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What explains worse patient experience in London? Evidence from secondary analysis of the Cancer Patient Experience Survey

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ABSTRACT

Objective: To explore why cancer patients treated by London hospitals report worse experiences of care compared with those treated in other English regions.

Design: Secondary analysis of the 2011/12 National Cancer Patient Experience Survey (n=69,086).

Setting and Participants: Cancer patients treated by English NHS hospitals.

Main outcome measures: 64 patient experience measures covering all aspects of cancer care (pre-diagnosis to discharge).

Methods: Using mixed effects logistic regression, we explored whether poorer scores in London hospitals could be explained by patient case-mix (age, gender, ethnicity, deprivation and cancer type). Because patients referred into tertiary centres and/or with complex medical problems may report more critical experiences, we also explored whether the experiences reported in London may reflect higher concentration of teaching hospitals in the capital. Lastly, using data from the (general) Adult Inpatients Survey, we explored whether the extent of poorer experience reported by London patients was similar for respondents to either survey

Results: For 52/64 questions there was evidence of poorer experience in London, with the percentage of patients reporting a positive experience being lowercompared with the rest of England by a median of 3.7% (inter-quartile range 2.5%-5.4%). After case-mix adjustment there was still evidence for worse experience in London for 44/64 questions. Additionally adjusting for teaching hospital status made trivial difference to the case-mix adjusted findings. There was evidence that London vs. rest-of-England differences were greater for cancer patients compared to (general) hospital inpatients for 10 of 16 questions in both the Cancer Patient Experience and the Adult Inpatients surveys.

Conclusions: Cancer patients treated by London hospitals report worse care experiences and by and large these differences are not explained by patient case-mix or teaching hospital status. Efforts to improve care in London should aim to meet both patient expectations and improve care quality.

What this paper adds

- Patients treated by London NHS services report a worse experience of their care compared with patients treated elsewhere in England
- Patient case-mix (including patient age, ethnicity and cancer diagnosis) and whether patients were treated at a teaching hospital only account for a small part of the overall London vs rest-of-England differences
- There are some indications that cancer patients treated by London hospitals report worse experiences because of poorer care as opposed to different expectations of quality

Strengths and limitations

- Data come from a large nationwide survey of patients with any cancer and a high (68%) response rate.
- We have not been able to directly examine the potential influence of differences in expectations of care quality between patients treated by London hospitals and hospitals elsewhere in England.

INTRODUCTION /BACKGROUND

Understanding variation in patient experience can help to inform priorities for improvement actions and policies. In the UK, the advent of large national surveys of cancer patients, has enabled a better appreciation of variation in cancer patient experience between different patient groups or hospitals.[1,2,3,4] A salient finding of recent cancer patient surveys is that patients treated by London hospitals reported poorer experiences compared with those treated by hospitals in other English regions.[1,5,6]

Several hypotheses can be considered to explain this type of geographical variation in crude hospital experience scores. First, London hospitals may be treating a higher proportion of patient groups known to report worse experiences of care, such as younger and ethnic minority patients, or patients with certain types of cancer.[2,3,7,8] Second, patient experience may vary by type of hospital, and if so the experiences reported in London could simply reflect a higher concentration of teaching (tertiary) hospitals in the capital region. This hypothesis assumes that patients who are referred into tertiary centres and/or have complex medical problems are likely to be more critical of their experiences. Third, it is possible that London patients receive the same care as that received by patients elsewhere but have higher expectations of care quality, leading to a more critical evaluation of their experience (the 'same care worse experience' hypothesis).[7] Fourth, care provided by London hospitals may indeed be different (worse) compared to the rest of the country, leading to worse experience.

Understanding the potential mechanisms responsible for poorer reported experience of cancer patients treated by London hospitals is important to inform efforts to address this disparity. In this paper we set out to directly explore whether London / rest-of-England inequalities in cancer patient experience may reflect confounding by socio-demographic or cancer diagnosis case-mix and/or hospital type. In addition, we consider indirect evidence to

provide insights about other potential sources of variation, beyond case-mix and hospital type.

METHODS

Data

Sources

For the main analysis we used publicly available anonymous data from the 2011/12 National Cancer Patient Experience Survey – a postal survey of cancer patients treated by 160 English NHS hospitals during January-March 2012 (71,793 respondents, response rate 68%) carried out by Quality Health for the Department of Health.[9] Of all respondents, 3.8% had missing self-reported ethnic group and were excluded, with the final analysis sample of 69,086. For each question, we included in analysis all patients with an informative response to the question of interest.

In further analysis we used data from the Adult Inpatients Survey, a postal survey of patients with any pathology and at least one night stay in an NHS hospital between June-August 2011 (70,863 respondents, response rate 53%) carried out by the Picker Institute for the Care Quality Commission.[10] Of all respondents, 3 had missing age and were excluded with a final analysis sample of 70,860.

Outcome and exposure variables

Of all 160 English hospitals treating cancer patients 27 are London hospitals and 26 are teaching hospitals (i.e. university hospitals with a tertiary referral centre function) (Appendix table 1). Eight teaching hospitals are also London hospitals.

The Cancer Patient Experience Survey comprises 65 questions that measure patient experience across the cancer patient journey. Most questions have a 4- or 5-point Likert scale response options, evaluating experience from very good to very poor. As public reporting of hospital scores for the survey is based on binary forms of these outcomes (i.e. good or poor patient experience),[1] we used the same binary categorisations in the analysis. There are 16 Cancer Patient Experience Survey questions that are also included in the Adult Inpatients Survey. Information on cancer diagnosis International Classification of Diseases

(ICD)-10 code, patient age and gender were available for all respondents based on hospital record information. Thirty-six different cancer diagnoses groups were considered (Appendix table 2). Age was categorised into eight groups (16-24, six 10-year groups from 25-34 to 75-84 and 85+). We used patients self-reported ethnicity (based on their responses to survey question 77) in this study rather than relying on information recorded in hospital records as the former is considered to be a gold-standard and the latter has been shown to contain inaccuracies.[11] A six-group classification (White, Mixed, Asian or Asian British, Black or Black British, Chinese and Other) was used in the analysis.

Analysis

Exploratory analysis showed that variation between English regions other than London was trivial (Appendix table 3). Therefore hereafter all analysis relates to London / rest-of-England comparisons, with patients treated by 'rest-of-England' hospitals considered together as a group.

We first described London / rest-of-England variation in the socio-demographic and clinical characteristics of respondents.

We then used mixed effects logistic regression (including a random effect for hospital) to estimate the odds ratio for cancer patients treated by London hospitals reporting poorer experience compared with those treated by hospitals elsewhere in England. We considered three models separately for each of the survey questions. To explore crude (unadjusted) differences, the first model only included a fixed effect variable denoting London / rest-of-England hospital location (in addition to a random effect for hospital, as above). To explore the potential influence of patient case-mix, the second model additionally included case-mix variables (patient age, gender, ethnic group and cancer diagnosis). Lastly, to explore the potential influence of teaching hospital status, the third model, in addition to socio-demographic characteristics and cancer diagnosis also adjusted for whether or not the hospital of treatment was a teaching hospital. For one question (question 28, whether a

patient was pleased to have been asked to take part in cancer research) the adjusted model did not converge, as patient experience was almost uniformly positive across all hospitals in England. This question was therefore excluded from all analyses, and results hereafter relate to 64 evaluative questions. We also explored interactions between London hospital and socio-demographic characteristics.

Finally, we combined data from the two hospital surveys (Cancer Patient Experience Survey and Adult Inpatients Survey) to test whether differences in experience reported by patients treated by London hospitals were consistent across the two surveys. After adjusting for age and gender, using this model we tested whether the association between London hospital location and patient experience was consistent between surveys for the 16 questions that they both share. All analyses were carried out using Stata v11.2.

RESULTS

Patient characteristics

On average, compared with patients treated elsewhere in England, those treated by London hospitals were younger (median age of 65 vs 64 years), more likely to belong to ethnic minorities (16% vs 2%), more likely to be treated by teaching hospitals (46% vs 24%) and more likely to suffer from rarer types of cancers (for example 6.5% vs 4.4% had multiple myeloma, table 1).

Unadjusted differences in positive experience

There was evidence ($p<0.05$) that cancer patients treated by London hospitals reported worse experiences compared with those treated by hospitals in the rest of England for 52 out of 64 survey questions (Figure 1, full results in appendix table 4b). For a single question (whether the patient was asked to take part in cancer research) experience was more positive in London whilst for nine other questions there was no evidence of difference (appendix table 4b).

For the 52 questions with worse experience in London, the proportion of patients reporting a positive experience was lower in London compared with the rest of England by a median of 3.7% (inter-quartile range 2.5%-5.4%, full details by question in appendix table 4a). For these questions the un-adjusted odds ratios (for London patients reporting worse experience) ranged from 1.13 to 2.05. The most pronounced difference was for the question on whether staff asked patients about the name by which they would like to be called [unadjusted odds ratio for worse experience in London=2.05 (1.75-2.41)].

Variation in experience adjusted for patient case-mix

After accounting for differences in case-mix the size of London / rest-of-England differences in patient experience was attenuated, but there was still evidence ($p<0.05$) that patient

experience was worse in London hospitals for 45 out of 64 questions (Figure 1 and appendix table 4b).

Adjustment for teaching hospital status

Adjusting for teaching hospital status (additional to adjustment for case-mix) made minimal difference to the size of London / rest-of-England differences: there remained evidence that patient experience was worse in London ($p<0.05$) for 44 of 64 survey questions, with effect sizes that were nearly identical to those observed after case-mix adjustment (Figure 1 and Appendix table 4b). Specific aspects of variation are further highlighted in Box 1.

Interaction analysis

There was no evidence for interactions between treatment by a London hospital and socio-demographic characteristics (data not shown). For example, this suggests that the impact of being treated by a London hospital is the same no matter of the age or ethnic background of the patient.

London variation for cancer patients and general in-patients

For 16 questions that are consistent across both surveys, reported experience was generally more positive for cancer patients (Cancer Patient Experience Survey respondents) compared to patients with a general mix of diagnoses (Adult Inpatients Survey respondents). Being treated in London appears to have a more negative impact on patient experience among cancer patients than among general hospital inpatients, with statistical evidence for such an interaction for 10 of the 16 questions that are common across the two surveys (table 2).

Box: Aspects of London / rest-of-England variation in cancer patient experience

Considering different questions across the patient journey, patients treated by London hospitals generally report worse experiences throughout (diagnosis, treatment, discharge and post-diagnosis). Further, worse experience in London is apparent both for questions relating to the experience of hospital care and for the (fewer) questions that relate to the experience of primary or social care. For example, patients treated by London hospitals reported worse experience for questions 1-4 (relating to pre-diagnosis experience, including aspects of care provided by general practitioners) and for question 55 (care from health and social services after discharge from hospital).

The few questions without evidence for worse experience in London hospitals include questions about treatment choice (question 15, whether the patient was given a choice of treatment options) and information provision (for example, question 68, on having been offered a written care plan).

London / rest-of-England differences in respect of nursing care were inconsistent. For two relevant report items (question 20, whether the patient was given the name of a Cancer Nurse Specialist; and question 43, whether there were enough ward nurses on duty) there was no evidence of differences. However for evaluation items relevant to nursing care (for example, questions 21-23 regarding ease of contacting a Cancer Nurse Specialist and inter-personal aspects of specialist nurse care; or questions 40-41 regarding the experience of ward nursing) patients treated by London hospitals reported worse experience.

Considering report or evaluation types of questions, in general, patients treated by London hospitals tended to report worse experience for both evaluation and report items (Figure 2).

Figure 1: London / rest-of-England differences in patient experience across the Cancer Patient Experience Survey questions. Odds ratio values > 1.0 indicate that cancer patients treated by London hospitals report comparatively worse experience of care than patients treated elsewhere, and vice versa.

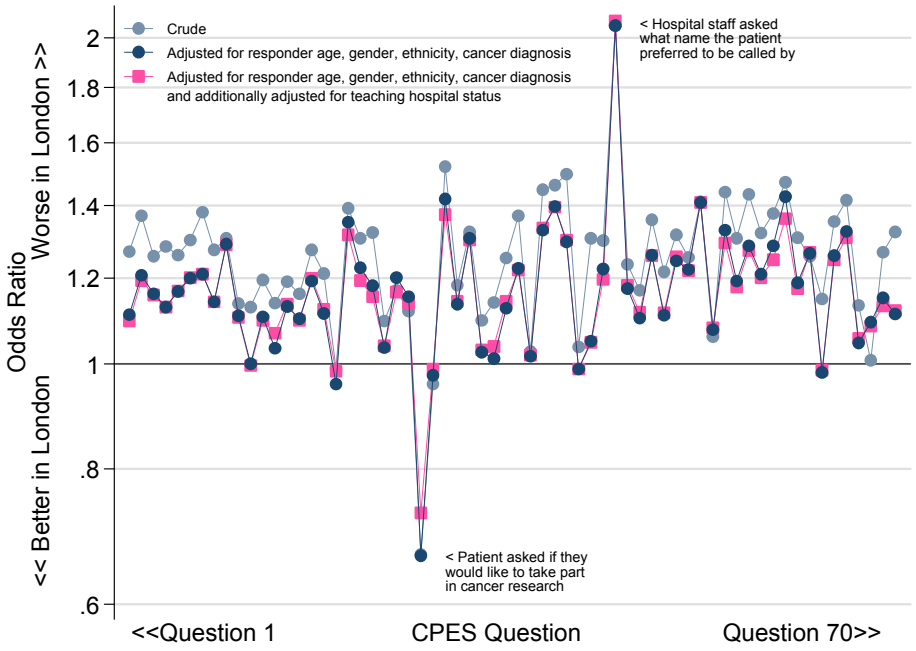

Figure 2. Odds ratios for London / rest-of-England differences for 'report' and 'evaluation' survey items. Cancer patients treated by London hospitals appear to be reporting worse experiences compared with those treated elsewhere in England both for evaluation and for report items. Questions are ordered on this graph from those with the smallest to the largest odds ratios for both 'report' and `evaluation' questions.

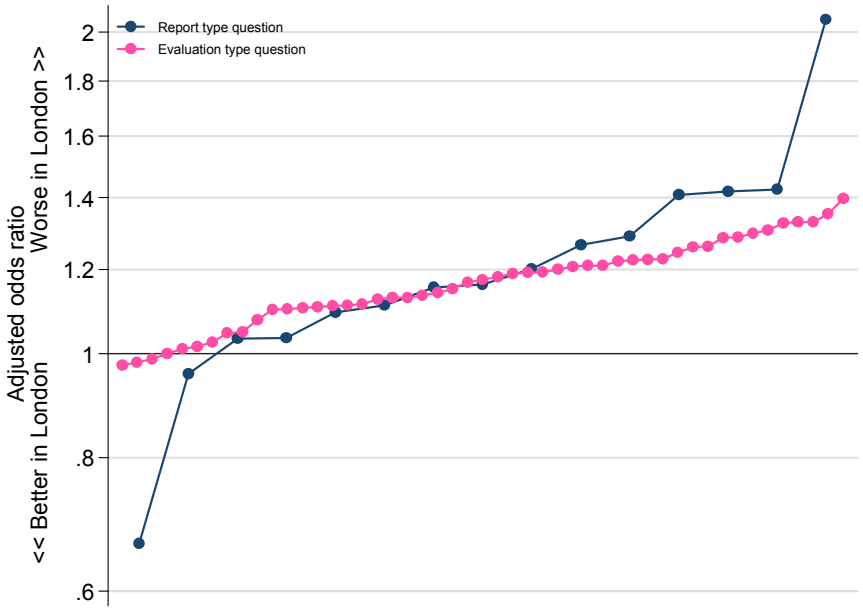

Table 1. Comparison of cancer patients treated by London hospitals compared with those treated elsewhere in England

Age	All	%	Rest-of-England	%	London	%
16-24	355	0.5	275	0.5	80	0.9
25-34	954	1.4	756	1.3	198	2.3
35-44	2,999	4.3	2492	4.1	507	5.8
45-54	8,911	12.9	7637	12.7	1,274	14.6
55-64	16,970	24.6	14820	24.6	2,150	24.6
65-74	22,749	32.9	20168	33.4	2,581	29.5
75-84	13,564	19.6	11901	19.7	1,663	19.0
85+	2,584	3.7	2289	3.8	295	3.4
Age Median (IQR)	66 (58-74)		66 (58-74)		65 (55-73)	
Gender						
Men	32,463	47.0	28,398	47.1	4,065	46.5
Women	36,623	53.0	31,940	52.9	4,683	53.5
Ethnic group						
White	66,421	96.1	59,071	97.9	7,350	84.0
Mixed	278	0.4	151	0.3	127	1.5
Asian	1,146	1.7	633	1.0	513	5.9
Black	949	1.4	334	0.6	615	7.0
Chinese	150	0.2	87	0.1	63	0.7
Other	142	0.2	62	0.1	80	0.9
Teaching hospital	18,758	27.2	14,711	24.4	4,047	46.3
Other hospital type	50,328	72.8	45,627	75.6	4,701	53.7
Cancer diagnosis						
Breast	13,396	19.4	11,742	19.5	1,654	18.9
DCIS	916	1.3	788	1.3	128	1.5
Ovarian	1,823	2.6	1,550	2.6	273	3.1
Endometrial	1,478	2.1	1,280	2.1	198	2.3
Cervical	405	0.6	355	0.6	50	0.6
Vulval / vaginal	236	0.3	206	0.3	30	0.3
Other gynaecological	88	0.1	74	0.1	14	0.2
Thyroid	493	0.7	434	0.7	59	0.7
Laryngeal	361	0.5	319	0.5	42	0.5
Other head & neck	1,280	1.9	1,136	1.9	144	1.6
Non-Hodgkin lymphoma	4,290	6.2	3,781	6.3	509	5.8
Multiple myeloma	3,236	4.7	2,667	4.4	569	6.5
Leukaemia	2,479	3.6	2,075	3.4	404	4.6
Hodgkin lymphoma	487	0.7	411	0.7	76	0.9
Rectal	3,541	5.1	3,176	5.3	365	4.2
Colon	5,054	7.3	4,516	7.5	538	6.1
Anal	242	0.4	213	0.4	29	0.3
Other lower gastro-intestinal	215	0.3	182	0.3	33	0.4
Lung	3,698	5.4	3,237	5.4	461	5.3
Mesothelioma	392	0.6	346	0.6	46	0.5
Brain	483	0.7	397	0.7	86	1.0
Other central nervous system	59	0.1	39	0.1	20	0.2
Oesophageal	1,362	2.0	1,209	2.0	153	1.7
Stomach	1,019	1.5	906	1.5	113	1.3
Pancreatic	673	1.0	569	0.9	104	1.2
Hepato-biliary / gall bladder	568	0.8	439	0.7	129	1.5
Bladder	6,503	9.4	5,808	9.6	695	7.9
Prostate	5,568	8.1	4,897	8.1	671	7.7
Renal	950	1.4	839	1.4	111	1.3
Other urological	349	0.5	309	0.5	40	0.5
Testicular	256	0.4	217	0.4	39	0.4
Secondary	4,308	6.2	3,740	6.2	568	6.5
Melanoma	1,546	2.2	1,420	2.4	126	1.4
Soft tissue sarcoma	575	0.8	447	0.7	128	1.5
Bone sarcoma	174	0.3	125	0.2	49	0.6
Any other cancer diagnosis	583	0.8	489	0.8	94	1.1

Table 2: Comparison of London / rest-of-England differences in patient experience for general in-patients (any pathology) and patients with cancer*

Question**		Effect of London in general inpatients	Effect of London in cancer patients	Interaction Odds Ratio	Interaction p-value
19	Patient definitely involved in decisions about which treatment	1.15	1.31	1.13 (1.06 - 1.22)	0.001
32	Staff gave complete explanation of what would be done	1.17	1.25	1.07 (0.95 - 1.20)	0.223
34	Staff explained how operation had gone in understandable way	1.14	1.13	0.99 (0.90 - 1.09)	0.392
37	Patient had confidence and trust in all doctors treating them	1.07	1.35	1.27 (1.15 - 1.40)	<0.0001
38	Doctors did not talk in front of patient as if they were not there	1.17	1.47	1.25 (1.14 - 1.37)	<0.0001
41	Patient had confidence and trust in all ward nurses	1.50	1.58	1.05 (0.97 - 1.14)	0.176
42	Nurses did not talk in front of patient as if they were not there	1.48	1.67	1.13 (1.03 - 1.23)	0.018
43	Always / nearly always enough nurses on duty	1.03	1.12	1.08 (1.00 - 1.17)	0.057
45	Patient never thought they were given conflicting information	1.18	1.32	1.12 (1.03 - 1.22)	0.011
47	Always given enough privacy when discussing condition/treatment	1.07	1.3	1.21 (1.10 - 1.33)	0.0001
48	Always given enough privacy when being examined or treated	1.16	1.19	1.03 (0.90 - 1.18)	0.363
51	Always treated with respect and dignity by staff	1.23	1.47	1.20 (1.09 - 1.31)	0.0005
53	Staff told patient who to contact if worried post discharge	1.17	1.58	1.35 (1.19 - 1.52)	<0.0001
54	Family definitely given all information needed to help care at home	1.02	1.11	1.09 (0.99 - 1.19)	0.077
67	Given the right amount of information about condition and treatment	1.05	1.2	1.14 (1.04 - 1.25)	0.010
70	Overall rating of care	1.24	1.49	1.20 (1.09 - 1.31)	0.0002

*Odds ratio values > 1 indicate that the worse experience of patients treated by London hospitals was worse for cancer patients (respondents to the Cancer Patient Experience Survey) compared with patients with a general mix of diagnoses (respondents to the Adult Inpatients survey respondents).

