



Who is More Likely to Use Doctor-Rating Websites, and Why?
A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A cross-sectional study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stravopoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the extent at which doctor-rating websites are known and used among the general population.
- To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low, although significantly higher than what previously documented by the literature.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' awareness of, and intention to use, doctor-rating websites.

Strength and Limitations:

- We provide for the first time direct evidence on the determinants of people's awareness of and willingness to use doctor-rating websites.
- The relatively small and non-representative sample size in one borough of London limits the possibility to immediately generalise the results of the analysis to a national level.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining awareness and intention to use the websites: the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on

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3 doctor-ranking websites, though, are unlikely to be representative of the overall patients'
4 pool. In particular, they tend to over-represent opinions from young, non white British,
5 medium-low income patients who are not satisfied with their choice of the healthcare
6 treatments and the level of information provided by their GP. Accounting for differences
7 in the users' characteristics is important when interpreting results from doctor-rating sites.
8

9 **Key messages**

- 10 • The share of the general public which uses doctor-rating websites is still quite low,
11 although significantly higher than what previously documented by the literature.
- 12 • Elderly, subjects with white British background, as well as subjects with higher income
13 are less likely to use doctor-rating websites.
- 14 • The GP-patient gender concordance is associated with higher awareness of, and intention
15 to use, the websites.
- 16 • Subjects who feel that their GP explains things clearly and is a valuable source of clear
17 information, are less likely to use online rating websites.
- 18 • Subjects who feel that they are more satisfied with the level of choice of healthcare
19 treatments are less likely to use online rating websites.
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INTRODUCTION

Doctor-rating websites such as *NHS Choices* and *Dr Foster Intelligence* are a relatively recent phenomenon in the UK. Compared to other sources of healthcare information – such as official hospital statistics – the websites claim to be more user-friendly and easy to understand. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice in healthcare, as they potentially enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health and wellbeing.

In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK. A study by the Kings Fund¹ explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.²

Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez³ found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as the rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.⁴

The apparently limited uptake of doctor rating in the UK calls into question how effective the existing websites may be as information exchange platforms from and to representative groups of patients.

Interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users providing feedback online, require a better understanding of which characteristics drive the patients' awareness and actual use of doctor-rating websites.

The aim of this work is to provide evidence on the degree at which doctor ratings websites are known and used among the general public. It also aims to provide some novel insights on what appear to be the most significant predictors of the fact that people are aware of, and willing to use, doctor-ratings websites.

SURVEY DESIGN AND DATA COLLECTION

We conducted a self-administered survey to directly collect quantitative data in the field. The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The final questionnaire contained questions on awareness and use of online rating websites; a wide range of socio-demographic and health variables; individual characteristics related to the access to healthcare services and the doctor-patient relationship; and internet use in general. A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for “*Not sure*”.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

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

Sample

The questionnaire was administered in June 2010 to a sample of respondents from the Borough of Hammersmith and Fulham, London. The sampling method used was convenience sampling, a form of non-probability sampling. Subjects were approached in public places and asked whether they wanted to take part in a survey on internet usage. To account for confounding variables, the questionnaire explicitly assessed a range of individual socio-demographic and behavioural characteristics to be used as controls in the statistical analysis (see section on Variables).

The sample size was calculated at a minimum number of 200 respondents to achieve a sufficient number of events to use maximum likelihood techniques in the statistical analysis. The target minimum sample size was readily achieved by the convenience sampling procedure, as only 68 subjects who were initially approached refused to take part to the survey, giving a response rate of around 74.6%.

While the convenience sampling in one borough of London, and the relatively small sample size limit the possibility to immediately generalise the results of the analysis to a

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3 national level, the careful choice of the location for the fieldwork was dictated by the
4 consideration that the borough of Hammersmith and Fulham comprises a mix of both
5 affluent and deprived neighbourhoods, and a broad heterogeneity in ethnic background,
6 two key dimensions we aimed to relate to doctor websites' awareness and intended usage.
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9 10 **DATA ANALYSIS**

11 **Descriptive statistics**

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14 Comparing the sample with the Census data for the borough the mean age of our sample
15 was slightly older than that for the borough (39.57 years compared to 35.2 years).⁵ Our
16 sample however was closer to the national mean age of 38.5 years. The range of ages
17 seems to show a positive skew, with a greater frequency of people aged 40 years and
18 under. This is consistent with the 2001 census data for Hammersmith and Fulham which
19 showed the borough contained a larger proportion of young people aged 20-29 (23.8%)
20 than the rest of England (12.66%). Age is an important demographic to consider when
21 analysing our results as age has been shown to be important in internet usage.⁴
22
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24 Also, the sample had a slightly greater proportion of females than the borough (54.44% to
25 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared
26 to 58% for the borough). This is also significantly lower than figures for England, White
27 British accounting for 87% of the population. The sample contained 28.99% non white
28 respondents. This is higher than the 2001 census data for Hammersmith and Fulham
29 which was 22% and significantly higher than the figures for England, showing non white
30 ethnic groups accounting for 9% of the total population. Our sample, therefore, allows
31 controlling for high heterogeneity in ethnic background even with a limited sample size.
32
33

34 One major difference in our sample was that 19.32% of respondents were unemployed
35 compared to only 5% from the Census data for the borough. The high number of
36 respondents who are unemployed is a result of the convenience sampling method which
37 was used to select respondents, which may have over-represented people who were out of
38 work and at home, and who had time to fill out the questionnaire. This feature is quite
39 common in field surveys conducted with convenience sampling. Moreover an
40 unemployment rate higher than the one documented in the 2001 Census survey was
41 largely expected, due to the consequences of the economic and financial crisis after 2007.
42
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44 The majority of actively working respondents reported an income within the £15-35,000
45 bracket. Income is an important variable to control for in the analysis, as previous
46 literature found that patients using the Internet were more educated and had higher
47 incomes.⁶
48

49 Our sample had a high percentage of people with higher level qualifications: 46.24% of
50 the sample had a university degree and 27.96% had a postgraduate degree. This is
51 reflective of Hammersmith and Fulham, where 45% of the population have a qualification
52 of degree level or higher, a figure which is significantly higher than in England, where
53 only 19.8% have a degree or higher qualification.
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57 **[Figure 1 in here]**
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Variables

The main aim of the empirical analysis is to explore the determinants of the individual awareness of, and attitude to use, doctor-ratings websites. The dependent variables (Y) of our empirical analysis are thus two:

- i) the likelihood of being aware of doctor-rating websites (*Awareness*), which is a binary variable (*Awareness*=1 if patient is aware, *Awareness*=0 otherwise);
- ii) the likelihood of the individual intention to use doctor-rating websites in the future (*IntentionToUse*), which is an ordered discrete dependent variable that assumes values equal to 1 if the respondent is not likely to use the websites in the future, 2 if is not sure, and 3 if is likely to use.

The explanatory variables (X_i) include five groups of individual variables, namely:

- i) individual socio-demographic characteristics such as age (*Age*); gender (*Gender*); a set of dummies variables for ethnicity (*WhiteNonBritish*, *WhiteBritish*) with the non-white respondents taken as reference group; education (*Education*), taking values between 1 and 7 increasing with the highest level of attained formal education; income (*Income*), taking values between 1 and 6 increasing with the bracket level of pre-tax income;
- ii) a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care, including the clinical performance of the healthcare providers (*HC_ClinicalPerform*); the closeness to home (*HC_CloseHome*); the familiarity with the doctor (*HC_Familiarity*); the financial performance of the hospital (*HC_FinPerform*); the reputation of the doctor (*HC_GPReputation*); the accessibility of the hospital (*HC_Access*); the past experience with the hospital (*HC_PastExp*); the waiting lists (*HC_Waiting*); and, finally, the rates of hospital-acquired complications (*HC_HospComp*);
- iii) a set of variables on the sources of information that are important in making decisions about where to receive health care, including published hospital statistics (*SI_HospStat*); online doctor-rating websites (*SI_DoctorRating*); advice from the GP (*SI_GPAdvice*); feedback from relatives or friends (*SI_Family*); and, finally, past experience (*SI_PastExp*);
- iv) two dummy variables which take value 1 if the gender and the age of the patient are the same, or within a comparable range, respectively, than the characteristics of her GP, and 0 otherwise (*GenderMatch*, *AgeMatch*);
- v) a set of variables that describe the respondents' feelings about their relation with their doctor, including the feeling that the doctor listens to their problems (*DOC_Listens*); spends enough time in the consultation (*DOC_Time*); explains things clearly (*DOC_Explains*); is sociable and friendly (*DOC_Friend*); and can be trusted (*DOC_Trust*);
- vi) a variable indicating the level of participation of the respondents in their GPs' decisions (*Participation*);
- vii) a set of variables on patients' satisfaction with the level of choice in their healthcare decisions, and in particular for the choice of the GP (*SAT_C_GP*); of treatments (*SAT_C_Treatment*); of a doctor for an outpatient appointment (*SAT_C_Doc*); of an hospital for an outpatient appointment (*SAT_C_Hosp*); of an appointment time (*SAT_C_Time*);

- viii) a dummy variable controlling for whether the subjects had access to internet at home or at work (*WEB_Access*);
- ix) in the estimation of the likelihood of the intention to use websites, an extra dummy variable controlling for whether the subjects were aware of the existence of doctor-rating websites (*AlreadyAware*)
- x) a dummy variable (*SameGP*) for whether the subject always asks to see the same GP.

Methodology

Using STATA 11, we estimate a binary probit model for the awareness of doctor online rating websites (*Awareness*), and, an ordered probit for the likelihood of intention to use these websites (*IntentionToUse*).

The main idea beyond the binary probit regression is that the likelihood of observing a positive awareness of the websites (*Awareness*=1) can be modelled as:

$$\Pr (Y = 1|X_1, X_2, X_3, \dots, X_k) = \Phi (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) \quad (1)$$

Where Φ is the cumulative standard normal distribution function, X_1, X_2, \dots, X_k are the above described explanatory variables, and $\beta_0, \beta_1, \beta_2, \dots, \beta_k$ are the coefficients of the explanatory variables to be estimated, which can be immediately interpreted as determining whether the likelihood of observing awareness increases with the corresponding explanatory variable.

The binary probit model can be equivalently generalised to the case where more than two discrete outcomes are possible, using an ordered probit model. In such a case, threshold parameters shown by cut-points between the outcomes are estimated by the data together with the regression coefficients and help to match the probabilities associated with the outcome.^{7,8} We in fact employ an ordered probit model to estimate the likelihood that the respondents to our survey intend to use online doctor-rating websites in the future (*IntentionToUse*).

RESULTS AND DISCUSSION

Missing data

The incomplete questionnaires were used and missing observations were considered for the questions not answered. From the sample 3.9% did not report their age, 2.43% their gender, 2.9% their ethnicity, 3.4% whether they had internet access, 6.34% did not report how many people they lived with, 3.41% did not report whether they had an outpatient appointment in the previous year.

Missing data was higher for income (15.1% of the sample), education (10.2% of the sample). Also, 27.31% of the respondents did not answer on the gender of their GP, 28.29% on the age and 29.37% on the ethnicity.

On the awareness only 1.46% of our sample did not answer to whether they were aware of the existence of online rating websites and 3.95% failed to answer on the likelihood of using these websites in the future.

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the use of these online sources is still quite limited in our sample, although significantly higher than what the previous studies have shown.¹

We then used a probit regression to explore the possible characteristics that make patients more likely to be aware of the doctor-rating websites. Table 2 summarises the results.

[Table 2 in here]

Among the demographic factors, age and ethnicity were the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Although white British and white non-British respondents were sometimes less likely to be aware of the websites, the effect of these variables is not fully robust across all specifications. Other demographic factors, including income, education and gender were not significant predictors of awareness.

When considering the importance that individuals give to different information channels in order to decide on where to receive care, three sources were significant: clinical performance rates, the reputation of the doctor, and the hospital statistics. Those who consider the reputation of the doctor and the hospital statistics important in deciding where to receive care were more likely to be aware of the rating websites. This is consistent with the fact that individuals who give importance to these factors are more likely to seek for this information and therefore be aware of the websites that provide it. On the contrary, those who considered clinical performance rates important were less likely to be aware of the doctor-rating websites, perhaps signalling that those respondents may be more familiar with other sources of information, such as hospital statistics, for instance.

Finally, although the majority of the variables on doctor-patient relationship were not significant, the gender match between the GP and the patient predicted higher awareness of the website ratings. We see this as an interesting finding. The doctor-patient gender concordance has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.⁹ If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Our evidence is consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues¹⁰ shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the patient-doctor consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to

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3 that they receive from their doctor, may be more engaged in their treatment, and therefore
4 more willing to adhere to medication prescribed by them.¹¹
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7 **Results on the likelihood to use online rating websites**

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9 Table 3 below summarizes several statistical specifications of the ordered probit model
10 looking at the determinants of the likelihood that respondents to our survey declared their
11 intention to use doctor-rating websites in the future.
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14 **[Table 3 in here]**
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16
17 Concerning socio-demographic variables, it turns out that white British, as well as
18 respondents who reported income in higher brackets, said they were less likely to use
19 doctor-rating websites. This result is partly in contrast to what found by the previous
20 literature^{6 12 13} and can signal that white British subjects and respondents with higher self-
21 reported income may feel less in need of checking online doctor ratings, perhaps because
22 they may also have private, or employer-paid, health insurance schemes, or because are in
23 the position of directly accessing alternative sources of information through their networks
24 of acquaintances. As the estimated effect of these variables appear to be robust across all
25 empirical specifications, these findings seem to suggest that online doctor-rating websites
26 are likely to be particularly attractive to subjects with non-white British ethnicity and less
27 favoured economic background.
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31 Among other socio-demographic variables, we do not find any effect of education, age
32 and gender of the respondents on the likelihood of their intention to use (the results of the
33 specifications including the age and gender variables are not reported in the table for the
34 sake of space but are available from authors upon request). These results seem to suggest
35 that while age and gender can be significant factors in explaining the use of Internet for
36 health information,⁴ they are not significant factors to explain the intention to use doctor-
37 rating websites once subjects are made aware of their existence.
38

39
40 Of the characteristics of the healthcare providers that respondents perceived as important
41 while making decisions where to receive healthcare, our data suggest that those who
42 consider clinical performance and doctor reputation (in most specifications) as important
43 factors, are more likely to use doctor-rating websites. These results are consistent with the
44 nature of the information provided in these websites. Also, subjects who consider the
45 familiarity with their doctor an important factor to decide where to seek healthcare, tend to
46 be less likely to intend to use websites.
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48
49 Concerning the role of the different sources of information on the decisions of where to
50 seek healthcare, respondents who see published hospital statistics (and, sometimes also
51 online doctor-rating websites) as important sources of information are more likely to use
52 the rating websites. On the other hand, and interestingly, those for whom GP advice is an
53 important source of information for decision making are less likely to use doctor-rating
54 websites.
55

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57 Also the nature of the doctor-patients relationship seems to play a key role in explaining
58 whether respondents intend to use online rating websites. First, patients with GPs of the
59 same gender tend to be more likely to use the websites. This seems consistent with the
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3 analogous effect found for the likelihood of being aware of those websites, and together
4 they point to the possible explanation that the doctor and the Internet may sometimes be
5 seen as complementary, rather than alternative, information channels.¹² This interpretation
6 is further confirmed by the finding that respondents for whom the doctor is able to listen
7 to them, and who perceive the nature of the relationship with their GP as friendly, also
8 tend to be more likely to use the websites.
9

10 On the other hand, there may be other dimensions in the patient-doctor relationship which
11 seem to rather point to a “substitute” relationship with information on the Internet. For
12 instance, respondents who feel that their doctor explains things clearly are less likely to
13 use online rating websites, suggesting that when they are generally more satisfied with the
14 feedback provided by their doctor they are less concerned about finding about alternative
15 doctors and how they perform relative to each other.
16

17
18 This result on a “substitute relationship” is consistent with previous evidence by Diaz and
19 colleagues⁶ that found that 11% of their respondents said they would rather use the
20 Internet ‘instead of seeing or speaking with their doctors’, and that 59% of respondents
21 ‘did not discuss information with their doctors’. It also seems in line with the study by
22 McMullan¹² that indicates that patients who become dissatisfied with the information
23 provided to them by the health professionals are more likely to seek confirmation of the
24 information given and additional information on the Internet.
25

26
27 Regarding other respondents’ attitudes within the patient-doctor relationship, it also
28 transpires that the more autonomy patients have in their healthcare, the more likely they
29 are to be willing to use the rating websites. This intuitive result is consistent with the
30 evidence by McMullan¹² that a patient would look up health information before a
31 consultation ‘to seek information to manage their own healthcare independently’. These
32 may be the type of people who are ‘more likely to be health-oriented’ or ‘health
33 conscious’, and therefore be more proactive in consultations.¹⁴
34

35
36 Concerning, finally, the interaction between levels of satisfaction for the healthcare
37 services within the NHS, and the intention to use doctor-rating websites, it is interesting
38 to note that those that have reported to be more satisfied with the level of choice of GP, and
39 with the amount of choice of the hospital to receive outpatient appointments, are more
40 likely to use these websites. These results may be considered as reinforcing the above
41 discussed interpretation that some dimensions of the patient-doctor relationship may be
42 “complementary” with online information. For instance, patients who are more satisfied
43 with their GP because they feel the latter is more friendly and empathic may also be more
44 likely to engage more actively with health and healthcare information more generally.
45

46
47 On the other hand, the respondents that are more satisfied with the level of choice of
48 treatments are less likely to use the websites. Together with the above result, these
49 findings suggest that the choice of doctors and providers may be seen as only instrumental
50 for the choice of treatment, and therefore respondents that are happy with treatment choice
51 levels are less likely to shop around for different doctors’ opinions.
52

53
54 Of course, the study was conducted on a relatively small sample in one borough of
55 London which limits the possibility to generalise the findings. Yet, having chosen a
56 borough which comprises a mix of ethnicities and both affluent and deprived
57 neighbourhoods and having controlled for a range of characteristics in the analysis, makes
58 the provided evidence of potential relevance under a much broader perspective.
59
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CONCLUSIONS

The use of doctor-rating websites in our sample remains particularly low. Our findings suggest that older and more affluent people, as well as subjects of a white ethnic background, are less likely to use them.

One of the main results that seem to emerge from our empirical analysis is the importance of the doctor-patient relationship as a factor determining people's awareness or intention to use online websites. In particular, the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the GP and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet. When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

The findings of our study thus contribute also to the wider debate on the inter-relationships between Internet usage and the doctor-patient relationship.^{15 16 17} The argument, sometimes addressed by the previous literature, that information on the Internet can threaten the trust relationship and the balance of roles between doctors and patients, seems a concern which is not supported by our evidence. If any, a potential challenge to the doctor-patient relation can only affect the patients who already feel dissatisfied with the ability of their doctor to listen to them and provide them enough information regarding their condition, or with the level of their choice for healthcare treatments.

The above, however, can hardly be seen as a serious threat by those who advocate a greater choice by patients. On the contrary, if the latter is indeed a priority in the health policy agenda, online information on healthcare providers should be seen as a stimulating opportunity to enhance patients' choice in healthcare, and public engagement with health information, especially for the less favoured segments of the population.

Our study shows, however, that subjects who seek and provide feedback on doctor-ranking websites are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from young, non white British, medium-low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP.

Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites and when informing interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users who seek and provide feedback on doctor-ratings.

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5 **Data sharing:** technical appendix, statistical code and dataset available from the
6 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
7 obtained but the presented data are anonymised and risk of identification is low.
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10 All authors had full access to all the data in the study and take responsibility for the
11 integrity of the data and the accuracy of the data analysis.
12

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Appendix 1
Table 1 Variable description

Label	Values
IntentionToUse	Dummy variable =1 if Yes
Awareness	Ordered discrete variable ranging from 1 ="not likely to use" to 3="likely to use"
HC_Waiting	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_HospComp	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_Clinical_Performance	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_CloseHome	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_Familiarity	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_FinPerform	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_GP_Reputation	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_Access	Ordered discrete variable ranging from 1 =not important to 5=very important
HC_PastExp	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_GP_Advice	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_HospStat	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_DoctorRating	Ordered discrete variable ranging from 1 =not important to 5=very important

SI_PastExp	Ordered discrete variable ranging from 1 =not important to 5=very important
SI_Family	Ordered discrete variable ranging from 1 =not important to 5=very important
Reliable	Ordered discrete variable ranging from 1 =very unreliable to 5=very reliable
DOC_Listens	Dummy variable =1 if "I feel my doctor listens to my problems"
DOC_Time	Dummy variable =1 if "I feel my doctor spends enough time with me in each consultation"
DOC_Explains	Dummy variable =1 if "I feel my doctor explains things clearly"
DOC_Friend	Dummy variable =1 if "I feel my doctor is sociable and friendly"
DOC_Trust	Dummy variable =1 if "I feel I can trust in my doctor"
Participation	Ordered discrete variable. Value=1 if "My doctor always makes decisions for me", Value =6 I make decisions with my parents/spouse/relatives
SAT_C_GP	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Hosp	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Doc	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Treatment	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
SAT_C_Time	Ordered discrete variable ranging from 1 =strongly dissatisfied to 5=strongly satisfied
CB_AWARE	Dummy variable =1 if aware of Choose &Book
CB_Use	Dummy variable =1 if has used Choose &Book
WEB_Access	Dummy variable =1 if has Internet Access at home or work
AgeMatch	Dummy variable =1 if gender matches GP age
GenderMatch	Dummy variable =1 if age matches GP age
WhiteBritish	Dummy variable =1 if White British
WhiteNonBritish	Dummy variable =1 if White Non British

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Income	Ordered discrete variable =1 if Income <15000; =6 if Income>95000
Education	Ordered discrete variable ranging from 1 to 7 increasing with level of highest attained education

For peer review only

Table 2: Probit model on the factors explaining individuals' awareness of doctor-rating websites

<i>Awareness</i>	Model 1	Model 2	Model 3	Model 4
Age	-.02511*	-.03802*		
Gender	0.17571	0.37698		
White British	-0.31364	-0.04029	-0.40867	-1.37686*
WhiteNonBritish	-.77154*	-0.51540	-0.73818	-1.49512*
Education	0.08598	0.22691	0.16062	0.15219
Income	-0.03388	-0.03182	-0.18586	-0.32047
HC_HospComp		0.09907	0.17904	0.13723
HC_Clinical_Performance		-0.24814	-0.34760	-.89496*
HC_Familiarity		-0.20002	-0.15916	-0.00744
HC_GP_Reputation		0.20240	0.23607	.88312*
SI_GP_Advice		0.07143	-0.06556	-0.24120
SI_HospStat		0.11735	0.17486	.78768*
SI_PastExp		-0.14996	0.06721	0.09103
SI_Family		-0.02373	-0.23585	-0.67718
DOC_Listens			-0.39510	-0.78662
DOC_Time			0.17592	-0.91318
DOC_Explains			0.38843	0.32532
DOC_Friend			-0.16654	0.78108
DOC_Trust			0.04683	0.30238
Participation			0.02650	0.22745
AgeMatch			0.41149	1.15968
GenderMatch			.60875*	0.83468
SameGP				-0.43671

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SAT_C_GP				0.34304
SAT_C_Hosp				0.03738
SAT_C_Doc				0.17756
SAT_C_Treatment				0.14192
SAT_C_Time				-0.09109
_cons	-0.17923	-0.00659	-0.70032	-3.12100
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	legend:		* p<0.05; **	p<0.01; ***
				p<0.001

peer review only

Table 3 Ordered Probit model on the factors explaining the likelihood to intend to use the doctor-rating websites.

IntentionToUse	Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII	Model IX	Model X	Model XI
Awareness	-1.490098 (1.105938)	-1.46876 (1.086428)	-1.37799 (1.013997)	-1.39186 (1.014678)	-1.39135 (1.028182)	-1.32087 (0.964004)	-1.33837 (0.950678)	-1.30858 (0.883072)	-1.21886 (0.859385)	-1.26392 (0.858102)	-1.25845 (0.850407)
HC_Waiting	-0.0333763 (0.4812862)	-0.0289 (0.475927)	0.034038 (0.42562)	0.037041 (0.427061)	-0.00202 (0.404197)	0.037416 (0.351975)					
HC_HospComp	0.1258374 (0.4490633)	0.130149 (0.448609)	-0.14574 (0.389477)	-0.14176 (0.389321)	-0.17246 (0.378143)	-0.17163 (0.376829)	-0.16192 (0.364591)	-0.16609 (0.361465)			
HC_Clinical_Performance	1.27466* (0.706387)	1.24218* (0.664938)	1.108376* (0.567199)	1.114709** (0.566718)	1.084543** (0.552248)	1.068527* (0.542242)	1.049116** (0.507769)	1.051533** (0.506566)	1.013939** (0.473)	0.972573** (0.475465)	0.961459** (0.47394)
HC_CloseHome	0.0479294 (0.4304794)	0.071271 (0.404689)	-0.06446 (0.36145)								
HC_Familiarity	-0.6430315 (0.4431286)	-0.61777 (0.396589)	-0.50769 (0.346218)	-0.50751 (0.346708)		-0.53364 (0.330284)	-0.55738* (0.330004)	-0.56245* (0.324459)	-0.56886* (0.326828)	-0.59213* (0.330537)	-0.57454* (0.317614)
HC_FinPerform	-0.2879855 (0.5759051)	-0.32068 (0.523122)	-0.17394 (0.474874)	-0.1614 (0.471761)							
HC_GP_Reputation	0.531551 (0.4888328)	0.559182 (0.457822)	0.649998 (0.422641)	0.667459 (0.413469)	0.716391* (0.397221)	0.734803* (0.389075)	0.734723* (0.389097)	0.739415* (0.385034)	0.706219* (0.3866097)	0.690839* (0.385655)	0.686293* (0.379665)
HC_Access	0.0646001 (0.3598014)	0.063482 (0.358318)	0.126025 (0.335348)	0.106341 (0.314739)	0.128631 (0.307265)	0.128902 (0.309413)	0.135516 (0.303004)	0.146907 (0.272835)	0.14238 (0.260669)	0.157805 (0.2587)	0.167118 (0.255171)
HC_PastExp	0.0116506 (0.3126032)	0.009942 (0.309821)	-0.07334 (0.285021)	-0.069 (0.284343)	-0.07509 (0.280258)	-0.08766 (0.272015)	-0.07412 (0.240066)	-0.07626 (0.238735)	-0.06161 (0.236172)	-0.05774 (0.236731)	-0.05854 (0.236593)
SI_GP_Advice	-0.965477* (0.5812963)	-0.96164* (0.572932)	-0.68184 (0.478883)	-0.71602* (0.439781)	-0.71349* (0.431606)	-0.70949* (0.431902)	-0.6887* (0.381957)	-0.69106* (0.381335)	-0.73722** (0.368857)	-0.73987** (0.377419)	-0.73816* (0.379712)
SI_HospStat	1.430153** (0.7232476)	1.472196** (0.654768)	1.282785** (0.563935)	1.266714** (0.560111)	1.157914** (0.464421)	1.109429** (0.382154)	1.112091** (0.380992)	1.11389** (0.381585)	1.070698** (0.366592)	1.077707** (0.374138)	1.057476** (0.366079)
SI_DoctorRating	0.3509325 (0.5678123)	0.341427 (0.554121)	0.140798 (0.482839)	0.166676 (0.466254)	0.167322 (0.461632)	0.225253 (0.3595)	0.212759 (0.339169)	0.205901 (0.329077)	0.213284 (0.331575)	0.263376 (0.318113)	0.256045 (0.313808)
SI_PastExp	-0.2323052 (0.6857292)	-0.27113 (0.63673)	-0.33326 (0.61977)	-0.32871 (0.617586)	-0.31629 (0.620509)	-0.33499 (0.617278)	-0.33643 (0.617512)	-0.33403 (0.615972)	-0.33182 (0.595386)	-0.34589 (0.593174)	-0.21412 (0.321702)
SI_Family	0.0969089 (0.6530482)	0.100416 (0.654709)	0.153811 (0.644386)	0.144818 (0.640823)	0.129728 (0.635845)	0.147216 (0.631958)	0.143252 (0.630112)	0.140679 (0.62874)	0.17626 (0.566482)	0.149968 (0.563479)	
Reliable	0.8541392 (0.6146382)	0.836024 (0.610583)	0.998539* (0.553175)	0.950086** (0.481689)	0.93444* (0.485219)	0.904671* (0.455675)	0.91699** (0.441021)	0.931441** (0.410032)	0.951635** (0.389758)	0.951738** (0.391553)	0.968708** (0.383293)
DOC_Listens	2.783105* (1.595183)	2.701009* (1.459189)	2.107379 (1.28265)	2.050764* (1.240544)	2.200222* (1.196851)	2.186488* (1.190079)	2.191035* (1.186518)	2.203634* (1.177361)	2.115074* (1.142362)	2.276804** (1.12992)	2.254619** (1.115993)
DOC_Time	0.0028009 (0.9663045)	0.031698 (0.935949)	0.263194 (0.862893)	0.291105 (0.846794)	0.288719 (0.841739)	0.295651 (0.83964)	0.277058 (0.820967)	0.279926 (0.819897)	0.426324 (0.746708)		

DOC_Explains	-2.873068** (1.451857)	-2.79747** (1.322986)	-2.93956** (1.211433)	-2.89406** (1.183745)	-2.9724** (1.189955)	-2.99408** (1.187278)	-3.01245*** (1.171195)	-3.03793*** (1.136076)	-3.01943*** (1.162068)	-3.13156*** (1.153486)	-3.08263*** (1.119211)
DOC_Friend	1.476197 (1.253959)	1.39654 (1.084211)	1.262265 (0.994411)	1.2366 (0.987052)	1.44486* (0.816683)	1.500166* (0.774784)	1.514821** (0.760908)	1.526402** (0.750412)	1.530325** (0.759932)	1.712944** (0.693328)	1.66892** (0.663803)
DOC_Trust	-1.186211 (1.151477)	-1.14321 (1.101659)	-0.33227 (0.852505)	-0.34088 (0.851113)	-0.45629 (0.781121)	-0.47195 (0.772027)	-0.47596 (0.770021)	-0.47622 (0.768023)	-0.42764 (0.744095)	-0.49349 (0.749657)	-0.52024 (0.741436)
Participation	0.8461796* (0.491942)	0.855876* (0.48811)	0.800821* (0.458173)	0.794849* (0.455168)	0.8473** (0.423296)	0.819995** (0.397621)	0.831744** (0.382059)	0.830086** (0.381645)	0.838354** (0.377555)	0.830293** (0.381665)	0.833261** (0.383463)
SAT_C_GP	1.616577* (0.9071144)	1.580913* (0.871629)	1.086233 (0.676455)	1.0879 (0.677227)	0.969971* (0.558515)	0.976733* (0.564364)	0.974172* (0.562785)	0.973823* (0.562188)	1.023485** (0.555839)	1.11913** (0.545879)	1.101251** (0.535677)
SAT_C_Hosp	1.723845** (0.8389526)	1.695945** (0.799005)	1.751533** (0.742486)	1.759649** (0.740237)	1.916303*** (0.614399)	1.923682** (0.612479)	1.932668*** (0.607808)	1.925975*** (0.60232)	1.903824*** (0.612007)	1.939607*** (0.614163)	1.891536*** (0.576251)
SAT_C_Doc	-0.7285988 (1.060924)	-0.66508 (0.948389)	-0.76136 (0.860521)	-0.75242 (0.857113)	-0.93997 (0.677123)	-0.94502 (0.675133)	-0.97965* (0.592137)	-0.97734* (0.591815)	-0.9978* (0.596322)	-1.05803* (0.586979)	-1.01815* (0.566104)
SAT_C_Treatment	-1.567085** (0.7866272)	-1.57843* (0.782397)	-1.35684* (0.693826)	-1.33813* (0.684359)	-1.28051* (0.655734)	-1.23127** (0.600107)	-1.20025** (0.52193)	-1.20117** (0.521766)	-1.21581** (0.522225)	-1.16225** (0.517201)	-1.13815** (0.503693)
SAT_C_Time	0.1581313 (0.581505)	0.194839 (0.510654)	0.093667 (0.448609)	0.11126 (0.439809)	0.083362 (0.435461)						
CB_AWARE	0.1785468 (1.21653)										
CB_Use	2.871912 (2.383214)	2.922662 (2.309773)									
WEB_Access	-0.1814284 (2.107242)	-0.33442 (1.813491)	-0.68649 (1.689725)	-0.68119 (1.688781)	-0.30375 (1.248163)	-0.36828 (1.201655)	-0.39107 (1.18264)	-0.39367 (1.181729)	-0.56363 (1.087667)	-0.64547 (1.078176)	-0.62991 (1.073669)
AgeMatch	0.3049883 (0.675904)	0.321252 (0.667981)	0.436832 (0.642998)	0.3895 (0.587025)	0.382174 (0.585798)	0.36762 (0.579437)	0.374635 (0.576317)	0.368968 (0.573503)	0.399045 (0.573024)	0.454745 (0.562488)	0.470967 (0.555307)
GenderMatch	1.625302* (0.9550201)	1.646905* (0.940185)	1.271183 (0.794867)	1.32497* (0.737975)	1.346428* (0.726754)	1.295927* (0.674346)	1.302533* (0.671871)	1.290756** (0.65768)	1.303267** (0.658903)	1.251888* (0.655342)	1.285204** (0.642696)
WhiteBritish	-2.445666* (1.302153)	-2.37552** (1.199783)	-1.66445* (0.967674)	-1.73668** (0.88187)	-1.65291** (0.833364)	-1.64323** (0.838285)	-1.64111** (0.837516)	-1.61578** (0.78357)	-1.6038** (0.792896)	-1.68753** (0.793251)	-1.67893** (0.790574)
WhiteNonBritish	0.1386463 (1.338847)	0.148545 (1.334615)	-0.03916 (1.133546)	-0.05989 (1.130741)	-0.08249 (1.115916)	-0.07566 (1.144774)	-0.09611 (1.119425)				
Income	-0.4429667* (0.2316356)	-0.44365* (0.230714)	-0.45861** (0.209061)	-0.44977** (0.202333)	-0.44793** (0.20238)	-0.44075** (0.199407)	-0.43956** (0.198726)	-0.43487** (0.19095)	-0.43322** (0.188427)	-0.41784** (0.188807)	-0.41836** (0.188147)
Education	-0.4187334 (0.6287027)	-0.44168 (0.603559)	-0.22666 (0.52803)	-0.27136 (0.466123)	-0.263 (0.467876)	-0.21485 (0.395259)	-0.21566 (0.394563)	-0.21695 (0.393897)	-0.17452 (0.368419)	-0.17701 (0.367215)	-0.19386 (0.362042)

Significance: *** 1%, **5%, *10%

IntentionToUse	Model XII	Model XIII	Model XIV	Model XV	Model XVI	Model XVII	Model XVIII
Awareness	-1.35405* (0.762141)	-1.39636* (0.71649)	-1.51122** (0.697829)	-1.39906** (0.664531)	-1.23561* (0.640507)	-1.07294* (0.62631)	-1.12425* (0.575731)
HC_Waiting							
HC_HospComp							
HC_Clinical_Performance	0.742779** (0.375086)	0.752098** (0.366512)	0.764735** (0.359466)	0.849936** (0.336895)	0.898678*** (0.330463)	0.882219*** (0.326485)	0.944563*** (0.295874)
HC_CloseHome							
HC_Familiarity	-0.54233* (0.290214)	-0.51609* (0.276828)	-0.51594* (0.267087)	-0.49808** (0.25428)	-0.54864** (0.241671)	-0.60725*** (0.232756)	-0.61785*** (0.223936)
HC_FinPerform							
HC_GP_Reputation	0.828095** (0.359508)	0.814669** (0.348304)	0.797127** (0.315723)	0.747344** (0.300588)	0.739494** (0.296632)	0.611509** (0.268221)	0.595868** (0.259027)
HC_Access	0.173275 (0.246916)	0.15193 (0.238385)					
HC_PastExp							
SI_GP_Advice	-0.65977** (0.33332)	-0.62503** (0.322332)	-0.60416** (0.30826)	-0.59226** (0.297143)	-0.53056* (0.293969)	-0.56652* (0.29569)	-0.50096* (0.26816)
SI_HospStat	0.987615*** (0.337093)	0.995717*** (0.316308)	0.994115*** (0.31843)	0.92096*** (0.297078)	0.84345*** (0.284109)	0.921466*** (0.286705)	0.90438*** (0.276913)
SI_DoctorRating	0.263139 (0.308835)	0.230677 (0.295113)	0.333973 (0.255608)	0.375391 (0.251258)	0.552494** (0.228649)	0.475429** (0.213175)	0.500322** (0.214247)
SI_PastExp	-0.32261 (0.27318)	-0.36216 (0.269062)	-0.37955 (0.26113)	-0.33212 (0.252811)	-0.37862 (0.238344)		
SI_Family							
Reliable	0.958473*** (0.367147)	1.01697*** (0.358757)	0.949026*** (0.322317)	0.914138*** (0.311631)	0.816859*** (0.283659)	0.792445** (0.281111)	0.765322*** (0.267114)
DOC_Listens	1.810485** (0.908723)	1.824438** (0.852209)	1.719578** (0.791297)	1.664127** (0.768941)	1.862081** (0.739667)	1.698746** (0.704665)	1.762115*** (0.674643)
DOC_Time							
DOC_Explains	-2.87072*** (1.05123)	-2.81547*** (1.006082)	-2.67299*** (0.904423)	-2.66787*** (0.872004)	-2.74535*** (0.832484)	-2.53694*** (0.795942)	-2.53369*** (0.754888)
DOC_Friend	1.593912*** (0.617866)	1.540915*** (0.591173)	1.46116*** (0.561516)	1.384344*** (0.534861)	1.302343** (0.528824)	1.188568** (0.505959)	1.13078** (0.487777)
DOC_Trust							

Participation	0.684301** (0.344683)	0.693557** (0.331651)	0.603889** (0.289766)	0.577557** (0.281968)	0.5249* (0.276517)	0.446094* (0.26172)	0.433024* (0.256209)
SAT_C_GP	0.952641** (0.45077)	0.888207** (0.391233)	0.966883** (0.392334)	0.955362** (0.363593)	0.933933*** (0.355031)	0.875975** (0.342618)	0.85138*** (0.321651)
SAT_C_Hosp	1.98471*** (0.574437)	1.954144*** (0.556058)	1.932415*** (0.539056)	1.911218*** (0.517017)	1.863321*** (0.507577)	1.647233*** (0.479992)	1.389768*** (0.379117)
SAT_C_Doc	-1.06978* (0.575851)	-0.99994* (0.557385)	-0.9119* (0.531006)	-0.83629 (0.513876)	-0.71345 (0.470408)	-0.45209 (0.428856)	
SAT_C_Treatment	-1.07515** (0.481247)	-1.05954** (0.464941)	-1.08114** (0.45812)	-1.08222** (0.44724)	-1.05645** (0.439241)	-1.09415** (0.43443)	-1.25888*** (0.401232)
SAT_C_Time							
CB_AWARE							
CB_Use							
WEB_Access	-0.61963 (0.996695)						
AgeMatch	0.555876 (0.548903)	0.556183 (0.549439)	0.471949 (0.517743)				
GenderMatch	1.34958** (0.599521)	1.376749** (0.579511)	1.514943*** (0.554387)	1.57004*** (0.540893)	1.673178*** (0.530982)	1.634432*** (0.516775)	1.565512*** (0.493472)
WhiteBritish	-1.61082** (0.76516)	-1.5309** (0.649262)	-1.72099*** (0.619344)	-1.69463*** (0.590724)	-1.4476*** (0.551136)	-1.37653** (0.542948)	-1.312** (0.522632)
WhiteNonBritish							
Income	-0.36211** (0.16748)	-0.36542** (0.165261)	-0.36142** (0.163348)	-0.36243** (0.159068)	-0.39924*** (0.15215)	-0.41213*** (0.151761)	-0.43588*** (0.144619)
Education	-0.27091 (0.335256)	-0.26045 (0.313089)	-0.33076 (0.293814)	-0.29302 (0.287501)			

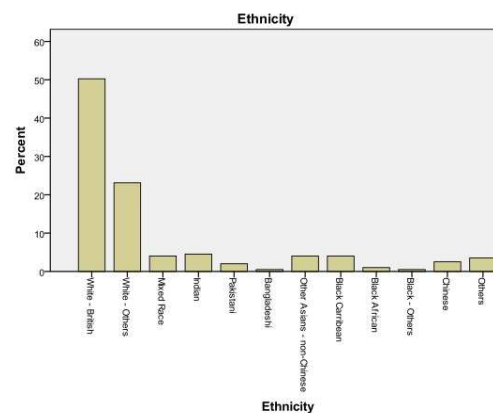
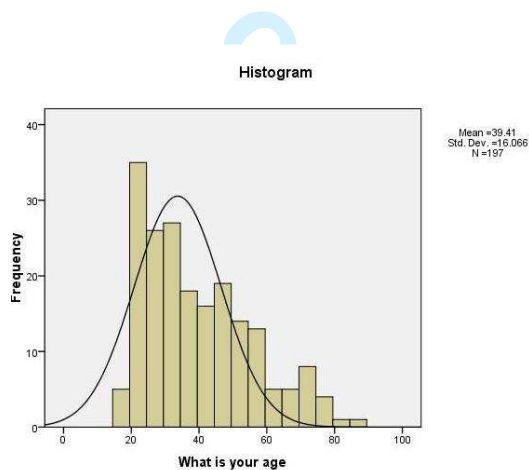
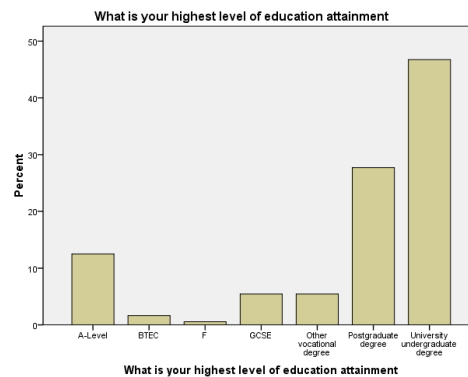
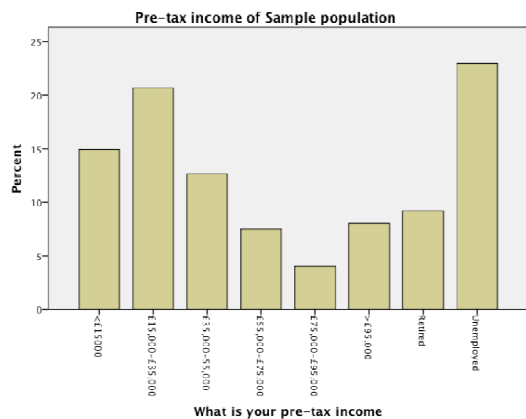
STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	8
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.



