 3 here]

[Table 4 here]

For both behaviours, higher levels of BMI point towards a higher agreement with the NHS covering for the costs associated with these risky behaviours. An analogous effect is associated to higher levels of income, as proxied by the expense in accommodation, with this result being consistent across specifications,

Differences between the two behaviours emerge too. Those reporting a long-term healthcare problem (and of being in charge of caring of sick people) tend to disagree with the NHS paying for the costs related to over-eating.

On the other hand, respondents with lower levels of education and whose parents were born outside the UK, tend to disagree with the NHS covering the costs of unhealthy diets. Another difference is that, whereas for over-eating there is no significant relation between agreeing and any risky behaviour indicator other than the BMI, subjects who consumed less alcohol per week tend to disagree with the NHS covering the costs related to unhealthy diets.

Sedentary lives

Individuals with higher BMI, those that are married or cohabitate, the elderly, and those subjects who do not work (e.g. students, homemakers, unemployed) are significantly keener on the NHS covering the costs of insufficient physical activity. Religion is significantly associated with the likelihood to disagree.

[Table 5 here]

There are no significant effects related to whether the respondents are physically active themselves. Those that have seen a healthcare provider recently tend to disagree with the NHS covering costs arising from sedentary lifestyles, whereas parents of more children tendentially agree.

Alcohol abuse

There is no significant relation between agreeing with the NHS covering for the healthcare costs associated with alcohol consumption and standard socio-demographics with two exceptions: those married and more educated were more likely to agree on the NHS paying the costs of alcohol-related diseases. Respondents who actively engage in religious practices are more likely to disagree. In some specifications smokers tend to agree with the alcohol-related costs being covered by the NHS.

[Table 6 here]

Smoking

The elderly, less educated, and those who engage in religious practices, or feel more financially constrained tend to disagree with the NHS paying the costs of smoking-related diseases, while subjects smoking more cigarettes tendentially agree.

[Table 7 here]

4. Discussion

Some patterns emerge from our analysis. First, respondents in our sample almost split in half between those who agreed and those who disagreed with idea that the NHS should pay the healthcare costs related to risky behaviours, with wider consensus among respondentsin relation to smoking, heavy drinking, and sedentary lives, than to overeating, or poor diets.

Secondly, with the exception of alcohol drinking and sedentary life, there seems to be an almost one-to-one relationship between the agreement that the NHS should bear the healthcare costs associated to one risk behaviour, and the respondents' actual engagement in that specific behaviour. This is consistent with analogous evidence from the US of little support for penalty-based weight loss programs among the overweight and obese (28).

There is also evidence of nuanced cross-behaviours effects: people engaging in a given risky behaviour are keener to agree with covering expenses related to *another* risky behaviour. For instance, subjects with higher BMI are in favour of the NHS covering the costs associated not only to over-eating, but also to unhealthy diets, and insufficient physical exercise. Similarly, smokers

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agree that the NHS should pay the healthcare costs caused not only by smoking, but also by heavy drinking. Subjects who drink less units of alcohol tend to disagree with the NHS covering the costs associated to unhealthy diet.

Elderly subjects are less keen on the NHS paying for the costs associated with smoking, a behaviour that is normally associated with the younger stages of life. They are instead keener on the idea that the NHS should cover the costs related to sedentary life, a risky behaviour that is prevelent among the elderly. Similarly subjects with a higher number of children (as well as those actively engaging in religious practices) tend to disagree with the NHS covering the costs associated with sedentary lives. On the other hand, respondents who did not work, such as students, homemakers, and unemployed, tend to agree with that same idea.

Respondents that are more dependent on the public health system and are at a higher risk of needing healthcare, such as those that took care of a sick person, suffered from a long-term health problem, or recently visited a hospital, tend to disagree with the idea that the NHS should pay the costs associated to risky behaviours.

In general, respondents with higher levels education are more likely to manifest agreement. This can be related to the more educated sharing the view that health systems should guarantee comprehensive and universal coverage, or to the documented association between risk awareness in health and the level of education (37). In general, also individuals spending higher amounts for their accommodation tend to agree with the NHS covering the costs associated with risky behaviours, reinforcing the effect of higher education that is typically associated with higher income.

Finally, especially for smoking and alcohol abuse, those who declared to pay attention in behaving healthily and who agreed with the idea that behaviour affects health, tended to manifest agreement.

These results, however, should not be over-emphasised. These variables, in fact, do not appear to be reliable predictors of health behaviours: many respondents who reported to pay attention to their health were, in fact, over-weight, smokers, or heavy drinkers, and there seems to be, at best, very little association between the two sets of variables.

There are several caveats in our analysis. First, respondents were sampled in London only, and are not a representative sample of the UK population. This clearly hampers the generalizability of the findings, since health policies have to be supported nationwide, not just locally.

