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London Patient Choice Project Evaluation

A model of patients' choices of hospital from stated and revealed preference choice data

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The research described in this report was prepared for the London Patient Choice Project Team, Department of Health.

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Preface

This report has been prepared for and funded by the London Patient Choice Project (LPCP), and presents the findings of an evaluation study examining various aspects of the choice project. This report covers the choice process and the trade-offs patients are willing to make in order to obtain earlier treatment. The main objective is to provide an understanding of the factors patients take into account in choosing between hospitals and, in particular, quantifies the trade offs they state they are willing to make between factors. The approach adopted by the research team uses a disaggregate discrete choice framework with both stated preference (SP) and revealed preference (RP) choice data and provides insights into how patients value various aspects of their current choices and how they may value choices which are currently outside of the scope of the current LPCP. It has been produced jointly by a team from RAND Europe, the King's Fund and City University.

The research project commenced in January 2003. A stated preference questionnaire was designed and administered by post as part of the "before choice" attitudes survey. This survey was sent to patients, across a range of specialities, who were eligible for choice and had been on a waiting list for three months. Following patients' actual choice of hospital, data were collected on how patients behaved in real-world situations. These two data sets have been analysed both separately and in combination in order to formulate a joint model of hospital choice using a logit model structure. From this model, estimates of patients' valuations of the various aspects of hospital choice can be obtained.

This report will be primarily of interest to policy makers in the Department of Health and health care providers. Specifically, this will include health service managers, clinicians and health service researchers, as well as those interested in the application of discrete choice modelling. It provides insights into the relative value different groups of patients place on particular characteristics of hospitals (waiting times, 'reputation', distance from patient's home etc).. In addition, our modelling results inform policy makers of the potential benefits of different ways of structuring and informing patients' choices, allowing a far greater customisation according to the patient, and hence increasing efficiency in the system as a whole.

This report is part of a wider evaluation study of the London Patient Choice Project. The strands of the evaluation are:

Patient Attitudes	- Picker Institute Europe
Patient Choice Modelling	- RAND Europe, King's Fund and City University
Management and Implementation	- Royal Holloway University of London
System-wide Impacts	- University of York

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Summary

Introduction

The London Patient Choice Project (LPCP) was established to improve choices for patients who are clinically eligible for treatment and who have been waiting for treatment at an NHS London hospital beyond some target waiting time (six months at the scheme's inception; this has subsequently been reduced). As the target waiting time approaches, patients are given an opportunity to choose from a range of alternative providers who have the capacity to offer earlier treatment.

The aim of this study is to investigate the following questions regarding patients' responses to the option of quicker treatment:

- What are the factors that patients consider when deciding whether to accept the alternatives they are offered?
- What *weight* do patients place on each factor when making their choices? What tradeoffs are patients prepared to make between time waited and other factors?
- Are there any systematic differences between sub-groups of patients (in terms of personal, health or socio-demographic characteristics) in terms of how they respond to choice? What are the characteristics of those who are more likely to opt for quicker treatment?

In this report, we present our analysis of these questions using stated preference data elicited from LPCP participants and revealed preference data that indicates the choices that were actually made by patients in the course of the project. These two sources of data complement each other, and a model has been estimated simultaneously on the two datasets.

Data on patients' choices

Data on hypothetical choices were obtained using a discrete choice experiment: participants were presented with a series of choices between pairs of scenarios from which their preferences for treatment are discerned. The design of the choice experiment was informed by a literature review, and refined following cognitive testing and piloting. The

respondents were recruited and mailed the surveys between September 2003 and January 2004.

The final study design examined the influence in the following factors on the choice between the home hospital and an alternative hospital:

- the **waiting time** at the home and the alternative hospital;
- the **travel time** to the alternative hospital, including whether the hospital is abroad;
- whether the **transport** was organised and paid for by the NHS or the patient;
- the **reputation** of the alternative hospital;
- the location of any **follow-up care**.

The results from the stated preference data indicate that 30% of the patients in our study would stay with their home hospital in all the scenarios offered; whereas, 5% consistently opted to take the treatment at the alternative hospital (with its shorter waiting time). 55% of patients 'switched' between choosing home and alternative treatment depending on the nature of the scenarios. The remaining 10% displayed choices where they would always choose to "opt out", i.e. decline treatment or seek treatment outside of the NHS, or always choose between one hospital alternative and the "opt out" option. In total 24% of the patients considered opting out in at least one of the scenarios presented.

The *revealed* preference data showed that, within the choices offered under the LPCP, 35% of patients chose to stay at their home hospital and 65% of patients chose to move to an alternative provider (with a shorter waiting time). An "opt out" option was not offered in practice to patients through the LPCP, whilst in practice patients may decide that they would not have wanted NHS treatment at this point, this information was not recorded so could not be incorporated in the models.

Modelling of choice behaviour

From the hypothetical choices offered in the questionnaire we found that patients were *less* likely to opt for quicker treatment at an alternative provider if:

- the reputation of the alternative hospital was worse than (or unknown) relative to the 'home' hospital;
- the travel time to the alternative provider increased relative to travel to the 'home' hospital;
- the alternative treatment offered was abroad;
- patients had to organise and pay for their transport to the alternative provider;
- follow-up care was delivered by the alternative rather than the home hospital.

Patients were also less likely to opt for quicker treatment at a hospital outside the UK if they had been on a waiting list for less than 6 months – thus, as waiting times fall in NHS hospitals overall, patients are less likely to opt for quicker treatment abroad.

More importantly, our model allows us to identify the *magnitude* of the influence these variables exert on patients' choices. From this we can also see the relative importance of each of the factors. In our analysis we have calculated the marginal rates of substitution between each of the factors and waiting time; this provides insight into the trade-offs made and the relative weight placed on each factor; we have also provided confidence intervals on these ratios to illustrate the extent of any uncertainty in the terms estimated within the model. While shorter waiting time is important to patients, our results suggest that whether patients opt for quicker treatment depends crucially on, for example, whether they can avoid travelling abroad, and whether they can avoid treatment at a hospital where the reputation is worse or unknown relative to their current hospital. These results have important implications for policy makers – for example, information about the quality and reputation of alternative providers is likely to play a key role in the uptake of choice.

Further, our results suggest there may be important implications of a choice policy for equity. With respect to the characteristics of those making the choice, patients are less likely to opt for quicker treatment at an alternative provider if:

- they are older (particularly if they are more than 60 years of age); or
- they have low education levels; if they have family commitments; or
- their income is < £10,000 p.a.

These factors interact with the 'choice' characteristics noted above: for example, while a poor or unknown reputation of the alternative hospital is associated with patients being less likely overall to opt for quicker treatment at an alternative hospital, the influence of reputation was much stronger for those with income >£10,000. Similarly, the influence of the transport arrangements for treatment at the alternative hospital was important overall, but much more so for parents or guardians of children.

The choices that patients stated they would make given the hypothetical scenarios they were presented with in our survey have been supplemented by information on the choices that have been made by patients in real choice situations.

The revealed preference data showed that when facing a real choice, patients tended to act to minimise their waiting and travel time, whilst trying to obtain treatment at a hospital that is perceived as offering a high quality of care. There are also discernable patterns of choices, however. For example:

- patients' age is positively associated with a tendency to stay at their local hospital to which they had originally been referred;
- men are more likely to decide to move to an alternative provider than women;

- large numbers of patients will opt for treatment at an alternative provider for procedures within the ophthalmology specialty, whilst those requiring gynaecological procedures will stay at their local provider in larger numbers.

In order to draw maximum information from the stated and revealed preference data, a model has been estimated using both sets of data within a common modelling framework. This has been achieved by using the variables that are common between both sources of data, namely: the remaining waiting time, the travel time, the patient's age and their gender. This model corrects the overall sensitivity of the stated preference model in predicting choices between alternatives and creates a model where the terms estimated through the hypothetical choices can be related to the observed choice behaviour. As such, it provides a model that can be used to inform how patients may respond to different policies that offer quicker choice of treatment for those on existing waiting lists.

Policy Implications

Our analysis concentrates on the way that patients may respond to choice. The behaviour of patients will clearly have impacts on waiting times, although the extent of these impacts is hard to ascertain directly from the results we present as we focus on the drivers of demand and at present there are no corresponding models of supply. The LPCP evaluation strand being conducted by the group from the University of York examines the system wide impacts of patient choice and provides a detailed analysis of how the LPCP may or may not have reduced waiting times within the hospitals participating in the project.

During the lifetime of the LPCP (and this evaluation), national policy on patient choice in the English NHS has been evolving. In particular, in August 2004, the Department of Health published guidance on the introduction of choice for patients at the time of GP referral. This new 'Choose and Book' policy differs from the LPCP choice model in that it is essentially a choice of outpatient department (and associated inpatient care if needed), not inpatient care per se. Given these changes, we examine the findings from this strand of the LPCP evaluation in the wider policy context of patient choice and its ongoing development.

Our results suggest that while some patients are probably willing to spend a significant time travelling to go to the hospital of their choice, on average, waiting times at the more distant alternative hospital would have to be considerably shorter than the local provider to persuade patients to travel. In general, while patients prefer not to travel abroad, having their travel paid for them by the NHS can significantly ameliorate their negative valuations.

Our findings also indicate that patients place a positive value on the NHS organising transport (rather than the patients having to do this themselves) even if transport costs have to be met by patients. However, current guidance on transport arrangements for choice at point of referral state that the NHS will not arrange or pay for transport except for patients currently eligible for free transport either as a result of low incomes or on the basis of their medical condition. Our findings suggest that this decision will reduce the

potential take up of choice in cases where patients have to organise and pay for their own transport.

As might be expected, reputation emerges as a very important factor in patients' decisions about whether or not to take up an offer of quicker treatment at an alternative hospital. Our analysis suggests that where the reputation of the alternative (shorter wait) hospital is either worse than the existing (longer wait) hospital or simply unknown, patients place a relatively high negative valuation on the choice. In particular, better off patients (with household incomes over £10,000 per annum) have a negative valuation for a worse reputation which is over one third higher than those with incomes below £10,000. There are potential equity implications here.

Our use of a comparative reputation factor (i.e. worse, or the same, or better than the home hospital, and unknown) begs the question as to what actual measures of reputation patients might find useful to inform their choices in a real situation. Current guidance under Choose and Book indicates that, together with waiting times and location of hospitals, patients will need information on (other) patients' experience of hospitals and data on clinical quality to support their choice of hospital. However, although there is information from national patient experience surveys on which to draw, there is a dearth of information on clinical quality, and in particular, information on health outcomes.

Current policy for choice at the point of referral notes that while aftercare will be provided at the provider originally chosen, any exceptions - for example, providing aftercare locally, needs to be managed through local processes. Our research suggests that patients place a negative value on follow-up care provided either at the alternative hospital or the patient's own home (rather than at the home hospital). However, relative to the other factors influencing choice, patients place lower values on follow-up care.

Given that all the attributes we have discussed are to an extent amenable to policy change (at a cost), this means that it is possible for policy makers to model the size of the take-up of choice under different policy scenarios. If a goal is to maximise the take-up of choice, then our results suggest, for example, that the NHS should not only arrange transport to alternative hospitals, but for parents in particular, the NHS should also pay for transport. In fact, current policy, as we noted above, is not to organise or pay for transport. In addition, follow-up care should be provided at the home hospital (rather than the alternative hospital) if the negative valuations patients' place on these arrangements is to be minimised.

An important issue that our analysis helps to explore is whether, and to what extent, different patient groups react differently in terms of the values they place on factors affecting the choice decision. For example, our results show that patients who are older, female, with low education levels, or who are parents/guardians of an under 18-year old are less likely to select faster treatment at an alternative hospital. Of course, the presence of differences does not automatically mean that patients' different choices should be deemed inequitable (or, for that matter, that every - or indeed any - effort should then be made to correct for the inequity, given that such correction will have an opportunity cost). Value judgements need to be brought to bear on these issues which go beyond this current analysis. However, we would point out that different patient groups do place different values (both positive and negative) on various attributes (under various policy scenarios)

and that while such inequalities may not be interpreted as inequities, differences may be of some concern.

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Finally we would like to acknowledge the assistance of Professor Andrew Daly in providing technical advice throughout the survey design and model estimation and Sebastian Caussade for his help in the data analysis.

CHAPTER 1 Introduction

The London Patient Choice Project (LPCP) was established in June 2002 to improve choices for patients who are clinically eligible for treatment and who have been waiting for treatment at an NHS London hospital beyond some target waiting time (six months at the scheme's inception; this has subsequently been reduced). As the target waiting time approaches, patients are given an opportunity to choose from a range of alternative providers who have the capacity to offer earlier treatment. These providers include hospitals elsewhere in the NHS, the UK private sector and overseas, but in practice have mainly been NHS hospitals in London. The LPCP is part of the commitment, indicated in the NHS Plan, for "strengthening patient choice"[1]. It also addresses another of the key priorities of the Plan – reducing the number of people who wait a long time for admission to hospital, in part through reducing variations in waiting times across NHS hospitals.

Starting in October 2002, ophthalmology patients who had been on London waiting lists for more than six months were offered a choice of alternative providers. Other specialties, including orthopaedics, ear, nose and throat (ENT), general surgery, gynaecology and urology were included in the scheme in 2003.

The objective of the LPCP was not necessarily to maximise the number of patients opting for a shorter wait at alternative hospitals, but to put in place organisational and managerial systems, to ensure the right level of capacity was available and to ensure patients were supported in making their choices. Patients, it is assumed, will benefit not just from the process of being offered a choice (regardless of the choice they make)[2], but will also benefit from the outcome of the choice they make. However, understanding the factors that influence patients' response to choice is important in ensuring equal opportunity of choice and informing possible changes in the systems put in place to offer choice.

The aim of this study was to investigate key issues regarding patients' response to the choice of quicker treatment, including:

- The factors ('attributes') that patients consider when deciding whether to accept the alternatives they are offered;
- The *weight* patients place on each factor when making their choices, and the tradeoffs patients are prepared to make between time waited and other factors;

- Systematic differences between sub-groups of patients (in terms of personal, health or socio-demographic characteristics) in terms of their response to the offer of choice, and the characteristics of those who are more likely to opt for quicker treatment.

By analysing patients' preferences, it is possible to offer predictions about patients' responses to choice under various scenarios. This provides policy makers with:

(a) a means of forecasting the likely demand for alternative providers under different policy settings.

(b) to pin-point the factors which exert a strong influence on the uptake of choice and which are amenable to policy change.

(c) a means to identify any important differences between sub-groups of patients in their preferences regarding how and where treatment is provided. This has direct relevance to the implications of choice policy on equity.

In the following sections, we report our analysis of these issues drawing upon patients' *stated* preferences before being offered choice in the LPCP and their *revealed* preferences as recorded through the choice process.

In Chapter 2 we discuss the design of the discrete choice experiment used to collect patients' stated preferences. Chapter 3 then provides a brief overview of the data available from the surveys before Chapter 4 goes on to explain how this choice data was used to create models of choice behaviour.

In Chapter 5 we explain the data that was available through the LPCP on the choices that patients actually made in practice, and discuss the limitations within this data and the assumptions required to allow a model to be estimated. Chapter 6 then details the structure of the model based on revealed preferences.

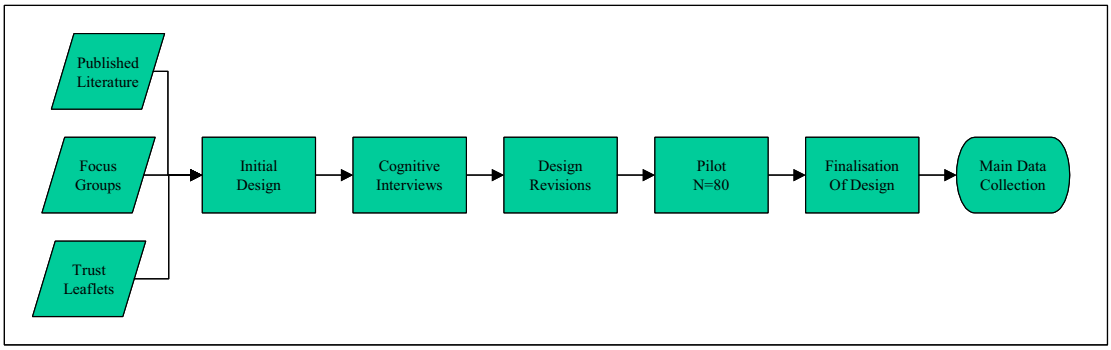
The two independent sources of data are then brought together in Chapter 7, where we discuss the estimation of a joint model utilising both the stated and revealed preference data.

Chapter 8 then provides a discussion of the key findings from the joint model, both in terms of how the results should be interpreted and what they imply about the policy of patient choice and how patients may respond to it.

CHAPTER 2 Survey Design and Development

Stated preference (SP) data have been collected through a discrete choice exercise that formed a component of a before-choice questionnaire sent to patients that were likely to be offered choice within the LPCP. The design of the SP choice exercise involved a number of important stages, which are presented in Figure 1.

Figure 1 Stages in design and development of SP choice exercises



First, a literature review was conducted using three separate sources of data; this informed the initial design of the choice experiments.

These experiments were then tested through cognitive interviews in which patients were asked to work through a pilot questionnaire, followed up by an interview probing their comprehension of the questions and a discussion around issues that may not have been incorporated in the pilot questionnaire. These cognitive interviews were conducted by researchers from the Picker Institute as a component of the design of the overall before-choice survey. The patients' responses to the choice exercises were analysed by the study team and revisions were made to the choice exercises for the main study.

These revised exercises were distributed to patients and were tested again in an interim "pilot" analysis using the first 80 respondents. As a result of this analysis the design was judged to be appropriate and was finalised for the main data collection.

2.1 Literature review

In order to design an appropriate choice exercise for the LPCP evaluation it was first necessary to understand which factors would be likely to play a role in the patients' choice process. Three

different resources were reviewed to gain an appropriate understanding of the key drivers of patient choice; firstly the literature surrounding other relevant choice experiments, secondly a series of focus groups undertaken in the early stages of the London Patient Choice Project and finally a series of leaflets produced by receiving trusts who are aiming to attract patients in the existing choice process.

2.1.1 Choice studies

A semi-structured approach was adopted to obtain literature from other relevant choice experiments. An initial review of the published literature available on "discrete choice experiments" and "conjoint analysis" was undertaken using PubMed. The list of papers identified was then refined through a search of the titles and abstracts to reduce the list down to those directly relating to choices made by patients in their health care. This core set of papers was supplemented by using a snow-balling approach where the references of each paper were interrogated for earlier papers of interest. Finally the health research literature was backed up with a number of seminal papers on demand modelling from the fields of transport demand modelling and market research.

A number of studies were identified which examined a range of aspects of health care provision from the perspective of the patient with an aim to elicit information on their preferences. These include studies which directly examined a choice between location and waiting time, in the context of health care provision in the USA[3], and on the Isle of Wight[4], and a couple of papers which examined the disutility of waiting lists in the NHS[5,6]. In this context, disutility is the negative value that a patient associates with their waiting experience. In addition, a number of papers were reviewed which reported on experiments with an alternative focus but which incorporated some of the aspects of location or care choice.

The idea of using conjoint analysis within the evaluation of patients' attitudes towards health care organisations was first proposed by Wind and Spitz[3] in 1976. This drew on existing techniques which were being used for the measurement of multi-attribute alternatives which had been pioneered by psychologists and developed by market researchers and management scientists. The Wind and Spitz paper presented an example of patient choice of hospital, in the US context, and suggested future areas in health research which could benefit from the application of conjoint analysis techniques.

Wind and Spitz reported that preliminary research undertaken among physicians and hospital administrators suggested six potential determinants of hospital selection: the type of hospital affiliation, the physical appearance of the hospital, the proximity of the hospital to the patient's home, the reputation of the attending physician, the familiarity with the physician and the price of a room per day. The levels investigated for each of these variables are presented in the following table.

Table 1: Variables and levels examined by Wind and Spitz[3]

	Variable		Levels
A.	Type of hospital	1.	Teaching hospital affiliated with a medical school of a major university
		2.	Teaching hospital not associated with a medical school
		3.	Non-teaching community hospital
B.	Physical appearance of hospital	1.	Very modern
		2.	Average facilities
		3.	Poor condition, old
C.	Proximity	1.	Downtown area – easy parking and access
		2.	Downtown area – difficult access and parking
		3.	In your neighbourhood
D.	Assignment of physician	1.	A physician recommended by your doctor
		2.	A physician recommended by a friend
		3.	A physician assigned to you by the hospital
E.	Prestige of physician	1.	World-renowned
		2.	Highly respected in his field
		3.	A specialist
F.	Price of room per day	1.	$60
		2.	$90
		3.	$120

A "grouping" approach was used to represent the choice process; respondents were asked to categorise 27 scenarios as either "definitely would select it", "probably would select it", "probably would not select it" or "definitely would not select it". These 27 scenarios were a subset of the total number of combinations that could have been examined, and allowed examination of the main effects and interactions between 3 of the 6 variables. This is a frequently used and accepted approach but requires *a priori* judgements as to which variables may have significant interactions. The "grouping" was conducted twice, once for a situation in which they would require surgery with a rapid recovery period and once for a situation in which they would have a longer period of hospitalisation. A MONANOVA[A] analysis was applied to determine the relative importance of each of the variables under the two hospitalisation conditions; the results are presented in the following table.

Table 2: Relative importance of the variables examined by Wind and Spitz[3]

Relative importance	Short stay	Long stay
Most important	Proximity (26%)	Proximity (24%)
	Prestige of physician (21%)	Prestige of physician (22%)
	Appearance of hospital (17%)	Appearance of hospital (16%)
	Price of room per day (14%)	Price of room per day (14%)
	Type of hospital (13%)	Assignment of physician (13%)
Least important	Assignment of physician (9%)	Type of hospital (11%)

Differences in valuations according to age, sex and hospitalisation characteristics were examined but not found to be statistically significant, although it should be noted that this was using a limited sample of 56 respondents. Although it is difficult to draw sound conclusions with any degree of statistical significance on such a small sample, the study nonetheless demonstrated the

[A] MONANOVA (Monotonic Analysis of Variance) is a technique that is used to derive utility functions when analysing rank ordered data. In this current study we have asked respondents to make choices between scenarios and have analysed the data with multinomial logit models.

successful application of a conjoint procedure to the patient hospital choice problem. The study reported that respondents were able to understand the choices which they were presented and could make sensible judgements on the basis of these. The prestige or reputation of the physician was in this case clearly an important factor in the eyes of the respondents, more so than price, which ranged from \$60/day to \$120/day at 1975 prices. Although cost will not form part of the LPCP, as all the alternatives to be offered will be provided directly by the NHS, this study does provide some useful insight into the intrinsic value that respondents placed on non-monetary attributes.