Figures 1 (a), (b), (c) and (d) (moving clockwise from top-left figure). Distribution of pre-tax income (a), highest level of attained education (b), ethnicity (c), and age (d) in the sample of respondents.



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A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stravopoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' awareness of, and intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's awareness of and willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining awareness of and intention to use the websites: the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on

1
2
3 doctor-ranking websites, though, are unlikely to be representative of the overall patients'
4 pool. In particular, they tend to over-represent opinions from young, non white British,
5 medium-low income patients who are not satisfied with their choice of the healthcare
6 treatments and the level of information provided by their GP. Accounting for differences
7 in the users' characteristics is important when interpreting results from doctor-rating sites.
8

9 **Key messages**

- 10 • The share of the general public which uses doctor-rating websites is still quite
11 low..
- 12 • Elderly, subjects with white British background, as well as subjects with higher
13 income are less likely to use doctor-rating websites.
- 14 • The GP-patient gender concordance is associated with higher awareness of, and
15 intention to use, the websites.
- 16 • Subjects who feel that their GP explains things clearly and is a valuable source of
17 clear information, are less likely to use online rating websites.
- 18 • Subjects who feel that they are more satisfied with the level of choice of healthcare
19 treatments are less likely to use online rating websites.
- 20
- 21
- 22

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INTRODUCTION

This study aims, first, at providing direct evidence on the extent to which doctor ratings websites are known and used among the general public in a borough of London. It also aims to directly provide some novel insight on what appear to be the most significant predictors of the fact that people are aware of, and willing to use, doctor-ratings websites.

Although direct evidence on both these aspects is scant, especially for the UK, doctor rating websites are often regarded as key innovations within the broader health policy agenda aiming at enhancing patients' choice.

Both the NHS Plan¹ and the NHS Improvement Plan², in fact, set out the changes required for the NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to shape a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement. This was with the aim of creating a patient-led service promptly responding and supporting patients' health needs.³

Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"⁴ acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community. This would involve empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Along this line, a number of initiatives have been introduced. In particular, *Choose and Book* is an IT service which allows patients needing an outpatient appointment to choose which hospital they are referred to by their GP, as well as the time and date of the appointment. *Choose and Book* was planned from 2003 as part of the National Program for IT (NPFIT), and has been progressively introduced from 2005 onwards. By 2009, 98% of GPs claimed to have used *Choose and Book* at some stage during the week, although only half of all secondary care appointments were being arranged using the system.⁵

A debate exists on whether *Choose and Book* has succeeded in actually increasing patient choice. A survey of 2,181 patients carried out in January 2009, for instance, found that only 46% were aware of having a choice of where to receive hospital care before attending their GP.⁶ This seems to naturally lead to the issue that the capability of making informed choices crucially depends on the availability of relevant information.

Key sources of information are doctor-rating websites. Websites such as *NHS Choices* and *Dr Foster Intelligence* are also a relatively recent phenomenon in the UK. Compared to other sources of healthcare information – such as official hospital statistics – these websites claim to be more user-friendly and easy to understand.

In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice in healthcare, as they potentially enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health and wellbeing.

1
2
3 In practice, however, relative little evidence is available on whether, and to what extent,
4 doctor-rating websites are actually known and actively used in the UK. A study by the
5 Kings Fund⁶ explored the information sources used by patients in making decisions about
6 where to receive care. Only 4% of the patients used the NHS Choices website, with the
7 majority instead drawing information from their own experiences (41%), advice from GP
8 (36%), advice from friends and family (18%), and other websites (1%). Similarly, a
9 national survey on patients' choice by the Department of Health found that the NHS
10 Choices website was only used by 5% of respondents.⁷ These figures are consistent with
11 the evidence from the US where usage of doctor rating websites is relatively more
12 diffused and established.^{8,9}
13

14
15 Moreover, very little is known about the profile of individuals who are more likely to
16 make active use of these sites. Appleby and Alvarez¹⁰ found that women in England desire
17 patient choice more than men (69% to 56%), suggesting that women may also be more
18 likely to use patient sources of information such as rating sites. This is in line with
19 findings from the US where women and younger adults are more active 'online health
20 information seekers'.¹¹
21

22
23 The apparently limited uptake of doctor rating sites in the UK calls into question how
24 effective the existing websites may be as information exchange platforms from and to
25 representative groups of patients.
26

27 Interventions that aim at enhancing the public engagement with health information on the
28 Internet, and the representativeness of the users providing feedback online, require a
29 thorough understanding of which characteristics drive the patients' awareness and use of
30 online health information such as the doctor-rating websites.¹²⁻¹⁴
31

32
33 The aim of this study is to contribute to fill these gaps by providing more direct evidence
34 to support decision-making.
35

36 **METHODS**

37
38 We conducted a self-administered survey to assess the extent and the determinants of i)
39 the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of
40 those websites; iii) the intention to use doctor-ratings websites in the future.
41

42
43 The field survey was considered the most appropriate administration mode to involve a
44 sample of respondents from the general population. An online survey, in fact, by
45 exclusively reaching the segment of active internet users, would have failed to address the
46 main goal of the study, whether the users of doctor-rating websites are fairly
47 representative of the general public.
48

49 **Questionnaire design**

50
51 Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain
52 an understanding of the practicalities associated with giving out questionnaires and
53 collecting responses. After listening to feedback from pilot respondents, and looking at
54 results from the pilot study, several changes were made to make the questionnaire easier to
55 understand. The changes related to content, phrasing and ordering of questions.
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3 The content of the final questionnaire was based on findings from the preliminary
4 literature review and was designed to have a number of sections (see Appendix for full
5 questionnaire). In particular, section A focuses on the awareness of online rating websites,
6 while section B assesses actual usage of online rating websites. Section C measures the
7 willingness to use the online rating websites in the future, and explores which aspects of
8 the healthcare providers and which sources of information are perceived as being
9 important factors in making decisions about where to receive healthcare. Section D
10 assesses the individual contribution to the online rating sites, while section E focuses on
11 aspects of the doctor-patient relationship and attitudes and dimensions of patient choice.
12 Finally section F controls for internet usage, while section G collects a broad range of
13 socio-demographic characteristics.
14

15
16 Closed questions were used, worded in a manner easy to understand. A limited number of
17 responses were provided, either with binary options (e.g. yes or no), or with a numerical
18 Likert scale ranging from 1 to 5, with a further option for “*Not sure*”.
19

20 A list of variables with a brief description is discussed in the Variables section and is
21 summarised in Table 1 in the Appendix.
22

23 **Ethical approval, informed consent and confidentiality of responses**

24
25 We completed the checklist for research ethics approval from Imperial College London.
26 As interviews were intended to be conducted in public places among respondents from the
27 general population, the study involved no risk or harm of any type to respondents, no link
28 with clinical data was expected to take place, and no incentives were going to be paid to
29 respondents, the study fitted all the criteria in the first stage checklist with no further
30 formal application to the Imperial College Research Ethics Committee.
31
32

33
34 At the beginning of each interview, interviewers showed credentials as research assistants
35 at the University of London, informed respondents that their answers were anonymous
36 and would remain strictly confidential, and that all responses and data were going to be
37 treated statistically and used for the purposes of scientific research only. Informed consent
38 by respondents was then given at the beginning of each interview.
39
40

41 **Sample**

42
43 The survey was conducted in the field by the researchers involved in the paper. The
44 borough of Hammersmith and Fulham was chosen for the location of the field survey
45 because it is a transport hub in Central West London, and hosts many offices and several
46 major business centres. The four interviewers went to different public locations within the
47 borough (underground stations, high street and residential areas) at different times during
48 the day (early morning, midday and in the evening) and in different days of the week
49 (including weekends). By covering different times and locations within the borough, we
50 aimed at being able to approach both working and non-working members of the public.
51 During the surveys in the field, the interviewers approached every third male and third
52 female that would pass by them. A target of 200 respondents was envisaged, which was
53 readily achieved, since only 68 subjects who were initially approached refused to take part
54 to the survey, with a final response rate of 74%.
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Statistical analysis

We have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

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3 Descriptive statistics of all the dependent and independent variables for the resulting
4 sample of respondents to our survey are provided in detail in Table 1, and here we briefly
5 report their main aspects. As a result of the convenience sampling, our resulting sample
6 consisted in 141 workers (ten of which reported to be currently unemployed), 33 students,
7 nine officially unemployed and six retired subjects. Eleven respondents did not report
8 their working status.
9

10
11 As common in field surveys of this type, the convenience sampling tended to over-
12 represent respondents who were currently not working, or were at home, and thus had
13 time to fill out the questionnaire: the proportion of subjects who were not currently
14 working, as given by the sum of the respondents who reported to be unemployed, retired,
15 or students, indeed amounts to 29% of the sample.
16

17
18 Related to that, it turned out that 9.5% of the respondents in our sample were currently
19 unemployed, compared to only 5% from the Census data for the borough. The relatively
20 higher proportion of unemployed respondents may also be a result of the convenience
21 sampling method. Moreover, an unemployment rate higher than the one documented in
22 the 2001 Census survey was largely expected, due to the consequences of the economic
23 and financial crisis after 2007.
24

25
26 Comparing the sample with the Census data for the borough the mean age of our sample
27 was slightly older than that for the borough (39.57 years compared to 35.2 years).¹⁵ Our
28 sample however was closer to the national mean age of 38.5 years. The range of ages
29 seems to show a positive skew, with a greater frequency of people aged 40 years and
30 under. This is consistent with the 2001 census data for Hammersmith and Fulham which
31 showed the borough contained a larger proportion of young people aged 20-29 (23.8%)
32 than the rest of England (12.66%) (ONS, 2001).¹⁵ Age is an important demographic to
33 consider when analysing our results as age has been shown to be important in internet
34 usage.¹¹
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37 Also, the sample had a slightly greater proportion of females than the borough (54.44% to
38 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared
39 to 58% for the borough).¹⁵ This is also significantly lower than figures for England, White
40 British accounting for 87% of the population.¹⁵ The sample contained 28.99% non white
41 respondents. This is higher than the 2001 census data for Hammersmith and Fulham
42 which was 22% and significantly higher than the figures for England, showing non white
43 ethnic groups accounting for 9% of the total population.¹⁵ Our sample, therefore, allows
44 controlling for high heterogeneity in ethnic background even with a limited sample size.
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46
47 The majority of actively working respondents reported an income within the £15-35,000
48 bracket. Income is an important variable to control for in the analysis, as previous
49 literature found that patients using the Internet were more educated and had higher
50 incomes.¹⁶
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53 Our sample had a high percentage of people with higher level qualifications: 46.24% of
54 the sample had a university degree and 27.96% had a postgraduate degree. This is
55 reflective of Hammersmith and Fulham, where 45% of the population have a qualification
56 of degree level or higher, a figure which is significantly higher than in England, where
57 only 19.8% have a degree or higher qualification.¹⁵
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Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.⁶

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).¹⁷

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 3 in here]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings, perhaps signalling that those respondents may be more familiar with alternative sources of information.

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio. This may signal the possible existence of 'complementary' effects between the two sources of information, according to which individuals who give importance to hospital statistics are also more likely to actively seek for doctor rating websites.

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3 Furthermore, although in one specification the respondents who feel that their GPs spend a
4 sufficient time in their consultation are less likely to be aware of the internet rating
5 websites, both the statistical significance and the estimated odds ratio do not appear robust
6 across specifications. Although all other variables on doctor-patient relationship were not
7 significant, whenever included among the regressors, the gender match between the GP
8 and the patient predicts higher awareness of the website ratings, with a noticeable effect as
9 evident by the reported value of the odds ratio.
10

11 From those that were aware of the existence of doctor-rating websites only 6 have
12 reported to have used these websites. In light of this low usage rate, and of the consequent
13 limitations of conducting statistical estimations with very little variation in the dependent
14 outcomes, we have thus focused the rest of the analysis on the determinants of the
15 intention to use, rather than actual usage of, doctor rating websites.
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20 **Results on the likelihood to use online rating websites**

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22 In Table 4 we present the estimate results of six different specifications of the ordered
23 logistic regression for the dependent variable *IntentionToUse* with different sets of
24 regressors, which are presented in terms of the odds ratio, together with the standard
25 errors, and levels of significance.
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28 **[Table 4 in here]**

29
30 Concerning socio-demographic variables, it turns out that white British, as well as
31 respondents who reported income in higher brackets, said they were less likely to use
32 doctor-rating websites. Moreover, we do not find any effect of education, age and gender
33 of the respondents on the likelihood of their intention to use (the results of the
34 specifications including the age and gender variables are not reported in the table for the
35 sake of space but are available from the authors upon request).
36
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38 Looking at the characteristics of the healthcare providers that respondents perceived as
39 important while making decisions where to receive healthcare, our data suggest that those
40 who consider clinical performance and doctor reputation (in most specifications) as
41 important factors, are more likely to use doctor-rating websites. These results are
42 consistent with the nature of the information provided in these websites. Also, and quite
43 intuitively, subjects who consider the familiarity with their doctor an important factor to
44 decide where to seek healthcare, tend to be less likely to intend to use websites.
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47 Concerning the role of the different sources of information on the decisions of where to
48 seek healthcare, respondents who see published hospital statistics as important sources of
49 information are more likely to use the rating websites. On the other hand, and
50 interestingly, those for whom GP advice is an important source of information for decision
51 making are less likely to use doctor-rating websites.
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54 Also the nature of the doctor-patient relationship seems to play a key role in explaining
55 whether respondents intend to use online rating websites. First, patients with GPs of the
56 same gender tend to be more likely to use the websites. Second, respondents for whom the
57 doctor is able to listen to them, and who perceive the nature of the relationship with their
58 GP as friendly, also tend to be more likely to use the websites. Third, respondents who
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feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the determinants of the awareness of doctor rating websites; ii) the actual usage of the websites; and iii) the determinants of the intention to use them in the future.

Awareness

As for the determinants of being aware of the doctor rating websites, we see the significant and positive effect by the gender match between the GP and the patient as a particularly interesting finding. The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.¹⁸ If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Actual usage

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply be because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund⁶ that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.⁷

The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.⁹ analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.⁸ also reported a low average number of ratings per physician.

Intention to use

The result that shows that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature^{16,19,20} and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.¹² As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patient sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).¹⁰ Both results differ from the findings from the US, where women and younger adults are more active 'online health information seekers'.¹¹

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.¹⁹ This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a "substitute relationship" is consistent with previous evidence by Diaz and colleagues¹⁶ that found that 11% of their respondents said they would rather use the Internet 'instead of seeing or speaking with their doctors', and that 59% of respondents 'did not discuss information with their doctors'. It also seems in line with the study by McMullan¹⁹ that indicates that patients who become dissatisfied with the information

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3 provided to them by the health professionals are more likely to seek confirmation of the
4 information given and additional information on the Internet.

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6 As for the other aspects of the patient-doctor relationship, the finding that the more
7 autonomous patients are in their healthcare decisions, the more willing they are to use the
8 rating websites is also consistent with previous evidence: a study by McMullan¹⁹, for
9 instance, reports that patients would seek health information before a consultation 'to
10 manage their own healthcare independently'. These may be the type of people who are
11 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive
12 in consultations.²¹

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15 Moreover, the positive association between willingness to use doctor rating websites and
16 levels of satisfaction with the level of choice of GP, and of outpatient appointments in the
17 hospital, can be considered as reinforcing the above discussed interpretation that some
18 dimensions of the doctor-patient relationship may be "complementary" with online
19 information. For instance, patients who are more satisfied with their GP because they feel
20 the latter is more friendly and empathic may also be more likely to engage more actively
21 with health and healthcare information more generally. These results, together with the
22 finding that the respondents who are more satisfied with the level of choice of treatments
23 are less likely to use the websites, suggest that the choice of doctors and providers may be
24 seen as only instrumental for the choice of treatment, and therefore respondents that are
25 happy with treatment choice levels are less likely to shop around for different doctors'
26 opinions.
27
28

29 **General discussion**

30
31 Overall, our evidence on the determinants of both awareness and intention to use is
32 broadly consistent with recent findings from the literature. Indeed, a study by Stevenson
33 and colleagues²² shows that although patients use the Internet increasingly more, they
34 show no intention of doing so with the aim of disrupting the existing balance of roles
35 during the doctor-patient consultation. They all mentioned the Internet as an additional
36 resource of health and healthcare information. Other evidence suggests that patients with
37 hypertension who search for more information on the Internet, in addition to that they
38 receive from their doctor, may be more engaged in their treatment, and therefore more
39 willing to adhere to medication prescribed by them.²³
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43 Our findings that online information can be used not only as "substitute" but also, and
44 perhaps mainly, as "complementary" to several dimensions of the doctor-patient
45 relationship do not seem to entail any particular evidence suggesting that online ratings
46 may put in danger the doctor-patient relationship, an important aspect which has been
47 raised in the literature.^{24,25}
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49
50 The "complementarity" findings, in particular, seem consistent with the evidence from the
51 US which shows that the vast majority of the reviews by patients are generally rather
52 positive.^{8,9,26} Taken together, this evidence can be seen as providing little support to the
53 related concern that the likeliest to use online ratings and enter actual comments may be
54 the most disgruntled patients.²⁷
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57 On a related topic, concerns have been expressed about the ability of online ratings to
58 truly reflect the quality of care. A recent UK study, however, demonstrated a strong
59 relationship between the ratings reported online and more objective measures of clinical
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3 quality such as mortality and infection rates,²⁸ while another study showed that online
4 ratings were associated with ratings derived from a traditional paper-based survey.²⁹
5 Online ratings, thus, do not seem to provide systematically biased or misleading
6 information regarding the health care that patients receive, at least not more than a
7 traditional survey would do. Consistently with this evidence, our results seem to support
8 the idea that patients may see online ratings as a supplementary information base to be
9 used in support of direct interaction with their doctor, which remains the most significant
10 and reliable information channel.³⁰
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13 More generally, the evidence provided by our study confirms that the actual usage of
14 doctor-rating websites in the UK remains particularly low. In our sample only 29
15 respondents out of 200 were aware of the existence of the patient rating websites. Among
16 these, however, only 6 subjects reported they were actually using those websites.
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18 While these figures are substantially in line with previous evidence brought forward from
19 the literature,^{6,7} considered together these results may pose serious concerns on the reasons
20 and consequences of the lack of patient awareness and usage.
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23 Previous studies in the US have reported a number of reasons behind this slow uptake,
24 including i) the preference for more traditional information channels, such as
25 recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact
26 that people do not recognise that the quality of care may vary.²⁵
27

28 Our study confirms that not only awareness of rating websites is still limited among the
29 general public in the UK, but awareness per se does not seem a sufficient condition to
30 guarantee active usage. This poses a double challenge from a clinician and health policy
31 perspective.
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34 In fact, on the one hand, the documented correlation between online ratings and other
35 measures of healthcare quality, including survey-based ratings and clinical quality
36 indicators,^{28,29} necessarily requires that patients have already gone through two
37 preliminary hurdles, namely i) being aware of, and ii) being active users of the doctor
38 rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare
39 quality, the effective removal of this double hurdle is likely to become the next priority to
40 guarantee the full spread of online rating website.
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43 On the other hand, while appropriate online and offline informational campaigns are likely
44 to overcome the first hurdle, thus effectively raising patients' awareness of online ratings
45 as a potential source of information on provider quality, informational campaigns alone
46 can fail to effectively trigger changes in behaviour. Alike in several other health contexts,
47 in fact, 'nudging' behaviour may be difficult as a mere consequence of accessing more
48 information.
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51 If this is the case, other avenues should be explored to increase the active usage of rating
52 websites by patients who are already aware of them. For instance, the evidence brought
53 forward by the present study confirms the importance of the doctor-patient relationship as
54 a factor determining individuals' awareness of and willingness to use online ratings^{25,31-34}
55 and suggests that tailored behavioural interventions based on the doctor-patient
56 relationship have the potential to help patients to overcome this last hurdle and actively
57 engage with online ratings.
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Limitations of the study

While dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. In a sample of the general public from a borough of London only 29 respondents out of 200 were aware of the existence of the patient rating websites, and only 6 reported to be actually using those websites.

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study also explicitly explores the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

Among other results, the statistical analysis provides evidence that the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

When the outcome of a consultation does not satisfy the patient, the use of Internet fills the gap of information needs. The intention to use online doctor-rating websites in this case also indicates that these patients are likely to look at these websites with the aim of seeking for another clinician. Individuals who are satisfied with their GPs may also search these websites, but more as an additional information channel as they seem keener to engage more actively with health and healthcare information in general.

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4 The findings of our study thus contribute also to the wider debate on the inter-
5 relationships between Internet usage and the doctor-patient relationship.^{8,25,26, 31-34} The
6 argument, sometimes addressed by the previous literature, that information on the Internet
7 can threaten the trust relationship and the balance of roles between doctors and patients,
8 seems a concern which is not supported by our evidence. If any, a potential challenge to
9 the doctor-patient relation can only affect the patients who already feel dissatisfied with
10 the ability of their doctor to listen to them and provide them enough information regarding
11 their condition, or with the level of their choice for healthcare treatments.
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14 The above, however, can hardly be seen as a serious threat by those who advocate a
15 greater choice by patients. On the contrary, if the latter is indeed a priority in the health
16 policy agenda, online information on healthcare providers should be seen as a challenging
17 opportunity to enhance patients' choice in healthcare, and public engagement with health
18 information, especially for the less favoured segments of the population. Indeed, our
19 findings suggest that subjects of non-white background and with lower income are more
20 willing to use online ratings.
21

22
23 Finally, our study highlights that subjects who use doctor rating websites are unlikely to
24 be representative of the overall patients' pool. In particular, they tend to over-represent
25 opinions from young, non-white British, medium-low income patients who are not
26 satisfied with their choice of healthcare treatments. Accounting for differences in the
27 users' characteristics is important when interpreting results from doctor-rating sites and
28 when informing interventions that aim at enhancing the public engagement with health
29 information on the Internet, and the representativeness of the users who seek and provide
30 feedback online.
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35 **Data sharing:** technical appendix, statistical code and dataset available from the
36 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
37 obtained but the presented data are anonymised and risk of identification is low.
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40 All authors had full access to all the data in the study and take responsibility for the
41 integrity of the data and the accuracy of the data analysis.
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44 **Funding:** this piece of work has not received any specific funding.
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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (<i>Awareness</i>) (0=no, 1=yes)	200	0.142	0.350
Intention to use (<i>IntentionToUse</i>)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (<i>HC_Waiting</i>)	198	3.818	1.165
Rates of hospital-acquired complications (<i>HC_HospComp</i>)	188	3.761	1.193
Clinical performance (<i>HC_Clinical_Performance</i>)	189	4.037	1.136
Closeness to home (<i>HC_CloseHome</i>)	200	3.683	1.265
Familiarity with the doctor (<i>HC_Familiarity</i>)	194	3.237	1.306
Financial performance of the hospital (<i>HC_FinPerform</i>)	191	2.387	1.164
Reputation of the doctor (<i>HC_GP_Reputation</i>)	199	3.980	1.137
Accessibility and parking facilities (<i>HC_Access</i>)	192	2.656	1.321
Past experience with the provider (<i>HC_PastExp</i>)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (<i>SI_GP_Advice</i>)	198	4.071	1.030
Published hospital statistics (<i>SI_HospStat</i>)	183	2.934	1.193
Online doctor rating websites (<i>SI_DoctorRating</i>)	178	2.315	1.204
Personal experiences in the past (<i>SI_PastExp</i>)	192	4.234	1.004
Feedback from family/friends (<i>SI_Family</i>)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (<i>DOC_Listens</i>)	200	0.575	0.496
...has time (0=no, 1=yes) (<i>DOC_Time</i>)	200	0.410	0.493
...explains (0=no, 1=yes) (<i>DOC_Explains</i>)	200	0.555	0.498
...is friendly (0=no, 1=yes) (<i>DOC_Friend</i>)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (<i>DOC_Trust</i>)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (<i>Reliable</i>)	141	2.759	1.055
How actively do you participate with your GP in making decisions (<i>Participation</i>)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (<i>SAT_C_GP</i>)	173	3.451	1.138
...hospital (<i>SAT_C_Hosp</i>)	152	3.493	1.055
...doctor (<i>SAT_C_Doc</i>)	139	3.252	1.022
...treatment (<i>SAT_C_Treatment</i>)	148	3.554	0.928
...time spent (<i>SAT_C_Time</i>)	168	3.179	1.123

Ethnicity				
White British (0=no, 1=yes) (WhiteBritish)	200	0.488	0.501	
White Other (0=no, 1=yes) (WhiteNonBritish)	200	0.222	0.417	
Highest level of educational attainment* (Education)				
1 if GCSE	12			
2 if A-Level/BTEC/Vocational	36			
3 if University undergraduate degree	86			
4 if Postgraduate Degree	52			
Age (years) (Age)	199	39.572	16.083	
Gender (Gender)				
Female (=1)	112			
Male (=0)	88			
Income (Income)				
0	40			
<£15000 but >0	27			
£15,000-£35,000	36			
£35,000-55,000	22			
£55,000-£75,000	14			
£75,000-£95,000	7			
>£95,000	14			
Doctor-patient concordance				
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (AgeMatch)	200	0.333	0.473	
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (GenderMatch)	200	0.444	0.498	

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		DOC_Friend	0.0127 (0.8599)	-0.0984 (0.1667)
Awareness	0.0846 (0.2359)	1	DOC_Trust	-0.0288 (0.6899)	-0.0388 (0.5863)
HC_Waiting	0.1617** (0.025)	0.016 (0.8236)	Participation	0.0412 (0.5678)	0.0189 (0.7911)
HC_HospComp	0.1474** (0.0465)	-0.0033 (0.9643)	SAT_C_GP	-0.0419 (0.591)	0.122 (0.1108)
HC_Clinical_Performance	0.2146*** (0.0034)	-0.0784 (0.2849)	SAT_C_Hosp	-0.003 (0.9715)	0.1024 (0.2111)
HC_CloseHome	-0.0623 (0.3848)	-0.0998 (0.1587)	SAT_C_Doc	-0.0348 (0.6909)	0.137 (0.1077)
HC_Familiarity	-0.0078 (0.9153)	-0.0752 (0.2986)	SAT_C_Treatment	-0.0157 (0.8526)	0.0932 (0.2598)
HC_FinPerform	0.1253** (0.0884)	0.1435** (0.0482)	SAT_C_Time	-0.0239 (0.7632)	0.0541 (0.4878)
HC_GP_Reputation	0.2020*** (0.0047)	-0.016 (0.8234)	CB_AWARE	-0.0381 (0.5972)	0.2997*** (0)
HC_Access	0.0451 (0.5399)	0.1196* (0.0992)	CB_Use	0.0996 (0.1651)	0.054 (0.4477)
HC_PastExp	0.0978 (0.182)	-0.0244 (0.7369)	WEB_Access	0.2054*** (0.0041)	0.1197* (0.0923)
SI_GP_Advice	0.1054 (0.1457)	0.0163 (0.8202)	AgeMatch	0.1373* (0.0532)	0.0695 (0.3234)
SI_HospStat	0.2937*** (0.0001)	0.1159 (0.1192)	GenderMatch	0.2077*** (0.0032)	0.1472** (0.0357)
SI_DoctorRating	0.3759*** (0)	0.1240* (0.099)	WhiteBritish	-0.0429 (0.5477)	-0.0662 (0.3468)
SI_PastExp	0.0563 (0.4455)	-0.0803 (0.2696)	WhiteNonBritish	-0.0017 (0.9809)	-0.0853 (0.2252)
SI_Family	0.1215* (0.0958)	-0.0511 (0.4804)	Income	0.012 (0.8818)	-0.1219 (0.1246)
Reliable	0.3429*** (0)	-0.0311 (0.7153)	Education	-0.0103 (0.8913)	0.0023 (0.9757)
DOC_Listens	0.0629 (0.3824)	-0.0888 (0.2122)	Gender	0.0315 (0.6614)	-0.0087 (0.9029)
DOC_Time	0.1565** (0.0289)	-0.0117 (0.87)	Age	-0.1081 (0.1344)	-0.1918*** (0.0068)
DOC_Explains	0.0968 (0.1784)	0.0152 (0.8314)			

P-Values in parentheses. * p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses

* p<.10, ** p<.05, *** p<.01

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974	2.561	2.000	2.782	1.051	0.946
	(2.377)	(2.953)	(1.965)	(2.613)	(0.818)	(0.729)
GenderMatch	18.42*	12.03*	10.45**	10.39**	16.67***	14.83***
	(30.24)	(17.75)	(12.33)	(10.54)	(15.48)	(13.17)
Awareness	0.0531	0.0505	0.0964	0.0758**	0.159*	0.147*
	(0.108)	(0.0971)	(0.149)	(0.0985)	(0.176)	(0.152)
HC_Clinical_Performance	9.289*	7.659*	5.560**	3.401*	4.395**	4.985***
	(11.84)	(8.241)	(4.759)	(2.253)	(2.653)	(2.734)
HC_Familiarity	0.359	0.468	0.371*	0.414*	0.355**	0.351***
	(0.287)	(0.282)	(0.220)	(0.206)	(0.147)	(0.141)
HC_GP_Reputation	2.328	2.827	3.608*	4.410**	2.903**	2.776**
	(1.980)	(2.106)	(2.542)	(2.753)	(1.374)	(1.260)
SI_GP_Advice	0.170*	0.223	0.238**	0.283**	0.344**	0.396*
	(0.173)	(0.206)	(0.167)	(0.176)	(0.186)	(0.193)
SI_HospStat	14.26**	13.74**	7.220***	6.550***	5.371***	5.133***
	(18.84)	(15.60)	(5.008)	(4.200)	(2.932)	(2.703)
SI_DoctorRating	1.596	1.067	1.424	1.461	2.245**	2.312**
	(1.636)	(0.958)	(0.851)	(0.770)	(0.835)	(0.876)
Reliable	6.181	8.682*	6.492**	7.586***	4.457***	4.061***
	(7.691)	(9.969)	(4.993)	(5.561)	(2.351)	(2.003)
DOC_Listens	141.9*	51.44	44.20*	27.05**	22.03**	22.98**
	(424.8)	(126.4)	(90.99)	(41.26)	(28.29)	(28.34)
DOC_Explains	0.00690*	0.00680**	0.00509**	0.00695***	0.0120***	0.0124***
	(0.0183)	(0.0148)	(0.0105)	(0.0124)	(0.0171)	(0.0169)
DOC_Friend	12.88	8.375	16.48**	19.66***	8.718**	7.781**
	(29.23)	(14.65)	(22.41)	(22.45)	(8.047)	(6.896)
Participation	5.473*	5.818*	5.171**	4.162**	2.349*	2.228*
	(5.255)	(5.410)	(3.664)	(2.687)	(1.126)	(1.036)
SAT_C_GP	17.03*	8.038	6.593*	5.410**	4.692**	4.377***
	(27.58)	(10.23)	(6.659)	(4.048)	(2.889)	(2.484)
SAT_C_Hosp	21.93**	22.86**	30.01***	34.38***	17.95***	11.11***
	(33.71)	(30.90)	(33.63)	(35.43)	(15.52)	(7.578)
SAT_C_Treatment	0.0515**	0.0561**	0.111**	0.147**	0.145**	0.111***
	(0.0764)	(0.0794)	(0.106)	(0.125)	(0.111)	(0.0788)
WhiteBritish	0.0137*	0.0409*	0.0542**	0.0539**	0.0909**	0.105**
	(0.0318)	(0.0738)	(0.0782)	(0.0690)	(0.0890)	(0.0973)
Income	0.416*	0.382**	0.449**	0.513**	0.476***	0.462***
	(0.190)	(0.162)	(0.154)	(0.154)	(0.129)	(0.120)
SAT_C_Doc	0.242	0.243	0.148*	0.135*	0.427	
	(0.468)	(0.374)	(0.161)	(0.144)	(0.321)	
SI_PastExp	0.670	0.590	0.535	0.551		
	(0.787)	(0.650)	(0.576)	(0.250)		

Education	0.486	0.583	0.683	0.610		
	(0.526)	(0.554)	(0.443)	(0.328)		
HC_Access	1.046	1.124	1.241	1.347		
	(0.659)	(0.678)	(0.564)	(0.565)		
HC_PastExp	1.030	0.914	0.930			
	(0.578)	(0.487)	(0.397)			
SI_Family	1.208	1.305	1.439			
	(1.357)	(1.484)	(1.458)			
DOC_Time	1.223	2.099	2.594			
	(2.118)	(3.261)	(3.547)			
DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09*	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	**					
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School



We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called “Choose & Book” which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King’s College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

Yes No (if No, skip ahead to Section C)

Other (please specify).....

Q2. How did you find out about these sites?

Family/Friends Doctor

The Media Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes No (if No, skip ahead to Section C)

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis Only before/after an appointment Rarely

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes No

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information Negative information

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these	<input type="checkbox"/>				

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

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3 **Q11. To what extent do you think that the online rating of doctors by patients is a reliable**
4 **measure of a doctor's performance?** Please circle the most appropriate number on a scale of 1 to 5
5 (1=very unreliable, 5=very reliable)
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8 1 2 3 4 5 Not sure

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13 **Q12. If you have not used these websites before, how likely do you feel you will use them in**
14 **the future?**

15 Not likely Quite likely Likely
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20 SECTION D

21
22 **Q13. These websites are based on patient input. Individuals can provide feedback based on**
23 **their own experiences. Considering this, when would you be most likely to contribute to the**
24 **online site?** Tick all that apply.

- 25 Every time
26 After particularly positive experiences only
27 After particularly negative experiences only
28 After both positive and negative experiences
29 Never
30 Not sure

31
32 **Q14. Out of the following what would be your motive for any contributions that you make to**
33 **an online doctor rating site?** Tick all that apply.

- 34 I would not contribute to these websites
35 To inform other patients
36 To improve standards of care in the NHS
37 As a method of complaint
38 In appreciation of a doctor's service
39 Not sure
-

40 SECTION E

41
42 **Q15. Which of the following attributes would you use to describe your GP?** Tick all that apply.

- 43 I feel my doctor listens to my problems
44 I feel my doctor spends enough time with me in each consultation
45 I feel my doctor explains things clearly
46 I feel my doctor is sociable and friendly
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- I feel that I can trust my doctor's opinions
 None of the above

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Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

- My doctor always makes decisions for me
 I like to know the options available but still let my doctor decide for me
 My doctor and I make the decisions together
 I make decisions for myself, after considering the advice of my GP
 I always make my own decisions, independently of the advice of my GP
 I make decisions with my parents/spouse/relatives

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Q17. Within your GP practice do you always want to see the same GP for an appointment?

- I always request to see the same GP
 I don't mind which doctor I see.

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Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = of no importance, 5 = very important) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of treatment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of appointment time	1	2	3	4	5	Not sure	<input type="checkbox"/>

(for primary & secondary care)

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Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>

Choice of doctor for outpatient appointment 1 2 3 4 5 Not sure

Choice of treatment 1 2 3 4 5 Not sure

Choice of appointment time (for primary & secondary care) 1 2 3 4 5 Not sure

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

Yes No

Q21. Have you used this Choose and Book system in the past?