Secondly, respondents were from a country where a public-funded single payer health system is in place. Thus, when asked whether the costs associated with risky behaviours should be covered, their answers can be anchored to the reference scenario of universal coverage, with healthcare virtually free at the point of usage. While many European health systems follow this model, it is plausible to presume that responses could significantly differ among respondents whose reference scenario is a market based system (such as the US) or even a social health insurance system (such as Germany, or the Netherlands). This intriguing question may merit further explicit investigation.

Finally, attitudes on whether costs associated with risky behaviours should be covered by the NHS were collected using a quite coarse binary measure. In order to induce subjects to take a clear-cut position, in fact, individual responses were deliberately constrained to be either '*coverage*' or '*no coverage*'. Such a measure is justified by our focus on a health system where health care is either provided free of charge in the public system or paid out of pocket (or through private insurance) in the private sector. In real policy decision-making contexts, however, health policy responses are often much more nuanced than that. For instance they can entail the introduction of variable copayments, insurance premia, or different degrees of coverage. It is plausible that, when facing a more finely grained set of coverage options, respondents could manifest higher willingness for, at

least partial, financial responsibility. This has, in fact, been documented among US respondents for obesity-related costs (28). Whether non-binary options could lead to different responses also within a public-funded health system is another interesting question deserving future attention.

Notwithstanding these caveats, our analysis suggests that individuals that engage in risky behaviours tend to be in favour of a health system coverage that does not contemplate lifestyle rationing.

Even though rationing is considered by many inevitable due to the obesity epidemics and the spread of other risky behaviours, with their consequent burden on treating chronic diseases and healthcare expenditure, our analysis suggests that future policies advocating rationing based on individual responsibility will be unlikely to gain unconditional support among the general public.

Which policy routes should be attempted to curb the surge of unhealthy behaviours remains an open question. Furher evidence is needed to explore whether prevention policies based, for instance, on financial incentives, 'sin taxes', or 'nudges' aiming at behavioural change, would benefit from broader public support.

Conflict of Interest Statement: The authors declare that there are no conflicts of interest.

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Tables.

Table 1. List of explanatory and dependent variables
(*London, July-August 2011*)

Explanatory Variables		
Health and behavioural variables	**Label definition**	**Values**
LifeSat	Life satisfaction	Scale 1-11: 1= not at all satisfied; 11= completely
HealthAtt	Attention in behaving healthily	Scale 1-11: 1=not at all; 11= completely
HealthAff	Agreement on the idea that behaviour can affect health	Scale 1-11: 1= not at all; 11= completely
SmokeStatus	Smoking status	Dummy, 1=active smoker; 2=ex-smoker, 3== never smoked
NoCig	Number of cigarettes smoked	Continuous variable
Alcohol	Amount of consumed alcohol	Scale 1-6: 1=6-7 times a week; 6= rarely, never
PhysAct	Engage in physical activities	Scale 1-6: 1=6-7 times a week; 6= rarely, never
HealthVisit	Any health visits to hospital, GP	Dummy, 1=yes
OwnHealth	How you see your own health	Scale 1-11: 1= really bad all; 11= really good
LTHProb	Any long term health problem	Dummy, 1=yes
CareSick	Taken care for sick person	Dummy, 1=yes
PrivHIns	Any private health insurance contract	Dummy, 1=yes
RiskSeek	Risk seeking in financial decisions	Scale 1-11: 1= not at all; 11= completely
BMI	Body Mass Index	Continuous variable constructed from the reported measures of weight (in Kg) divided by the height (in metres) squared
Socio-demographic variables		
Gender	Gender	Dummy, 1= Male
MarrieD	Marital Status	Dummy variable taking value 1 if records in marital status questions are 2 or 3: 1=single, 2= cohabiting, 3=living together with spouse, 4= widowed, 5= divorced, 6= married living separated
Children	Number of Children	Values 0-8, 0=no children, 8= 8 or more children
Edu	Education level	Values 1-6, 1=less than primary school children, 6= post-graduate degree completed
EmplD	employment situation	Dummy, 1=employed or self-employed; 0=student non employed, unemployed, homemaker,
Accom	Amount spent in accommodation	Continuous variable
ReligD	Religion	Dummy, 1= practice
Income	Annual Income Level	Scale 1-7, 1= <£15,000 7= > £150,000)
FinConstr	Living comfortably with current income level	Scale 1-5, 1= living comfortably (excluding reply to Fin_cons=6, *Don't know*)
Age	Age	Continuous variable
NonUK	Parents place of birth	Scale 1-3, 1= born in the UK, 2= one born in the UK, 3= both born abroad
Dependent Variables		
Smoking Oveating UnhealDiet ExcessAlcoh SedLife	*"In your opinion, should the health system pay the healthcare costs of treating diseases caused by any of the following behaviors?"*	Dummy, 1=Yes; 0=No

Table 2. Descriptive Statistics
(*London, July-August 2011*)

		Dependent Variables		
Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Smoking	0.541096	0.500024	0	1
Overeating	0.427586	0.496443	0	1
UnhealDiet	0.465753	0.500543	0	1
ExcessAlcoh	0.486301	0.501533	0	1
SedLife	0.492958	0.50172	0	1