The Isle of Wight study[4] investigated a choice between hospital location, waiting time and travel cost. Once again, the cost information is not directly relevant to the LPCP where individuals currently have their travel costs covered by the NHS, however the findings with respect to location and waiting time provide a valuable indication of the changes which were required to induce respondents to move to a hospital on the mainland. The study concluded that on average the waiting time needed to be reduced by 3.9 months in order to persuade an individual to give up his or her position in their preferred hospital. There are obvious differences in the choice between moving from the Isle of Wight to a mainland hospital and moving from one London hospital to an alternative London hospital in the LPCP, however, this study does provide useful insight into the choice process. It is notable that there were significant numbers of respondents who were not willing to change location under any of the circumstances offered; in fact, only 30 percent of respondents actually traded between the options. From the sample observed, 22 percent consistently chose the island hospital and the remaining 48 percent consistently chose the mainland hospital. A number of characteristics were identified which could be used to distinguish trading behaviour, with those who consistently chose the island having a significantly older age profile than those who traded in the experiments. In addition the availability of personal transport was found to have a significant effect in the trading behaviour, with those having access to a car being more likely to consistently choose the mainland.

Further research on disutility of waiting times in the NHS[5,6] has also employed stated preference choice exercises to obtain quantitative results. It is useful at this point to mention that there is some confusion in the health literature between the terms conjoint analysis and stated preference. Louviere[7] discussed the differences between these two paradigms and highlighted the problem that the terms are often used erroneously. For the purposes of this study we have used the stated preference discrete choice modelling approach founded on random utility theory.

The experiments undertaken by Propper[5,6] examined three aspects in the choice of treatment: waiting time until treatment, cost of treatment, and uncertainty in waiting time. The uncertainty was represented as a binary variable in which the date of the appointment was either fixed or estimated, this was found to be statistically significant with respondents demonstrating a preference for certainty. This research identified some interesting results in terms of how different groups of patients valued each of the attributes, e.g. those on higher incomes placed higher values on reductions in waiting time. There were no differences in the valuations according to the respondent's socio-economic group, although there was a suggestion that there may have been a trend towards those in employment placing a higher value on the time variable. The consideration of both income and employment is also important in the LPCP project as there is evidence that differentiations by these classifications can reveal underlying differences in how respondents value the various attributes. Whilst at the outset of the LPCP it was decided that patients will not be required to pay for choice (although this may change in the future), there

will remain potential for the valuation of waiting time to be affected according to income, with those on higher incomes potentially placing a higher implicit value on their time and therefore showing a greater preference for reduced waiting times.

The Propper papers also discuss the issue of non-response, in which respondents choose not to answer a question as they find neither of the choices either acceptable or realistic. This is an issue which was given careful consideration in the SP design for the LPCP outlined in the following sections. There is clearly less scope for non-response problems in an experiment where respondents are not asked to trade on cost, and are not asked to pay for services which are otherwise available for free, however, there remains potential for political responses. It is possible that respondents may decide that waiting times should not be traded off against other aspects of treatment, or that travelling to receive treatment is unacceptable and that better provision should be made within the local hospitals. From these issues it was clear that there was a need for careful wording of the introduction to the survey to ensure that the effects of any prior beliefs or misinterpretation of the motives of the experiments were minimised.

A number of other papers have been reviewed, which cover a number of different topics surrounding issues of choice in the provision of health care; these are summarised in Table 3. Common themes across the various papers are the duration of the waiting time, the cost of travel and the continuity of care received as part of the treatment.

At the time of the initial design, the cost of travel was not an issue in the LPCP as these costs were being paid by the NHS. However, the distance that the patient has to travel was thought to be an important issue. A deterring aspect of a choice may become the distance that patients are required to travel, particularly in cases where their medical condition makes travel unpleasant or they would like to be close to friends or family so that they can visit. It was unclear at the initial design stage how distance was likely to be perceived by patients facing a choice between hospitals, i.e. whether these should be presented as the distance that the patient would be required to travel, or the time that it would take the patient to travel to the hospital, which is not necessarily directly related to distance. It was also possible that patients may have thought in terms of general regions rather than continuous distances or travel times. This is an area that was further examined in the cognitive interviews.

The continuity of care also emerged as a variable of interest in a number of the studies examined. In general, respondents indicated a preference for cases where they are dealt with by the same medical team throughout their treatment. This has important implications where treatment may be undertaken at distant hospitals but the follow-up care provided by the home hospital. Consideration was given to examining whether this aspect was crucial in patients' decisions to have an operation in a hospital outside of the direct area of residence in the LPCP -- for example, it is possible that this may have differed in importance according to the nature of the operation to be undertaken and the level of subsequent contact necessary.

Table 3: Summary of attributes examined and confounding factors found significant from papers on choices in health care (√ =reported in study, X = not reported in study)

Authors	Year	Title	Attributes (whether examined)			Confounding factors (whether significant)				
			Continuity of carer - choice of carer	Waiting time	Travel costs	Age	Sex	State of Health	Education	Income
Moayyedi; Wardman; Toner; Ryan, and Duffett[8]	2002	Establishing patient preferences for gastroenterology clinic reorganization using conjoint analysis	X	√	X	√	√	X	X	X
Ratcliffe and Longworth[9]	2002	Investigating the structural reliability of a discrete choice experiment within health technology assessment	√	X	X	√	X	X	√	X
Ratcliffe; Van Haselen; Buxton; Hardy; Colehan, and Partridge[10]	2002	Assessing patients' preferences for characteristics associated with homeopathic and conventional treatment of asthma: a conjoint analysis study	X	X	√	√	√	√	X	X
Telser and Zweifel[11]	2002	Measuring willingness-to-pay for risk reduction: an application of conjoint analysis	X	X	X	√	√	√	√	√
Longworth; Ratcliffe, and Boulton[12]	2001	Investigating women's preferences for intrapartum care: home versus hospital births	√	X	X	X	X	X	X	X
Meister; Lausberg; Walger, and von Wedel[13]	2001	Using conjoint analysis to examine the importance of hearing aid attributes	X	X	X	√	√	√	X	X
Ryan; Bate; Eastmond, and Ludbrook[14]	2001	Use of discrete choice experiments to elicit preferences	√	X	X	X	X	X	X	X
Ryan; Scott; Reeves; Bate; van Teijlingen; Russell; Napper, and Robb[15]	2001	Eliciting public preferences for healthcare: a systematic review of techniques	X	X	X	X	X	X	X	X
Morgan; Shackley; Pickin, and Brazier[16]	2000	Quantifying patient preferences for out-of-hours primary care	√	√	X	X	X	X	X	X
Ryan and Farrar[17]	2000	Using conjoint analysis to elicit preferences for health care	X	√	X	X	X	X	X	X
Tilley and Chambers[18]	2000	An application of conjoint analysis to the process of psychiatric day hospital care	X	X	X	X	X	X	X	X
Cunningham; Gaeth; Juang, and Chakraborty[19]	1999	Using choice-based conjoint to determine the relative importance of dental benefit plan attributes	X	X	X	X	X	X	X	X
Ratcliffe and Buxton[20]	1999	Patients' preferences regarding the process and outcomes of life-saving technology. An application of conjoint analysis to liver transplantation	√	√	X	√	√	√	√	X
Ryan[21]	1999	A role for conjoint analysis in technology assessment in health care?	√	√	X	X	√	X	X	X
Ryan; McIntosh, and Shackley[22]	1998	Methodological issues in the application of conjoint analysis in health care	√	√	X	X	X	√	X	X
Ryan; McIntosh, and Shackley[23]	1998	Using conjoint analysis to elicit the views of health service users: an application to the patient health card	√	√	X	X	X	X	X	X
van der Pol and Cairns[24]	1998	Establishing patient preferences for blood transfusion support: an application of conjoint analysis	X	X	X	√	X	√	X	X
Ryan and Hughes[25]	1997	Using conjoint analysis to assess women's preferences for miscarriage management	X	X	X	X	X	X	X	√

The discussion from the Isle of Wight study[4] advocated a number of potential developments which could be investigated in a future project with a wider ranging scope; these correspond well with the objectives laid out in the proposal for this LPCP evaluation study. One such area was the analysis of sub-groups of patients allowing examination of how preferences may differ according to factors such as status of current health, length of time on waiting list and the type of condition to be treated. The papers reviewed in Table 3 also identified a number of segmentations or confounding factors that have been found in previous studies to have an influence on choice. These include age, gender, state of health, education and income. It was anticipated that age, state of health and income could be particularly important determinants in the LPCP.

State of health is a particularly interesting aspect in the choice to travel; this may act in favour of either the current or alternative hospitals. It is possible that those who are suffering from a poorer state of health will wish to have their operation sooner, however, they may also be more reluctant to travel considerable distances due to this poor health. It is possible that there is therefore a point of trade-off at which the reduction in waiting time is outweighed by the reluctance to travel. Both waiting time and travel distance were included in the final SP exercise and this issue was examined in the model analysis to see whether there were different trading points for different groups within the sample.

It is also suggested that a number of other factors may come to play in the choice of hospital location. These could include accessibility, with those having access to a car demonstrating different willingness to travel to those dependent on a public transport alternative. The NHS may be able to assist in this area by continuing to arrange and/or pay for transport, but it may be important to consider the impacts should this prove economically unviable. There may also be differences depending on the household composition, with some household and family structures placing constraints on the ability to travel.

There is a further discussion in the Isle of Wight study[4] around the issue of validity of hypothetical choices. It is suggested that in the past high levels of theoretical validity and internal consistency have been identified, however, that little appeared to have been done within the health field to test the external validity of choice experiments.

Outside of the health literature, substantial research has been carried out to test the reliability and validity of SP techniques. Broadly speaking, reliability refers to the extent to which the technique reproduces the same results within a given time period. Validity is concerned with the extent to which the instrument measures that which it intends to measure. Most of the research on reliability was carried out in the 1970s, by market researchers. The available evidence[26,27] on the reliability of SP, based on test-retest checks, suggests a good level for the most widely used SP methods. These studies concluded that correlations between the preferences given at different times by the same people typically result in correlation coefficients around 0.9.

The validity issue has been studied most intensively by transport economists, usually in the context of validating forecast demand derived from stated preference models. One comparative study[28] investigating the validity aspects of stated preference (SP) research looked at 18 studies from which indications about the external validity of SP could be obtained. The results of most of these studies seemed encouraging, and suggest that SP

methods can predict choice behaviour for the investigated sample with a reasonable degree of accuracy.

The authors of the Isle of Wight study[4] advocated a test of validity taking predictions from a model of the responses from the hypothetical exercises and comparing them with real-world, revealed preference (RP) take-up rates. This is not the current practice in other fields, where it is recognised that the scale of RP and SP choices may be different as a result of differing biases in each type of data. Current best practice is to use both SP and RP data jointly to develop discrete choice models, taking explicit account of the differing scale of each type of data. The use of both types of data simultaneously, takes advantage of the strengths of each of the data sets, specifically by obtaining statistically reliable estimates of the key drivers of choice (from the SP data) whilst grounding these estimates in reality (from the RP data). A study undertaken by Bradley and Daly[29] to explore the potential for combining these two different data sources in a transport demand context concluded that the results indicated that the preferences for individuals for hypothetical travel alternatives are a reasonably good guide for the real underlying preferences.

2.1.2 Focus groups discussing hospital choice

A series of focus groups were undertaken in the early stages of the LPCP, these covered both a general sample of patients[30] and a number of interest groups with special concerns. These groups were not conducted by the research team, but the written summaries have been made available by the DoH for this review. The interest groups covered in this review are the Tower Hamlets Arthritis Support Group[31], the African Community Involvement Association[32] and Carers UK[33]. The issues coming out of the focus groups reflected the key concerns of those who may be directly affected by the patient choice process and as such provide a valuable indication of some of the key factors which may influence choice.

One particularly important issue which emerged from the focus groups was that of the reputation of the hospital and/or consultant. There was a concern amongst those involved that they may be offered space at an inferior hospital that had shorter waiting lists and they would want to know the track record of the consultant before being transferred. Whilst this can be recognised as a concern it is not clear how patients actually receive this information in practice. Wind and Spitz[3] tackled this area by presenting two separate attributes: the level of prestige of the consultant, and the person who recommended the consultant. Within the LPCP patients will not be offered individual consultants by name, but rather an alternative hospital, and an independent Patient Care Advisor (PCA) will offer the choices. The patients will probably therefore have to rely on any prior knowledge they may have of the hospital, anecdotal evidence from friends, GPs and relatives, or any evidence they may discover from their own research. This may also be supplemented with any material they receive from the receiving trust via their PCA; the content of this material is examined in the next section of this review.

Participants in the focus groups also drew attention to concerns of the potential for the inconvenience caused by the need for duplication of information and having to establish a relationship with a consultant at a hospital that they had not previously visited. This concern carried through to the continuing care following the operation with questions

asked about which hospital would deal with complications and any follow up appointments. Within the choice exercises that were developed the patients will face a balance between the value placed on receiving continuity of care with the same team and the inconvenience this may cause if travel to a distant location is required. This was considered an interesting aspect to examine within the SP, which allowed the possibility to evaluate the point at which different groups would trade-off between these two aspects.

Waiting list time was clearly a concern for those involved, but this had two dimensions, the reduction in overall wait and the notice provided before an appointment. There was a concern that being offered an appointment at very short notice could be very difficult for some people who have schedules that can not be adjusted at short notice, particularly those who have others reliant on them for care. There may therefore be different optimal waiting times for different sections of the community and some people may even have a disutility associated with low waiting times. These issues were examined further in the analysis of the choice data.

These groups also provide some insight into the factors surrounding hospital stays which are not necessarily part of the choice process, but may be issues of concern to some of the respondents. One such factor is the time which is available to contemplate the options and make a decision. This links into the idea of gauging reputation and the availability of opportunities to elicit the opinion of other parties such as friends and family. Whilst this will remain a constant between choices, it will be an important factor for some patients and may lead to different propensities to leave the status quo. This also links into the concerns regarding short notice of treatment.

Participants within the groups also expressed concern surrounding the length of the stay they may require at the hospital and whether they would be suitably rested before discharge and their journey home. This is an area outside of the direct control of the PCA, but will be an issue for the receiving trusts. As a result care was taken to ensure that it was made clear in the introduction to the SP exercises that the patient could expect the same treatment at all of the hospitals offered, in order to control for any concern in this area. In the RP data this may be examined further when information on actual lengths of stay are available after choice.

2.1.3 Leaflets produced by receiving hospitals

As part of the choice process, the PCA can send patients facing choice a leaflet from the receiving trust informing them of some of the details of the hospital which they may choose for their treatment. This is an opportunity for the trusts to "sell" their hospitals to the patient and influence their decision as to where to have the operation. As such, the leaflets potentially provide interesting information on what the trusts themselves view as important determinants in the choice process. The LPCP team within the Department of Health provided a number of leaflets for review. All of these were for trusts offering cataract surgery and were provided by The Western Eye Hospital[34], King's College Hospital[35], and two sites for Moorfields Eye Hospital NHS Trust[36,37].

The leaflets covered a number of common themes, but there were also a number of interesting differences. All of the trusts recognised the importance of reputation and each reported that they had received three stars in the national performance exercise,

emphasising that this was the maximum attainable. This is, however, a poor indication of performance in care as the rating is primarily associated with management efficiency, although it is not clear to what extent patients understand what the star rating represents. Any additional independent reviews are also quoted, particularly the Commission of Health Improvement. In addition the trusts discuss the levels of research that they are undertaking. Moorfields also quotes a patient satisfaction survey in which "99% of respondents rated their care highly enough to recommend the hospital to others" and also quotes their high success rate in the operation being offered. A further aspect of reputation used in the leaflets is recognition as a specialist centre both locally, nationally and internationally, and the history behind the hospital. None of the hospitals reported statistics from any nationwide survey or measure which would allow comparison of the quality of care between hospitals, suggesting that such a measure is currently unavailable.

The trusts also try to build familiarity with the hospitals by providing floor plans of the hospitals, maps of their location, and details of access by public transport. Contact details within the hospital are also provided as a potential avenue for further information. King's also send out details of the procedure to be undertaken and booking forms for pre-operative assessment, presumably as a way of reducing mailings and providing the patient with a clear way forward should they choose the hospital.

All of the trusts used the leaflets to draw attention to their staff and facilities. These ranged from statements about the quality of the staff, the number of staff, and in one case even a list of the key consultants by name. This is an area in which the familiarity and reputation can combine to provide an overall picture of a competent and trust-worthy hospital. Competence is also captured in statements surrounding the quantity of operations undertaken, with teaching hospitals drawing on the expertise of their senior staff to counter any issues surrounding treatment by students.

None of the leaflets reviewed were produced as glossy brochures, they were plain text letters aimed more at providing information than hard sell. This may reflect the little influence that the trusts feel that they may have in the process, aiming more to reassure potential patients than draw them to their trust on grounds other than reduced waiting time.

2.1.4 Summary

The existing literature, focus groups and leaflets produced by receiving trusts provided some useful insights into the aspects that may prove to be important for patients when provided with a choice between hospitals and suggested the key variables that were likely to be of influence in a patient's choice of hospital. At the completion of this research there remained, however, a number of unanswered questions directly relevant to the definition of the hypothetical choices for this project, which required further research. An initial design for the choice experiments was therefore formulated which was then tested through cognitive interviews with patients. These interviews also provided the opportunity to explore some of the questions of definition surrounding travel distance and hospital/surgeon reputation.

2.2 Initial design of the choice exercises

Following on from the literature review, a number of variables were identified which were of interest in a choice between hospitals.

2.2.1 Waiting time

The waiting time for each hospital is clearly a key variable in this project. Patients were offered an alternative hospital with a shorter waiting time than that which they currently face. In addition, it was the intention of the LPCP team that patients would be given a confirmed admission date for their current hospital at the point of choice, if this had not been provided before this time.

There were a number of options available for defining the waiting time levels in the choice experiments. One option would have been to base the waiting times around known waiting times for the specialty in question. However, the paper nature of the questionnaire placed some restrictions on the number of versions that could be administered and as a result this was rejected at an early stage. An alternative, which would have been possible in the case of this project, was to present the remaining waiting times from the point of choice. This had the advantage that there was a defined period in which the respondents would be likely to be offered choice, and it was therefore possible to examine how choices could vary as the waiting time at the current hospital was varied.

For the initial experiment design the patient's current hospital was assigned a remaining waiting time in the range of 5-9 months and the alternative hospital was assigned waiting times in the range of 1-4½ months.

2.2.2 Proximity

The location of the hospital was anticipated to be of key interest to the patients. This could be specified in a number of different ways; either by distance, travel time, or geographical region. This issue was put forward for further examination in the cognitive interviews, where questions were asked about how patients themselves would consider the proximity of the hospitals they were offered.

For the initial design the following options were presented to the respondents:

- This will be performed at your current hospital in London
- This will be performed at a hospital in London with a journey of less than 1 hour
- This will be performed at a hospital in London with a journey of 1 hour of more
- This will be performed at a hospital elsewhere in the South East
- This will be performed at a hospital elsewhere in England
- This will be performed at a hospital outside of the UK

2.2.3 Type of hospital

At present the main receiving hospitals in the LPCP are teaching hospitals. However, there is potential for this to change and there is the possibility of capacity being purchased

from private hospitals under some circumstances. We therefore considered examining whether the ownership (independent or NHS) of hospitals was an important criteria brought to bear by patients in making their choice of place of treatment.

For the initial design the following options were presented to the respondents:

- This is a hospital in the private sector
- This is a teaching hospital in the public sector
- This is a general hospital in the public sector

2.2.4 Reputation of hospital

A key factor presumed to influence patients' choice of hospital is the quality of care. However, quantifying 'quality' is extremely difficult. Currently available measures - such as mortality rates, star ratings etc - were felt to be inadequate for various reasons (for example, being too narrowly focussed or reported at an inappropriate level such as the hospital rather than the clinical team). We therefore opted for a non-specific notion of quality - 'reputation' - which would be presented in a relative way to patients in our survey:

- You have information which suggests that this hospital has a better reputation than your current hospital
- You have information which suggests that this hospital has a similar reputation than your current hospital
- You have information which suggests that this hospital has a worse reputation than your current hospital
- You have no information about the reputation of this hospital

2.2.5 Continuity of care

A further issue which emerged from the literature was the importance of continuity of care. In the context of the LPCP, this becomes relevant when considering where the follow-up treatment is provided if the procedure is undertaken at a hospital other than the patient's home hospital. Discussion with the LPCP team at the Department of Health suggested that the following three options are currently available under different circumstances and with different NHS trusts:

- Follow-up treatment will remain at your current hospital
- Follow-up treatment will be at the alternative hospital
- Follow-up treatment will be provided at your home by someone from the alternative hospital

2.2.6 Experimental design

These options were used for the pilot questionnaire that was used in the cognitive interviews.

Twelve different versions of the questionnaire were prepared – each of which contained the same background questions but offered different choice pairs from a near-orthogonal main effects fractional factorial design[38]. This ensured that independence was maintained between all of the factors examined but with significantly smaller requirements than the full factorial design, which would include all possible combinations of levels in each attribute. The factorial design contained a total of 25 different treatment combinations.

In none of these combinations could one alternative be assumed to dominate the other, as the definition of the variable levels (informed by the type of choices being presented to patients) ensured that the waiting time for the "alternative hospital" was always shorter than that for the "home hospital", but the travel time was always greater. It was judged that 25 separate choice situations would be too many for any individual patient to evaluate, so the design was split into smaller blocks of seven choices. In total, twelve different blocks were generated to provide coverage of the design across the respondents; in generating these blocks the fractional factorial was subjected to two separate fold-overs to increase the resolution and improve the balance of the design across respondents.