**Relates to 16 questions that are common in both surveys. Question numbering relates to CPES questions.

DISCUSSION

We explored potential sources of variation in the experience of cancer patients treated by London hospitals compared with those treated by hospitals elsewhere in England. Considering unadjusted percentages, cancer patient experience in London is rated worse than any other English region for the great majority of questions, although the absolute percentage difference is typically small. Confounding by patient case-mix (socio-demographic characteristics or cancer diagnosis) explains some of the London / rest-of-England disparities but its overall impact is small. Additional adjustment for teaching hospital status only has a marginal influence. There is some evidence that London / rest-of-England differences in patient experience are larger for cancer patients than patients with a general mix of diagnoses. These findings indicate that the hypotheses that London / rest-of-England differences in patient experience reflect either patient case-mix or teaching hospital status are unlikely to be true.

Previous work has documented that London patients have worse experience of primary and hospital care.[12,13,14] However, by and large regional differences in the UK are confined to London / rest-of-England variation, which is a matter of on-going policy concern and improvement initiatives.[15] Research from Canada has also demonstrated rural-urban differences in patient experience, with patients in urban areas reporting worse experience.[16] Our study is reminiscent of a study exploring geographical variation in patient experience within the context of the Medicare's Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey in the US, specifically exploring sources of variation between California and the rest of the United States in patient experience scores.[17]

Particular strengths of our study is its large sample size, and the ability to explore potential confounding by cancer diagnosis, in addition to 'universal' socio-demographic confounders such as age, gender and ethnicity. Certain limitations should also be considered. We were not able to adjust for disease severity, but we believe that the potential for residual confounding by disease severity is likely to be small, as inclusion of cancer diagnosis in the

model made little difference to the findings. We were also not able to explore potential confounding by a range of other patient factors or hospital factors (such as such as the quality of patient transport links, the availability of parking and hospital environment and facilities in general). Importantly, we were also not able to adjust for patient socioeconomic status. However, previous work indicates only small and inconsistent differences in cancer patient experience between patients of different deprivation groups.[1,2,3] Further, in supplementary analysis that used data from the 2010 Cancer Patient Experience Survey, adjustment for the deprivation group of patients (which was available for that survey) in addition to age, gender, ethnicity and cancer diagnosis produced trivial differences in hospital ranks (data not shown).

Having been able to directly examine and eliminate case-mix or teaching hospital status as major sources of variation in the experience of patients treated by London hospitals, it is worth considering whether the findings may reflect differential expectations of care quality among Londoners, or worse care quality leading to worse experience. Disentangling this research question is fraught with substantive methodological difficulties. Evaluating standardised (e.g. videoed) encounters between patients and healthcare professionals to be rated by patients from different regions of England could be useful, as has been shown for studies of ethnic variation in experience.[18] In the absence of other evidence, it is worth considering three observations that may be insightful. First, with few exceptions patients treated by London hospitals evaluated their experience more negatively both for evaluation and report questions (figure 2), and this would seem to suggest that care provided by London hospitals may be worse than in other parts of the country. This is because if the sole explanation for London / rest-of-England inequalities were that patients treated by London hospitals had higher expectations of quality then this factor could have been expected to chiefly have influenced their responses to evaluation (e.g. 'did the nurse listen to you carefully'?) as opposed to report items (e.g. 'have you been given the name of a Cancer Nurse Specialist'?). Similarly, the fact that London / rest-of-England differences appear to be

larger for cancer patients compared with patients with other pathologies treated by the same hospitals would also support the hypothesis that an exogenous factor (such as worse quality of cancer care) may be responsible, as opposed to an intrinsic tendency for Londoners to evaluate their care differently to patients treated elsewhere in the country.. Third, we also note that some London hospitals (including one central London teaching hospital) have cancer patient experience scores that are above the national average.[1] This observation does not support the hypothesis that patients treated by London hospitals have different higher expectations of care quality. It also indicates a potential for improvement for the majority of London hospitals where patient experience is poorer overall.

In brief, some indirect evidence indicates that at least in some part London / rest-of-England disparities may reflect worse care provided by London hospitals

In conclusion, the findings suggest that patient case-mix and hospital type are unlikely to be important sources of geographical variations in the experience of cancer patients. These realisations can help to further motivate clinical and managerial engagement with improvement efforts, and appropriate investment and improvement actions to address disparities in patient experience reported by cancer patients treated by London hospitals. In the absence of direct evidence about whether these disparity reflect different expectations or worse care, such efforts should aim to understand both how to meet patient expectations at the same time as delivering actual improvements in care quality.

Data sharing statement: All data used in this study are already publicly available through UK Data Archive.

Contributors: All authors contributed to all stages of the study. CS is the guarantor for this study and affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and discrepancies from the study as planned (and, if relevant, registered) have been explained.

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STROBE checklist for an observational study: Attached separately.

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Appendix 1 (a-b). NHS hospitals providing cancer treatment classified as London hospitals (i.e. those located within the London Strategic Health Authority); Hospitals classified as 'teaching' hospitals in England

a. London hospitals

Barking, Havering and Redbridge
Barnet and Chase Farm Hospitals
Barts and The London
Chelsea and Westminster Hospital
Ealing Hospital
Epsom and St Helier University Hospital
Guy's and St Thomas'
Hillingdon Hospital
Homerton University Hospital
Imperial College Healthcare
King's College Hospital
Kingston Hospital
Lewisham Hospital
Mayday Healthcare
Newham University Hospital
North Middlesex University Hospital
North West London Hospitals
Royal Brompton and Harefield
Royal Free Hampstead
The Royal Marsden Hospital
Royal National Orthopaedic Hospital
South London Healthcare
St George's Healthcare
University College London Hospitals
West Middlesex University Hospital
The Whittington Hospital
Whipps Cross University Hospital

b. NHS Teaching hospitals in England

London teaching hospitals

Barts and The London
Chelsea and Westminster Hospital
Guy's and St Thomas'
Imperial College Healthcare
King's College Hospital
Royal Free Hampstead
St George's Healthcare
University College London Hospitals

Teaching hospitals in other parts of England

Brighton and Sussex University Hospitals
Cambridge University Hospitals
Central Manchester University Hospitals
Leeds Teaching Hospitals
The Newcastle Upon Tyne Hospitals
Norfolk and Norwich University Hospital
Nottingham University Hospitals
Oxford Radcliffe Hospitals
Royal Devon and Exeter
Royal Liverpool and Broadgreen University Hospitals

Salford Royal
Sheffield Teaching Hospitals
Southampton University Hospitals
University Hospital Birmingham
University Hospital of South Manchester
University Hospitals Bristol
University Hospitals Coventry and Warwick
University Hospitals of Leicester

Appendix table 2. Cancer International Classification of Diseases 10 codes, diagnosis groups and Multi-Disciplinary Team classifications

Breast	C50	Malignant neoplasm of breast
Ductal carcinoma in situ (DCIS)	D05	Carcinoma in situ of breast
Ovarian	C56	Malignant neoplasm of ovary
Endometrial	C54, C55	Malignant neoplasm of corpus uteri (C54) and of uterus, part unspecified (C55)
Cervical	C53	Malignant neoplasm of cervix uteri
Vulval / vaginal	C51, C52	Malignant neoplasm of vulva (C51) and vagina (C52)
Other gynaecological cancer	C57	Malignant neoplasm of other and unspecified female genital organs (C57)
Thyroid	C73	Malignant neoplasm of thyroid gland
Laryngeal	C32	Malignant neoplasm of larynx
Other head and neck cancers	C00 - C14, C30, C31	Malignant neoplasm of lip (C00), base of tongue (C01), other and unspecified parts of tongue (C02), gum (C03), floor of mouth (C04), palate (C05), other/unspecified parts of mouth (C06), parotid gland (C07), other/unspecified major salivary gland (C08), tonsil (C09), oropharynx (C10), nasopharynx (C11), pyriform sinus (C12), hypopharynx (C13), other and ill-defined sites in the lip, oral cavity and pharynx (C14), nasal cavity and middle ear (C30) and accessory sinuses (C31)
Non-Hodgkin lymphoma	C82, C83, C85, C84	Follicular [nodular] non-Hodgkin's lymphoma (C82), diffuse non-Hodgkin's lymphoma (C83), Mycosis Fungoides (C84) other and unspecified types of non-Hodgkin's lymphoma (C85)
Multiple myeloma	C90	Multiple myeloma and malignant plasma cell neoplasms
Leukaemia	C91, C92, C93, C94, C95	Lymphoid (C91), myeloid (C92), monocytic (C93), and other leukemia of specified cell type (C94) and unspecified cell type (C95)
Hodgkin's lymphoma	C81	Hodgkin's disease
Rectal	C19, C20	Malignant neoplasm of recto-sigmoid junction (C19), and of rectum (C20)
Colon	C18	Malignant neoplasm of colon
Anal	C21	Malignant neoplasm of anus and anal canal (C21)
Other LGI	C17, C26	Malignant neoplasm of small intestine (C17), and of other and ill-defined digestive organs (C26)
Lung	C34, C33	Malignant neoplasm of bronchus and lung (C34) Malignant neoplasm of trachea (C33)
Mesothelioma	C45	Mesothelioma
Brain	C71	Malignant neoplasm of brain
Other central nervous system cancers	C47, C69, C70, C72	Malignant neoplasm of peripheral nerves and autonomic nervous system (C47), eye and adnexa (C69), meninges (C70), and spinal cord, cranial nerves and other parts of central nervous system (C72)
Oesophageal	C15	Malignant neoplasm of oesophagus
Stomach	C16	Malignant neoplasm of stomach
Pancreatic	C25	Malignant neoplasm of pancreas
Hepato-biliary gallbladder	C22, C23, C24	Malignant neoplasm of liver and intrahepatic bile ducts (C22) and of gallbladder (C23) Malignant neoplasm of other and unspecified parts of biliary tract (C24)
Bladder	C67	Malignant neoplasm of bladder
Prostate	C61	Malignant neoplasm of prostate
Renal	C64	Malignant neoplasm of kidney, except renal pelvis
Other urological cancers	C60, C63, C65, C66, C68	Malignant neoplasm of penis (C60), other/unspecified male genital organs (C63), renal pelvis (C65), ureter (C66) and other/unspecified urinary organs (C68)
Testicular	C62	Malignant neoplasm of testis
Secondary	C77, C78, C79	Secondary and unspecified malignant neoplasm of lymph nodes (C77) Secondary malignant neoplasm of respiratory and digestive organs (C78) Secondary malignant neoplasm of other and unspecified sites (C79)
Melanoma	C43	Malignant melanoma of skin
Soft Tissue Sarcoma	C48, C49, C46	Kaposi's sarcoma (C46) Malignant neoplasm of retroperitoneum and peritoneum (C48) and other connective and soft tissue (C49)
Bone Sarcoma	C40, C41	Malignant neoplasm of bone and articular cartilage of limbs (C40) and of bone and articular cartilage of other and unspecified sites (C41)
General Other	C37, C38, C39, C74, C75, C76, C80, C97, C58, C88, C96	Malignant immunoproliferative diseases (C88) Thymus (C37), heart, mediastinum and pleura (C38) and of other and ill-defined sites in the respiratory system and intrathoracic organs (C39)

Appendix table 3

Regional differences in cancer patient experience scores. This table describes crude absolute difference in percentage of positive responses by region, compared with London. Negative number London=better, positive number London=worse. We see in this table that across most questions all non-London regions have average cancer patient experience scores that are several percent higher than London.

Question number		West Midlands	East Midlands	EOE	London	North East	North West	South Central	South East Coast	South West	Yorkshire and the Humber
1	Saw GP once/twice before being told had to go to hospital	4	5	4	0	6	6	4	7	5	6
2	Patient thought they were seen as soon as necessary	4	4	3	0	7	5	3	5	4	5
3	% saw a hospital doctor in less than 3 months	3	3	3	0	4	4	4	3	4	4
4	Patient's health got better or remained about the same while waiting	4	5	5	0	5	6	3	5	5	4
6	Staff gave complete explanation of purpose of test(s)	2	2	3	0	5	3	2	3	3	4
7	Staff explained completely what would be done during test	3	2	3	0	5	3	3	4	3	4
8	Given easy to understand written information about test	3	3	3	0	5	1	3	3	4	3
9	Given complete explanation of test results in understandable way	4	3	4	0	7	4	4	4	4	5
11	Patient told they could bring a friend when first told they had cancer	7	6	3	0	10	6	4	4	7	5
12	Patient felt they were told sensitively that they had cancer	3	2	1	0	4	2	2	3	2	1
13	Patient completely understood the explanation of what was wrong	2	2	3	0	4	2	2	4	2	2
14	Patient given written information about the type of cancer they had	4	5	4	0	7	2	3	7	3	3
15	Patient given a choice of different types of treatment	0	2	1	0	4	3	1	1	1	4
16	Patient thinks that their views were taken into account when discussing treatment	3	3	3	0	6	4	1	3	4	4
17	Possible side effects explained in an understandable way	3	2	1	0	7	1	2	2	2	4
18	Patient given written information about side effects	4	4	2	0	4	0	1	2	2	4
19	Patient definitely involved in decisions about which treatment	2	2	2	0	6	3	3	3	4	5
20	Patient given the name of the CNS in charge of their care	-2	-4	0	0	2	-1	-1	-2	-2	1
21	Patient finds it easy to contact their CNS	6	6	5	0	13	7	2	5	8	8
22	CNS definitely listened carefully the last time spoken to	2	0	2	0	4	2	2	1	3	3
23	Get understandable answers to important questions all/most of the time (CNS)	2	0	2	0	4	2	3	2	3	3
24	Hospital staff gave information about support groups	0	-1	3	0	0	-1	1	4	3	4
25	Hospital staff gave information on getting financial help	1	-3	1	0	8	1	1	0	5	8
26	Hospital staff told patient they could get free prescriptions	3	-1	1	0	2	1	-1	1	1	4
27	Patient asked if they would like to take part in cancer research	-15	-16	-11	0	-15	-15	-9	-17	-13	-7
29	Patient would have liked to have been asked	-2	0	-1	0	-3	-3	0	-2	-2	-2
31	Admission date not changed by hospital	3	3	4	0	5	3	3	4	4	4
32	Staff gave complete explanation of what would be done	2	1	2	0	4	1	3	2	3	2
33	Patient given written information about the operation	5	8	5	0	5	3	4	5	5	4
34	Staff explained how operation had gone in understandable way	1	-1	2	0	5	1	2	2	2	2
36	Got understandable answers to important questions all/most of the time (doctor)	0	1	0	0	4	1	2	2	3	2
37	Patient had confidence and trust in all doctors treating them	2	1	2	0	6	3	3	4	4	3
38	Doctors did not talk in front of patient as if they were not there	4	3	4	0	5	5	4	3	5	4
39	Patient's family definitely had opportunity to talk to doctor	-1	-2	-1	0	4	1	-2	-1	1	1
40	Got understandable answers to important questions all/most of the time (ward nurse)	3	4	4	0	8	6	4	5	8	6
41	Patient had confidence and trust in all ward nurses	5	5	6	0	11	9	5	7	9	8
42	Nurses did not talk in front of patient as if they were not there	4	4	3	0	6	7	6	6	6	6
43	Always / nearly always enough nurses on duty	-4	-3	-4	0	3	0	0	2	0	-3
44	Patient did not think hospital staff deliberately misinformed them	2	1	3	0	5	3	3	3	4	3
45	Patient never thought they were given conflicting information	3	2	2	0	7	6	3	5	5	2
46	Hospital staff asked what name the patient preferred to be called by	16	23	12	0	25	14	20	14	21	19
47	Always given enough privacy when discussing condition/treatment	2	3	3	0	3	3	4	2	2	2
48	Always given enough privacy when being examined or treated	1	1	1	0	1	1	1	1	0	1
49	Patient was able to discuss worries and fears with staff	5	6	4	0	9	7	6	7	8	7
50	Hospital staff did everything to help control pain all of the time	0	1	2	0	3	2	2	1	4	2
51	Always treated with respect and dignity by staff	3	3	3	0	6	4	3	3	5	4
52	Given clear written information about what should / should not do post discharge	4	3	3	0	4	3	3	4	3	3
53	Staff told patient who to contact if worried post discharge	3	1	2	0	3	1	2	2	3	3
54	Family definitely given all information needed to help care at home	1	0	0	0	3	0	0	0	3	1
55	Patient definitely given enough care from health or social services	8	4	8	0	13	11	3	8	8	11
56	Staff definitely did everything to control side effects of radiotherapy	4	4	4	0	8	5	2	2	4	9
57	Staff definitely did everything to control side effects of chemotherapy	6	1	6	0	9	4	4	4	5	7
58	Staff definitely did everything they could to help control pain	3	3	5	0	7	3	2	3	5	7
59	Hospital staff definitely gave patient enough emotional support	6	3	6	0	10	8	4	6	6	10

61	Waited no longer than 30 minutes for OPD appointment to start	6	8	7	0	19	8	9	11	12	9
62	Patient thought doctor spent about the right amount of time with them	1	1	1	0	2	1	2	2	2	3
63	Doctor had the right notes and other documentation with them	1	1	1	0	2	1	1	1	1	1
64	GP given enough information about patient's condition and treatment	0	0	1	0	2	-1	-1	2	0	1
65	Practice staff definitely did everything they could to support patient	6	5	7	0	10	6	9	7	9	7
66	Hospital and community staff always worked well together	8	6	8	0	12	9	6	9	9	9
67	Given the right amount of information about condition and treatment	0	0	1	0	4	0	1	2	1	2
68	Patient was offered a written care plan	3	-2	0	0	6	0	-6	0	-3	3
69	Patient did not feel that they were treated as a set of cancer symptoms	2	1	4	0	5	4	4	5	4	6
70	Overall rating of care	1	0	2	0	3	2	3	2	3	3

Appendix table 4a presents London vs. rest-of-England comparisons in absolute percentage scores.