Yes No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

- I have never used Choose & Book
- My doctor always makes decisions for me
- I like to know the options available but still let my doctor decide for me
- My doctor and I make the decisions together
- I make decisions for myself, after considering the advice of my GP
- I always make my own decisions, independently of the advice of my GP
- I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

- Routine outpatient consultation
- Day-case procedure/surgery
- Major surgery
- None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

Yes No

Q25. Have you used the internet in the past to search for health information?

Yes No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

- I'm too busy to have the time to use them
- The sites are not a reliable source of information
- It is difficult to interpret the information provided
- I already have enough information from other sources to make choices
- I don't have access to the internet
- I did not know these websites existed
- I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

- Shopping websites (e.g. Amazon)
- Holiday websites (e.g. TripAdvisor)
- Car insurance websites (e.g. Compare The Market)
- Restaurants/venue websites (e.g. ViewLondon)
- Film websites (e.g. Rottentomatoes)
- Other (please specify).....
- I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- Star-rating out of 5
- Percentage scores
- Thumbs Up/Down
- Written comments from patients/users
- No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age?

Q30. What is your gender?

Male Female

Q31. How would you describe your ethnicity?

<input type="checkbox"/>	White – British	<input type="checkbox"/>	Other Asian – non-Chinese
<input type="checkbox"/>	White – Others	<input type="checkbox"/>	Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. What is your postcode?

Q33. How many other individuals do you live with?

Q34. Do you live with your parents?

Yes No

Q35. What is/was your profession?

Unemployed Retired

Q36. What is your level of pre-tax income?

0
 <£15000 but >0 £15,000-£35,000
 £35,000-55,000 £55,000-£75,000
 £75,000-£95,000 >£95,000

Q37. What is your highest level of educational attainment?

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

0 times 1-3 times
 4-5 times More than 5 times

Q39. What is the sex of your GP?

Male Female

Q40. How old is your GP?

<30 years
 30-50 years
 >50 years

Q41. What is the ethnicity of your GP?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

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	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP.

This is the end of the questionnaire, thank you for your time.



For peer review only

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stravopoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stravopoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low, ~~although significantly higher than what previously documented by the literature.~~
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' awareness of, and intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's awareness of and willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from it took place in one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people aware of, and willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining awareness of and intention to use the websites: the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

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3 **Conclusions:** Online rating websites can play a major role in supporting patients'
4 informed decisions on which health care providers to seek advice from, thus potentially
5 fostering patients' choice in health care. Subjects who seek and provide feedback on
6 doctor-ranking websites, though, are unlikely to be representative of the overall patients'
7 pool. In particular, they tend to over-represent opinions from young, non white British,
8 medium-low income patients who are not satisfied with their choice of the healthcare
9 treatments and the level of information provided by their GP. Accounting for differences
10 in the users' characteristics is important when interpreting results from doctor-rating sites.
11

12 **Key messages**

- 14 • The share of the general public which uses doctor-rating websites is still quite
15 low, ~~although significantly higher than what previously documented by the~~
16 ~~literature.~~
- 17 • Elderly, subjects with white British background, as well as subjects with higher
18 income are less likely to use doctor-rating websites.
- 19 • The GP-patient gender concordance is associated with higher awareness of, and
20 intention to use, the websites.
- 21 • Subjects who feel that their GP explains things clearly and is a valuable source of
22 clear information, are less likely to use online rating websites.
- 23 • Subjects who feel that they are more satisfied with the level of choice of healthcare
24 treatments are less likely to use online rating websites.
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INTRODUCTION

This study aims, first, at providing direct evidence on the extent to which doctor ratings websites are known and used among the general public in a borough of London. It also aims to directly provide some novel insight on what appear to be the most significant predictors of the fact that people are aware of, and willing to use, doctor-ratings websites.

Although direct evidence on both these aspects is scant, especially for the UK, doctor rating websites are often regarded as key innovations within the broader health policy agenda aiming at enhancing patients' choice.

Both the NHS Plan¹ and the NHS Improvement Plan², in fact, set out the changes required for the NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to shape a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement. This was with the aim of creating a patient-led service promptly responding and supporting patients' health needs.³

Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"⁴ acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community. This would involve empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Along this line, a number of initiatives have been introduced. In particular, *Choose and Book* is an IT service which allows patients needing an outpatient appointment to choose which hospital they are referred to by their GP, as well as the time and date of the appointment. *Choose and Book* was planned from 2003 as part of the National Program for IT (NPfIT), and has been progressively introduced from 2005 onwards. By 2009, 98% of GPs claimed to have used *Choose and Book* at some stage during the week, although only half of all secondary care appointments were being arranged using the system.⁵

A debate exists on whether *Choose and Book* has succeeded in actually increasing patient choice. A survey of 2,181 patients carried out in January 2009, for instance, found that only 46% were aware of having a choice of where to receive hospital care before attending their GP.⁶ This seems to naturally lead to the issue that the capability of making informed choices crucially depends on the availability of relevant information.

Key sources of information are doctor-rating websites. Websites such as *NHS Choices* and *Dr Foster Intelligence* are also a relatively recent phenomenon in the UK. Compared to other sources of healthcare information – such as official hospital statistics – these websites claim to be more user-friendly and easy to understand.

In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice in healthcare, as they potentially enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health and wellbeing.

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In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK. A study by the Kings Fund⁶ explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.⁷ These figures are consistent with the evidence from the US where usage of doctor rating websites is relatively more diffused and established.^{8,9}

Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez¹⁰ found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.¹¹

The apparently limited uptake of doctor rating sites in the UK calls into question how effective the existing websites may be as information exchange platforms from and to representative groups of patients.

Interventions that aim at enhancing the public engagement with health information on the Internet, and the representativeness of the users providing feedback online, require a thorough understanding of which characteristics drive the patients' awareness and use of online health information such as the doctor-rating websites.¹²⁻¹⁴

The aim of this study is to contribute to fill these gaps by providing more direct evidence to support decision-making.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study, whether the users of doctor-rating websites are fairly representative of the general public.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

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4 The content of the final questionnaire was based on findings from the preliminary
5 literature review and was designed to have a number of sections (see Appendix for full
6 questionnaire). In particular, section A focuses on the awareness of online rating websites,
7 while section B assesses actual usage of online rating websites. Section C measures the
8 willingness to use the online rating websites in the future, and explores which aspects of
9 the healthcare providers and which sources of information are perceived as being
10 important factors in making decisions about where to receive healthcare. Section D
11 assesses the individual contribution to the online rating sites, while section E focuses on
12 aspects of the doctor-patient relationship and attitudes and dimensions of patient choice.
13 Finally section F controls for internet usage, while section G collects a broad range of
14 socio-demographic characteristics.

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17 Closed questions were used, worded in a manner easy to understand. A limited number of
18 responses were provided, either with binary options (e.g. yes or no), or with a numerical
19 Likert scale ranging from 1 to 5, with a further option for “Not sure”.

20
21 A list of variables with a brief description is discussed in the Variables section and is
22 summarised in Table 1 in the Appendix.

23 24 25 **Ethical approval, informed consent and confidentiality of responses**

26
27 We completed the checklist for research ethics approval from Imperial College London.
28 As interviews were intended to be conducted in public places among respondents from the
29 general population, the study involved no risk or harm of any type to respondents, no link
30 with clinical data was expected to take place, and no incentives were going to be paid to
31 respondents, the study fitted all the criteria in the first stage checklist with no further
32 formal application to the Imperial College Research Ethics Committee.

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35 At the beginning of each interview, interviewers showed credentials as research assistants
36 at the University of London, informed respondents that their answers were anonymous
37 and would remain strictly confidential, and that all responses and data were going to be
38 treated statistically and used for the purposes of scientific research only. Informed consent
39 by respondents was then given at the beginning of each interview.

40 41 42 **Sample**

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45 The survey was conducted in the field by the researchers involved in the paper. The
46 borough of Hammersmith and Fulham was chosen for the location of the field survey
47 because it is a transport hub in Central West London, and hosts many offices and several
48 major business centres. The four interviewers went to different public locations within the
49 borough (underground stations, high street and residential areas) at different times during
50 the day (early morning, midday and in the evening) and in different days of the week
51 (including weekends). By covering different times and locations within the borough, we
52 aimed at being able to approach both working and non-working members of the public.
53 During the surveys in the field, the interviewers approached every third male and third
54 female that would pass by them. A target of 200 respondents was envisaged, which was
55 readily achieved, since only 68 subjects who were initially approached refused to take part
56 to the survey, with a final response rate of 74%.

Statistical analysis

We have carried a multiple regression analysis which aims to explore the determinants of i) being either aware or not of doctor rating websites; and ii) the individual intention of using these websites in the future.

The dependent variable in the first case is modeled as a binary variable (*Awareness*) taking values 1 or 0 for the respondents who reported to be aware or unaware of the websites, respectively. The second dependent variable is instead modeled as a discrete ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be 'not likely', 'quite likely', and 'likely' to use the websites in the future, respectively.

The explanatory variables (X_i) include the variables described in Table 1, namely: individual socio-demographic characteristics; a set of variables on the characteristics of the healthcare providers that the respondents consider important for making their decisions on where to receive health care; a set of variables on the sources of information that are important in making decisions about where to receive health care; two dummy variables that capture whether the patient's gender and age are the same, or within a comparable range, respectively, than the gender and age of her GP; a set of variables that describe the respondents' feelings about their relation with their doctor; a variable indicating the level of participation of the respondents in their GPs' decisions; a set of variables on patients' satisfaction with the level of choice in their healthcare decisions; a dummy variable controlling for whether the subjects had access to internet at home or at work; a variable on awareness of the existence of doctor-rating websites; and a variable on whether the subject always asks to see the same GP (see Table 1 for variables' details). The choice of the explanatory variables was further informed by the bivariate correlation analysis reported in Table 2 in the Appendix.

We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

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4 Descriptive statistics of all the dependent and independent variables for the resulting
5 sample of respondents to our survey are provided in detail in Table 1, and here we briefly
6 report their main aspects. As a result of the convenience sampling, our resulting sample
7 consisted in 141 workers (ten of which reported to be currently unemployed), 33 students,
8 nine officially unemployed and six retired subjects. Eleven respondents did not report
9 their working status.

10
11 As common in field surveys of this type, the convenience sampling tended to over-
12 represent respondents who were currently not working, or were at home, and thus had
13 time to fill out the questionnaire: the proportion of subjects who were not currently
14 working, as given by the sum of the respondents who reported to be unemployed, retired,
15 or students, indeed amounts to 29% of the sample.

16
17 Related to that, it turned out that 9.5% of the respondents in our sample were currently
18 unemployed, compared to only 5% from the Census data for the borough. The relatively
19 higher proportion of unemployed respondents may also be a result of the convenience
20 sampling method. Moreover, an unemployment rate higher than the one documented in
21 the 2001 Census survey was largely expected, due to the consequences of the economic
22 and financial crisis after 2007.

23
24 Comparing the sample with the Census data for the borough the mean age of our sample
25 was slightly older than that for the borough (39.57 years compared to 35.2 years).¹⁵ Our
26 sample however was closer to the national mean age of 38.5 years. The range of ages
27 seems to show a positive skew, with a greater frequency of people aged 40 years and
28 under. This is consistent with the 2001 census data for Hammersmith and Fulham which
29 showed the borough contained a larger proportion of young people aged 20-29 (23.8%)
30 than the rest of England (12.66%) (ONS, 2001).¹⁵ Age is an important demographic to
31 consider when analysing our results as age has been shown to be important in internet
32 usage.¹¹

33
34 Also, the sample had a slightly greater proportion of females than the borough (54.44% to
35 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared
36 to 58% for the borough).¹⁵ This is also significantly lower than figures for England, White
37 British accounting for 87% of the population.¹⁵ The sample contained 28.99% non white
38 respondents. This is higher than the 2001 census data for Hammersmith and Fulham
39 which was 22% and significantly higher than the figures for England, showing non white
40 ethnic groups accounting for 9% of the total population.¹⁵ Our sample, therefore, allows
41 controlling for high heterogeneity in ethnic background even with a limited sample size.

42
43 The majority of actively working respondents reported an income within the £15-35,000
44 bracket. Income is an important variable to control for in the analysis, as previous
45 literature found that patients using the Internet were more educated and had higher
46 incomes.¹⁶

47
48 Our sample had a high percentage of people with higher level qualifications: 46.24% of
49 the sample had a university degree and 27.96% had a postgraduate degree. This is
50 reflective of Hammersmith and Fulham, where 45% of the population have a qualification
51 of degree level or higher, a figure which is significantly higher than in England, where
52 only 19.8% have a degree or higher qualification.¹⁵

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.⁶

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).¹⁷

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 3 in here]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings, perhaps signalling that those respondents may be more familiar with alternative sources of information.

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio. This may signal the possible existence of 'complementary' effects between the two sources of information, according to which

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3 individuals who give importance to hospital statistics are also more likely to actively seek
4 for doctor rating websites.

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6 Furthermore, although in one specification the respondents who feel that their GPs spend a
7 sufficient time in their consultation are less likely to be aware of the internet rating
8 websites, both the statistical significance and the estimated odds ratio do not appear robust
9 across specifications. Although all other variables on doctor-patient relationship were not
10 significant, whenever included among the regressors, the gender match between the GP
11 and the patient predicts higher awareness of the website ratings, with a noticeable effect as
12 evident by the reported value of the odds ratio.

13
14 From those that were aware of the existence of doctor-rating websites only 6 have
15 reported to have used these websites. In light of this low usage rate, and of the consequent
16 limitations of conducting statistical estimations with very little variation in the dependent
17 outcomes, we have thus focused the rest of the analysis on the determinants of the
18 intention to use, rather than actual usage of, doctor rating websites.

21 22 23 Results on the likelihood to use online rating websites

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26 In Table 4 we present the estimate results of six different specifications of the ordered
27 logistic regression for the dependent variable *IntentionToUse* with different sets of
28 regressors, which are presented in terms of the odds ratio, together with the standard
29 errors, and levels of significance.

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32 [Table 4 in here]

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34 Concerning socio-demographic variables, it turns out that white British, as well as
35 respondents who reported income in higher brackets, said they were less likely to use
36 doctor-rating websites. Moreover, we do not find any effect of education, age and gender
37 of the respondents on the likelihood of their intention to use (the results of the
38 specifications including the age and gender variables are not reported in the table for the
39 sake of space but are available from the authors upon request).

40
41 Looking at the characteristics of the healthcare providers that respondents perceived as
42 important while making decisions where to receive healthcare, our data suggest that those
43 who consider clinical performance and doctor reputation (in most specifications) as
44 important factors, are more likely to use doctor-rating websites. These results are
45 consistent with the nature of the information provided in these websites. Also, and quite
46 intuitively, subjects who consider the familiarity with their doctor an important factor to
47 decide where to seek healthcare, tend to be less likely to intend to use websites.

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49
50 Concerning the role of the different sources of information on the decisions of where to
51 seek healthcare, respondents who see published hospital statistics as important sources of
52 information are more likely to use the rating websites. On the other hand, and
53 interestingly, those for whom GP advice is an important source of information for decision
54 making are less likely to use doctor-rating websites.

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57 Also the nature of the doctor-patient relationship seems to play a key role in explaining
58 whether respondents intend to use online rating websites. First, patients with GPs of the
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same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the determinants of the awareness of doctor rating websites; ii) the actual usage of the websites; and iii) the determinants of the intention to use them in the future.

Awareness

As for the determinants of being aware of the doctor rating websites, we see the significant and positive effect by the gender match between the GP and the patient as a particularly interesting finding. The doctor-patient gender concordance, in fact, has often been reported in the literature as a factor associated with higher patient satisfaction with the consultation as well as better outcomes.¹⁸ If we interpret the gender match variable as an indication of satisfaction with the consultation, our finding indicates that being aware of the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the Internet and the doctor are likely to be seen as complementary, rather than alternative, information channels.

Actual usage

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply be because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund⁶ that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.⁷

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The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.⁹ analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.⁸ also reported a low average number of ratings per physician.

Intention to use

The result that shows that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature^{16,19,20} and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study among different socio-economic groups in the US by Brodie et al.¹² As the estimated effect of these variables appear to be robust across all empirical specifications, these findings seem to suggest that online doctor-rating websites are likely to be particularly attractive to subjects with non-white British ethnicity and less favoured economic background.

On the other hand, the lack of statistical significance in the ordered logit estimates, seems to suggest that while age can be a significant factor in explaining the awareness of Internet for health information, it is not significantly explaining the intention to use doctor-rating websites once subjects are made aware of their existence. The analogous lack of significance for the respondents' gender, on the other hand, does not support the view that women in the UK may be more likely to use patient sources of information and rating websites, although they have been found to desire patient choice more than men (69% to 56%).¹⁰ Both results differ from the findings from the US, where women and younger adults are more active 'online health information seekers'.¹¹

From the perspective of the doctor-patient relationship, the finding that patients with GPs of the same gender tend to be more likely to use the websites is of particular interest, and it is consistent with the analogous effect found for the likelihood of being aware of those websites. Considered together these findings point to the possible explanation that the doctor and the Internet may sometimes be seen by patients as "complementary", rather than alternative, information channels.¹⁹ This interpretation is further confirmed by the finding that respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a "substitute" relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

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This result on a “substitute relationship” is consistent with previous evidence by Diaz and colleagues¹⁶ that found that 11% of their respondents said they would rather use the Internet ‘instead of seeing or speaking with their doctors’, and that 59% of respondents ‘did not discuss information with their doctors’. It also seems in line with the study by McMullan¹⁹ that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous -patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan¹⁹, for instance, reports that patients would seek health information before a consultation ‘to manage their own healthcare independently’. These may be the type of people who are ‘more likely to be health-oriented’ or ‘health conscious’, and therefore be more proactive in consultations.²¹

Moreover, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be “complementary” with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors’ opinions.

General discussion

Overall, our evidence on the determinants of both awareness and intention to use is broadly consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues²² shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.²³

Our findings that online information can be used not only as “substitute” but also, and perhaps mainly, as “complementary” to several dimensions of the doctor-patient relationship do not seem to entail any particular evidence suggesting that online ratings may put in danger the doctor-patient relationship, an important aspect which has been raised in the literature.^{24,25}

The “complementarity” findings, in particular, seem consistent with the evidence from the US which shows that the vast majority of the reviews by patients are generally rather positive.^{8,9,26} Taken together, this evidence can be seen as providing little support to the

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3 related concern that the likeliest to use online ratings and enter actual comments may be
4 the most disgruntled patients.²⁷

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6 On a related topic, concerns have been expressed about the ability of online ratings to
7 truly reflect the quality of care. A recent UK study, however, demonstrated a strong
8 relationship between the ratings reported online and more objective measures of clinical
9 quality such as mortality and infection rates,²⁸ while another study showed that online
10 ratings were associated with ratings derived from a traditional paper-based survey.²⁹
11 Online ratings, thus, do not seem to provide systematically biased or misleading
12 information regarding the health care that patients receive, at least not more than a
13 traditional survey would do. Consistently with this evidence, our results seem to support
14 the idea that patients may see online ratings as a supplementary information base to be
15 used in support of direct interaction with their doctor, which remains the most significant
16 and reliable information channel.³⁰

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19 More generally, the evidence provided by our study confirms that the actual usage of
20 doctor-rating websites in the UK remains particularly low. In our sample only 29
21 respondents out of 200 were aware of the existence of the patient rating websites. Among
22 these, however, only 6 subjects reported they were actually using those websites.

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25 While these figures are substantially in line with previous evidence brought forward from
26 the literature,^{6,7} considered together these results may pose serious concerns on the reasons
27 and consequences of the lack of patient awareness and usage.

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29 Previous studies in the US have reported a number of reasons behind this slow uptake,
30 including i) the preference for more traditional information channels, such as
31 recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact
32 that people do not recognise that the quality of care may vary.²⁵

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35 Our study confirms that not only awareness of rating websites is still limited among the
36 general public in the UK, but awareness per se does not seem a sufficient condition to
37 guarantee active usage. This poses a double challenge from a clinician and health policy
38 perspective.

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40 In fact, on the one hand, the documented correlation between online ratings and other
41 measures of healthcare quality, including survey-based ratings and clinical quality
42 indicators,^{28,29} necessarily requires that patients have already gone through two
43 preliminary hurdles, namely i) being aware of, and ii) being active users of the doctor
44 rating websites. If the ultimate goal is indeed the continuous enhancement of healthcare
45 quality, the effective removal of this double hurdle is likely to become the next priority to
46 guarantee the full spread of online rating website.

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49 On the other hand, while appropriate online and offline informational campaigns are likely
50 to overcome the first hurdle, thus effectively raising patients' awareness of online ratings
51 as a potential source of information on provider quality, informational campaigns alone
52 can fail to effectively trigger changes in behaviour. Alike in several other health contexts,
53 in fact, 'nudging' behaviour may be difficult as a mere consequence of accessing more
54 information.

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57 If this is the case, other avenues should be explored to increase the active usage of rating
58 websites by patients who are already aware of them. For instance, the evidence brought
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forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals' awareness of and willingness to use online ratings^{25,31-34} and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome this last hurdle and actively engage with online ratings.

Limitations of the study

While dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. In a sample of the general public from a borough of London only 29 respondents out of 200 were aware of the existence of the patient rating websites, and only 6 reported to be actually using those websites.

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study also explicitly explores the determinants of respondents' awareness of the doctor ratings websites, and of their intention to use the sites in the future.

Among other results, the statistical analysis provides evidence that the GP-patient gender concordance is associated with higher awareness of, and intention to use, the websites, while respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

The existence of both "substitute" and "complementary" effects between the doctor-patient and the Internet information channels is not at all conflicting. In fact, they both indicate that the level of concordance achieved during the consultation is likely to define whether or not individuals will seek for further information channels, such as the Internet.

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4 When the outcome of a consultation does not satisfy the patient, the use of Internet fills
5 the gap of information needs. The intention to use online doctor-rating websites in this
6 case also indicates that these patients are likely to look at these websites with the aim of
7 seeking for another clinician. Individuals who are satisfied with their GPs may also search
8 these websites, but more as an additional information channel as they seem keener to
9 engage more actively with health and healthcare information in general.

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11 The findings of our study thus contribute also to the wider debate on the inter-
12 relationships between Internet usage and the doctor-patient relationship.^{8,25,26, 31-34} The
13 argument, sometimes addressed by the previous literature, that information on the Internet
14 can threaten the trust relationship and the balance of roles between doctors and patients,
15 seems a concern which is not supported by our evidence. If any, a potential challenge to
16 the doctor-patient relation can only affect the patients who already feel dissatisfied with
17 the ability of their doctor to listen to them and provide them enough information regarding
18 their condition, or with the level of their choice for healthcare treatments.

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21 The above, however, can hardly be seen as a serious threat by those who advocate a
22 greater choice by patients. On the contrary, if the latter is indeed a priority in the health
23 policy agenda, online information on healthcare providers should be seen as a challenging
24 opportunity to enhance patients' choice in healthcare, and public engagement with health
25 information, especially for the less favoured segments of the population. Indeed, our
26 findings suggest that subjects of non-white background and with lower income are more
27 willing to use online ratings.

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30 Finally, our study highlights that subjects who use doctor rating websites are unlikely to
31 be representative of the overall patients' pool. In particular, they tend to over-represent
32 opinions from young, non-white British, medium-low income patients who are not
33 satisfied with their choice of healthcare treatments. Accounting for differences in the
34 users' characteristics is important when interpreting results from doctor-rating sites and
35 when informing interventions that aim at enhancing the public engagement with health
36 information on the Internet, and the representativeness of the users who seek and provide
37 feedback online.

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43 **Data sharing:** technical appendix, statistical code and dataset available from the
44 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
45 obtained but the presented data are anonymised and risk of identification is low.

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47 All authors had full access to all the data in the study and take responsibility for the
48 integrity of the data and the accuracy of the data analysis.

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51 **Funding:** this piece of work has not received any specific funding.

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Appendix 1
Table 1 Variable description and descriptive statistics

<u>Variable</u>	<u>Obs</u>	<u>Mean</u>	<u>Std. Dev</u>
<u>Awareness (Awareness) (0=no, 1=yes)</u>	200	0.142	0.350
<u>Intention to use (IntentionToUse)</u>	199	2.136	0.743
<u>Not likely</u>	43		
<u>Quite likely</u>	86		
<u>Likely</u>	70		
<u>Important factors in making decisions (1=not important at all, 5=very important)</u>			
<u>Waiting lists (HC_Waiting)</u>	198	3.818	1.165
<u>Rates of hospital-acquired complications (HC_HospComp)</u>	188	3.761	1.193
<u>Clinical performance (HC_Clinical_Performance)</u>	189	4.037	1.136
<u>Closeness to home (HC_CloseHome)</u>	200	3.683	1.265
<u>Familiarity with the doctor (HC_Familiarity)</u>	194	3.237	1.306
<u>Financial performance of the hospital (HC_FinPerform)</u>	191	2.387	1.164
<u>Reputation of the doctor (HC_GP_Reputation)</u>	199	3.980	1.137
<u>Accessibility and parking facilities (HC_Access)</u>	192	2.656	1.321
<u>Past experience with the provider (HC_PastExp)</u>	193	3.544	1.311
<u>Important sources of information in making decisions (1=not important at all, 5=very important)</u>			
<u>GP advice (SI_GP_Advice)</u>	198	4.071	1.030
<u>Published hospital statistics (SI_HospStat)</u>	183	2.934	1.193
<u>Online doctor rating websites (SI_DoctorRating)</u>	178	2.315	1.204
<u>Personal experiences in the past (SI_PastExp)</u>	192	4.234	1.004
<u>Feedback from family/friends (SI_Family)</u>	194	4.149	0.924
<u>I feel the doctor...</u>			
<u>...listens (0=no, 1=yes) (DOC_Listens)</u>	200	0.575	0.496
<u>...has time (0=no, 1=yes) (DOC_Time)</u>	200	0.410	0.493
<u>...explains (0=no, 1=yes) (DOC_Explains)</u>	200	0.555	0.498
<u>...is friendly (0=no, 1=yes) (DOC_Friend)</u>	200	0.445	0.498
<u>... Is someone I can trust (0=no, 1=yes) (DOC_Trust)</u>	200	0.550	0.499
<u>I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (Reliable)</u>	141	2.759	1.055
<u>How actively do you participate with your GP in making decisions (Participation)</u>	193		
<u>My doctor always makes decisions for me</u>	2		
<u>I like to know the options available but still let my doctor decide for me</u>	13		
<u>My doctor and I make the decisions together</u>	25		
<u>I make decisions for myself, after considering the advice of my GP</u>	65		
<u>I always make my own decisions, independently of the advice of my GP</u>	75		
<u>I make decisions with my parents/spouse/relatives</u>	13		
<u>Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)</u>			
<u>...GP (SAT_C_GP)</u>	173	3.451	1.138
<u>...hospital (SAT_C_Hosp)</u>	152	3.493	1.055
<u>...doctor (SAT_C_Doc)</u>	139	3.252	1.022
<u>...treatment (SAT_C_Treatment)</u>	148	3.554	0.928
<u>...time spent (SAT_C_Time)</u>	168	3.179	1.123

Ethnicity				
White British (0=no, 1=yes) (WhiteBritish)	200	0.488	0.501	
White Other (0=no, 1=yes) (WhiteNonBritish)	200	0.222	0.417	
Highest level of educational attainment* (Education)				
1 if GCSE	12			
2 if A-Level/BTEC/Vocational	36			
3 if University undergraduate degree	86			
4 if Postgraduate Degree	52			
Age (years) (Age)	199	39.572	16.083	
Gender (Gender)				
Female (=1)	112			
Male (=0)	88			
Income (Income)				
0	40			
<£15000 but >0	27			
£15,000-£35,000	36			
£35,000-55,000	22			
£55,000-£75,000	14			
£75,000-£95,000	7			
>£95,000	14			
Doctor-patient concordance				
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (AgeMatch)	200	0.333	0.473	
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (GenderMatch)	200	0.444	0.498	

Table 2: Bivariate Correlations

	<u>IntentionToUse</u>	<u>Awareness</u>		<u>IntentionToUse</u>	<u>Awareness</u>
<u>IntentionToUse</u>	1		<u>DOC Friend</u>	0.0127 (0.8599)	-0.0984 (0.1667)
<u>Awareness</u>	0.0846 (0.2359)	1	<u>DOC Trust</u>	-0.0288 (0.6899)	-0.0388 (0.5863)
<u>HC Waiting</u>	0.1617** (0.025)	0.016 (0.8236)	<u>Participation</u>	0.0412 (0.5678)	0.0189 (0.7911)
<u>HC HospComp</u>	0.1474** (0.0465)	-0.0033 (0.9643)	<u>SAT C GP</u>	-0.0419 (0.591)	0.122 (0.1108)
<u>HC Clinical Performance</u>	0.2146*** (0.0034)	-0.0784 (0.2849)	<u>SAT C Hosp</u>	-0.003 (0.9715)	0.1024 (0.2111)
<u>HC CloseHome</u>	-0.0623 (0.3848)	-0.0998 (0.1587)	<u>SAT C Doc</u>	-0.0348 (0.6909)	0.137 (0.1077)
<u>HC Familiarity</u>	-0.0078 (0.9153)	-0.0752 (0.2986)	<u>SAT C Treatment</u>	-0.0157 (0.8526)	0.0932 (0.2598)
<u>HC FinPerform</u>	0.1253** (0.0884)	0.1435** (0.0482)	<u>SAT C Time</u>	-0.0239 (0.7632)	0.0541 (0.4878)
<u>HC GP Reputation</u>	0.2020*** (0.0047)	-0.016 (0.8234)	<u>CB AWARE</u>	-0.0381 (0.5972)	0.2997*** (0)
<u>HC Access</u>	0.0451 (0.5399)	0.1196* (0.0992)	<u>CB Use</u>	0.0996 (0.1651)	0.054 (0.4477)
<u>HC PastExp</u>	0.0978 (0.182)	-0.0244 (0.7369)	<u>WEB Access</u>	0.2054*** (0.0041)	0.1197* (0.0923)
<u>SI GP Advice</u>	0.1054 (0.1457)	0.0163 (0.8202)	<u>AgeMatch</u>	0.1373* (0.0532)	0.0695 (0.3234)
<u>SI HospStat</u>	0.2937*** (0.0001)	0.1159 (0.1192)	<u>GenderMatch</u>	0.2077*** (0.0032)	0.1472** (0.0357)
<u>SI DoctorRating</u>	0.3759*** (0)	0.1240* (0.099)	<u>WhiteBritish</u>	-0.0429 (0.5477)	-0.0662 (0.3468)
<u>SI PastExp</u>	0.0563 (0.4455)	-0.0803 (0.2696)	<u>WhiteNonBritish</u>	-0.0017 (0.9809)	-0.0853 (0.2252)
<u>SI Family</u>	0.1215* (0.0958)	-0.0511 (0.4804)	<u>Income</u>	0.012 (0.8818)	-0.1219 (0.1246)
<u>Reliable</u>	0.3429*** (0)	-0.0311 (0.7153)	<u>Education</u>	-0.0103 (0.8913)	0.0023 (0.9757)
<u>DOC Listens</u>	0.0629 (0.3824)	-0.0888 (0.2122)	<u>Gender</u>	0.0315 (0.6614)	-0.0087 (0.9029)
<u>DOC Time</u>	0.1565** (0.0289)	-0.0117 (0.87)	<u>Age</u>	-0.1081 (0.1344)	-0.1918*** (0.0068)
<u>DOC Explains</u>	0.0968 (0.1784)	0.0152 (0.8314)			

P-Values in parentheses. * p<.10, ** p<.05, *** p<.01

Table 3 [Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.](#)

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 4</u>
Awareness				
Age	<u>0.953*</u>	<u>0.931**</u>		
	<u>(0.0239)</u>	<u>(0.0307)</u>		
Gender	<u>1.347</u>	<u>1.819</u>		
	<u>(0.648)</u>	<u>(1.092)</u>		
WhiteBritish	<u>0.595</u>	<u>0.841</u>	<u>0.401</u>	<u>0.0150**</u>
	<u>(0.309)</u>	<u>(0.524)</u>	<u>(0.276)</u>	<u>(0.0292)</u>
WhiteNonBritish	<u>0.273*</u>	<u>0.398</u>	<u>0.228*</u>	<u>0.00399**</u>
	<u>(0.198)</u>	<u>(0.324)</u>	<u>(0.200)</u>	<u>(0.00957)</u>
Education	<u>1.105</u>	<u>1.396</u>	<u>1.279</u>	<u>1.682</u>
	<u>(0.341)</u>	<u>(0.534)</u>	<u>(0.438)</u>	<u>(1.399)</u>
Income	<u>0.952</u>	<u>0.943</u>	<u>0.708*</u>	<u>0.228*</u>
	<u>(0.157)</u>	<u>(0.169)</u>	<u>(0.132)</u>	<u>(0.180)</u>
HC HospComp		<u>1.173</u>	<u>1.353</u>	<u>2.237</u>
		<u>(0.366)</u>	<u>(0.442)</u>	<u>(1.825)</u>
HC Clinical Performance		<u>0.691</u>	<u>0.527</u>	<u>0.0342*</u>
		<u>(0.245)</u>	<u>(0.207)</u>	<u>(0.0609)</u>
HC Familiarity		<u>0.710</u>	<u>0.756</u>	<u>2.564</u>
		<u>(0.170)</u>	<u>(0.202)</u>	<u>(2.096)</u>
HC GP Reputation		<u>1.409</u>	<u>1.611</u>	<u>13.57*</u>
		<u>(0.509)</u>	<u>(0.599)</u>	<u>(19.95)</u>
HC FinPerform		<u>0.921</u>	<u>0.963</u>	<u>0.0783**</u>
		<u>(0.264)</u>	<u>(0.297)</u>	<u>(0.0919)</u>
HC Access		<u>1.112</u>	<u>1.088</u>	<u>0.917</u>
		<u>(0.236)</u>	<u>(0.242)</u>	<u>(0.444)</u>
SI GP Advice		<u>1.173</u>	<u>0.922</u>	<u>1.115</u>
		<u>(0.350)</u>	<u>(0.290)</u>	<u>(0.718)</u>
SI HospStat		<u>1.291</u>	<u>1.390</u>	<u>49.75**</u>
		<u>(0.410)</u>	<u>(0.477)</u>	<u>(87.28)</u>
SI Family		<u>0.935</u>	<u>0.614</u>	<u>0.146</u>
		<u>(0.361)</u>	<u>(0.273)</u>	<u>(0.186)</u>
SI PastExp		<u>0.762</u>	<u>1.202</u>	<u>0.284</u>
		<u>(0.275)</u>	<u>(0.499)</u>	<u>(0.343)</u>
SI DoctorRating		<u>0.938</u>	<u>0.933</u>	<u>1.859</u>
		<u>(0.261)</u>	<u>(0.271)</u>	<u>(1.119)</u>
DOC Listens			<u>0.416</u>	<u>1.182</u>
			<u>(0.324)</u>	<u>(2.244)</u>
DOC Time			<u>1.289</u>	<u>0.00185**</u>
			<u>(0.950)</u>	<u>(0.00580)</u>
DOC Explains			<u>2.533</u>	<u>0.885</u>
			<u>(1.799)</u>	<u>(1.658)</u>
DOC Friend			<u>0.752</u>	<u>15.62</u>
			<u>(0.535)</u>	<u>(30.63)</u>
DOC Trust			<u>0.930</u>	<u>3.173</u>
			<u>(0.583)</u>	<u>(4.555)</u>
Participation			<u>1.080</u>	<u>3.346</u>
			<u>(0.298)</u>	<u>(2.835)</u>
AgeMatch			<u>2.247</u>	<u>269.4*</u>
			<u>(1.429)</u>	<u>(791.0)</u>
GenderMatch			<u>3.153*</u>	<u>32.77*</u>
			<u>(1.867)</u>	<u>(61.36)</u>
SAT C GP				<u>3.020</u>
				<u>(2.948)</u>
SAT C Hosp				<u>0.802</u>
				<u>(1.134)</u>

1	<u>SAT C Doc</u>	<u>2.794</u>
2		<u>(3.411)</u>
3	<u>SAT C Treatment</u>	<u>1.818</u>
4		<u>(2.311)</u>
5	<u>SAT C Time</u>	<u>0.735</u>
6		<u>(0.550)</u>
7	<u>Same GP</u>	<u>0.641</u>
8		<u>(0.766)</u>

9 Exponentiated coefficients; Standard errors in parentheses

10 * p<.10, ** p<.05, *** p<.01

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For peer review only

-Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974 (2.377)	2.561 (2.953)	2.000 (1.965)	2.782 (2.613)	1.051 (0.818)	0.946 (0.729)
GenderMatch	18.42* (30.24)	12.03* (17.75)	10.45** (12.33)	10.39** (10.54)	16.67*** (15.48)	14.83*** (13.17)
Awareness	0.0531 (0.108)	0.0505 (0.0971)	0.0964 (0.149)	0.0758** (0.0985)	0.159* (0.176)	0.147* (0.152)
HC Clinical Performance	9.289* (11.84)	7.659* (8.241)	5.560** (4.759)	3.401* (2.253)	4.395** (2.653)	4.985*** (2.734)
HC Familiarity	0.359 (0.287)	0.468 (0.282)	0.371* (0.220)	0.414* (0.206)	0.355** (0.147)	0.351** (0.141)
HC GP Reputation	2.328 (1.980)	2.827 (2.106)	3.608* (2.542)	4.410** (2.753)	2.903** (1.374)	2.776** (1.260)
SI GP Advice	0.170* (0.173)	0.223 (0.206)	0.238** (0.167)	0.283** (0.176)	0.344** (0.186)	0.396* (0.193)
SI HospStat	14.26** (18.84)	13.74** (15.60)	7.220*** (5.008)	6.550*** (4.200)	5.371*** (2.932)	5.133*** (2.703)
SI DoctorRating	1.596 (1.636)	1.067 (0.958)	1.424 (0.851)	1.461 (0.770)	2.245** (0.835)	2.312** (0.876)
Reliable	6.181 (7.691)	8.682* (9.969)	6.492** (4.993)	7.586*** (5.561)	4.457*** (2.351)	4.061*** (2.003)
DOC Listens	141.9* (424.8)	51.44 (126.4)	44.20* (90.99)	27.05** (41.26)	22.03** (28.29)	22.98** (28.34)
DOC Explains	0.00690* (0.0183)	0.00680** (0.0148)	0.00509** (0.0105)	0.00695*** (0.0124)	0.0120*** (0.0171)	0.0124*** (0.0169)
DOC Friend	12.88 (29.23)	8.375 (14.65)	16.48** (22.41)	19.66*** (22.45)	8.718** (8.047)	7.781** (6.896)
Participation	5.473* (5.255)	5.818* (5.410)	5.171** (3.664)	4.162** (2.687)	2.349* (1.126)	2.228* (1.036)
SAT C GP	17.03* (27.58)	8.038 (10.23)	6.593* (6.659)	5.410** (4.048)	4.692** (2.889)	4.377*** (2.484)
SAT C Hosp	21.93** (33.71)	22.86** (30.90)	30.01*** (33.63)	34.38*** (35.43)	17.95*** (15.52)	11.11*** (7.578)
SAT C Treatment	0.0515** (0.0764)	0.0561** (0.0794)	0.111** (0.106)	0.147** (0.125)	0.145** (0.111)	0.111*** (0.0788)
WhiteBritish	0.0137* (0.0318)	0.0409* (0.0738)	0.0542** (0.0782)	0.0539** (0.0690)	0.0909** (0.0890)	0.105** (0.0973)
Income	0.416* (0.190)	0.382** (0.162)	0.449** (0.154)	0.513** (0.154)	0.476*** (0.129)	0.462*** (0.120)
SAT C Doc	0.242 (0.468)	0.243 (0.374)	0.148* (0.161)	0.135* (0.144)	0.427 (0.321)	
SI PastExp	0.670 (0.787)	0.590 (0.650)	0.535 (0.576)	0.551 (0.250)		
Education	0.486 (0.526)	0.583 (0.554)	0.683 (0.443)	0.610 (0.328)		
HC Access	1.046 (0.659)	1.124 (0.678)	1.241 (0.564)	1.347 (0.565)		
HC PastExp	1.030 (0.578)	0.914 (0.487)	0.930 (0.397)			
SI Family	1.208 (1.357)	1.305 (1.484)	1.439 (1.458)			
DOC Time	1.223 (2.118)	2.099 (3.261)	2.594 (3.547)			

DOC Trust	<u>0.153</u>	<u>0.608</u>	<u>0.460</u>			
	<u>(0.327)</u>	<u>(0.983)</u>	<u>(0.629)</u>			
WEB Access	<u>1.122</u>	<u>0.558</u>	<u>0.483</u>			
	<u>(4.345)</u>	<u>(1.763)</u>	<u>(0.918)</u>			
HC Waiting	<u>0.960</u>	<u>1.097</u>				
	<u>(0.806)</u>	<u>(0.846)</u>				
HC HospComp	<u>1.200</u>	<u>0.790</u>				
	<u>(0.929)</u>	<u>(0.540)</u>				
HC CloseHome	<u>0.930</u>	<u>0.790</u>				
	<u>(0.726)</u>	<u>(0.516)</u>				
HC FinPerform	<u>0.610</u>	<u>0.692</u>				
	<u>(0.621)</u>	<u>(0.588)</u>				
SAT C Time	<u>1.449</u>	<u>1.530</u>				
	<u>(1.441)</u>	<u>(1.280)</u>				
WhiteNonBritish	<u>0.742</u>	<u>0.493</u>				
	<u>(1.790)</u>	<u>(1.041)</u>				
CB AWARE	<u>1.422</u>					
	<u>(3.158)</u>					
CB Use	<u>83.93</u>					
	<u>(354.7)</u>					
cut1	<u>9454769.9**</u>	<u>2474784.8**</u>	<u>3131224.6**</u>	<u>2460471.3***</u>	<u>10470831.2***</u>	<u>13892352.4***</u>
	<u>(63313549.3)</u>	<u>(15197453.2)</u>	<u>(18256829.6)</u>	<u>(13260544.4)</u>	<u>(45550085.5)</u>	<u>(59299449.7)</u>
cut2	<u>7.05660e+09*</u>	<u>1.22556e+09***</u>	<u>1.14387e+09***</u>	<u>674102348.3***</u>	<u>1.42570e+09***</u>	<u>1.60379e+09***</u>
	<u>**</u>					
	<u>(5.66892e+10)</u>	<u>(8.86204e+09)</u>	<u>(7.69789e+09)</u>	<u>(4.20283e+09)</u>	<u>(7.17551e+09)</u>	<u>(7.78799e+09)</u>

QUESTIONNAIRE

Imperial College Business School



We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called "Choose & Book" which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King's College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

Yes _____ No (if No, skip ahead to Section C)

Other (please specify).....