2.3 Analysis of the cognitive interviews

The research team from Picker Institute carried out 27 cognitive interviews in which one version of the pilot questionnaire was presented to the respondents for them to complete and discuss with an interviewer. These interviews were conducted in patients' homes and were recorded for transcription purposes. The analysis of the data from these interviews is presented in Annex A.

On the basis of the data available from the cognitive interviews, it appeared that the choice exercises were returning sensible data corresponding to respondents answering the choices in a thoughtful and considered manner. This would imply that on the whole the choices offered were considered realistic and that they offered situations in which the respondents had to weigh up the relative benefits of each alternative. It was encouraging to see that the majority of respondents in these cognitive interviews did not appear to be trading on waiting time alone, with only 15% of the respondents always opting for the alternative hospital with its guaranteed shorter waiting time. This suggests that the levels used to define the waiting time are such that they also encourage consideration of the other factors and do not dominate the choice processes that we are seeking to observe.

The additional feedback from the interviewers suggested that placing the waiting time variable at the top of each choice description may have led to some respondents focusing primarily on this variable. It was therefore decided for the main interviews to examine the option of moving this variable further down the description to encourage the respondents to fully read all the information presented about the alternative hospital.

Whilst the early analysis of the data from the cognitive interviews was encouraging, with an initial choice model returning largely intuitive results[B], it was recognised that it would be important to develop some models during the early stages of the main survey using data

[B] See Annex A for further details

from all twelve SP choice sets in order to ensure that the indications emerging from the cognitive data follow through into the full set of choices.

2.4 Revisions to the choice exercises

A number of changes were proposed to the stated preference choice exercises following the feedback from the cognitive interviews and information on potential future developments in patient choice.

2.4.1 Proximity

One of the issues examined in the cognitive interviews was how patients would best understand the concept of the proximity of the alternative hospital; whether this was best presented as regions, distances, or travel times. The feedback from the cognitive interviews suggested that patients preferred to think in terms of travel times, with a suggestion that two hours would be an acceptable travel time. As a result, the proximity variable was changed in the choice experiment, to be presented in journey time bands. The option of treatment at a hospital abroad was still retained, but no explicit time was associated with this as this would vary greatly by location. This had the result of producing a variable that presented the travel as within the UK or abroad, and then if within the UK a time was associated with the journey.

2.4.2 Travel costs

The cognitive interviews also highlighted the importance of whether the patient would have to pay for their travel costs. In the cognitive interviews it was assumed that travel costs would be paid by the NHS in all cases, as is current practice in the LPCP. The patients often sought to confirm with the interviewer that the costs would be paid, and clearly this was an issue that may have affected the choices made by some patients.

The research team also attended a number of meetings during the course of this project where the issue of travel costs were raised. At the workshop "LPCP Review of Lessons Learnt" held on 17th March 2003, there was discussion about whether it would be realistic for the NHS to continue paying for travel costs, particularly in the context of a national roll-out. In addition, the team received some input from the DH strategy unit which suggested that travel costs would become an increasingly important issue in a national choice project.

In the light of this information, it was decided that the issue of whether costs would be paid for by the NHS should be explicitly included in the choice experiments. This provided the opportunity to examine which groups of patients considered this to be an important issue and to evaluate how it would affect choice behaviour. It was anticipated that there could be an interaction between whether the costs are paid and the length of the journey required; and this was explicitly examined in the model analysis.

A wording was devised that encompassed the notion of the travel being organised and/or paid for by the NHS. It was anticipated that there could be a preference for some groups of patients for a situation where they had to pay, but the NHS still organised their

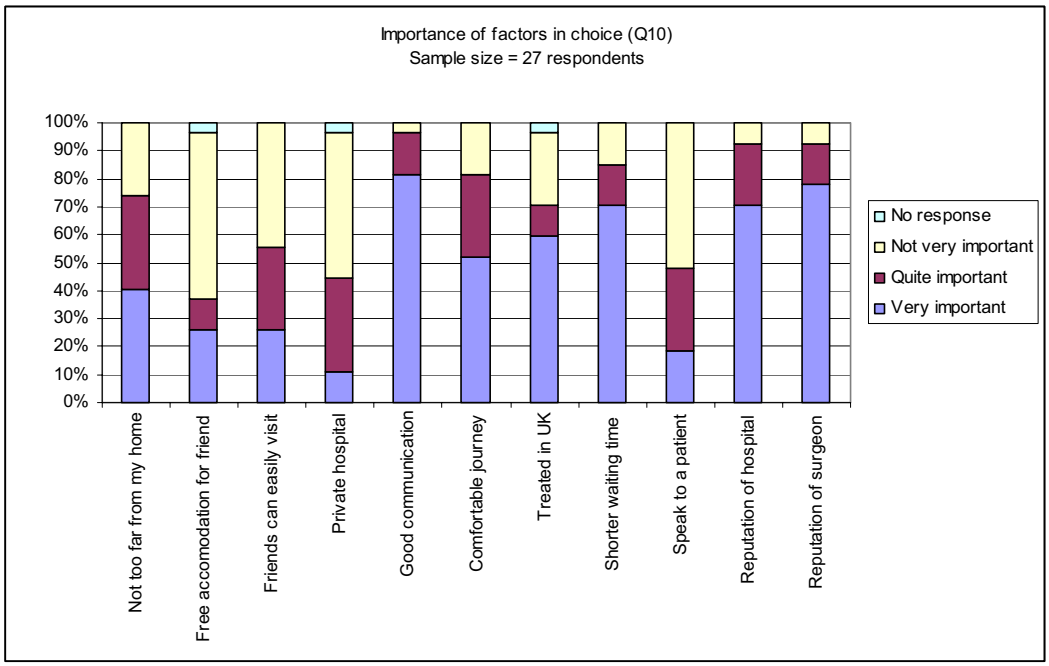
transport. In addition, all options allowed the patient to organise their own transport, which already occurs in a number of cases.

- The NHS will arrange free transport for you, or you can organise and pay for your own
- The NHS will arrange transport for you which you have to pay for, or you can organise and pay for your own
- The NHS will not arrange transport for you, so you will need to organise and pay for your own

2.4.3 Reputation

In the choices for the cognitive interviews the issue of reputation was presented as an issue related to the hospital. The data from the background questions shows that this was important, but that the patients were equally concerned about the reputation of the clinician.

Figure 2: Cognitive interviews: importance ratings of factors in choice



Data source: Before-choice survey (Picker Institute)

Restrictions on the number of questionnaire versions that could be practically administered restricted us to an experimental design with six variables. It was therefore only possible to examine either the reputation of the hospital or the surgeon.

Whilst information on the clinical team would clearly be important to the patient, it was not clear how they would obtain such information and whether they would actually know who would conduct the procedure when they made their choice between hospitals. Information is, however, available on overall hospital performance[39]. A decision was therefore made that the reputation of the hospital was the most relevant to the choice

decision and should be retained. In the RP model analysis we have examined hospital rating data that is available in the public domain, thereby providing an examination of whether the choices show a statistically significant relationship with this real world "reputation" data.

2.4.4 Public or Private

The cognitive interviews suggested that the distinction between whether the hospital is public or private was not important to the patients interviewed. In order to include payment of travel costs as a variable it was necessary to drop one of the original variables from the cognitive choices. It was decided that the hospital type variable was the least important of those being examined and was therefore removed.

2.5 Interim pilot analysis

It was difficult to make statistical judgements on the cognitive data alone and there were also significant changes made to the choice experiments following the cognitive analysis. It was therefore considered necessary to perform an interim pilot analysis once the first 80 interviews were collected to allow an assessment to be made of the appropriateness of the choices presented. This additional analysis did not interrupt data collection, but provided the option for revisions to the choice section of the questionnaire for later respondents should difficulties have been identified. This check was considered essential in ensuring that the data collected over the course of the surveys met the objectives of the evaluation. The analysis also provided an early insight for the LPCP team into the emerging behavioural trends. The details of this analysis are provided in Annex B.

On the basis of the data available from these first 80 responses to the stated preference survey, it appeared that the choice exercises were returning credible results corresponding to respondents answering the choices in a thoughtful and considered manner. This was judged to indicate that the choices offered in the survey were realistic and offered situations in which the respondent had to weigh up the relative benefits of each alternative. It was encouraging to see that the majority of respondents did not appear to be trading on waiting time alone.

It was therefore concluded that there was no need for adjustments to the choice exercises and that the data being collected appeared to be fit for purpose and would provide useful insight into choice behaviour.

2.6 Summary of final variables for choice exercises

The following table details the revised variables which were implemented in the choice exercises for the main surveys.

Table 4: Main survey: variables and levels examined in choice experiments

Variable	Level	Wording
Waiting time for current hospital	1	You will receive your operation in 9 months
	2	You will receive your operation in 7 months
	3	You will receive your operation in 6½ months
	4	You will receive your operation in 6 months
	5	You will receive your operation in 5 months
Waiting time for alternative hospital	1	You will receive your operation in 4½ months
	2	You will receive your operation in 3 months
	3	You will receive your operation in 2½ months
	4	You will receive your operation in 2 months
	5	You will receive your operation in 1 month
Location of alternative hospital	1	It would take less than 1 hour to travel by car to this hospital in the UK
	2	It would take between 1 and 2 hours to travel by car to this hospital in the UK
	3	It would take between 2 and 3 hours to travel by car to this hospital in the UK
	4	It would take between 3 and 5 hours to travel by car to this hospital in the UK
	5	This hospital will be outside of the UK
Travel costs	1	The NHS will arrange free transport for you, or you can organise and pay for your own
	2	The NHS will arrange transport for you which you have to pay for, or you can organise and pay for your own
	3	The NHS will not arrange transport for you, so you will need to organise and pay for your own
Reputation of alternative hospital	1	You have information which suggests that the hospital has a better reputation than your home hospital
	2	You have information which suggests that the hospital has a similar reputation to your home hospital
	3	You have information which suggests that the hospital has a worse reputation than your home hospital
	4	You have no information about the reputation of the hospital
Follow-up care	1	Follow-up treatment will remain at your home hospital
	2	Follow-up treatment will be at the alternative hospital
	3	Follow-up treatment will be provided at your house by someone from the alternative hospital

CHAPTER 3 Data on Patients' Stated Preferences

In total, 2,114 completed before-choice survey forms were returned to the project team in time for coding and inclusion in the stated preference modelling. This represented a response rate of 54% (from 3998 questionnaires distributed). The Picker Institute have reported that this rate is comparable with that obtained from London patients in previous surveys, although they acknowledge that this rate is lower than originally anticipated.

An external data coding company, Ciconi, undertook the coding of the responses from the before-choice survey under the supervision of the Picker Institute. The accuracy of the coding was monitored throughout to ensure that the data recorded accurately reflected that collected, with an anticipated accuracy in the region of 99.8%. Cases where a respondent entered more than one response on the paper form for a single answer question were coded as "duplicate" so that the response to that question could be excluded from analysis. This was deemed preferable to the analyst or the data-enterer selecting one of the responses as the intended response.

More details on the survey administration, response rates and characteristics of the patients responding are available in the Picker Institute report on their evaluation of the LPCP[40].

3.1 Distribution of sample

Twelve different versions of the questionnaire were distributed across the sample of patients, each of which contained the same background questions, but different choice pairs in the discrete choice experiment section. This allowed the orthogonal fractional factorial design[C] to be distributed across respondents and provided the opportunity for collecting more variation in attribute combinations than could be obtained in a single fixed design. Table 5 presents the distribution of the twelve versions of the questionnaire across the sample. The different questionnaire versions were sent out in roughly equal numbers, and the distribution of the returned responses by version is almost uniform. This indicates that certain sets of choices are not associated with a systematically lower response rate.

[C] Such a design maintains the statistical independence of each factor by itself, but trades off reducing the number of choices required with the ability to look at many of the interactions amongst the factors. If one assumes that the main factor effects are of primary concern and that the interactions, if any, are secondary, then this is a worthwhile trade-off as it reduces the demands placed on the respondent.

Table 5: Distribution of questionnaires across sample

Version	Frequency	Percent
A	184	8.6
B	172	8.0
C	174	8.1
D	190	8.9
E	190	8.9
F	166	7.7
G	182	8.5
H	163	7.6
I	171	8.0
J	181	8.4
K	179	8.3
L	192	9.0
Total	2144	100.0

The respondents were recruited from a number of originating trusts. Different trusts generated different volumes of patients for admission to the LPCP, so the numbers of respondents from each trust would not be expected to be equal. Table 6 provides an overview of the representation of each of the five trusts sampled for this study.

Table 6: Distribution of sample by originating trust

Originating Trust	Frequency	Percent
Guy's and St Thomas'	262	12.2
Barnet and Chase Farm	609	28.4
Barking, Havering and Redbridge	684	31.9
Mayday Healthcare	443	20.7
St George's	141	6.6
Not known	5	0.2
Total	2144	100.0

Respondents were on waiting lists for a range of different operations. Some of these had a relatively low incidence in the sample, preventing analysis of whether there were differences specific to the patients waiting for these procedures. However the procedures were grouped for analysis purposes to allow comparisons between groups of patients; these aggregations by operation type are presented in Table 7.

Table 7: Distribution of operations across sample

Group	Operation	Frequency	Percent	Percent in Group
Orthopaedics	Knee operation	625	29.2	39.9
	Hip replacement	230	10.7	
Ear, Nose and Throat	Nasal surgery	192	9.0	12.3
	Tonsillectomy	70	3.3	
Urology and Gynaecology	Urology operation	224	10.4	11.9
	Gynaecological operation	33	1.5	
General surgery and other	Hernia repair	335	15.6	35.9
	Gall bladder (cholecystectomy)	161	7.5	
	Varicose veins	118	5.5	
	Haemorrhoids (piles)	51	2.4	
	Cataract (or other eye operation)	101	4.7	
	Plastic surgery	4	0.2	
	Total	2144	100.0	100.0

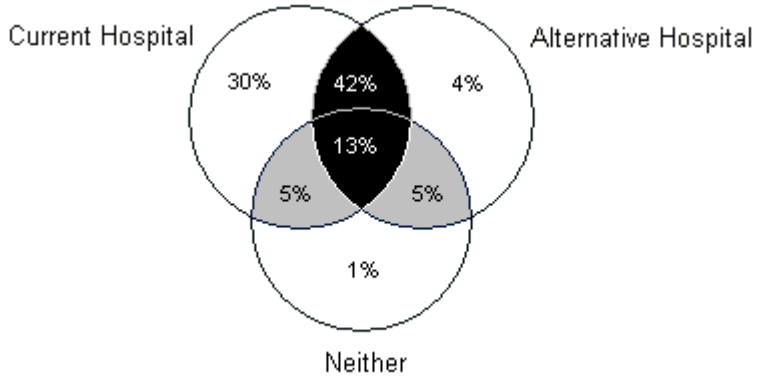
A wide range of other information was collected on the respondent, their medical history and their background characteristics; the full questionnaire is available in Annex C.

3.2 Trading behaviour in SP choices

Of the 2,144 responses available from the before-choice survey, 30 did not complete the choice exercises, representing a total of 1.4% of the returned responses. This left 2,114 respondents available for analysis in the SP models.

The Venn diagram in Figure 3 summarises the stated preference choice behaviour of the 2,114 respondents across their seven choice scenarios.

Figure 3: Number of respondents with each choice pattern (sample size = 2,114)



The two darkest segments provide the most information on the trade-offs patients make when considering alternative hospital providers, relating to cases where respondents trade between their current home hospital and the hypothetical alternative hospital depending on the characteristics of these; this represents 55% of the respondents.

The mid-coloured segments provide less information on patient trade-off behaviour because in these cases the respondent consistently chose between one hospital and the "neither" alternative. This is still valuable information, particularly for the neither choice.

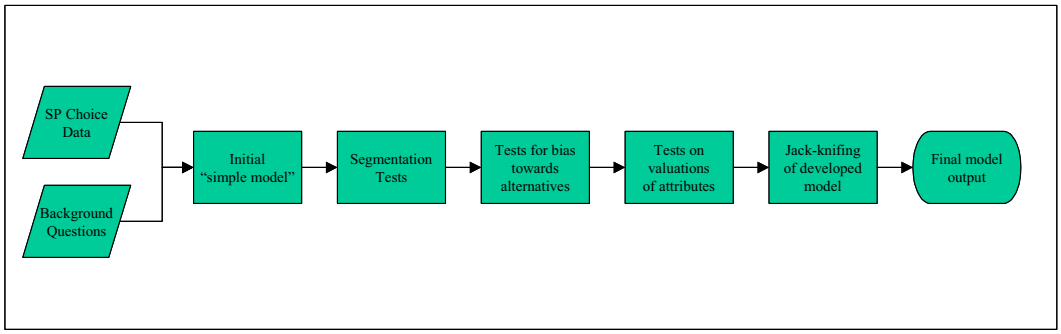
Finally the lightest segments reflect cases where the respondent stated that they would always choose one of the alternatives. A response of always choosing one option is a valid response and reflects a preference for one alternative under all of the choices offered. It is encouraging to see that of those responding in the exercises, only thirteen respondents always chose "neither" (less than 1%) – these may be considered political responses in which the respondents may not have felt that anything put forward by the NHS would be sufficient. These thirteen cases where the respondent consistently answered "neither" in each choice were excluded from the models analysis as they were judged to not to be "playing the game". Thirty percent of the sample always chose the current "home" hospital alternative; about 4% always chose the alternative hospital alternative (with its shorter waiting time). In the SP model analysis, further tests are performed to examine whether certain groups of patients have a stronger underlying preference for one alternative than the other.

CHAPTER 4 Analysis of Stated Preference Data

This chapter describes the choice models developed from the SP choice experiment data. These choice models provide the means by which the response of patients to changes in the service provisions can be estimated.

Firstly, the theoretical background for the modelling is presented. This is then followed by an overview of the model development, the outline of which is presented in Figure 4.

Figure 4 Stages in modelling of behaviour observed from SP choice exercises



First the data from the choices the respondents made in the SP exercises were used to create an initial model, which included coefficients[D] for all the attributes (such as waiting time, reputation, etc) presented in the choices.

A series of tests were then conducted to explore whether the differences in behaviour within the sample were sufficient to justify a series of separate models for different groups of respondents, or whether a single model should be developed with explanatory variables to cover key differences. For example, when we estimated separate models for different specialties we found that there were differences in choice making for those waiting for ENT procedures, but the differences were only significant with respect to the value placed on the location of any follow-up treatment. These respondents were not found to be significantly different from any other patients in other respects so a separate model to

[D] The coefficients indicate the relative importance that, on average, the respondents have placed on each of the attributes within the choice. The coefficients are estimated in the model such that the model provides the best fit to the choices made in the data.

explain their behaviour was not an efficient use of the data, but separate terms on this one attribute did provide a better explanation of the behaviour across the whole sample.

Model tests were then undertaken to understand the influence of person-specific variables such as age, gender, income, etc on the bias[E] towards one of the alternatives. Once these behavioural differences were identified, tests were undertaken to understand whether different patient groups value individual attributes differently and to identify those groups which had significantly different choice behaviour. This enabled us to determine the specification of the final explanatory model. Lastly, necessary corrections for interdependence of observations were made.

4.1 Theoretical Background

The models developed reflect the choices and attributes presented in the SP choice experiments. Utility equations are specified for each choice alternative in the experiment: the current home hospital, the alternative hospital and the "neither" alternative.

The utility equations reflect the attribute levels presented to the respondent in the SP choices multiplied by coefficients (β) that reflect the relative value of each of the attributes in the choices.

- In the case of continuous variables, e.g. waiting time in months, the coefficient represents the gain or loss in utility for each unit change in the variable.
- In the case of categorical variables, e.g. hospital reputation, the coefficients in the utility equation reflect the value of a level of the variable relative to a base level of that same variable; i.e. for a five level variable the utility equation could contain four coefficients representing the differences in valuation between each level and the selected base level.

The estimated coefficients have no intuitive explanation for their absolute magnitude, but their relative values indicate respondents' "trade-offs" between service attributes.

An alternative-specific constant (ASC) is applied to the alternative hospital utility function to reflect potential bias for the alternative hospital once all explanatory variables are taken into account: a positive constant reflects a positive bias, a negative constant a negative bias. A constant is also used to explain the preference for the "neither" alternative. For example, in the simplest model specification the utilities are formulated as follows:

[E] "Bias" when used in this context does not suggest an undesirable effect in either direction; it is used as a technical term to explain systematic preference for one of the alternatives within the choice set.

U(home)	= βwait	* home hospital waiting time (varied in choices)
	+ βtraveltime	* existing travel time (background variable)
U(alternative)	= βwait	* alternative hospital waiting time (varied in choices)
	+ βreputation1	* if (reputation = Level 1 of 4) [F]
	+ βreputation2	* if (reputation = Level 2 of 4)
	+ βreputation3	* if (reputation = Level 3 of 4)
	+ βtraveltime	* travel time to alternative (if travel = Level 1-4)
	+ βabroad	* if (travel = Level 5)
	+ βtransport1	* if (transport = Level 1 of 3)
	+ βtransport2	* if (transport = Level 2 of 3)
	+ βcare1	* if (follow-up care = Level 1 of 3)
	+ βcare2	* if (follow-up care = Level 2 of 3)
	+ βASC_alternative	
U(neither)	= βASC_neither	

It is the model coefficients (β) that are estimated in the model calibration procedure. The model is based on the assumption that each respondent chooses the alternative that provides him or her with the highest utility. An error term is included on each utility function to reflect unobservable factors in the individual's utility. The estimation can therefore be conducted within the framework of random utility theory, i.e. accounting for the fact that the analyst has only imperfect insight into the utility functions of the respondents.

The most popular and widely available estimation procedure is logit analysis[G]. The estimation procedure produces estimates of the model coefficients, such that the choices made by the respondents are best represented. The standard statistical criterion of Maximum Likelihood is used to define best fit. Both the values of the coefficients (in utility terms) and information on the significance of the coefficients are output.[H]

Additional terms and non-linear variations in the *variables* can be added to these functions – the testing of the appropriate forms for the utility functions forms an important part of the model estimation process. However, linearity with respect to the *coefficients* β is maintained in the current study.

In the preliminary models, no account is taken of the fact that the observations from a single individual cannot be considered to be independent of each other. The error terms for an individual can therefore be expected to be correlated. Experience with stated preference data indicates that coefficients estimated using a "naïve" assumption of independence generally give reasonable estimates of the coefficients but overstate their significance. A correction is made for these correlations later in the modelling.