		All responses		"Rest of England"		London	
	Question	N	% positive	N	% positive	N	% positive
1	Saw GP once/twice before being told had to go to hospital	52808	74.4	46286	75.1	6522	69.7
2	Patient thought they were seen as soon as necessary	66716	83.4	58328	84.0	8388	79.4
3	% saw a hospital doctor in less than 3 months	64558	80.9	56464	81.4	8094	77.7
4	Patient's health got better or remained about the same while waiting	66644	79.5	58268	80.1	8376	75.6
6	Staff gave complete explanation of purpose of test(s)	55125	83.0	48334	83.4	6791	80.4
7	Staff explained completely what would be done during test	56574	86.6	49631	87.0	6943	83.8
8	Given easy to understand written information about test	43832	86.7	38426	87.1	5406	84.2
9	Given complete explanation of test results in understandable way	57658	77.7	50529	78.2	7129	73.9
11	Patient told they could bring a friend when first told they had cancer	54834	71.9	48075	72.6	6759	66.9
12	Patient felt they were told sensitively that they had cancer	67651	83.1	59130	83.4	8521	81.2
13	Patient completely understood the explanation of what was wrong	67675	73.0	59155	73.3	8520	70.8
14	Patient given written information about the type of cancer they had	58460	68.9	51027	69.4	7433	65.4
15	Patient given a choice of different types of treatment	23869	84.0	20588	84.2	3281	82.5
16	Patient thinks that their views were taken into account when discussing treatment	57815	69.6	50430	70.0	7385	66.6
17	Possible side effects explained in an understandable way	64025	74.8	55850	75.1	8175	72.7
18	Patient given written information about side effects	62784	81.5	54825	81.8	7959	79.2
19	Patient definitely involved in decisions about which treatment	65333	71.9	57090	72.3	8243	69.1
20	Patient given the name of the CNS in charge of their care	64459	87.0	56343	86.9	8116	87.9
21	Patient finds it easy to contact their CNS	50171	74.8	43661	75.7	6510	69.0
22	CNS definitely listened carefully the last time spoken to	53905	91.3	47035	91.6	6870	89.4
23	Get understandable answers to important questions all/most of the time (CNS)	49270	91.1	42893	91.4	6377	89.2
24	Hospital staff gave information about support groups	50148	81.6	43759	81.8	6389	80.1
25	Hospital staff gave information on getting financial help	38488	52.2	33488	52.5	5000	49.9
26	Hospital staff told patient they could get free prescriptions	31595	72.9	27095	73.1	4500	71.7
27	Patient asked if they would like to take part in cancer research	64235	32.7	56128	31.1	8107	44.0
29	Patient would have liked to have been asked	40257	53.1	36034	52.9	4223	54.5
31	Admission date not changed by hospital	37807	90.4	33238	90.8	4569	87.2
32	Staff gave complete explanation of what would be done	37074	86.7	32592	86.9	4482	84.9
33	Patient given written information about the operation	34377	73.5	30229	74.1	4148	69.2
34	Staff explained how operation had gone in understandable way	36723	74.7	32261	74.9	4462	73.2
36	Got understandable answers to important questions all/most of the time (doctor)	42426	82.3	37088	82.5	5338	81.0
37	Patient had confidence and trust in all doctors treating them	45724	84.8	40048	85.2	5676	82.3
38	Doctors did not talk in front of patient as if they were not there	45658	83.0	39989	83.5	5669	79.4
39	Patient's family definitely had opportunity to talk to doctor	38414	64.9	33677	64.9	4737	64.9
40	Got understandable answers to important questions all/most of the time (ward nurse)	40180	75.1	35093	75.8	5087	70.4
41	Patient had confidence and trust in all ward nurses	45500	69.4	39853	70.3	5647	63.1
42	Nurses did not talk in front of patient as if they were not there	45507	84.7	39861	85.4	5646	80.1
43	Always / nearly always enough nurses on duty	45261	61.0	39630	60.8	5631	62.1
44	Patient did not think hospital staff deliberately misinformed them	45570	87.5	39912	87.9	5658	84.9
45	Patient never thought they were given conflicting information	45476	79.0	39832	79.5	5644	75.5
46	Hospital staff asked what name the patient preferred to be called by	45308	56.0	39704	58.2	5604	40.6
47	Always given enough privacy when discussing condition/treatment	45578	84.0	39922	84.3	5656	81.8
48	Always given enough privacy when being examined or treated	45712	94.1	40032	94.2	5680	93.4
49	Patient was able to discuss worries and fears with staff	39253	63.8	34355	64.6	4898	58.2
50	Hospital staff did everything to help control pain all of the time	38902	84.6	34049	84.9	4853	82.7
51	Always treated with respect and dignity by staff	45206	82.7	39617	83.2	5589	79.5
52	Given clear written information about what should / should not do post discharge	43020	84.1	37753	84.5	5267	81.3
53	Staff told patient who to contact if worried post discharge	43894	92.9	38489	93.2	5405	91.0
54	Family definitely given all information needed to help care at home	37254	59.9	32756	60.0	4498	59.0
55	Patient definitely given enough care from health or social services	25356	61.1	22248	62.1	3108	53.6
56	Staff definitely did everything to control side effects of radiotherapy	22552	79.2	19505	79.8	3047	75.1
57	Staff definitely did everything to control side effects of chemotherapy	39073	81.3	33827	82.0	5246	76.8
58	Staff definitely did everything they could to help control pain	38130	81.0	32954	81.6	5176	77.4
59	Hospital staff definitely gave patient enough emotional support	45884	70.5	39989	71.4	5895	64.7
61	Waited no longer than 30 minutes for OPD appointment to start	59989	69.8	52385	71.0	7604	61.5
62	Patient thought doctor spent about the right amount of time with them	62104	93.8	54227	94.0	7877	92.4
63	Doctor had the right notes and other documentation with them	59844	95.2	52282	95.3	7562	94.3
64	GP given enough information about patient's condition and treatment	55920	94.2	48534	94.2	7386	93.9
65	Practice staff definitely did everything they could to support patient	47116	67.1	41312	68.0	5804	60.7
66	Hospital and community staff always worked well together	65561	62.4	57289	63.4	8272	55.2
67	Given the right amount of information about condition and treatment	67842	88.7	59256	88.8	8586	87.7
68	Patient was offered a written care plan	57441	24.2	50203	24.2	7238	24.0
69	Patient did not feel that they were treated as a set of cancer symptoms	67371	79.8	58845	80.3	8526	76.3
70	Overall rating of care	67863	87.9	59272	88.2	8591	86.0

Appendix table 4b: Odds Ratios (95% Confidence Intervals) and p-values for cancer patients treated by London hospitals reporting poorer patient experience compared with patients treated by hospitals elsewhere in England. Results from three logistic regression models are presented: crude associations with only adjustment for hospital; results from a model adjusting for patient case-mix; and from a model which additionally accounted for whether a patient was treated at a teaching hospital or not. Synoptic forms of questions are given in Appendix table 4a

	Unadjusted		Adjusted for clinical and socio-demographic variables		Additionally adjusted for teaching hospital status	
Question	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
1	1.27 (1.16 - 1.39)	<0.0001	1.11 (1.03 - 1.20)	0.010	1.10 (1.01 - 1.19)	0.026
2	1.37 (1.24 - 1.51)	<0.0001	1.21 (1.11 - 1.32)	<0.0001	1.19 (1.09 - 1.31)	<0.0001
3	1.26 (1.17 - 1.35)	<0.0001	1.16 (1.09 - 1.24)	<0.0001	1.16 (1.08 - 1.24)	<0.0001
4	1.28 (1.17 - 1.41)	<0.0001	1.13 (1.05 - 1.22)	0.002	1.13 (1.04 - 1.22)	0.002
6	1.26 (1.15 - 1.38)	<0.0001	1.17 (1.06 - 1.28)	0.002	1.17 (1.06 - 1.29)	0.002
7	1.30 (1.18 - 1.44)	<0.0001	1.20 (1.08 - 1.33)	0.001	1.20 (1.08 - 1.33)	0.001
8	1.38 (1.19 - 1.59)	<0.0001	1.21 (1.05 - 1.40)	0.010	1.21 (1.04 - 1.40)	0.011
9	1.27 (1.17 - 1.39)	<0.0001	1.14 (1.05 - 1.24)	0.003	1.14 (1.05 - 1.24)	0.003
11	1.31 (1.17 - 1.46)	<0.0001	1.29 (1.16 - 1.44)	<0.0001	1.29 (1.15 - 1.44)	<0.0001
12	1.14 (1.04 - 1.24)	0.006	1.11 (1.01 - 1.21)	0.025	1.10 (1.01 - 1.21)	0.033
13	1.13 (1.05 - 1.21)	0.001	1.00 (0.93 - 1.07)	0.986	1.00 (0.93 - 1.07)	0.929
14	1.20 (1.08 - 1.33)	0.001	1.10 (1.00 - 1.22)	0.049	1.10 (0.99 - 1.21)	0.073
15	1.14 (0.99 - 1.31)	0.075	1.03 (0.89 - 1.20)	0.657	1.07 (0.92 - 1.24)	0.381
16	1.19 (1.10 - 1.30)	<0.0001	1.13 (1.04 - 1.23)	0.005	1.14 (1.04 - 1.24)	0.004
17	1.16 (1.06 - 1.27)	0.001	1.10 (1.01 - 1.20)	0.028	1.10 (1.00 - 1.20)	0.039
18	1.27 (1.13 - 1.44)	<0.0001	1.19 (1.06 - 1.33)	0.002	1.20 (1.07 - 1.35)	0.002
19	1.21 (1.11 - 1.32)	<0.0001	1.11 (1.02 - 1.21)	0.015	1.12 (1.03 - 1.23)	0.010
20	0.99 (0.85 - 1.16)	0.893	0.96 (0.81 - 1.13)	0.614	0.98 (0.83 - 1.16)	0.854
21	1.39 (1.22 - 1.59)	<0.0001	1.35 (1.19 - 1.54)	<0.0001	1.32 (1.15 - 1.50)	<0.0001
22	1.31 (1.17 - 1.46)	<0.0001	1.23 (1.09 - 1.38)	<0.0001	1.19 (1.06 - 1.34)	0.003
23	1.32 (1.17 - 1.49)	<0.0001	1.18 (1.05 - 1.33)	0.006	1.15 (1.02 - 1.30)	0.020
24	1.10 (0.94 - 1.28)	0.243	1.04 (0.89 - 1.21)	0.663	1.04 (0.89 - 1.22)	0.638
25	1.17 (1.01 - 1.36)	0.043	1.20 (1.03 - 1.40)	0.018	1.17 (1.00 - 1.36)	0.051
26	1.12 (0.97 - 1.29)	0.115	1.15 (0.99 - 1.34)	0.063	1.14 (0.98 - 1.33)	0.101
27	0.67 (0.56 - 0.79)	<0.0001	0.66 (0.56 - 0.79)	<0.0001	0.73 (0.62 - 0.85)	<0.0001
29	0.96 (0.87 - 1.05)	0.374	0.98 (0.90 - 1.06)	0.563	0.99 (0.91 - 1.08)	0.795
31	1.52 (1.30 - 1.78)	<0.0001	1.42 (1.22 - 1.64)	<0.0001	1.37 (1.19 - 1.59)	<0.0001
32	1.18 (1.06 - 1.32)	0.003	1.13 (1.01 - 1.27)	0.029	1.14 (1.02 - 1.28)	0.024
33	1.32 (1.15 - 1.52)	<0.0001	1.31 (1.15 - 1.49)	<0.0001	1.30 (1.14 - 1.49)	<0.0001
34	1.10 (0.99 - 1.21)	0.066	1.03 (0.93 - 1.13)	0.618	1.03 (0.93 - 1.14)	0.566
36	1.14 (1.02 - 1.27)	0.022	1.01 (0.90 - 1.13)	0.841	1.04 (0.93 - 1.16)	0.518
37	1.25 (1.11 - 1.41)	<0.0001	1.12 (0.99 - 1.27)	0.062	1.14 (1.01 - 1.29)	0.037
38	1.37 (1.24 - 1.52)	<0.0001	1.23 (1.10 - 1.36)	<0.0001	1.22 (1.10 - 1.36)	<0.0001
39	1.03 (0.93 - 1.13)	0.593	1.02 (0.92 - 1.12)	0.749	1.02 (0.92 - 1.13)	0.728
40	1.45 (1.29 - 1.63)	<0.0001	1.33 (1.18 - 1.50)	<0.0001	1.33 (1.18 - 1.51)	<0.0001
41	1.46 (1.32 - 1.62)	<0.0001	1.40 (1.26 - 1.55)	<0.0001	1.40 (1.25 - 1.55)	<0.0001
42	1.50 (1.34 - 1.68)	<0.0001	1.30 (1.16 - 1.46)	<0.0001	1.30 (1.16 - 1.46)	<0.0001
43	1.04 (0.91 - 1.17)	0.576	0.99 (0.87 - 1.12)	0.869	0.99 (0.87 - 1.13)	0.872
44	1.31 (1.17 - 1.46)	<0.0001	1.05 (0.94 - 1.17)	0.399	1.05 (0.93 - 1.17)	0.433
45	1.30 (1.17 - 1.44)	<0.0001	1.22 (1.11 - 1.35)	<0.0001	1.20 (1.09 - 1.32)	<0.0001
46	2.05 (1.75 - 2.41)	<0.0001	2.05 (1.75 - 2.41)	<0.0001	2.07 (1.76 - 2.44)	<0.0001
47	1.24 (1.10 - 1.38)	<0.0001	1.17 (1.04 - 1.32)	0.008	1.18 (1.05 - 1.33)	0.007
48	1.17 (1.02 - 1.35)	0.030	1.10 (0.95 - 1.28)	0.193	1.12 (0.96 - 1.29)	0.151
49	1.36 (1.23 - 1.50)	<0.0001	1.26 (1.14 - 1.39)	<0.0001	1.26 (1.14 - 1.39)	<0.0001
50	1.22 (1.09 - 1.36)	0.001	1.11 (0.99 - 1.24)	0.075	1.11 (0.99 - 1.25)	0.068
51	1.32 (1.18 - 1.47)	<0.0001	1.24 (1.11 - 1.40)	<0.0001	1.26 (1.12 - 1.41)	<0.0001
52	1.25 (1.09 - 1.44)	0.002	1.22 (1.06 - 1.41)	0.006	1.22 (1.05 - 1.41)	0.008
53	1.41 (1.19 - 1.67)	<0.0001	1.41 (1.19 - 1.67)	<0.0001	1.41 (1.18 - 1.68)	<0.0001
54	1.06 (0.97 - 1.16)	0.191	1.08 (0.98 - 1.18)	0.120	1.08 (0.98 - 1.18)	0.114
55	1.44 (1.25 - 1.66)	<0.0001	1.33 (1.16 - 1.53)	<0.0001	1.29 (1.13 - 1.49)	<0.0001
56	1.31 (1.16 - 1.47)	<0.0001	1.19 (1.05 - 1.35)	0.006	1.18 (1.04 - 1.34)	0.012
57	1.43 (1.27 - 1.62)	<0.0001	1.29 (1.13 - 1.46)	<0.0001	1.27 (1.12 - 1.45)	<0.0001
58	1.32 (1.19 - 1.47)	<0.0001	1.21 (1.08 - 1.35)	0.001	1.20 (1.07 - 1.34)	0.001
59	1.38 (1.24 - 1.53)	<0.0001	1.29 (1.16 - 1.43)	<0.0001	1.25 (1.12 - 1.38)	<0.0001
61	1.47 (1.23 - 1.77)	<0.0001	1.43 (1.19 - 1.71)	<0.0001	1.36 (1.14 - 1.63)	0.001
62	1.31 (1.12 - 1.52)	0.001	1.19 (1.02 - 1.38)	0.026	1.17 (1.00 - 1.37)	0.045
63	1.26 (1.07 - 1.47)	0.004	1.27 (1.08 - 1.49)	0.004	1.27 (1.08 - 1.49)	0.005
64	1.15 (0.96 - 1.37)	0.129	0.98 (0.82 - 1.17)	0.837	0.99 (0.82 - 1.18)	0.889
65	1.35 (1.24 - 1.47)	<0.0001	1.26 (1.16 - 1.37)	<0.0001	1.25 (1.14 - 1.36)	<0.0001
66	1.42 (1.31 - 1.53)	<0.0001	1.33 (1.23 - 1.43)	<0.0001	1.31 (1.21 - 1.41)	<0.0001
67	1.13 (1.03 - 1.25)	0.013	1.05 (0.94 - 1.16)	0.393	1.06 (0.95 - 1.17)	0.307
68	1.01 (0.88 - 1.15)	0.918	1.09 (0.95 - 1.25)	0.201	1.08 (0.94 - 1.25)	0.258
69	1.27 (1.15 - 1.40)	<0.0001	1.15 (1.05 - 1.26)	0.003	1.13 (1.03 - 1.24)	0.011
70	1.32 (1.17 - 1.49)	<0.0001	1.11 (0.98 - 1.26)	0.098	1.12 (0.99 - 1.27)	0.080

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

	Item No	Recommendation
Title and abstract	1	*(a)* Indicate the study's design with a commonly used term in the title or the abstract *The study design (survey) indicated in the title – last word in the title.*
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found *The abstract provides an informative and balanced summary as suggested.*
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported *We indicate the rationale for the study in the Introduction section – previous knowledge that cancer patient experience is worse in London, but reasons for this variation are unknown*
Objectives	3	State specific objectives, including any prespecified hypotheses *We provide those explicitly as part of our (brief) Introduction section*
Methods		
Study design	4	Present key elements of study design early in the paper *We present those in Methods*
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection *We describe those in Methods, Data*
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants *We describe those in Methods, Data*
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable *We describe those in Methods, Analysis.*
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group *We describe those in Methods, Data*
Bias	9	Describe any efforts to address potential sources of bias *We describe these in Methods, Analysis*
Study size	10	Explain how the study size was arrived at *For each question, we included in analysis all patients with an informative response*

		to the question of interest and complete information on the exposure variables, see Methods, Data, end of first paragraph.
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why *Please see Methods, Data and Analysis*
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding *Please see above (Methods, Analysis)*
		(*b*) Describe any methods used to examine subgroups and interactions *We explored interactions as applicable to the study hypothesis, see Methods last paragraph, and Results section entitled "London variation for cancer patients and general in-patients"*
		(*c*) Explain how missing data were addressed *Please see reply to item 10 above*
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses *Details are given in the results (final paragraph) and discussion (paragraph 3)*
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed *This is a secondary analysis of an already created dataset, analysed in a complete case analysis fashion (see also Methods and reply to item 10 above).*
		(b) Give reasons for non-participation at each stage *See above (13a)*
		(c) Consider use of a flow diagram *Not applicable, please see above (13a)*
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders *See Results, Table 1*
		(b) Indicate number of participants with missing data for each variable of interest *Please see reply to items 10 and 13a above*
Outcome data	15*	Report numbers of outcome events or summary measures *See Results and Tables 2 and 3*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included

		See Results and Table 2 (unadjusted odds ratios), also Online Appendix 3
		(*b*) Report category boundaries when continuous variables were categorized *See Methods, Data, and Results, Tables.*
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period *We present information on London vs rest-of-England differences in cancer patient experience both in percentages (Appendix 3) and odds ratios (Table 2)*
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses *Please see reply to item 12b above*
Discussion		
Key results	18	Summarise key results with reference to study objectives *See First Paragraph of Discussion, also 'What is known / what this study adds' section*
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias *We do consider limitations as part of Discussion, paragraph 3*
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence *See Discussion, paragraph 4*
Generalisability	21	Discuss the generalisability (external validity) of the study results *Not particularly applicable in the context of a nationwide patient survey*
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based *Provided at the end of manuscript as required by BMJ house-style*

*Give information separately for exposed and unexposed groups.

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

What explains worse patient experience in London? Evidence from secondary analysis of the Cancer Patient Experience Survey

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What explains worse patient experience in London? Evidence from secondary analysis of the Cancer Patient Experience Survey

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ABSTRACT

Objective: To explore why cancer patients treated by London hospitals report worse experiences of care compared with those treated in other English regions.

Design: Secondary analysis of the 2011/12 National Cancer Patient Experience Survey (n=69,086).

Setting and Participants: Cancer patients treated by English NHS hospitals.

Main outcome measures: 64 patient experience measures covering all aspects of cancer care (pre-diagnosis to discharge).

Methods: Using mixed effects logistic regression, we explored whether poorer scores in London hospitals could be explained by patient case-mix (age, gender, ethnicity, deprivation and cancer type). Because patients referred into tertiary centres and/or with complex medical problems may report more critical experiences, we also explored whether the experiences reported in London may reflect higher concentration of teaching hospitals in the capital. Lastly, using data from the (general) Adult Inpatients Survey, we explored whether the extent of poorer experience reported by London patients was similar for respondents to either survey

Results: For 52/64 questions there was evidence of poorer experience in London, with the percentage of patients reporting a positive experience being lower compared with the rest of England by a median of 3.7% (inter-quartile range 2.5%-5.4%). After case-mix adjustment there was still evidence for worse experience in London for 44/64 questions. Additionally adjusting for teaching hospital status made trivial difference to the case-mix adjusted findings. There was evidence that London vs. rest-of-England differences were greater for cancer patients compared to (general) hospital inpatients for 10 of 16 questions in both the Cancer Patient Experience and the Adult Inpatients surveys.

Conclusions: Cancer patients treated by London hospitals report worse care experiences and by and large these differences are not explained by patient case-mix or teaching hospital status. Efforts to improve care in London should aim to meet both patient expectations and improve care quality.