Q2. How did you find out about these sites?

Family/Friends _____ Doctor

The Media _____ Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes _____ No (if No, skip ahead to Section C)

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis _____ Only before/after an appointment Rarely

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes _____ No

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information _____ Negative information

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these	<input type="checkbox"/>				

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

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Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

Not likely Quite likely Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

- Every time
- After particularly positive experiences only
- After particularly negative experiences only
- After both positive and negative experiences
- Never
- Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

- I would not contribute to these websites
- To inform other patients
- To improve standards of care in the NHS
- As a method of complaint
- In appreciation of a doctor's service
- Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

- I feel my doctor listens to my problems
- I feel my doctor spends enough time with me in each consultation
- I feel my doctor explains things clearly
- I feel my doctor is sociable and friendly

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- [I feel that I can trust my doctor's opinions](#)
- [None of the above](#)

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Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

- [My doctor always makes decisions for me](#)
- [I like to know the options available but still let my doctor decide for me](#)
- [My doctor and I make the decisions together](#)
- [I make decisions for myself, after considering the advice of my GP](#)
- [I always make my own decisions, independently of the advice of my GP](#)
- [I make decisions with my parents/spouse/relatives](#)

Q17. Within your GP practice do you always want to see the same GP for an appointment?

- [I always request to see the same GP](#)
- [I don't mind which doctor I see.](#)

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = of no importance, 5 = very important) or select 'not sure'.

Choice of GP 1 2 3 4 5 Not sure

Choice of hospital for 1 2 3 4 5 Not sure

[outpatient appointment](#)

Choice of doctor for 1 2 3 4 5 Not sure

[outpatient appointment](#)

Choice of treatment 1 2 3 4 5 Not sure

Choice of appointment time 1 2 3 4 5 Not sure

[\(for primary & secondary care\)](#)

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP 1 2 3 4 5 Not sure

Choice of hospital for 1 2 3 4 5 Not sure

[outpatient appointment](#) _____

Yes _____ No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply _____

- I'm too busy to have the time to use them
- The sites are not a reliable source of information
- It is difficult to interpret the information provided
- I already have enough information from other sources to make choices
- I don't have access to the internet
- I did not know these websites existed
- I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply. _____

- Shopping websites _____ (e.g. Amazon)
- Holiday websites _____ (e.g. TripAdvisor)
- Car insurance websites _____ (e.g. Compare The Market)
- Restaurants/venue websites (e.g. ViewLondon)
- Film websites _____ (e.g. Rottentomatoes)
- Other _____ (please specify).....
- I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- Star-rating out of 5
- Percentage scores
- Thumbs Up/Down
- Written comments from patients/users
- No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age?

Q30. What is your gender?

Male _____ Female

Q31. How would you describe your ethnicity?

<input type="checkbox"/> White – British	<input type="checkbox"/> Other Asian – non-Chinese
<input type="checkbox"/> White – Others	<input type="checkbox"/> Black Caribbean

Mixed race	Black African
Indian	Black – Others
Pakistani	Chinese
Bangladeshi	Other

Q32. What is your postcode?

Q33. How many other individuals do you live with?

Q34. Do you live with your parents?

[Yes](#) [No](#)

Q35. What is/was your profession?

[Unemployed](#) [Retired](#)

Q36. What is your level of pre-tax income?

[0](#)
 [<£15000 but >0](#) [£15,000-£35,000](#)
 [£35,000-55,000](#) [£55,000-£75,000](#)
 [£75,000-£95,000](#) [>£95,000](#)

Q37. What is your highest level of educational attainment?

GCSE	Other vocational degree
A-Level	University degree
BTEC	Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

[0 times](#) [1-3 times](#)
 [4-5 times](#) [More than 5 times](#)

Q39. What is the sex of your GP?

[Male](#) [Female](#)

Q40. How old is your GP?

[<30 years](#)
 [30-50 years](#)
 [>50 years](#)

Q41. What is the ethnicity of your GP?

White – British	Other Asian – non-Chinese
White – Others	Black Caribbean

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Mixed race	Black African
Indian	Black – Others
Pakistani	Chinese
Bangladeshi	Other

[Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP.](#)

[This is the end of the questionnaire, thank you for your time.](#)

For peer review only

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	8
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.



Who is More Likely to Use Doctor-Rating Websites, and Why?
A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining intention to use the websites: the GP-patient gender concordance is associated with higher intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on doctor-ranking websites, though, are unlikely to be representative of the overall patients'

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3 pool. In particular, they tend to over-represent opinions from young, non white British,
4 medium-low income patients who are not satisfied with their choice of the healthcare
5 treatments and the level of information provided by their GP. Accounting for differences
6 in the users' characteristics is important when interpreting results from doctor-rating sites.
7

8 **Key messages**

- 9 • The share of the general public which uses doctor-rating websites is still quite low.
- 10 • Elderly, subjects with white British background, as well as subjects with higher
11 income are less likely to use doctor-rating websites.
- 12 • The GP-patient gender concordance is associated with higher intention to use, the
13 websites.
- 14 • Subjects who feel that their GP explains things clearly and is a valuable source of
15 clear information, are less likely to use online rating websites.
- 16 • Subjects who feel that they are more satisfied with the level of choice of healthcare
17 treatments are less likely to use online rating websites.
- 18
- 19

20
21 ¹ London School of Economics, LSE Health and Centre for the Study of Incentives in Health

22 ² Imperial College Business School

23 ³ University of Surrey

24 ⁴ Imperial College School of Medicine

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26
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INTRODUCTION

In recent years, both the NHS Plan¹ and the NHS Improvement Plan², set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.³ Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"⁴ acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence*, have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund⁵ explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.⁶ These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.^{7,8} Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez⁹ found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.¹⁰

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among the general public in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

Questionnaire design

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3 Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain
4 an understanding of the practicalities associated with giving out questionnaires and
5 collecting responses. After listening to feedback from pilot respondents, and looking at
6 results from the pilot study, several changes were made to make the questionnaire easier to
7 understand. The changes related to content, phrasing and ordering of questions.
8

9
10 The content of the final questionnaire was based on findings from the preliminary
11 literature review and was designed to have a number of sections (see Appendix for full
12 questionnaire). In particular, section A focuses on the awareness of online rating websites,
13 while section B assesses actual usage of online rating websites. Section C measures the
14 willingness to use the online rating websites in the future, and explores which aspects of
15 the healthcare providers and which sources of information are perceived as being
16 important factors in making decisions about where to receive healthcare. Section D
17 assesses the individual contribution to the online rating sites, while section E focuses on
18 aspects of the doctor-patient relationship and attitudes and dimensions of patient choice.
19 Finally section F controls for internet usage, while section G collects a broad range of
20 socio-demographic characteristics.
21

22
23 Closed questions were used, worded in a manner easy to understand. A limited number of
24 responses were provided, either with binary options (e.g. yes or no), or with a numerical
25 Likert scale ranging from 1 to 5, with a further option for “*Not sure*”.
26

27 A list of variables with a brief description is discussed in the Variables section and is
28 summarised in Table 1 in the Appendix.
29

30 **Ethical approval, informed consent and confidentiality of responses**

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32 We completed the checklist for research ethics approval from Imperial College London.
33 As interviews were intended to be conducted in public places among respondents from the
34 general population, the study involved no risk or harm of any type to respondents, no link
35 with clinical data was expected to take place, and no incentives were going to be paid to
36 respondents, the study fitted all the criteria in the first stage checklist with no further
37 formal application to the Imperial College Research Ethics Committee.
38
39

40 At the beginning of each interview, interviewers showed credentials as research assistants
41 at the University of London, informed respondents that their answers were anonymous
42 and would remain strictly confidential, and that all responses and data were going to be
43 treated statistically and used for the purposes of scientific research only. Informed consent
44 by respondents was then given at the beginning of each interview.
45
46
47

48 **Sample**

49
50 The survey was conducted in the field by the researchers involved in the paper. The
51 borough of Hammersmith and Fulham was chosen for the location of the field survey
52 because it is a transport hub in Central West London, and hosts many offices and several
53 major business centres. The four interviewers went to different public locations within the
54 borough (underground stations, high street and residential areas) at different times during
55 the day (early morning, midday and in the evening) and in different days of the week
56 (including weekends). By covering different times and locations within the borough, we
57 aimed at being able to approach both working and non-working members of the public.
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3 During the surveys in the field, the interviewers approached every third male and third
4 female that would pass by them.

5
6 Sample size calculations were based on the intended objective to look at the correlation
7 coefficient between the likelihood of using the websites on the one hand, and a typical
8 survey response, on the other. The minimum sample size to test the null hypothesis of no
9 significant correlation between these two variables was calculated given the most
10 conservative assumption that the correlation coefficient between the variables in the
11 population was in the region of 0.2 (a “low” effect size, the variance of one variables
12 accounting for just 4% of the variance of the other). Under the assumptions that all
13 variables are normally distributed, a bi-directional test (both positive and negative
14 correlation were expected) with 95% significance level reaches a standard 80% power
15 level at a minimum sample of n=200 subjects.¹¹ We thus targeted a sample size of 200
16 respondents. The envisaged target was then readily achieved, since only 68 subjects who
17 were initially approached refused to take part to the survey, with a final response rate of
18 74%.
19
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24

25 **Statistical analysis**

26
27 We have carried a multiple regression analysis which aims to explore the determinants of
28 i) being either aware or not of doctor rating websites; and ii) the individual intention of
29 using these websites in the future.
30

31 The dependent variable in the first case is modeled as a binary variable (*Awareness*)
32 taking values 1 or 0 for the respondents who reported to be aware or unaware of the
33 websites, respectively. The second dependent variable is instead modeled as a discrete
34 ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be
35 ‘not likely’, ‘quite likely’, and ‘likely’ to use the websites in the future, respectively.
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38 The explanatory variables (X_i) include the variables described in Table 1, namely:
39 individual socio-demographic characteristics; a set of variables on the characteristics of
40 the healthcare providers that the respondents consider important for making their
41 decisions on where to receive health care; a set of variables on the sources of information
42 that are important in making decisions about where to receive health care; two dummy
43 variables that capture whether the patient’s gender and age are the same, or within a
44 comparable range, respectively, than the gender and age of her GP; a set of variables that
45 describe the respondents’ feelings about their relation with their doctor; a variable
46 indicating the level of participation of the respondents in their GPs’ decisions; a set of
47 variables on patients’ satisfaction with the level of choice in their healthcare decisions; a
48 dummy variable controlling for whether the subjects had access to internet at home or at
49 work; a variable on awareness of the existence of doctor-rating websites; and a variable on
50 whether the subject always asks to see the same GP (see Table 1 for variables’ details).
51 The choice of the explanatory variables was further informed by the bivariate correlation
52 analysis reported in Table 2 in the Appendix.
53
54
55

56 We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the
57 *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability
58 between the empirical results obtained for the two set of regressions. The two models, in
59
60

fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications, which assume a Gaussian error term and present results in terms of estimated coefficients instead of odds ratio. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

Descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects. As a result of the convenience sampling, our resulting sample consisted in 141 workers (ten of which reported to be currently unemployed), 33 students, nine officially unemployed and six retired subjects. Eleven respondents did not report their working status.

The mean age of our sample was of 39.57. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.¹⁰ From the sample, 54.44% were female, 48.79% of 'White British' ethnicity and 28.99% non white respondents.

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.¹²

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree.

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about.

In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who

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3 see accessibility and financial performances of hospitals important factors in making
4 decisions where to seek healthcare.

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6 [Table 2 in here]
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10 In Table 3 we present the estimate results of four different specifications of the binary
11 logistic regression for the dependent variable *Awareness* with different sets of regressors,
12 which are presented in terms of the odds ratio, together with the standard errors, and levels
13 of significance.
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17 [Table 3 in here]
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19
20 Among the demographic factors, age and ethnicity are the only significant variables. Older
21 individuals are less likely to be aware of the rating websites, which does not constitute a
22 surprise, as they are usually less familiar with the use of internet in general. Moreover, in
23 most specifications, white British and white non-British respondents appear less likely to
24 be aware of the websites.
25

26
27 Among the broader socio-demographic factors, only income is sometimes (marginally)
28 significant, pointing to the fact that respondents with higher reported levels of income tend
29 to be less aware of the websites, while neither education or gender turn out to be
30 significant predictors of awareness.
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32
33 Looking at the characteristics of the providers that respondents consider important in
34 making their decisions on where to receive healthcare, in one specification the reputation
35 of the doctor has a strong positive effect, while both clinical and financial performance
36 rates of the providers show negative significant effects. Thus, the respondents who
37 consider the reputation of the doctor important in deciding where to receive care are more
38 likely to be aware of the rating websites, while this is less often the case for respondents
39 putting a higher weight on financial or clinical performance ratings.
40

41
42 Concerning the sources of information, in one specification respondents who consider the
43 hospital statistics important in deciding where to receive care, turn out to be more likely of
44 being aware of the rating websites, with an effect which is particularly significant and
45 quite remarkable in terms of odds ratio.

46 Furthermore, although in one specification the respondents who feel that their GPs spend a
47 sufficient time in their consultation are less likely to be aware of the internet rating
48 websites, both the statistical significance and the estimated odds ratio do not appear robust
49 across specifications. Although all other variables on doctor-patient relationship were not
50 significant, whenever included among the regressors, the gender match between the GP
51 and the patient predicts higher awareness of the website ratings, with a noticeable effect as
52 evident by the reported value of the odds ratio.
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55 From those that were aware of the existence of doctor-rating websites only 6 have
56 reported to have used these websites. In light of this low usage rate, and of the consequent
57 limitations of conducting statistical estimations with very little variation in the dependent
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3 outcomes, we have thus focused the rest of the analysis on the determinants of the
4 intention to use, rather than actual usage of, doctor rating websites.
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8 **Results on the likelihood to use online rating websites**

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10 In Table 2 we present the set of bivariate correlations between the intention to use the
11 doctor rating websites and each of the variables collected in the survey. As it can be
12 noticed, there is a positive correlation between having internet access, and being aware of
13 the doctor rating websites. Both the age and the gender concordance with the GP show a
14 positive correlation with the intention to use. Positive correlations with the willingness to
15 use doctor rating websites also hold for respondents who think that those websites, or
16 hospital statistics, are important sources of information. Also the fact that respondents
17 believe that online rating is a reliable measure is clearly correlated with the intention to
18 use them. Finally, positive correlations also hold for respondents who feel that their doctor
19 has time to dedicate to them, or who see several aspects of healthcare providers - such as
20 reputation, clinical and financial performances, waiting lists, accessibility – as important
21 factors when making decisions where to seek healthcare.
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24 In Table 4 we present the estimate results of six different specifications of the ordered
25 logistic regression for the dependent variable *IntentionToUse* with different sets of
26 regressors, which are presented in terms of the odds ratio, together with the standard
27 errors, and levels of significance.
28

29 **[Table 4 in here]**
30

31 Concerning socio-demographic variables, it turns out that white British, as well as
32 respondents who reported income in higher brackets, said they were less likely to use
33 doctor-rating websites. Moreover, we do not find any effect of education, age and gender
34 of the respondents on the likelihood of their intention to use (the results of the
35 specifications including the age and gender variables are not reported in the table for the
36 sake of space but are available from the authors upon request).
37
38

39 Looking at the characteristics of the healthcare providers that respondents perceived as
40 important while making decisions where to receive healthcare, our data suggest that those
41 who consider clinical performance and doctor reputation (in most specifications) as
42 important factors, are more likely to use doctor-rating websites. These results are
43 consistent with the nature of the information provided in these websites. Also, and quite
44 intuitively, subjects who consider the familiarity with their doctor an important factor to
45 decide where to seek healthcare, tend to be less likely to intend to use websites.
46
47

48 Concerning the role of the different sources of information on the decisions of where to
49 seek healthcare, respondents who see published hospital statistics as important sources of
50 information are more likely to use the rating websites. On the other hand, and
51 interestingly, those for whom GP advice is an important source of information for decision
52 making are less likely to use doctor-rating websites.
53
54

55 Also the nature of the doctor-patient relationship seems to play a key role in explaining
56 whether respondents intend to use online rating websites. First, patients with GPs of the
57 same gender tend to be more likely to use the websites. Second, respondents for whom the
58 doctor is able to listen to them, and who perceive the nature of the relationship with their
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GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the representativeness of our sample; ii) the level of awareness and usage of doctor rating websites; and iii) the determinants of the intention to use them in the future.

The sample

As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.

Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed compared to only 5% from the Census data for the borough.

The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).¹³ Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).¹³

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).¹³ This is also significantly lower than figures for England, White British accounting for 87% of the population.¹³ The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white

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3 ethnic groups accounting for 9% of the total population.¹³ Our sample, therefore, allows
4 controlling for high heterogeneity in ethnic background even with a limited sample size.
5

6 Our sample had a high percentage of people with higher level qualifications: 46.24% of
7 the sample had a university degree and 27.96% had a postgraduate degree. This is
8 reflective of Hammersmith and Fulham, where 45% of the population have a qualification
9 of degree level or higher, a figure which is significantly higher than in England, where
10 only 19.8% have a degree or higher qualification.¹³
11

12 13 14 **Awareness and actual usage**

15 Only 15% of our sample were aware of the existence of these websites, indicating that the
16 awareness and, consequently, usage of these online sources is still quite limited in the UK,
17 although significantly higher than what the previous studies have shown.⁵
18

19 A slow uptake of online ratings has also been reported in the US, a more market-oriented
20 health system. It is indicative that only 6% of Americans were aware of Hospital
21 Compare, the quality reporting website maintained by the Centres for Medicare and
22 Medicaid Services (CMS).¹⁴
23

24 Concerning the low reported rate of active usage of doctor rating websites, the finding is
25 not too surprising given that the survey was done among the general population: the
26 reason why many more respondents were aware of the online ratings than did actually use
27 it may simply be because those subjects did not actually need to see a doctor. Generally
28 speaking, the finding is consistent with previously reported levels of usage in the UK. In
29 particular, a study by the Kings Fund⁵ that explored the information sources used by
30 patients in making decisions about where to receive care, found that only 4% of the
31 patients used the *NHS Choices* website, with the majority instead drawing information
32 from their own experiences (41%), advice from GP (36%), advice from friends and family
33 (18%), and other websites (1%). Similarly, a national survey on patients' choice by the
34 Department of Health found that the *NHS Choices* website was only used by 5% of
35 respondents.⁶
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39 The proportion of active users in our survey is also consistent with evidence from the US
40 on the limited usage of doctor rating websites. Gao et al.⁸ analysed 386,000 national
41 ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those
42 included in the study had received some rating. Lagu, Hannon, Rothberg et al.⁷ also
43 reported a low average number of ratings per physician.
44
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46 **Intention to use**

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48 The results that show that white British and respondents who reported income in higher
49 brackets said that they were less likely to use doctor-rating websites, is partly in contrast
50 to what found by the previous literature^{12,15,16} and can signal that white British subjects
51 and respondents with higher self-reported income may feel less in need of checking online
52 doctor ratings, perhaps because they may also have private, or employer-paid, health
53 insurance schemes, or because they are in the position of directly accessing alternative
54 sources of information through their networks of acquaintances. Another possible
55 explanation may be that white British individuals may trust less information that exists
56 online and they have more concerns about confidentiality issues as shown in a study
57 among different socio-economic groups in the US by Brodie et al.¹⁷ As the estimated
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3 effect of these variables appear to be robust across all empirical specifications, these
4 findings seem to suggest that online doctor-rating websites are likely to be particularly
5 attractive to subjects with non-white British ethnicity and less favoured economic
6 background.

7
8 On the other hand, the lack of statistical significance in the ordered logit estimates, seems
9 to suggest that while age can be a significant factor in explaining the awareness of Internet
10 for health information, it is not significantly explaining the intention to use doctor-rating
11 websites once subjects are made aware of their existence. The analogous lack of
12 significance for the respondents' gender, on the other hand, does not support the view that
13 women in the UK may be more likely to use patient sources of information and rating
14 websites, although they have been found to desire patient choice more than men (69% to
15 56%).⁹ Both results differ from the findings from the literature. The literature has shown
16 that socio-demographic characteristics are major determinants of usage of online health
17 information. In particular women and younger adults are more active 'online health
18 information seekers'.^{10,18-21}

19
20
21 Education has also been found to determine usage of online and offline health
22 information. Cotton and Gupta¹⁶ and Diaz et al,¹² carried out research into the
23 characteristics of online and offline health information seekers and showed that
24 individuals who are less educated were shown to be less likely to be users of online health
25 information.

26
27
28 Therefore even though, according to our findings, intentions to use do not differ across
29 different socio demographic groups, actual usage may be greatly determined by access
30 rather than intentions to use, with the former substantially differing according to socio-
31 economic and demographic characteristics. That is, there may exist income- or age-related
32 barriers to actual access that prevent individuals from using doctor rating sites even
33 though their intentions to use them are similar.

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35
36 From the perspective of the doctor-patient relationship, the finding that patients with GPs
37 of the same gender tend to be more likely to use the websites is of particular interest, and
38 it is consistent with the analogous effect found for the likelihood of being aware of those
39 websites. Considered together these findings point to the possible explanation that the
40 doctor and the Internet may sometimes be seen by patients as "complementary", rather
41 than alternative, information channels.¹⁵ This interpretation is further confirmed by the
42 finding that respondents for whom the doctor is able to listen to them, and who perceive
43 the nature of the relationship with their GP as friendly, also tend to be more likely to use
44 the websites.

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46
47 The doctor-patient gender concordance, in fact, has often been reported in the literature as
48 a factor associated with higher patient satisfaction with the consultation as well as better
49 outcomes.²² If we interpret the gender match variable as an indication of satisfaction with
50 the consultation, our finding indicates that being aware of and the intention to use the
51 doctor-rating websites is not necessarily the result of a poor consultation. Instead, the
52 Internet and the doctor are likely to be seen as complementary, rather than alternative,
53 information channels.

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56 Nevertheless for those that put a higher weight on financial or clinical performance ratings
57 this is less the case, perhaps signalling that those respondents may be more familiar with
58 alternative sources of information.

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4 On the other hand, there may be other dimensions in the patient-doctor relationship which
5 seem to rather point to a “substitute” relationship with information on the Internet. For
6 instance, the fact that respondents who feel that their doctor explains things clearly are less
7 likely to use online rating websites, suggests that when they are generally more satisfied
8 with the feedback provided by their doctor they are less concerned about finding about
9 alternative doctors and compare them with their current GP.
10

11 This result on a “substitute relationship” is consistent with previous evidence by Diaz and
12 colleagues¹² that found that 11% of their respondents said they would rather use the
13 Internet ‘instead of seeing or speaking with their doctors’, and that 59% of respondents
14 ‘did not discuss information with their doctors’. It also seems in line with the study by
15 McMullan¹⁵ that indicates that patients who become dissatisfied with the information
16 provided to them by the health professionals are more likely to seek confirmation of the
17 information given and additional information on the Internet.
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20 As for the other aspects of the patient-doctor relationship, the finding that the more
21 autonomous patients are in their healthcare decisions, the more willing they are to use the
22 rating websites is also consistent with previous evidence: a study by McMullan¹⁵, for
23 instance, reports that patients would seek health information before a consultation ‘to
24 manage their own healthcare independently’. These may be the type of people who are
25 ‘more likely to be health-oriented’ or ‘health conscious’, and therefore be more proactive
26 in consultations.²³
27
28

29 Moreover, the positive association between willingness to use doctor rating websites and
30 levels of satisfaction with the level of choice of GP, and of outpatient appointments in the
31 hospital, can be considered as reinforcing the above discussed interpretation that some
32 dimensions of the doctor-patient relationship may be “complementary” with online
33 information. For instance, patients who are more satisfied with their GP because they feel
34 the latter is more friendly and empathic may also be more likely to engage more actively
35 with health and healthcare information more generally. These results, together with the
36 finding that the respondents who are more satisfied with the level of choice of treatments
37 are less likely to use the websites, suggest that the choice of doctors and providers may be
38 seen as only instrumental for the choice of treatment, and therefore respondents that are
39 happy with treatment choice levels are less likely to shop around for different doctors’
40 opinions.
41
42

43 **General discussion**

44
45 Overall, our evidence on the determinants of intention to use is broadly consistent with
46 recent findings from the literature. Indeed, a study by Stevenson and colleagues²⁴ shows
47 that although patients use the Internet increasingly more, they show no intention of doing
48 so with the aim of disrupting the existing balance of roles during the doctor-patient
49 consultation. They all mentioned the Internet as an additional resource of health and
50 healthcare information. Other evidence suggests that patients with hypertension who
51 search for more information on the Internet, in addition to that they receive from their
52 doctor, may be more engaged in their treatment, and therefore more willing to adhere to
53 medication prescribed by them.²⁵
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57 Our findings that online information can be used not only as “substitute” but also, and
58 perhaps mainly, as “complementary” to several dimensions of the doctor-patient
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3 relationship do not seem to entail any particular evidence suggesting that online ratings
4 may put in danger the doctor-patient relationship, an important aspect which has been
5 raised in the literature.^{26,27}
6

7 The “complementarity” findings, in particular, seem consistent with the evidence from the
8 US which shows that the vast majority of the reviews by patients are generally rather
9 positive.^{7,8,28} Taken together, this evidence can be seen as providing little support to the
10 related concern that the likeliest to use online ratings and enter actual comments may be
11 the most disgruntled patients.²⁹
12

13
14 On a related topic, concerns have been expressed about the ability of online ratings to
15 truly reflect the quality of care. A recent UK study, however, demonstrated a strong
16 relationship between the ratings reported online and more objective measures of clinical
17 quality such as mortality and infection rates,³⁰ while another study showed that online
18 ratings were associated with ratings derived from a traditional paper-based survey.³¹
19 Online ratings, thus, do not seem to provide systematically biased or misleading
20 information regarding the health care that patients receive, at least not more than a
21 traditional survey would do. Consistently with this evidence, our results seem to support
22 the idea that patients may see online ratings as a supplementary information base to be
23 used in support of direct interaction with their doctor, which remains the most significant
24 and reliable information channel.³²
25
26

27 More generally, the evidence provided by our study confirms that the actual usage of
28 doctor-rating websites in the UK remains particularly low. In our sample only 29
29 respondents out of 200 were aware of the existence of the patient rating websites. Among
30 these, however, only 6 subjects reported they were actually using those websites.
31
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33 These figures are substantially in line with previous evidence brought forward from the
34 literature for the UK.^{5,6} The fact that even in the US, a more market-oriented health
35 system, the use of similar sites is not much higher may suggest that the slow uptake in the
36 UK cannot be attributed only to the early stage of the “choice” model. Considered together
37 these results may pose serious concerns on the reasons and consequences of the lack of
38 patient awareness and usage of online health related information.

39 Previous studies in the US have reported a number of reasons behind this slow uptake,
40 including i) the preference for more traditional information channels, such as
41 recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact
42 that people do not recognise that the quality of care may vary.²⁷
43

44 Our study confirms that not only awareness of rating websites is still limited among the
45 general public in the UK, but awareness and willingness to use per se do not seem a
46 sufficient condition to guarantee active usage. This poses a double challenge from a
47 clinician and health policy perspective.
48

49 In fact, on the one hand, the documented correlation between online ratings and other
50 measures of healthcare quality, including survey-based ratings and clinical quality
51 indicators,^{30,31} necessarily requires that patients have already gone through three
52 preliminary hurdles, namely i) being aware of, ii) having effective access to, and ii) being
53 active users of the doctor rating websites. If the ultimate goal is indeed the continuous
54 enhancement of healthcare quality, the effective removal of this double hurdle is likely to
55 become the next priority to guarantee the full spread of online rating website.
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3 On the other hand, while appropriate online and offline informational campaigns are likely
4 to overcome the first hurdle, thus effectively raising patients' awareness of online ratings
5 as a potential source of information on provider quality, informational campaigns alone
6 can fail to grant effective access and effectively trigger changes in behaviour. Alike in
7 several other health contexts, in fact, 'nudging' behaviour may be difficult as a mere
8 consequence of accessing more information.
9

10
11 If this is the case, other avenues should be explored to increase the active usage of rating
12 websites by patients who are already aware of them. For instance, the evidence brought
13 forward by the present study confirms the importance of the doctor-patient relationship as
14 a factor determining individuals' awareness of and willingness to use online ratings^{27,33-36}
15 and suggests that tailored behavioural interventions based on the doctor-patient
16 relationship have the potential to help patients to overcome this last hurdle and actively
17 engage with online ratings.
18
19

20 21 **Limitations of the study**

22
23 The convenience field survey was considered the most appropriate administration mode to
24 involve a sample of respondents from the general population. An online survey, in fact, by
25 exclusively reaching the segment of active internet users, would have failed to address the
26 main goal of the study, whether the users of doctor-rating websites are fairly
27 representative of the general public
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29

30
31 However, while dictated by practical issues, the convenience sampling is a limitation of
32 the study, and tends to over-represent respondents who are currently not employed, such
33 as unemployed, retired and students. Also the fact that the study was conducted in only
34 one borough of London limits the possibility to immediately generalise the findings to the
35 broader UK population.
36

37
38 In an attempt to make such limitations of smaller concern to enhance the external validity
39 and generalisability of the analysis, we have i) chosen a borough which comprises a mix
40 of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii)
41 conducted surveys in the field at different public locations and at different times of the
42 day and of the week to approach both working and non-working members of the public;
43 and iii) controlled for a wide range of socio-demographic measures in the statistical
44 analysis.
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48 **CONCLUSIONS**

49
50 This study brings forward direct evidence suggesting that the awareness and actual usage
51 of doctor-rating websites in the UK remains particularly low. In a sample of the general
52 public from a borough of London only 29 respondents out of 200 were aware of the
53 existence of the patient rating websites, and only 6 reported to be actually using those
54 websites.
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58 By collecting a broad range of information on the socio-demographic characteristics of the
59 respondents, their views and perceptions of the most important aspects of healthcare
60

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3 quality, patient choice, and doctor-patient relationship, the study also explicitly explores
4 the determinants of respondents' awareness of the doctor ratings websites, and of their
5 intention to use the sites in the future.

6
7 Among other results, the statistical analysis provides evidence that the GP-patient gender
8 concordance is associated with higher awareness of, and intention to use, the websites,
9 while respondents who feel that their GP is a valuable source of clear information, and
10 who are more satisfied with the level of choice of healthcare treatments, are less likely to
11 use online rating websites.

12
13 The existence of both “substitute” and “complementary” effects between the doctor-
14 patient and the Internet information channels is not at all conflicting. In fact, they both
15 indicate that the level of concordance achieved during the consultation is likely to define
16 whether or not individuals will seek for further information channels, such as the Internet.

17
18 When the outcome of a consultation does not satisfy the patient, the use of Internet fills
19 the gap of information needs. The intention to use online doctor-rating websites in this
20 case also indicates that these patients are likely to look at these websites with the aim of
21 seeking for another clinician. Individuals who are satisfied with their GPs may also search
22 these websites, but more as an additional information channel as they seem keener to
23 engage more actively with health and healthcare information in general.

24
25 The findings of our study thus contribute also to the wider debate on the inter-
26 relationships between Internet usage and the doctor-patient relationship.^{7,27,28,33-36} The
27 argument, sometimes addressed by the previous literature, that information on the Internet
28 can threaten the trust relationship and the balance of roles between doctors and patients,
29 seems a concern which is not supported by our evidence. If any, a potential challenge to
30 the doctor-patient relation can only affect the patients who already feel dissatisfied with
31 the ability of their doctor to listen to them and provide them enough information regarding
32 their condition, or with the level of their choice for healthcare treatments.

33
34 The above, however, can hardly be seen as a serious threat by those who advocate a
35 greater choice by patients. On the contrary, if the latter is indeed a priority in the health
36 policy agenda, online information on healthcare providers should be seen as a challenging
37 opportunity to enhance patients' choice in healthcare, and public engagement with health
38 information, especially for the less favoured segments of the population. Indeed, our
39 findings suggest that subjects of non-white background and with lower income are more
40 willing to use online ratings.

41
42 Finally, our study highlights that subjects who use doctor rating websites are unlikely to
43 be representative of the overall patients' pool. In particular, they tend to over-represent
44 opinions from young, non-white British, medium-low income patients who are not
45 satisfied with their choice of healthcare treatments. Accounting for differences in the
46 users' characteristics is important when interpreting results from doctor-rating sites and
47 when informing interventions that aim at enhancing the public engagement with health
48 information on the Internet, and the representativeness of the users who seek and provide
49 feedback online.