[F] The notation if(attribute level) indicates a binary variable, which takes the value 1 if the attribute is at that level and 0 if not. Where more than two levels exist, a series of binary variables are used to represent the various options presented with one of the levels presented in the choices used as the implicit base.

[G] The logit model predicts choice probabilities as $p_1 = \exp V_1 / (\exp V_1 + \exp V_2 + \exp V_3)$, where the V's represent the utility functions of the alternatives and exp is the standard exponential function.

[H] Further information on this procedure can be obtained from Ben-Akiva and Lerman [H].

4.2 Model Development

4.2.1 Model segmentation

Data was collected from patients from various trusts and waiting for various procedures in different specialties. The first part of the analysis investigated whether the choice behaviour of these different groups differed with respect to the alternatives presented in the SP exercises.

A decision was required as to what extent the data from trusts and procedures should be grouped together in the modelling. Separate models are advantageous when the majority of the terms in the model are significantly different between groups, but if there are only minor differences a more robust model can be formulated by jointly estimating the terms that are common between groups.

In order to make a judgement as to the appropriate segmentation of the data, a series of models for the different groups were created and compared for differences and similarities. The likelihood ratio tests performed at this stage indicated that separate models provided little improvement in overall model fit, and that the differences observed could largely be explained with additional terms within a jointly estimated model.

4.2.2 Investigation of differences in underlying preference

The model was then subjected to a series of tests to assess the accuracy of the model in predicting the choice of hospital alternatives across different subgroups of the sample, e.g. age, gender, income, etc.. In these tests, a series of model runs were performed to assess the accuracy of the model, specifically comparing the observed and predicted choices, across different subgroups. Where behavioural differences were identified for a specific sub-group an additional explanatory variable was added to the utility functions of the choice model. Changes in overall model fit were used to examine whether the introduction of the additional variable improved the fit of the model significantly[I]. Further tests were then run to assess the success of the additional variable and to reassess how the model predicted observed choices across the range of subgroups. This procedure was repeated until the predicted choices matched the observed choices at an acceptable level for all sub-groups. These tests specifically examined whether there were any systematic biases for the current hospital, the alternative hospital, or the "neither" alternative across the range of possible explanatory variables presented in Figure 5.

Table 8 details the behavioural differences observed in the underlying preferences for hospital alternatives in the experiment.

[I] Changes in model fit were assessed using the likelihood ratio test, which assesses whether the reduction in log likelihood of the model (increase in likelihood) is sufficient to justify the addition of the new terms within the model. This uses a chi-squared statistic to check for significance and the 95% level of significance has been used as the criteria for the addition of new terms into the model.

Figure 5: Potential sub-groupings explored during model development

- Operation group (see Table 7)
- Originating trust
- Whether the patient had been given an estimated waiting time when put on list
- For those with a waiting time, how long they were told they would wait
- How long the patient had been waiting to date
- Whether the patient had an admission date now
- Whether their admission date had changed
- Perceived reputation of home hospital
- Usual mode of transport to home hospital
- Travel time to home hospital
- Whether the patient would bring someone with them to the hospital
- Self-reported level mobility
- Self-reported ability to care for self
- Whether the patient was able to perform their usual activites
- Self-reported level of pain
- Self-reported level of anxiety
- Self-reported state of health for previous 4 weeks
- Gender
- Age
- Age when left full-time education
- Whether live alone
- Whether parent or guardian of anyone aged under 18
- Whether respondent acts as a carer (non-professional)
- Work status
- Household income before tax
- Ethnic group

Table 8: Biases found to be significant in choice of hospital

	More likely to choose	Less likely to choose
Home hospital	- If aged between 45-59 (compared to <45) - If aged over 60 (compared to 45-59) - If left full-time education at 16 years or less - If were given an estimated waiting time when placed on list - If parent or guardian of under 18 year old	- As travel time to home hospital increases - If reputation of home hospital is good (compared to excellent-very good) - If reputation of home hospital is fair-poor (compared to good) - If reputation of home hospital is very poor (compared to fair-poor) - If male - If in extreme pain - If rate anxiety/depression as moderate-extreme - If health rated as poor or very poor - If had admission date changed - If from: St George's (compared to Guy's/St Thomas' & Barnet/Chase Farm) - If from: Mayday Healthcare (compared to St George's) - If from: Barking, Havering and Redbridge (compared to Mayday Healthcare)
Alternative hospital	- If employed - If unemployed[J]	- If household <£10k
"Neither"	- As waiting time on home hospital increases - If unable to perform usual activities	- If aged 16-29 years - If would usually drive self to home hospital - If unable to work due to disability

[J] Unemployed was defined as 'not in employment', but excludes those who are: retired, unable to work through disability, looking after home, or in full time education

Any of the potential variables listed in Figure 5 but not represented in Table 8 were not found to provide statistically significant terms in the model, that is to say that we have not observed any biases towards one of the choice alternatives for any of these sub-groups within our sample of respondents. The magnitude of the biases that have been estimated and their level of significance are presented later along with the other coefficients within the final model.

One particularly interesting finding, worth highlighting at this stage, is that the probability of a patient choosing the "neither" alternative was found to increase as the waiting time on the home hospital increased. The "neither" opt-out category had a specific meaning in the choice experiment. In the instructions to the respondent it was made clear that choosing "neither" corresponded to a decision to either look for alternative treatment outside of the NHS or opting not to have the operation. This option is available to patients in real life and as such its inclusion helped to build credibility in being asked to choose between the NHS options offered. The inclusion of such opt-out alternatives has been recommended in a number of recent design guidelines[41],[42]. This increased probability of a patient choosing the "neither" alternative as the waiting time on the home hospital increased highlights the importance of waiting times and their influence on the propensity of NHS patients to "opt out" of NHS treatment. It is interesting that income has not been found to be an influence in this decision within the sample observed, and unfortunately there is not information on ownership of private medical cover in the before-choice survey.

4.2.3 Variations in the valuation of individual attributes

A series of tests were then conducted to determine whether there were significant differences in the valuation of individual service attributes for sub-groups within the sample, for example, did different groups value reputation differently?

In these tests a series of model runs were performed to assess the accuracy of the model, specifically comparing how the observed and predicted choices varied for each of the attribute levels across different subgroups. Where behavioural differences were identified for a specific sub-group an appropriate attribute-specific term was added to the utility functions of the choice model (e.g. it was observed that men were more willing to travel abroad for treatment therefore a separate "abroad" term was tested in the utility function for the alternative hospital for men). Changes in overall model fit were used to examine whether the introduction of the additional variable improved the fit of the model. Further tests were then run to assess the success of the additional variable and to reassess how the model predicted observed choices across the range of subgroups. This procedure was repeated until the predicted choices matched the observed choices at an acceptable level for all sub-groups.

These tests examined the observed and predicted choices across a broad range of variables collected in the questionnaire, relating to the respondent's experience of health care, their own state of health, and their socio-economic characteristics. The key variables listed in Figure 5 were used again as the basic groups to be tested for these differences in valuation. As a result of these tests we picked up any differences in the main effects by patient type.

A series of tests were also run on the waiting time and travel time within the models, to check whether a linear formulation was the most appropriate. Both logarithmic and

polynomial functions were tested to examine whether there were diminishing returns from larger changes in waiting time; neither of these were found to provide a better fit to the data than a linear term. Piece-wise linear functions were also tested but were not found to offer a statistically better fit than a single linear term within the ranges examined within the choice exercises.

The following table details the behavioural differences observed in the valuation of attribute levels.

Table 9: Sub-groups found to place different values on key attributes in choice

Variable	Difference sub-groups identified
Waiting time	- None
UK travel time	- None
Travel abroad	- If on waiting list for 6 months or more - If on waiting list for less than 6 months and male - If on waiting list for less than 6 months and female
Reputation: worse than existing	- If household income under £10k - If household income £10k or more
Reputation unknown	- If household income under £10k - If household income £10k or more
Reputation better than existing	- If reputation of home hospital rated as poor or worse - If reputation of home hospital rated as better than poor
Transport organised by NHS, but paid by self	- None
Transport organised by NHS, and paid by NHS	- If parent or guardian of under 18 year old - If not parent or guardian of under 18 year old
Follow-up care at alternative hospital	- If waiting for ENT procedure - If waiting for other procedure
Follow-up care at patient's home	- None

4.2.4 Testing for key interactions

In specifying the models, consideration was also given to the potential for interactions between variables. The final model includes one such interaction between willingness to travel abroad and whether the NHS pays the travel costs; this term shows patients would be more willing to consider treatment abroad when the NHS pays the travel costs. A series of tests were performed on this interaction as the model contains a number of different valuations of both the willingness to travel abroad and the importance of having travel costs paid as indicated by the sub-groups in Table 9. These tests demonstrated that the respondents in the sample appear to place an equal importance on this relationship between the two variables regardless of their valuation of the two separate attributes, i.e. no differences were discovered between respondents in the value of this additional incentive to travel abroad for treatment.

Two further interaction tests were undertaken:

1. A test was also performed to identify whether a similar interaction existed between the organisation of (but not payment for) the travel arrangements by the NHS and the willingness to travel abroad.

2. A further test was run to examine whether the willingness to travel longer distances within the UK was influenced by the payment of travel costs.

Neither was found to be statistically significant.

4.2.5 Allowing for repeated measures

An important advantage of the stated preference approach is that several responses can be collected from each individual. This reduces substantially the cost of data collection and allows for more advanced experimental designs. However, the collection of multiple responses means that each respondent's basic preferences apply to the series of responses that he or she has given: those responses are therefore interdependent. Naïve analysis methods that assume the independence of observations are therefore, in principle, invalid.

While a number of methods can be used to correct for the interdependence of SP observations, experience has shown that a good practical method is to use the "jack-knife" procedure.[43,44] This is a standard statistical method for testing and correcting model misspecifications. RAND Europe has pioneered its use in connection with SP data[45] and has found it to be effective and reliable in this context. In general, the application of the jack-knife procedure to SP data has confirmed that the coefficient estimates themselves are not greatly affected by the specification error of assuming independent observations. However, the significance of the coefficient estimates is often substantially overstated by the naïve estimation. Thus, when there is an important issue about the significance of a specific variable, it is necessary to test that variable in a jack-knife procedure rather than in a naïve estimation. Generally it is found that when variables are significant at very high levels in a naïve estimation, they remain significant in the jack-knife estimation; but when the significance of a variable in the naïve estimation is marginal, a jack-knife estimation may show that it is not truly significant.

The model results following the jack-knife procedure are presented in the following section.

4.3 SP model results

For each model, two sets of values are presented:

1. Model summary statistics before the jack-knife procedure is applied;
2. Post-jack-knife coefficient values and their associated t-ratios.

The model summary statistics which are presented are defined in Table 10.

Table 10: Model Summary Statistics

Statistic	Definition
Observations	The number of observations included in the model estimation.
Final log (L)	This indicates the value of the log-likelihood at convergence. The log-likelihood is defined as the sum of the log of the probabilities of the chosen alternatives, and is the function that is maximised in model estimation. The value of log-likelihood for a single model has no obvious meaning. However comparing the log-likelihood of two models with different specifications allows the statistical significance of new model coefficients to be assessed properly.
D.O.F.	Degrees of freedom, i.e. the number of coefficients estimated in this model. Note that if a coefficient is constrained to a fixed value (indicated by(*)) then it is not a degree of freedom.
$Rho^2(0)$	The rho-squared measure compares the log-likelihood (LL(final)) to the log-likelihood of a model with all coefficients restricted to zero (LL(0)): $Rho^2(0) = 1 – LL(final)/LL(0)$ A higher value indicates a better fitting model.

Table 11 presents these summary statistics for the final SP model before the jack-knife procedure is applied.

Table 11: Model summary statistics for the final model

Observations	11604
Final Log Likelihood	-8470.6
D.O.F	44
$Rho^2(0)$	0.336

The $Rho^2(0)$ value of 0.336 is in line with that which would be hoped for from a well specified discrete choice model. This model based on the attributes of the hospitals offered and the characteristics of the patients making the choices provides a reasonable fit to the decision as to whether to receive treatment at the home hospital or elsewhere. The model fit is particularly encouraging given the number of respondents; the terms in the model are based on averages of how different groups value certain factors, and this model contains a large number of individual respondents with a distribution of preferences around these averages.

In interpreting the coefficient values after the jack-knife correction the following points should be considered.

- A positive coefficient means that the variable level or constant has a positive impact of utility and so reflects a higher probability of choosing the alternatives to which it is applied.
- A negative coefficient means that the variable level or constant has a negative impact on utility and so reflects a lower probability of choosing the alternative to which it is applied.
- Some coefficients are multiplied by continuous variables and therefore reflect the disutility per unit of the variable, e.g. waiting time, which reflect the relative disutility per month of wait.
- Some coefficients are applied to categorical variables; these therefore reflect the total utility increase or decrease for that variable, relative to a base situation, e.g. the increase in utility as a result of differences in the reputation of the alternative

hospital are always compared to the base situation of "the reputation is the same as the existing hospital".

- **The constants in each model** reflect preferences for the alternatives to which they are applied. For example, the constant for "were told waiting time when placed on list" has a positive value of 0.143 and so implies that these patients have a preference for the home hospital alternative.
- **A *positive* value for a constant** indicates that the respondent is *more likely* to choose that alternative, and a ***negative* value** indicates that the respondent is *less likely* to choose that alternative.
- **The constants on the models are additive** and more than one constant can be applied to each individual.

A "neither" option was included in the choices presented to the respondents for cases where neither option was acceptable to the respondent. In order to take account of the cases where respondents chose this option it is necessary to include a utility equation for this alternative. A number of terms have been identified that explain differences in propensity to choose the neither option, which are reflected as separate constants.

The value shown in italics after each coefficient estimate is the t-ratio. This defines the (statistical) significance of the coefficient estimate; regardless of the sign, the larger the t-ratio, the more significant the estimate. A coefficient with a t-ratio greater than +/-1.960 is estimated to be significantly different from zero at the 95% confidence level. A t-ratio of +/-1.645 is significantly different from zero at the 90% confidence interval. In the model estimation procedure we have used the 95% confidence interval coupled with professional judgement to determine which coefficients to retain in the model; these are re-examined later in this report once the revealed preference data is incorporated.

The post-jack-knife coefficients estimates and their t-ratios are presented on the following page. The three separate columns of coefficients group the different terms that form the utility function of each of the three alternatives in the SP choices: home hospital, alternative hospital, and "neither".

HOME HOSPITAL		
Coefficient	**Estimate**	**t-ratio**
Variables in offered choices		
Waiting time (months)	-0.1478	-10.2
Constants		
Reported UK travel time (hours)	-0.3461	-14.8
Reputation: Very poor (base excellent-very good)	-1.1129	-8.1
Reputation: Fair-poor (base excellent-very good)	-0.4908	-5.9
Reputation: Good (base excellent-very good)	-0.2244	-2.8
Age between 45-59 (relative to <45)	0.1785	1.5
Age over 60 (relative to <45)	0.4713	4.1
Left full-time education 16 years or less	0.2100	2.8
Were told waiting time when placed on list	0.0989	1.2
Parent or guardian of under 18 year old	0.3692	3.7
Male	-0.2501	-3.1
In extreme pain	-0.3155	-3.3
Anxiety/depression moderate-extreme	-0.2033	-2.4
Health rated as poor or very poor	-0.3206	-3.2
Had admission date changed	-0.3599	-2.0
Trust: Barking, Havering and Redbridge	-0.5517	-6.1
Trust: Mayday Healthcare	-0.3297	-3.6
Trust: St George's	-0.3261	-1.9

ALTERNATIVE HOSPITAL		
Coefficient	**Estimate**	**t-ratio**
Variables in offered choices		
Waiting time (months)	-0.1478	-10.2
UK travel time (hours)	-0.3461	-14.8
Travel abroad - on waiting list >=6 months	-1.6237	-8.0
Travel abroad - on waiting list <6 months and male	-2.0611	-17.3
Travel abroad - on waiting list <6 months and female	-2.4290	-19.9
Interaction - Travel abroad if transport paid by NHS	0.7585	5.1
Reputation: worse than existing – household income <£10k	-1.5050	-12.9
Reputation: worse than existing – household income >=£10k	-2.0323	-16.3
Reputation: unknown – household income <£10k	-0.6536	-7.5
Reputation: unknown – household income >=£10k	-1.0355	-13.2
Reputation: better than existing - reputation of existing poor or worse	0.9335	6.3
Reputation: better than existing - reputation of existing better than poor	0.5315	10.6
Transport arrangements: organised by NHS, paid by self	0.2223	4.0
Transport arrangements: organised by NHS, paid by NHS - parent	0.7534	6.9
Transport arrangements: organised by NHS, paid by NHS - not parent	0.5196	8.4
Follow-up care: at alternative hospital - ENT operations	-0.6065	-4.3
Follow-up care: at alternative hospital - all other operations	-0.3207	-5.3
Follow-up care: at patient's home	-0.2190	-3.8
Constants		
Employed	0.1669	1.7
Unemployed	0.4805	2.1
Household income <£10k	-0.7749	-8.0
Unexplained bias for alternative hospital	-0.5235	-3.2

"NEITHER"		
Coefficient	**Estimate**	**t-ratio**
Variables in offered choices		
Waiting time on home hospital (months)	0.1685	5.9
Constants		
Unable to perform usual activities	0.3343	1.6
Aged 16-29 years	-0.4895	-2.3
Would usually drive self to home hospital	-0.3267	-2.6
Unable to work due to disability	-0.5433	-2.8
Unexplained bias for "neither"	-4.4928	-18.0

From this model we can see the importance of reputation in influencing the decisions the patients have made in the discrete choice experiment. We can also observe that there are differences between how different groups of patients value reputation, with those from households with lower incomes being less risk adverse than those on higher incomes.

The model also indicates that patients are very reluctant to consider accepting treatment in a hospital outside of the UK, this is characterised by the large negative coefficients on the abroad option. Again we can observe differences between groups, with those that have been on a waiting list for longer being more prepared to consider accepting treatment outside of the UK, and male patients generally being more prepared to travel to these hospitals than female patients.

The coefficients on waiting time and travel time both have intuitive signs, indicating that patients will tend to act to minimise both their travel and wait. Both of these terms are strongly estimated (with large t-ratios), indicating that the standard error of these estimates is relatively small.

We can also see that once we take account of the options offered there are some groups of patients have a greater tendency to choose to stay at their home hospital than others, for example, we can see that as the patient's age increases they are, on average, more likely to choose to stay at the home hospital. Other groups are less likely to stay, for example, those who are in extreme pain, are suffering from depression, or rate their health as poor, are less likely to stay at the home hospital and are more likely to accept the alternative offered.

The next three chapters describe our analysis of patients' revealed preferences and a further model estimated on the basis of results from both the stated and revealed preference models. This joint model takes the behaviour we observe in the stated preference choice experiments, but grounds it in the reality of how patients have been observed to make their choices in practice. Chapter 8 provides a summary of the results that follow from this joint model that uses both the stated preference and revealed preference data.

CHAPTER 5 Data on Patients' Revealed Preferences

The values presented in the earlier chapters of this report are the result of models that incorporate only stated preference data. Stated preference data provides good indications of the relative importance to respondents of individual variables and has a number of strengths in the modelling of choice that address problems that exist with revealed preference choice data, for example:

- there are no measurement errors in the explanatory attributes as these are explicitly defined within the choice offered in SP exercises, rather than inferred in RP choice observations;
- multicollinearity of variables can be avoided through experimental design;
- there is economic advantage in collecting multiple observations from each individual.

However, models based on hypothetical choices can differ from those derived from RP data in two important ways:

- the overall sensitivity of the model in predicting choices between alternatives;
- the bias for specific alternatives, as represented by the constants in the utility formulation.

As such, revealed preference data has an important role in *calibrating* the choice models to the observed behaviour of patients in real-world choice situations.

Here we describe the available data on patients' actual, revealed preferences and in the next section estimate a model of choice which uses variables which match, as far as has been possible, those used in the stated preference model.

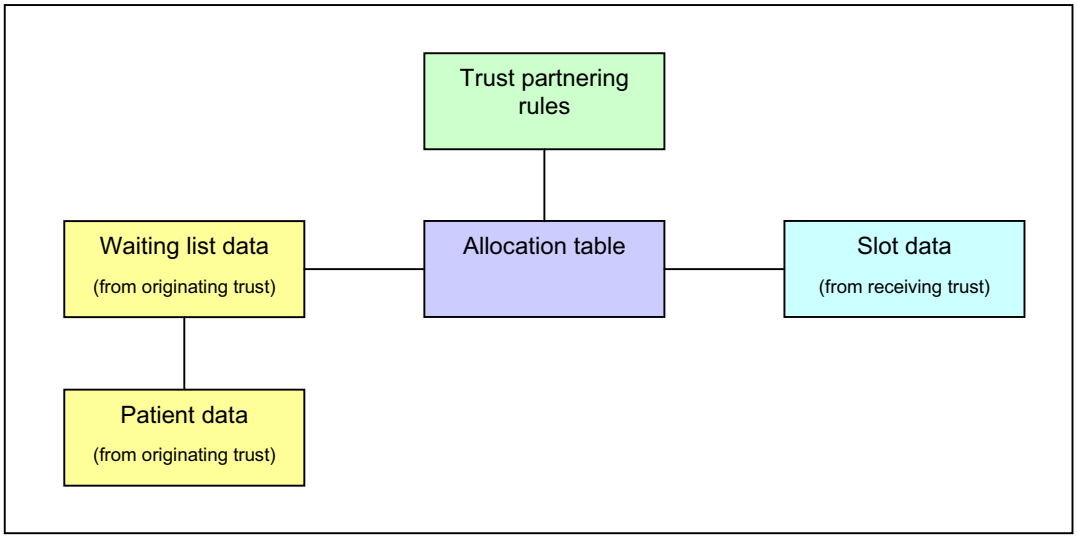
5.1 Data on patient choices available from the LPCP

The LPCP is administered by a central unit who are provided with the information on the eligible patients from the originating trusts and the slots available at the receiving trusts. The Patient Care Advisors then contact the eligible patients by telephone and offer them the option of staying at their existing hospital or transferring to one of the alternative hospitals which have a slot available; the alternatives which can be offered are constrained by "buddying" relationships between originating and receiving trusts. The whole choice

process is based upon an IT system with a supporting database that records the slot allocations.