What this paper adds

- Patients treated by London NHS services report a worse experience of their care compared with patients treated elsewhere in England
- Patient case-mix (including patient age, ethnicity and cancer diagnosis) and whether patients were treated at a teaching hospital only account for a small part of the overall London vs rest-of-England differences
- There are some indications that cancer patients treated by London hospitals report worse experiences because of poorer care as opposed to different expectations of quality

Strengths and limitations

- Data come from a large nationwide survey of patients with any cancer and a high (68%) response rate.
- We have not been able to directly examine the potential influence of differences in expectations of care quality between patients treated by London hospitals and hospitals elsewhere in England.

INTRODUCTION /BACKGROUND

Understanding variation in patient experience can help to inform priorities for improvement actions and policies. In the UK, the advent of large national surveys of cancer patients, has enabled a better appreciation of variation in cancer patient experience between different patient groups or hospitals.[1,2,3,4] A salient finding of recent cancer patient surveys is that patients treated by London hospitals reported poorer experiences compared with those treated by hospitals in other English regions.[1,5,6,7]

Several hypotheses can be considered to explain this type of geographical variation in crude hospital experience scores. First, London hospitals may be treating a higher proportion of patient groups known to report worse experiences of care, such as younger and ethnic minority patients, or patients with certain types of cancer.[2,3,8,9] Second, patient experience may vary by type of hospital, and if so the experiences reported in London could simply reflect a higher concentration of teaching (tertiary) hospitals in the capital region.[7] This hypothesis assumes that patients who are referred into tertiary centres and/or have complex medical problems and/or have more complex care pathways are likely to be more critical of their experiences. Third, it is possible that London patients receive the same care as that received by patients elsewhere but have higher expectations of care quality, perhaps because of different cultural expectations, leading to a more critical evaluation of their experience (the 'same care worse experience' hypothesis).[8] Fourth, care provided by London hospitals may indeed be different (worse) compared to the rest of the country, leading to worse experience.

Understanding the potential mechanisms responsible for poorer reported experience of cancer patients treated by London hospitals is important to inform efforts to address this disparity. In this paper we set out to directly explore whether London / rest-of-England inequalities in cancer patient experience may reflect confounding by socio-demographic or

cancer diagnosis case-mix and/or hospital type. In addition, we consider indirect evidence to provide insights about other potential sources of variation, beyond case-mix and hospital type.

METHODS

Data

Sources

For the main analysis we used publicly available anonymous data from the 2011/12 National Cancer Patient Experience Survey – a postal survey of cancer patients treated by 160 English NHS hospitals during January-March 2012 (71,793 respondents, response rate 68%) carried out by Quality Health for the Department of Health.[10] Of all respondents, 3.8% had missing self-reported ethnic group and were excluded, with the final analysis sample of 69,086. For each question, we included in analysis all patients with an informative response to the question of interest.

In further analysis we used data from the Adult Inpatients Survey, a postal survey of patients with any pathology and at least one night stay in an NHS hospital between June-August 2011 (70,863 respondents, response rate 53%) carried out by the Picker Institute for the Care Quality Commission.[11] Of all respondents, 3 had missing age and were excluded with a final analysis sample of 70,860.

Outcome and exposure variables

Of all 160 English hospitals treating cancer patients 27 are London hospitals and 26 are teaching hospitals (i.e. university hospitals with a tertiary referral centre function) (Appendix table 1). Eight teaching hospitals are also London hospitals.

The Cancer Patient Experience Survey comprises 65 questions that measure patient experience across the cancer patient journey. Most questions have a 4- or 5-point Likert scale response options, evaluating experience from very good to very poor. As public reporting of hospital scores for the survey is based on binary forms of these outcomes (i.e. good or poor patient experience),[1] we used the same binary categorisations in the analysis. There are 16 Cancer Patient Experience Survey questions that are also included in the Adult Inpatients Survey. Information on cancer diagnosis International Classification of Diseases

(ICD)-10 code, patient age and gender were available for all respondents based on hospital record information. Thirty-six different cancer diagnoses groups were considered (Appendix table 2). Age was categorised into eight groups (16-24, six 10-year groups from 25-34 to 75-84 and 85+). We used patients self-reported ethnicity (based on their responses to survey question 77) in this study rather than relying on information recorded in hospital records as the former is considered to be a gold-standard and the latter has been shown to contain inaccuracies.[12] A six-group classification (White, Mixed, Asian or Asian British, Black or Black British, Chinese and Other) was used in the analysis.

Analysis

Exploratory analysis showed that variation between English regions other than London was trivial (Appendix table 3). Therefore hereafter all analysis relates to London / rest-of-England comparisons, with patients treated by 'rest-of-England' hospitals considered together as a group.

We first described London / rest-of-England variation in the socio-demographic and clinical characteristics of respondents.

We then used mixed effects logistic regression (including a random effect for hospital) to estimate the odds ratio for cancer patients treated by London hospitals reporting poorer experience compared with those treated by hospitals elsewhere in England. We considered three models separately for each of the survey questions. To explore crude (unadjusted) differences, the first model only included a fixed effect variable denoting London / rest-of-England hospital location (in addition to a random effect for hospital, as above). To explore the potential influence of patient case-mix, the second model additionally included case-mix variables (patient age, gender, ethnic group and cancer diagnosis). Lastly, to explore the potential influence of teaching hospital status, the third model, in addition to socio-demographic characteristics and cancer diagnosis also adjusted for whether or not the hospital of treatment was a teaching hospital. We plotted the p-values from these fully

adjusted models to evaluate the role of chance in these findings. For one question (question 28, whether a patient was pleased to have been asked to take part in cancer research) the adjusted model did not converge, as patient experience was almost uniformly positive across all hospitals in England. This question was therefore excluded from all analyses, and results hereafter relate to 64 evaluative questions. We also explored interactions between London hospital and socio-demographic characteristics which allows us to explore whether any particular groups of patients report particularly different experiences in London; for ethnic groups specifically, because interaction models include a large numbers of degrees of freedom we considered a broad 2 group classification of ethnicity (White / Non-White).

Finally, we combined data from the two hospital surveys (Cancer Patient Experience Survey and Adult Inpatients Survey) to test whether differences in experience reported by patients treated by London hospitals were consistent across the two surveys. After adjusting for age and gender, using this model we tested whether the association between London hospital location and patient experience was consistent between surveys for the 16 questions that they both share. All analyses were carried out using Stata v11.2.

RESULTS

Patient characteristics

On average, compared with patients treated elsewhere in England, those treated by London hospitals were younger (median age of 65 vs 66 years), more likely to belong to ethnic minorities (16% vs 2%), more likely to be treated by teaching hospitals (46% vs 24%) and more likely to suffer from rarer types of cancers (for example 6.5% vs 4.4% had multiple myeloma, table 1).

Unadjusted differences in positive experience

There was evidence ($p<0.05$) that cancer patients treated by London hospitals reported worse experiences compared with those treated by hospitals in the rest of England for 52 out of 64 survey questions (Figure 1, full results in appendix table 4b). For a single question (whether the patient was asked to take part in cancer research) experience was more positive in London whilst for nine other questions there was no evidence of difference (appendix table 4b). Depending on item non-response and the frequency of positive responses observed (unadjusted and adjusted) effect sizes of OR~1.1 are significant at $p<0.05$.

For the 52 questions with worse experience in London, the proportion of patients reporting a positive experience was lower in London compared with the rest of England by a median of 3.7% (inter-quartile range 2.5%-5.4%, full details by question in appendix table 4a). For these questions the un-adjusted odds ratios (for London patients reporting worse experience) ranged from 1.13 to 2.05. The most pronounced difference was for the question on whether staff asked patients about the name by which they would like to be called [unadjusted odds ratio for worse experience in London=2.05 (1.75-2.41)].

Variation in experience adjusted for patient case-mix

After accounting for differences in case-mix the size of London / rest-of-England differences in patient experience was attenuated, but there was still evidence ($p<0.05$) that patient experience was worse in London hospitals for 45 out of 64 questions (Figure 1 and appendix table 4b).

Adjustment for teaching hospital status

Adjusting for teaching hospital status (additional to adjustment for case-mix) made minimal difference to the size of London / rest-of-England differences: there remained evidence that patient experience was worse in London ($p<0.05$) for 44 of 64 survey questions, with effect sizes that were nearly identical to those observed after case-mix adjustment (Figure 1 and Appendix table 4b). Specific aspects of variation are further highlighted in Box 1. The observed and expected distribution of p-values under the null hypothesis were plotted from these models (figure 3). The significant associations observed are unlikely to be due to chance alone.

Interaction analysis

There was little evidence for interactions between treatment by a London hospital and socio-demographic characteristics. Full results for ethnicity are presented in appendix 5. Briefly the results suggest that the impact of being treated by a London hospital is the same no matter the ethnic background of the patient. Another way to consider this would be that although ethnic minority patients generally report worse care than white patients there is no evidence that this disparity is any larger or smaller in London hospitals.

London variation for cancer patients and general in-patients

For 16 questions that are consistent across both surveys, reported experience was generally more positive for cancer patients (Cancer Patient Experience Survey respondents) compared to patients with a general mix of diagnoses (Adult Inpatients Survey respondents). Being treated in London appears to have a more negative impact on patient experience

among cancer patients than among general hospital inpatients, with statistical evidence for such an interaction for 10 of the 16 questions that are common across the two surveys (table 2).

Box: Aspects of London / rest-of-England variation in cancer patient experience

Considering different questions across the patient journey, patients treated by London hospitals generally report worse experiences throughout (diagnosis, treatment, discharge and post-diagnosis). Further, worse experience in London is apparent both for questions relating to the experience of hospital care and for the (fewer) questions that relate to the experience of primary or social care. For example, patients treated by London hospitals reported worse experience for questions 1-4 (relating to pre-diagnosis experience, including aspects of care provided by general practitioners) and for question 55 (care from health and social services after discharge from hospital).

The few questions without evidence for worse experience in London hospitals include questions about treatment choice (question 15, whether the patient was given a choice of treatment options) and information provision (for example, question 68, on having been offered a written care plan).

London / rest-of-England differences in respect of nursing care were inconsistent. For two relevant report items (question 20, whether the patient was given the name of a Cancer Nurse Specialist; and question 43, whether there were enough ward nurses on duty) there was no evidence of differences. However for evaluation items relevant to nursing care (for example, questions 21-23 regarding ease of contacting a Cancer Nurse Specialist and inter-personal aspects of specialist nurse care; or questions 40-41 regarding the experience of ward nursing) patients treated by London hospitals reported worse experience.

The strength of the association between poorer patient experience in London / rest-of-England was attenuated for most questions after adjusting for case-mix and hospital type (Figure 1). Improvement efforts should be focused on questions where the associations are strongest (appendix table 4b), rather than on individual changes in p-values.

Considering report or evaluation types of questions, in general, patients treated by London hospitals tended to report worse experience for both evaluation and report items (Figure 2).

Table 1. Comparison of cancer patients treated by London hospitals compared with those treated elsewhere in England

Age	All	%	Rest-of-England	%	London	%
16-24	355	0.5	275	0.5	80	0.9
25-34	954	1.4	756	1.3	198	2.3
35-44	2,999	4.3	2492	4.1	507	5.8
45-54	8,911	12.9	7637	12.7	1,274	14.6
55-64	16,970	24.6	14820	24.6	2,150	24.6
65-74	22,749	32.9	20168	33.4	2,581	29.5
75-84	13,564	19.6	11901	19.7	1,663	19.0
85+	2,584	3.7	2289	3.8	295	3.4
Age Median (IQR)	66 (58-74)		66 (58-74)		65 (55-73)	
Gender						
Men	32,463	47.0	28,398	47.1	4,065	46.5
Women	36,623	53.0	31,940	52.9	4,683	53.5
Ethnic group						
White	66,421	96.1	59,071	97.9	7,350	84.0
Mixed	278	0.4	151	0.3	127	1.5
Asian	1,146	1.7	633	1.0	513	5.9
Black	949	1.4	334	0.6	615	7.0
Chinese	150	0.2	87	0.1	63	0.7
Other	142	0.2	62	0.1	80	0.9
Teaching hospital	18,758	27.2	14,711	24.4	4,047	46.3
Other hospital type	50,328	72.8	45,627	75.6	4,701	53.7
Cancer diagnosis						
Breast	13,396	19.4	11,742	19.5	1,654	18.9
DCIS	916	1.3	788	1.3	128	1.5
Ovarian	1,823	2.6	1,550	2.6	273	3.1
Endometrial	1,478	2.1	1,280	2.1	198	2.3
Cervical	405	0.6	355	0.6	50	0.6
Vulval / vaginal	236	0.3	206	0.3	30	0.3
Other gynaecological	88	0.1	74	0.1	14	0.2
Thyroid	493	0.7	434	0.7	59	0.7
Laryngeal	361	0.5	319	0.5	42	0.5
Other head & neck	1,280	1.9	1,136	1.9	144	1.6
Non-Hodgkin lymphoma	4,290	6.2	3,781	6.3	509	5.8
Multiple myeloma	3,236	4.7	2,667	4.4	569	6.5
Leukaemia	2,479	3.6	2,075	3.4	404	4.6
Hodgkin lymphoma	487	0.7	411	0.7	76	0.9
Rectal	3,541	5.1	3,176	5.3	365	4.2
Colon	5,054	7.3	4,516	7.5	538	6.1
Anal	242	0.4	213	0.4	29	0.3
Other lower gastro-intestinal	215	0.3	182	0.3	33	0.4
Lung	3,698	5.4	3,237	5.4	461	5.3
Mesothelioma	392	0.6	346	0.6	46	0.5
Brain	483	0.7	397	0.7	86	1.0
Other central nervous system	59	0.1	39	0.1	20	0.2
Oesophageal	1,362	2.0	1,209	2.0	153	1.7
Stomach	1,019	1.5	906	1.5	113	1.3
Pancreatic	673	1.0	569	0.9	104	1.2
Hepato-biliary / gall bladder	568	0.8	439	0.7	129	1.5
Bladder	6,503	9.4	5,808	9.6	695	7.9
Prostate	5,568	8.1	4,897	8.1	671	7.7
Renal	950	1.4	839	1.4	111	1.3
Other urological	349	0.5	309	0.5	40	0.5
Testicular	256	0.4	217	0.4	39	0.4
Secondary	4,308	6.2	3,740	6.2	568	6.5
Melanoma	1,546	2.2	1,420	2.4	126	1.4
Soft tissue sarcoma	575	0.8	447	0.7	128	1.5
Bone sarcoma	174	0.3	125	0.2	49	0.6
Any other cancer diagnosis	583	0.8	489	0.8	94	1.1

Table 2: Comparison of London / rest-of-England differences in patient experience for general in-patients (any pathology) and patients with cancer*

Question**		Effect of London in general inpatients	Effect of London in cancer patients	Interaction Odds Ratio	Interaction p-value
19	Patient definitely involved in decisions about which treatment	1.15	1.31	1.13 (1.06 - 1.22)	0.001
32	Staff gave complete explanation of what would be done	1.17	1.25	1.07 (0.95 - 1.20)	0.223
34	Staff explained how operation had gone in understandable way	1.14	1.13	0.99 (0.90 - 1.09)	0.392
37	Patient had confidence and trust in all doctors treating them	1.07	1.35	1.27 (1.15 - 1.40)	<0.0001
38	Doctors did not talk in front of patient as if they were not there	1.17	1.47	1.25 (1.14 - 1.37)	<0.0001
41	Patient had confidence and trust in all ward nurses	1.50	1.58	1.05 (0.97 - 1.14)	0.176
42	Nurses did not talk in front of patient as if they were not there	1.48	1.67	1.13 (1.03 - 1.23)	0.018
43	Always / nearly always enough nurses on duty	1.03	1.12	1.08 (1.00 - 1.17)	0.057
45	Patient never thought they were given conflicting information	1.18	1.32	1.12 (1.03 - 1.22)	0.011
47	Always given enough privacy when discussing condition/treatment	1.07	1.3	1.21 (1.10 - 1.33)	0.0001
48	Always given enough privacy when being examined or treated	1.16	1.19	1.03 (0.90 - 1.18)	0.363
51	Always treated with respect and dignity by staff	1.23	1.47	1.20 (1.09 - 1.31)	0.0005
53	Staff told patient who to contact if worried post discharge	1.17	1.58	1.35 (1.19 - 1.52)	<0.0001
54	Family definitely given all information needed to help care at home	1.02	1.11	1.09 (0.99 - 1.19)	0.077
67	Given the right amount of information about condition and treatment	1.05	1.20	1.14 (1.04 - 1.25)	0.010
70	Overall rating of care	1.24	1.49	1.20 (1.09 - 1.31)	0.0002

*Odds ratio values > 1 indicate that the worse experience of patients treated by London hospitals was worse for cancer patients (respondents to the Cancer Patient Experience Survey) compared with patients with a general mix of diagnoses (respondents to the Adult Inpatients survey respondents).

**Relates to 16 questions that are common in both surveys. Question numbering relates to CPES questions.

DISCUSSION

We explored potential sources of variation in the experience of cancer patients treated by London hospitals compared with those treated by hospitals elsewhere in England. Considering unadjusted percentages, cancer patient experience in London is rated worse than any other English region for the great majority of questions, although the absolute percentage difference is typically small. Confounding by patient case-mix (socio-demographic characteristics or cancer diagnosis) explains some of the London / rest-of-England disparities but its overall impact is small. Additional adjustment for teaching hospital status only has a marginal influence. The observed distribution of p-values across questions would indicate that these findings are unlikely to be explained by chance alone (Figure 3). There is some evidence that London / rest-of-England differences in patient experience are larger for cancer patients than patients with a general mix of diagnoses. These findings indicate that the hypotheses that London / rest-of-England differences in patient experience reflect either patient case-mix or teaching hospital status are unlikely to be true.

Previous work has documented that London patients have worse experience of primary and hospital care.[13,14,15] However, by and large regional differences in the UK are confined to London / rest-of-England variation, which is a matter of on-going policy concern and improvement initiatives.[16] Research from Canada has also demonstrated rural-urban differences in patient experience, with patients in urban areas reporting worse experience.[17] Our study is reminiscent of a study exploring geographical variation in patient experience within the context of the Medicare's Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey in the US, specifically exploring sources of variation between California and the rest of the United States in patient experience scores.[18] This study, however, does not provide direct insights about the important question of whether differences relate to patient expectations or differences in care. The plurality of 'for profit' care providers and the fact that that survey is not focused on cancer patients make informative comparisons even more difficult.

Particular strengths of our study is its large sample size, and the ability to explore potential confounding by cancer diagnosis, in addition to 'universal' socio-demographic confounders such as age, gender and ethnicity. Certain limitations should also be considered. We were not able to adjust for disease severity, but we believe that the potential for residual confounding by disease severity is likely to be small, as inclusion of cancer diagnosis in the model made little difference to the findings. We were also not able to explore potential confounding by a range of other patient factors or hospital factors (such as such as the quality of patient transport links, the availability of parking and hospital environment and facilities in general). Importantly, we were also not able to adjust for patient socioeconomic status. However, previous work indicates only small and inconsistent differences in cancer patient experience between patients of different deprivation groups.[1,2,3] Further, in supplementary analysis that used data from the 2010 Cancer Patient Experience Survey, adjustment for the deprivation group of patients (which was available for that survey) in addition to age, gender, ethnicity and cancer diagnosis produced trivial differences in hospital ranks (data not shown).

Having been able to directly examine and eliminate case-mix or teaching hospital status as major sources of variation in the experience of patients treated by London hospitals, it is worth considering whether the findings may reflect differential expectations of care quality among Londoners, or worse care quality leading to worse experience. Disentangling this research question is fraught with substantive methodological difficulties. Evaluating standardised (e.g. videoed) encounters between patients and healthcare professionals to be rated by patients from different regions of England could be useful, as has been shown for studies of ethnic variation in experience.[19] In the absence of other evidence, it is worth considering three observations that may be insightful. First, with few exceptions patients treated by London hospitals evaluated their experience more negatively both for evaluation and report questions (figure 2), and this would seem to suggest that care provided by London hospitals may be worse than in other parts of the country. This is because if the sole

explanation for London / rest-of-England inequalities were that patients treated by London hospitals had higher expectations of quality then this factor could have been expected to chiefly have influenced their responses to evaluation (e.g. 'did the nurse listen to you carefully'?) as opposed to report items (e.g. 'have you been given the name of a Cancer Nurse Specialist'?). Similarly, the fact that London / rest-of-England differences appear to be larger for cancer patients compared with patients with other pathologies treated by the same hospitals would also support the hypothesis that an exogenous factor (such as worse quality of cancer care) may be responsible, as opposed to an intrinsic tendency for Londoners to evaluate their care differently to patients treated elsewhere in the country.. Third, we also note that some London hospitals (including one central London teaching hospital) have cancer patient experience scores that are above the national average.1 This observation does not support the hypothesis that patients treated by London hospitals have different higher expectations of care quality. It also indicates a potential for improvement for the majority of London hospitals where patient experience is poorer overall.