		Explanatory Variables		
Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
LifeSat	8.383562	1.472789	3	11
HealthAtt	8.19863	1.787388	1	11
HealthAff	8.917808	2.046045	1	11
SmokeStatus	2.184932	0.855033	1	3
NoCig	5.106383	8.798297	0	60
Alcohol	3.393103	1.528873	1	6
PhysAct	2.794521	1.394164	0	6
HealthVisit	0.767123	0.424119	0	1
OwnHealth	7.972603	1.753598	2	11
LTHProb	0.212329	0.410364	0	1
CareSick	0.089041	0.285783	0	1
PrivHIns	0.201389	0.402438	0	1
RiskSeek	5.705479	2.772196	1	11
Gender	0.486301	0.501533	0	1
Edu	4.869863	0.977426	1	6
Children	0.662069	1.292181	0	8
Accom	636.6407	494.9046	0	2834
NonUK	2.205479	0.953526	1	3
Income	2.302158	1.386554	1	7
Age	38.28472	15.49765	18	90
BMI	23.86988	4.322984	16.50891	39.26075
ReligD	0.732877	0.44398	0	1
FinConstr	2.158621	0.902742	1	5
EmplD	0.917808	0.275602	0	1
MarrieD	0.328767	0.471382	0	1

Table 3
Logit regression for the determinants of the likelihood to agree: over-eating
(*London, July-August 2011*)

	m1	m2	m3	m4
Overeating				
Gender	0.951	0.740	0.955	1.722
	(0.406)	(0.394)	(0.536)	(1.116)
Age	1.007	0.989	0.981	0.986
	(0.0228)	(0.0252)	(0.0265)	(0.0289)
Edu	1.357	1.315	1.415	1.515
	(0.390)	(0.413)	(0.467)	(0.515)
NonUk	0.763	0.668	0.611*	0.652
	(0.191)	(0.188)	(0.181)	(0.207)
MarrieD	2.014	2.042	1.970	1.453
	(0.944)	(1.039)	(1.018)	(0.812)
Children	1.100	1.091	1.280	1.646
	(0.355)	(0.401)	(0.506)	(0.723)
EmpD	0.552	0.476	0.588	1.101
	(0.506)	(0.470)	(0.610)	(1.213)
Accom	1.001*	1.001*	1.001	1.001*
	(0.000558)	(0.000586)	(0.000653)	(0.000734)
PrivHIns	1.166	1.608	2.105	3.494*
	(0.652)	(0.958)	(1.316)	(2.472)
Income	0.907	0.981	0.943	0.899
	(0.225)	(0.267)	(0.281)	(0.304)
FincConstr	1.171	1.239	1.233	1.052
	(0.285)	(0.372)	(0.382)	(0.338)
ReligD	0.528	0.430	0.454	0.315*
	(0.261)	(0.243)	(0.266)	(0.211)
LifeSat		1.175	1.266	1.137
		(0.230)	(0.260)	(0.261)
HealthAtt		1.382*	1.349	1.233
		(0.232)	(0.250)	(0.238)
HealthAff		1.134	1.169	1.231
		(0.180)	(0.186)	(0.224)

OwnHealth		0.802	0.824	0.970
		(0.149)	(0.158)	(0.218)
CareSick		0.203*	0.239	0.230
		(0.189)	(0.245)	(0.255)
RiskSeek		0.845*	0.828*	0.811*
		(0.0817)	(0.0861)	(0.0882)
NoCig			1.036	1.015
			(0.0309)	(0.0319)
Alcohol			0.944	0.751
			(0.193)	(0.184)
PhysAct			0.859	0.835
			(0.156)	(0.167)
HealthVisit				1.174
				(0.751)
LTHProb				0.178**
				(0.146)
BMI				1.193**
				(0.0909)
Observations	110	110	105	103

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 4

Logit regression for the determinants of the likelihood to agree: unhealthy diet
(*London, July-August 2011*)

	m1	m2	m3	m4
UnhealDiet				
Gender	0.585	0.564	0.620	1.151
	(0.260)	(0.298)	(0.351)	(0.738)
Age	1.019	1.005	1.007	1.008
	(0.0236)	(0.0256)	(0.0275)	(0.0296)
Edu	1.784*	1.754*	1.828*	2.037**
	(0.535)	(0.556)	(0.618)	(0.724)
NonUk	0.632*	0.578*	0.607*	0.639
	(0.163)	(0.165)	(0.176)	(0.194)
MarrieD	0.960	0.926	1.097	0.926
	(0.461)	(0.469)	(0.576)	(0.531)
Children	1.111	1.158	1.466	1.773
	(0.370)	(0.424)	(0.593)	(0.781)
EmpD	0.453	0.378	0.581	0.957
	(0.424)	(0.379)	(0.615)	(1.078)
Accom	1.002***	1.002***	1.002***	1.002***
	(0.000610)	(0.000620)	(0.000688)	(0.000749)
PrivHIns	1.086	1.240	1.470	1.758
	(0.631)	(0.751)	(0.945)	(1.238)
Income	0.817	0.824	0.719	0.673
	(0.219)	(0.238)	(0.222)	(0.225)
FincConstr	1.112	1.105	1.111	0.946
	(0.280)	(0.334)	(0.350)	(0.307)
ReligD	0.622	0.608	0.688	0.663
	(0.313)	(0.345)	(0.402)	(0.419)
LifeSat		0.991	1.049	0.942
		(0.193)	(0.218)	(0.218)
HealthAtt		1.293	1.246	1.215
		(0.214)	(0.226)	(0.238)
HealthAff		1.170	1.143	1.196
		(0.190)	(0.194)	(0.221)