The database is essentially a booking allocation system, and has not been designed to retain historic information that is not directly relevant to the patient's ongoing treatment. The structure is illustrated in the following diagram.

Figure 6: LPCP Slot Allocation Database Structure



The originating trusts supply the patients who they believe are eligible for choice. The allocation is made on the basis of the waiting list data (some patients will be on lists for more than one procedure).

The **waiting list table** stores information such as:

- Procedure
- Date patient joined list
- Site that the patient has come from (hospital site and trust)
- Where they are in the waiting and allocation process
- GP information (name, identifying code, address)
- When they would be treated at their originating trust

The **patient table** is linked directly to the **waiting list table** and contains information on each individual:

- Date of birth
- Gender
- Address (from which the postcode can be extracted)
- Any special language requirement

- Any special mobility requirement

On the other side of the system the receiving trusts provide their available capacity for assignment. This is stored in the **slot table** which records:

- Date of slot
- Time of slot
- Location of slot (trust and hospital site)
- Procedure which could be conducted

The allocation system then acts to pair up those on waiting lists with available slots. There are contractual restrictions around which receiving trusts can receive patients from each originating trust, these are stored in the table containing the **partnering rules**. This filters the available slots and provides the information on available choices to the Patient Care Advisor that phones each patient that enters the system and offers them choice.

The choice set is therefore dynamic; it depends on what slots are available at the specific time of the phone call (some are not available as the trusts are incompatible, other slots may already have been assigned). The PCA asks the patient whether they would be interested in choice – some decline at this stage – if they are interested the PCA then is given a screen that provides different locations and different dates and times and they can offer these to the patient. Some patients will immediately accept the first choice offered and will not be given the details of the others in the choice set, some will place their own restrictions (e.g. not hospital X, or not on a Friday), a few may want to know all of the available options.

The **allocation table** then acts to pair each record on the incoming **waiting list table** with the slot they have chosen to accept from the **slot table**. A variable on the waiting list table records the status of each individual case, these can be summarised as:

- Accepted choice, given slot
- Declined choice, stay at originating trust
- In system awaiting offer or decision
- Rejected as not appropriate for choice (e.g. wrong contact details, died, surgery not actually required, etc)

None of the information on the choices available is recorded within the **allocation table**, just the outcome, i.e. the pairing of each waiting case with a slot. It would be possible to go back and infer the choices which may have been available from the date/time stamps, but this would be a very resource intensive task, and as has been indicated previously, the telephone interaction between patient and PCA may have resulted in only a subset of choices being discussed.

For those that are recorded as declined, their reason is recorded within the following coding frame:

1. The patient wants to remain with current hospital
2. The patient does not want to travel

3. The patient has caring duties he/she cannot neglect
4. The dates offered are not convenient to the patient
5. The patient feels it is too far for friends/relatives
6. The patient has been offered an earlier TCI date by the OT
7. The patient is not ready for surgery
8. Another medical procedure makes choice inconvenient
9. Other

The data from this database was made available to the research team; thereby providing revealed preference data on the choices actually made by patients. There were however a number of limitations in this data as it was recorded primarily to support the slot allocation process and was not set up from the outset with the intention of supporting choice modelling.

- **The database contained a record of the patient's final decision, but did not record the options offered to them.**

  In practice this meant that for those who decided to accept the choice of moving to an alternative hospital we knew where they had come from and the details of the alternative that they decided to accept, but for those who decided to stay at their home hospital we only knew the details of the hospital from which they had come and not details of the alternatives they rejected.

- **The database contained minimal information on the characteristics of the patient**

  From the database it was possible to extract the patient's gender, age, and the specialty for which they were awaiting treatment. Their home postcode was also available to support the calculation of journey distances. However, no further information was available such as the patient's socio-economic group or their household income.

- **Some of the fields within the database were acknowledged to contain information of variable quality**

  The recorded date that the patient joined the list is a true record of waiting time to date for many patients, however there will be some who may have come off a list and then placed back on, resulting in an underestimate of their wait to date. A lot of patients also do not have a date recorded for their treatment at the originating trust, and many of those that do have inaccurate information here. Many patients in the database are also simply set as having a date 9 months later than entering the allocation system

5.2 Processing of the RP data

Following approval from the Caldicott Guardian, a number of fields from the LPCP database were made available to the study team for all of the patients passing through the

choice system from inception up until 4th June 2004. This provided a total of 25,241 records.

As previously explained, the database recorded all patients entering the system, whether they were offered choice or not. The first stage of data cleaning was therefore to remove the 3,804 records corresponding to cases where the patient was deemed ineligible for choice once they had reached the LPCP system (in theory these patients should not have been passed to the choice team by the originating trust).

5.2.1 Addition of information on travel times and reputation

The postcode for the originating and receiving sites were appended to the dataset to allow the computation of the distance between each patient's home and their originating and receiving trust (where the alternative was accepted). In order to make these calculations, data from the Postcode Address File (PAF) was appended to the dataset to provide the approximate National Grid coordinates for each postcode, thereby allowing the straight-line distance between the patient's home and their hospital to be calculated. There were a small number of cases where the postcodes in the database were either incomplete or incorrect; these 686 cases were dropped from the dataset.

The stated preference experiments collected data on how the choices of patients varied by travel time (by car) rather than distance, so a conversion was applied to the revealed preference data to provide consistent variables for joint modelling of the two datasets. This conversion to an approximate travel time was achieved by using two assumptions. The first was that the true distance by road is 1.29 times longer than the straight-line (crow's flies) distance; this assumption was made on the basis of an analysis of GIS data previously undertaken for a large sample of locations in another major UK city[K]. This provided an estimate of the distance by road between the hospitals and each patient's home. The second assumption was that an average speed of 30km/hour could be expected for car journeys within London (remembering that the LPCP data only contains information on those travelling to London hospitals). It is acknowledged that journey distance and car travel times are not perfectly correlated and there will be variation in average journey speeds between different areas within London, but this assumption of an average car speed of 30km/hour was considered appropriate given the level of accuracy in the distances that was available from the postcode data. As a result of these calculations we obtained an approximate journey time by car between the patient's home and the hospitals offered to them.

The models based on the stated preference data indicated the importance that patients said they would place on the hospital reputation when making their choices. It was therefore deemed necessary to try and make an assessment of the reputation of the hospitals in the revealed preference dataset. Two different sets of data were appended to the database using information available in the public domain from the Healthcare Commission[46]:

[K] The analysis of GIS data was undertaken in the West Midlands area as part of the PRISM transport model development (for further details see "RAND Europe (2004) RED-02061-05 PRISM West Midlands: Tour Based Mode Destination Modelling")

- the star rating of the NHS trust;
- a rating of the NHS trust from the question "overall, how would you rate the care you received?" collected in the 2004 NHS inpatient surveys.

There are arguments in favour of both measures of "reputation". The star ratings are widely available and have received significant publicity in the media; however, the ratings are a composite measure of a number of 'performance' variables, including, for example, whether or not a trust is in financial balance. It is arguable whether such measures would be considered relevant by a patient choosing treatment, and in particular they are overall measures which apply to a trust as a whole and not to a specific service or clinical team. A rating obtained from patient surveys is more likely to reflect the perception of patients and would be more in line with any anecdotal evidence they may receive. However, it may not necessarily be an accurate representation for hospitals that are outside of the experience of the patient or their network of contacts. In both cases an average value would have to be applied to all patients at each trust, which whilst representing the main differences in general perception between hospitals would not provide any variation in perception between different types of patients being treated within each trust.

5.2.2 Assumptions used in the absence of data on choice alternatives

As discussed above, the LPCP records did not contain comprehensive information on the hospital alternatives offered to the patient. For those that accepted choice, we know the details of their originating hospital and the alternative which they decided to accept, but for those declining the choices offered we only have information on the originating hospital. In order to build a model of choice we therefore needed to make some assumptions about which options may have been offered to the patients.

The approach adopted was to assume that where no information was available on the alternative hospital the patient was offered an option similar to that offered to their fellow patients seeking treatment within the same specialty from the same originating trust. To achieve this, a mean value for each of the attributes (travel time, waiting time and reputation) was calculated for each specialty/originating trust combination from the data available from those accepting treatment at an alternative provider. This approach utilises the fact that there are a limited number of "buddying" relationships for each specialty at each trust and works on the assumption that all possible combinations are equally represented in the data from those accepting treatment elsewhere. In practice, this may generate over-estimates of the appeal of the alternative hospital for those declining an alternative provider; the fact that the patients have declined to move in these choices may have been a result of the alternatives being offered to them being less attractive than those offered to those that have accepted treatment away from their existing provider. However, in practice this is the best assumption we can make in the absence of any alternative data and is preferred to assigning totally arbitrary values for those missing data.

5.2.3 Data cleaning

Once the additional variables had been added to the dataset and values were calculated and assigned to those missing data it was necessary to check the dataset and remove any records

which had unrealistic values or were missing key attributes. This process resulted in the exclusion of 775 further records; the details of these are provided below:

- records presenting negative values for the age: 24
- records missing patient's gender: 5
- records dropped with non-feasible booking dates (before 2000 or after 2004): 14
- records dropped with negative days on waiting list: 25
- records having accepted the choice but missing data on the receiving trust: 618
- records presenting non-realistic distances (hospital > 100km from home): 10
- records for which it wasn't possible to assign "mean values": 79

Following this data cleaning process, 19,976 records were available for use in the choice modelling. This is a sizeable dataset and, although subject to the limitations outlined above, provided a valuable source of data to explore how patients behaved when offered real choices.

CHAPTER 6 Analysis of Revealed Preference Data

From the 19,976 records of those making choices within the LPCP it is possible to observe the proportions choosing to stay at their home hospital or move to an alternative hospital.

Table 12: Proportions choosing to remain at home hospital in LPCP RP data

Chosen alternative	Frequency	Percent
Home hospital	6886	34.5
Alternative hospital	13090	65.5
Total	19976	100.0

It is worth noting that the proportions observed in the RP data set are not dissimilar to those obtained through the SP discrete choice experiment (see Figure 3).

The number of people deciding to "opt out" of the NHS when offered a choice within the LPCP scheme is not recorded. It is assumed that any patient deciding they would not have wanted NHS treatment at this point would have been recorded as declining choice and would have been placed back on the waiting list for their home hospital. The results from the Stated Preference choice experiments suggest that there are not likely to be many patients making the decision at this point, probably because they would have exercised this choice earlier rather than remain on a long waiting list.

6.1 Model Development

From the available revealed preference data it has been possible to create a model including information on the waiting times – both remaining and elapsed, travel times, trust reputation, specialty, patient age and gender.

As with the modelling of the stated preference data, tests were undertaken to examine whether there were differences in the valuation of each of the treatment related variables between different types of patients. These tests were limited, as a result of the data available, to the examination of differences by gender, age and specialty within which the patient required treatment. These tests did not reveal any significant difference in waiting time or travel distance between different groups, which is in line with the findings of the model from the stated preference data.

As discussed in 0, two different measures of reputation or perceived quality of care were available:

- the star rating of the NHS trust;
- a rating of the NHS trust from the question "overall, how would you rate the care you received?" collected in the 2004 NHS inpatient surveys.

Both of these measures were explored in the modelling of the RP data. The star ratings were found to provide counter-intuitive responses, although when examined further it could be seen that there was very little variation in the ratings of the receiving trusts; these typically had a high rating. For a key element of star ratings, waiting times, receiving trusts typically had shorter waiting times than those providing patients as originating trusts. In addition, the star ratings provide scores on a relatively insensitive scale, with a maximum of 3 stars; as a result there is very little variation recorded between the better trusts.

The responses to the question on overall quality of care from the NHS inpatient surveys were recorded on a five-point scale from "poor" to "excellent" with a corresponding scoring system assigning a numerical value between 0 and 100. These were used to compute an average score for each trust which could be used as a general rating of how the care was perceived across patients. When these scores were used instead of the star ratings the models were found to provide a more intuitive result, with patients being more likely to choose hospitals with a better general rating, although there was still a general tendency for the receiving trusts to have a higher score than those acting as originating trusts.

6.2 RP model results

As with the SP model, two sets of values are presented:

1. Model summary statistics;
2. Coefficient values and their associated t-ratios.

The model summary statistics which are presented are defined in Table 13.

Table 13: Model summary statistics for the final RP model

Observations	18871
Final Log Likelihood	-11730.7
D.O.F	14
$Rho^2(0)$	0.103

The following table presents the coefficients estimated in the final RP model.

HOME HOSPITAL		
Coefficient	**Estimate**	**t-ratio**
Waiting time (months)	-0.1075	*-8.8*
Travel time (hours)	-0.0693	*-1.7*
Reputation (from patient survey scores)	0.0086	*3.6*
Elapsed waiting time (months)	-0.0886	*-6.2*
Patient aged 45 – 59	0.2571	*4.7*
Patient aged 60 – 79	0.3226	*6.2*
Patient aged 80 or older	0.5629	*8.9*
Patient is male	-0.2224	*-6.8*
Treatment classified as Orthopaedics, relative to Ophthalmology	0.8034	*15.7*
Treatment classified as ENT, relative to Ophthalmology	0.8470	*11.7*
Treatment classified as General Surgery, relative to Ophthalmology	1.0030	*16.4*
Treatment classified as Urology, relative to Ophthalmology	1.1892	*14.0*
Treatment classified as Gynaecology, relative to Ophthalmology	1.8173	*7.3*
Unexplained bias for home hospital	-0.3644	*-2.6*

ALTERNATIVE HOSPITAL		
Coefficient	**Estimate**	**t-ratio**
Waiting time (months)	-0.1075	*-8.8*
Travel time (hours)	-0.0693	*-1.7*
Reputation (from patient survey scores)	0.0086	*3.6*

From this model we can see that when presented with choices, patients tend to act to minimise their waiting and travel time, whilst trying to obtain treatment at a hospital that is perceived as offering a high quality of care. As a patient's age increases they are more likely to stay at their local hospital, to which they had originally been referred. Male patients are more likely to decide to move to an alternative provider than their female counterparts.

Greatest numbers of patients will opt for treatment at an alternative provider for procedures within the ophthalmology specialty, whilst those requiring gynaecological procedures will stay at their local provider in larger numbers. Once all these factors have been taken into account we can see there remains a preference for moving to an alternative hospital, which we have been unable to explain with the data available.

The $Rho^2(0)$ on this model is considerably lower than that obtained on the model using stated preference data. There are a number of reasons for this low level of model fit. The first consideration is that there are relatively few variables available for modelling the choice behaviour. There are likely to be a wide range of factors that influence the patients' choices which are not recorded in the LPCP choice database; it should be noted in this respect that the only details we have relating to "who" the patient is are the age, gender and specialty within which they are waiting for treatment. The averages represented in the model are therefore unlikely to provide a good fit to a diverse group of patients. Secondly, it has been necessary to make a number of assumptions in the modelling of the revealed choice data due to the inadequacies of the original dataset, specifically with respect to what had been offered as an alternative to those deciding to remain at their existing hospital. The averaging that has been undertaken to provide usable data is an approximation to the real choices offered and as a result a model based on these estimated variables should be expected to have a reduced level of fit. Thirdly, it should be noted that the model draws

on a very large number of individual observations (18,871 patients). As noted earlier with respect to the model based on stated preference data, the overall fit of a model to coefficients representing averages should be expected to decrease as the number of observations increase. This is a result of the model being less able to fit to the specific trends of a small number of patients and becoming more "general" across a larger sample.

However, having noted that the overall fit of the model is low, it is worth drawing attention to the fact that statistically significant terms have been estimated on the revealed choice data, showing that we can detect some general patterns across the patients from the data we have available.

CHAPTER 7 Joint Analysis of Revealed and Stated Preference Data

7.1 Motivation

We have two sources of data that are available for modelling purposes: the stated preference (SP) data from the discrete choice experiments, and the revealed preference (RP) data that is recorded from patients that have made choices within the course of the LPCP. Both of these sources of data have strengths and weaknesses.

In an ideal situation we would build choice models around what people are observed to do. In this respect the revealed preference data provides us with information on the choices that have been made in real situations and from this we can see how large the influence of particular variables (e.g. waiting time) may be in a real choice context. However, there are problems with this form of data[47]:

- the choice set may be ambiguous;
- it is not possible to observe non-existent alternatives;
- the attributes may include measurement errors;
- the attributes may be correlated; and
- the range of the attributes may be limited.

In this study, we encounter some of these problems with the revealed preference data. Specifically, we have limited information on the alternatives in the choice set (especially for those deciding to stay at their home hospital), we have the potential for measurement error in attributes used to describe the alternatives offered to the patient, and there is little variation in the choices they have been offered (as a result of the LPCP being a London based pilot). In addition, we know relatively little about the patients themselves.

These weaknesses can be addressed with stated preference data, where it is possible to construct controlled experiments which allow the analyst to investigate how patients may make their choices on the basis of pre-specified factors. However, this form of data is based on hypothetical choices which brings with it other weaknesses.

In this study, the stated preference data provides us with a very good understanding of how patients say they would respond in a controlled set of circumstances; as a result we can

observe how varying the factors within the choice can influence the decisions they make. In addition, from the stated preference data we have very detailed information about the background of the patients (e.g. age, income, household structure) and the circumstances within which they are making their choices (e.g. their perceived state of health). However, the data we collect is from hypothetical choices, and whilst we can see how they say they trade off factors against each other, i.e. we can quantify the relative importance of the factors, the 'scale' of the model may over or understate the influence that these factors have on how choices are made in the real world, i.e. is not the same as that estimated in the model developed from RP data.

The two sources of data are therefore complementary: the RP data ensures we have the appropriate model scale, i.e. that which is consistent with choices made in the real world, whilst the SP strengthens the valuations of the relative importance of the explanatory factors. For this reason, both datasets are used together, simultaneously in the estimation of the model, to draw on the strengths of both data sets. This uses the data from the revealed preference choices as the frame of reference, but draws on the detailed insight into the choice processes that we obtain from the stated preference data.

7.2 Theoretical Background

The models developed using the two different sources of data contain terms which are common between the models (e.g. waiting time and travel distance) and terms which are specific to only one set of data (e.g. transport arrangements). We can state this mathematically with the following formulas that represent the utility functions within each model[29]:

$$u^{RP} = \beta.x^{RP} + \alpha.w + \varepsilon$$

where:

- x^{RP}, w are vectors of the measured variables influencing the RP decision;
- β, α are vectors of unknown parameters (to be estimated);
- ε represents the sum of the unmeasured utility components of utility influencing the RP decision.

and similarly,

$$u^{SP} = \beta.x^{SP} + \gamma.z + \nu$$

where:

- x^{SP}, z are vectors of the measured variables influencing the SP decision;
- β, γ are vectors of unknown parameters (to be estimated);
- ν represents the sum of the unmeasured utility components of utility influencing the SP decision.

As there are variables (x) that appear in both utility functions, their coefficients can be estimated using the information from both surveys. We can therefore exploit the data from the two contexts to make *joint* estimates. In doing so it is necessary to assume that the effect of the x variables in the RP and SP contexts is the same. From the models we have developed we have the remaining waiting time, the travel time, the patient's age and their gender as common variables in both data sets.

In estimating this model we need to make some assumptions about the distributional properties of the unmeasured components of utility in each data set. Here we assume that both of these components are distributed independently (across both individuals and alternatives and independently of each other) with the limiting-value distribution (Gumbell) but with unequal variance. This allows us to use a specification from the logit family of models and we can estimate the coefficients on the utilities jointly if we allow for the differences in the variance of the unmeasured components on each of the two sets of data; this is achieved by also estimating a scale parameter: $\theta^2 = \text{var}(\varepsilon) / \text{var}(\nu)$.

It is not possible for us to jointly estimate any terms relating to the reputation or quality of the hospitals as these are specified differently in each data set and there is no obvious way to convert one to the other in a logical and consistent manner. The effects of differences in reputation can, however, still be observed in the model through the terms estimated separately from the SP and RP data.

As with the development of the separate stated and revealed preference models, we have used a series of tests to develop a model specification that provides the best fit that we can achieve to the two sets of data.

7.3 Joint RP-SP model results

The following table presents the final model, estimated jointly on both sets of data and then subjected to a post-estimate jack-knife to correct for biases in the standard errors of the SP coefficients from the repeated measures.

The model summary statistics which are presented are defined in Table 14.

Table 14: Model Summary Statistics

Statistic	Definition
Observations	The number of observations included in the model estimation.
Final log (L)	This indicates the value of the log-likelihood at convergence. The log-likelihood is defined as the sum of the log of the probabilities of the chosen alternatives, and is the function that is maximised in model estimation. The value of log-likelihood for a single model has no obvious meaning. However comparing the log-likelihood of two models with different specifications allows the statistical significance of new model coefficients to be assessed properly.
D.O.F.	Degrees of freedom, i.e. the number of coefficients estimated in this model. Note that if a coefficient is constrained to a fixed value (indicated by(*)) then it is not a degree of freedom.
$Rho^2(0)$	The rho-squared measure compares the log-likelihood (LL(final)) to the log-likelihood of a model with all coefficients restricted to zero (LL(0)): $Rho^2(0) = 1 – LL(final)/LL(0)$ A higher value indicates a better fitting model.

Table 15: Model summary statistics for the final joint RP-SP model

Observations	32448
Final Log Likelihood	-21719.3
D.O.F	50
$Rho^2(0)$	0.224

In interpreting the coefficient values the following points should be considered.

- **A positive coefficient** means that the variable level or constant has a positive impact of utility and so reflects a higher probability of choosing the alternatives to which it is applied.
- **A negative coefficient** means that the variable level or constant has a negative impact on utility and so reflects a lower probability of choosing the alternative to which it is applied.
- **Some coefficients are multiplied by continuous variables** and therefore reflect the disutility per unit of the variable, e.g. waiting time, which reflect the relative disutility per month of wait.
- **Some coefficients are applied to categorical variables**; these therefore reflect the total utility increase or decrease for that variable, relative to a base situation, e.g. the increase in utility as a result of differences in the reputation of the alternative hospital are always compared to the base situation of "the reputation is the same as the existing hospital".
- **The constants in each model** reflect preferences for the alternatives to which they are applied. For example, the constant for "Parent or guardian of under 18 year

old" has a positive value of 0.2481 and so implies that these patients have a preference for the home hospital alternative.

