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Making patients' views count

The relationship between cancer patient experience and staff survey results

A REPORT FOR MACMILLAN CANCER SUPPORT

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Picker Institute Europe

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- build and use evidence to champion the best possible patient-centred care
- work with patients, professionals and policy makers to strive continuously for the highest standards of patient experience.

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Summary

Picker Institute Europe were contracted by Macmillan Cancer Support to investigate the relationship between the results for the Cancer Patient Experience Survey (CPES) and the NHS Staff Survey.

The objectives were to:

- understand at an organisation level what, if any, areas of staff experience are associated with good or poor cancer patient experience;
- generate hypotheses as to what might be underlying any associations; and
- make recommendations for further research, based on findings.

The data were from the 2011 Cancer Patient Experience Survey and the 2011 NHS Staff Survey. They were analysed in two main stages. Firstly, a correlation analysis was conducted on trust-level results for both surveys. Following this, promising results were followed up using a two-level regression model, to identify the strongest links between responses to the two surveys. Regression models were constructed using composite scores representing patient survey items of similar thematic content.

At the whole trust level, there were relationships between a number of patient experience items and staff survey key findings. With the exception of 'were there enough nurses on duty', there were few CPES items that were related to a range of staff survey results, while there were a number of staff survey indicators that were associated with a range of patient experience measures. These relationships were also present at the level of individual patient experience, but were rather less strong. Slightly different staff survey indicators emerged as the most predictive of individual patient experience, probably in part because of the level of intercorrelation amongst the staff survey indicators.

At the trust level, the staff survey findings most frequently associated with patient experience items were:

- KF19 availability of handwashing materials.
- KF37 trust provides equal opportunities to staff.
- KF38 suffered discrimination in last 12 months.

Among the staff survey indicators most related to the experience of individual patients were:

- KF16 had health & safety training in last 12 months.
- KF34 would recommend trust as place to work or receive treatment.
- KF38 suffered discrimination in last 12 months.

These variables were predictive of patient experience in a number of domains, and in each case positive patient experience was related to positive staff experience.

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The underlying reasons for the relationships found were not necessarily clear and were likely to be complex and affected by unmeasured variables. Because of this, it is also not always clear to what extent any initiative to improve staff experience might also impact on cancer patient experience, or vice versa.

There is potential for extension of this research. One option would be to model case-level staff results as a function of trust-level experience scores. Another might be to explore the relationship between the surveys with a more specific data set, focusing on one major cancer type. However, of more value would be in-depth exploration of the link between cancer patient and staff experience through a dedicated study to collect finer-grained data within relevant specialities, supported by qualitative work.

An additional benefit from the current work is the identification of patient experience domains that may be of value in future analysis of survey data and related work. These are:

- Provision of information.
- Involvement in decisions.
- Care transition.
- Interpersonal relations, respect and dignity.

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Introduction

Picker Institute Europe were contracted by Macmillan Cancer Support to investigate the relationship between the results for the Cancer Patient Experience Survey (CPES) and the NHS Staff Survey.

The objectives were to:

- understand at an organisation level what, if any, areas of staff experience are associated with good or poor cancer patient experience;
- generate hypotheses as to what might be underlying any associations; and
- make recommendations for further research, based on findings.

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Analysis methods

Data were obtained for the 2011 CPES and for the 2011 NHS Staff Survey, as the latter data were closely temporally aligned with those for the patient survey.

The data were analysed in two main stages. Firstly, a correlation analysis was conducted on trust-level results for both surveys, to give a broad view of the pattern of interrelationships between them. Following this, promising results were followed up using a two-level regression model, allowing adjustment of patient results for demographic variables and the investigation of trust-level factors, to identify the strongest links between responses to the two surveys. Regression models were constructed using composite scores combining responses from a number of patient survey items of similar thematic content. This was done in order to provide more reliable and discriminating indicators of patient experience and to reduce the number of models required. The composition of the composite indicators was informed both by review of their content and statistical factor analytic methods.

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Correlation analysis of trust-level indicators

Data for the CPES comprised percentage results for the 2011 survey released in the 'Master Unified Spreadsheet' prepared by Quality Health and available at http://www.ncin.org.uk/view?rid=1712. For the staff survey, results were obtained from the survey coordination centre at Picker Institute Europe. The results were filtered to include only respondents from acute and acute specialist trusts who were from staff groups most likely to be involved or potentially involved in patient care[1]. However, it was not possible to identify separately staff dedicated to cancer services. The staff survey data were then aggregated to compute mean scores for the key findings. These are indicators constructed from responses to one or more survey questions that relate to NHS staff pledges. Case weights were applied, as for the national result reporting, in order to adjust for differences in the distribution of responses by staff groups.