OwnHealth		0.881	0.849	0.925
		(0.168)	(0.173)	(0.212)
CareSick		0.436	0.134	0.175
		(0.358)	(0.166)	(0.217)
RiskSeek		0.991	0.947	0.946
		(0.0930)	(0.0965)	(0.101)
NoCig			1.008	0.997
			(0.0286)	(0.0302)
Alcohol			0.793	0.645*
			(0.169)	(0.162)
PhysAct			1.009	0.985
			(0.187)	(0.198)
HealthVisit				0.436
				(0.265)
LTHProb				0.442
				(0.342)
BMI				1.162**
				(0.0882)
Observations	111	111	106	104

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 5
Logit regression for the determinants of the likelihood to agree: sedentary life
(*London, July-August 2011*)

	m1	m2	m3	m4
SedLife				
Gender	0.668	0.377*	0.611	1.542
	(0.307)	(0.217)	(0.369)	(1.133)
Age	1.055**	1.060**	1.046	1.044
	(0.0256)	(0.0303)	(0.0330)	(0.0367)
Edu	1.275	1.251	1.233	1.433
	(0.395)	(0.417)	(0.455)	(0.594)
NonUk	0.945	0.948	0.960	1.199
	(0.259)	(0.286)	(0.300)	(0.435)
MarrieD	3.700**	4.848***	5.367***	7.514***
	(1.885)	(2.711)	(3.081)	(5.198)
Children	0.515*	0.394**	0.411**	0.391*
	(0.178)	(0.155)	(0.177)	(0.196)
EmpD	0.240	0.173*	0.112*	0.0772*
	(0.244)	(0.179)	(0.136)	(0.111)
Accom	1.001	1.001	1.000	1.000
	(0.000609)	(0.000629)	(0.000716)	(0.000801)
PrivHIns	1.242	1.425	1.863	3.297
	(0.726)	(0.889)	(1.296)	(2.748)
Income	1.130	1.103	1.324	1.273
	(0.315)	(0.336)	(0.471)	(0.483)
FincConstr	1.252	1.156	1.294	0.922
	(0.336)	(0.360)	(0.430)	(0.357)
ReligD	0.257**	0.217**	0.197**	0.141**
	(0.138)	(0.133)	(0.134)	(0.113)
LifeSat		0.963	1.051	0.936
		(0.201)	(0.241)	(0.262)
HealthAtt		1.423*	1.336	1.367
		(0.257)	(0.254)	(0.329)
HealthAff		0.973	0.951	0.971
		(0.159)	(0.160)	(0.203)

OwnHealth		0.688*	0.740	0.805
		(0.138)	(0.157)	(0.198)
CareSick		1.307	0.494	0.374
		(1.092)	(0.518)	(0.424)
RiskSeek		0.900	0.855	0.824
		(0.0874)	(0.0920)	(0.100)
NoCig			1.059	1.052
			(0.0423)	(0.0434)
Alcohol			1.170	0.874
			(0.258)	(0.243)
PhysAct			1.292	1.260
			(0.258)	(0.290)
HealthVisit				0.226*
				(0.175)
LTHProb				1.487
				(1.336)
BMI				1.302***
				(0.122)
Observations	109	109	104	102

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 6
Logit regression for the determinants of the likelihood to agree: excess alcohol
(*London, July-August 2011*)

	m1	m2	m3	m4
ExcessAlcoh				
Gender	0.538	0.440	0.546	0.731
	(0.237)	(0.234)	(0.319)	(0.460)
Age	1.014	1.006	0.996	1.004
	(0.0234)	(0.0261)	(0.0302)	(0.0312)
Edu	1.424	1.267	1.967*	2.009*
	(0.424)	(0.399)	(0.739)	(0.758)
NonUk	0.874	0.851	0.805	0.842
	(0.226)	(0.246)	(0.250)	(0.270)
MarrieD	2.279*	2.519*	3.545**	2.883*
	(1.109)	(1.306)	(2.080)	(1.729)
Children	0.623	0.556	0.701	0.780
	(0.209)	(0.209)	(0.301)	(0.349)
EmpD	0.252	0.183	0.341	0.461
	(0.257)	(0.201)	(0.384)	(0.535)
Accom	1.000	1.000	1.000	1.000
	(0.000565)	(0.000582)	(0.000685)	(0.000741)
PrivHIns	1.303	1.584	2.432	3.038
	(0.738)	(0.951)	(1.584)	(2.180)
Income	1.180	1.276	1.001	0.992
	(0.304)	(0.356)	(0.313)	(0.333)
FincConstr	1.439	1.535	1.453	1.332
	(0.365)	(0.459)	(0.481)	(0.457)
ReligD	0.339**	0.269**	0.280**	0.247**
	(0.172)	(0.153)	(0.174)	(0.165)
LifeSat		1.123	1.173	1.104
		(0.222)	(0.257)	(0.254)
HealthAtt		1.428**	1.488**	1.451*
		(0.246)	(0.301)	(0.295)
HealthAff		1.000	1.151	1.190
		(0.156)	(0.200)	(0.215)