- **A *positive* value for a constant** indicates that the respondent is *more likely* to choose that alternative, and a ***negative* value** indicates that the respondent is *less likely* to choose that alternative.
- **The constants on the models are additive** and more than one constant can be applied to each individual.

The value shown in italics after each coefficient estimate is the t-ratio. This defines the (statistical) significance of the coefficient estimate; regardless of the sign, the larger the t-ratio, the more significant the estimate. In estimating this final model any coefficient with a t-ratio less than +/-1.960 (after jack-knifing) has been dropped from the model specification. As a result, all the terms in the model are estimated to be significantly different from zero at the 95% confidence level.

HOME HOSPITAL			ALTERNATIVE HOSPITAL		
Coefficient	**Estimate**	**t-ratio**	**Coefficient**	**Estimate**	**t-ratio**
Estimated jointly with RP and SP data					
Waiting time (months)	-0.1006	*-10.4*	Waiting time (months)	-0.1006	*-10.4*
UK travel time (hours)	-0.2121	*-10.3*	UK travel time (hours)	-0.2121	*-10.3*
Age between 45-59 (relative to <45)	0.1644	*2.7*			
Age between 60-79 (relative to <45)	0.3368	*7.3*			
Age over 80 (relative to <45)	0.4778	*7.0*			
Male	-0.1923	*-4.8*			
Scale on SP data (relative to RP)	1.5233	*9.9*	Scale on SP data (relative to RP)	1.5233	*9.9*
Estimated on RP data only					
Reputation (as scored by patient rating of care, scale of 1-100)	0.0100	*8.7*	Reputation (as scored by patient rating of care, scale of 1-100)	0.0100	*8.7*
Elapsed waiting time (months)	-0.0860	*-8.7*			
Gynaecology (compared to Ophthalmology)	1.7725	*6.3*			
Urology (compared to Ophthalmology)	1.1295	*16.1*			
ENT (compared to Ophthalmology)	0.7523	*12.3*			
Orthopaedics (compared to Ophthalmology)	0.7526	*19.6*			
General Surgery (compared to Ophthalmology)	0.9556	*19.2*			
Bias for home hospital	-0.4197	*-3.7*			

HOME HOSPITAL			ALTERNATIVE HOSPITAL		
Coefficient	**Estimate**	**t-ratio**	**Coefficient**	**Estimate**	**t-ratio**
Estimated on SP data only					
Reputation: Very poor (base excellent-very good)	-0.7313	*-6.7*	Travel abroad - on waiting list >=6 months	-1.0093	*-6.3*
Reputation: Fair-poor (base excellent-very good)	-0.3195	*-5.4*	Travel abroad - on waiting list <6 months and male	-1.3042	*-9.8*
Reputation: Good (base excellent-very good)	-0.1425	*-2.8*	Travel abroad - on waiting list <6 months and female	-1.5316	*-9.9*
Left full-time education 16 years or less	0.1347	*2.7*	Interaction - Travel abroad if transport paid by NHS	0.4704	*4.4*
Parent or guardian of under 18 year old	0.2481	*4.1*	Reputation: worse than existing - HH income <£10k	-0.9640	*-8.1*
In extreme pain	-0.2051	*-3.2*	Reputation: worse than existing - HH income >=£10k	-1.3010	*-9.6*
Anxiety/depression moderate-extreme	-0.1350	*-2.4*	Reputation: unknown - HH income <£10k	-0.4159	*-6.0*
Health rated as poor or very poor	-0.2116	*-3.1*	Reputation: unknown - HH income >=£10k	-0.6576	*-9.0*
Had admission date changed	-0.2380	*-2.0*	Reputation: better than existing - reputation of existing poor or worse	0.6002	*4.9*
Trust: Barking, Havering and Redbridge	-0.3502	*-5.7*	Reputation: better than existing - reputation of existing better than poor	0.3422	*8.3*
Trust: Mayday Healthcare	-0.1933	*-3.2*	Transport arrangements: organised by NHS, paid by self	0.1414	*3.6*
Trust: St George's	-0.2242	*-2.0*	Transport arrangements: organised by NHS, paid by NHS - parent	0.4977	*6.0*
"NEITHER"			Transport arrangements: organised by NHS, paid by NHS - not parent	0.3341	*6.8*
Coefficient	**Estimate**	**t-ratio**	Follow-up care: at alternative hospital - ENT operations	-0.3756	*-4.1*
Waiting time on home hospital (months)	0.1051	*4.6*	Follow-up care: at alternative hospital - all other operations	-0.2065	*-5.0*
Aged 16-29 years	-0.3777	*-2.8*	Follow-up care: at patient's home	-0.1419	*-4.0*
Would usually drive self to home hospital	-0.2390	*-2.9*	HH income <£10k	-0.5167	*-7.0*
Unable to work due to disability	-0.2925	*-2.4*	Bias for alternative hospital	-0.3332	*-3.9*
Bias for "neither"	-2.8973	*-8.9*			

The following chapter provides a detailed interpretation of this model.

7.4 Comparison of common terms

Before moving on to examine the details of this model, it is useful to compare and contrast what we can observe from the two separate sources of data that have we have brought together in the joint model. The model contains a number of terms that are common to the two sets of data: waiting time, travel distance, patient age and gender; these form the basis of the joint estimation. The following table compares the coefficients estimated on these terms.

Table 16: Comparison of terms common to both data sets

Coefficient	SP data only		RP data only		Joint model	
	Estimate	t-ratio	Estimate	t-ratio	Estimate	t-ratio
Waiting time (months)	-0.1478	-10.2	-0.1075	-8.8	-0.1006	-10.4
UK travel time (hours)	-0.3461	-14.8	-0.0693	-1.7	-0.2121	-10.3
Age between 45-59 (relative to <45)	0.1785	1.5	0.2571	4.7	0.1644	2.7
Age between 60-79 (relative to <45)			0.3226	6.2	0.3368	7.3
Age over 60 (relative to <45)	0.4713	4.1				
Age over 80 (relative to <45)			0.5629	8.9	0.4778	7.0
Male	-0.2501	-3.1	-0.2224	-6.8	-0.1923	-4.8

From this table we can see that the coefficients estimated from the stated preference and revealed preference data are broadly similar. This implies that the choice behaviour that we observe in the stated preference discrete choice exercises is largely consistent with the behaviour that we observe in real choice situations and that our process of estimating a model simultaneously on both sets of data can be justified. The one coefficient which is valued differently from the two data sources if the travel time coefficient, but this term has a low level of significance in the model estimated on the revealed preference data, which may be the result of the limited range of the differences in hospital travel distance that exist in this data set; the RP data only contains information on journeys to London hospitals, whereas the SP data has much more variation in travel time looking at an upper level of 3-5 hours travel time by car within the UK.

When comparing the joint parameters it is also informative to look at the scale parameter; this takes a value of 1.5. As this parameter is greater than 1 we can infer that there is more variance in the unmeasured component of the utility function of the revealed preference dataset than the unmeasured component of the utility function of the stated preference dataset. This is an intuitive result; we have a better appreciation of the factors driving the choices in the stated preference data set, and we also have more information on the demographics of the patients that allows us to pick up some differences in behaviour which may be masked in the revealed preference data.

From the revealed preference data we gain additional insight into how the patients respond to a wider range of real, named hospitals. We can estimate a statistically significant terms on the NHS trust rating from a patient survey where other patients have rated the quality of care that they experienced at various hospitals. This suggests that quality of care is important in the patients' consideration of where to be treated. We also have far more data for each specialty than in the stated preference data set; so can estimate the differing propensity of patients waiting for various procedures in various specialties to choose to move to an alternative hospital.

CHAPTER 8 Key Findings and Discussion

This chapter discusses the key findings with respect to choice behaviour that have been identified through the modelling of patients' choice behaviour. The relative importance of these key attributes is discussed and is contrasted for different groups within the sample.

8.1 Interpretation of model results

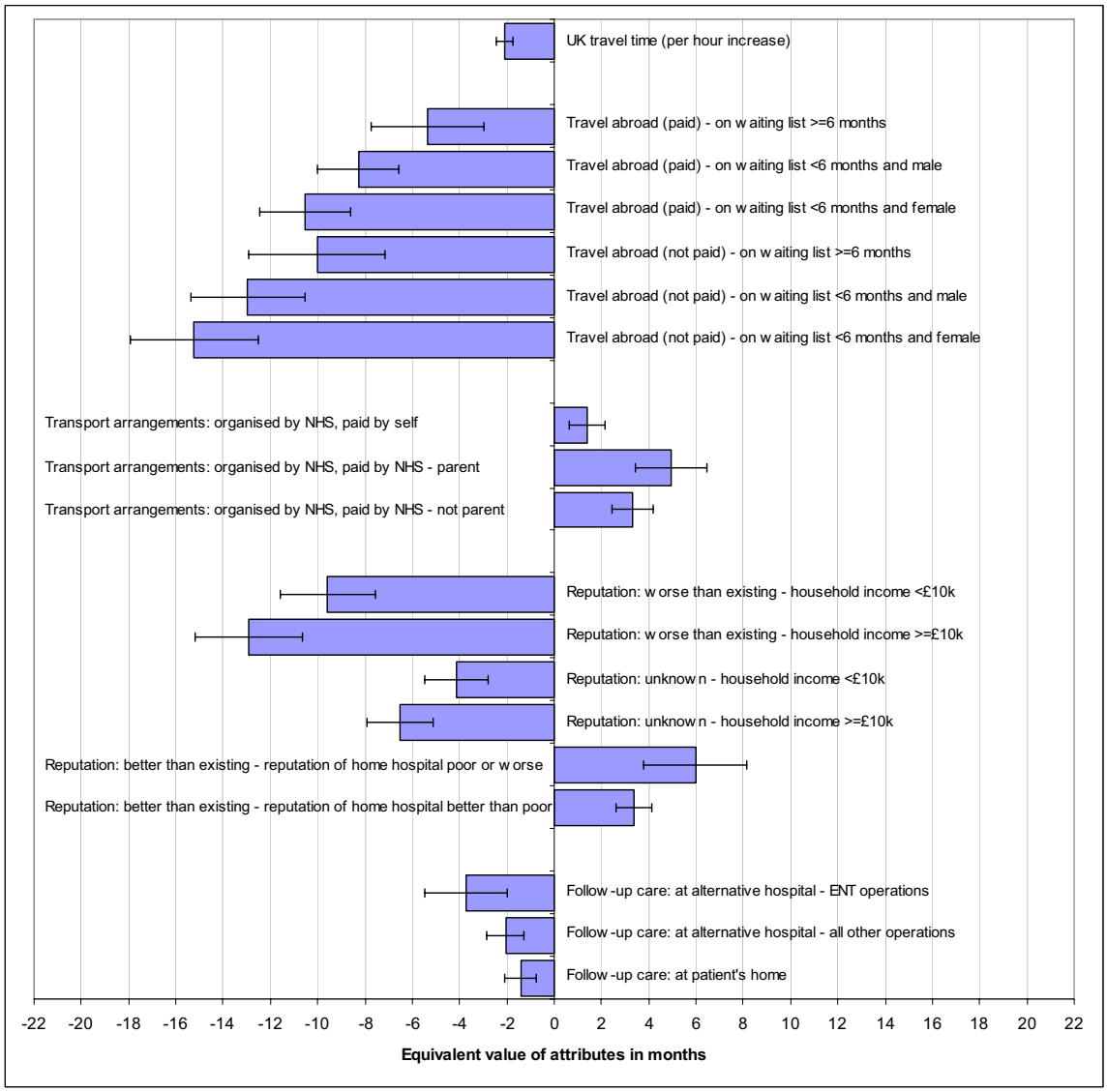
The coefficients of the model, developed in the preceding chapter from both the stated and revealed preference data, indicate the relative value that the respondents place on each of the attributes in the choices. The absolute value of the individual coefficients has no direct interpretation, but the *relative* values of the coefficients demonstrate the relative importance of each factor. The coefficients in the model as reported previously have been measured in units of utility (utils), but if we divide all of the model coefficients by the waiting time coefficient (which, as a linear term, has units of utils/month) we obtain the values of each coefficient in *units of months of additional wait*. In the absence of a willingness to pay variable in our model, this provides an alternative "currency" with which to offer an insight into the relative importance of the attributes in patients' choices.

The values of the key attribute levels are presented in Figure 7 in units of months of additional wait time (resulting from the model based on both the revealed and stated preference data). It should be noted that these are all relative to a base situation for each attribute, e.g. values of "transport arrangements organised and paid for by NHS" are relative to the base of "transport arrangements organised and paid for by patient".

A negative value of the attribute level within the figure indicates the size of the *disincentive* to switching to the alternative hospital, i.e. the amount of *additional* time that the patients would on average be prepared to wait at their home hospital to avoid switching to the alternative hospital. Conversely, a positive value indicates the size of the incentive to switching, i.e. the amount of additional time that the patients would on average be prepared to wait to gain this benefit for the alternative hospital. In all cases these values assume that all other aspects relating to the two hospitals are equal.

As these values from estimated coefficients we also present the 95% confidence intervals (after jack-knifing) for the values. The width of the confidence interval gives us some idea about how uncertain we are about the unknown parameters that we are estimating for the population from our sample.

Figure 7: Value of model coefficients in units of months of wait



Base levels of attributes: (relative to which others are valued)	Travel: within UK Transport arrangements: organised and paid for by patient Reputation: same as home hospital Follow-up care: at home hospital

As both the waiting time and travel time are represented as linear terms in the model it is possible to calculate the valuation of waiting time in months for each additional hour of travel required to reach the alternative hospital. The models suggest that patients would equate each hour of additional travel time to the alternative hospital with 2.1 months of additional waiting at the home hospital. This has a 95% confidence interval of plus or minus 0.4 months, meaning that there is a 95% probability that the true population value of travel time is somewhere between 1.7 and 2.5 months of additional waiting time.

There are large differences in the willingness to travel abroad, ranging from a value equivalent to 5.4 months wait for those who have been waiting 6 months or more and are offered having their travel costs paid, up to a value equivalent to 15.2 months for female patients who have been on their existing list for under 6 months and would have to pay their own travel costs. From the values it is also possible to calculate the effects of the interaction between the decision to travel abroad and whether the NHS pays the travel costs. The model indicates that patients would on average rather wait an additional 4.6 months if they have to personally pay for their travel to have treatment at an alternative hospital abroad.

With regard to the reputation, we can examine the differences in value of reputation around the level "unknown" rather than "same as home hospital". This would indicate that patients from households with incomes under £10,000 would be prepared to wait an additional 5.4 months, on average, for treatment rather than move to a hospital with a "worse" rather than an "unknown" reputation, and that patients from households with incomes of £10,000 or above would wait an additional 6.4 months for treatment rather than move to a hospital with a "worse" rather than an "unknown" reputation.

For all respondents a preference is shown for the follow-up care to be based at the home hospital rather than the alternative hospital. In the case of Ear, Nose and Throat (ENT) patients, this difference is equated to a waiting time of 3.7 months, and the average across all other patients is 2.1 months.

8.2 What the trends suggest about choice

Our analysis concentrates on the way that patients may respond to choice. The behaviour of patients will clearly have impacts on waiting times, although the extent of these impacts is hard to ascertain directly from the results we present as we focus on the drivers of demand and at present there are no corresponding models of supply. The LPCP evaluation strand being conducted by the group from the University of York examines the system wide impacts of patient choice and provides a detailed analysis of how the LPCP may or may not have reduced waiting times within the hospitals participating in the project.

During the lifetime of the LPCP (and this evaluation), national policy on patient choice in the English NHS has been evolving. In particular, in August 2004, the Department of Health published guidance on the introduction of choice for patients at the time of GP referral[48]. This included the introduction in January 2005 of the choice (at point of referral) of at least two providers for patients potentially needing a cataract operation, and further, that all patients to be offered a choice of at least five providers at time of referral by December 2005. This new 'Choose and Book' policy differs from the LPCP choice model in that it is essentially a choice of outpatient department (and associated inpatient care if needed), not inpatient care per se. The Choose and Book guidance does indicate that patients will only have a choice of provider for inpatient care if they are unhappy with the care offered by their chosen provider. In these circumstances, patients will have to return to their GP and obtain another referral to another provider's outpatient department. In addition, while policy has evolved, waiting times have continued to fall quite rapidly.

Given these changes, we examine the findings from this strand of the LPCP evaluation in the wider policy context of patient choice and its ongoing development.

The results obtained from the discrete choice models provide a rich source of information on the trade offs patients have stated that they would make, and have been observed to make, when offered a choice of quicker treatment at an alternative hospital. Interpreting the results of the model can be complicated, so here we present what we consider to be some of the important emerging trends from the analysis, relating to the four main attributes:

- UK travel time and travel abroad;
- transport arrangements;
- reputation; and
- follow-up care.

In doing so, we also note the relative importance our survey patients attached to these different factors. Finally, we return to the three issues we identified in the Introduction:

- forecasting likely demand for choice under alternative policy scenarios;
- pin-pointing factors exerting a significant influence on take-up of choice; and
- identifying important differences between patient groups in their choice preferences.

Lastly we summarise the contribution of the current model results to our understanding of these issues and in particular, given changes in the policy environment, we relate our findings to current moves to choice at point of referral and its associated policy guidance.

8.2.1 UK travel time and travel abroad

Coefficients for all the travel attributes were negative, indicating that as travel becomes more onerous, patients would be less willing to take up the offer of treatment at an alternative hospital. More specifically, the size of the coefficients indicates the strength of feeling about each of the travel factors, as shown in Figure 7. The implicit 'valuation' placed on different travel factors reveals a very strong preference for *not* travelling abroad for alternative care - particularly if patients have to bear their own travel costs. Even a patient who, hypothetically, had been waiting more than six months and would have their travel paid for by the NHS, would require a reduction in waiting time of around 5.4 months at the alternative hospital before accepting the offer to travel abroad for treatment.

'Choose and Book' recognises, at least implicitly, the trade off patients are likely to make between travel times and choosing an alternative hospital, with choice options for choice at the point of referral to be based on *locally* commissioned services. However, the current goal of the government's policy on choice is for patients to eventually have a free choice of any hospital in the UK at time of referral. Our results suggest that while some patients are probably willing to spend a significant time travelling to go to the hospital of their choice, on average, waiting times at the more distant alternative hospital would have to be considerably shorter than the local provider to persuade patients to travel.

In general, while patients prefer not to travel abroad, having their travel paid for them by the NHS can significantly ameliorate their negative valuations: overall, payment of travel costs by the NHS is valued positively at around 4.7 months of waiting.

For alternative hospitals in the UK, the model results suggest, as might be expected, a much lower negative valuation. For every additional hour of travel, on average, patients would require a reduction in waiting time of 2.1 months to take up the offer of an alternative hospital.

8.2.2 Transport arrangements

Our findings indicate that, given all the transport arrangement coefficients are positive, patients place a positive value on the NHS organising transport (rather than the patients having to do this themselves) even if transport costs have to be met by patients. In addition, those patients that are parents placed a higher positive value on scenarios where transport is not only arranged by the NHS, but paid by the NHS too, compared with others, and of course, compared with a situation where they are required to pay.

However, guidance on transport arrangements for choice at point of referral state that the NHS will *not* arrange or pay for transport except for patients currently eligible for free transport either as a result of low incomes or on the basis of their medical condition. Given our findings, unless waiting times at the alternative hospital are, on average, around 3 months less than the home hospital, this decision will reduce the take up of choice in cases where patients have to organise and pay for their own transport.

8.2.3 Reputation

As might be expected, reputation emerges as a very important factor in patients' decisions about whether or not to take up an offer of quicker treatment at an alternative hospital. Our analysis suggests that where the reputation of the alternative (shorter wait) hospital is either worse than the existing (longer wait) hospital or simply unknown, patients place a relatively high negative valuation on the choice. In particular, better off patients (with household incomes over £10,000 per annum) have a negative valuation for a worse reputation which is over one third higher than those with incomes below £10,000. There are potential equity implications here, which we note below.

Where the alternative hospital has a better reputation than the home hospital, patients place a high positive valuation on the choice. In effect, patients are not only being offered a shorter wait but at a more reputable hospital.

Our use of a comparative reputation factor (i.e. worse, or the same, or better than the home hospital, and unknown) begs the question as to what *actual* measures of reputation patients might find useful to inform their choices in a real situation. Current guidance under Choose and Book indicates that, together with waiting times and location of hospitals, patients will need information on (other) patients' experience of hospitals and data on clinical quality to support their choice of hospital. However, there is information from national patient experience surveys on which to draw[49], there is a dearth of information on clinical quality, and in particular, information on health outcomes[50]. And although Primary Care Trusts, GPs, the Patient Advice and Liaison Service and Patient

Care Advisers are to be encouraged to provide advice and guidance to patients in making their choices[48], this does not fully address the relative absence of 'reputational' information on clinical quality and health outcomes of care that from our research, patients value. .

8.2.4 Follow-up care

Current policy for choice at the point of referral notes that while aftercare will be provided at the provider originally chosen, any exceptions - for example, providing aftercare locally, needs to be managed through local processes. Our research suggests that patients place a negative value on follow-up care provided either at the alternative hospital or the patient's own home (rather than at the home hospital). Relative to the other factors influencing choice, patients place lower values on follow-up care. By and large, patients place the greatest negative valuation on follow-up care at the alternative hospital for ENT operations and the lowest negative valuation when follow-up care is carried out in their own homes.

8.2.5 Forecasting demand for choice under alternative policy scenarios

The foregoing analysis of the results from the discrete choice model suggest that all the factors we included as attributes have, to a greater or lesser extent, a (statistically significant) impact on patients' willingness or otherwise to take up offers of quicker treatment at alternative providers. Of course, some factors are valued (either positively or negatively) less highly than others. Given that all the attributes are to an extent amenable to policy change (at a cost), this means that it is possible for policy makers to model the size of the take-up of choice under different policy scenarios. If a goal is to maximise the take-up of choice, then our results suggest, for example, that the NHS should not only arrange transport to alternative hospitals, but for parents in particular, the NHS should also pay for transport. In fact, current policy, as we noted above, is not to organise or pay for transport. In addition, follow-up care should be provided at the home hospital (rather than the alternative hospital or patients' own homes) if the negative valuations patients' place on these latter arrangements is to be minimised. Again, as we noted earlier, current policy would appear to allow for some flexibility on the location of aftercare.