A product-moment correlation matrix was constructed crossing all patient survey items with all staff survey indicators. No distinction was made at this stage between items in the CPES that were fact-gathering or filtering (such as whether patients had diagnostic tests) and evaluative items asking for opinions about the service offered.

Trust-level correlation results

The full matrix of correlation coefficients between staff survey key findings and patient experience questions is presented in Appendix A. Not all indicators were scaled such that higher values were more positive, and the matrix presents a mixture of positive and negative correlation coefficients. For the purpose of analysis, correlations were divided into the following groups, following the usual interpretation of Cohen's guidelines (Cohen, 1988):

- Correlations of magnitude 0.3-0.5 are 'moderate'.
- Correlations of magnitude 0.5 or more are 'large'.

The results indicated, first of all, an asymmetric set of relationships. While most patient survey items show moderate-to-large relationships with more than one staff survey indicator, this was mainly with a relatively small number of key findings from the staff survey. The most prominent staff survey items (ordered by key finding) were

KF16 *had health & safety training in last 12 months*
KF19 *availability of handwashing materials*
KF24 *experienced violence from colleagues in last 12 months*
KF25 *experienced harassment from patients/relatives in last 12 months?*
KF26 *experienced harassment from colleagues in last 12 months?*
KF33 *staff intention to leave*
KF37 *trust provides equal opportunities to staff*
KF38 *suffered discrimination in last 12 months*

[1] *Nurses, medical/dental practitioners and allied health professionals*

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Of these, KF19, KF37 and KF38 (*) were the most frequently associated with experience items at a substantive level. The most prominent CPES indicators (in questionnaire order) were:

Staff gave complete explanation of purpose of test(s)
Patient definitely involved in decisions about care and treatment
Patient had confidence and trust in all doctors treating them
Doctors did not talk in front of patient as if they were not there
Patient had confidence and trust in all ward nurses
Always/nearly always enough nurses on duty
All staff asked patient what name they preferred to be called by
Patient was able to discuss worries or fears with staff during visit
Always treated with respect and dignity by staff
Staff told patient who to contact if worried post discharge
Staff definitely did everything to control side effects of chemotherapy
Hospital staff definitely gave patient enough emotional support
Doctor had the right notes and other documentation with them
Patient`s rating of care `excellent`/`very good`

Results were examined for a selection of combinations of indicators to determine whether the correlations might be influenced by outliers. There was no consistent pattern, but in a few cases the correlation was influenced by one or more cases at some distance from the main cluster. This is illustrated for one indicator pairing in Figure 1: here results for three trusts (identified by case numbers) appear at some distance from the main cluster and two of them (67 & 98) are also some way from the line of best fit.