OwnHealth		0.777	0.792	0.806
		(0.148)	(0.165)	(0.188)
CareSick		0.539	1.052	1.078
		(0.434)	(1.035)	(1.116)
RiskSeek		0.980	0.962	0.940
		(0.0896)	(0.0965)	(0.0988)
NoCig			1.101*	1.084
			(0.0554)	(0.0532)
Alcohol			0.750	0.675
			(0.158)	(0.163)
PhysAct			0.759	0.766
			(0.156)	(0.161)
HealthVisit				0.854
				(0.550)
LTHProb				0.305
				(0.245)
BMI				1.082
				(0.0805)
Observations	111	111	106	104

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Table 7
Logit regression for the determinants of the likelihood to agree: smoking
(*London, July-August 2011*)

	m1	m2	m3	m4
Smoking				
Gender	0.728	0.830	1.161	1.274
	(0.311)	(0.423)	(0.696)	(0.861)
Age	0.976	0.967	0.919**	0.918**
	(0.0231)	(0.0251)	(0.0325)	(0.0345)
Edu	1.441	1.275	2.044*	2.014*
	(0.419)	(0.394)	(0.769)	(0.756)
NonUk	0.701	0.669	0.561*	0.567
	(0.179)	(0.193)	(0.188)	(0.196)
MarrieD	1.183	1.204	1.873	1.932
	(0.549)	(0.594)	(1.093)	(1.213)
Children	1.081	1.089	1.482	1.516
	(0.349)	(0.395)	(0.663)	(0.695)
EmpD	0.408	0.333	0.287	0.297
	(0.421)	(0.385)	(0.381)	(0.399)
Accom	1.000	1.000	1.000	1.000
	(0.000540)	(0.000558)	(0.000678)	(0.000710)
PrivHIns	1.440	1.775	2.857	2.481
	(0.805)	(1.070)	(1.997)	(1.826)
Income	1.083	1.145	1.189	1.177
	(0.261)	(0.297)	(0.371)	(0.380)
FincConstr	1.476	1.666*	2.003*	1.965*
	(0.368)	(0.496)	(0.736)	(0.763)
ReligD	0.423*	0.336*	0.305*	0.395
	(0.211)	(0.188)	(0.199)	(0.272)
LifeSat		1.170	1.275	1.199
		(0.227)	(0.313)	(0.309)
HealthAtt		1.346*	1.701**	1.748**
		(0.225)	(0.362)	(0.404)

HealthAff		1.009	1.136	1.198
		(0.152)	(0.213)	(0.235)
OwnHealth		0.853	0.925	0.843
		(0.158)	(0.193)	(0.196)
CareSick		0.322	0.918	0.973
		(0.264)	(0.922)	(1.014)
RiskSeek		1.077	1.085	1.083
		(0.0964)	(0.112)	(0.115)
NoCig			1.226***	1.226***
			(0.0770)	(0.0784)
Alcohol			0.910	0.943
			(0.196)	(0.225)
PhysAct			1.176	1.253
			(0.242)	(0.269)
HealthVisit				0.371
				(0.255)
LTHProb				0.818
				(0.624)
BMI				0.966
				(0.0755)
Observations	111	111	106	104

Exponentiated coefficients; Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Appendix A. Questionnaire

**Imperial College
London
BUSINESS SCHOOL**

INDIVIDUAL CONSENT FORM

Dear Participant,
You have been randomly selected to take part of this survey and we would, therefore, like to ask you to please fill this questionnaire. This survey is carried out by Imperial College London, Business School.
The information you provide will only be used to understand the main things that affect people's attitudes towards public healthcare expenditure.

The survey will take approximately 20 minutes. Questions will be about:
- some personal details
- your behaviour, including activities that you generally carry out
- your attitudes towards public healthcare expenditure

The information you provide is totally confidential, will be treated anonymously, and will not be disclosed to anyone. Data will be processed in statistical form, and will only be used for research purposes. Any personal information will be removed from the questionnaire. All information and data will be stored in safe storage space which will only available to the researchers directly involved in this project. Any information from this study that is published or presented at scientific meetings will be completely anonymous.

Your participation is voluntary and you can withdraw from the survey at any moment, even after having agreed to participate. If you have any questions about this survey you may ask me.

Signing this consent indicates that you you agree to participate in this survey, and that you give your consent to use the information collected.