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3 **Data sharing:** technical appendix, statistical code and dataset available from the
4 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
5 obtained but the presented data are anonymised and risk of identification is low.
6

7 All authors had full access to all the data in the study and take responsibility for the
8 integrity of the data and the accuracy of the data analysis.
9

10
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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (<i>Awareness</i>) (0=no, 1=yes)	200	0.142	0.350
Intention to use (<i>IntentionToUse</i>)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (<i>HC_Waiting</i>)	198	3.818	1.165
Rates of hospital-acquired complications (<i>HC_HospComp</i>)	188	3.761	1.193
Clinical performance (<i>HC_Clinical_Performance</i>)	189	4.037	1.136
Closeness to home (<i>HC_CloseHome</i>)	200	3.683	1.265
Familiarity with the doctor (<i>HC_Familiarity</i>)	194	3.237	1.306
Financial performance of the hospital (<i>HC_FinPerform</i>)	191	2.387	1.164
Reputation of the doctor (<i>HC_GP_Reputation</i>)	199	3.980	1.137
Accessibility and parking facilities (<i>HC_Access</i>)	192	2.656	1.321
Past experience with the provider (<i>HC_PastExp</i>)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (<i>SI_GP_Advice</i>)	198	4.071	1.030
Published hospital statistics (<i>SI_HospStat</i>)	183	2.934	1.193
Online doctor rating websites (<i>SI_DoctorRating</i>)	178	2.315	1.204
Personal experiences in the past (<i>SI_PastExp</i>)	192	4.234	1.004
Feedback from family/friends (<i>SI_Family</i>)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (<i>DOC_Listens</i>)	200	0.575	0.496
...has time (0=no, 1=yes) (<i>DOC_Time</i>)	200	0.410	0.493
...explains (0=no, 1=yes) (<i>DOC_Explains</i>)	200	0.555	0.498
...is friendly (0=no, 1=yes) (<i>DOC_Friend</i>)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (<i>DOC_Trust</i>)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (<i>Reliable</i>)	141	2.759	1.055
How actively do you participate with your GP in making decisions (<i>Participation</i>)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (<i>SAT_C_GP</i>)	173	3.451	1.138
...hospital (<i>SAT_C_Hosp</i>)	152	3.493	1.055
...doctor (<i>SAT_C_Doc</i>)	139	3.252	1.022
...treatment (<i>SAT_C_Treatment</i>)	148	3.554	0.928
...time spent (<i>SAT_C_Time</i>)	168	3.179	1.123

Ethnicity				
White British (0=no, 1=yes) (WhiteBritish)	200	0.488	0.501	
White Other (0=no, 1=yes) (WhiteNonBritish)	200	0.222	0.417	
Highest level of educational attainment* (Education)				
1 if GCSE	12			
2 if A-Level/BTEC/Vocational	36			
3 if University undergraduate degree	86			
4 if Postgraduate Degree	52			
Age (years) (Age)	199	39.572	16.083	
Gender (Gender)				
Female (=1)	112			
Male (=0)	88			
Income (Income)				
0	40			
<£15000 but >0	27			
£15,000-£35,000	36			
£35,000-55,000	22			
£55,000-£75,000	14			
£75,000-£95,000	7			
>£95,000	14			
Doctor-patient concordance				
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (AgeMatch)	200	0.333	0.473	
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (GenderMatch)	200	0.444	0.498	

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		DOC_Friend	0.0127 (0.8599)	-0.0984 (0.1667)
Awareness	0.0846 (0.2359)	1	DOC_Trust	-0.0288 (0.6899)	-0.0388 (0.5863)
HC_Waiting	0.1617** (0.025)	0.016 (0.8236)	Participation	0.0412 (0.5678)	0.0189 (0.7911)
HC_HospComp	0.1474** (0.0465)	-0.0033 (0.9643)	SAT_C_GP	-0.0419 (0.591)	0.122 (0.1108)
HC_Clinical_Performance	0.2146*** (0.0034)	-0.0784 (0.2849)	SAT_C_Hosp	-0.003 (0.9715)	0.1024 (0.2111)
HC_CloseHome	-0.0623 (0.3848)	-0.0998 (0.1587)	SAT_C_Doc	-0.0348 (0.6909)	0.137 (0.1077)
HC_Familiarity	-0.0078 (0.9153)	-0.0752 (0.2986)	SAT_C_Treatment	-0.0157 (0.8526)	0.0932 (0.2598)
HC_FinPerform	0.1253** (0.0884)	0.1435** (0.0482)	SAT_C_Time	-0.0239 (0.7632)	0.0541 (0.4878)
HC_GP_Reputation	0.2020*** (0.0047)	-0.016 (0.8234)	CB_AWARE	-0.0381 (0.5972)	0.2997*** (0)
HC_Access	0.0451 (0.5399)	0.1196* (0.0992)	CB_Use	0.0996 (0.1651)	0.054 (0.4477)
HC_PastExp	0.0978 (0.182)	-0.0244 (0.7369)	WEB_Access	0.2054*** (0.0041)	0.1197* (0.0923)
SI_GP_Advice	0.1054 (0.1457)	0.0163 (0.8202)	AgeMatch	0.1373* (0.0532)	0.0695 (0.3234)
SI_HospStat	0.2937*** (0.0001)	0.1159 (0.1192)	GenderMatch	0.2077*** (0.0032)	0.1472** (0.0357)
SI_DoctorRating	0.3759*** (0)	0.1240* (0.099)	WhiteBritish	-0.0429 (0.5477)	-0.0662 (0.3468)
SI_PastExp	0.0563 (0.4455)	-0.0803 (0.2696)	WhiteNonBritish	-0.0017 (0.9809)	-0.0853 (0.2252)
SI_Family	0.1215* (0.0958)	-0.0511 (0.4804)	Income	0.012 (0.8818)	-0.1219 (0.1246)
Reliable	0.3429*** (0)	-0.0311 (0.7153)	Education	-0.0103 (0.8913)	0.0023 (0.9757)
DOC_Listens	0.0629 (0.3824)	-0.0888 (0.2122)	Gender	0.0315 (0.6614)	-0.0087 (0.9029)
DOC_Time	0.1565** (0.0289)	-0.0117 (0.87)	Age	-0.1081 (0.1344)	-0.1918*** (0.0068)
DOC_Explains	0.0968 (0.1784)	0.0152 (0.8314)			

P-Values in parentheses. * p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses

* p<.10, ** p<.05, *** p<.01

For peer review only

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974 (2.377)	2.561 (2.953)	2.000 (1.965)	2.782 (2.613)	1.051 (0.818)	0.946 (0.729)
GenderMatch	18.42* (30.24)	12.03* (17.75)	10.45** (12.33)	10.39** (10.54)	16.67*** (15.48)	14.83*** (13.17)
Awareness	0.0531 (0.108)	0.0505 (0.0971)	0.0964 (0.149)	0.0758** (0.0985)	0.159* (0.176)	0.147* (0.152)
HC_Clinical_Performance	9.289* (11.84)	7.659* (8.241)	5.560** (4.759)	3.401* (2.253)	4.395** (2.653)	4.985*** (2.734)
HC_Familiarity	0.359 (0.287)	0.468 (0.282)	0.371* (0.220)	0.414* (0.206)	0.355** (0.147)	0.351*** (0.141)
HC_GP_Reputation	2.328 (1.980)	2.827 (2.106)	3.608* (2.542)	4.410** (2.753)	2.903** (1.374)	2.776** (1.260)
SI_GP_Advice	0.170* (0.173)	0.223 (0.206)	0.238** (0.167)	0.283** (0.176)	0.344** (0.186)	0.396* (0.193)
SI_HospStat	14.26** (18.84)	13.74** (15.60)	7.220*** (5.008)	6.550*** (4.200)	5.371*** (2.932)	5.133*** (2.703)
SI_DoctorRating	1.596 (1.636)	1.067 (0.958)	1.424 (0.851)	1.461 (0.770)	2.245** (0.835)	2.312** (0.876)
Reliable	6.181 (7.691)	8.682* (9.969)	6.492** (4.993)	7.586*** (5.561)	4.457*** (2.351)	4.061*** (2.003)
DOC_Listens	141.9* (424.8)	51.44 (126.4)	44.20* (90.99)	27.05** (41.26)	22.03** (28.29)	22.98** (28.34)
DOC_Explains	0.00690* (0.0183)	0.00680** (0.0148)	0.00509** (0.0105)	0.00695*** (0.0124)	0.0120*** (0.0171)	0.0124*** (0.0169)
DOC_Friend	12.88 (29.23)	8.375 (14.65)	16.48** (22.41)	19.66*** (22.45)	8.718** (8.047)	7.781** (6.896)
Participation	5.473* (5.255)	5.818* (5.410)	5.171** (3.664)	4.162** (2.687)	2.349* (1.126)	2.228* (1.036)
SAT_C_GP	17.03* (27.58)	8.038 (10.23)	6.593* (6.659)	5.410** (4.048)	4.692** (2.889)	4.377*** (2.484)
SAT_C_Hosp	21.93** (33.71)	22.86** (30.90)	30.01*** (33.63)	34.38*** (35.43)	17.95*** (15.52)	11.11*** (7.578)
SAT_C_Treatment	0.0515** (0.0764)	0.0561** (0.0794)	0.111** (0.106)	0.147** (0.125)	0.145** (0.111)	0.111*** (0.0788)
WhiteBritish	0.0137* (0.0318)	0.0409* (0.0738)	0.0542** (0.0782)	0.0539** (0.0690)	0.0909** (0.0890)	0.105** (0.0973)
Income	0.416* (0.190)	0.382** (0.162)	0.449** (0.154)	0.513** (0.154)	0.476*** (0.129)	0.462*** (0.120)
SAT_C_Doc	0.242 (0.468)	0.243 (0.374)	0.148* (0.161)	0.135* (0.144)	0.427 (0.321)	
SI_PastExp	0.670 (0.787)	0.590 (0.650)	0.535 (0.576)	0.551 (0.250)		
Education	0.486 (0.526)	0.583 (0.554)	0.683 (0.443)	0.610 (0.328)		
HC_Access	1.046 (0.659)	1.124 (0.678)	1.241 (0.564)	1.347 (0.565)		
HC_PastExp	1.030 (0.578)	0.914 (0.487)	0.930 (0.397)			
SI_Family	1.208 (1.357)	1.305 (1.484)	1.439 (1.458)			
DOC_Time	1.223 (2.118)	2.099 (3.261)	2.594 (3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09*	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	**					
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School



We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called “Choose & Book” which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King’s College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

Yes No (if No, skip ahead to Section C)

Other (please specify).....

Q2. How did you find out about these sites?

Family/Friends Doctor

The Media Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes No (if No, skip ahead to Section C)

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis Only before/after an appointment Rarely

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes No

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information Negative information

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these	<input type="checkbox"/>				

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

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Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

Not likely Quite likely Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

- Every time
- After particularly positive experiences only
- After particularly negative experiences only
- After both positive and negative experiences
- Never
- Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

- I would not contribute to these websites
- To inform other patients
- To improve standards of care in the NHS
- As a method of complaint
- In appreciation of a doctor's service
- Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

- I feel my doctor listens to my problems
- I feel my doctor spends enough time with me in each consultation
- I feel my doctor explains things clearly
- I feel my doctor is sociable and friendly

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- I feel that I can trust my doctor's opinions
 None of the above

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Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

- My doctor always makes decisions for me
 I like to know the options available but still let my doctor decide for me
 My doctor and I make the decisions together
 I make decisions for myself, after considering the advice of my GP
 I always make my own decisions, independently of the advice of my GP
 I make decisions with my parents/spouse/relatives

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Q17. Within your GP practice do you always want to see the same GP for an appointment?

- I always request to see the same GP
 I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of treatment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of appointment time (for primary & secondary care)	1	2	3	4	5	Not sure	<input type="checkbox"/>

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>

Choice of doctor for outpatient appointment 1 2 3 4 5 Not sure

Choice of treatment 1 2 3 4 5 Not sure

Choice of appointment time (for primary & secondary care) 1 2 3 4 5 Not sure

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

Yes No

Q21. Have you used this Choose and Book system in the past?

Yes No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

- I have never used Choose & Book
- My doctor always makes decisions for me
- I like to know the options available but still let my doctor decide for me
- My doctor and I make the decisions together
- I make decisions for myself, after considering the advice of my GP
- I always make my own decisions, independently of the advice of my GP
- I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

- Routine outpatient consultation
- Day-case procedure/surgery
- Major surgery
- None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

Yes No

Q25. Have you used the internet in the past to search for health information?

Yes No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

- I'm too busy to have the time to use them
- The sites are not a reliable source of information
- It is difficult to interpret the information provided
- I already have enough information from other sources to make choices
- I don't have access to the internet
- I did not know these websites existed
- I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

- Shopping websites (e.g. Amazon)
- Holiday websites (e.g. TripAdvisor)
- Car insurance websites (e.g. Compare The Market)
- Restaurants/venue websites (e.g. ViewLondon)
- Film websites (e.g. Rottentomatoes)
- Other (please specify).....
- I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- Star-rating out of 5
- Percentage scores
- Thumbs Up/Down
- Written comments from patients/users
- No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age?

Q30. What is your gender?

Male Female

Q31. How would you describe your ethnicity?

<input type="checkbox"/>	White – British	<input type="checkbox"/>	Other Asian – non-Chinese
<input type="checkbox"/>	White – Others	<input type="checkbox"/>	Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. What is your postcode?

Q33. How many other individuals do you live with?

Q34. Do you live with your parents?

Yes No

Q35. What is/was your profession?

Unemployed Retired

Q36. What is your level of pre-tax income?

0
 <£15000 but >0 £15,000-£35,000
 £35,000-55,000 £55,000-£75,000
 £75,000-£95,000 >£95,000

Q37. What is your highest level of educational attainment?

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

0 times 1-3 times
 4-5 times More than 5 times

Q39. What is the sex of your GP?

Male Female

Q40. How old is your GP?

<30 years
 30-50 years
 >50 years

Q41. What is the ethnicity of your GP?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

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	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP.

This is the end of the questionnaire, thank you for your time.



For peer review only

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴,
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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴,
Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating and its usage among the general population.
- To understand the main predictors of what makes people ~~aware of, and~~ willing to use doctor-ratings websites.

Key messages:

- The share of the general public which uses doctor-rating websites is still quite low.
- Elderly, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' ~~awareness of, and~~ intention to use, doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's ~~awareness of and~~ willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent at which doctor-rating websites are known and used among the general population. To understand the main predictors of what makes people ~~aware of, and~~ willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. Elderly, white British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The doctor-patient relationship also plays a key role in explaining ~~awareness of and~~ intention to use the websites: the GP-patient gender concordance is associated with higher ~~awareness of, and~~ intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on

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3 doctor-ranking websites, though, are unlikely to be representative of the overall patients'
4 pool. In particular, they tend to over-represent opinions from young, non white British,
5 medium-low income patients who are not satisfied with their choice of the healthcare
6 treatments and the level of information provided by their GP. Accounting for differences
7 in the users' characteristics is important when interpreting results from doctor-rating sites.
8

9 Key messages

- 10 • The share of the general public which uses doctor-rating websites is still quite low.
- 11 • Elderly, subjects with white British background, as well as subjects with higher
12 income are less likely to use doctor-rating websites.
- 13 • The GP-patient gender concordance is associated with higher ~~awareness of, and~~
14 intention to use, the websites.
- 15 • Subjects who feel that their GP explains things clearly and is a valuable source of
16 clear information, are less likely to use online rating websites.
- 17 • Subjects who feel that they are more satisfied with the level of choice of healthcare
18 treatments are less likely to use online rating websites.
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INTRODUCTION

In recent years, both the NHS Plan¹ and the NHS Improvement Plan², set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.³ Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"⁴ acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence*, have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund⁵ explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.⁶ These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.^{7,8} Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez⁹ found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.¹⁰

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among the general public in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

~~The field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the~~

~~main goal of the study, whether the users of doctor rating websites are fairly representative of the general public.~~

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed to have a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for “*Not sure*”.

A list of variables with a brief description is discussed in the Variables section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

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

Sample

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several

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2
3 major business centres. The four interviewers went to different public locations within the
4 borough (underground stations, high street and residential areas) at different times during
5 the day (early morning, midday and in the evening) and in different days of the week
6 (including weekends). By covering different times and locations within the borough, we
7 aimed at being able to approach both working and non-working members of the public.
8 During the surveys in the field, the interviewers approached every third male and third
9 female that would pass by them.

10
11 Sample size calculations were based on the intended objective to look at the correlation
12 coefficient between the likelihood of using the websites on the one hand, and a typical
13 survey response, on the other. The minimum sample size to test the null hypothesis of no
14 significant correlation between these two variables was calculated given the most
15 conservative assumption that the correlation coefficient between the variables in the
16 population was in the region of 0.2 (a “low” effect size, the variance of one variables
17 accounting for just 4% of the variance of the other). Under the assumptions that all
18 variables are normally distributed, a bi-directional test (both positive and negative
19 correlation were expected) with 95% significance level reaches a standard 80% power
20 level at a minimum sample of n=200 subjects.¹¹ We thus targeted a sample size of 200
21 respondents. The envisaged target was then readily achieved, since only 68 subjects who
22 were initially approached refused to take part to the survey, with a final response rate of
23 74%.

30 Statistical analysis

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32 We have carried a multiple regression analysis which aims to explore the determinants of
33 i) being either aware or not of doctor rating websites; and ii) of the individual intention
34 of using these websites in the future.

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37 The dependent variable in the first case is modeled as a binary variable (*Awareness*)
38 taking values 1 or 0 for the respondents who reported to be aware or unaware of the
39 websites, respectively. The second dependent variable is instead modeled as a discrete
40 ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be
41 ‘not likely’, ‘quite likely’, and ‘likely’ to use the websites in the future, respectively.

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44 The explanatory variables (X_i) include the variables described in Table 1, namely:
45 individual socio-demographic characteristics; a set of variables on the characteristics of
46 the healthcare providers that the respondents consider important for making their
47 decisions on where to receive health care; a set of variables on the sources of information
48 that are important in making decisions about where to receive health care; two dummy
49 variables that capture whether the patient’s gender and age are the same, or within a
50 comparable range, respectively, than the gender and age of her GP; a set of variables that
51 describe the respondents’ feelings about their relation with their doctor; a variable
52 indicating the level of participation of the respondents in their GPs’ decisions; a set of
53 variables on patients’ satisfaction with the level of choice in their healthcare decisions; a
54 dummy variable controlling for whether the subjects had access to internet at home or at
55 work; a variable on awareness of the existence of doctor-rating websites; and a variable on
56 whether the subject always asks to see the same GP (see Table 1 for variables’ details).

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3 The choice of the explanatory variables was further informed by the bivariate correlation
4 analysis reported in Table 2 in the Appendix.

5
6 We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the
7 *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability
8 between the empirical results obtained for the two set of regressions. The two models, in
9 fact, only differ in the number of values that the dependent variables can take, while the
10 underlying structure of the error terms follows the same standardized logistic distribution.
11 The logistic specification is particularly appealing because its results can be readily
12 expressed in terms of odds ratio. We have, however, conducted a robustness check by
13 replicating the multiple regression analysis using the alternative binary and ordered probit
14 specifications, which assume a Gaussian error term and present results in terms of
15 estimated coefficients instead of odds ratio. The two set of regressions provide consistent
16 estimates and results which are qualitatively fully aligned. Results of the probit
17 specifications are available, upon request, from the authors.
18
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20 All the regression analysis has been conducted using STATA v.11.
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23 24 25 RESULTS

26 27 Descriptive statistics

28
29 Descriptive statistics of all the dependent and independent variables for the resulting
30 sample of respondents to our survey are provided in detail in Table 1, and here we briefly
31 report their main aspects. As a result of the convenience sampling, our resulting sample
32 consisted in 141 workers (ten of which reported to be currently unemployed), 33 students,
33 nine officially unemployed and six retired subjects. Eleven respondents did not report
34 their working status.
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36

37 ~~As common in field surveys of this type, the convenience sampling tended to over-~~
38 ~~represent respondents who were currently not working, or were at home, and thus had~~
39 ~~time to fill out the questionnaire: the proportion of subjects who were not currently~~
40 ~~working, as given by the sum of the respondents who reported to be unemployed, retired,~~
41 ~~or students, indeed amounts to 29% of the sample.~~

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44 ~~Related to that, it turned out that 9.5% of the respondents in our sample were currently~~
45 ~~unemployed, compared to only 5% from the Census data for the borough. The relatively~~
46 ~~higher proportion of unemployed respondents may also be a result of the convenience~~
47 ~~sampling method. Moreover, an unemployment rate higher than the one documented in~~
48 ~~the 2001 Census survey was largely expected, due to the consequences of the economic~~
49 ~~and financial crisis after 2007.~~

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52 ~~Comparing the sample with the Census data for the borough the mean age of our sample~~
53 ~~was slightly older than that for the borough (39.57 years compared to 35.2 years).¹⁵ Our~~
54 ~~sample however was closer to the national mean age of 38.5 years. The range of ages~~
55 ~~seems to show a positive skew, with a greater frequency of people aged 40 years and~~
56 ~~under. This is consistent with the 2001 census data for Hammersmith and Fulham which~~
57 ~~showed the borough contained a larger proportion of young people aged 20-29 (23.8%)~~
58 ~~than the rest of England (12.66%) (ONS, 2001).¹⁵ Age is an important demographic to~~
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consider when analysing our results as age has been shown to be important in internet usage.¹⁴

The mean age of our sample was of 39.57. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. Age is an important demographic to consider when analysing our results as age has been shown to be important in internet usage.¹⁰ From the sample, 54.44% were female, 48.79% of 'White British' ethnicity and 28.99% non white respondents.

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).¹⁵ This is also significantly lower than figures for England, White British accounting for 87% of the population.¹⁵ The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.¹⁵ Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

The majority of actively working respondents reported an income within the £15-35,000 bracket. Income is an important variable to control for in the analysis, as previous literature found that patients using the Internet were more educated and had higher incomes.¹²⁺⁶

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.¹⁵

Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about. This corresponds to less than 15% of our sample, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.⁶

In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who see accessibility and financial performances of hospitals important factors in making decisions where to seek healthcare.

[Table 2 in here]

A slow uptake of online ratings has also been reported in the US, a more market oriented health system. It is indicative that only 6% of Americans were aware of Hospital

~~Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).¹⁷~~

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 3 in here]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings, ~~perhaps signalling that those respondents may be more familiar with alternative sources of information.~~

Concerning the sources of information, in one specification respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio. ~~This may signal the possible existence of 'complementary' effects between the two sources of information, according to which individuals who give importance to hospital statistics are also more likely to actively seek for doctor rating websites.~~

Furthermore, although in one specification the respondents who feel that their GPs spend a sufficient time in their consultation are less likely to be aware of the internet rating websites, both the statistical significance and the estimated odds ratio do not appear robust across specifications. Although all other variables on doctor-patient relationship were not significant, whenever included among the regressors, the gender match between the GP and the patient predicts higher awareness of the website ratings, with a noticeable effect as evident by the reported value of the odds ratio.

From those that were aware of the existence of doctor-rating websites only 6 have reported to have used these websites. In light of this low usage rate, and of the consequent limitations of conducting statistical estimations with very little variation in the dependent

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3 outcomes, we have thus focused the rest of the analysis on the determinants of the
4 intention to use, rather than actual usage of, doctor rating websites.
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8 **Results on the likelihood to use online rating websites**

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10 In Table 2 we present the set of bivariate correlations between the intention to use the
11 doctor rating websites and each of the variables collected in the survey. As it can be
12 noticed, there is a positive correlation between having internet access, and being aware of
13 the doctor rating websites. Both the age and the gender concordance with the GP show a
14 positive correlation with the intention to use. Positive correlations with the willingness to
15 use doctor rating websites also hold for respondents who think that those websites, or
16 hospital statistics, are important sources of information. Also the fact that respondents
17 believe that online rating is a reliable measure is clearly correlated with the intention to
18 use them. Finally, positive correlations also hold for respondents who feel that their doctor
19 has time to dedicate to them, or who see several aspects of healthcare providers - such as
20 reputation, clinical and financial performances, waiting lists, accessibility – as important
21 factors when making decisions where to seek healthcare.
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24 In Table 4 we present the estimate results of six different specifications of the ordered
25 logistic regression for the dependent variable *IntentionToUse* with different sets of
26 regressors, which are presented in terms of the odds ratio, together with the standard
27 errors, and levels of significance.
28

29 **[Table 4 in here]**
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31 Concerning socio-demographic variables, it turns out that white British, as well as
32 respondents who reported income in higher brackets, said they were less likely to use
33 doctor-rating websites. Moreover, we do not find any effect of education, age and gender
34 of the respondents on the likelihood of their intention to use (the results of the
35 specifications including the age and gender variables are not reported in the table for the
36 sake of space but are available from the authors upon request).
37
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39 Looking at the characteristics of the healthcare providers that respondents perceived as
40 important while making decisions where to receive healthcare, our data suggest that those
41 who consider clinical performance and doctor reputation (in most specifications) as
42 important factors, are more likely to use doctor-rating websites. These results are
43 consistent with the nature of the information provided in these websites. Also, and quite
44 intuitively, subjects who consider the familiarity with their doctor an important factor to
45 decide where to seek healthcare, tend to be less likely to intend to use websites.
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48 Concerning the role of the different sources of information on the decisions of where to
49 seek healthcare, respondents who see published hospital statistics as important sources of
50 information are more likely to use the rating websites. On the other hand, and
51 interestingly, those for whom GP advice is an important source of information for decision
52 making are less likely to use doctor-rating websites.
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55 Also the nature of the doctor-patient relationship seems to play a key role in explaining
56 whether respondents intend to use online rating websites. First, patients with GPs of the
57 same gender tend to be more likely to use the websites. Second, respondents for whom the
58 doctor is able to listen to them, and who perceive the nature of the relationship with their
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GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, it is interesting to note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on i) the representativeness of our sample; ii) the determinants of the level of awareness and usage of doctor rating websites; iii) the actual usage of the websites; and iiiv) the determinants of the intention to use them in the future.

The sample

As common in field surveys of this type, the convenience sampling tended to over-represent respondents who were currently not working, or were at home, and thus had time to fill out the questionnaire: the proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample.

Related to that, it turned out that 9.5% of the respondents in our sample were currently unemployed compared to only 5% from the Census data for the borough.

The relatively higher proportion of unemployed respondents may also be a result of the convenience sampling method. Moreover, an unemployment rate higher than the one documented in the 2001 Census survey was largely expected, due to the consequences of the economic and financial crisis after 2007.

Comparing the sample with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).¹³ Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%) (ONS, 2001).¹³

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).¹³ This is also significantly lower than figures for England, White British accounting for 87% of the population.¹³ The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham

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which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.¹³ Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification of degree level or higher, a figure which is significantly higher than in England, where only 19.8% have a degree or higher qualification.¹³

Awareness and actual usage

Only 15% of our sample were aware of the existence of these websites, indicating that the awareness and, consequently, usage of these online sources is still quite limited in the UK, although significantly higher than what the previous studies have shown.⁵

A slow uptake of online ratings has also been reported in the US, a more market-oriented health system. It is indicative that only 6% of Americans were aware of Hospital Compare, the quality reporting website maintained by the Centres for Medicare and Medicaid Services (CMS).¹⁴

Concerning the low reported rate of active usage of doctor rating websites, the finding is not too surprising given that the survey was done among the general population: the reason why many more respondents were aware of the online ratings than did actually use it may simply be because those subjects did not actually need to see a doctor. Generally speaking, the finding is consistent with previously reported levels of usage in the UK. In particular, a study by the Kings Fund⁵ that explored the information sources used by patients in making decisions about where to receive care, found that only 4% of the patients used the *NHS Choices* website, with the majority instead drawing information from their own experiences (41%), advice from GP (36%), advice from friends and family (18%), and other websites (1%). Similarly, a national survey on patients' choice by the Department of Health found that the *NHS Choices* website was only used by 5% of respondents.⁶

The proportion of active users in our survey is also consistent with evidence from the US on the limited usage of doctor rating websites. Gao et al.⁸ analysed 386,000 national ratings from 2005-2010 in the US and showed that only 1 out of 6 physicians among those included in the study had received some rating. Lagu, Hannon, Rothberg et al.⁷ also reported a low average number of ratings per physician.

Intention to use

The results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature^{12,15,16} and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more concerns about confidentiality issues as shown in a study

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3 among different socio-economic groups in the US by Brodie et al.¹⁷ As the estimated
4 effect of these variables appear to be robust across all empirical specifications, these
5 findings seem to suggest that online doctor-rating websites are likely to be particularly
6 attractive to subjects with non-white British ethnicity and less favoured economic
7 background.

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10 On the other hand, the lack of statistical significance in the ordered logit estimates, seems
11 to suggest that while age can be a significant factor in explaining the awareness of Internet
12 for health information, it is not significantly explaining the intention to use doctor-rating
13 websites once subjects are made aware of their existence. The analogous lack of
14 significance for the respondents' gender, on the other hand, does not support the view that
15 women in the UK may be more likely to use patient sources of information and rating
16 websites, although they have been found to desire patient choice more than men (69% to
17 56%).⁹ Both results differ from the findings from the literature. The literature has shown
18 that socio-demographic characteristics are major determinants of usage of online health
19 information. In particular women and younger adults are more active 'online health
20 information seekers'.^{10,18-21}

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23 Education has also been found to determine usage of online and offline health
24 information. Cotton and Gupta¹⁶ and Diaz et al,¹² carried out research into the
25 characteristics of online and offline health information seekers and showed that
26 individuals who are less educated were shown to less likely to be users of online health
27 information.

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30 Therefore even though, according to our findings, intentions to use do not differ across
31 different socio demographic groups, actual usage may be greatly determined by access
32 rather than intentions to use, with the former substantially differing according to socio-
33 economic and demographic characteristics. That is, there may exist income- or age-related
34 barriers to actual access that prevent individuals from using doctor rating sites even
35 though their intentions to use them are similar.

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38 From the perspective of the doctor-patient relationship, the finding that patients with GPs
39 of the same gender tend to be more likely to use the websites is of particular interest, and
40 it is consistent with the analogous effect found for the likelihood of being aware of those
41 websites. Considered together these findings point to the possible explanation that the
42 doctor and the Internet may sometimes be seen by patients as "complementary", rather
43 than alternative, information channels.¹⁵ This interpretation is further confirmed by the
44 finding that respondents for whom the doctor is able to listen to them, and who perceive
45 the nature of the relationship with their GP as friendly, also tend to be more likely to use
46 the websites.

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49 The doctor-patient gender concordance, in fact, has often been reported in the literature as
50 a factor associated with higher patient satisfaction with the consultation as well as better
51 outcomes.²² If we interpret the gender match variable as an indication of satisfaction with
52 the consultation, our finding indicates that being aware of and the intention to use the
53 doctor-rating websites is not necessarily the result of a poor consultation. Instead, the
54 Internet and the doctor are likely to be seen as complementary, rather than alternative,
55 information channels.

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Nevertheless for those that put a higher weight on financial or clinical performance ratings this is less the case, perhaps signalling that those respondents may be more familiar with alternative sources of information.

On the other hand, there may be other dimensions in the patient-doctor relationship which seem to rather point to a “substitute” relationship with information on the Internet. For instance, the fact that respondents who feel that their doctor explains things clearly are less likely to use online rating websites, suggests that when they are generally more satisfied with the feedback provided by their doctor they are less concerned about finding about alternative doctors and compare them with their current GP.

This result on a “substitute relationship” is consistent with previous evidence by Diaz and colleagues¹² that found that 11% of their respondents said they would rather use the Internet ‘instead of seeing or speaking with their doctors’, and that 59% of respondents ‘did not discuss information with their doctors’. It also seems in line with the study by McMullan¹⁵ that indicates that patients who become dissatisfied with the information provided to them by the health professionals are more likely to seek confirmation of the information given and additional information on the Internet.

As for the other aspects of the patient-doctor relationship, the finding that the more autonomous patients are in their healthcare decisions, the more willing they are to use the rating websites is also consistent with previous evidence: a study by McMullan¹⁵, for instance, reports that patients would seek health information before a consultation ‘to manage their own healthcare independently’. These may be the type of people who are ‘more likely to be health-oriented’ or ‘health conscious’, and therefore be more proactive in consultations.²³

Moreover, the positive association between willingness to use doctor rating websites and levels of satisfaction with the level of choice of GP, and of outpatient appointments in the hospital, can be considered as reinforcing the above discussed interpretation that some dimensions of the doctor-patient relationship may be “complementary” with online information. For instance, patients who are more satisfied with their GP because they feel the latter is more friendly and empathic may also be more likely to engage more actively with health and healthcare information more generally. These results, together with the finding that the respondents who are more satisfied with the level of choice of treatments are less likely to use the websites, suggest that the choice of doctors and providers may be seen as only instrumental for the choice of treatment, and therefore respondents that are happy with treatment choice levels are less likely to shop around for different doctors’ opinions.

-General discussion

Overall, our evidence on the determinants of intention to use is broadly consistent with recent findings from the literature. Indeed, a study by Stevenson and colleagues²⁴ shows that although patients use the Internet increasingly more, they show no intention of doing so with the aim of disrupting the existing balance of roles during the doctor-patient consultation. They all mentioned the Internet as an additional resource of health and healthcare information. Other evidence suggests that patients with hypertension who search for more information on the Internet, in addition to that they receive from their doctor, may be more engaged in their treatment, and therefore more willing to adhere to medication prescribed by them.²⁵

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4 Our findings that online information can be used not only as “substitute” but also, and
5 perhaps mainly, as “complementary” to several dimensions of the doctor-patient
6 relationship do not seem to entail any particular evidence suggesting that online ratings
7 may put in danger the doctor-patient relationship, an important aspect which has been
8 raised in the literature.^{26,27}
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10 The “complementarity” findings, in particular, seem consistent with the evidence from the
11 US which shows that the vast majority of the reviews by patients are generally rather
12 positive.^{7,8,28} Taken together, this evidence can be seen as providing little support to the
13 related concern that the likeliest to use online ratings and enter actual comments may be
14 the most disgruntled patients.²⁹
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17 On a related topic, concerns have been expressed about the ability of online ratings to
18 truly reflect the quality of care. A recent UK study, however, demonstrated a strong
19 relationship between the ratings reported online and more objective measures of clinical
20 quality such as mortality and infection rates,³⁰ while another study showed that online
21 ratings were associated with ratings derived from a traditional paper-based survey.³¹
22 Online ratings, thus, do not seem to provide systematically biased or misleading
23 information regarding the health care that patients receive, at least not more than a
24 traditional survey would do. Consistently with this evidence, our results seem to support
25 the idea that patients may see online ratings as a supplementary information base to be
26 used in support of direct interaction with their doctor, which remains the most significant
27 and reliable information channel.³²
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30 More generally, the evidence provided by our study confirms that the actual usage of
31 doctor-rating websites in the UK remains particularly low. In our sample only 29
32 respondents out of 200 were aware of the existence of the patient rating websites. Among
33 these, however, only 6 subjects reported they were actually using those websites.
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36 These figures are substantially in line with previous evidence brought forward from the
37 literature for the UK.^{5,6} The fact that even in the US, a more market-oriented health
38 system, the use of similar sites is not much higher may suggest that the slow uptake in the
39 UK cannot be attributed only to the early stage of the “choice” model. Considered together
40 these results may pose serious concerns on the reasons and consequences of the lack of
41 patient awareness and usage of online health related information.
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44 Previous studies in the US have reported a number of reasons behind this slow uptake,
45 including i) the preference for more traditional information channels, such as
46 recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact
47 that people do not recognise that the quality of care may vary.²⁷
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50 Our study confirms that not only awareness of rating websites is still limited among the
51 general public in the UK, but awareness and willingness to use per se do not seem a
52 sufficient condition to guarantee active usage. This poses a double challenge from a
53 clinician and health policy perspective.
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56 In fact, on the one hand, the documented correlation between online ratings and other
57 measures of healthcare quality, including survey-based ratings and clinical quality
58 indicators,^{30,31} necessarily requires that patients have already gone through three
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3 preliminary hurdles, namely i) being aware of, ii) having effective access to, and ii) being
4 active users of the doctor rating websites. If the ultimate goal is indeed the continuous
5 enhancement of healthcare quality, the effective removal of this double hurdle is likely to
6 become the next priority to guarantee the full spread of online rating website.
7

8 On the other hand, while appropriate online and offline informational campaigns are likely
9 to overcome the first hurdle, thus effectively raising patients' awareness of online ratings
10 as a potential source of information on provider quality, informational campaigns alone
11 can fail to grant effective access and effectively trigger changes in behaviour. Alike in
12 several other health contexts, in fact, 'nudging' behaviour may be difficult as a mere
13 consequence of accessing more information.
14

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16 If this is the case, other avenues should be explored to increase the active usage of rating
17 websites by patients who are already aware of them. For instance, the evidence brought
18 forward by the present study confirms the importance of the doctor-patient relationship as
19 a factor determining individuals' awareness of and willingness to use online ratings'^{27,33-36}
20 and suggests that tailored behavioural interventions based on the doctor-patient
21 relationship have the potential to help patients to overcome this last hurdle and actively
22 engage with online ratings.
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25 26 27 **Limitations of the study**

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29 The convenience field survey was considered the most appropriate administration mode to
30 involve a sample of respondents from the general population. An online survey, in fact, by
31 exclusively reaching the segment of active internet users, would have failed to address the
32 main goal of the study, whether the users of doctor-rating websites are fairly
33 representative of the general public
34

35
36 However, While dictated by practical issues, the convenience sampling is a limitation of
37 the study, and tends to over-represent respondents who are currently not employed, such
38 as unemployed, retired and students. Also the fact that the study was conducted in only
39 one borough of London limits the possibility to immediately generalise the findings to the
40 broader UK population.
41

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43 In an attempt to make such limitations of smaller concern to enhance the external validity
44 and generalisability of the analysis, we have i) chosen a borough which comprises a mix
45 of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii)
46 conducted surveys in the field at different public locations and at different times of the
47 day and of the week to approach both working and non-working members of the public;
48 and iii) controlled for a wide range of socio-demographic measures in the statistical
49 analysis.
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51 52 53 **CONCLUSIONS**

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56 This study brings forward direct evidence suggesting that the awareness and actual usage
57 of doctor-rating websites in the UK remains particularly low. In a sample of the general
58 public from a borough of London only 29 respondents out of 200 were aware of the
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3 existence of the patient rating websites, and only 6 reported to be actually using those
4 websites.

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6 By collecting a broad range of information on the socio-demographic characteristics of the
7 respondents, their views and perceptions of the most important aspects of healthcare
8 quality, patient choice, and doctor-patient relationship, the study also explicitly explores
9 the determinants of respondents' awareness of the doctor ratings websites, and of their
10 intention to use the sites in the future.

11
12 Among other results, the statistical analysis provides evidence that the GP-patient gender
13 concordance is associated with higher awareness of, and intention to use, the websites,
14 while respondents who feel that their GP is a valuable source of clear information, and
15 who are more satisfied with the level of choice of healthcare treatments, are less likely to
16 use online rating websites.

17
18 The existence of both "substitute" and "complementary" effects between the doctor-
19 patient and the Internet information channels is not at all conflicting. In fact, they both
20 indicate that the level of concordance achieved during the consultation is likely to define
21 whether or not individuals will seek for further information channels, such as the Internet.

22
23 When the outcome of a consultation does not satisfy the patient, the use of Internet fills
24 the gap of information needs. The intention to use online doctor-rating websites in this
25 case also indicates that these patients are likely to look at these websites with the aim of
26 seeking for another clinician. Individuals who are satisfied with their GPs may also search
27 these websites, but more as an additional information channel as they seem keener to
28 engage more actively with health and healthcare information in general.

29
30 The findings of our study thus contribute also to the wider debate on the inter-
31 relationships between Internet usage and the doctor-patient relationship.^{7,27,28,33-36} The
32 argument, sometimes addressed by the previous literature, that information on the Internet
33 can threaten the trust relationship and the balance of roles between doctors and patients,
34 seems a concern which is not supported by our evidence. If any, a potential challenge to
35 the doctor-patient relation can only affect the patients who already feel dissatisfied with
36 the ability of their doctor to listen to them and provide them enough information regarding
37 their condition, or with the level of their choice for healthcare treatments.

38
39 The above, however, can hardly be seen as a serious threat by those who advocate a
40 greater choice by patients. On the contrary, if the latter is indeed a priority in the health
41 policy agenda, online information on healthcare providers should be seen as a challenging
42 opportunity to enhance patients' choice in healthcare, and public engagement with health
43 information, especially for the less favoured segments of the population. Indeed, our
44 findings suggest that subjects of non-white background and with lower income are more
45 willing to use online ratings.