In brief, some indirect evidence indicates that at least in some part London / rest-of-England disparities may reflect worse care provided by London hospitals

The possible consequences of increasing fragmentation and care pathway complexity for cancer patient experience are an ongoing concern, particularly in London. In the future, it would be helpful if, subject to cognitive validation and development, specific questions to explore pathway complexity were included into the survey. For example, asking participants to indicate whether their current hospital of treatment was also the hospital of diagnosis (or related questions). An alternative would be for such information to be produced at the point of generating the sampling frame of the survey, using hospital episodes statistics data.

In conclusion, the findings suggest that patient case-mix and hospital type are unlikely to be important sources of geographical variations in the experience of cancer patients. These realisations can help to further motivate clinical and managerial engagement with

improvement efforts, and appropriate investment and improvement actions to address disparities in patient experience reported by cancer patients treated by London hospitals. In the absence of direct evidence about whether these disparity reflect different expectations or worse care, such efforts should aim to understand both how to meet patient expectations at the same time as delivering actual improvements in care quality.

Figure legends

Figure 1: London / rest-of-England differences in patient experience across the Cancer Patient Experience Survey questions. Odds ratio values > 1.0 indicate that cancer patients treated by London hospitals report comparatively worse experience of care than patients treated elsewhere, and vice versa.

Figure 2. Odds ratios for London / rest-of-England differences for 'report' and 'evaluation' survey items. Cancer patients treated by London hospitals appear to be reporting worse experiences compared with those treated elsewhere in England both for evaluation and for report items. Questions are ordered on this graph from those with the smallest to the largest odds ratios for both 'report' and `evaluation' questions.

Figure 3. Variation in observed p-values for the association between being treated at a London hospital and reported patient experience after adjustment for case-mix and teaching hospital status. The observed variation is compared with that which we might expect under the null hypothesis of no association (line). If there were no true association then three or four (i.e. ~5%) of the 64 questions would be expected to have a p-value of less than 0.05 (red line) by chance alone and the observed distribution would follow the expected straight line. Multiple testing is unlikely to be the explanation for the distribution observed in these analyses

Data sharing statement: All data used in this study are already publicly available through UK Data Archive.

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STROBE checklist for an observational study: Attached separately.

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What explains worse patient experience in London? Evidence from secondary analysis of the Cancer Patient Experience Survey

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ABSTRACT

Objective: To explore why cancer patients treated by London hospitals report worse experiences of care compared with those treated in other English regions.

Design: Secondary analysis of the 2011/12 National Cancer Patient Experience Survey (n=69,086).

Setting and Participants: Cancer patients treated by English NHS hospitals.

Main outcome measures: 64 patient experience measures covering all aspects of cancer care (pre-diagnosis to discharge).

Methods: Using mixed effects logistic regression, we explored whether poorer scores in London hospitals could be explained by patient case-mix (age, gender, ethnicity, deprivation and cancer type). Because patients referred into tertiary centres and/or with complex medical problems may report more critical experiences, we also explored whether the experiences reported in London may reflect higher concentration of teaching hospitals in the capital. Lastly, using data from the (general) Adult Inpatients Survey, we explored whether the extent of poorer experience reported by London patients was similar for respondents to either survey

Results: For 52/64 questions there was evidence of poorer experience in London, with the percentage of patients reporting a positive experience being lower compared with the rest of England by a median of 3.7% (inter-quartile range 2.5%-5.4%). After case-mix adjustment there was still evidence for worse experience in London for 44/64 questions. Additionally adjusting for teaching hospital status made trivial difference to the case-mix adjusted findings. There was evidence that London vs. rest-of-England differences were greater for cancer patients compared to (general) hospital inpatients for 10 of 16 questions in both the Cancer Patient Experience and the Adult Inpatients surveys.

Conclusions: Cancer patients treated by London hospitals report worse care experiences and by and large these differences are not explained by patient case-mix or teaching hospital status. Efforts to improve care in London should aim to meet both patient expectations and improve care quality.

What this paper adds

- Patients treated by London NHS services report a worse experience of their care compared with patients treated elsewhere in England
- Patient case-mix (including patient age, ethnicity and cancer diagnosis) and whether patients were treated at a teaching hospital only account for a small part of the overall London vs rest-of-England differences
- There are some indications that cancer patients treated by London hospitals report worse experiences because of poorer care as opposed to different expectations of quality

Strengths and limitations

- Data come from a large nationwide survey of patients with any cancer and a high (68%) response rate.
- We have not been able to directly examine the potential influence of differences in expectations of care quality between patients treated by London hospitals and hospitals elsewhere in England.

INTRODUCTION /BACKGROUND

Understanding variation in patient experience can help to inform priorities for improvement actions and policies. In the UK, the advent of large national surveys of cancer patients, has enabled a better appreciation of variation in cancer patient experience between different patient groups or hospitals.[1,2,3,4] A salient finding of recent cancer patient surveys is that patients treated by London hospitals reported poorer experiences compared with those treated by hospitals in other English regions.[1,5,6,7]

Several hypotheses can be considered to explain this type of geographical variation in crude hospital experience scores. First, London hospitals may be treating a higher proportion of patient groups known to report worse experiences of care, such as younger and ethnic minority patients, or patients with certain types of cancer.[2,3,8,9] Second, patient experience may vary by type of hospital, and if so the experiences reported in London could simply reflect a higher concentration of teaching (tertiary) hospitals in the capital region.[7] This hypothesis assumes that patients who are referred into tertiary centres and/or have complex medical problems and/or have more complex care pathways are likely to be more critical of their experiences. Third, it is possible that London patients receive the same care as that received by patients elsewhere but have higher expectations of care quality, perhaps because of different cultural expectations, leading to a more critical evaluation of their experience (the 'same care worse experience' hypothesis).[8] Fourth, care provided by London hospitals may indeed be different (worse) compared to the rest of the country, leading to worse experience.

Understanding the potential mechanisms responsible for poorer reported experience of cancer patients treated by London hospitals is important to inform efforts to address this disparity. In this paper we set out to directly explore whether London / rest-of-England inequalities in cancer patient experience may reflect confounding by socio-demographic or

cancer diagnosis case-mix and/or hospital type. In addition, we consider indirect evidence to provide insights about other potential sources of variation, beyond case-mix and hospital type.

METHODS

Data

Sources

For the main analysis we used publicly available anonymous data from the 2011/12 National Cancer Patient Experience Survey – a postal survey of cancer patients treated by 160 English NHS hospitals during January-March 2012 (71,793 respondents, response rate 68%) carried out by Quality Health for the Department of Health.[10] Of all respondents, 3.8% had missing self-reported ethnic group and were excluded, with the final analysis sample of 69,086. For each question, we included in analysis all patients with an informative response to the question of interest.

In further analysis we used data from the Adult Inpatients Survey, a postal survey of patients with any pathology and at least one night stay in an NHS hospital between June-August 2011 (70,863 respondents, response rate 53%) carried out by the Picker Institute for the Care Quality Commission.[11] Of all respondents, 3 had missing age and were excluded with a final analysis sample of 70,860.

Outcome and exposure variables

Of all 160 English hospitals treating cancer patients 27 are London hospitals and 26 are teaching hospitals (i.e. university hospitals with a tertiary referral centre function) (Appendix table 1). Eight teaching hospitals are also London hospitals.

The Cancer Patient Experience Survey comprises 65 questions that measure patient experience across the cancer patient journey. Most questions have a 4- or 5-point Likert scale response options, evaluating experience from very good to very poor. As public reporting of hospital scores for the survey is based on binary forms of these outcomes (i.e. good or poor patient experience),[1] we used the same binary categorisations in the analysis. There are 16 Cancer Patient Experience Survey questions that are also included in the Adult Inpatients Survey. Information on cancer diagnosis International Classification of Diseases

(ICD)-10 code, patient age and gender were available for all respondents based on hospital record information. Thirty-six different cancer diagnoses groups were considered (Appendix table 2). Age was categorised into eight groups (16-24, six 10-year groups from 25-34 to 75-84 and 85+). We used patients self-reported ethnicity (based on their responses to survey question 77) in this study rather than relying on information recorded in hospital records as the former is considered to be a gold-standard and the latter has been shown to contain inaccuracies.[12] A six-group classification (White, Mixed, Asian or Asian British, Black or Black British, Chinese and Other) was used in the analysis.

Analysis

Exploratory analysis showed that variation between English regions other than London was trivial (Appendix table 3). Therefore hereafter all analysis relates to London / rest-of-England comparisons, with patients treated by 'rest-of-England' hospitals considered together as a group.

We first described London / rest-of-England variation in the socio-demographic and clinical characteristics of respondents.

We then used mixed effects logistic regression (including a random effect for hospital) to estimate the odds ratio for cancer patients treated by London hospitals reporting poorer experience compared with those treated by hospitals elsewhere in England. We considered three models separately for each of the survey questions. To explore crude (unadjusted) differences, the first model only included a fixed effect variable denoting London / rest-of-England hospital location (in addition to a random effect for hospital, as above). To explore the potential influence of patient case-mix, the second model additionally included case-mix variables (patient age, gender, ethnic group and cancer diagnosis). Lastly, to explore the potential influence of teaching hospital status, the third model, in addition to socio-demographic characteristics and cancer diagnosis also adjusted for whether or not the hospital of treatment was a teaching hospital. We plotted the p-values from these fully

adjusted models to evaluate the role of chance in these findings. For one question (question 28, whether a patient was pleased to have been asked to take part in cancer research) the adjusted model did not converge, as patient experience was almost uniformly positive across all hospitals in England. This question was therefore excluded from all analyses, and results hereafter relate to 64 evaluative questions. We also explored interactions between London hospital and socio-demographic characteristics which allows us to explore whether any particular groups of patients report particularly different experiences in London; for ethnic groups specifically, because interaction models include a large numbers of degrees of freedom we considered a broad 2 group classification of ethnicity (White / Non-White).

Finally, we combined data from the two hospital surveys (Cancer Patient Experience Survey and Adult Inpatients Survey) to test whether differences in experience reported by patients treated by London hospitals were consistent across the two surveys. After adjusting for age and gender, using this model we tested whether the association between London hospital location and patient experience was consistent between surveys for the 16 questions that they both share. All analyses were carried out using Stata v11.2.

RESULTS

Patient characteristics

On average, compared with patients treated elsewhere in England, those treated by London hospitals were younger (median age of 65 vs 66 years), more likely to belong to ethnic minorities (16% vs 2%), more likely to be treated by teaching hospitals (46% vs 24%) and more likely to suffer from rarer types of cancers (for example 6.5% vs 4.4% had multiple myeloma, table 1).

Unadjusted differences in positive experience

There was evidence ($p<0.05$) that cancer patients treated by London hospitals reported worse experiences compared with those treated by hospitals in the rest of England for 52 out of 64 survey questions (Figure 1, full results in appendix table 4b). For a single question (whether the patient was asked to take part in cancer research) experience was more positive in London whilst for nine other questions there was no evidence of difference (appendix table 4b). Depending on item non-response and the frequency of positive responses observed (unadjusted and adjusted) effect sizes of OR~1.1 are significant at $p<0.05$.

For the 52 questions with worse experience in London, the proportion of patients reporting a positive experience was lower in London compared with the rest of England by a median of 3.7% (inter-quartile range 2.5%-5.4%, full details by question in appendix table 4a). For these questions the un-adjusted odds ratios (for London patients reporting worse experience) ranged from 1.13 to 2.05. The most pronounced difference was for the question on whether staff asked patients about the name by which they would like to be called [unadjusted odds ratio for worse experience in London=2.05 (1.75-2.41)].

Variation in experience adjusted for patient case-mix

After accounting for differences in case-mix the size of London / rest-of-England differences in patient experience was attenuated, but there was still evidence ($p<0.05$) that patient experience was worse in London hospitals for 45 out of 64 questions (Figure 1 and appendix table 4b).

Adjustment for teaching hospital status

Adjusting for teaching hospital status (additional to adjustment for case-mix) made minimal difference to the size of London / rest-of-England differences: there remained evidence that patient experience was worse in London ($p<0.05$) for 44 of 64 survey questions, with effect sizes that were nearly identical to those observed after case-mix adjustment (Figure 1 and Appendix table 4b). Specific aspects of variation are further highlighted in Box 1. The observed and expected distribution of p-values under the null hypothesis were plotted from these models (figure 3). The significant associations observed are unlikely to be due to chance alone.

Interaction analysis

There was little evidence for interactions between treatment by a London hospital and socio-demographic characteristics. Full results for ethnicity are presented in appendix 5. Briefly the results suggest that the impact of being treated by a London hospital is the same no matter the ethnic background of the patient. Another way to consider this would be that although ethnic minority patients generally report worse care than white patients there is no evidence that this disparity is any larger or smaller in London hospitals.

London variation for cancer patients and general in-patients

For 16 questions that are consistent across both surveys, reported experience was generally more positive for cancer patients (Cancer Patient Experience Survey respondents) compared to patients with a general mix of diagnoses (Adult Inpatients Survey respondents). Being treated in London appears to have a more negative impact on patient experience

among cancer patients than among general hospital inpatients, with statistical evidence for such an interaction for 10 of the 16 questions that are common across the two surveys (table 2).

Box: Aspects of London / rest-of-England variation in cancer patient experience

Considering different questions across the patient journey, patients treated by London hospitals generally report worse experiences throughout (diagnosis, treatment, discharge and post-diagnosis). Further, worse experience in London is apparent both for questions relating to the experience of hospital care and for the (fewer) questions that relate to the experience of primary or social care. For example, patients treated by London hospitals reported worse experience for questions 1-4 (relating to pre-diagnosis experience, including aspects of care provided by general practitioners) and for question 55 (care from health and social services after discharge from hospital).

The few questions without evidence for worse experience in London hospitals include questions about treatment choice (question 15, whether the patient was given a choice of treatment options) and information provision (for example, question 68, on having been offered a written care plan).

London / rest-of-England differences in respect of nursing care were inconsistent. For two relevant report items (question 20, whether the patient was given the name of a Cancer Nurse Specialist; and question 43, whether there were enough ward nurses on duty) there was no evidence of differences. However for evaluation items relevant to nursing care (for example, questions 21-23 regarding ease of contacting a Cancer Nurse Specialist and inter-personal aspects of specialist nurse care; or questions 40-41 regarding the experience of ward nursing) patients treated by London hospitals reported worse experience.

The strength of the association between poorer patient experience in London / rest-of-England was attenuated for most questions after adjusting for case-mix and hospital type (Figure 1). Improvement efforts should be focused on questions where the associations are strongest (appendix table 4b), rather than on individual changes in p-values.

Considering report or evaluation types of questions, in general, patients treated by London hospitals tended to report worse experience for both evaluation and report items (Figure 2).

Figure 1: London / rest-of-England differences in patient experience across the Cancer Patient Experience Survey questions. Odds ratio values > 1.0 indicate that cancer patients treated by London hospitals report comparatively worse experience of care than patients treated elsewhere, and vice versa.

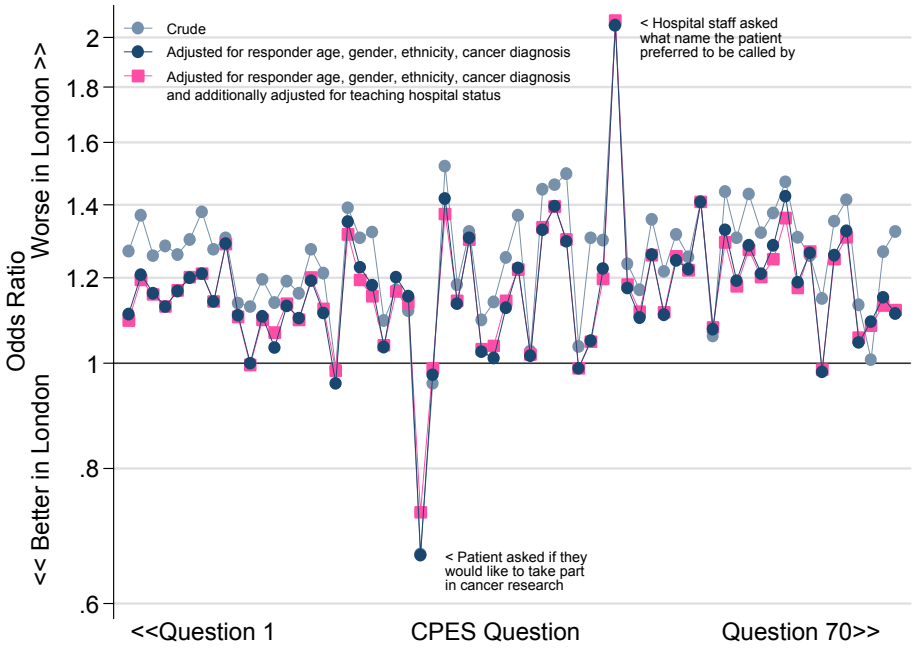

Figure 2. Odds ratios for London / rest-of-England differences for 'report' and 'evaluation' survey items. Cancer patients treated by London hospitals appear to be reporting worse experiences compared with those treated elsewhere in England both for evaluation and for report items. Questions are ordered on this graph from those with the smallest to the largest odds ratios for both 'report' and `evaluation' questions.