We do not go into further detail here in estimating take-up under different policy scenarios, but this can be undertaken with the model that includes both stated and revealed preference choice data.

8.2.6 Factors which strongly influence choice

From Figure 7, which converts coefficient values into a more meaningful currency of waiting time, the relative ranking of factors is evident and largely as might be expected.

Most attributes (relative to their associated base situations) have a negative impact on patients' willingness to choose faster treatment from an alternative hospital. However, for some factors (where transport is arranged by the NHS, and where the reputation of the alternative hospital is better than the existing hospital) patients' valuations are positive - again, relative to the associated base situations. Perhaps a particularly interesting attribute, given the results, is reputation, which (whether known or unknown) is revealed to exert a major influence over patients' choice decisions. Given this, as we noted earlier, serious

consideration needs to be given to how best to generate and disseminate this information to patients.

8.2.7 Differences between patient groups

An important issue this analysis helps to explore is whether, and to what extent, different patient groups react differently in terms of the values they place on factors affecting the choice decision. For example, our results show that patients who are older, female, with low education levels, or who are parents/guardians of an under 18-year old are less likely to select faster treatment at an alternative hospital. Of course, the presence of differences does not automatically mean that patients' different choices should be deemed i*nequitable* (or, for that matter, that every - or indeed any - effort should then be made to correct for the inequity, given that such correction will have an opportunity cost). Value judgements need to be brought to bear on these issues which go beyond this current analysis. However, we would point out that different patient groups do place different values (both positive and negative) on various attributes (under various policy scenarios) and that while such inequalities may not be interpreted as inequities, differences may be of some concern.

For example, the fact that those patients from richer households place a greater negative valuation on reputation of the alternative hospital when it is worse than the home hospital than those patients from poorer households could, under some circumstances, lead to significant inequalities in health. For example, if the choices richer patients take are more heavily influenced by the reputation of a hospital than the choices made by poorer patients, then in a system in which patient choice is offered and where information on reputation is available, all other things being equal, richer patients will tend to migrate to hospitals with better reputations in greater numbers than poorer patients. On the other hand, if information about the reputation of the hospital is not available, those accepting the option of faster treatment may be dominated by poorer patients, given the greater aversion to reputational uncertainty of higher income patients. The sensitivity of patients' choices to reputation suggests that policy makers need carefully to consider how to generate information on quality so as to facilitate well-informed choices.

ANNEXES

Annex A: Analysis of cognitive interviews

Variables examined

The following table summarises the variables which were examined in the choices for the cognitive interviews.

Table 17: Cognitive interviews: variables and levels examined

Variable	Level	Wording
Waiting time for current hospital	1	You will receive your operation in 9 months
	2	You will receive your operation in 7 months
	3	You will receive your operation in 6½ months
	4	You will receive your operation in 6 months
	5	You will receive your operation in 5 months
Waiting time for alternative hospital	1	You will receive your operation in 4½ months
	2	You will receive your operation in 3 months
	3	You will receive your operation in 2½ months
	4	You will receive your operation in 2 months
	5	You will receive your operation in 1 month
Location of alternative hospital	1	This will be performed at a hospital in London with a journey of less than 1 hour
	2	This will be performed at a hospital in London with a journey of 1 hour of more
	3	This will be performed at a hospital elsewhere in the South East
	4	This will be performed at a hospital elsewhere in England
	5	This will be performed at a hospital outside of the UK
Reputation of alternative hospital	1	You have information which suggests that this hospital has a better reputation than your current hospital
	2	You have information which suggests that this hospital has a similar reputation than your current hospital
	3	You have information which suggests that this hospital has a worse reputation than your current hospital
	4	You have no information about the reputation of this hospital
Type of alternative hospital	1	This is a hospital in the private sector
	2	This is a teaching hospital in the public sector
	3	This is a general hospital in the public sector
Follow-up care	1	Follow-up treatment will remain at your current hospital
	2	Follow-up treatment will be at the alternative hospital
	3	Follow-up treatment will be provided at your home by someone from the alternative hospital

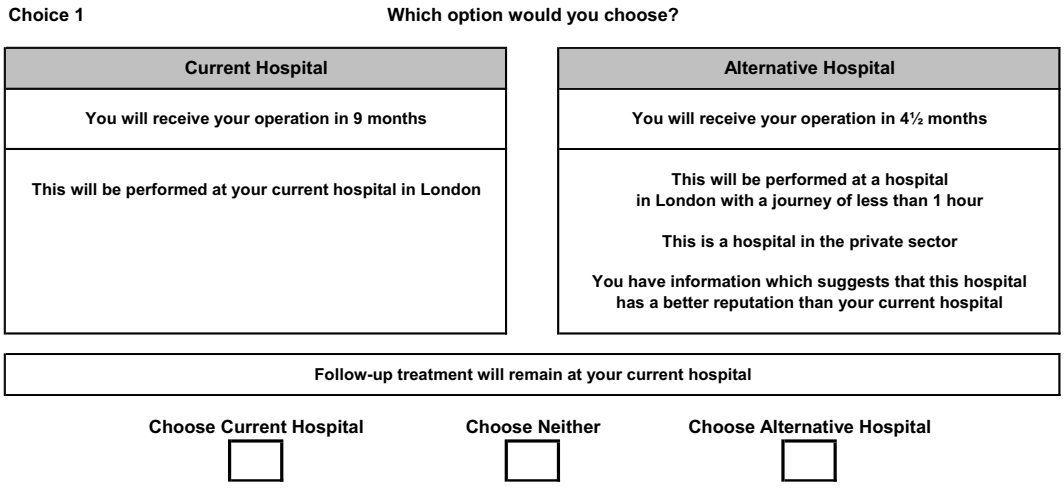
Due to practical constraints, it was only possibly to pilot one set of choices in the cognitive interviews. In the main postal survey, twelve different versions of the questionnaire were

used. This allowed the examination of a wide range of combinations of variables and levels.

Format of choices

The following figure provides an example of the choices as presented to the respondents in the cognitive interviews. In the introduction it was made clear that the "neither" option was for cases where neither option would meet their needs and they would decide to look for alternative treatment themselves outside of the NHS at their own expense.

Figure 8: Cognitive interviews: example choice pair



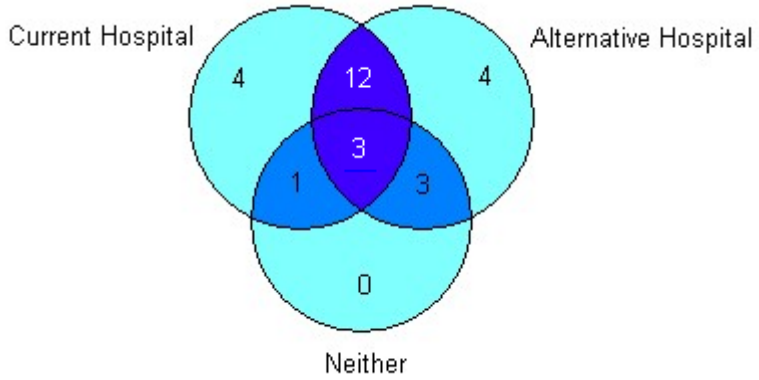
Each respondent was asked to respond to seven different choice situations.

Analysis

Trading behaviour

Cognitive interviews were undertaken with 27 respondents, using a single version of the SP choice pairs (Set A). The following Venn diagram summarises the choice patterns of the respondents over the 7 choice pairs. For example if a respondent always chose the current hospital they would be placed in the segment which relates to this alone, whereas if they chose a mixture of the current and alternative hospital over their 7 choice they would be placed in the segment where these two circles overlap.

Figure 9: Cognitive interviews: number of respondents with each choice pattern



The two darkest segments provide the most information for the choice models, relating to cases where respondents indicated that they preferred different alternatives under different situations; this represents 56% (15/27) of the data collected.

The mid-coloured segments provide less information on the point at which people trade as the alternatives considered by these respondents were one hospital or opting out. This is still valuable information, particularly for the neither choices, in which we obtain information on the circumstances under which the patients decide to opt out. In order to correctly interpret the data from these respondents it was clearly essential to ensure that the introduction makes it clear that choosing "neither" implies that the respondent will either opt out of NHS treatment and find an alternative at their own expense or will opt not to have any treatment – this was reviewed prior to the main surveys.

Finally the lightest segments reflect cases where the respondent stated that they would always choose one of the alternatives. A response of always choosing one option is a valid response and reflects a preference for one alternative under all of the choices offered. It is encouraging to see that in the 27 interviews undertaken, no one always chose "neither", which may have been considered a political response. There are equal numbers of respondents choosing each of the alternatives at this level, suggesting a fairly balanced design. In the main phase further segmentation analysis was performed to investigate whether certain groups of patients had a stronger underlying preference for one alternative than the other.

Choice models

From the cognitive interviews a limited amount of data was available for building models of choice, as only one of the twelve available sets of SP choices were piloted in the cognitive interviews. This restriction was necessary in order to reduce the complexity of the administration of these in-home interviews. The data available could, however, be used to build some preliminary models to gain a first impression as to whether the respondents behaved in intuitive ways to the options presented to them.

The following table presents the results from the basic choice model estimated from the choice data collected in the cognitive interviews. The small data sample means that these results are illustrative and do not represent a robust statistical result, but they provided an

indication of the model output that was obtained and provided some simple logical checks on the design.

Table 18: Cognitive interviews: preliminary choice model

Summary statistics

Observations	189
Final Log Likelihood	-163.0
d.o.f	9
Rho²(0)	0.215
Rho²(c)	0.058

Coefficient	**Estimate**	**t-ratio**
Wait	-0.2958	-1.3
Location – base "London<1hr"		
lon>1hr	-0.1659	-0.2
Southeast	-0.8862	-1.1
England	-1.3503	-2.0
Abroad	-1.0394	-1.5
Reputation – base "same"		
Worse	0.0000	n/a
Unknown	-0.1525	-0.2
Hospital Type – "Teaching"		
General	0.0000	n/a
Follow-up care – "current hospital"		
care_home	-0.3339	-0.4
Constants		
Neither	-3.3063	-2.1
New_hosp	0.1406	0.1

In this model, two sets of values are presented:

1. Model summary statistics;
2. Model coefficients and their associated approximate t-ratios.[L]

The model summary statistics which are presented are defined in Table 19.

[L] This ratio is an asymptotic approximation to the standard statistical Student's t-ratio.

Table 19: Model Summary Statistics

Statistic	Definition
Observations	The number of observations included in the model estimation.
Final log (L)	This indicates the value of the log-likelihood at convergence. The log-likelihood is defined as the sum of the log of the probabilities of the chosen alternatives, and is the function that is maximised in model estimation. The value of log-likelihood for a single model has no obvious meaning. However comparing the log-likelihood of two models with different specifications allows the statistical significance of new model coefficients to be assessed properly.
d.o.f.	Degrees of freedom, i.e. the number of coefficients estimated in this model. Note that if a coefficient is constrained to a fixed value (indicated by (*)) then it is not counted as a degree of freedom.
$Rho^2(0)$	The rho-squared measure compares the log-likelihood (LL(final)) to the log-likelihood of a model with all coefficients restricted to zero (LL(0)): Rho2(0) = 1 – LL(final)/LL(0) A higher value indicates a better fitting model.
$Rho^2(c)$	If we compare the log-likelihood (LL(final)) value obtained with the log-likelihood of a model with only constants (LL(c)) we get: Rho2(c): 1 – LL(final)/LL(c) Again a higher value indicates a better fitting model.

The coefficient values are then presented. As previously explained, if a coefficient is positive then it has a positive impact of utility and so reflects a higher probability of choosing the alternatives to which it is applied. Conversely if a coefficient is negative then it has a negative impact on utility and so reflects a lower probability of choosing the alternative to which it is applied.

The value shown in brackets after the coefficient value is the t-ratio which defines the significance of the coefficient estimate. A higher t-ratio indicates a more significant estimate. A coefficient should have a t-value greater than 1.96 to be significantly different from zero (at a 95% confidence level). The 95% confidence interval is often applied in model development to determine which coefficients to retain in the model. If the coefficient is constrained to a fixed value then an asterisk is reported instead of the t-ratio.

It should be noted that the following terms could not be estimated on the basis of the data from SP Set A alone:

- Reputation better, worse
- Hospital type private, general
- Follow-up care alternative hospital

The basic model, which was estimated from the cognitive interview data, indicated that:

- respondents demonstrated a preference for shorter waiting times;
- respondents preferred closer hospitals, with a declining preference for the alternative as the hospital got further away;
- a hospital with an unknown reputation was considered worse than one where the reputation was known;
- receiving follow-up treatment at home was considered to be less attractive than receiving the treatment in a hospital setting.

It was not possible to estimate all the potential variable levels as the full orthogonal design was not covered over the respondents in the cognitive interviews. The attributes which could be recovered from this design, do however, follow the general trends expected. These results are intuitive and suggested that the design put forward was working. Non-intuitive results at this stage would have been a cause for concern.

The data obtained from the main interviews cover the full choice design, and in combination with the increased sample size, provide a richer data source for the estimation of all the parameters.

Revisions

Format of choices

Consideration was given to the presentation of the choices. The "follow-up" variable was moved from below the choice descriptions into the alternative hospital to which it directly relates; an additional clarification was also added to the current hospital to make it clear that the follow-up treatment there would remain the same.

The choices used in the cognitive interviews also contained a line separating the waiting time from the other variables. This was removed as it was judged that it could lead to an increased tendency for respondents to focus on the waiting time over the other variables. The affect of the position of the waiting time variable was controlled by placing it at the top of the description in six of the choice sets and at the bottom of the description in the other six choice sets.

References to the "current" hospital were changed to the "home" hospital in order to be consistent with the language which had been established throughout the rest of the questionnaire.

The following figures provide examples of the choices that were presented to the respondents following the changes made after the cognitive interviews.

Figure 10: Main survey: example choice pair – Format for sets A-F

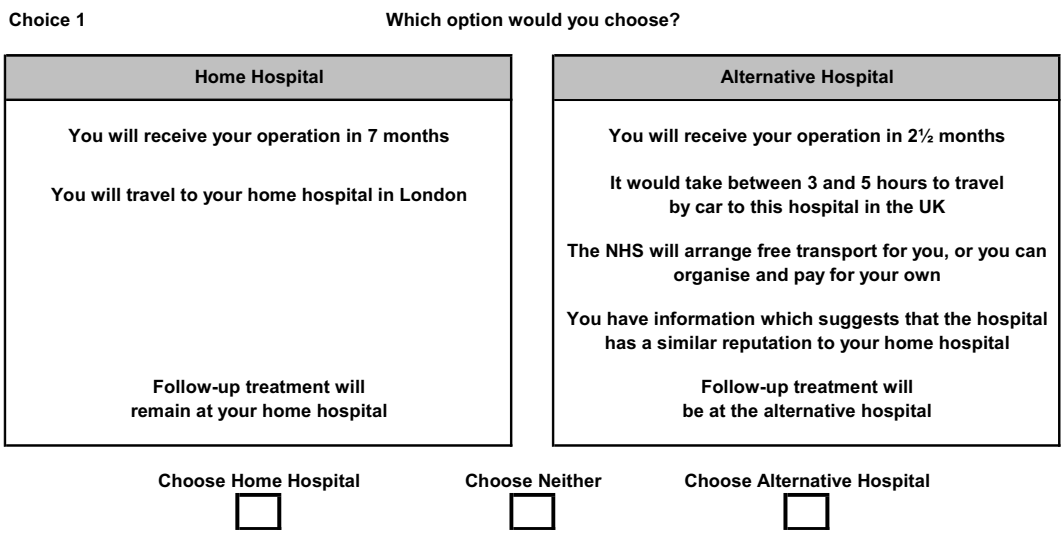
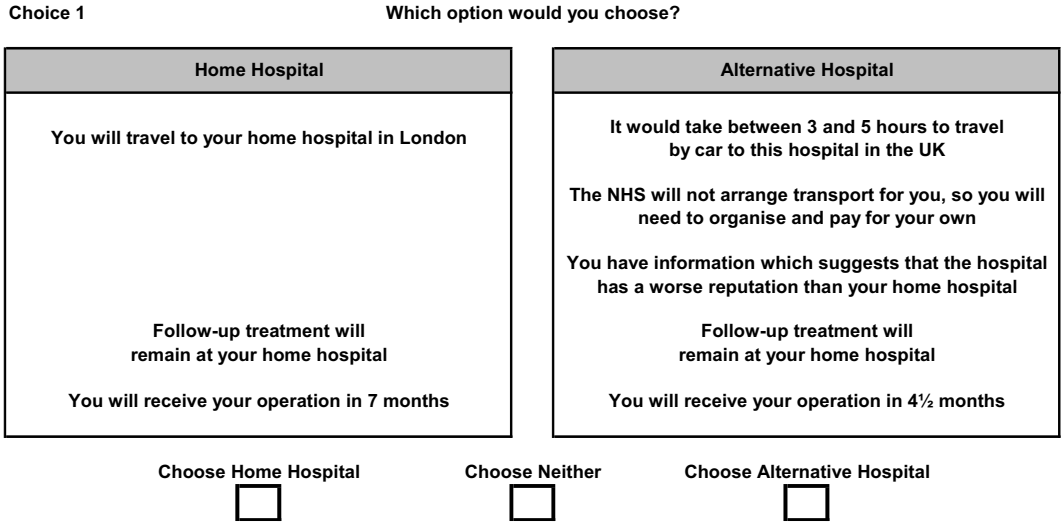


Figure 11: Main survey: example choice pair – Format for sets G-L



Each respondent was asked to respond to seven different choice situations.

Introduction to choice section

The original introduction used in the cognitive interviews was considered to be too long for a paper-based questionnaire; a revised introduction was therefore developed. This removed the introduction to the variables, which were considered to be self explanatory, and also dropped the paragraph relating to travel costs being paid as this was now being explicitly examined in the choices. The revised introduction to the choice exercises developed for the main survey is presented on the following page.

WHICH HOSPITAL WOULD YOU CHOOSE?

PLEASE READ CAREFULLY

We would like to find out what is important to you when choosing a hospital and treatment.

On the following 2 pages are a series of **possible** choices for the treatment for your current condition. We would like you to place yourself in the position where you were offered these choices. These choices are **imaginary** and **not real**, but we would like you to think about how you would act if you were in these situations. There are no right or wrong answers to these choices; we are only interested in your views.

In each case please indicate which option you would choose. We are aware that both options may be different to those you would like to be offered but we would like to know which you would choose if these were your options.

If you would not choose either of these options you may choose "neither", but this should only be done if neither option would meet your needs and you would decide to either look for alternative treatment outside of the NHS or opt not to have your operation.

Please assume that the only differences between the hospitals are those presented, anything not mentioned would be the same at either of the two hospitals.

Additional background questions

The pilot analysis and the changes to the variables also suggested a number of questions that could usefully be added to the before-choice questionnaire before the stated preference choice exercise to provide the context for the responses given in the choices.

How long the patient has been on a waiting list for their current treatment (since first being referred)

How long it would take them to travel to their current hospital

How they would rate their current hospital

Whether they would travel to the hospital alone or take someone with them

The question about access to a car was also re-examined, and this was change from:

1. Do you have access to a car?

1 ☐ Yes, I have my own car

2 ☐ Yes, I have access to a car, which I share with other members of my household

3 ☐ No, I do not have access to a car

to:

1. If you had to organise your own transport, how do you think you would travel to the hospital for your treatment?

1 ☐ I would drive myself in a car

2 ☐ I would get someone else to drive me there by car

3 ☐ I would use public transport (bus, train or underground)

4 ☐ I would use a taxi

5 ☐ Other

(please write in box)

Annex B: Pilot analysis

Survey distribution

This analysis was conducted on the first 80 responses obtained to the LPCP before-choice survey. All of these data were collected from patients from the Barnet and Chase Farm Trust. These data were spread across the different versions of the SP choice pairs as is shown in Table 20 below. The different versions provided a range of different scenarios, with the distribution achieved providing a good range of variation in the combinations of attribute levels across the sample. This indicated that the distribution of the questionnaires was working as intended.

Table 20: Version of questionnaire allocated to patient

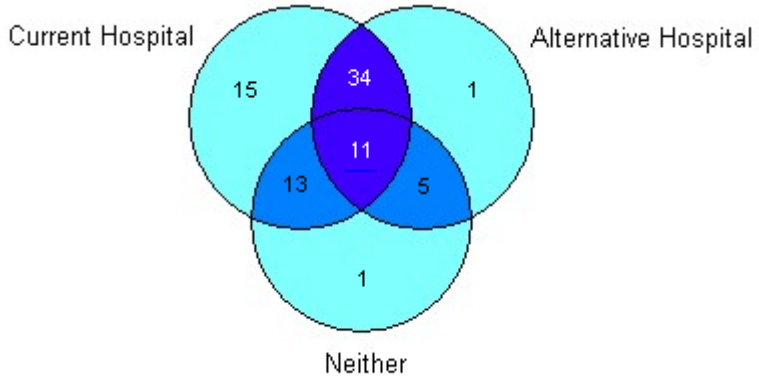
Version	Frequency	Percent	Cumulative Percent
A	4	5.0	5.0
B	9	11.3	16.3
C	5	6.3	22.5
D	6	7.5	30.0
E	6	7.5	37.5
F	9	11.3	48.8
G	5	6.3	55.0
H	4	5.0	60.0
I	9	11.3	71.3
J	8	10.0	81.3
K	7	8.8	90.0
L	8	10.0	100.0
Total	80	100.0	

Preliminary results

Trading behaviour

The Venn diagram in Figure 12 summarises the stated preference choice behaviour of the 80 respondents across their 7 choice scenarios

Figure 12: Number of respondents with each choice pattern (sample size = 80)



The two darkest segments provide the most information for the choice models, relating to cases where respondents made trades between their home hospital and the hypothetical alternative hospital; this represents 56% of the data collected.

The mid-coloured segments provide less information on patient trade-off behaviour because in these cases the respondent consistently chose between one hospital and the neither alternative. This is still valuable information, particularly for the alternative-neither choice.