46
47 Finally, our study highlights that subjects who use doctor rating websites are unlikely to
48 be representative of the overall patients' pool. In particular, they tend to over-represent
49 opinions from young, non-white British, medium-low income patients who are not
50 satisfied with their choice of healthcare treatments. Accounting for differences in the
51 users' characteristics is important when interpreting results from doctor-rating sites and
52 when informing interventions that aim at enhancing the public engagement with health
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3 information on the Internet, and the representativeness of the users who seek and provide
4 feedback online.
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8 **Data sharing:** technical appendix, statistical code and dataset available from the
9 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
10 obtained but the presented data are anonymised and risk of identification is low.
11

12 All authors had full access to all the data in the study and take responsibility for the
13 integrity of the data and the accuracy of the data analysis.
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17 **Funding:** this piece of work has not received any specific funding.
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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (<i>Awareness</i>) (0=no, 1=yes)	200	0.142	0.350
Intention to use (<i>IntentionToUse</i>)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (<i>HC_Waiting</i>)	198	3.818	1.165
Rates of hospital-acquired complications (<i>HC_HospComp</i>)	188	3.761	1.193
Clinical performance (<i>HC_Clinical_Performance</i>)	189	4.037	1.136
Closeness to home (<i>HC_CloseHome</i>)	200	3.683	1.265
Familiarity with the doctor (<i>HC_Familiarity</i>)	194	3.237	1.306
Financial performance of the hospital (<i>HC_FinPerform</i>)	191	2.387	1.164
Reputation of the doctor (<i>HC_GP_Reputation</i>)	199	3.980	1.137
Accessibility and parking facilities (<i>HC_Access</i>)	192	2.656	1.321
Past experience with the provider (<i>HC_PastExp</i>)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (<i>SI_GP_Advice</i>)	198	4.071	1.030
Published hospital statistics (<i>SI_HospStat</i>)	183	2.934	1.193
Online doctor rating websites (<i>SI_DoctorRating</i>)	178	2.315	1.204
Personal experiences in the past (<i>SI_PastExp</i>)	192	4.234	1.004
Feedback from family/friends (<i>SI_Family</i>)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (<i>DOC_Listens</i>)	200	0.575	0.496
...has time (0=no, 1=yes) (<i>DOC_Time</i>)	200	0.410	0.493
...explains (0=no, 1=yes) (<i>DOC_Explains</i>)	200	0.555	0.498
...is friendly (0=no, 1=yes) (<i>DOC_Friend</i>)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (<i>DOC_Trust</i>)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (<i>Reliable</i>)	141	2.759	1.055
How actively do you participate with your GP in making decisions (<i>Participation</i>)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (<i>SAT_C_GP</i>)	173	3.451	1.138
...hospital (<i>SAT_C_Hosp</i>)	152	3.493	1.055
...doctor (<i>SAT_C_Doc</i>)	139	3.252	1.022
...treatment (<i>SAT_C_Treatment</i>)	148	3.554	0.928
...time spent (<i>SAT_C_Time</i>)	168	3.179	1.123

Ethnicity				
White British (0=no, 1=yes) (WhiteBritish)	200	0.488	0.501	
White Other (0=no, 1=yes) (WhiteNonBritish)	200	0.222	0.417	
Highest level of educational attainment* (Education)	186	2.957	0.856	
1 if GCSE	12			
2 if A-Level/BTEC/Vocational	36			
3 if University undergraduate degree	86			
4 if Postgraduate Degree	52			
Age (years) (Age)	199	39.572	16.083	
Gender (Gender)				
Female (=1)	112			
Male (=0)	88			
Income (Income)	160	2.125	1.859	
0	40			
<£15000 but >0	27			
£15,000-£35,000	36			
£35,000-55,000	22			
£55,000-£75,000	14			
£75,000-£95,000	7			
>£95,000	14			
Doctor-patient concordance				
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (AgeMatch)	200	0.333	0.473	
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (GenderMatch)	200	0.444	0.498	

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		DOC_Friend	0.0127 (0.8599)	-0.0984 (0.1667)
Awareness	0.0846 (0.2359)	1	DOC_Trust	-0.0288 (0.6899)	-0.0388 (0.5863)
HC_Waiting	0.1617** (0.025)	0.016 (0.8236)	Participation	0.0412 (0.5678)	0.0189 (0.7911)
HC_HospComp	0.1474** (0.0465)	-0.0033 (0.9643)	SAT_C_GP	-0.0419 (0.591)	0.122 (0.1108)
HC_Clinical_Performance	0.2146*** (0.0034)	-0.0784 (0.2849)	SAT_C_Hosp	-0.003 (0.9715)	0.1024 (0.2111)
HC_CloseHome	-0.0623 (0.3848)	-0.0998 (0.1587)	SAT_C_Doc	-0.0348 (0.6909)	0.137 (0.1077)
HC_Familiarity	-0.0078 (0.9153)	-0.0752 (0.2986)	SAT_C_Treatment	-0.0157 (0.8526)	0.0932 (0.2598)
HC_FinPerform	0.1253** (0.0884)	0.1435** (0.0482)	SAT_C_Time	-0.0239 (0.7632)	0.0541 (0.4878)
HC_GP_Reputation	0.2020*** (0.0047)	-0.016 (0.8234)	CB_AWARE	-0.0381 (0.5972)	0.2997*** (0)
HC_Access	0.0451 (0.5399)	0.1196* (0.0992)	CB_Use	0.0996 (0.1651)	0.054 (0.4477)
HC_PastExp	0.0978 (0.182)	-0.0244 (0.7369)	WEB_Access	0.2054*** (0.0041)	0.1197* (0.0923)
SI_GP_Advice	0.1054 (0.1457)	0.0163 (0.8202)	AgeMatch	0.1373* (0.0532)	0.0695 (0.3234)
SI_HospStat	0.2937*** (0.0001)	0.1159 (0.1192)	GenderMatch	0.2077*** (0.0032)	0.1472** (0.0357)
SI_DoctorRating	0.3759*** (0)	0.1240* (0.099)	WhiteBritish	-0.0429 (0.5477)	-0.0662 (0.3468)
SI_PastExp	0.0563 (0.4455)	-0.0803 (0.2696)	WhiteNonBritish	-0.0017 (0.9809)	-0.0853 (0.2252)
SI_Family	0.1215* (0.0958)	-0.0511 (0.4804)	Income	0.012 (0.8818)	-0.1219 (0.1246)
Reliable	0.3429*** (0)	-0.0311 (0.7153)	Education	-0.0103 (0.8913)	0.0023 (0.9757)
DOC_Listens	0.0629 (0.3824)	-0.0888 (0.2122)	Gender	0.0315 (0.6614)	-0.0087 (0.9029)
DOC_Time	0.1565** (0.0289)	-0.0117 (0.87)	Age	-0.1081 (0.1344)	-0.1918*** (0.0068)
DOC_Explains	0.0968 (0.1784)	0.0152 (0.8314)			

P-Values in parentheses. * p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses

* p<.10, ** p<.05, *** p<.01

For peer review only

Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974 (2.377)	2.561 (2.953)	2.000 (1.965)	2.782 (2.613)	1.051 (0.818)	0.946 (0.729)
GenderMatch	18.42* (30.24)	12.03* (17.75)	10.45** (12.33)	10.39** (10.54)	16.67*** (15.48)	14.83*** (13.17)
Awareness	0.0531 (0.108)	0.0505 (0.0971)	0.0964 (0.149)	0.0758** (0.0985)	0.159* (0.176)	0.147* (0.152)
HC_Clinical_Performance	9.289* (11.84)	7.659* (8.241)	5.560** (4.759)	3.401* (2.253)	4.395** (2.653)	4.985*** (2.734)
HC_Familiarity	0.359 (0.287)	0.468 (0.282)	0.371* (0.220)	0.414* (0.206)	0.355** (0.147)	0.351*** (0.141)
HC_GP_Reputation	2.328 (1.980)	2.827 (2.106)	3.608* (2.542)	4.410** (2.753)	2.903** (1.374)	2.776** (1.260)
SI_GP_Advice	0.170* (0.173)	0.223 (0.206)	0.238** (0.167)	0.283** (0.176)	0.344** (0.186)	0.396* (0.193)
SI_HospStat	14.26** (18.84)	13.74** (15.60)	7.220*** (5.008)	6.550*** (4.200)	5.371*** (2.932)	5.133*** (2.703)
SI_DoctorRating	1.596 (1.636)	1.067 (0.958)	1.424 (0.851)	1.461 (0.770)	2.245** (0.835)	2.312** (0.876)
Reliable	6.181 (7.691)	8.682* (9.969)	6.492** (4.993)	7.586*** (5.561)	4.457*** (2.351)	4.061*** (2.003)
DOC_Listens	141.9* (424.8)	51.44 (126.4)	44.20* (90.99)	27.05** (41.26)	22.03** (28.29)	22.98** (28.34)
DOC_Explains	0.00690* (0.0183)	0.00680** (0.0148)	0.00509** (0.0105)	0.00695*** (0.0124)	0.0120*** (0.0171)	0.0124*** (0.0169)
DOC_Friend	12.88 (29.23)	8.375 (14.65)	16.48** (22.41)	19.66*** (22.45)	8.718** (8.047)	7.781** (6.896)
Participation	5.473* (5.255)	5.818* (5.410)	5.171** (3.664)	4.162** (2.687)	2.349* (1.126)	2.228* (1.036)
SAT_C_GP	17.03* (27.58)	8.038 (10.23)	6.593* (6.659)	5.410** (4.048)	4.692** (2.889)	4.377*** (2.484)
SAT_C_Hosp	21.93** (33.71)	22.86** (30.90)	30.01*** (33.63)	34.38*** (35.43)	17.95*** (15.52)	11.11*** (7.578)
SAT_C_Treatment	0.0515** (0.0764)	0.0561** (0.0794)	0.111** (0.106)	0.147** (0.125)	0.145** (0.111)	0.111*** (0.0788)
WhiteBritish	0.0137* (0.0318)	0.0409* (0.0738)	0.0542** (0.0782)	0.0539** (0.0690)	0.0909** (0.0890)	0.105** (0.0973)
Income	0.416* (0.190)	0.382** (0.162)	0.449** (0.154)	0.513** (0.154)	0.476*** (0.129)	0.462*** (0.120)
SAT_C_Doc	0.242 (0.468)	0.243 (0.374)	0.148* (0.161)	0.135* (0.144)	0.427 (0.321)	
SI_PastExp	0.670 (0.787)	0.590 (0.650)	0.535 (0.576)	0.551 (0.250)		
Education	0.486 (0.526)	0.583 (0.554)	0.683 (0.443)	0.610 (0.328)		
HC_Access	1.046 (0.659)	1.124 (0.678)	1.241 (0.564)	1.347 (0.565)		
HC_PastExp	1.030 (0.578)	0.914 (0.487)	0.930 (0.397)			
SI_Family	1.208 (1.357)	1.305 (1.484)	1.439 (1.458)			
DOC_Time	1.223 (2.118)	2.099 (3.261)	2.594 (3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09*	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	**					
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School



We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called “Choose & Book” which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King’s College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

Yes No (if No, skip ahead to Section C)

Other (please specify).....

Q2. How did you find out about these sites?

Family/Friends Doctor

The Media Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes No (if No, skip ahead to Section C)

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis Only before/after an appointment Rarely

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes No

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information Negative information

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these	<input type="checkbox"/>				

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

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Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

Not likely Quite likely Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

- Every time
- After particularly positive experiences only
- After particularly negative experiences only
- After both positive and negative experiences
- Never
- Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

- I would not contribute to these websites
- To inform other patients
- To improve standards of care in the NHS
- As a method of complaint
- In appreciation of a doctor's service
- Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

- I feel my doctor listens to my problems
- I feel my doctor spends enough time with me in each consultation
- I feel my doctor explains things clearly
- I feel my doctor is sociable and friendly

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- I feel that I can trust my doctor's opinions
 None of the above

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Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

- My doctor always makes decisions for me
 I like to know the options available but still let my doctor decide for me
 My doctor and I make the decisions together
 I make decisions for myself, after considering the advice of my GP
 I always make my own decisions, independently of the advice of my GP
 I make decisions with my parents/spouse/relatives

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Q17. Within your GP practice do you always want to see the same GP for an appointment?

- I always request to see the same GP
 I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of treatment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of appointment time	1	2	3	4	5	Not sure	<input type="checkbox"/>

(for primary & secondary care)

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>

Choice of doctor for outpatient appointment 1 2 3 4 5 Not sure

Choice of treatment 1 2 3 4 5 Not sure

Choice of appointment time (for primary & secondary care) 1 2 3 4 5 Not sure

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

Yes No

Q21. Have you used this Choose and Book system in the past?

Yes No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

- I have never used Choose & Book
- My doctor always makes decisions for me
- I like to know the options available but still let my doctor decide for me
- My doctor and I make the decisions together
- I make decisions for myself, after considering the advice of my GP
- I always make my own decisions, independently of the advice of my GP
- I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

- Routine outpatient consultation
- Day-case procedure/surgery
- Major surgery
- None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

Yes No

Q25. Have you used the internet in the past to search for health information?

Yes No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

- I'm too busy to have the time to use them
- The sites are not a reliable source of information
- It is difficult to interpret the information provided
- I already have enough information from other sources to make choices
- I don't have access to the internet
- I did not know these websites existed
- I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

- Shopping websites (e.g. Amazon)
- Holiday websites (e.g. TripAdvisor)
- Car insurance websites (e.g. Compare The Market)
- Restaurants/venue websites (e.g. ViewLondon)
- Film websites (e.g. Rottentomatoes)
- Other (please specify).....
- I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- Star-rating out of 5
- Percentage scores
- Thumbs Up/Down
- Written comments from patients/users
- No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age?

Q30. What is your gender?

Male Female

Q31. How would you describe your ethnicity?

<input type="checkbox"/>	White – British	<input type="checkbox"/>	Other Asian – non-Chinese
<input type="checkbox"/>	White – Others	<input type="checkbox"/>	Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. What is your postcode?

Q33. How many other individuals do you live with?

Q34. Do you live with your parents?

Yes No

Q35. What is/was your profession?

Unemployed Retired

Q36. What is your level of pre-tax income?

0
 <£15000 but >0 £15,000-£35,000
 £35,000-55,000 £55,000-£75,000
 £75,000-£95,000 >£95,000

Q37. What is your highest level of educational attainment?

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

0 times 1-3 times
 4-5 times More than 5 times

Q39. What is the sex of your GP?

Male Female

Q40. How old is your GP?

<30 years
 30-50 years
 >50 years

Q41. What is the ethnicity of your GP?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

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	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP.

This is the end of the questionnaire, thank you for your time.



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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	8
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.



Who is More Likely to Use Doctor-Rating Websites, and Why?
A cross sectional study in London.

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating websites and their usage among a sample of respondents from London.
- To understand the main predictors of what makes people willing to use doctor-ratings websites.

Key messages:

- The share of actual users of doctor-rating websites is quite low.
- Subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' intention to use doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent to which doctor-rating websites are known and used among a sample of respondents from London . To understand the main predictors of what makes people willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. White British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. Aspects of the doctor-patient relationship also play a key role in explaining intention to use the websites. The doctor has both a "complementary" and "substitute" role with respect to Internet information.

Conclusions: Online rating websites can play a major role in supporting patients' informed decisions on which health care providers to seek advice from, thus potentially fostering patients' choice in health care. Subjects who seek and provide feedback on doctor-ranking websites, though, are unlikely to be representative of the overall patients' pool. In particular, they tend to over-represent opinions from non white British, medium-

low income patients who are not satisfied with their choice of the healthcare treatments and the level of information provided by their GP. Accounting for differences in the users' characteristics is important when interpreting results from doctor-rating sites.

Key messages

- The share of actual users of doctor-rating websites is quite low.
- Subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The GP-patient gender concordance is associated with higher intention to use the websites.
- Subjects who feel that their GP explains things clearly and is a valuable source of clear information, are less likely to use online rating websites.
- Subjects who feel that they are more satisfied with the level of choice of healthcare treatments are less likely to use online rating websites.

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INTRODUCTION

In recent years, both the NHS Plan¹ and the NHS Improvement Plan², set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.³ Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"⁴ acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence*, have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund⁵ explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.⁶ These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.^{7,8} Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez⁹ found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.¹⁰

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among a sample of respondents in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

Questionnaire design

Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain an understanding of the practicalities associated with giving out questionnaires and collecting responses. After listening to feedback from pilot respondents, and looking at results from the pilot study, several changes were made to make the questionnaire easier to understand. The changes related to content, phrasing and ordering of questions.

The content of the final questionnaire was based on findings from the preliminary literature review and was designed in a number of sections (see Appendix for full questionnaire). In particular, section A focuses on the awareness of online rating websites, while section B assesses actual usage of online rating websites. Section C measures the willingness to use the online rating websites in the future, and explores which aspects of the healthcare providers and which sources of information are perceived as being important factors in making decisions about where to receive healthcare. Section D assesses the individual contribution to the online rating sites, while section E focuses on aspects of the doctor-patient relationship and attitudes and dimensions of patient choice. Finally section F controls for internet usage, while section G collects a broad range of socio-demographic characteristics.

Closed questions were used, worded in a manner easy to understand. A limited number of responses were provided, either with binary options (e.g. yes or no), or with a numerical Likert scale ranging from 1 to 5, with a further option for “*Not sure*”.

A list of variables with a brief description is discussed in the Statistical analysis section and is summarised in Table 1 in the Appendix.

Ethical approval, informed consent and confidentiality of responses

We completed the checklist for research ethics approval from Imperial College London. As interviews were intended to be conducted in public places among respondents from the general population, the study involved no risk or harm of any type to respondents, no link with clinical data was expected to take place, and no incentives were going to be paid to respondents, the study fitted all the criteria in the first stage checklist with no further formal application to the Imperial College Research Ethics Committee.

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

Data Collection

The survey was conducted in the field by the researchers involved in the paper. The borough of Hammersmith and Fulham was chosen for the location of the field survey because it is a transport hub in Central West London, and hosts many offices and several major business centres. The four interviewers went to different public locations within the borough (underground stations, high street and residential areas) at different times during the day (early morning, midday and in the evening) and in different days of the week

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3 (including weekends). By covering different times and locations within the borough, we
4 aimed at being able to approach both working and non-working members of the public.
5 During the surveys in the field, the interviewers approached every third male and third
6 female that would pass by them.
7

8 Sample size calculations were based on the intended objective to look at the correlation
9 coefficient between the likelihood of using the websites on the one hand, and a typical
10 survey response, on the other. The minimum sample size to test the null hypothesis of no
11 significant correlation between these two variables was calculated given the most
12 conservative assumption that the correlation coefficient between the variables in the
13 population was in the region of 0.2 (a “low” effect size, the variance of one variables
14 accounting for just 4% of the variance of the other). Under the assumptions that all
15 variables are normally distributed, a bi-directional test (both positive and negative
16 correlation were expected) with 95% significance level reaches a standard 80% power
17 level at a minimum sample of n=200 subjects.¹¹ We thus targeted a sample size of 200
18 respondents. The envisaged target was then readily achieved, since only 68 subjects who
19 were initially approached refused to take part to the survey, with a final response rate of
20 74%.
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27 **Statistical analysis**

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29 Besides a correlation analysis, we have carried a multiple regression analysis which aims
30 to explore the determinants of i) being either aware or not of doctor rating websites; and
31 ii) the individual intention of using these websites in the future.
32

33
34 The dependent variable in the first case is modeled as a binary variable (*Awareness*)
35 taking values 1 or 0 for the respondents who reported to be aware or unaware of the
36 websites, respectively. The second dependent variable is instead modeled as a discrete
37 ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be
38 ‘not likely’, ‘quite likely’, and ‘likely’ to use the websites in the future, respectively.
39

40
41 The explanatory variables (X_i) include the variables described in Table 1, namely:
42 individual socio-demographic characteristics; a set of variables on the characteristics of
43 the healthcare providers that the respondents consider important for making their
44 decisions on where to receive health care; a set of variables on the sources of information
45 that are important in making decisions about where to receive health care; two dummy
46 variables that capture whether the patient’s gender and age are the same, or within a
47 comparable range, respectively, than the gender and age of her GP; a set of variables that
48 describe the respondents’ feelings about their relation with their doctor; a variable
49 indicating the level of participation of the respondents in their GPs’ decisions; a set of
50 variables on patients’ satisfaction with the level of choice in their healthcare decisions; a
51 dummy variable controlling for whether the subjects had access to internet at home or at
52 work; a variable on awareness of the existence of doctor-rating websites; and a variable on
53 whether the subject always asks to see the same GP (see Table 1 for variables’ details).
54 The choice of the explanatory variables was further informed by the bivariate correlation
55 analysis reported in Table 2 in the Appendix.
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We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability between the empirical results obtained for the two set of regressions. The two models, in fact, only differ in the number of values that the dependent variables can take, while the underlying structure of the error terms follows the same standardized logistic distribution. The logistic specification is particularly appealing because its results can be readily expressed in terms of odds ratio. We have, however, conducted a robustness check by replicating the multiple regression analysis using the alternative binary and ordered probit specifications. The two set of regressions provide consistent estimates and results which are qualitatively fully aligned. Results of the probit specifications are available, upon request, from the authors.

All the regression analysis has been conducted using STATA v.11.

RESULTS

The sample and descriptive statistics

Descriptive statistics of all the dependent and independent variables for the resulting sample of respondents to our survey are provided in detail in Table 1, and here we briefly report their main aspects.

Our sample consisted of 200 subjects. Comparing it with the Census data for the borough the mean age of our sample was slightly older than that for the borough (39.57 years compared to 35.2 years).¹² Our sample however was closer to the national mean age of 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of people aged 40 years and under. This is consistent with the 2001 census data for Hammersmith and Fulham which showed the borough contained a larger proportion of young people aged 20-29 (23.8%) than the rest of England (12.66%).¹²

Also, the sample had a slightly greater proportion of females than the borough (54.44% to 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared to 58% for the borough).¹² This is also significantly lower than figures for England, White British accounting for 87% of the population.¹² The sample contained 28.99% non white respondents. This is higher than the 2001 census data for Hammersmith and Fulham which was 22% and significantly higher than the figures for England, showing non white ethnic groups accounting for 9% of the total population.¹² Our sample, therefore, allows controlling for high heterogeneity in ethnic background even with a limited sample size.

Regarding working status, 141 individuals were workers (ten of which reported to be currently unemployed), 33 students, 9 officially unemployed and 6 retired. Eleven respondents did not report their working status. The proportion of subjects who were not currently working, as given by the sum of the respondents who reported to be unemployed, retired, or students, indeed amounts to 29% of the sample. The majority of actively working respondents reported an income within the £15-35,000 bracket.

Our sample had a high percentage of people with higher level qualifications: 46.24% of the sample had a university degree and 27.96% had a postgraduate degree. This is reflective of Hammersmith and Fulham, where 45% of the population have a qualification

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3 of degree level or higher, a figure which is significantly higher than in England, where
4 only 19.8% have a degree or higher qualification.¹²
5

6 **Results on awareness**

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8 Only 29 of our respondents were aware of the doctor-rating websites they were asked
9 about and only 6 reported to have used them.

10 In Table 2 we present the set of bivariate correlations between the fact of being aware of
11 the websites and each of the variables collected in the survey. As it can be seen, there is
12 positive correlation between having an internet access, or being aware of the NHS Choose
13 and Book system, and being aware of the doctor rating websites. Age exhibits a negative
14 correlation, while the gender concordance with the GP, shows a positive correlation.
15 Positive correlations with the awareness of doctor rating websites also hold for
16 respondents who think that those websites are important sources of information, or who
17 see accessibility and financial performances of hospitals important factors in making
18 decisions where to seek healthcare.
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21 [Table 2 in here]
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26 In Table 3 we present the estimate results of four different specifications of the binary
27 logistic regression for the dependent variable *Awareness* with different sets of regressors,
28 which are presented in terms of the odds ratio, together with the standard errors, and levels
29 of significance.
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33 [Table 3 in here]
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36 Among the demographic factors, age and ethnicity are the only significant variables. Older
37 individuals are less likely to be aware of the rating websites, which does not constitute a
38 surprise, as they are usually less familiar with the use of internet in general. Moreover, in
39 most specifications, white British and white non-British respondents appear less likely to
40 be aware of the websites.
41

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43 Among the broader socio-demographic factors, only income is sometimes (marginally)
44 significant, pointing to the fact that respondents with higher reported levels of income tend
45 to be less aware of the websites, while neither education or gender turn out to be
46 significant predictors of awareness.
47

48 Looking at the characteristics of the providers that respondents consider important in
49 making their decisions on where to receive healthcare, in one specification the reputation
50 of the doctor has a strong positive effect, while both clinical and financial performance
51 rates of the providers show negative significant effects. Thus, the respondents who
52 consider the reputation of the doctor important in deciding where to receive care are more
53 likely to be aware of the rating websites, while this is less often the case for respondents
54 putting a higher weight on financial or clinical performance ratings.
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57 Concerning the sources of information, respondents who consider the hospital statistics
58 important in deciding where to receive care, turn out to be more likely of being aware of
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3 the rating websites, with an effect which is particularly significant and quite remarkable in
4 terms of odds ratio.

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6 Furthermore, although in one specification the respondents who feel that their GPs spend a
7 sufficient time in their consultation are less likely to be aware of the internet rating
8 websites, both the statistical significance and the estimated odds ratio do not appear robust
9 across specifications. Although all other variables on doctor-patient relationship were not
10 significant, whenever included among the regressors, the gender match between the GP
11 and the patient predicts higher awareness of the website ratings, with a noticeable effect as
12 evident by the reported value of the odds ratio.

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15 As mentioned above, from those that were aware of the existence of doctor-rating
16 websites only 6 have reported to have used these websites. In light of this low usage rate,
17 and of the consequent limitations of conducting statistical estimations with very little
18 variation in the dependent outcomes, we have thus focused the rest of the analysis on the
19 determinants of the intention to use, rather than actual usage of, doctor rating websites.

20 21 22 23 24 **Results on the likelihood to use online rating websites**

25 In Table 2 we present the set of bivariate correlations between the intention to use the
26 doctor rating websites and each of the variables collected in the survey. As it can be
27 noticed, there is a positive correlation between having internet access, and being aware of
28 the doctor rating websites. Both the age and the gender concordance with the GP show a
29 positive correlation with the intention to use. Positive correlations with the willingness to
30 use doctor rating websites also hold for respondents who think that those websites, or
31 hospital statistics, are important sources of information. Also the fact that respondents
32 believe that online rating is a reliable measure is clearly correlated with the intention to
33 use them. Finally, positive correlations also hold for respondents who feel that their doctor
34 has time to dedicate to them, or who see several aspects of healthcare providers - such as
35 reputation, clinical and financial performances, waiting lists, accessibility – as important
36 factors when making decisions where to seek healthcare.

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39 In Table 4 we present the estimate results of six different specifications of the ordered
40 logistic regression for the dependent variable *IntentionToUse* with different sets of
41 regressors, which are presented in terms of the odds ratio, together with the standard
42 errors, and levels of significance.

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45 **[Table 4 in here]**

46
47 Concerning socio-demographic variables, it turns out that white British, as well as
48 respondents who reported income in higher brackets, said they were less likely to use
49 doctor-rating websites. Moreover, we do not find any effect of education, age and gender
50 of the respondents on the likelihood of their intention to use (the results of the
51 specifications including the age and gender variables are not reported in the table for the
52 sake of space but are available from the authors upon request).

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54
55 Looking at the characteristics of the healthcare providers that respondents perceived as
56 important while making decisions where to receive healthcare, our data suggest that those
57 who consider clinical performance and doctor reputation (in most specifications) as
58 important factors, are more likely to use doctor-rating websites. These results are

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consistent with the nature of the information provided in these websites. Also, and quite intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on the determinants of the intention to use doctor rating websites and the level of awareness and actual usage of these websites. Results show that socio-demographic characteristics (in particular income and ethnicity) and the doctor patient relationship are significant determinants of the intention to use these websites. Regarding the latter we further show that, from a patient's perspective, the doctor and the Internet can be seen as being both "complementary" and "substitute" sources of information. Yet, we find that awareness and usage of doctor rating websites is low in our sample. In what follows we will discuss these results and relate them to evidence from the literature.

Intention to use

On the socio-demographic variables the results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature^{13,14,15} and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may

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3 trust less information that exists online and they have more concerns about confidentiality
4 issues as shown in a study among different socio-economic groups in the US by Brodie et
5 al.¹⁶ As the estimated effect of these variables appear to be robust across all empirical
6 specifications, these findings seem to suggest that online doctor-rating websites are likely
7 to be particularly attractive to subjects with non-white British ethnicity and less favoured
8 economic background.
9

10 On the other hand, the lack of statistical significance in the ordered logit estimates, seems
11 to suggest that, while age can be a significant factor in explaining the awareness of
12 Internet for health information, it is not significantly explaining the intention to use
13 doctor-rating websites once subjects are made aware of their existence. The analogous
14 lack of significance for the respondents' gender, on the other hand, does not support the
15 view that women in the UK may be more likely to use patients' sources of information
16 and rating websites, although they have been found to desire patient choice more than men
17 (69% to 56%).⁹ Both results differ from the findings from the literature on the use of
18 online information. The literature has shown that socio-demographic characteristics are
19 major determinants of usage of online health information. In particular women and
20 younger adults are more active 'online health information seekers'.^{10,17-20} Education has
21 also been found to determine usage of online and offline health information. Cotton and
22 Gupta¹⁵ and Diaz et al,¹³ carried out research into the characteristics of online and offline
23 health information seekers and found that less educated individuals were less likely to be
24 users of online health information.
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28 Therefore even though, according to our findings, intentions to use do not differ
29 significantly across all socio demographic characteristics, actual usage may be greatly
30 determined by access rather than only by intention to use, with the former substantially
31 differing according to socio-economic and demographic characteristics. That is, there may
32 exist income-, education- or age-related barriers to actual access that prevent individuals
33 from using doctor rating sites even though their intentions to use them are similar.
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36 From the perspective of the doctor-patient relationship, the finding that patients with GPs
37 of the same gender tend to be more likely to use the websites is of particular interest, and
38 it is consistent with the analogous effect found for the likelihood of being aware of those
39 websites. Considered together these findings point to the possible explanation that the
40 doctor and the Internet may sometimes be seen by patients as "complementary", rather
41 than alternative, information channels.¹⁴ This interpretation is further confirmed by the
42 finding that respondents for whom the doctor is able to listen to them, and who perceive
43 the nature of the relationship with their GP as friendly, also tend to be more likely to use
44 the websites.
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46
47 The doctor-patient gender concordance, in fact, has often been reported in the literature as
48 a factor associated with higher patient satisfaction with the consultation as well as better
49 outcomes.²¹ If we interpret the gender match variable as an indication of satisfaction with
50 the consultation, our finding indicates that the intention to use (as well as being aware of)
51 the doctor-rating websites is not necessarily the result of a poor consultation. Instead, the
52 Internet and the doctor are likely to be seen as complementary, rather than alternative,
53 information channels. This could explain why patients that consider hospital statistics as a
54 good source of information are more likely to use these websites. Indeed this type of
55 information might not be provided by the doctor in a consultation.
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3 Indeed, a study by Stevenson and colleagues²² shows that although patients use the
4 Internet increasingly more, they show no intention of doing so with the aim of disrupting
5 the existing balance of roles during the doctor-patient consultation. They all mentioned the
6 Internet as an additional resource of health and healthcare information. Other evidence
7 suggests that patients with hypertension who search for more information on the Internet,
8 in addition to that they receive from their doctor, may be more engaged in their treatment,
9 and therefore more willing to adhere to medication prescribed by them.²³
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11
12 Finally, the positive association between willingness to use doctor rating websites and
13 levels of satisfaction with the level of choice of GP, and of outpatient appointments in the
14 hospital, can be considered as reinforcing the above discussed interpretation that some
15 dimensions of the doctor-patient relationship may be “complementary” with online
16 information. For instance, patients who are more satisfied with their GP because they feel
17 the latter is more friendly and empathic may also be more likely to engage more actively
18 with health and healthcare information more generally. These results, together with the
19 finding that the respondents who are more satisfied with the level of choice of treatments
20 are less likely to use the websites, suggest that the choice of doctors and providers may be
21 seen as only instrumental for the choice of treatment, and therefore respondents that are
22 happy with treatment choice levels are less likely to shop around for different doctors’
23 opinions.
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25
26 On the other hand, there may be other dimensions in the patient-doctor relationship which
27 seem to rather point to a “substitute” relationship with information on the Internet. For
28 instance, the fact that respondents who feel that their doctor explains things clearly and
29 consider the advice given by the GP as being important are less likely to use online rating
30 websites, suggests that when they are generally more satisfied with the feedback provided
31 by their doctor they are less concerned about finding about alternative doctors and
32 compare them with their current GP.
33

34
35 This result on a “substitute relationship” is consistent with previous evidence by Diaz and
36 colleagues¹³ that found that 11% of their respondents said they would rather use the
37 Internet ‘instead of seeing or speaking with their doctors’, and that 59% of respondents
38 ‘did not discuss information with their doctors’. It also seems in line with the study by
39 McMullan¹⁴ that indicates that patients who become dissatisfied with the information
40 provided to them by the health professionals are more likely to seek confirmation of the
41 information given and additional information on the Internet.
42

43
44 Our findings that online information can be used not only as “substitute” but also, and
45 perhaps mainly, as “complementary” to several dimensions of the doctor-patient
46 relationship do not seem to entail any particular evidence suggesting that online ratings
47 may put in danger the doctor-patient relationship, an important aspect which has been
48 raised in the literature.^{24,25} The “complementarity” findings, in particular, seem consistent
49 with the evidence from the US which shows that the vast majority of the reviews by
50 patients are generally rather positive.^{7,8,26} Taken together, this evidence can be seen as
51 providing little support to the related concern that the likeliest to use online ratings and
52 enter actual comments may be the most disgruntled patients.²⁷
53

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55 As for the other aspects of the patient-doctor relationship, the finding that the more
56 autonomous patients are in their healthcare decisions, the more willing they are to use the
57 rating websites is also consistent with previous evidence: a study by McMullan,¹⁴ for
58 instance, reports that patients would seek health information before a consultation ‘to
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3 manage their own healthcare independently'. These may be the type of people who are
4 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive
5 in consultations.²⁸
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8 **Awareness and actual usage**

9 Only 15% of our sample were aware of the existence of these websites, indicating that the
10 awareness and, consequently, usage of these online sources is still quite limited in the UK,
11 although significantly higher than what the previous studies have shown.⁵
12

13
14 Concerning the low reported rate of active usage of doctor rating websites, the finding is
15 not too surprising given that the survey was done among a sample of respondents from the
16 general population: the reason why many more respondents were aware of the online
17 ratings than did actually use it may simply be because those subjects did not actually need to
18 see a doctor.
19

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21 These figures are substantially in line with previous evidence brought forward from the
22 literature for the UK.^{5,6} A slow uptake of online ratings has also been reported in the US.
23 It is indicative that only 6% of Americans were aware of Hospital Compare, the quality
24 reporting website maintained by the Centres for Medicare and Medicaid Services
25 (CMS).²⁹ Gao et al.⁸ analysed 386,000 national ratings from 2005-2010 in the US and
26 showed that only 1 out of 6 physicians among those included in the study had received
27 some rating. Lagu, Hannon, Rothberg et al.⁷ also reported a low average number of ratings
28 per physician.
29

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31 The fact that even in the US, a more market-oriented health system, the use of similar sites
32 is not much higher may suggest that the slow uptake in the UK cannot be attributed only
33 to the early stage of the "choice" model. Considered together these results may pose
34 concerns on the reasons and consequences of the lack of patient awareness and usage of
35 online health related information.
36

37
38 Previous studies in the US have reported a number of reasons behind this slow uptake,
39 including i) the preference for more traditional information channels, such as
40 recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact
41 that people do not recognise that the quality of care may vary.²⁵
42

43
44 As for the UK, our study confirms that not only awareness of rating websites is still
45 limited among a sample of respondents the general public in London, but awareness and
46 willingness to use per se do not seem a sufficient condition to guarantee active usage. This
47 poses a double challenge from a clinician and health policy perspective. In fact, on the one
48 hand, the documented correlation between online ratings and other measures of healthcare
49 quality, including survey-based ratings and clinical quality indicators,^{30,31} necessarily
50 requires that patients have already gone through three preliminary hurdles, namely i) being
51 aware of, ii) having effective access to, and ii) being active users of the doctor rating
52 websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality,
53 the effective removal of this triple hurdle is likely to become the next priority to guarantee
54 the full spread of online rating website.
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57 On the other hand, while appropriate online and offline informational campaigns are likely
58 to overcome the first hurdle, thus effectively raising patients' awareness of online ratings
59 as a potential source of information on provider quality, informational campaigns alone
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can fail to grant effective access and trigger actual changes in behaviour. Alike in several other health contexts, in particular, ‘nudging’ behaviour may be difficult as a mere consequence of accessing more information.

If this is the case, other avenues should be explored to increase the active usage of rating websites by patients who are already aware of them. For instance, the evidence brought forward by the present study confirms the importance of the doctor-patient relationship as a factor determining individuals’ awareness of and willingness to use online ratings^{25,32-35} and suggests that tailored behavioural interventions based on the doctor-patient relationship have the potential to help patients to overcome the last hurdle and actively engage with online ratings.

Limitations of the study

The convenience field survey was considered the most appropriate administration mode to involve a sample of respondents from the general population. An online survey, in fact, by exclusively reaching the segment of active internet users, would have failed to address the main goal of the study.

However, while dictated by practical issues, the convenience sampling is a limitation of the study, and tends to over-represent respondents who are currently not employed, such as unemployed, retired and students. Also the fact that the study was conducted in only one borough of London limits the possibility to immediately generalise the findings to the broader UK population.

In an attempt to make such limitations of smaller concern to enhance the external validity and generalisability of the analysis, we have i) chosen a borough which comprises a mix of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii) conducted surveys in the field at different public locations and at different times of the day and of the week to approach both working and non-working members of the public; and iii) controlled for a wide range of socio-demographic measures in the statistical analysis.

CONCLUSIONS

By collecting a broad range of information on the socio-demographic characteristics of the respondents, their views and perceptions of the most important aspects of healthcare quality, patient choice, and doctor-patient relationship, the study explicitly explores the usage doctor-rating websites, the determinants of respondents’ awareness of the doctor ratings websites, and of their intention to use the sites in the future.

This study brings forward direct evidence suggesting that the awareness and actual usage of doctor-rating websites in the UK remains particularly low. The main finding suggests that the doctor-patient relationship plays a key role in explaining intention to use the websites and that the doctor has both a “complementary” and “substitute” role with respect to Internet information.