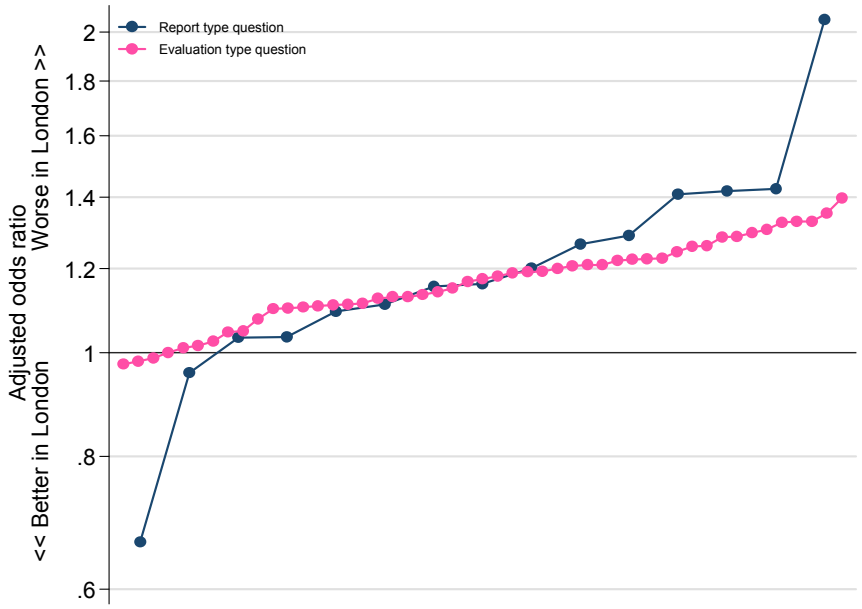

Figure 3. Variation in observed p-values for the association between being treated at a London hospital and reported patient experience after adjustment for case-mix and teaching hospital status. The observed variation is compared with that which we might expect under the null hypothesis of no association (line). If there were no true association then three or four (i.e. ~5%) of the 64 questions would be expected to have a p-value of less than 0.05 (red line) by chance alone and the observed distribution would follow the expected straight line. Multiple testing is unlikely to be the explanation for the distribution observed in these analyses

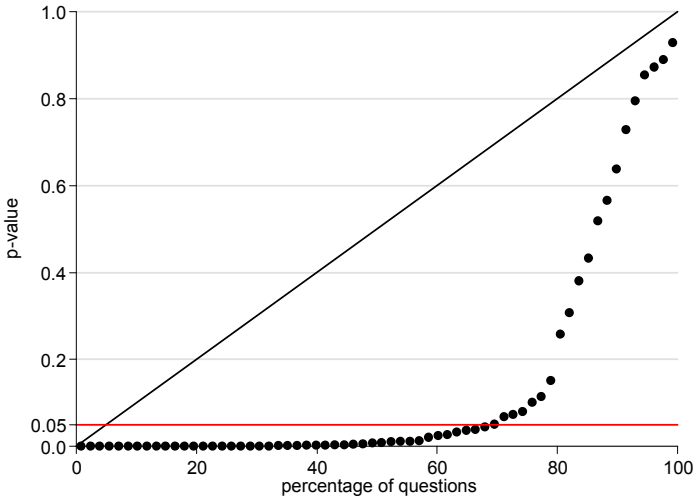

Table 1. Comparison of cancer patients treated by London hospitals compared with those treated elsewhere in England

Age	All	%	Rest-of-England	%	London	%
16-24	355	0.5	275	0.5	80	0.9
25-34	954	1.4	756	1.3	198	2.3
35-44	2,999	4.3	2492	4.1	507	5.8
45-54	8,911	12.9	7637	12.7	1,274	14.6
55-64	16,970	24.6	14820	24.6	2,150	24.6
65-74	22,749	32.9	20168	33.4	2,581	29.5
75-84	13,564	19.6	11901	19.7	1,663	19.0
85+	2,584	3.7	2289	3.8	295	3.4
Age Median (IQR)	66 (58-74)		66 (58-74)		65 (55-73)	
Gender						
Men	32,463	47.0	28,398	47.1	4,065	46.5
Women	36,623	53.0	31,940	52.9	4,683	53.5
Ethnic group						
White	66,421	96.1	59,071	97.9	7,350	84.0
Mixed	278	0.4	151	0.3	127	1.5
Asian	1,146	1.7	633	1.0	513	5.9
Black	949	1.4	334	0.6	615	7.0
Chinese	150	0.2	87	0.1	63	0.7
Other	142	0.2	62	0.1	80	0.9
Teaching hospital	18,758	27.2	14,711	24.4	4,047	46.3
Other hospital type	50,328	72.8	45,627	75.6	4,701	53.7
Cancer diagnosis						
Breast	13,396	19.4	11,742	19.5	1,654	18.9
DCIS	916	1.3	788	1.3	128	1.5
Ovarian	1,823	2.6	1,550	2.6	273	3.1
Endometrial	1,478	2.1	1,280	2.1	198	2.3
Cervical	405	0.6	355	0.6	50	0.6
Vulval / vaginal	236	0.3	206	0.3	30	0.3
Other gynaecological	88	0.1	74	0.1	14	0.2
Thyroid	493	0.7	434	0.7	59	0.7
Laryngeal	361	0.5	319	0.5	42	0.5
Other head & neck	1,280	1.9	1,136	1.9	144	1.6
Non-Hodgkin lymphoma	4,290	6.2	3,781	6.3	509	5.8
Multiple myeloma	3,236	4.7	2,667	4.4	569	6.5
Leukaemia	2,479	3.6	2,075	3.4	404	4.6
Hodgkin lymphoma	487	0.7	411	0.7	76	0.9
Rectal	3,541	5.1	3,176	5.3	365	4.2
Colon	5,054	7.3	4,516	7.5	538	6.1
Anal	242	0.4	213	0.4	29	0.3
Other lower gastro-intestinal	215	0.3	182	0.3	33	0.4
Lung	3,698	5.4	3,237	5.4	461	5.3
Mesothelioma	392	0.6	346	0.6	46	0.5
Brain	483	0.7	397	0.7	86	1.0
Other central nervous system	59	0.1	39	0.1	20	0.2
Oesophageal	1,362	2.0	1,209	2.0	153	1.7
Stomach	1,019	1.5	906	1.5	113	1.3
Pancreatic	673	1.0	569	0.9	104	1.2
Hepato-biliary / gall bladder	568	0.8	439	0.7	129	1.5
Bladder	6,503	9.4	5,808	9.6	695	7.9
Prostate	5,568	8.1	4,897	8.1	671	7.7
Renal	950	1.4	839	1.4	111	1.3
Other urological	349	0.5	309	0.5	40	0.5
Testicular	256	0.4	217	0.4	39	0.4
Secondary	4,308	6.2	3,740	6.2	568	6.5
Melanoma	1,546	2.2	1,420	2.4	126	1.4
Soft tissue sarcoma	575	0.8	447	0.7	128	1.5
Bone sarcoma	174	0.3	125	0.2	49	0.6
Any other cancer diagnosis	583	0.8	489	0.8	94	1.1

Table 2: Comparison of London / rest-of-England differences in patient experience for general in-patients (any pathology) and patients with cancer*

Question**		Effect of London in general inpatients	Effect of London in cancer patients	Interaction Odds Ratio	Interaction p-value
19	Patient definitely involved in decisions about which treatment	1.15	1.31	1.13 (1.06 - 1.22)	0.001
32	Staff gave complete explanation of what would be done	1.17	1.25	1.07 (0.95 - 1.20)	0.223
34	Staff explained how operation had gone in understandable way	1.14	1.13	0.99 (0.90 - 1.09)	0.392
37	Patient had confidence and trust in all doctors treating them	1.07	1.35	1.27 (1.15 - 1.40)	<0.0001
38	Doctors did not talk in front of patient as if they were not there	1.17	1.47	1.25 (1.14 - 1.37)	<0.0001
41	Patient had confidence and trust in all ward nurses	1.50	1.58	1.05 (0.97 - 1.14)	0.176
42	Nurses did not talk in front of patient as if they were not there	1.48	1.67	1.13 (1.03 - 1.23)	0.018
43	Always / nearly always enough nurses on duty	1.03	1.12	1.08 (1.00 - 1.17)	0.057
45	Patient never thought they were given conflicting information	1.18	1.32	1.12 (1.03 - 1.22)	0.011
47	Always given enough privacy when discussing condition/treatment	1.07	1.3	1.21 (1.10 - 1.33)	0.0001
48	Always given enough privacy when being examined or treated	1.16	1.19	1.03 (0.90 - 1.18)	0.363
51	Always treated with respect and dignity by staff	1.23	1.47	1.20 (1.09 - 1.31)	0.0005
53	Staff told patient who to contact if worried post discharge	1.17	1.58	1.35 (1.19 - 1.52)	<0.0001
54	Family definitely given all information needed to help care at home	1.02	1.11	1.09 (0.99 - 1.19)	0.077
67	Given the right amount of information about condition and treatment	1.05	1.20	1.14 (1.04 - 1.25)	0.010
70	Overall rating of care	1.24	1.49	1.20 (1.09 - 1.31)	0.0002

*Odds ratio values > 1 indicate that the worse experience of patients treated by London hospitals was worse for cancer patients (respondents to the Cancer Patient Experience Survey) compared with patients with a general mix of diagnoses (respondents to the Adult Inpatients survey respondents).

**Relates to 16 questions that are common in both surveys. Question numbering relates to CPES questions.

DISCUSSION

We explored potential sources of variation in the experience of cancer patients treated by London hospitals compared with those treated by hospitals elsewhere in England. Considering unadjusted percentages, cancer patient experience in London is rated worse than any other English region for the great majority of questions, although the absolute percentage difference is typically small. Confounding by patient case-mix (socio-demographic characteristics or cancer diagnosis) explains some of the London / rest-of-England disparities but its overall impact is small. Additional adjustment for teaching hospital status only has a marginal influence. The observed distribution of p-values across questions would indicate that these findings are unlikely to be explained by chance alone (Figure 3). There is some evidence that London / rest-of-England differences in patient experience are larger for cancer patients than patients with a general mix of diagnoses. These findings indicate that the hypotheses that London / rest-of-England differences in patient experience reflect either patient case-mix or teaching hospital status are unlikely to be true.

Previous work has documented that London patients have worse experience of primary and hospital care.[13,14,15] However, by and large regional differences in the UK are confined to London / rest-of-England variation, which is a matter of on-going policy concern and improvement initiatives.[16] Research from Canada has also demonstrated rural-urban differences in patient experience, with patients in urban areas reporting worse experience.[17] Our study is reminiscent of a study exploring geographical variation in patient experience within the context of the Medicare's Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey in the US, specifically exploring sources of variation between California and the rest of the United States in patient experience scores.[18] This study, however, does not provide direct insights about the important question of whether differences relate to patient expectations or differences in care. The plurality of 'for profit' care providers and the fact that that survey is not focused on cancer patients make informative comparisons even more difficult.

Particular strengths of our study is its large sample size, and the ability to explore potential confounding by cancer diagnosis, in addition to 'universal' socio-demographic confounders such as age, gender and ethnicity. Certain limitations should also be considered. We were not able to adjust for disease severity, but we believe that the potential for residual confounding by disease severity is likely to be small, as inclusion of cancer diagnosis in the model made little difference to the findings. We were also not able to explore potential confounding by a range of other patient factors or hospital factors (such as such as the quality of patient transport links, the availability of parking and hospital environment and facilities in general). Importantly, we were also not able to adjust for patient socioeconomic status. However, previous work indicates only small and inconsistent differences in cancer patient experience between patients of different deprivation groups.[1,2,3] Further, in supplementary analysis that used data from the 2010 Cancer Patient Experience Survey, adjustment for the deprivation group of patients (which was available for that survey) in addition to age, gender, ethnicity and cancer diagnosis produced trivial differences in hospital ranks (data not shown).

Having been able to directly examine and eliminate case-mix or teaching hospital status as major sources of variation in the experience of patients treated by London hospitals, it is worth considering whether the findings may reflect differential expectations of care quality among Londoners, or worse care quality leading to worse experience. Disentangling this research question is fraught with substantive methodological difficulties. Evaluating standardised (e.g. videoed) encounters between patients and healthcare professionals to be rated by patients from different regions of England could be useful, as has been shown for studies of ethnic variation in experience.[19] In the absence of other evidence, it is worth considering three observations that may be insightful. First, with few exceptions patients treated by London hospitals evaluated their experience more negatively both for evaluation and report questions (figure 2), and this would seem to suggest that care provided by London hospitals may be worse than in other parts of the country. This is because if the sole

explanation for London / rest-of-England inequalities were that patients treated by London hospitals had higher expectations of quality then this factor could have been expected to chiefly have influenced their responses to evaluation (e.g. 'did the nurse listen to you carefully'?) as opposed to report items (e.g. 'have you been given the name of a Cancer Nurse Specialist'?). Similarly, the fact that London / rest-of-England differences appear to be larger for cancer patients compared with patients with other pathologies treated by the same hospitals would also support the hypothesis that an exogenous factor (such as worse quality of cancer care) may be responsible, as opposed to an intrinsic tendency for Londoners to evaluate their care differently to patients treated elsewhere in the country.. Third, we also note that some London hospitals (including one central London teaching hospital) have cancer patient experience scores that are above the national average.1 This observation does not support the hypothesis that patients treated by London hospitals have different higher expectations of care quality. It also indicates a potential for improvement for the majority of London hospitals where patient experience is poorer overall.

In brief, some indirect evidence indicates that at least in some part London / rest-of-England disparities may reflect worse care provided by London hospitals

The possible consequences of increasing fragmentation and care pathway complexity for cancer patient experience are an ongoing concern, particularly in London. In the future, it would be helpful if, subject to cognitive validation and development, specific questions to explore pathway complexity were included into the survey. For example, asking participants to indicate whether their current hospital of treatment was also the hospital of diagnosis (or related questions). An alternative would be for such information to be produced at the point of generating the sampling frame of the survey, using hospital episodes statistics data.

In conclusion, the findings suggest that patient case-mix and hospital type are unlikely to be important sources of geographical variations in the experience of cancer patients. These realisations can help to further motivate clinical and managerial engagement with

improvement efforts, and appropriate investment and improvement actions to address disparities in patient experience reported by cancer patients treated by London hospitals. In the absence of direct evidence about whether these disparity reflect different expectations or worse care, such efforts should aim to understand both how to meet patient expectations at the same time as delivering actual improvements in care quality.

Data sharing statement: All data used in this study are already publicly available through UK Data Archive.

Contributors: All authors contributed to all stages of the study. CS is the guarantor for this study and affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and discrepancies from the study as planned (and, if relevant, registered) have been explained.

Ethics approval: Not required.

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Competing interest statement: All authors have completed the Unified Competing Interest form at http://www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years and no other relationships or activities that could appear to have influenced the submitted work.

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STROBE checklist for an observational study: Attached separately.

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Appendix 1 (a-b). NHS hospitals providing cancer treatment classified as London hospitals (i.e. those located within the London Strategic Health Authority); Hospitals classified as 'teaching' hospitals in England

a. London hospitals

Barking, Havering and Redbridge
Barnet and Chase Farm Hospitals
Barts and The London
Chelsea and Westminster Hospital
Ealing Hospital
Epsom and St Helier University Hospital
Guy's and St Thomas'
Hillingdon Hospital
Homerton University Hospital
Imperial College Healthcare
King's College Hospital
Kingston Hospital
Lewisham Hospital
Mayday Healthcare
Newham University Hospital
North Middlesex University Hospital
North West London Hospitals
Royal Brompton and Harefield
Royal Free Hampstead
The Royal Marsden Hospital
Royal National Orthopaedic Hospital
South London Healthcare
St George's Healthcare
University College London Hospitals
West Middlesex University Hospital
The Whittington Hospital
Whipps Cross University Hospital

b. NHS Teaching hospitals in England

London teaching hospitals

Barts and The London
Chelsea and Westminster Hospital
Guy's and St Thomas'
Imperial College Healthcare
King's College Hospital
Royal Free Hampstead
St George's Healthcare
University College London Hospitals

Teaching hospitals in other parts of England

Brighton and Sussex University Hospitals
Cambridge University Hospitals
Central Manchester University Hospitals
Leeds Teaching Hospitals
The Newcastle Upon Tyne Hospitals
Norfolk and Norwich University Hospital
Nottingham University Hospitals
Oxford Radcliffe Hospitals
Royal Devon and Exeter
Royal Liverpool and Broadgreen University Hospitals

Salford Royal
Sheffield Teaching Hospitals
Southampton University Hospitals
University Hospital Birmingham
University Hospital of South Manchester
University Hospitals Bristol
University Hospitals Coventry and Warwick
University Hospitals of Leicester

Appendix table 2. Cancer International Classification of Diseases 10 codes and diagnosis groups

Breast	C50	Malignant neoplasm of breast
Ductal carcinoma in situ (DCIS)	D05	Carcinoma in situ of breast
Ovarian	C56	Malignant neoplasm of ovary
Endometrial	C54, C55	Malignant neoplasm of corpus uteri (C54) and of uterus, part unspecified (C55)
Cervical	C53	Malignant neoplasm of cervix uteri
Vulval / vaginal	C51, C52	Malignant neoplasm of vulva (C51) and vagina (C52)
Other gynaecological cancer	C57	Malignant neoplasm of other and unspecified female genital organs (C57)
Thyroid	C73	Malignant neoplasm of thyroid gland
Laryngeal	C32	Malignant neoplasm of larynx
Other head and neck cancers	C00 - C14, C30, C31	Malignant neoplasm of lip (C00), base of tongue (C01), other and unspecified parts of tongue (C02), gum (C03), floor of mouth (C04), palate (C05), other/unspecified parts of mouth (C06), parotid gland (C07), other/unspecified major salivary gland (C08), tonsil (C09), oropharynx (C10), nasopharynx (C11), pyriform sinus (C12), hypopharynx (C13), other and ill-defined sites in the lip, oral cavity and pharynx (C14), nasal cavity and middle ear (C30) and accessory sinuses (C31)
Non-Hodgkin lymphoma	C82, C83, C85, C84	Follicular [nodular] non-Hodgkin's lymphoma (C82), diffuse non-Hodgkin's lymphoma (C83), Mycosis Fungoides (C84) other and unspecified types of non-Hodgkin's lymphoma (C85)
Multiple myeloma	C90	Multiple myeloma and malignant plasma cell neoplasms
Leukaemia	C91, C92, C93, C94, C95	Lymphoid (C91), myeloid (C92), monocytic (C93), and other leukemia of specified cell type (C94) and unspecified cell type (C95)
Hodgkin's lymphoma	C81	Hodgkin's disease
Rectal	C19, C20	Malignant neoplasm of recto-sigmoid junction (C19), and of rectum (C20)
Colon	C18	Malignant neoplasm of colon
Anal	C21	Malignant neoplasm of anus and anal canal (C21)
Other LGI	C17, C26	Malignant neoplasm of small intestine (C17), and of other and ill-defined digestive organs (C26)
Lung	C34, C33	Malignant neoplasm of bronchus and lung (C34) Malignant neoplasm of trachea (C33)
Mesothelioma	C45	Mesothelioma
Brain	C71	Malignant neoplasm of brain
Other central nervous system cancers	C47, C69, C70, C72	Malignant neoplasm of peripheral nerves and autonomic nervous system (C47), eye and adnexa (C69), meninges (C70), and spinal cord, cranial nerves and other parts of central nervous system (C72)
Oesophageal	C15	Malignant neoplasm of oesophagus
Stomach	C16	Malignant neoplasm of stomach
Pancreatic	C25	Malignant neoplasm of pancreas
Hepato-biliary gallbladder	C22, C23, C24	Malignant neoplasm of liver and intrahepatic bile ducts (C22) and of gallbladder (C23) Malignant neoplasm of other and unspecified parts of biliary tract (C24)
Bladder	C67	Malignant neoplasm of bladder
Prostate	C61	Malignant neoplasm of prostate
Renal	C64	Malignant neoplasm of kidney, except renal pelvis
Other urological cancers	C60, C63, C65, C66, C68	Malignant neoplasm of penis (C60), other/unspecified male genital organs (C63), renal pelvis (C65), ureter (C66) and other/unspecified urinary organs (C68)
Testicular	C62	Malignant neoplasm of testis
Secondary	C77, C78, C79	Secondary and unspecified malignant neoplasm of lymph nodes (C77) Secondary malignant neoplasm of respiratory and digestive organs (C78) Secondary malignant neoplasm of other and unspecified sites (C79)
Melanoma	C43	Malignant melanoma of skin
Soft Tissue Sarcoma	C48, C49, C46	Kaposi's sarcoma (C46) Malignant neoplasm of retroperitoneum and peritoneum (C48) and other connective and soft tissue (C49)
Bone Sarcoma	C40, C41	Malignant neoplasm of bone and articular cartilage of limbs (C40) and of bone and articular cartilage of other and unspecified sites (C41)
General Other	C37, C38, C39, C74, C75, C76, C80, C97, C58, C88, C96	Malignant immunoproliferative diseases (C88) Thymus (C37), heart, mediastinum and pleura (C38) and of other and ill-defined sites in the respiratory system and intrathoracic organs (C39)

Appendix table 3

Regional differences in cancer patient experience scores. This table describes crude absolute difference in percentage of positive responses by region, compared with London. Negative number London=better, positive number London=worse. We see in this table that across most questions all non-London regions have average cancer patient experience scores that are several percent higher than London.