Read by   Respondent [ ]   Interviewer [ ]

Agreed [ ] Refused [ ]

Respondent: _____
Interviewer:
Date: ___ / ___ /___

BPA

BPA1. How satisfied are you with your life in general? Please tick a box on the scale below where the value 0 means "not at all satisfied", and the value 10 means "completely satisfied".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
0 1 2 3 4 5 6 7 8 9 10
not at all   completely

BPA2. How do you see yourself: are you generally a person who puts effort into behaving in a healthy way, or do you not pay too much attention to behavior that might affect your health? Please tick a box on the scale below where the value 0 means " do not pay attention at all to to behaving in a healthy way", and the value 10 means "pay complete attention to behave in a healthy way".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
0 1 2 3 4 5 6 7 8 9 10
No attention   complete attention

BPA3. To what extent do you believe your level of health can be affected by your behavior? Please tick a box on the scale below where the value 0 means "not affected at all", and the value 10 means "completely affected".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
0 1 2 3 4 5 6 7 8 9 10
not at all   completely

BPA4. Do you smoke, or have you ever smoked cigarettes, cigars, cigarillos or a pipe daily for a period of at least one year?

Yes, and I am currently smoking………………☐
Yes, but I have quit smoking………………. ☐
No, I have never smoked ………………………☐
(Go to Question No. BPA6)

BPA5. How many cigarettes do (did) you smoke on average per day?

WRITE IN NUMBER ☐☐☐

BPA6. During the last 3 months, how often have you drunk any alcoholic beverages, like beer, cider, wine, spirits or cocktails?

6-7 times a week…………………………☐
3-5 times a week…………………………☐
1-2 times a week…………………………☐
1-2 times a month…………………………☐
Less than once a month……………………☐
Rarely or never……………………………☐

BPA7. How many times have you been drunk in the last 3 months?

WRITE IN NUMBER ☐☐☐

BPA8. How often do you engage in vigorous physical activity, such as sports, heavy housework, or a job that involves physical labour for more than 30 minutes at a time?

6-7 times a week…………………………☐
3-5 times a week…………………….......☐
1-2 times a week…………………………☐
1-2 times a month…………………………☐
Less than once a month……………………☐
Rarely or never……………………………☐

BPA9. How often do you engage in activities that require a moderate level of energy, such as gardening, cleaning the car, or doing a walk?

6-7 times a week…………………………☐
3-5 times a week…………………………☐
1-2 times a week…………………………☐
1-2 times a month…………………………☐
Less than once a month……………………☐
Rarely or never……………………………☐

BPA10. How often on average do you eat a serving of fruit?

6-7 times a week or more…………………☐
3-5 times a week……………………….....☐
1-2 times a week…………………………. ☐
1-2 times a month…………………………☐
Less than once a month……………………☐
Rarely or never…………………………… ☐

BPA11 How often on average do you eat a serving of vegetables?

6-7 times a week or more…………………☐
3-5 times a week…………………………☐
1-2 times a week…………………………☐
1-2 times a month…………………………☐
Less than once a month……………………☐
Rarely or never……………………………☐

BPA12. How often do you eat fast food such as McDonalds, Burger King, Kentucky Fried Chicken, kebabs, or other take away food like that?

6-7 times a week………………………☐
3-5 times a week………………………☐
1-2 times a week………………………☐
1-2 times a month………………………☐
Less than once a month…………………☐
Rarely or never…………………………☐

BPA13. During the last 6 months, have you had any of the health visits, check-up and diagnostic tests listed below? (Please check all that apply)

FOR MEN ONLY   FOR WOMEN ONLY

Seeing the GP…………………☐   Seeing the GP…………………☐
Seeing a specialist doctor……..☐   Seeing a specialist doctor……..☐
Being admitted to hospital……☐   Being admitted to hospital…….☐
Dental check up………………..☐   Dental check up………………..☐
Eyesight test by an optician…..☐   Eyesight test by an optician…..☐
Chest / other x-rays……………☐   Chest / other x-rays……………☐
Blood pressure…………………☐   Blood pressure…………………☐
Cholesterol test………………..☐   Cholesterol test………………..☐
Blood test………………………☐   Blood test………………………☐
Urology visit …………………..☐   Cervical smear…………………☐
                                        Breast screening………………..☐

Any other diagnostic test……..☐   Any other diagnostic test…….☐
Other……………………………☐   Other…………………………...☐

HS

HS1. How tall are you (in cm or feet and inches) without shoes?

I am _____feet_____ inches tall

I am _____meter ____cm tall

HS2. How much do you weigh without shoes and clothes?

My weight is _____ Kg

My weight is _____ stones and _____pounds

HS3. How would you see your own health is? Please tick a box on the scale below where the value 0 means "really bad", and the value 10 means "really good".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
1   2   3   4   5   6   7   8   9   10 11
really bad   really good

HS4. During the past six months, how much time have your physical health or emotional problems interfered with your usual activities, and your social life (e.g. family, friends)?