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3 The existence of both “substitute” and “complementary” effects between the doctor-
4 patient and the Internet information channels is not at all conflicting. In fact, they both
5 indicate that the level of concordance achieved during the consultation is likely to define
6 whether or not individuals will seek for further information channels, such as the Internet.
7

8 The findings of our study thus contribute also to the wider debate on the inter-
9 relationships between Internet usage and the doctor-patient relationship.^{7,25-26,32-35} The
10 argument, sometimes addressed by the previous literature, that information on the Internet
11 can threaten the trust relationship and the balance of roles between doctors and patients,
12 seems a concern which is not supported by our evidence. If any, a potential challenge to
13 the doctor-patient relation can only affect the patients who already feel dissatisfied with
14 the ability of their doctor to listen to them and provide them enough information regarding
15 their condition, or with the level of their choice for healthcare treatments.
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18 The above, however, can hardly be seen as a serious threat by those who advocate a
19 greater choice by patients. On the contrary, if the latter is indeed a priority in the health
20 policy agenda, online information on healthcare providers should be seen as a challenging
21 opportunity to enhance patients’ choice in healthcare, and public engagement with health
22 information, especially for the less favoured segments of the population. Indeed, our
23 findings suggest that subjects of non-white background and with lower income are more
24 willing to use online ratings.
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27 Finally, our study highlights that subjects who use doctor rating websites are unlikely to
28 be representative of the overall patients’ pool. In particular, they tend to over-represent
29 opinions from non-white British, medium-low income patients who are not satisfied with
30 their choice of healthcare treatments. Accounting for differences in the users’
31 characteristics is important when interpreting results from doctor-rating sites and when
32 informing interventions that aim at enhancing the public engagement with health
33 information on the Internet, and the representativeness of the users who seek and provide
34 feedback online.
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39 **Data sharing:** technical appendix, statistical code and dataset available from the
40 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
41 obtained but the presented data are anonymised and risk of identification is low.
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44 All authors had full access to all the data in the study and take responsibility for the
45 integrity of the data and the accuracy of the data analysis.
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Appendix
Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (<i>Awareness</i>) (0=no, 1=yes)	200	0.142	0.350
Intention to use (<i>IntentionToUse</i>)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (<i>HC_Waiting</i>)	198	3.818	1.165
Rates of hospital-acquired complications (<i>HC_HospComp</i>)	188	3.761	1.193
Clinical performance (<i>HC_Clinical_Performance</i>)	189	4.037	1.136
Closeness to home (<i>HC_CloseHome</i>)	200	3.683	1.265
Familiarity with the doctor (<i>HC_Familiarity</i>)	194	3.237	1.306
Financial performance of the hospital (<i>HC_FinPerform</i>)	191	2.387	1.164
Reputation of the doctor (<i>HC_GP_Reputation</i>)	199	3.980	1.137
Accessibility and parking facilities (<i>HC_Access</i>)	192	2.656	1.321
Past experience with the provider (<i>HC_PastExp</i>)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (<i>SI_GP_Advice</i>)	198	4.071	1.030
Published hospital statistics (<i>SI_HospStat</i>)	183	2.934	1.193
Online doctor rating websites (<i>SI_DoctorRating</i>)	178	2.315	1.204
Personal experiences in the past (<i>SI_PastExp</i>)	192	4.234	1.004
Feedback from family/friends (<i>SI_Family</i>)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (<i>DOC_Listens</i>)	200	0.575	0.496
...has time (0=no, 1=yes) (<i>DOC_Time</i>)	200	0.410	0.493
...explains (0=no, 1=yes) (<i>DOC_Explains</i>)	200	0.555	0.498
...is friendly (0=no, 1=yes) (<i>DOC_Friend</i>)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (<i>DOC_Trust</i>)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (<i>Reliable</i>)	141	2.759	1.055
How actively do you participate with your GP in making decisions (<i>Participation</i>)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (<i>SAT_C_GP</i>)	173	3.451	1.138
...hospital (<i>SAT_C_Hosp</i>)	152	3.493	1.055
...doctor (<i>SAT_C_Doc</i>)	139	3.252	1.022
...treatment (<i>SAT_C_Treatment</i>)	148	3.554	0.928
...time spent (<i>SAT_C_Time</i>)	168	3.179	1.123

Ethnicity				
White British (0=no, 1=yes) (WhiteBritish)	200	0.488	0.501	
White Other (0=no, 1=yes) (WhiteNonBritish)	200	0.222	0.417	
Highest level of educational attainment* (Education)	186	2.957	0.856	
1 if GCSE	12			
2 if A-Level/BTEC/Vocational	36			
3 if University undergraduate degree	86			
4 if Postgraduate Degree	52			
Age (years) (Age)	199	39.572	16.083	
Gender (Gender)				
Female (=1)	112			
Male (=0)	88			
Income (Income)	160	2.125	1.859	
0	40			
<£15000 but >0	27			
£15,000-£35,000	36			
£35,000-55,000	22			
£55,000-£75,000	14			
£75,000-£95,000	7			
>£95,000	14			
Doctor-patient concordance				
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (AgeMatch)	200	0.333	0.473	
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (GenderMatch)	200	0.444	0.498	

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		DOC_Friend	0.0127 (0.8599)	-0.0984 (0.1667)
Awareness	0.0846 (0.2359)	1	DOC_Trust	-0.0288 (0.6899)	-0.0388 (0.5863)
HC_Waiting	0.1617** (0.025)	0.016 (0.8236)	Participation	0.0412 (0.5678)	0.0189 (0.7911)
HC_HospComp	0.1474** (0.0465)	-0.0033 (0.9643)	SAT_C_GP	-0.0419 (0.591)	0.122 (0.1108)
HC_Clinical_Performance	0.2146*** (0.0034)	-0.0784 (0.2849)	SAT_C_Hosp	-0.003 (0.9715)	0.1024 (0.2111)
HC_CloseHome	-0.0623 (0.3848)	-0.0998 (0.1587)	SAT_C_Doc	-0.0348 (0.6909)	0.137 (0.1077)
HC_Familiarity	-0.0078 (0.9153)	-0.0752 (0.2986)	SAT_C_Treatment	-0.0157 (0.8526)	0.0932 (0.2598)
HC_FinPerform	0.1253** (0.0884)	0.1435** (0.0482)	SAT_C_Time	-0.0239 (0.7632)	0.0541 (0.4878)
HC_GP_Reputation	0.2020*** (0.0047)	-0.016 (0.8234)	CB_AWARE	-0.0381 (0.5972)	0.2997*** (0)
HC_Access	0.0451 (0.5399)	0.1196* (0.0992)	CB_Use	0.0996 (0.1651)	0.054 (0.4477)
HC_PastExp	0.0978 (0.182)	-0.0244 (0.7369)	WEB_Access	0.2054*** (0.0041)	0.1197* (0.0923)
SI_GP_Advice	0.1054 (0.1457)	0.0163 (0.8202)	AgeMatch	0.1373* (0.0532)	0.0695 (0.3234)
SI_HospStat	0.2937*** (0.0001)	0.1159 (0.1192)	GenderMatch	0.2077*** (0.0032)	0.1472** (0.0357)
SI_DoctorRating	0.3759*** (0)	0.1240* (0.099)	WhiteBritish	-0.0429 (0.5477)	-0.0662 (0.3468)
SI_PastExp	0.0563 (0.4455)	-0.0803 (0.2696)	WhiteNonBritish	-0.0017 (0.9809)	-0.0853 (0.2252)
SI_Family	0.1215* (0.0958)	-0.0511 (0.4804)	Income	0.012 (0.8818)	-0.1219 (0.1246)
Reliable	0.3429*** (0)	-0.0311 (0.7153)	Education	-0.0103 (0.8913)	0.0023 (0.9757)
DOC_Listens	0.0629 (0.3824)	-0.0888 (0.2122)	Gender	0.0315 (0.6614)	-0.0087 (0.9029)
DOC_Time	0.1565** (0.0289)	-0.0117 (0.87)	Age	-0.1081 (0.1344)	-0.1918*** (0.0068)
DOC_Explains	0.0968 (0.1784)	0.0152 (0.8314)			

P-Values in parentheses. * p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical_Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

SAT_C_Doc	2.794
	(3.411)
SAT_C_Treatment	1.818
	(2.311)
SAT_C_Time	0.735
	(0.550)
Same GP	0.641
	(0.766)

Exponentiated coefficients; Standard errors in parentheses

* p<.10, ** p<.05, *** p<.01

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Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974 (2.377)	2.561 (2.953)	2.000 (1.965)	2.782 (2.613)	1.051 (0.818)	0.946 (0.729)
GenderMatch	18.42* (30.24)	12.03* (17.75)	10.45** (12.33)	10.39** (10.54)	16.67*** (15.48)	14.83*** (13.17)
Awareness	0.0531 (0.108)	0.0505 (0.0971)	0.0964 (0.149)	0.0758** (0.0985)	0.159* (0.176)	0.147* (0.152)
HC_Clinical_Performance	9.289* (11.84)	7.659* (8.241)	5.560** (4.759)	3.401* (2.253)	4.395** (2.653)	4.985*** (2.734)
HC_Familiarity	0.359 (0.287)	0.468 (0.282)	0.371* (0.220)	0.414* (0.206)	0.355** (0.147)	0.351*** (0.141)
HC_GP_Reputation	2.328 (1.980)	2.827 (2.106)	3.608* (2.542)	4.410** (2.753)	2.903** (1.374)	2.776** (1.260)
SI_GP_Advice	0.170* (0.173)	0.223 (0.206)	0.238** (0.167)	0.283** (0.176)	0.344** (0.186)	0.396* (0.193)
SI_HospStat	14.26** (18.84)	13.74** (15.60)	7.220*** (5.008)	6.550*** (4.200)	5.371*** (2.932)	5.133*** (2.703)
SI_DoctorRating	1.596 (1.636)	1.067 (0.958)	1.424 (0.851)	1.461 (0.770)	2.245** (0.835)	2.312** (0.876)
Reliable	6.181 (7.691)	8.682* (9.969)	6.492** (4.993)	7.586*** (5.561)	4.457*** (2.351)	4.061*** (2.003)
DOC_Listens	141.9* (424.8)	51.44 (126.4)	44.20* (90.99)	27.05** (41.26)	22.03** (28.29)	22.98** (28.34)
DOC_Explains	0.00690* (0.0183)	0.00680** (0.0148)	0.00509** (0.0105)	0.00695*** (0.0124)	0.0120*** (0.0171)	0.0124*** (0.0169)
DOC_Friend	12.88 (29.23)	8.375 (14.65)	16.48** (22.41)	19.66*** (22.45)	8.718** (8.047)	7.781** (6.896)
Participation	5.473* (5.255)	5.818* (5.410)	5.171** (3.664)	4.162** (2.687)	2.349* (1.126)	2.228* (1.036)
SAT_C_GP	17.03* (27.58)	8.038 (10.23)	6.593* (6.659)	5.410** (4.048)	4.692** (2.889)	4.377*** (2.484)
SAT_C_Hosp	21.93** (33.71)	22.86** (30.90)	30.01*** (33.63)	34.38*** (35.43)	17.95*** (15.52)	11.11*** (7.578)
SAT_C_Treatment	0.0515** (0.0764)	0.0561** (0.0794)	0.111** (0.106)	0.147** (0.125)	0.145** (0.111)	0.111*** (0.0788)
WhiteBritish	0.0137* (0.0318)	0.0409* (0.0738)	0.0542** (0.0782)	0.0539** (0.0690)	0.0909** (0.0890)	0.105** (0.0973)
Income	0.416* (0.190)	0.382** (0.162)	0.449** (0.154)	0.513** (0.154)	0.476*** (0.129)	0.462*** (0.120)
SAT_C_Doc	0.242 (0.468)	0.243 (0.374)	0.148* (0.161)	0.135* (0.144)	0.427 (0.321)	
SI_PastExp	0.670 (0.787)	0.590 (0.650)	0.535 (0.576)	0.551 (0.250)		
Education	0.486 (0.526)	0.583 (0.554)	0.683 (0.443)	0.610 (0.328)		
HC_Access	1.046 (0.659)	1.124 (0.678)	1.241 (0.564)	1.347 (0.565)		
HC_PastExp	1.030 (0.578)	0.914 (0.487)	0.930 (0.397)			
SI_Family	1.208 (1.357)	1.305 (1.484)	1.439 (1.458)			
DOC_Time	1.223 (2.118)	2.099 (3.261)	2.594 (3.547)			

DOC_Trust	0.153	0.608	0.460			
	(0.327)	(0.983)	(0.629)			
WEB_Access	1.122	0.558	0.483			
	(4.345)	(1.763)	(0.918)			
HC_Waiting	0.960	1.097				
	(0.806)	(0.846)				
HC_HospComp	1.200	0.790				
	(0.929)	(0.540)				
HC_CloseHome	0.930	0.790				
	(0.726)	(0.516)				
HC_FinPerform	0.610	0.692				
	(0.621)	(0.588)				
SAT_C_Time	1.449	1.530				
	(1.441)	(1.280)				
WhiteNonBritish	0.742	0.493				
	(1.790)	(1.041)				
CB_AWARE	1.422					
	(3.158)					
CB_Use	83.93					
	(354.7)					
_cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***	13892352.4***
	(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)	(59299449.7)
_cut2	7.05660e+09*	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***	1.60379e+09***
	**					
	(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)	(7.78799e+09)

QUESTIONNAIRE

Imperial College Business School



We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called “Choose & Book” which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King’s College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

Yes No (if No, skip ahead to Section C)

Other (please specify).....

Q2. How did you find out about these sites?

Family/Friends Doctor

The Media Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes No (if No, skip ahead to Section C)

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis Only before/after an appointment Rarely

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes No

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information Negative information

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these	<input type="checkbox"/>				

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

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Q11. To what extent do you think that the online rating of doctors by patients is a reliable measure of a doctor's performance? Please circle the most appropriate number on a scale of 1 to 5 (1=very unreliable, 5=very reliable)

1 2 3 4 5 Not sure

Q12. If you have not used these websites before, how likely do you feel you will use them in the future?

Not likely Quite likely Likely

SECTION D

Q13. These websites are based on patient input. Individuals can provide feedback based on their own experiences. Considering this, when would you be most likely to contribute to the online site? Tick all that apply.

- Every time
- After particularly positive experiences only
- After particularly negative experiences only
- After both positive and negative experiences
- Never
- Not sure

Q14. Out of the following what would be your motive for any contributions that you make to an online doctor rating site? Tick all that apply.

- I would not contribute to these websites
- To inform other patients
- To improve standards of care in the NHS
- As a method of complaint
- In appreciation of a doctor's service
- Not sure

SECTION E

Q15. Which of the following attributes would you use to describe your GP? Tick all that apply.

- I feel my doctor listens to my problems
- I feel my doctor spends enough time with me in each consultation
- I feel my doctor explains things clearly
- I feel my doctor is sociable and friendly

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- I feel that I can trust my doctor's opinions
 None of the above

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Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

- My doctor always makes decisions for me
 I like to know the options available but still let my doctor decide for me
 My doctor and I make the decisions together
 I make decisions for myself, after considering the advice of my GP
 I always make my own decisions, independently of the advice of my GP
 I make decisions with my parents/spouse/relatives

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Q17. Within your GP practice do you always want to see the same GP for an appointment?

- I always request to see the same GP
 I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of treatment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of appointment time	1	2	3	4	5	Not sure	<input type="checkbox"/>

(for primary & secondary care)

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>

Choice of doctor for outpatient appointment 1 2 3 4 5 Not sure

Choice of treatment 1 2 3 4 5 Not sure

Choice of appointment time (for primary & secondary care) 1 2 3 4 5 Not sure

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

Yes No

Q21. Have you used this Choose and Book system in the past?

Yes No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

- I have never used Choose & Book
- My doctor always makes decisions for me
- I like to know the options available but still let my doctor decide for me
- My doctor and I make the decisions together
- I make decisions for myself, after considering the advice of my GP
- I always make my own decisions, independently of the advice of my GP
- I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

- Routine outpatient consultation
- Day-case procedure/surgery
- Major surgery
- None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

Yes No

Q25. Have you used the internet in the past to search for health information?

Yes No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

- I'm too busy to have the time to use them
- The sites are not a reliable source of information
- It is difficult to interpret the information provided
- I already have enough information from other sources to make choices
- I don't have access to the internet
- I did not know these websites existed
- I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

- Shopping websites (e.g. Amazon)
- Holiday websites (e.g. TripAdvisor)
- Car insurance websites (e.g. Compare The Market)
- Restaurants/venue websites (e.g. ViewLondon)
- Film websites (e.g. Rottentomatoes)
- Other (please specify).....
- I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- Star-rating out of 5
- Percentage scores
- Thumbs Up/Down
- Written comments from patients/users
- No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age?

Q30. What is your gender?

Male Female

Q31. How would you describe your ethnicity?

<input type="checkbox"/>	White – British	<input type="checkbox"/>	Other Asian – non-Chinese
<input type="checkbox"/>	White – Others	<input type="checkbox"/>	Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. What is your postcode?

Q33. How many other individuals do you live with?

Q34. Do you live with your parents?

- Yes No

Q35. What is/was your profession?

- Unemployed Retired

Q36. What is your level of pre-tax income?

- 0
- <£15000 but >0 £15,000-£35,000
- £35,000-55,000 £55,000-£75,000
- £75,000-£95,000 >£95,000

Q37. What is your highest level of educational attainment?

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

- 0 times 1-3 times
- 4-5 times More than 5 times

Q39. What is the sex of your GP?

- Male Female

Q40. How old is your GP?

- <30 years
- 30-50 years
- >50 years

Q41. What is the ethnicity of your GP?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

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	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP.

This is the end of the questionnaire, thank you for your time.



For peer review only

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2- 3
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4-6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5-6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	6
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8
		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	8
		(d) If applicable, describe analytical methods taking account of sampling strategy	NA
		(e) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	5
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6
		(b) Indicate number of participants with missing data for each variable of interest	8
Outcome data	15*	Report numbers of outcome events or summary measures	8-11
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	18-23
		(b) Report category boundaries when continuous variables were categorized	NA
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11-12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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7 **Who is More Likely to Use Doctor-Rating Websites, and Why?**
8 **A Cross-sectional Study in London**
9

10 **Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴, Wikum**
11 **Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵**
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16
17 **Declaration:** All authors have completed the Unified Competing Interest form at
18 www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author)
19 and declare: no support from any organisation for the submitted work; no financial
20 relationships with any organisations that might have an interest in the submitted work in
21 the previous three years, no other relationships or activities that could appear to have
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Who is More Likely to Use Doctor-Rating Websites, and Why? A Cross-sectional Study in London

Matteo M Galizzi¹, Marisa Miraldo^{2*}, Charitini Stavropoulou³, Mihir Desai⁴, Wikum Jayatunga⁴, Mitesh Joshi⁴, Sunny Parikh⁵

Article summary

Article focus:

- To explore the awareness of the existence of doctor-rating websites and ~~its~~ their usage among a sample of respondents from London ~~the general population~~.
- To understand the main predictors of what makes people willing to use doctor-ratings websites.

Key messages:

- The share of ~~the general public~~ actual users of which uses doctor-rating websites is ~~still~~ quite low.
- ~~SElderly~~, subjects with white British background, as well as subjects with higher income are less likely to use doctor-rating websites.
- The doctor-patient relationship is a significant predictor of patients' intention to use ~~;~~ doctor-rating websites.

Strength and Limitations:

- Our study contributes to the literature of online health information where evidence on the determinants of people's willingness to use doctor-rating websites is limited.
- The main limitation of the study is that we use a convenience sample from one borough of London, UK and therefore results cannot be immediately generalised to the UK population.

Abstract

Objectives: To explore the extent ~~at to~~ which doctor-rating websites are known and used among a sample of respondents from London ~~the general population~~. To understand the main predictors of what makes people willing to use doctor-ratings websites.

Design: A cross-sectional study.

Setting: The Borough of Hammersmith and Fulham, London, England.

Participants: 200 individuals from the borough.

Main outcome measures: The likelihood of being aware of doctor-rating websites and the intention to use doctor-rating websites.

Results: The use and awareness of doctor-rating websites is still quite limited. ~~Elderly~~, ~~w~~White British subjects, as well as respondents with higher income are less likely to use doctor-rating websites. The Aspects of the doctor-patient relationship also plays a key role in explaining intention to use the websites: ~~the GP-patient gender concordance is associated with higher intention to use, the websites. Respondents who feel that their GP is a valuable source of clear information, and who are more satisfied with the level of choice of healthcare treatments, are less likely to use online rating websites. The doctor has both a "complementary" and "substitute" role with respect to Internet information.~~

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6 **Conclusions:** Online rating websites can play a major role in supporting patients'
7 informed decisions on which health care providers to seek advice from, thus potentially
8 fostering patients' choice in health care. Subjects who seek and provide feedback on
9 doctor-ranking websites, though, are unlikely to be representative of the overall patients'
10 pool. In particular, they tend to over-represent opinions from ~~young~~, non white British,
11 medium-low income patients who are not satisfied with their choice of the healthcare
12 treatments and the level of information provided by their GP. Accounting for differences
13 in the users' characteristics is important when interpreting results from doctor-rating sites.
14

15 Key messages

- 16 • The share of ~~the general public which uses~~ actual users of doctor-rating websites is
17 ~~still~~ quite low.
- 18 • ~~Elderly,~~ sSubjects with white British background, as well as subjects with higher
19 income are less likely to use doctor-rating websites.
- 20 • The GP-patient gender concordance is associated with higher ~~-~~intention to use ~~;~~ the
21 websites.
- 22 • Subjects who feel that their GP explains things clearly and is a valuable source of
23 clear information, are less likely to use online rating websites.
- 24 • Subjects who feel that they are more satisfied with the level of choice of healthcare
25 treatments are less likely to use online rating websites.

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INTRODUCTION

In recent years, both the NHS Plan¹ and the NHS Improvement Plan², set out the changes required for the English NHS to become more patient-focussed. Greater patient involvement in the running of the NHS has gone hand in hand with the policymakers' drive to improve the quality of public healthcare services. The 'bottom-up' approach to a more patient-centred NHS has typically focused on three main areas: i) giving users more choice and personalisation; ii) making funding respond to users' choices; and iii) engaging users through greater involvement.³ Lord Darzi's 2008 report "High Quality Care For All - The Next Stage Review"⁴ acknowledged that improvements to the NHS should focus on improving the quality of services, and that the best way of achieving this would be to ensure that services are locally responsive to the needs of the community, for instance, by empowering providers and patients as decentralised decision-makers in order to foster a culture of continuous quality improvement and innovation.

Websites, such as the *NHS Choices* and *Dr Foster Intelligence*, have been developed with the explicit aim of informing patients about the services that the NHS provides and therefore allowing a better choice of physicians and treatments. In principle, doctor-rating websites can have a profound impact on public involvement and patients' choice, as they enable patients to make more informed decisions on where to seek healthcare, and thus to engage more often in active choices concerning their health. In practice, however, relative little evidence is available on whether, and to what extent, doctor-rating websites are actually known and actively used in the UK.

A study by the Kings Fund⁵ explored the information sources used by patients in making decisions about where to receive care. Only 4% of the patients used the NHS Choices website, with the majority instead drawing information from their own experiences (41%), and advice from GP (36%). Similarly, a national survey on patients' choice by the Department of Health found that the NHS Choices website was only used by 5% of respondents.⁶ These figures are consistent with the evidence from the US where usage of doctor rating websites is still quite low.^{7,8} Moreover, very little is known about the profile of individuals who are more likely to make active use of these sites. Appleby and Alvarez⁹ found that women in England desire patient choice more than men (69% to 56%), suggesting that women may also be more likely to use patient sources of information such as rating sites. This is in line with findings from the US where women and younger adults are more active 'online health information seekers'.¹⁰

The aim of this study is to contribute to fill these gaps by providing more direct evidence on, first, the extent to which doctor ratings websites are known and used among ~~the general public~~ a sample of respondents in a borough of London; and, second, the most significant predictors of the fact that people are willing to use doctor-ratings websites.

METHODS

We conducted a self-administered survey to assess the extent and the determinants of i) the awareness of the existence of doctor-ratings websites; ii) the level of actual usage of those websites; iii) the intention to use doctor-ratings websites in the future.

Questionnaire design

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6 Prior to the data collection a pilot study was conducted. The aim of the pilot was to gain
7 an understanding of the practicalities associated with giving out questionnaires and
8 collecting responses. After listening to feedback from pilot respondents, and looking at
9 results from the pilot study, several changes were made to make the questionnaire easier to
10 understand. The changes related to content, phrasing and ordering of questions.

11
12 The content of the final questionnaire was based on findings from the preliminary
13 literature review and was designed ~~to have~~in a number of sections (see Appendix for full
14 questionnaire). In particular, section A focuses on the awareness of online rating websites,
15 while section B assesses actual usage of online rating websites. Section C measures the
16 willingness to use the online rating websites in the future, and explores which aspects of
17 the healthcare providers and which sources of information are perceived as being
18 important factors in making decisions about where to receive healthcare. Section D
19 assesses the individual contribution to the online rating sites, while section E focuses on
20 aspects of the doctor-patient relationship and attitudes and dimensions of patient choice.
21 Finally section F controls for internet usage, while section G collects a broad range of
22 socio-demographic characteristics.

23
24 Closed questions were used, worded in a manner easy to understand. A limited number of
25 responses were provided, either with binary options (e.g. yes or no), or with a numerical
26 Likert scale ranging from 1 to 5, with a further option for “*Not sure*”.

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28 | A list of variables with a brief description is discussed in the [Variables-Statistical analysis](#)
29 section and is summarised in Table 1 in the Appendix.

30 **Ethical approval, informed consent and confidentiality of responses**

31
32 We completed the checklist for research ethics approval from Imperial College London.
33 As interviews were intended to be conducted in public places among respondents from the
34 general population, the study involved no risk or harm of any type to respondents, no link
35 with clinical data was expected to take place, and no incentives were going to be paid to
36 respondents, the study fitted all the criteria in the first stage checklist with no further
37 formal application to the Imperial College Research Ethics Committee.

38
39 At the beginning of each interview, interviewers showed credentials as research assistants
40 at the University of London, informed respondents that their answers were anonymous
41 and would remain strictly confidential, and that all responses and data were going to be
42 treated statistically and used for the purposes of scientific research only. Informed consent
43 by respondents was then given at the beginning of each interview.

44 45 46 **Data CollectionSample**

47
48 The survey was conducted in the field by the researchers involved in the paper. The
49 borough of Hammersmith and Fulham was chosen for the location of the field survey
50 because it is a transport hub in Central West London, and hosts many offices and several
51 major business centres. The four interviewers went to different public locations within the
52 borough (underground stations, high street and residential areas) at different times during
53 the day (early morning, midday and in the evening) and in different days of the week
54 (including weekends). By covering different times and locations within the borough, we
55 aimed at being able to approach both working and non-working members of the public.

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6 During the surveys in the field, the interviewers approached every third male and third
7 female that would pass by them.
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9 Sample size calculations were based on the intended objective to look at the correlation
10 coefficient between the likelihood of using the websites on the one hand, and a typical
11 survey response, on the other. The minimum sample size to test the null hypothesis of no
12 significant correlation between these two variables was calculated given the most
13 conservative assumption that the correlation coefficient between the variables in the
14 population was in the region of 0.2 (a “low” effect size, the variance of one variables
15 accounting for just 4% of the variance of the other). Under the assumptions that all
16 variables are normally distributed, a bi-directional test (both positive and negative
17 correlation were expected) with 95% significance level reaches a standard 80% power
18 level at a minimum sample of $n=200$ subjects.¹¹ We thus targeted a sample size of 200
19 respondents. The envisaged target was then readily achieved, since only 68 subjects who
20 were initially approached refused to take part to the survey, with a final response rate of
21 74%.
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26 Statistical analysis

27 | Besides a correlation analysis, ~~We~~ we have carried a multiple regression analysis which
28 aims to explore the determinants of i) being either aware or not of doctor rating websites;
29 and ii) the individual intention of using these websites in the future.
30

31 The dependent variable in the first case is modeled as a binary variable (*Awareness*)
32 taking values 1 or 0 for the respondents who reported to be aware or unaware of the
33 websites, respectively. The second dependent variable is instead modeled as a discrete
34 ordered variable (*IntentionToUse*) taking values 1, 2, and 3 for subjects reporting to be
35 ‘not likely’, ‘quite likely’, and ‘likely’ to use the websites in the future, respectively.
36

37 The explanatory variables (X_i) include the variables described in Table 1, namely:
38 individual socio-demographic characteristics; a set of variables on the characteristics of
39 the healthcare providers that the respondents consider important for making their
40 decisions on where to receive health care; a set of variables on the sources of information
41 that are important in making decisions about where to receive health care; two dummy
42 variables that capture whether the patient’s gender and age are the same, or within a
43 comparable range, respectively, than the gender and age of her GP; a set of variables that
44 describe the respondents’ feelings about their relation with their doctor; a variable
45 indicating the level of participation of the respondents in their GPs’ decisions; a set of
46 variables on patients’ satisfaction with the level of choice in their healthcare decisions; a
47 dummy variable controlling for whether the subjects had access to internet at home or at
48 work; a variable on awareness of the existence of doctor-rating websites; and a variable on
49 whether the subject always asks to see the same GP (see Table 1 for variables’ details).
50 The choice of the explanatory variables was further informed by the bivariate correlation
51 analysis reported in Table 2 in the Appendix.
52

53 We employed a binary logistic and an ordered logistic model to fit the *Awareness* and the
54 *IntentionToUse* discrete variables, respectively, to ensure a reasonable comparability
55 between the empirical results obtained for the two set of regressions. The two models, in
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6 fact, only differ in the number of values that the dependent variables can take, while the
7 underlying structure of the error terms follows the same standardized logistic distribution.
8 The logistic specification is particularly appealing because its results can be readily
9 expressed in terms of odds ratio. We have, however, conducted a robustness check by
10 replicating the multiple regression analysis using the alternative binary and ordered probit
11 specifications, ~~which assume a Gaussian error term and present results in terms of~~
12 ~~estimated coefficients instead of odds ratio.~~ The two set of regressions provide consistent
13 estimates and results which are qualitatively fully aligned. Results of the probit
14 specifications are available, upon request, from the authors.

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16 All the regression analysis has been conducted using STATA v.11.

17 18 19 20 RESULTS

21 The sample and descriptive statistics

22 Descriptive statistics of all the dependent and independent variables for the resulting
23 sample of respondents to our survey are provided in detail in Table 1, and here we briefly
24 report their main aspects.

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26
27 Our sample consisted of 200 subjects. Comparing it with the Census data for the borough
28 the mean age of our sample was slightly older than that for the borough (39.57 years
29 compared to 35.2 years).¹³¹² Our sample however was closer to the national mean age of
30 38.5 years. The range of ages seems to show a positive skew, with a greater frequency of
31 people aged 40 years and under. This is consistent with the 2001 census data for
32 Hammersmith and Fulham which showed the borough contained a larger proportion of
33 young people aged 20-29 (23.8%) than the rest of England (12.66%).¹³¹²

34
35 Also, the sample had a slightly greater proportion of females than the borough (54.44% to
36 52% respectively), and a lower proportion of 'White British' ethnicity (48.79% compared
37 to 58% for the borough).¹³¹² This is also significantly lower than figures for England,
38 White British accounting for 87% of the population.¹³¹² The sample contained 28.99% non
39 white respondents. This is higher than the 2001 census data for Hammersmith and Fulham
40 which was 22% and significantly higher than the figures for England, showing non white
41 ethnic groups accounting for 9% of the total population.¹²⁴³ Our sample, therefore, allows
42 controlling for high heterogeneity in ethnic background even with a limited sample size.

43
44 Regarding working status, 141 individuals were workers (ten of which reported to be
45 currently unemployed), 33 students, 9 officially unemployed and 6 retired. Eleven
46 respondents did not report their working status. The proportion of subjects who were not
47 currently working, as given by the sum of the respondents who reported to be
48 unemployed, retired, or students, indeed amounts to 29% of the sample. The majority of
49 actively working respondents reported an income within the £15-35,000 bracket.

50
51 Our sample had a high percentage of people with higher level qualifications: 46.24% of
52 the sample had a university degree and 27.96% had a postgraduate degree. This is
53 reflective of Hammersmith and Fulham, where 45% of the population have a qualification
54 of degree level or higher, a figure which is significantly higher than in England, where
55 only 19.8% have a degree or higher qualification.¹²⁴³

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Results on awareness

Only 29 of our respondents were aware of the doctor-rating websites they were asked about and only 6 reported to have used them.

In Table 2 we present the set of bivariate correlations between the fact of being aware of the websites and each of the variables collected in the survey. As it can be seen, there is positive correlation between having an internet access, or being aware of the NHS Choose and Book system, and being aware of the doctor rating websites. Age exhibits a negative correlation, while the gender concordance with the GP, shows a positive correlation. Positive correlations with the awareness of doctor rating websites also hold for respondents who think that those websites are important sources of information, or who see accessibility and financial performances of hospitals important factors in making decisions where to seek healthcare.

[Table 2 in here]

In Table 3 we present the estimate results of four different specifications of the binary logistic regression for the dependent variable *Awareness* with different sets of regressors, which are presented in terms of the odds ratio, together with the standard errors, and levels of significance.

[Table 3 in here]

Among the demographic factors, age and ethnicity are the only significant variables. Older individuals are less likely to be aware of the rating websites, which does not constitute a surprise, as they are usually less familiar with the use of internet in general. Moreover, in most specifications, white British and white non-British respondents appear less likely to be aware of the websites.

Among the broader socio-demographic factors, only income is sometimes (marginally) significant, pointing to the fact that respondents with higher reported levels of income tend to be less aware of the websites, while neither education or gender turn out to be significant predictors of awareness.

Looking at the characteristics of the providers that respondents consider important in making their decisions on where to receive healthcare, in one specification the reputation of the doctor has a strong positive effect, while both clinical and financial performance rates of the providers show negative significant effects. Thus, the respondents who consider the reputation of the doctor important in deciding where to receive care are more likely to be aware of the rating websites, while this is less often the case for respondents putting a higher weight on financial or clinical performance ratings.

Concerning the sources of information, respondents who consider the hospital statistics important in deciding where to receive care, turn out to be more likely of being aware of the rating websites, with an effect which is particularly significant and quite remarkable in terms of odds ratio.

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7 Furthermore, although in one specification the respondents who feel that their GPs spend a
8 sufficient time in their consultation are less likely to be aware of the internet rating
9 websites, both the statistical significance and the estimated odds ratio do not appear robust
10 across specifications. Although all other variables on doctor-patient relationship were not
11 significant, whenever included among the regressors, the gender match between the GP
12 and the patient predicts higher awareness of the website ratings, with a noticeable effect as
13 evident by the reported value of the odds ratio.

14
15 | As mentioned above, ~~F~~from those that were aware of the existence of doctor-rating
16 websites only 6 have reported to have used these websites. In light of this low usage rate,
17 and of the consequent limitations of conducting statistical estimations with very little
18 variation in the dependent outcomes, we have thus focused the rest of the analysis on the
19 determinants of the intention to use, rather than actual usage of, doctor rating websites.

20 21 22 23 **Results on the likelihood to use online rating websites**

24 In Table 2 we present the set of bivariate correlations between the intention to use the
25 doctor rating websites and each of the variables collected in the survey. As it can be
26 noticed, there is a positive correlation between having internet access, and being aware of
27 the doctor rating websites. Both the age and the gender concordance with the GP show a
28 positive correlation with the intention to use. Positive correlations with the willingness to
29 use doctor rating websites also hold for respondents who think that those websites, or
30 hospital statistics, are important sources of information. Also the fact that respondents
31 believe that online rating is a reliable measure is clearly correlated with the intention to
32 use them. Finally, positive correlations also hold for respondents who feel that their doctor
33 has time to dedicate to them, or who see several aspects of healthcare providers - such as
34 reputation, clinical and financial performances, waiting lists, accessibility – as important
35 factors when making decisions where to seek healthcare.

36 In Table 4 we present the estimate results of six different specifications of the ordered
37 logistic regression for the dependent variable *IntentionToUse* with different sets of
38 regressors, which are presented in terms of the odds ratio, together with the standard
39 errors, and levels of significance.

40
41 **[Table 4 in here]**

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43 Concerning socio-demographic variables, it turns out that white British, as well as
44 respondents who reported income in higher brackets, said they were less likely to use
45 doctor-rating websites. Moreover, we do not find any effect of education, age and gender
46 of the respondents on the likelihood of their intention to use (the results of the
47 specifications including the age and gender variables are not reported in the table for the
48 sake of space but are available from the authors upon request).

49
50 Looking at the characteristics of the healthcare providers that respondents perceived as
51 important while making decisions where to receive healthcare, our data suggest that those
52 who consider clinical performance and doctor reputation (in most specifications) as
53 important factors, are more likely to use doctor-rating websites. These results are
54 consistent with the nature of the information provided in these websites. Also, and quite

intuitively, subjects who consider the familiarity with their doctor an important factor to decide where to seek healthcare, tend to be less likely to intend to use websites.

Concerning the role of the different sources of information on the decisions of where to seek healthcare, respondents who see published hospital statistics as important sources of information are more likely to use the rating websites. On the other hand, ~~and interestingly~~, those for whom GP advice is an important source of information for decision making are less likely to use doctor-rating websites.

Also the nature of the doctor-patient relationship seems to play a key role in explaining whether respondents intend to use online rating websites. First, patients with GPs of the same gender tend to be more likely to use the websites. Second, respondents for whom the doctor is able to listen to them, and who perceive the nature of the relationship with their GP as friendly, also tend to be more likely to use the websites. Third, respondents who feel that their doctor explains things clearly are less likely to use online rating websites. Fourth, it also transpires that the more autonomy patients have in their healthcare decisions, the more likely they are to be willing to use the rating websites.

Finally, concerning, the interaction between levels of satisfaction for the healthcare services within the NHS, and the intention to use doctor-rating websites, ~~it is interesting to~~ note that those that have reported to be more satisfied with the level of choice of GP, and with the amount of choice of the hospital to receive outpatient appointments, are more likely to use these websites. On the other hand, the respondents that are more satisfied with the level of choice of treatments are less likely to use the websites.

DISCUSSION

In this section we briefly discuss our main findings on the determinants of the intention to use doctor rating websites and the level of awareness and actual usage of these websites. Results show that socio-demographic characteristics (in particular income and ethnicity) and the doctor patient relationship are significant determinants of the intention to use these websites. Regarding the latter we further show that, from a patient's perspective, the doctor and the Internet can be seen as being both "complementary" and "substitute" sources of information. Yet, we find that awareness and usage of doctor rating websites is low in our sample. In what follows we will discuss these results and relate them to evidence from the literature.

Intention to use

On the socio-demographic variables the results that show that white British and respondents who reported income in higher brackets said that they were less likely to use doctor-rating websites, is partly in contrast to what found by the previous literature^{12,15,16,13,14,15} and can signal that white British subjects and respondents with higher self-reported income may feel less in need of checking online doctor ratings, perhaps because they may also have private, or employer-paid, health insurance schemes, or because they are in the position of directly accessing alternative sources of information through their networks of acquaintances. Another possible explanation may be that white British individuals may trust less information that exists online and they have more

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6 concerns about confidentiality issues as shown in a study among different socio-economic
7 groups in the US by Brodie et al.¹⁶¹⁷ As the estimated effect of these variables appear to be
8 robust across all empirical specifications, these findings seem to suggest that online
9 doctor-rating websites are likely to be particularly attractive to subjects with non-white
10 British ethnicity and less favoured economic background.

11
12 On the other hand, the lack of statistical significance in the ordered logit estimates, seems
13 to suggest that, while age can be a significant factor in explaining the awareness of
14 Internet for health information, it is not significantly explaining the intention to use
15 doctor-rating websites once subjects are made aware of their existence. The analogous
16 lack of significance for the respondents' gender, on the other hand, does not support the
17 view that women in the UK may be more likely to use patients' sources of information
18 and rating websites, although they have been found to desire patient choice more than men
19 (69% to 56%).⁹ Both results differ from the findings from the literature on the use of
20 online information. The literature has shown that socio-demographic characteristics are
21 major determinants of usage of online health information. In particular women and
22 younger adults are more active 'online health information seekers'.^{10,18-21,17-20} Education
23 has also been found to determine usage of online and offline health information. Cotton
24 and Gupta¹⁵¹⁶ and Diaz et al.¹²¹³ carried out research into the characteristics of online and
25 offline health information seekers and found that less educated individuals were less likely
26 to be users of online health information.