Question number		West Midlands	East Midlands	EOE	London	North East	North West	South Central	South East Coast	South West	Yorkshire and the Humber
1	Saw GP once/twice before being told had to go to hospital	4	5	4	0	6	6	4	7	5	6
2	Patient thought they were seen as soon as necessary	4	4	3	0	7	5	3	5	4	5
3	% saw a hospital doctor in less than 3 months	3	3	3	0	4	4	4	3	4	4
4	Patient's health got better or remained about the same while waiting	4	5	5	0	5	6	3	5	5	4
6	Staff gave complete explanation of purpose of test(s)	2	2	3	0	5	3	2	3	3	4
7	Staff explained completely what would be done during test	3	2	3	0	5	3	3	4	3	4
8	Given easy to understand written information about test	3	3	3	0	5	1	3	3	4	3
9	Given complete explanation of test results in understandable way	4	3	4	0	7	4	4	4	4	5
11	Patient told they could bring a friend when first told they had cancer	7	6	3	0	10	6	4	4	7	5
12	Patient felt they were told sensitively that they had cancer	3	2	1	0	4	2	2	3	2	1
13	Patient completely understood the explanation of what was wrong	2	2	3	0	4	2	2	4	2	2
14	Patient given written information about the type of cancer they had	4	5	4	0	7	2	3	7	3	3
15	Patient given a choice of different types of treatment	0	2	1	0	4	3	1	1	1	4
16	Patient thinks that their views were taken into account when discussing treatment	3	3	3	0	6	4	1	3	4	4
17	Possible side effects explained in an understandable way	3	2	1	0	7	1	2	2	2	4
18	Patient given written information about side effects	4	4	2	0	4	0	1	2	2	4
19	Patient definitely involved in decisions about which treatment	2	2	2	0	6	3	3	3	4	5
20	Patient given the name of the CNS in charge of their care	-2	-4	0	0	2	-1	-1	-2	-2	1
21	Patient finds it easy to contact their CNS	6	6	5	0	13	7	2	5	8	8
22	CNS definitely listened carefully the last time spoken to	2	0	2	0	4	2	2	1	3	3
23	Get understandable answers to important questions all/most of the time (CNS)	2	0	2	0	4	2	3	2	3	3
24	Hospital staff gave information about support groups	0	-1	3	0	0	-1	1	4	3	4
25	Hospital staff gave information on getting financial help	1	-3	1	0	8	1	1	0	5	8
26	Hospital staff told patient they could get free prescriptions	3	-1	1	0	2	1	-1	1	1	4
27	Patient asked if they would like to take part in cancer research	-15	-16	-11	0	-15	-15	-9	-17	-13	-7
29	Patient would have liked to have been asked	-2	0	-1	0	-3	-3	0	-2	-2	-2
31	Admission date not changed by hospital	3	3	4	0	5	3	3	4	4	4
32	Staff gave complete explanation of what would be done	2	1	2	0	4	1	3	2	3	2
33	Patient given written information about the operation	5	8	5	0	5	3	4	5	5	4
34	Staff explained how operation had gone in understandable way	1	-1	2	0	5	1	2	2	2	2
36	Got understandable answers to important questions all/most of the time (doctor)	0	1	0	0	4	1	2	2	3	2
37	Patient had confidence and trust in all doctors treating them	2	1	2	0	6	3	3	4	4	3
38	Doctors did not talk in front of patient as if they were not there	4	3	4	0	5	5	4	3	5	4
39	Patient's family definitely had opportunity to talk to doctor	-1	-2	-1	0	4	1	-2	-1	1	1
40	Got understandable answers to important questions all/most of the time (ward nurse)	3	4	4	0	8	6	4	5	8	6
41	Patient had confidence and trust in all ward nurses	5	5	6	0	11	9	5	7	9	8
42	Nurses did not talk in front of patient as if they were not there	4	4	3	0	6	7	6	6	6	6
43	Always / nearly always enough nurses on duty	-4	-3	-4	0	3	0	0	2	0	-3
44	Patient did not think hospital staff deliberately misinformed them	2	1	3	0	5	3	3	3	4	3
45	Patient never thought they were given conflicting information	3	2	2	0	7	6	3	5	5	2
46	Hospital staff asked what name the patient preferred to be called by	16	23	12	0	25	14	20	14	21	19
47	Always given enough privacy when discussing condition/treatment	2	3	3	0	3	3	4	2	2	2
48	Always given enough privacy when being examined or treated	1	1	1	0	1	1	1	1	0	1
49	Patient was able to discuss worries and fears with staff	5	6	4	0	9	7	6	7	8	7
50	Hospital staff did everything to help control pain all of the time	0	1	2	0	3	2	2	1	4	2
51	Always treated with respect and dignity by staff	3	3	3	0	6	4	3	3	5	4
52	Given clear written information about what should / should not do post discharge	4	3	3	0	4	3	3	4	3	3
53	Staff told patient who to contact if worried post discharge	3	1	2	0	3	1	2	2	3	3
54	Family definitely given all information needed to help care at home	1	0	0	0	3	0	0	0	3	1
55	Patient definitely given enough care from health or social services	8	4	8	0	13	11	3	8	8	11
56	Staff definitely did everything to control side effects of radiotherapy	4	4	4	0	8	5	2	2	4	9
57	Staff definitely did everything to control side effects of chemotherapy	6	1	6	0	9	4	4	4	5	7
58	Staff definitely did everything they could to help control pain	3	3	5	0	7	3	2	3	5	7
59	Hospital staff definitely gave patient enough emotional support	6	3	6	0	10	8	4	6	6	10

61	Waited no longer than 30 minutes for OPD appointment to start	6	8	7	0	19	8	9	11	12	9
62	Patient thought doctor spent about the right amount of time with them	1	1	1	0	2	1	2	2	2	3
63	Doctor had the right notes and other documentation with them	1	1	1	0	2	1	1	1	1	1
64	GP given enough information about patient's condition and treatment	0	0	1	0	2	-1	-1	2	0	1
65	Practice staff definitely did everything they could to support patient	6	5	7	0	10	6	9	7	9	7
66	Hospital and community staff always worked well together	8	6	8	0	12	9	6	9	9	9
67	Given the right amount of information about condition and treatment	0	0	1	0	4	0	1	2	1	2
68	Patient was offered a written care plan	3	-2	0	0	6	0	-6	0	-3	3
69	Patient did not feel that they were treated as a set of cancer symptoms	2	1	4	0	5	4	4	5	4	6
70	Overall rating of care	1	0	2	0	3	2	3	2	3	3

Appendix table 4a presents London vs. rest-of-England comparisons in absolute percentage scores.

	Question	All responses		"Rest of England"		London	
		N	% positive	N	% positive	N	% positive
1	Saw GP once/twice before being told had to go to hospital	52808	74.4	46286	75.1	6522	69.7
2	Patient thought they were seen as soon as necessary	66716	83.4	58328	84.0	8388	79.4
3	% saw a hospital doctor in less than 3 months	64558	80.9	56464	81.4	8094	77.7
4	Patient's health got better or remained about the same while waiting	66644	79.5	58268	80.1	8376	75.6
6	Staff gave complete explanation of purpose of test(s)	55125	83.0	48334	83.4	6791	80.4
7	Staff explained completely what would be done during test	56574	86.6	49631	87.0	6943	83.8
8	Given easy to understand written information about test	43832	86.7	38426	87.1	5406	84.2
9	Given complete explanation of test results in understandable way	57658	77.7	50529	78.2	7129	73.9
11	Patient told they could bring a friend when first told they had cancer	54834	71.9	48075	72.6	6759	66.9
12	Patient felt they were told sensitively that they had cancer	67651	83.1	59130	83.4	8521	81.2
13	Patient completely understood the explanation of what was wrong	67675	73.0	59155	73.3	8520	70.8
14	Patient given written information about the type of cancer they had	58460	68.9	51027	69.4	7433	65.4
15	Patient given a choice of different types of treatment	23869	84.0	20588	84.2	3281	82.5
16	Patient thinks that their views were taken into account when discussing treatment	57815	69.6	50430	70.0	7385	66.6
17	Possible side effects explained in an understandable way	64025	74.8	55850	75.1	8175	72.7
18	Patient given written information about side effects	62784	81.5	54825	81.8	7959	79.2
19	Patient definitely involved in decisions about which treatment	65333	71.9	57090	72.3	8243	69.1
20	Patient given the name of the CNS in charge of their care	64459	87.0	56343	86.9	8116	87.9
21	Patient finds it easy to contact their CNS	50171	74.8	43661	75.7	6510	69.0
22	CNS definitely listened carefully the last time spoken to	53905	91.3	47035	91.6	6870	89.4
23	Get understandable answers to important questions all/most of the time (CNS)	49270	91.1	42893	91.4	6377	89.2
24	Hospital staff gave information about support groups	50148	81.6	43759	81.8	6389	80.1
25	Hospital staff gave information on getting financial help	38488	52.2	33488	52.5	5000	49.9
26	Hospital staff told patient they could get free prescriptions	31595	72.9	27095	73.1	4500	71.7
27	Patient asked if they would like to take part in cancer research	64235	32.7	56128	31.1	8107	44.0
29	Patient would have liked to have been asked	40257	53.1	36034	52.9	4223	54.5
31	Admission date not changed by hospital	37807	90.4	33238	90.8	4569	87.2
32	Staff gave complete explanation of what would be done	37074	86.7	32592	86.9	4482	84.9
33	Patient given written information about the operation	34377	73.5	30229	74.1	4148	69.2
34	Staff explained how operation had gone in understandable way	36723	74.7	32261	74.9	4462	73.2
36	Got understandable answers to important questions all/most of the time (doctor)	42426	82.3	37088	82.5	5338	81.0
37	Patient had confidence and trust in all doctors treating them	45724	84.8	40048	85.2	5676	82.3
38	Doctors did not talk in front of patient as if they were not there	45658	83.0	39989	83.5	5669	79.4
39	Patient's family definitely had opportunity to talk to doctor	38414	64.9	33677	64.9	4737	64.9
40	Got understandable answers to important questions all/most of the time (ward nurse)	40180	75.1	35093	75.8	5087	70.4
41	Patient had confidence and trust in all ward nurses	45500	69.4	39853	70.3	5647	63.1
42	Nurses did not talk in front of patient as if they were not there	45507	84.7	39861	85.4	5646	80.1
43	Always / nearly always enough nurses on duty	45261	61.0	39630	60.8	5631	62.1
44	Patient did not think hospital staff deliberately misinformed them	45570	87.5	39912	87.9	5658	84.9
45	Patient never thought they were given conflicting information	45476	79.0	39832	79.5	5644	75.5
46	Hospital staff asked what name the patient preferred to be called by	45308	56.0	39704	58.2	5604	40.6
47	Always given enough privacy when discussing condition/treatment	45578	84.0	39922	84.3	5656	81.8
48	Always given enough privacy when being examined or treated	45712	94.1	40032	94.2	5680	93.4
49	Patient was able to discuss worries and fears with staff	39253	63.8	34355	64.6	4898	58.2
50	Hospital staff did everything to help control pain all of the time	38902	84.6	34049	84.9	4853	82.7
51	Always treated with respect and dignity by staff	45206	82.7	39617	83.2	5589	79.5
52	Given clear written information about what should / should not do post discharge	43020	84.1	37753	84.5	5267	81.3
53	Staff told patient who to contact if worried post discharge	43894	92.9	38489	93.2	5405	91.0
54	Family definitely given all information needed to help care at home	37254	59.9	32756	60.0	4498	59.0
55	Patient definitely given enough care from health or social services	25356	61.1	22248	62.1	3108	53.6
56	Staff definitely did everything to control side effects of radiotherapy	22552	79.2	19505	79.8	3047	75.1
57	Staff definitely did everything to control side effects of chemotherapy	39073	81.3	33827	82.0	5246	76.8
58	Staff definitely did everything they could to help control pain	38130	81.0	32954	81.6	5176	77.4
59	Hospital staff definitely gave patient enough emotional support	45884	70.5	39989	71.4	5895	64.7
61	Waited no longer than 30 minutes for OPD appointment to start	59989	69.8	52385	71.0	7604	61.5
62	Patient thought doctor spent about the right amount of time with them	62104	93.8	54227	94.0	7877	92.4
63	Doctor had the right notes and other documentation with them	59844	95.2	52282	95.3	7562	94.3
64	GP given enough information about patient's condition and treatment	55920	94.2	48534	94.2	7386	93.9
65	Practice staff definitely did everything they could to support patient	47116	67.1	41312	68.0	5804	60.7
66	Hospital and community staff always worked well together	65561	62.4	57289	63.4	8272	55.2
67	Given the right amount of information about condition and treatment	67842	88.7	59256	88.8	8586	87.7
68	Patient was offered a written care plan	57441	24.2	50203	24.2	7238	24.0
69	Patient did not feel that they were treated as a set of cancer symptoms	67371	79.8	58845	80.3	8526	76.3
70	Overall rating of care	67863	87.9	59272	88.2	8591	86.0

Appendix table 4b: Odds Ratios (95% Confidence Intervals) and p-values for cancer patients treated by London hospitals reporting poorer patient experience compared with patients treated by hospitals elsewhere in England. Results from three logistic regression models are presented: crude associations with only adjustment for hospital; results from a model adjusting for patient case-mix; and from a model which additionally accounted for whether a patient was treated at a teaching hospital or not. Synoptic forms of questions are given in Appendix table 4a

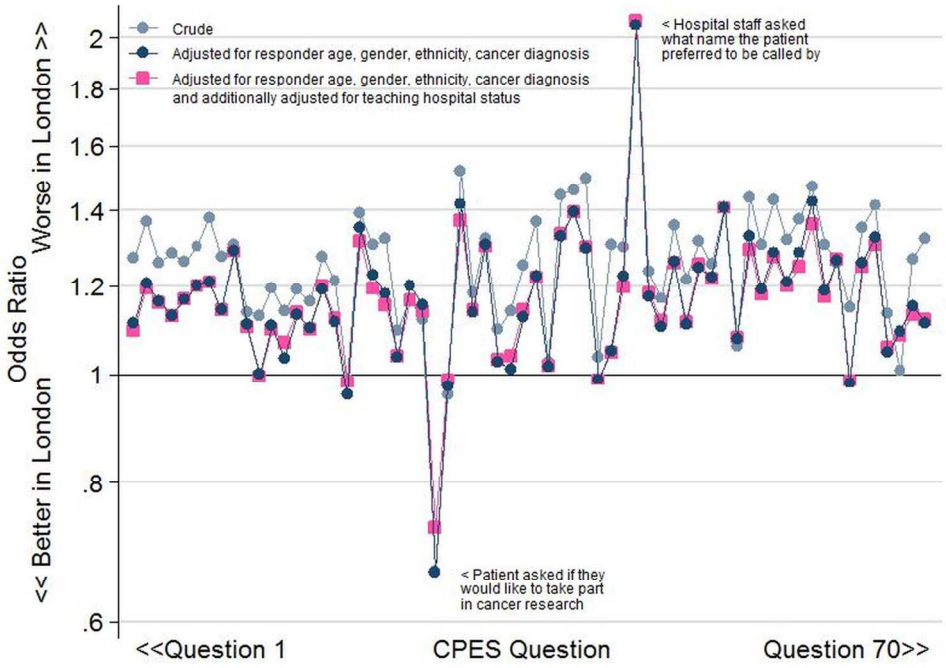
	Unadjusted		Adjusted for clinical and socio-demographic variables		Additionally adjusted for teaching hospital status	
Question	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
1	1.27 (1.16 - 1.39)	<0.0001	1.11 (1.03 - 1.20)	0.010	1.10 (1.01 - 1.19)	0.026
2	1.37 (1.24 - 1.51)	<0.0001	1.21 (1.11 - 1.32)	<0.0001	1.19 (1.09 - 1.31)	<0.0001
3	1.26 (1.17 - 1.35)	<0.0001	1.16 (1.09 - 1.24)	<0.0001	1.16 (1.08 - 1.24)	<0.0001
4	1.28 (1.17 - 1.41)	<0.0001	1.13 (1.05 - 1.22)	0.002	1.13 (1.04 - 1.22)	0.002
6	1.26 (1.15 - 1.38)	<0.0001	1.17 (1.06 - 1.28)	0.002	1.17 (1.06 - 1.29)	0.002
7	1.30 (1.18 - 1.44)	<0.0001	1.20 (1.08 - 1.33)	0.001	1.20 (1.08 - 1.33)	0.001
8	1.38 (1.19 - 1.59)	<0.0001	1.21 (1.05 - 1.40)	0.010	1.21 (1.04 - 1.40)	0.011
9	1.27 (1.17 - 1.39)	<0.0001	1.14 (1.05 - 1.24)	0.003	1.14 (1.05 - 1.24)	0.003
11	1.31 (1.17 - 1.46)	<0.0001	1.29 (1.16 - 1.44)	<0.0001	1.29 (1.15 - 1.44)	<0.0001
12	1.14 (1.04 - 1.24)	0.006	1.11 (1.01 - 1.21)	0.025	1.10 (1.01 - 1.21)	0.033
13	1.13 (1.05 - 1.21)	0.001	1.00 (0.93 - 1.07)	0.986	1.00 (0.93 - 1.07)	0.929
14	1.20 (1.08 - 1.33)	0.001	1.10 (1.00 - 1.22)	0.049	1.10 (0.99 - 1.21)	0.073
15	1.14 (0.99 - 1.31)	0.075	1.03 (0.89 - 1.20)	0.657	1.07 (0.92 - 1.24)	0.381
16	1.19 (1.10 - 1.30)	<0.0001	1.13 (1.04 - 1.23)	0.005	1.14 (1.04 - 1.24)	0.004
17	1.16 (1.06 - 1.27)	0.001	1.10 (1.01 - 1.20)	0.028	1.10 (1.00 - 1.20)	0.039
18	1.27 (1.13 - 1.44)	<0.0001	1.19 (1.06 - 1.33)	0.002	1.20 (1.07 - 1.35)	0.002
19	1.21 (1.11 - 1.32)	<0.0001	1.11 (1.02 - 1.21)	0.015	1.12 (1.03 - 1.23)	0.010
20	0.99 (0.85 - 1.16)	0.893	0.96 (0.81 - 1.13)	0.614	0.98 (0.83 - 1.16)	0.854
21	1.39 (1.22 - 1.59)	<0.0001	1.35 (1.19 - 1.54)	<0.0001	1.32 (1.15 - 1.50)	<0.0001
22	1.31 (1.17 - 1.46)	<0.0001	1.23 (1.09 - 1.38)	<0.0001	1.19 (1.06 - 1.34)	0.003
23	1.32 (1.17 - 1.49)	<0.0001	1.18 (1.05 - 1.33)	0.006	1.15 (1.02 - 1.30)	0.020
24	1.10 (0.94 - 1.28)	0.243	1.04 (0.89 - 1.21)	0.663	1.04 (0.89 - 1.22)	0.638
25	1.17 (1.01 - 1.36)	0.043	1.20 (1.03 - 1.40)	0.018	1.17 (1.00 - 1.36)	0.051
26	1.12 (0.97 - 1.29)	0.115	1.15 (0.99 - 1.34)	0.063	1.14 (0.98 - 1.33)	0.101
27	0.67 (0.56 - 0.79)	<0.0001	0.66 (0.56 - 0.79)	<0.0001	0.73 (0.62 - 0.85)	<0.0001
29	0.96 (0.87 - 1.05)	0.374	0.98 (0.90 - 1.06)	0.563	0.99 (0.91 - 1.08)	0.795
31	1.52 (1.30 - 1.78)	<0.0001	1.42 (1.22 - 1.64)	<0.0001	1.37 (1.19 - 1.59)	<0.0001
32	1.18 (1.06 - 1.32)	0.003	1.13 (1.01 - 1.27)	0.029	1.14 (1.02 - 1.28)	0.024
33	1.32 (1.15 - 1.52)	<0.0001	1.31 (1.15 - 1.49)	<0.0001	1.30 (1.14 - 1.49)	<0.0001
34	1.10 (0.99 - 1.21)	0.066	1.03 (0.93 - 1.13)	0.618	1.03 (0.93 - 1.14)	0.566
36	1.14 (1.02 - 1.27)	0.022	1.01 (0.90 - 1.13)	0.841	1.04 (0.93 - 1.16)	0.518
37	1.25 (1.11 - 1.41)	<0.0001	1.12 (0.99 - 1.27)	0.062	1.14 (1.01 - 1.29)	0.037
38	1.37 (1.24 - 1.52)	<0.0001	1.23 (1.10 - 1.36)	<0.0001	1.22 (1.10 - 1.36)	<0.0001
39	1.03 (0.93 - 1.13)	0.593	1.02 (0.92 - 1.12)	0.749	1.02 (0.92 - 1.13)	0.728
40	1.45 (1.29 - 1.63)	<0.0001	1.33 (1.18 - 1.50)	<0.0001	1.33 (1.18 - 1.51)	<0.0001
41	1.46 (1.32 - 1.62)	<0.0001	1.40 (1.26 - 1.55)	<0.0001	1.40 (1.25 - 1.55)	<0.0001
42	1.50 (1.34 - 1.68)	<0.0001	1.30 (1.16 - 1.46)	<0.0001	1.30 (1.16 - 1.46)	<0.0001
43	1.04 (0.91 - 1.17)	0.576	0.99 (0.87 - 1.12)	0.869	0.99 (0.87 - 1.13)	0.872
44	1.31 (1.17 - 1.46)	<0.0001	1.05 (0.94 - 1.17)	0.399	1.05 (0.93 - 1.17)	0.433
45	1.30 (1.17 - 1.44)	<0.0001	1.22 (1.11 - 1.35)	<0.0001	1.20 (1.09 - 1.32)	<0.0001
46	2.05 (1.75 - 2.41)	<0.0001	2.05 (1.75 - 2.41)	<0.0001	2.07 (1.76 - 2.44)	<0.0001
47	1.24 (1.10 - 1.38)	<0.0001	1.17 (1.04 - 1.32)	0.008	1.18 (1.05 - 1.33)	0.007
48	1.17 (1.02 - 1.35)	0.030	1.10 (0.95 - 1.28)	0.193	1.12 (0.96 - 1.29)	0.151
49	1.36 (1.23 - 1.50)	<0.0001	1.26 (1.14 - 1.39)	<0.0001	1.26 (1.14 - 1.39)	<0.0001
50	1.22 (1.09 - 1.36)	0.001	1.11 (0.99 - 1.24)	0.075	1.11 (0.99 - 1.25)	0.068
51	1.32 (1.18 - 1.47)	<0.0001	1.24 (1.11 - 1.40)	<0.0001	1.26 (1.12 - 1.41)	<0.0001
52	1.25 (1.09 - 1.44)	0.002	1.22 (1.06 - 1.41)	0.006	1.22 (1.05 - 1.41)	0.008
53	1.41 (1.19 - 1.67)	<0.0001	1.41 (1.19 - 1.67)	<0.0001	1.41 (1.18 - 1.68)	<0.0001
54	1.06 (0.97 - 1.16)	0.191	1.08 (0.98 - 1.18)	0.120	1.08 (0.98 - 1.18)	0.114
55	1.44 (1.25 - 1.66)	<0.0001	1.33 (1.16 - 1.53)	<0.0001	1.29 (1.13 - 1.49)	<0.0001
56	1.31 (1.16 - 1.47)	<0.0001	1.19 (1.05 - 1.35)	0.006	1.18 (1.04 - 1.34)	0.012
57	1.43 (1.27 - 1.62)	<0.0001	1.29 (1.13 - 1.46)	<0.0001	1.27 (1.12 - 1.45)	<0.0001
58	1.32 (1.19 - 1.47)	<0.0001	1.21 (1.08 - 1.35)	0.001	1.20 (1.07 - 1.34)	0.001
59	1.38 (1.24 - 1.53)	<0.0001	1.29 (1.16 - 1.43)	<0.0001	1.25 (1.12 - 1.38)	<0.0001
61	1.47 (1.23 - 1.77)	<0.0001	1.43 (1.19 - 1.71)	<0.0001	1.36 (1.14 - 1.63)	0.001
62	1.31 (1.12 - 1.52)	0.001	1.19 (1.02 - 1.38)	0.026	1.17 (1.00 - 1.37)	0.045
63	1.26 (1.07 - 1.47)	0.004	1.27 (1.08 - 1.49)	0.004	1.27 (1.08 - 1.49)	0.005
64	1.15 (0.96 - 1.37)	0.129	0.98 (0.82 - 1.17)	0.837	0.99 (0.82 - 1.18)	0.889
65	1.35 (1.24 - 1.47)	<0.0001	1.26 (1.16 - 1.37)	<0.0001	1.25 (1.14 - 1.36)	<0.0001
66	1.42 (1.31 - 1.53)	<0.0001	1.33 (1.23 - 1.43)	<0.0001	1.31 (1.21 - 1.41)	<0.0001
67	1.13 (1.03 - 1.25)	0.013	1.05 (0.94 - 1.16)	0.393	1.06 (0.95 - 1.17)	0.307
68	1.01 (0.88 - 1.15)	0.918	1.09 (0.95 - 1.25)	0.201	1.08 (0.94 - 1.25)	0.258
69	1.27 (1.15 - 1.40)	<0.0001	1.15 (1.05 - 1.26)	0.003	1.13 (1.03 - 1.24)	0.011
70	1.32 (1.17 - 1.49)	<0.0001	1.11 (0.98 - 1.26)	0.098	1.12 (0.99 - 1.27)	0.080