Finally the lightest segments reflect cases where the respondent stated that they would always choose one of the alternatives. It is encouraging to see that in the 80 responses collected, only one respondent always chose "neither" – this may be considered a political response in which the respondent may not have felt that anything put forward by the NHS would be sufficient. Nineteen percent (15/80) of the sample always choose the current "home" hospital alternative; about 1% (1/80) always chose the alternative hospital alternative. A response of always choosing one option is a valid response and reflects a preference for one alternative under all of the choices offered. In the main analysis further tests are performed to examine whether certain groups of patients have a stronger underlying preference for one alternative than the other.

Choice models

A limited amount of data was available for building models of choice, as only 80 sets of responses were available at this stage (560 separate choices). It was, however, possible to build some preliminary models using this data to gain a first impression as to whether the respondents behaved in intuitive ways to the options presented to them.

The model summary statistics which are presented are defined in Table 21.

Table 21: Model Summary Statistics

Statistic	Definition
Observations	The number of observations included in the model estimation.
Final log (L)	This indicates the value of the log-likelihood at convergence. The log-likelihood is defined as the sum of the log of the probabilities of the chosen alternatives, and is the function that is maximised in model estimation. The value of log-likelihood for a single model has no obvious meaning. However comparing the log-likelihood of two models with different specifications allows the statistical significance of new model coefficients to be assessed properly.
D.O.F.	Degrees of freedom, i.e. the number of coefficients estimated in this model. Note that if a coefficient is constrained to a fixed value (indicated by(*)) then it is not a degree of freedom.
$Rho^2(0)$	The rho-squared measure compares the log-likelihood (LL(final)) to the log-likelihood of a model with all coefficients restricted to zero (LL(0)): $Rho^2(0) = 1 – LL(final)/LL(0)$ A higher value indicates a better fitting model.
$Rho^2(c)$	If we compare the log-likelihood (LL(final)) value obtained with the log-likelihood of a model with only constants (LL(c)) we get: $Rho^2(c) = 1 – LL(final)/LL(c)$ Again a higher value indicates a better fitting model.

The coefficient values are then presented. If a coefficient is positive then it has a positive impact on utility and so reflects a higher probability of choosing the alternatives to which it is applied. Conversely if a coefficient is negative then it has a negative impact on utility and so reflects a lower probability of choosing the alternative to which it is applied.

Some coefficients are multiplied by continuous variables and therefore reflect the disutility per unit of the variable, e.g. waiting time, which reflect the relative disutility per month of wait. Other coefficients are applied to categorical variables; these therefore reflect the total utility increase or decrease for that variable, relative to a base situation, e.g. the increase in utility as a result of differences in the reputation of the hospital.

A neither option was included in the choices presented to the respondents for cases where neither option was acceptable to the respondent. In order to take account of the cases where respondents chose this option it is necessary to include a utility equation for this alternative. This typically contains a single constant to explain any preference for neither over all respondents.

A constant is also included on the alternative hospital to quantify any bias for or against this alternative across the sample as a whole.

The value shown after each coefficient value is the t-ratio which defines the significance of the coefficient estimate. A higher t-ratio indicates a more significant estimate. A coefficient must have a t-value greater than 1.96 to be significantly different from zero (at a 95% confidence level).

The following table presents the results from a basic choice model estimated from the data collected in first phase of surveys.

Table 22: Choice model from first 80 respondents

Summary statistics

Observations	560
Final Log Likelihood	-472.2
D.O.F	14
Rho²(0)	0.232
Rho²(c)	0.109

Coefficient	**Estimate**	**t-ratio**
Wait (per month)	-0.2701	-4.8
Location – base "UK, <1hr by car"		
UK, between 1 and 2 hours by car	0.1209	0.4
UK, between 2 and 3 hours by car	-0.1287	-0.4
UK, between 3 and 5 hours by car	-0.6967	-2.0
Abroad	-1.1831	-3.2
Reputation – base "unknown"		
Worse than home hospital	-1.1644	-2.8
Same as home hospital	0.4821	1.5
Better than home hospital	1.4613	4.7
Transport – "organise and pay for own"		
Organised by NHS, you pay	0.6367	2.2
Organised by NHS and free	0.7967	2.8
Follow-up care – "current hospital"		
Alternative hospital	0.0200	0.1
At patient's home	-0.0232	-0.1
Constants		
Neither	-3.1003	-7.7
Alternative hospital	-2.6296	-5.8

The basic model which were estimated indicated that this sample of respondents:

- treated the waiting times as a significant factor in their choices and revealed a strong preference for shorter waiting times;
- were prepared to travel up to 3 hours by car before considering this as a factor against the alternative hospital, there was also a strong preference not to be sent abroad for treatment;
- had a reduced probability of choosing an alternative hospital with a reputation that is worse than the reputation of the current hospital and increased probability of choosing an alternative hospital where they knew the reputation was better;
- had a reduced probability of choosing an alternative hospital if they did not know the reputation of the alternative hospital;
- had an increased probability of choosing the alternative hospital if the NHS organised transport to that hospital, even if the respondent had to pay for that travel;

- were not found to place a significant value on where their follow-up care was provided;
- showed a general bias towards their home hospital when all other variables were taken into account.

It is emphasised that this analysis was conducted on a limited sample and that the main analysis on a larger sample allows us to estimate the effects within the sample with greater confidence. It is also be possible with a larger sample to explore whether different groups within the sample demonstrate different preferences; both in terms of whether they value the variables differently, and whether they have different underlying preferences for one alternative over the other. It is important to emphasise that the results obtained at this stage of the study were from a very limited sample (only 1 trust), which may not be representative of the patient choice population, and that the values obtained reflected averages across all respondents and that they therefore may have hidden important behavioural differences between the respondents. However, the results were encouraging and suggested that the experimental design being used was capable of quantifying the relative trade-offs between the variables being considered.

Annex C: Final before-choice questionnaire (version A)

LONDON PATIENT CHOICE SURVEY

What is the survey about?

This survey is about a scheme in which London patients who have been on waiting lists for more than 6 months might be asked if they would like to be treated at an alternative hospital. We want to find out what you think about the patient choice scheme and what factors would be important to you if you were offered a choice.

Note: We do not know whether you personally will be offered a choice, or, if you were offered a choice, what those choices would be. The answers you give here will be used for research purposes only, and will NOT affect the choices you are offered OR the care you receive in any way at all.

Who should complete the questionnaire?

The questions should be answered by the person named on the front of the envelope. If that person needs help to complete the questionnaire, the answers should be given from his/her point of view – not the point of view of the person who is helping.

Who is carrying out the survey?

The survey is being carried out by Picker Institute Europe, an independent research organisation, on behalf of the NHS London Patient Choice Project Team.

Completing the questionnaire

For each question please tick clearly inside one box using a black or blue pen.

Sometimes you will find the box you have ticked has an instruction to go to another question. By following the instructions carefully you will miss out questions that do not apply to you.

Don't worry if you make a mistake; simply cross out the mistake and put a tick in the correct box.

Please do not write your name or address anywhere on the questionnaire.

Questions or help?

If you have any queries about the questionnaire, please call Picker Institute Europe on **0800 197 5273.**

Your participation in this survey is voluntary.

Your answers will be treated in confidence.

Please note:

Some of the following questions refer to your **home hospital**. This is the hospital at which you are on the waiting list for treatment.

Waiting for your operation

1. Which type of operation are you currently waiting for?

1 ☐ Cataract (or other eye operation)
2 ☐ Hernia repair
3 ☐ Gall bladder (cholecystectomy)
4 ☐ Varicose veins
5 ☐ Haemorrhoids (piles)
6 ☐ Hip replacement
7 ☐ Knee operation
8 ☐ Nasal surgery (nose)
9 ☐ Tonsillectomy
10 ☐ Gynaecological operation (e.g. hysterectomy, D & C, sterilisation)
11 ☐ Urology operation (e.g. prostatectomy, cystoscopy, vasectomy)
12 ☐ Plastic surgery
13 ☐ Other
(please write in box)

2. When you were **first** put on the waiting list did someone tell you approximately how long you would have to wait for your operation?

1 ☐ Yes, I was told by someone at my home hospital ➔ **Go to 3**
2 ☐ Yes, I was told by my GP ➔ **Go to 3**
3 ☐ Yes, I was told by someone else ➔ **Go to 3**
4 ☐ No, I was not told ➔ **Go to 4**
5 ☐ Don't know/can't remember ➔ **Go to 4**

3. **How long** were you told you would have to wait for your operation?

1 ☐ Less than 3 months
2 ☐ 3 months or more, but less than 6 months
3 ☐ 6 months or more, but less than 9 months
4 ☐ 9 months or more, but less than 12 months
5 ☐ 12 months or more
6 ☐ Don't know/can't remember

4. **Up to now,** how long have you been on the waiting list for this operation?

1 ☐ Less than 3 months
2 ☐ 3 months or more, but less than 6 months
3 ☐ 6 months or more, but less than 9 months
4 ☐ 9 months or more, but less than 12 months
5 ☐ 12 months or more
6 ☐ Don't know/can't remember

5. Have you been given an admission date for your operation?

1 ☐ Yes, I have been given a date ➔ **Go to 6**
2 ☐ Yes, but I had to cancel ➔ **Go to 6**
3 ☐ No, I have not been given a date ➔ **Go to 7**

6. Has your admission date been changed by the hospital?

1 ☐ No
2 ☐ Yes, once
3 ☐ Yes, 2 or 3 times
4 ☐ Yes, 4 times or more

About your home hospital

Remember:

Your **home hospital** is the hospital at which you are on the waiting list for treatment.

7. How would you describe the reputation of your home hospital?

1 ☐ Excellent
2 ☐ Very good
3 ☐ Good
4 ☐ Fair
5 ☐ Poor
6 ☐ Very poor

8. How do you **normally** get to your home hospital?

(Tick one only)

1 ☐ I drive myself in a car
2 ☐ I get someone else to drive me there by car
3 ☐ I use public transport (bus, train or underground)
4 ☐ I take a taxi
5 ☐ I go on foot
6 ☐ I use hospital transport
7 ☐ Other

9. How long does it **normally** take you to travel to your home hospital?

1 ☐ Less than 1 hour
2 ☐ 1 hour or more, but less than 2 hours
3 ☐ 2 hours or more, but less than 3 hours
4 ☐ 3 hours or more, but less than 4 hours
5 ☐ 4 hours or more

10. When you have your operation will someone come with you to the hospital?

1 ☐ Yes, my partner/friend/family member
2 ☐ Yes, someone else
3 ☐ No, I will go by myself

Being offered a choice of hospital

Please note:

The **alternative hospital** might be in London, elsewhere in the UK or abroad.

11. If you were given a choice of having your operation at a hospital other than your home hospital, would you **consider** it?

1 ☐ Yes, definitely ➔ **Go to 12**
2 ☐ Yes, possibly ➔ **Go to 12**
3 ☐ No, I would not consider it under any circumstances ➔ **Go to Page 6**

12. If you were offered the chance to have your operation more quickly, how much advance notice would you need? (on a typical week)

1 ☐ 0 to 7 days
2 ☐ 8 to 14 days
3 ☐ 15 days or more, but less than 1 month
4 ☐ 1 month or more, but less than 2 months
5 ☐ 2 months or more

13. If you were given a choice of having your operation at a hospital other than your home hospital, what would you want to know about the **alternative** hospital?

Please tick up to <u>three</u> things that you think are the most important

1 ☐ Where it is/how to get there

2 ☐ Success rates for the operation that I am having

3 ☐ Who will perform the operation

4 ☐ What the staff are like

5 ☐ What the food is like

6 ☐ What the surroundings/facilities are like

7 ☐ Visiting hours

8 ☐ Whether a friend or family member can come with me to the hospital/stay nearby

9 ☐ How long I will have to stay

10 ☐ What type of hospital it is (e.g. private, NHS, teaching)

11 ☐ How clean the wards are

12 ☐ The reputation of the hospital

14. Is there anything else you would like to know about the **alternative** hospital?

(Please write in box)

15. Where would you look for information about the **alternative** hospital?

(Tick all that apply)

1 ☐ My GP

2 ☐ A doctor at my home hospital

3 ☐ A doctor at the alternative hospital

4 ☐ My family or friends

5 ☐ Newspapers

6 ☐ Internet

7 ☐ NHS Direct

8 ☐ Library

9 ☐ Somewhere else

(Please write in box)

16. Who would you like to discuss your options with?

(Tick all that apply)

1 ☐ My GP

2 ☐ A doctor at my home hospital

3 ☐ A doctor at the alternative hospital

4 ☐ My family or friends

5 ☐ A special telephone helpline

6 ☐ Someone else

(Please write in box)

17. Would you **consider** having your operation at a hospital in another country? (e.g. France, Germany, Belgium etc.)

1 ☐ Yes, definitely

2 ☐ Yes, possibly

3 ☐ No, I would not consider it under any circumstances

18. If you were offered a choice of hospital, how important would **each** of the following factors be in making your decision?

	VERY IMPORTANT	QUITE IMPORTANT	NOT AT ALL IMPORTANT	
a. Having my operation in a hospital **not too far from my home**	☐	☐	☐	1
b. Having my operation at a **private hospital**	☐	☐	☐	2
c. Having my operation at an **NHS hospital**	☐	☐	☐	3
d. Having my operation in a **teaching hospital**	☐	☐	☐	4
e. Having my operation **in the UK,** rather than abroad	☐	☐	☐	5
f. Having my operation somewhere my **friends and family can easily visit**	☐	☐	☐	6
g. **Free accommodation for a friend or family member** near the hospital where I have my operation	☐	☐	☐	7
h. The **reputation of the hospital** where I would have the operation	☐	☐	☐	8
i. The **reputation of the surgeon** who would perform the operation	☐	☐	☐	9
j. Having my operation in a hospital with a **high standard of cleanliness**	☐	☐	☐	10
k. Having my operation in a hospital with **high success rates** for the operation I will be having	☐	☐	☐	11
l. Having a **shorter waiting time**	☐	☐	☐	12
m. **Not having to pay for transport to and from the hospital** where I would have my operation	☐	☐	☐	13
n. A **comfortable journey** to and from the hospital	☐	☐	☐	14
o. **Good communication** between the alternative hospital, my “home hospital”, and my GP	☐	☐	☐	15
p. Receiving my **follow-up care** somewhere not too far from my home	☐	☐	☐	16

Which hospital would you choose?

PLEASE READ CAREFULLY

We would like to find out what is important to you when choosing a hospital and treatment.

On the following 2 pages are a series of **possible** choices for the treatment for your current condition. We would like you to place yourself in the position where you were offered these choices. These choices are **imaginary** and **not real**, but we would like you to think about how you would act if you were in these situations. There are no right or wrong answers to these choices; we are only interested in your views.

In each case please indicate which option you would choose. We are aware that both options may be different to those you would like to be offered but we would like to know which you would choose if these were your options.

If you would not choose either of these options you may choose **"neither"**, but this should only be done if neither option would meet your needs and you would decide to either look for alternative treatment outside of the NHS or opt not to have your operation.

Please assume that the only differences between the hospitals are those presented, anything not mentioned would be the same at either of the two hospitals.

Choice 1 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 7 months	**You will receive your operation in 2½ months**
You will travel to your home hospital in London	**It would take between 3 and 5 hours to travel by car to this hospital in the UK**
	The NHS will arrange free transport for you, or you can organise and pay for your own
	You have information which suggests that the hospital has a similar reputation to your home hospital
Follow-up treatment will remain at your home hospital	**Follow-up treatment will be at the alternative hospital**

Choose Home Hospital ☐ **Choose Neither** ☐ **Choose Alternative Hospital** ☐

Choice 2 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 6 months	You will receive your operation in 2½ months
You will travel to your home hospital in London	It would take between 2 and 3 hours to travel by car to this hospital in the UK
	The NHS will arrange transport for you which you have to pay for, or you can organise and pay for your own
	You have information which suggests that the hospital has a worse reputation than your home hospital
Follow-up treatment will remain at your home hospital	Follow-up treatment will remain at your home hospital

Choose Home Hospital ☐ Choose Neither ☐ Choose Alternative Hospital ☐

Choice 3 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 6 months	You will receive your operation in 3 months
You will travel to your home hospital in London	This hospital will be outside of the UK
	The NHS will arrange free transport for you, or you can organise and pay for your own
	You have no information about the reputation of the hospital
Follow-up treatment will remain at your home hospital	Follow-up treatment will be provided at your house by someone from the alternative hospital

Choose Home Hospital ☐ Choose Neither ☐ Choose Alternative Hospital ☐

Choice 4 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 6½ months	You will receive your operation in 3 months
You will travel to your home hospital in London	It would take between 2 and 3 hours to travel by car to this hospital in the UK
	The NHS will not arrange transport for you, so you will need to organise and pay for your own
	You have information which suggests that the hospital has a better reputation than your home hospital
Follow-up treatment will remain at your home hospital	Follow-up treatment will be at the alternative hospital

Choose Home Hospital ☐ Choose Neither ☐ Choose Alternative Hospital ☐

Choice 5 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 6 months	You will receive your operation in 1 month
You will travel to your home hospital in London	It would take between 3 and 5 hours to travel by car to this hospital in the UK
	The NHS will arrange free transport for you, or you can organise and pay for your own
	You have information which suggests that the hospital has a better reputation than your home hospital
Follow-up treatment will remain at your home hospital	Follow-up treatment will be at the alternative hospital

Choose Home Hospital ☐ Choose Neither ☐ Choose Alternative Hospital ☐

Choice 6 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 5 months	You will receive your operation in 2 months
You will travel to your home hospital in London	It would take between 2 and 3 hours to travel by car to this hospital in the UK
	The NHS will arrange free transport for you, or you can organise and pay for your own
	You have information which suggests that the hospital has a better reputation than your home hospital
Follow-up treatment will remain at your home hospital	Follow-up treatment will be at the alternative hospital

Choose Home Hospital ☐ Choose Neither ☐ Choose Alternative Hospital ☐

Choice 7 **Which option would you choose?**

Home Hospital	Alternative Hospital
You will receive your operation in 5 months	You will receive your operation in 2½ months
You will travel to your home hospital in London	This hospital will be outside of the UK
	The NHS will arrange transport for you which you have to pay for, or you can organise and pay for your own
	You have information which suggests that the hospital has a better reputation than your home hospital
Follow-up treatment will remain at your home hospital	Follow-up treatment will remain at your home hospital

Choose Home Hospital ☐ Choose Neither ☐ Choose Alternative Hospital ☐

Your own health state today

By placing a tick in one box in each group below, please indicate which statement best describes your own health state today.

Please do not tick more than one box in each group.

19. Mobility

1 ☐ I have no problems in walking about

2 ☐ I have some problems in walking about

3 ☐ I am confined to bed

20. Self-Care

1 ☐ I have no problems with self-care

2 ☐ I have some problems washing or dressing myself

3 ☐ I am unable to wash or dress myself

21. Usual Activities (e.g. work, study, housework, family or leisure activities)

1 ☐ I have no problems with performing my usual activities

2 ☐ I have some problems with performing my usual activities

3 ☐ I am unable to perform my usual activities

22. Pain/Discomfort

1 ☐ I have no pain or discomfort

2 ☐ I have moderate pain or discomfort

3 ☐ I have extreme pain or discomfort

23. Anxiety/Depression

1 ☐ I am not anxious or depressed

2 ☐ I am moderately anxious or depressed

3 ☐ I am extremely anxious or depressed

24. Overall, how would you rate your health during the **past 4 weeks?**

1 ☐ Excellent

2 ☐ Very good

3 ☐ Good

4 ☐ Fair

5 ☐ Poor

6 ☐ Very poor

About you

25. Are you male or female?

1 ☐ Male

2 ☐ Female

26. How old are you?

1 ☐ 16-29 years

2 ☐ 30-44 years

3 ☐ 45-59 years

4 ☐ 60-79 years

5 ☐ 80 years or older

27. How old were you when you left full-time education?

1 ☐ 16 years or less

2 ☐ 17 or 18 years

3 ☐ 19 years or over

4 ☐ Still in full-time education

28. Do you live alone (single person household)?

1 ☐ Yes

2 ☐ No

29. Are you the parent or guardian of anyone aged under 18 who lives with you?

1 ☐ Yes

2 ☐ No

30. Do you look after, or give special help to anyone who is sick, has a disability, or is an older person, other than in a professional capacity?

1 ☐ Yes, I care for another person in my household

2 ☐ Yes, I care for a person in another household

3 ☐ No

31. Which of these **best** describes your current situation?

1 ☐ In paid work

2 ☐ Unemployed

3 ☐ Retired from paid work

4 ☐ Unable to work because of disability or ill health

5 ☐ Looking after my family, home or dependants

6 ☐ In full time education (including government training programmes)

7 ☐ Other

(please write in box)

32. Which of the following describes your **annual household income**, before tax and national insurance? (Please take pensions, benefits and any extra earnings into account)

1 ☐ Less than £5,000

2 ☐ £5,000 to £9,999

3 ☐ £10,000 to £14,999

4 ☐ £15,000 to £19,999

5 ☐ £20,000 to £29,999

6 ☐ £30,000 to £39,999

7 ☐ £40,000 to £49,999

8 ☐ £50,000 to £74,999

9 ☐ £75,000 or more

10 ☐ Don't know

33. To which of these ethnic groups would you say you belong? **(tick ONE only)**

a. WHITE

1 ☐ British

2 ☐ Irish

3 ☐ Any other white background
(Please write in box)

b. MIXED

4 ☐ White and Black Caribbean

5 ☐ White and Black African

6 ☐ White and Asian

7 ☐ Any other mixed background
(Please write in box)

c. ASIAN OR ASIAN BRITISH

8 ☐ Indian

9 ☐ Pakistani

10 ☐ Bangladeshi

11 ☐ Any other Asian background
(Please write in box)

d. BLACK OR BLACK BRITISH

12 ☐ Caribbean

13 ☐ African

14 ☐ Any other black background
(Please write in box)

e. CHINESE OR OTHER ETHNIC GROUP

15 ☐ Chinese

16 ☐ Any other ethnic group
(Please write in box)

ANY OTHER COMMENTS

If you have any other comments you would like to make, please use the space below

Thank you for taking part in this survey.

Please check that you answered all the questions that apply to you.

Please post this questionnaire back in the FREEPOST envelope provided.

No stamp is needed.

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