Always……….…………………………☐
Most of the time…………………….…☐
Sometimes……………………………..☐
Few times……………………………...☐
Never……………………………………☐

HS5. How often did you have to take any prescription or over the counter drugs during the past 6 months?

6-7 times a week…………………………☐
3-5 times a week…………………………☐
1-3 times a week…………………………☐
1-2 times a month………………………..☐
Less than once a month…………………☐
Rarely or never…………………………..☐

HS6. Some people suffer from chronic or long-term health problems. By long-term we mean it has troubled you over a period of time or it is likely to affect you over a period of time. Do you have any long-term health problems, illness disability or infirmity?

Yes………………………………………☐
No…………………………………….…☐

HS8. Have you ever, for six weeks or longer, taken care of a sick person who was confined to a bed?

Yes……………………………………☐
No …………………………………….☐

E

E1. Do you have any private health insurance contract?

Yes……………………………………☐
No …………………………………….☐
(Go to question No E3)

E2. If you have a private insurance contract, how much did you pay out-of-pocket as health insurance premium in the last 12 months?

WRITE IN £ ☐☐☐☐☐

E3. Not counting health insurance premiums, or reimbursements from employers, about how much did you pay out-of-pocket for all your drugs and health care expenses in the last 12 months?

WRITE IN £ ☐☐☐☐☐

E4. Think about the income taxes you pay. Which share of your monthly tax contributions do you think is going to finance the health care expenditure?

WRITE IN % ☐☐☐☐

E5. How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale below where the value 0 means "not at all prepared to take risks", and the value 10 means "completely prepared to take risks".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
0   1   2   3   4   5   6   7   8   9   10
not at all   completely

E6. How do you see yourself: are you a person who is fully prepared to take risks in financial matters, or do you try to avoid taking risks in financial matters? Please tick a box on the scale below where the value 0 means "not at all prepared to take risks in financial matters", and the value 10 means "completely prepared to take risks in financial matters".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
0   1   2   3   4   5   6   7   8   9   10

not at all   completely

E7. How do you see yourself: are you a person who is fully prepared to take risks in health, or do you try to avoid taking risks in health? Please tick a box on the scale below where the value 0 means "not at all prepared to take risks in health", and the value 10 means "completely prepared to take risks in health".

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
1   2   3   4   5   6   7   8   9   10   11
not at all   completely

T

T1. According to your opinion, should the health system pay the healthcare costs of treating diseases caused by any of the following behaviors?
(PLEASE, FOR EACH BEHAVIOUR, TICK EITHER "YES" (i.e. the system should pay) OR "NO" (i.e. the system should not Pay))

	YES	NO
Drug use…………………………	☐	☐
Smoking…………………………	☐	☐
Over-eating……………………	☐	☐
Unhealthy diet…………….......	☐	☐
Excess of alcohol……………..	☐	☐
Drink and driving…………….	☐	☐
Sedentary life............................	☐	☐

SD

SD1. Year of birth ☐☐☐☐

SD2. Gender
- Female………………………………………………………☐
- Male……………………………………………………………☐

SD3. What is your highest level of education?
- Less than primary school………………………………………☐
- Primary school completed……………………………………☐
- Secondary school completed…………………………………☐
- High school (or equivalent) completed………………………☐
- University/College first degree completed…………………☐
- Post-graduate degree completed……………………………☐

SD4. If you have a degree, in what subject is your degree?

- Medicine and health studies…………………………………☐
- Economics and social sciences………………………………☐
- Engineering, mathematics and physics………………………☐
- Natural sciences………………………………………………☐
- Law………………………………………………………………☐
- Human studies…………………………………………………☐
- Art, music and design…………………………………………☐

SD5. What is your marital status?

- Single (never married)………………………………………☐
- Cohabiting ……………………………………………………☐
- Currently married and living together with spouse…………☐
- Widowed………………………………………………………☐
- Divorced………………………………………………………☐
- Married living separated ……………………………………☐

SD6. How many children (if any) do you have?

WRITE IN NUMBER ☐☐

SD7   How would you describe your current employment situation?

- Employed by private company………………………………☐
- Civil servant……………………………………………………☐
- Self employed…………………………………………………☐
- Student– employed……………………………………………☐
- Student not in labour market…………………………………☐
- Unemployed……………………………………………………☐

Homemaker…………………………………………………☐
Retired from paid work altogether…………………………☐
On maternity leave…………………………………………☐
Long term sick or disabled……………………………….☐
On a government training scheme…………………………☐
Something else……………………………………………☐

SD8. What best describes your job?

Legislator, senior official or manager………………………☐
Professional…………………………………………………☐
Technician or associate professional………………………☐
Clerk…………………………………………………………☐
Service worker and shop and market sales worker…………☐
Skilled agricultural or fishery worker……………………☐
Craft and related trades worker……………………………☐
Plan and machine operator or assembler…………………☐
Elementary occupation……………………………………☐
Armed forces………………………………………………☐

SD9. Does your household own or rent your accommodation, or does it come rent-free?