Appendix table 5. Interaction odds ratios for the association between being treated at a London hospital and reporting poorer patient experience, by ethnicity. The first column of this table presents the case-mix adjusted odds ratio and 95% CI (column duplicated from appendix table 4b); the middle column shows the same association presented for both White and non-White responders separately. The final column (interaction OR) presents the interaction odds ratio. Interaction odds ratio values > 1 denote that the association between poorer patient experience and being treated at a London hospital is stronger among White respondents, and values < 1 that associations are stronger among ethnic minority groups. For only 5 questions is there evidence (p<0.05) that the association varies by ethnic group, and out of 63 hypothesis tests (63 survey questions) these are more likely to have occurred by chance than to reflect true heterogeneity. This is further supported by noting that about half the interaction odds ratios (whether or not they are significant) are greater than, and about half are less than 1.

Question	OR London (95% CI) adjusted for clinical and socio-demographic variables *	OR London among White, Non-White respondents (adjusted for clinical and socio-demographic variables)	Interaction OR, 95%CI, p-value
1	1.11 (1.03 - 1.20)	1.11, 1.10	0.99 (0.80 - 1.22), p=0.90
2	1.21 (1.11 - 1.32)	1.20, 1.24	1.03 (0.84 - 1.25), p=0.79
3	1.16 (1.09 - 1.24)	1.16, 1.16	1.00 (0.82 - 1.23), p=0.99
4	1.13 (1.05 - 1.22)	1.13, 1.09	0.96 (0.79 - 1.18), p=0.72
6	1.17 (1.06 - 1.28)	1.15, 1.35	1.18 (0.93 - 1.48), p=0.17
7	1.20 (1.08 - 1.33)	1.18, 1.37	1.16 (0.91 - 1.47), p=0.24
8	1.21 (1.05 - 1.40)	1.22, 1.14	0.94 (0.72 - 1.21), p=0.61
9	1.14 (1.05 - 1.24)	1.11, 1.41	1.27 (1.04 - 1.56), p=0.02
11	1.29 (1.16 - 1.44)	1.29, 1.33	1.03 (0.84 - 1.27), p=0.77
12	1.11 (1.01 - 1.21)	1.11, 1.05	0.94 (0.76 - 1.16), p=0.57
13	1.00 (0.93 - 1.07)	0.99, 1.09	1.10 (0.92 - 1.32), p=0.29
14	1.10 (1.00 - 1.22)	1.13, 0.92	0.82 (0.68 - 0.98), p=0.03
15	1.03 (0.89 - 1.20)	1.02, 1.11	1.08 (0.80 - 1.47), p=0.60
16	1.13 (1.04 - 1.23)	1.12, 1.24	1.11 (0.92 - 1.34), p=0.28
17	1.10 (1.01 - 1.20)	1.10, 1.12	1.02 (0.85 - 1.23), p=0.81
18	1.19 (1.06 - 1.33)	1.20, 1.10	0.91 (0.73 - 1.13), p=0.40
19	1.11 (1.02 - 1.21)	1.09, 1.34	1.23 (1.03 - 1.47), p=0.02
20	0.96 (0.81 - 1.13)	0.97, 0.88	0.91 (0.70 - 1.20), p=0.51
21	1.35 (1.19 - 1.54)	1.35, 1.34	0.99 (0.81 - 1.22), p=0.92
22	1.23 (1.09 - 1.38)	1.24, 1.12	0.90 (0.68 - 1.19), p=0.47
23	1.18 (1.05 - 1.33)	1.19, 1.13	0.95 (0.73 - 1.25), p=0.74
24	1.04 (0.89 - 1.21)	1.05, 0.94	0.90 (0.71 - 1.14), p=0.39
25	1.20 (1.03 - 1.40)	1.24, 0.99	0.80 (0.66 - 0.98), p=0.03
26	1.15 (0.99 - 1.34)	1.18, 1.03	0.87 (0.69 - 1.10), p=0.25
27	0.66 (0.56 - 0.79)	0.67, 0.63	0.95 (0.79 - 1.14), p=0.57
29	0.98 (0.90 - 1.06)	0.98, 0.94	0.96 (0.75 - 1.22), p=0.72
31	1.42 (1.22 - 1.64)	1.38, 1.84	1.33 (0.94 - 1.89), p=0.11
32	1.13 (1.01 - 1.27)	1.12, 1.26	1.12 (0.82 - 1.55), p=0.47
33	1.31 (1.15 - 1.49)	1.30, 1.36	1.05 (0.79 - 1.38), p=0.75
34	1.03 (0.93 - 1.13)	1.02, 1.12	1.10 (0.86 - 1.41), p=0.45
36	1.01 (0.90 - 1.13)	**	**
37	1.12 (0.99 - 1.27)	1.14, 1.04	0.91 (0.71 - 1.17), p=0.46
38	1.23 (1.10 - 1.36)	1.22, 1.23	1.01 (0.79 - 1.28), p=0.95
39	1.02 (0.92 - 1.12)	1.01, 1.11	1.10 (0.87 - 1.39), p=0.41
40	1.33 (1.18 - 1.50)	1.36, 1.12	0.83 (0.66 - 1.03), p=0.09
41	1.40 (1.26 - 1.55)	1.41, 1.29	0.91 (0.74 - 1.13), p=0.39
42	1.30 (1.16 - 1.46)	1.32, 1.14	0.86 (0.68 - 1.08), p=0.20
43	0.99 (0.87 - 1.12)	0.97, 1.18	1.21 (0.99 - 1.50), p=0.07
44	1.05 (0.94 - 1.17)	1.06, 1.01	0.95 (0.75 - 1.21), p=0.69
45	1.22 (1.11 - 1.35)	1.25, 1.02	0.82 (0.65 - 1.04), p=0.10
46	2.05 (1.75 - 2.41)	2.09, 1.73	0.83 (0.67 - 1.02), p=0.08
47	1.17 (1.04 - 1.32)	1.20, 0.98	0.81 (0.63 - 1.05), p=0.12
48	1.10 (0.95 - 1.28)	1.14, 0.83	0.73 (0.50 - 1.08), p=0.12
49	1.26 (1.14 - 1.39)	1.26, 1.26	1.00 (0.80 - 1.24), p=1.00
50	1.11 (0.99 - 1.24)	1.08, 1.39	1.29 (0.99 - 1.68), p=0.06
51	1.24 (1.11 - 1.40)	1.28, 0.97	0.76 (0.60 - 0.97), p=0.03
52	1.22 (1.06 - 1.41)	1.22, 1.29	1.06 (0.79 - 1.42), p=0.71
53	1.41 (1.19 - 1.67)	1.39, 1.72	1.24 (0.81 - 1.90), p=0.32
54	1.08 (0.98 - 1.18)	1.06, 1.28	1.22 (0.97 - 1.53), p=0.09
55	1.33 (1.16 - 1.53)	1.30, 1.60	1.23 (0.95 - 1.59), p=0.11
56	1.19 (1.05 - 1.35)	1.22, 1.06	0.88 (0.66 - 1.16), p=0.36
57	1.29 (1.13 - 1.46)	1.28, 1.33	1.04 (0.83 - 1.31), p=0.73
58	1.21 (1.08 - 1.35)	1.18, 1.42	1.21 (0.96 - 1.51), p=0.10
59	1.29 (1.16 - 1.43)	1.28, 1.29	1.00 (0.82 - 1.22), p=0.99
61	1.43 (1.19 - 1.71)	1.43, 1.42	0.99 (0.82 - 1.20), p=0.95

62	1.19 (1.02 - 1.38)	1.03, 1.19	1.16 (0.92 - 1.46), p=0.22
63	1.27 (1.08 - 1.49)	1.28, 1.16	0.91 (0.61 - 1.37), p=0.65
64	0.98 (0.82 - 1.17)	0.94, 1.25	1.34 (0.99 - 1.81), p=0.06
65	1.26 (1.16 - 1.37)	1.26, 1.22	0.96 (0.80 - 1.17), p=0.71
66	1.33 (1.23 - 1.43)	1.32, 1.34	1.01 (0.85 - 1.21), p=0.87
67	1.05 (0.94 - 1.16)	1.03, 1.19	1.16 (0.92 - 1.46), p=0.22
68	1.09 (0.95 - 1.25)	1.11, 0.97	0.88 (0.72 - 1.07), p=0.20
69	1.15 (1.05 - 1.26)	1.13, 1.28	1.13 (0.94 - 1.35), p=0.21
70	1.11 (0.98 - 1.26)	1.10, 1.16	1.05 0.86 - 1.29), p=0.61

*Results also presented in appendix table 4b; **The full interaction model for this question did not maximise



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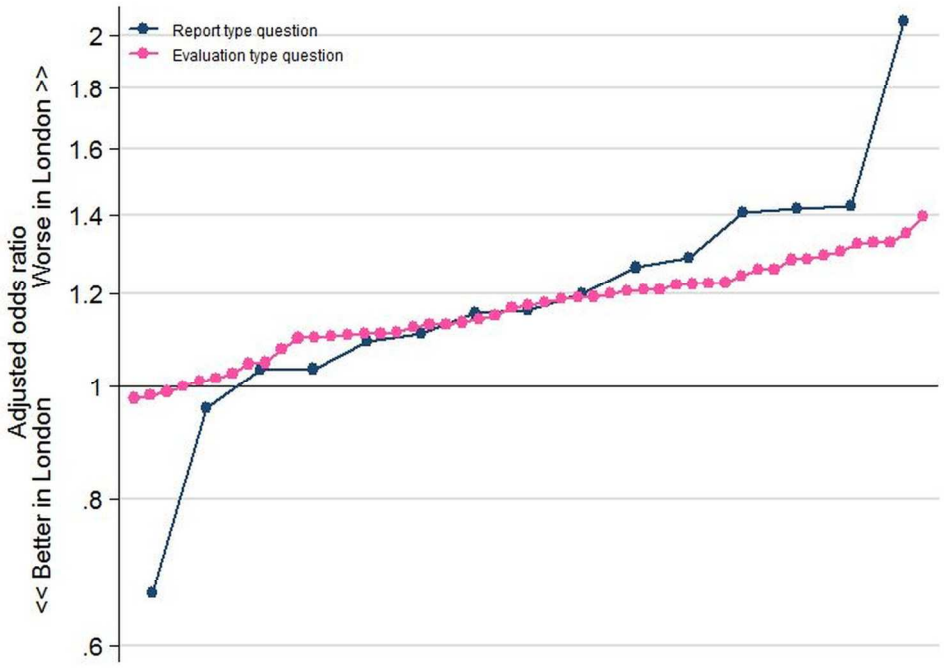

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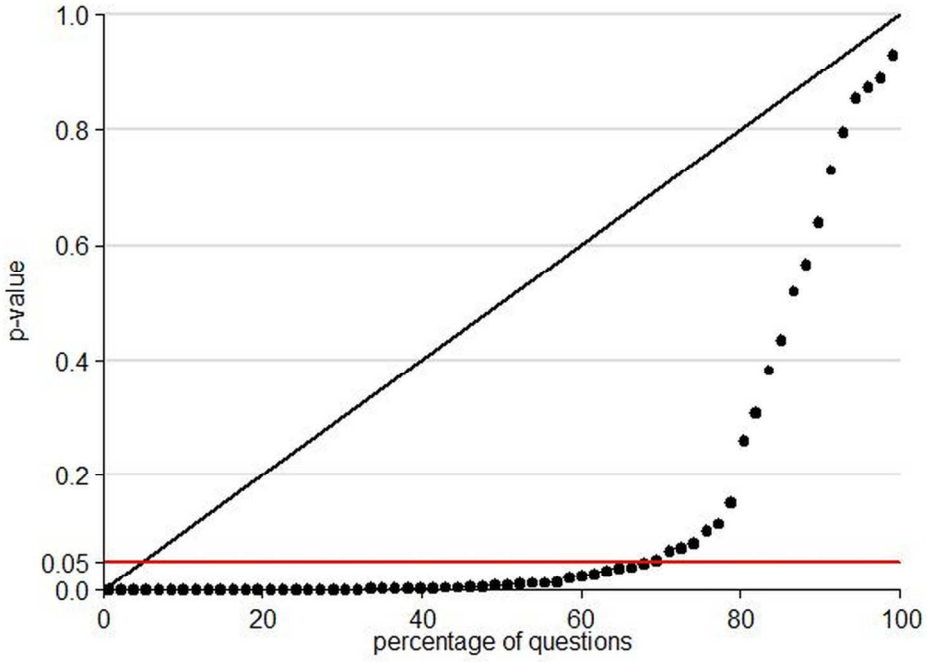

127x90mm (300 x 300 DPI)

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

	Item No	Recommendation
Title and abstract	1	*(a)* Indicate the study's design with a commonly used term in the title or the abstract *The study design (survey) indicated in the title – last word in the title.*
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found *The abstract provides an informative and balanced summary as suggested.*
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported *We indicate the rationale for the study in the Introduction section – previous knowledge that cancer patient experience is worse in London, but reasons for this variation are unknown*
Objectives	3	State specific objectives, including any prespecified hypotheses *We provide those explicitly as part of our (brief) Introduction section*
Methods		
Study design	4	Present key elements of study design early in the paper *We present those in Methods*
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection *We describe those in Methods, Data*
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants *We describe those in Methods, Data*
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable *We describe those in Methods, Analysis.*
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group *We describe those in Methods, Data*
Bias	9	Describe any efforts to address potential sources of bias *We describe these in Methods, Analysis*
Study size	10	Explain how the study size was arrived at *For each question, we included in analysis all patients with an informative response*

		to the question of interest and complete information on the exposure variables, see Methods, Data, end of first paragraph.
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why *Please see Methods, Data and Analysis*
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding *Please see above (Methods, Analysis)*
		(*b*) Describe any methods used to examine subgroups and interactions *We explored interactions as applicable to the study hypothesis, see Methods last paragraph, and Results section entitled "London variation for cancer patients and general in-patients"*
		(*c*) Explain how missing data were addressed *Please see reply to item 10 above*
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses *Details are given in the results (final paragraph) and discussion (paragraph 3)*
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed *This is a secondary analysis of an already created dataset, analysed in a complete case analysis fashion (see also Methods and reply to item 10 above).*
		(b) Give reasons for non-participation at each stage *See above (13a)*
		(c) Consider use of a flow diagram *Not applicable, please see above (13a)*
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders *See Results, Table 1*
		(b) Indicate number of participants with missing data for each variable of interest *Please see reply to items 10 and 13a above*
Outcome data	15*	Report numbers of outcome events or summary measures *See Results and Tables 2 and 3*
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included

		See Results and Table 2 (unadjusted odds ratios), also Online Appendix 3
		(*b*) Report category boundaries when continuous variables were categorized *See Methods, Data, and Results, Tables.*
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period *We present information on London vs rest-of-England differences in cancer patient experience both in percentages (Appendix 3) and odds ratios (Table 2)*
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses *Please see reply to item 12b above*
Discussion		
Key results	18	Summarise key results with reference to study objectives *See First Paragraph of Discussion, also 'What is known / what this study adds' section*
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias *We do consider limitations as part of Discussion, paragraph 3*
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence *See Discussion, paragraph 4*
Generalisability	21	Discuss the generalisability (external validity) of the study results *Not particularly applicable in the context of a nationwide patient survey*
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based *Provided at the end of manuscript as required by BMJ house-style*

*Give information separately for exposed and unexposed groups.

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

Correction

Saunders CL, Abel GA, Lyratzopoulos G. What explains worse patient experience in London? Evidence from secondary analysis of the Cancer Patient Experience Survey. *BMJ Open* 2013;**4**: e004039. Several errors were inadvertently uncorrected during the proofing stage for this article as follows:

1) Minor errors occurred in references 4, 7 and 16. Corrected references are provided below.

4. Griffiths P, Simon M, Richardson A, *et al.* Is a larger specialist nurse workforce in cancer care associated with better patient experience? Cross-sectional study. *J Health Serv Res Policy* 2013;**18**:39-46.

7. Burki TK. Cancer care in northern England rated best in England. *Lancet Oncol* 2013;**14**:e445.

16. Fulop N, Raine R. Leading healthcare in London: time for a radical response? *BMJ* 2013;**347**:f4711.

2) In the Results section of the Abstract, the second sentence should read, 'After case-mix adjustment there was still evidence for worse experience in London for 45/64 question'.

3) The sentence at the end of box 1 should read 'Considering report or evaluation types of questions separately…'

4) In the Funding statement 'research' should be capitalised in 'National Institute for Health Research.' In addition, the following sentence should be added, 'The views expressed in this publication are those of the authors and not necessarily those of Macmillan Cancer Support, the NHS, the National Institute for Health Research or the Department of Health.'

BMJ Open 2014;**4**:e004039. doi:10.1136/bmjopen-2013-004039corr1