27
28 Therefore even though, according to our findings, intentions to use do not differ
29 significantly across all socio demographic characteristics, actual usage may be greatly
30 determined by access rather than only by intention to use, with the former substantially
31 differing according to socio-economic and demographic characteristics. That is, there may
32 exist income-, education- or age-related barriers to actual access that prevent individuals
33 from using doctor rating sites even though their intentions to use them are similar.

34
35 From the perspective of the doctor-patient relationship, the finding that patients with GPs
36 of the same gender tend to be more likely to use the websites is of particular interest, and
37 it is consistent with the analogous effect found for the likelihood of being aware of those
38 websites. Considered together these findings point to the possible explanation that the
39 doctor and the Internet may sometimes be seen by patients as "complementary", rather
40 than alternative, information channels.⁴⁵¹⁴ This interpretation is further confirmed by the
41 finding that respondents for whom the doctor is able to listen to them, and who perceive
42 the nature of the relationship with their GP as friendly, also tend to be more likely to use
43 the websites.

44
45 The doctor-patient gender concordance, in fact, has often been reported in the literature as
46 a factor associated with higher patient satisfaction with the consultation as well as better
47 outcomes.²²²¹ If we interpret the gender match variable as an indication of satisfaction
48 with the consultation, our finding indicates that the intention to use (as well as being
49 aware of) the doctor-rating websites is not necessarily the result of a poor consultation.
50 Instead, the Internet and the doctor are likely to be seen as complementary, rather than
51 alternative, information channels. This could explain why patients that consider hospital
52 statistics as a good source of information are more likely to use these websites. Indeed this
53 type of information might not be provided by the doctor in a consultation.

54 Indeed, a study by Stevenson and colleagues²²²⁴ shows that although patients use the
55 Internet increasingly more, they show no intention of doing so with the aim of disrupting

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6 the existing balance of roles during the doctor-patient consultation. They all mentioned the
7 Internet as an additional resource of health and healthcare information. Other evidence
8 suggests that patients with hypertension who search for more information on the Internet,
9 in addition to that they receive from their doctor, may be more engaged in their treatment,
10 and therefore more willing to adhere to medication prescribed by them.²³²⁵

11
12 Finally, the positive association between willingness to use doctor rating websites and
13 levels of satisfaction with the level of choice of GP, and of outpatient appointments in the
14 hospital, can be considered as reinforcing the above discussed interpretation that some
15 dimensions of the doctor-patient relationship may be “complementary” with online
16 information. For instance, patients who are more satisfied with their GP because they feel
17 the latter is more friendly and empathic may also be more likely to engage more actively
18 with health and healthcare information more generally. These results, together with the
19 finding that the respondents who are more satisfied with the level of choice of treatments
20 are less likely to use the websites, suggest that the choice of doctors and providers may be
21 seen as only instrumental for the choice of treatment, and therefore respondents that are
22 happy with treatment choice levels are less likely to shop around for different doctors’
23 opinions.

24
25 On the other hand, there may be other dimensions in the patient-doctor relationship which
26 seem to rather point to a “substitute” relationship with information on the Internet. For
27 instance, the fact that respondents who feel that their doctor explains things clearly and
28 consider the advice given by the GP as being important are less likely to use online rating
29 websites, suggests that when they are generally more satisfied with the feedback provided
30 by their doctor they are less concerned about finding about alternative doctors and
31 compare them with their current GP.

32
33 This result on a “substitute relationship” is consistent with previous evidence by Diaz and
34 colleagues¹³⁴² that found that 11% of their respondents said they would rather use the
35 Internet ‘instead of seeing or speaking with their doctors’, and that 59% of respondents
36 ‘did not discuss information with their doctors’. It also seems in line with the study by
37 McMullan¹⁴⁴⁵ that indicates that patients who become dissatisfied with the information
38 provided to them by the health professionals are more likely to seek confirmation of the
39 information given and additional information on the Internet.

40
41 Our findings that online information can be used not only as “substitute” but also, and
42 perhaps mainly, as “complementary” to several dimensions of the doctor-patient
43 relationship do not seem to entail any particular evidence suggesting that online ratings
44 may put in danger the doctor-patient relationship, an important aspect which has been
45 raised in the literature.^{26,2724,25} The “complementarity” findings, in particular, seem
46 consistent with the evidence from the US which shows that the vast majority of the
47 reviews by patients are generally rather positive.^{7,8,2628} Taken together, this evidence can
48 be seen as providing little support to the related concern that the likeliest to use online
49 ratings and enter actual comments may be the most disgruntled patients.²⁷²⁹

50
51 As for the other aspects of the patient-doctor relationship, the finding that the more
52 autonomous patients are in their healthcare decisions, the more willing they are to use the
53 rating websites is also consistent with previous evidence: a study by McMullan,⁴⁵¹⁴ for
54 instance, reports that patients would seek health information before a consultation ‘to
55 manage their own healthcare independently’. These may be the type of people who are

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6 'more likely to be health-oriented' or 'health conscious', and therefore be more proactive
7 in consultations.²⁸²³

Awareness and actual usage

10 Only 15% of our sample were aware of the existence of these websites, indicating that the
11 awareness and, consequently, usage of these online sources is still quite limited in the UK,
12 although significantly higher than what the previous studies have shown.⁵

14 Concerning the low reported rate of active usage of doctor rating websites, the finding is
15 not too surprising given that the survey was done among a sample of respondents from the
16 general population: the reason why many more respondents were aware of the online
17 ratings than did actually use it may simply be because those subjects did not actually need to
18 see a doctor.

20 These figures are substantially in line with previous evidence brought forward from the
21 literature for the UK.^{5,6} A slow uptake of online ratings has also been reported in the US.
22 It is indicative that only 6% of Americans were aware of Hospital Compare, the quality
23 reporting website maintained by the Centres for Medicare and Medicaid Services
24 (CMS).²⁹¹⁴ Gao et al.⁸ analysed 386,000 national ratings from 2005-2010 in the US and
25 showed that only 1 out of 6 physicians among those included in the study had received
26 some rating. Lagu, Hannon, Rothberg et al.⁷ also reported a low average number of ratings
27 per physician.

29 The fact that even in the US, a more market-oriented health system, the use of similar sites
30 is not much higher may suggest that the slow uptake in the UK cannot be attributed only
31 to the early stage of the "choice" model. Considered together these results may pose
32 concerns on the reasons and consequences of the lack of patient awareness and usage of
33 online health related information.

35 Previous studies in the US have reported a number of reasons behind this slow uptake,
36 including i) the preference for more traditional information channels, such as
37 recommendations by family and friends; ii) the lack of time; and iii) in many cases the fact
38 that people do not recognise that the quality of care may vary.²⁷²⁵

40 As for the UK, our study confirms that not only awareness of rating websites is still
41 limited among a sample of respondents the general public in London, but awareness and
42 willingness to use per se do not seem a sufficient condition to guarantee active usage. This
43 poses a double challenge from a clinician and health policy perspective. In fact, on the one
44 hand, the documented correlation between online ratings and other measures of healthcare
45 quality, including survey-based ratings and clinical quality indicators,^{30,31} necessarily
46 requires that patients have already gone through three preliminary hurdles, namely i) being
47 aware of, ii) having effective access to, and ii) being active users of the doctor rating
48 websites. If the ultimate goal is indeed the continuous enhancement of healthcare quality,
49 the effective removal of this ~~double~~triple hurdle is likely to become the next priority to
50 guarantee the full spread of online rating website.

52 On the other hand, while appropriate online and offline informational campaigns are likely
53 to overcome the first hurdle, thus effectively raising patients' awareness of online ratings
54 as a potential source of information on provider quality, informational campaigns alone
55 can fail to grant effective access and trigger actual changes in behaviour. Alike in several

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6 other health contexts, in particular, ‘nudging’ behaviour may be difficult as a mere
7 consequence of accessing more information.

8
9 If this is the case, other avenues should be explored to increase the active usage of rating
10 websites by patients who are already aware of them. For instance, the evidence brought
11 forward by the present study confirms the importance of the doctor-patient relationship as
12 a factor determining individuals’ awareness of and willingness to use online ratings^{7, 25, 32-}
13 3527, 33-36 and suggests that tailored behavioural interventions based on the doctor-patient
14 relationship have the potential to help patients to overcome the last hurdle and actively
15 engage with online ratings.

16 17 18 **Limitations of the study**

19
20 The convenience field survey was considered the most appropriate administration mode to
21 involve a sample of respondents from the general population. An online survey, in fact, by
22 exclusively reaching the segment of active internet users, would have failed to address the
23 main goal of the study.:-

24 As common in field surveys of this type, the convenience sampling tended to over-
25 represent respondents who were currently not working, or were at home:

26
27 However, while dictated by practical issues, the convenience sampling is a limitation of
28 the study, and tends to over-represent respondents who are currently not employed, such
29 as unemployed, retired and students. Also the fact that the study was conducted in only
30 one borough of London limits the possibility to immediately generalise the findings to the
31 broader UK population.

32
33 In an attempt to make such limitations of smaller concern to enhance the external validity
34 and generalisability of the analysis, we have i) chosen a borough which comprises a mix
35 of both affluent and deprived neighbourhoods from heterogeneous ethnic backgrounds; ii)
36 conducted surveys in the field at different public locations and at different times of the
37 day and of the week to approach both working and non-working members of the public;
38 and iii) controlled for a wide range of socio-demographic measures in the statistical
39 analysis.

40 41 42 **CONCLUSIONS**

43
44 By collecting a broad range of information on the socio-demographic characteristics of the
45 respondents, their views and perceptions of the most important aspects of healthcare
46 quality, patient choice, and doctor-patient relationship, the study explicitly explores the
47 usage doctor-rating websites, the determinants of respondents’ awareness of the doctor
48 ratings websites, and of their intention to use the sites in the future.

49
50 This study brings forward direct evidence suggesting that the awareness and actual usage
51 of doctor-rating websites in the UK remains particularly low. The main finding suggests
52 that the doctor-patient relationship plays a key role in explaining intention to use the
53 websites and that the doctor has both a “complementary” and “substitute” role with
54 respect to Internet information.

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7 The existence of both “substitute” and “complementary” effects between the doctor-
8 patient and the Internet information channels is not at all conflicting. In fact, they both
9 indicate that the level of concordance achieved during the consultation is likely to define
10 whether or not individuals will seek for further information channels, such as the Internet.

11
12 The findings of our study thus contribute also to the wider debate on the inter-
13 relationships between Internet usage and the doctor-patient relationship.^{7,27,28,33-36,25-26,32-35}
14 The argument, sometimes addressed by the previous literature, that information on the
15 Internet can threaten the trust relationship and the balance of roles between doctors and
16 patients, seems a concern which is not supported by our evidence. If any, a potential
17 challenge to the doctor-patient relation can only affect the patients who already feel
18 dissatisfied with the ability of their doctor to listen to them and provide them enough
19 information regarding their condition, or with the level of their choice for healthcare
20 treatments.

21
22 The above, however, can hardly be seen as a serious threat by those who advocate a
23 greater choice by patients. On the contrary, if the latter is indeed a priority in the health
24 policy agenda, online information on healthcare providers should be seen as a challenging
25 opportunity to enhance patients’ choice in healthcare, and public engagement with health
26 information, especially for the less favoured segments of the population. Indeed, our
27 findings suggest that subjects of non-white background and with lower income are more
28 willing to use online ratings.

29
30 Finally, our study highlights that subjects who use doctor rating websites are unlikely to
31 be representative of the overall patients’ pool. In particular, they tend to over-represent
32 opinions from non-white British, medium-low income patients who are not satisfied with
33 their choice of healthcare treatments. Accounting for differences in the users’
34 characteristics is important when interpreting results from doctor-rating sites and when
35 informing interventions that aim at enhancing the public engagement with health
36 information on the Internet, and the representativeness of the users who seek and provide
37 feedback online.

38
39
40 **Data sharing:** technical appendix, statistical code and dataset available from the
41 corresponding author at m.miraldo@imperial.ac.uk. Consent for data sharing was not
42 obtained but the presented data are anonymised and risk of identification is low.

43
44 All authors had full access to all the data in the study and take responsibility for the
45 integrity of the data and the accuracy of the data analysis.

46
47
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Appendix

Table 1 Variable description and descriptive statistics

Variable	Obs	Mean	Std. Dev
Awareness (<i>Awareness</i>) (0=no, 1=yes)	200	0.142	0.350
Intention to use (<i>IntentionToUse</i>)	199	2.136	0.743
Not likely	43		
Quite likely	86		
Likely	70		
Important factors in making decisions (1=not important at all, 5=very important)			
Waiting lists (<i>HC_Waiting</i>)	198	3.818	1.165
Rates of hospital-acquired complications (<i>HC_HospComp</i>)	188	3.761	1.193
Clinical performance (<i>HC_Clinical_Performance</i>)	189	4.037	1.136
Closeness to home (<i>HC_CloseHome</i>)	200	3.683	1.265
Familiarity with the doctor (<i>HC_Familiarity</i>)	194	3.237	1.306
Financial performance of the hospital (<i>HC_FinPerform</i>)	191	2.387	1.164
Reputation of the doctor (<i>HC_GP_Reputation</i>)	199	3.980	1.137
Accessibility and parking facilities (<i>HC_Access</i>)	192	2.656	1.321
Past experience with the provider (<i>HC_PastExp</i>)	193	3.544	1.311
Important sources of information in making decisions (1=not important at all, 5=very important)			
GP advice (<i>SI_GP_Advice</i>)	198	4.071	1.030
Published hospital statistics (<i>SI_HospStat</i>)	183	2.934	1.193
Online doctor rating websites (<i>SI_DoctorRating</i>)	178	2.315	1.204
Personal experiences in the past (<i>SI_PastExp</i>)	192	4.234	1.004
Feedback from family/friends (<i>SI_Family</i>)	194	4.149	0.924
I feel the doctor...			
...listens (0=no, 1=yes) (<i>DOC_Listens</i>)	200	0.575	0.496
...has time (0=no, 1=yes) (<i>DOC_Time</i>)	200	0.410	0.493
...explains (0=no, 1=yes) (<i>DOC_Explains</i>)	200	0.555	0.498
...is friendly (0=no, 1=yes) (<i>DOC_Friend</i>)	200	0.445	0.498
... Is someone I can trust (0=no, 1=yes) (<i>DOC_Trust</i>)	200	0.550	0.499
I feel that online rating is a reliable measure (1=very unreliable, 5=very reliable) (<i>Reliable</i>)	141	2.759	1.055
How actively do you participate with your GP in making decisions (<i>Participation</i>)	193		
My doctor always makes decisions for me	2		
I like to know the options available but still let my doctor decide for me	13		
My doctor and I make the decisions together	25		
I make decisions for myself, after considering the advice of my GP	65		
I always make my own decisions, independently of the advice of my GP	75		
I make decisions with my parents/spouse/relatives	13		
Satisfied with the current level of choice of... (1 = strongly dissatisfied, 5 = strongly satisfied)			
...GP (<i>SAT_C_GP</i>)	173	3.451	1.138
...hospital (<i>SAT_C_Hosp</i>)	152	3.493	1.055
...doctor (<i>SAT_C_Doc</i>)	139	3.252	1.022
...treatment (<i>SAT_C_Treatment</i>)	148	3.554	0.928
...time spent (<i>SAT_C_Time</i>)	168	3.179	1.123

Ethnicity			
White British (0=no, 1=yes) (WhiteBritish)	200	0.488	0.501
White Other (0=no, 1=yes) (WhiteNonBritish)	200	0.222	0.417
Highest level of educational attainment* (Education)	186	2.957	0.856
1 if GCSE	12		
2 if A-Level/BTEC/Vocational	36		
3 if University undergraduate degree	86		
4 if Postgraduate Degree	52		
Age (years) (Age)	199	39.572	16.083
Gender (Gender)			
Female (=1)	112		
Male (=0)	88		
Income (Income)	160	2.125	1.859
0	40		
<£15000 but >0	27		
£15,000-£35,000	36		
£35,000-55,000	22		
£55,000-£75,000	14		
£75,000-£95,000	7		
>£95,000	14		
Doctor-patient concordance			
Age Match (=1 if doctor and patient belong to the same age bracket; =0 otherwise) (AgeMatch)	200	0.333	0.473
Gender Match (=1 if patient and doctor are of same gender; =0 otherwise) (GenderMatch)	200	0.444	0.498

Table 2: Bivariate Correlations

	IntentionToUse	Awareness		IntentionToUse	Awareness
IntentionToUse	1		DOC_Friend	0.0127	-0.0984
				(0.8599)	(0.1667)
Awareness	0.0846	1	DOC_Trust	-0.0288	-0.0388
	(0.2359)			(0.6899)	(0.5863)
HC_Waiting	0.1617**	0.016	Participation	0.0412	0.0189
	(0.025)	(0.8236)		(0.5678)	(0.7911)
HC_HospComp	0.1474**	-0.0033	SAT_C_GP	-0.0419	0.122
	(0.0465)	(0.9643)		(0.591)	(0.1108)
HC_Clinical_Performance	0.2146***	-0.0784	SAT_C_Hosp	-0.003	0.1024
	(0.0034)	(0.2849)		(0.9715)	(0.2111)
HC_CloseHome	-0.0623	-0.0998	SAT_C_Doc	-0.0348	0.137
	(0.3848)	(0.1587)		(0.6909)	(0.1077)
HC_Familiarity	-0.0078	-0.0752	SAT_C_Treatment	-0.0157	0.0932
	(0.9153)	(0.2986)		(0.8526)	(0.2598)
HC_FinPerform	0.1253**	0.1435**	SAT_C_Time	-0.0239	0.0541
	(0.0884)	(0.0482)		(0.7632)	(0.4878)
HC_GP_Reputation	0.2020***	-0.016	CB_AWARE	-0.0381	0.2997***
	(0.0047)	(0.8234)		(0.5972)	(0)
HC_Access	0.0451	0.1196*	CB_Use	0.0996	0.054
	(0.5399)	(0.0992)		(0.1651)	(0.4477)
HC_PastExp	0.0978	-0.0244	WEB_Access	0.2054***	0.1197*
	(0.182)	(0.7369)		(0.0041)	(0.0923)
SI_GP_Advice	0.1054	0.0163	AgeMatch	0.1373*	0.0695
	(0.1457)	(0.8202)		(0.0532)	(0.3234)
SI_HospStat	0.2937***	0.1159	GenderMatch	0.2077***	0.1472**
	(0.0001)	(0.1192)		(0.0032)	(0.0357)
SI_DoctorRating	0.3759***	0.1240*	WhiteBritish	-0.0429	-0.0662
	(0)	(0.099)		(0.5477)	(0.3468)
SI_PastExp	0.0563	-0.0803	WhiteNonBritish	-0.0017	-0.0853
	(0.4455)	(0.2696)		(0.9809)	(0.2252)
SI_Family	0.1215*	-0.0511	Income	0.012	-0.1219
	(0.0958)	(0.4804)		(0.8818)	(0.1246)
Reliable	0.3429***	-0.0311	Education	-0.0103	0.0023
	(0)	(0.7153)		(0.8913)	(0.9757)
DOC_Listens	0.0629	-0.0888	Gender	0.0315	-0.0087
	(0.3824)	(0.2122)		(0.6614)	(0.9029)
DOC_Time	0.1565**	-0.0117	Age	-0.1081	-0.1918***
	(0.0289)	(0.87)		(0.1344)	(0.0068)
DOC_Explains	0.0968	0.0152			
	(0.1784)	(0.8314)			

P-Values in parentheses.* p<.10, ** p<.05, *** p<.01

Table 3 Odds Ratios for the Binary Logit explaining the awareness of doctor rating websites.

	Model 1	Model 2	Model 3	Model 4
Awareness				
Age	0.953*	0.931**		
	(0.0239)	(0.0307)		
Gender	1.347	1.819		
	(0.648)	(1.092)		
WhiteBritish	0.595	0.841	0.401	0.0150**
	(0.309)	(0.524)	(0.276)	(0.0292)
WhiteNonBritish	0.273*	0.398	0.228*	0.00399**
	(0.198)	(0.324)	(0.200)	(0.00957)
Education	1.105	1.396	1.279	1.682
	(0.341)	(0.534)	(0.438)	(1.399)
Income	0.952	0.943	0.708*	0.228*
	(0.157)	(0.169)	(0.132)	(0.180)
HC_HospComp		1.173	1.353	2.237
		(0.366)	(0.442)	(1.825)
HC_Clinical Performance		0.691	0.527	0.0342*
		(0.245)	(0.207)	(0.0609)
HC_Familiarity		0.710	0.756	2.564
		(0.170)	(0.202)	(2.096)
HC_GP_Reputation		1.409	1.611	13.57*
		(0.509)	(0.599)	(19.95)
HC_FinPerform		0.921	0.963	0.0783**
		(0.264)	(0.297)	(0.0919)
HC_Access		1.112	1.088	0.917
		(0.236)	(0.242)	(0.444)
SI_GP_Advice		1.173	0.922	1.115
		(0.350)	(0.290)	(0.718)
SI_HospStat		1.291	1.390	49.75**
		(0.410)	(0.477)	(87.28)
SI_Family		0.935	0.614	0.146
		(0.361)	(0.273)	(0.186)
SI_PastExp		0.762	1.202	0.284
		(0.275)	(0.499)	(0.343)
SI_DoctorRating		0.938	0.933	1.859
		(0.261)	(0.271)	(1.119)
DOC_Listens			0.416	1.182
			(0.324)	(2.244)
DOC_Time			1.289	0.00185**
			(0.950)	(0.00580)
DOC_Explains			2.533	0.885
			(1.799)	(1.658)
DOC_Friend			0.752	15.62
			(0.535)	(30.63)
DOC_Trust			0.930	3.173
			(0.583)	(4.555)
Participation			1.080	3.346
			(0.298)	(2.835)
AgeMatch			2.247	269.4*
			(1.429)	(791.0)
GenderMatch			3.153*	32.77*
			(1.867)	(61.36)
SAT_C_GP				3.020
				(2.948)
SAT_C_Hosp				0.802
				(1.134)

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SAT_C_Doc	2.794 (3.411)
SAT_C_Treatment	1.818 (2.311)
SAT_C_Time	0.735 (0.550)
Same GP	0.641 (0.766)

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

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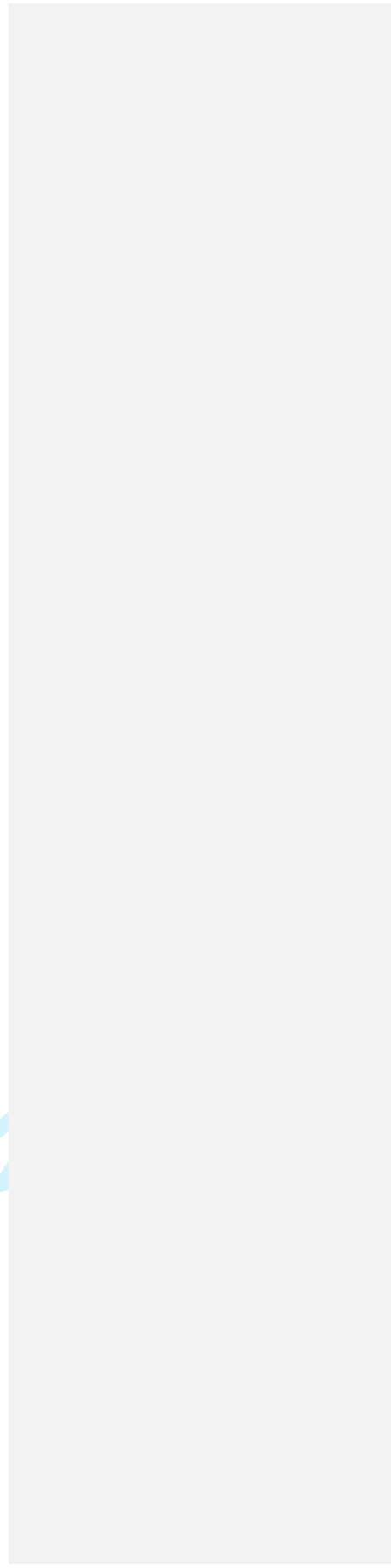


Table 4 Odds Ratios for the Ordered Logit explaining the likelihood to use different doctor rating websites

	m1	m2	m3	m4	m5	m6
AgeMatch	1.974 (2.377)	2.561 (2.953)	2.000 (1.965)	2.782 (2.613)	1.051 (0.818)	0.946 (0.729)
GenderMatch	18.42* (30.24)	12.03* (17.75)	10.45** (12.33)	10.39** (10.54)	16.67*** (15.48)	14.83*** (13.17)
Awareness	0.0531 (0.108)	0.0505 (0.0971)	0.0964 (0.149)	0.0758** (0.0985)	0.159* (0.176)	0.147* (0.152)
HC_Clinical_Performance	9.289* (11.84)	7.659* (8.241)	5.560** (4.759)	3.401* (2.253)	4.395** (2.653)	4.985*** (2.734)
HC_Familiarity	0.359 (0.287)	0.468 (0.282)	0.371* (0.220)	0.414* (0.206)	0.355** (0.147)	0.351*** (0.141)
HC_GP_Reputation	2.328 (1.980)	2.827 (2.106)	3.608* (2.542)	4.410** (2.753)	2.903** (1.374)	2.776** (1.260)
GP_Advice	0.170* (0.173)	0.223 (0.206)	0.238** (0.167)	0.283** (0.176)	0.344** (0.186)	0.396* (0.193)
HospStat	14.26** (18.84)	13.74** (15.60)	7.220*** (5.008)	6.550*** (4.200)	5.371*** (2.932)	5.133*** (2.703)
DoctorRating	1.596 (1.636)	1.067 (0.958)	1.424 (0.851)	1.461 (0.770)	2.245** (0.835)	2.312** (0.876)
Reliable	6.181 (7.691)	8.682* (9.969)	6.492** (4.993)	7.586*** (5.561)	4.457*** (2.351)	4.061*** (2.003)
DOC_Listens	141.9* (424.8)	51.44 (126.4)	44.20* (90.99)	27.05** (41.26)	22.03** (28.29)	22.98** (28.34)
DOC_Explains	0.00690* (0.0183)	0.00680** (0.0148)	0.00509** (0.0105)	0.00695*** (0.0124)	0.0120*** (0.0171)	0.0124*** (0.0169)
DOC_Friend	12.88 (29.23)	8.375 (14.65)	16.48** (22.41)	19.66*** (22.45)	8.718** (8.047)	7.781** (6.896)
Participation	5.473* (5.255)	5.818* (5.410)	5.171** (3.664)	4.162** (2.687)	2.349* (1.126)	2.228* (1.036)
SAT_C_GP	17.03* (27.58)	8.038 (10.23)	6.593* (6.659)	5.410** (4.048)	4.692** (2.889)	4.377*** (2.484)
SAT_C_Hosp	21.93** (33.71)	22.86** (30.90)	30.01*** (33.63)	34.38*** (35.43)	17.95*** (15.52)	11.11*** (7.578)
SAT_C_Treatment	0.0515** (0.0764)	0.0561** (0.0794)	0.111** (0.106)	0.147** (0.125)	0.145** (0.111)	0.111*** (0.0788)
WhiteBritish	0.0137* (0.0318)	0.0409* (0.0738)	0.0542** (0.0782)	0.0539** (0.0690)	0.0909** (0.0890)	0.105** (0.0973)
Income	0.416* (0.190)	0.382** (0.162)	0.449** (0.154)	0.513** (0.154)	0.476*** (0.129)	0.462*** (0.120)
SAT_C_Doc	0.242 (0.468)	0.243 (0.374)	0.148* (0.161)	0.135* (0.144)	0.427 (0.321)	
PastExp	0.670 (0.787)	0.590 (0.650)	0.535 (0.576)	0.551 (0.250)		
Education	0.486 (0.526)	0.583 (0.554)	0.683 (0.443)	0.610 (0.328)		
HC_Access	1.046 (0.659)	1.124 (0.678)	1.241 (0.564)	1.347 (0.565)		
HC_PastExp	1.030 (0.578)	0.914 (0.487)	0.930 (0.397)			
Family	1.208 (1.357)	1.305 (1.484)	1.439 (1.458)			
DOC_Time	1.223 (2.118)	2.099 (3.261)	2.594 (3.547)			

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5	DOC_Trust	0.153	0.608	0.460		
6		(0.327)	(0.983)	(0.629)		
7	WEB_Access	1.122	0.558	0.483		
8		(4.345)	(1.763)	(0.918)		
9	HC_Waiting	0.960	1.097			
10		(0.806)	(0.846)			
11	HC_HospComp	1.200	0.790			
12		(0.929)	(0.540)			
13	HC_CloseHome	0.930	0.790			
14		(0.726)	(0.516)			
15	HC_FinPerform	0.610	0.692			
16		(0.621)	(0.588)			
17	SAT_C_Time	1.449	1.530			
18		(1.441)	(1.280)			
19	WhiteNonBritish	0.742	0.493			
20		(1.790)	(1.041)			
21	AWARE	1.422				
22		(3.158)				
23	CB_Use	83.93				
24		(354.7)				
25	cut1	9454769.9**	2474784.8**	3131224.6**	2460471.3***	10470831.2***
26		(63313549.3)	(15197453.2)	(18256829.6)	(13260544.4)	(45550085.5)
27	cut2	7.05660e+09*	1.22556e+09***	1.14387e+09***	674102348.3***	1.42570e+09***
28		**				1.60379e+09***
29		(5.66892e+10)	(8.86204e+09)	(7.69789e+09)	(4.20283e+09)	(7.17551e+09)
30						(7.78799e+09)

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QUESTIONNAIRE

Imperial College Business School



We would be very grateful for your cooperation in completing this questionnaire. It should take around **10 minutes** to complete.

The data collected will contribute towards a study into the healthcare service in the UK. There are currently major changes taking place in the NHS, in an effort to improve the choice and quality of services available to the public. One of these changes has been the introduction of a system called “Choose & Book” which gives you the option to choose which hospital you wish to go to for your outpatient appointment, following a GP referral. This is a study into how individuals regard these new choices and how they make decisions about where to receive care. In particular, we are studying the awareness and use of online doctor rating websites as a source of information for patients. These doctor rating websites allow patients to rate their doctors and provide feedback based on their own experiences. The ratings can then be used by others when deciding where to receive health care.

All data collected will remain strictly confidential. The study is being conducted by researchers from Imperial College London and King’s College London. If you would like to be informed of the results of this study, please contact m.miraldo@imperial.ac.uk.

SECTION A

www.iwantgreatcare.com

www.NHSchoices.co.uk

www.patientopinion.co.uk

www.privatehealth.co.uk

Q1. Are you aware of any of the above online doctor rating websites or any other doctor rating websites?

Yes No (if No, skip ahead to Section C)

Other (please specify).....

Q2. How did you find out about these sites?

Family/Friends

Doctor

The Media

Other (please specify).....

SECTION B

Q3. Have you used these websites in the past to look at doctor/hospital ratings?

Yes No (if No, skip ahead to Section C)

Q4. What specialty of doctor have you searched for in the past in these websites?

.....

Q5. When do you use these websites?

On a regular basis Only before/after an appointment Rarely

Q6. In the past, has the information on these websites influenced your choice of doctor/hospital?

Yes No

Q7. If Yes, was this based on positive or negative information on the websites?

Positive information Negative information

Q8. How easy to use do you find the sites? Please circle the most appropriate number on a scale of 1 to 5 (1=very easy, 5=very difficult)

1 2 3 4 5

SECTION C

Q9. Which of the following factors are important to you in making decisions about where to receive healthcare? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important), or 'none of these'.

Waiting lists	1	2	3	4	5
Rates of hospital-acquired complications	1	2	3	4	5
Clinical performance rating	1	2	3	4	5
Closeness to home	1	2	3	4	5
Familiarity with the doctor	1	2	3	4	5
Financial performance of the hospital	1	2	3	4	5
Reputation of the doctor	1	2	3	4	5
Accessibility and parking facilities	1	2	3	4	5
Past experience with the provider	1	2	3	4	5
None of these					<input type="checkbox"/>

Q10. Which of the following sources of information are important in making decisions about where to receive health care? Please circle the most appropriate number on a scale of 1 to 5 (1=not important at all, 5=very important).

GP advice	1	2	3	4	5
Published hospital statistics	1	2	3	4	5
Online doctor rating website	1	2	3	4	5
Personal experiences in the past	1	2	3	4	5
Feedback from family/friends	1	2	3	4	5

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7 **Q11. To what extent do you think that the online rating of doctors by patients is a reliable**
8 **measure of a doctor's performance?** Please circle the most appropriate number on a scale of 1 to 5
9 (1=very unreliable, 5=very reliable)

10
11 1 2 3 4 5 Not sure

12
13
14
15 **Q12. If you have not used these websites before, how likely do you feel you will use them in**
16 **the future?**

17
18 Not likely Quite likely Likely
19
20

21 22 23 SECTION D

24
25 **Q13. These websites are based on patient input. Individuals can provide feedback based on**
26 **their own experiences. Considering this, when would you be most likely to contribute to the**
27 **online site?** Tick all that apply.

- 28
29 Every time
30 After particularly positive experiences only
31 After particularly negative experiences only
32 After both positive and negative experiences
33 Never
34 Not sure
35

36 **Q14. Out of the following what would be your motive for any contributions that you make to**
37 **an online doctor rating site?** Tick all that apply.

- 38
39 I would not contribute to these websites
40 To inform other patients
41 To improve standards of care in the NHS
42 As a method of complaint
43 In appreciation of a doctor's service
44 Not sure
45

46 47 SECTION E

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50 **Q15. Which of the following attributes would you use to describe your GP?** Tick all that apply.

- 51 I feel my doctor listens to my problems
52 I feel my doctor spends enough time with me in each consultation
53 I feel my doctor explains things clearly
54 I feel my doctor is sociable and friendly
55

- I feel that I can trust my doctor's opinions
- None of the above

Q16. How actively do you participate with your GP in making decisions about your health care generally? Tick the single most appropriate.

- My doctor always makes decisions for me
- I like to know the options available but still let my doctor decide for me
- My doctor and I make the decisions together
- I make decisions for myself, after considering the advice of my GP
- I always make my own decisions, independently of the advice of my GP
- I make decisions with my parents/spouse/relatives

Q17. Within your GP practice do you always want to see the same GP for an appointment?

- I always request to see the same GP
- I don't mind which doctor I see.

Q18. Where is choice more important to you in the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 =of no importance, 5 =very important) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of treatment	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of appointment time	1	2	3	4	5	Not sure	<input type="checkbox"/>

(for primary & secondary care)

Q19. How satisfied are you with the current level of choice of where you can receive health care within the NHS? Please circle the most appropriate number on a scale of 1 to 5 (1 = strongly dissatisfied, 5 = strongly satisfied) or select 'not sure'.

Choice of GP	1	2	3	4	5	Not sure	<input type="checkbox"/>
Choice of hospital for outpatient appointment	1	2	3	4	5	Not sure	

Choice of doctor for outpatient appointment	1	2	3	4	5	Not sure <input type="checkbox"/>
Choice of treatment	1	2	3	4	5	Not sure <input type="checkbox"/>
Choice of appointment time (for primary & secondary care)	1	2	3	4	5	Not sure <input type="checkbox"/>

Q20. Choose and Book is a new NHS system which gives you the option to choose which hospital you wish to go to for your outpatient appointment. Are you aware of this system?

Yes No

Q21. Have you used this Choose and Book system in the past?

Yes No

Q22. If you have used the Choose & Book system in the past, how actively have you participated in making decisions about where to receive care? Tick the single most appropriate.

- I have never used Choose & Book
- My doctor always makes decisions for me
- I like to know the options available but still let my doctor decide for me
- My doctor and I make the decisions together
- I make decisions for myself, after considering the advice of my GP
- I always make my own decisions, independently of the advice of my GP
- I make decisions with my parents/spouse/relative

Q23. When is the choice of hospital important to you, for outpatient referrals? Tick all that apply.

- Routine outpatient consultation
- Day-case procedure/surgery
- Major surgery
- None of these

SECTION F

Q24. Do you have access to a computer/laptop with internet access, at home or at work?

Yes No

Q25. Have you used the internet in the past to search for health information?

- Yes No

Q26. If you do not use online doctor rating websites, which of the following factors stops you from doing so? Tick all that apply

- I'm too busy to have the time to use them
- The sites are not a reliable source of information
- It is difficult to interpret the information provided
- I already have enough information from other sources to make choices
- I don't have access to the internet
- I did not know these websites existed
- I have never needed to use these websites

Q27. What other internet websites involving ratings do you use? Tick all that apply.

- Shopping websites (e.g. Amazon)
- Holiday websites (e.g. TripAdvisor)
- Car insurance websites (e.g. Compare The Market)
- Restaurants/venue websites (e.g. ViewLondon)
- Film websites (e.g. Rottentomatoes)
- Other (please specify).....
- I don't use any rating websites.

Q28. What methods of rating do you feel are a useful form of feedback in these websites? Tick all that apply.

- Star-rating out of 5
- Percentage scores
- Thumbs Up/Down
- Written comments from patients/users
- No preference

SECTION G

We remind you that all personal data collected will remain confidential and is collected for academic purposes.

Q29. What is your age?

Q30. What is your gender?

- Male Female

Q31. How would you describe your ethnicity?

<input type="checkbox"/> White – British	<input type="checkbox"/> Other Asian – non-Chinese
<input type="checkbox"/> White – Others	<input type="checkbox"/> Black Caribbean

	Mixed race		Black African
	Indian		Black – Others
	Pakistani		Chinese
	Bangladeshi		Other

Q32. What is your postcode?

Q33. How many other individuals do you live with?

Q34. Do you live with your parents?

Yes No

Q35. What is/was your profession?

Unemployed Retired

Q36. What is your level of pre-tax income?

0
 <£15000 but >0 £15,000-£35,000
 £35,000-55,000 £55,000-£75,000
 £75,000-£95,000 >£95,000

Q37. What is your highest level of educational attainment?

	GCSE		Other vocational degree
	A-Level		University degree
	BTEC		Postgraduate degree

Q38. In the last year how many times have you had an outpatient hospital appointment?

0 times 1-3 times
 4-5 times More than 5 times

Q39. What is the sex of your GP?

Male Female

Q40. How old is your GP?

<30 years
 30-50 years
 >50 years

Q41. What is the ethnicity of your GP?

	White – British		Other Asian – non-Chinese
	White – Others		Black Caribbean

Mixed race	Black African
Indian	Black – Others
Pakistani	Chinese
Bangladeshi	Other

Q42. I cannot answer Q39, Q40, Q41 because I don't always see the same GP.

This is the end of the questionnaire, thank you for your time.