Owned/being bought on mortgage…………………………☐
Part owned part rented……………………………………☐
Rented………………………………………………………☐
Rent free……………………………………………………☐
Other (SPECIFY):_____

SD10. How much was the last monthly rent payment, or mortgage payment, for the place where you live?

WRITE IN £ ☐☐☐☐

SD11. About how much did you pay last month for charges and services that were not included in the last rent payment, or mortgage payment?

WRITE IN £ ☐☐☐☐

SD 12. What religion do you belong, or feel attached to, mostly?

Catholic………………………………………………………☐
Protestant……………………………………………………☐
Church of England…………………………………………☐
Presbyterian…………………………………………………☐
Methodist……………………………………………………☐
Baptist………………………………………………………☐
Other Christian……………………………………………☐
Buddhist……………………………………………………☐
Hindu…………………………………………………………☐
☐

☐

Jewish…………………………………………………………

Muslim…………………………………………………☐.

Sikh……………………………………………………………

Any other religion……………………………………….☐

No religion…………………………………….................☐

SD13. Do you consider that you are actively practicing your religion?

Yes……………………………………………………☐

No……………………………………………………☐

SD14   How well would you say you yourself are managing financially these days? Would you say you are. . .

Living comfortably ……………………………………….☐

Doing alright……………………………………………….☐

Just about getting by……………………………………☐

Finding it quite difficult …………………………………☐

Finding it very difficult……………………………………☐

Don't know ……………………………………………☐

SD15   Were your parents born in this country or abroad?

Both born in this country...☐

One born here, the other abroad ....☐

Both born abroad...☐

SD16 What level of income do you earn annually?

< £ 15,000...☐

£ 15,000-35,000...☐

£ 35,000-55,000...☐

£ 55,000-75,000...☐

£ 75,000-95,000...☐

£ 95,000-150,000...☐

> £ 150,000...☐

Appendix B. Sampling

We selected seven boroughs within a radius of ten miles from the 'centre' of central London (the roadcross between the Strand and Whitehall at Trafalgar Square), substantially corresponding to areas located in zones 1 and 2 of inner London. Within each borough, we randomly selected two postal codes. Within each selected postal code, interviewers had to achieve 10 interviews within gender-defined quotas. To achieve this, the interviewers first attempted to administer the questionnaire door-to-door to every three addresses starting from an initial randomly selected house number. If the door-to-door questionnaire failed to achieve 10 interviews within gender quotas, then the interviewers proceeded by approaching individuals walking in the selected postal code until reaching the envisaged quotas. The questionnaire was self-filled by the respondents.

This random location quota sampling turned out to produce a mixture of different areas with sufficient heterogeneity and variation in terms of the respondents' socio-economic characteristics, including: Queen's Gate, Earl's Court, Bayswater, Sheperds Bush, Victoria Station, Waterloo Road, Lambeth, Borough Road, Elephant and Castle, Vauxhall, Swiss Cottage, Liverpool Street, Shoreditch High Street. Only individuals living in the UK and willing to sign an informed consent were recruited for the study.

Interviewers went to selected postal codes at different times during the day (early morning, midday and in the evening) and in different days of the week (including weekends) with the aim to capture both residents and individuals working in the area.

Appendix C. Sample characteristics

From our sample, 48.6% of respondents are female (parallel interviews in two selected postal codes having resulted in slightly unbalanced gender quotas), 52% are single, while 32% are either married or cohabitate. The mean number of children is 0.7. The great majority (91.8%) of respondents are employed.

Comparing the sample with the Census data [29], the mean age of our sample is close to the national mean age of 38.5 years. The gender split for London was 50.33% females and 49.67% males, and 50.84% females and 49.16% males for the whole UK. The percentage of employed in the population in the second quarter of 2010 was 90.7% in London and 92.2% in the UK. For what concerns gender, age, employment, and the other variables above, our sample is thus fairly representative of London and the UK.

As for education, 45.2% of respondents have a university or college degree and 26.7% a postgraduate degree. The sample therefore reflects the inner London area in which it was carried out, containing a greater proportion of respondents with higher qualifications compared to the UK, where only 19.8% having a degree or higher qualification. Similarly, for 36% of our respondents both parents were born in the UK, while for 57% both were born abroad. About 73% of respondents actively practise their religion.

In our sample 47.3% of respondents are non-smokers and never smoked, 24.0% quitted smoking and the remainder 28.8% are current smokers, the mean number of cigarettes being 5.1 a day. On average subjects in the sample report to drink alcohol 1-2 times per week, and to engage in physical activity 1-2 times per week. The BMI mean is 23.9 ranging from a minimum of 16.5 to a maximum of 39. This is slightly below the national average of BMI in England (27.4 for males and 27.1 for

females) [30]. On average, they assess their own health status as generally good (8.0), whereas 21.2% suffer from a long-term condition, and 8.9% take care of sick people.

The average annual income reported by respondents is in the second bracket (i.e. £15,000-£35,000). Respondents report they are "doing alright" in living comfortably within their budget, and are paying a rent or mortgage of an average of £636.641. One fifth of the respondents in the sample have private health insurance.