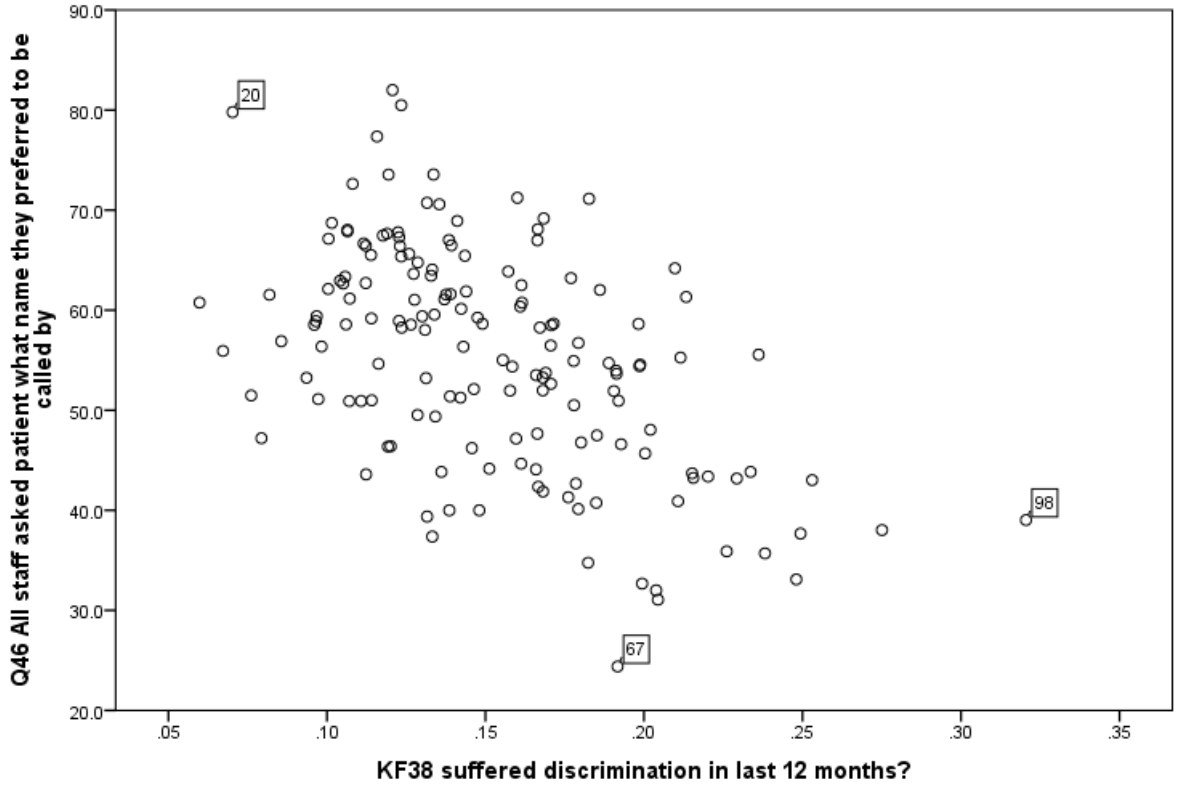

Figure 1: Scatter plot of relationship between staff and patient indicators

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Two trusts that frequently appeared with low score combinations were Newham University Hospital NHS Trust (98 in the chart) and Croydon Health Services NHS Trust (67). Correlations were re-run excluding those two trusts. While this reduced the magnitude of some of the associations (Appendix A), the general pattern remained as with them included.

Discussion

The nature of the possible underlying relationships is sometimes difficult to envisage: why the availability of hand-washing materials might be related to such a wide range of patient experience (including GP care) is not at all clear. Other relationships are perhaps easier to understand. Staff intention to leave is consistently (though weakly to moderately) negatively related to patient experience. There appear to be potential underlying links between respect and dignity for staff (expressed in equality of opportunity, lack of discrimination and lack of harassment and violence in the workplace) and similar constructs in the patient survey (asking patients what name they preferred used; being treated with dignity and respect; giving emotional support).

The most frequently linked CPES item was *Always/nearly always enough nurses on duty*. This was substantially correlated with a range of staff survey findings, including satisfaction with quality of work, work-life balance, lack of pressure, good opportunities to develop, lack of stress, action taken on errors, lack of harassment by patients, good communication with managers and indicators of staff satisfaction with the trust as a place to work. One reasonable hypothesis is that poor resourcing or overburdening of staff was reflected in less positive results in both patient and staff surveys.

Staff having had health and safety training was positively linked to patient experience and substantially so for a number of CPES items, such as doctors devoting enough time to patients, patients' receiving the right amount of information about their condition and treatment and information that was comprehensible, non-conflicting and did not appear deliberately to misinform. It was also linked to involvement of patients in decision-making and taking account of their preferences, confidence in staff and not being talked in front of as if they were not there.

These results apply at the trust level. They indicate only whether a trust with high/low scores on one variable also has high/low scores on an associated variable. This does not necessarily imply that the association applies at the level of the individual patient. Both patient- and trust-level variables may affect how individuals experience their care and its association with staff experience. Hence the next step was to examine these links using a modelling approach that allows these factors to be taken into account.

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Construction of composite scores

As described in Analysis above, composite indicators of key aspects of patient experience were constructed for incorporation in the statistical models. This was done both to reduce the number of models needed and also to increase the reliability of the patient-level indicators. A mixture of factor analysis and review of item content was used to form the CPES domains.

Exploratory factor analysis

A pairwise correlation matrix was constructed from the evaluative items in the patient level CPES data set, obtained from the UK Data Service. These items were treated as ordinal-level variables, and consequently the analysis was conducted using polychoric correlations (Gilley & Uhlig, 1993). Non-evaluative responses were treated as missing data for this analysis, and in some cases items were reverse-keyed (higher response codes were associated with less positive evaluations), so not all correlations were positive. A small number of items was omitted because they had too few respondents or were not ordinally-scaled (questions about clinical trials, about contact with a Clinical Nurse Specialist, about the time spent in a consultation and about the amount of information provided).

Exploratory factor analyses were conducted on the resulting correlation matrix and a number of procedures were applied to indicate the likely number of substantive underlying dimensions[2]. These gave differing estimates, but evaluating the range of information suggested that either one or three factors were likely to provide the best models. Combining these two alternatives, a bifactor model (Reise, Morizot, & Hays, 2007) was fitted, with a single overarching factor and three 'group' factors. In this model, each item is viewed as reflecting both a general factor underlying all items and one factor specific to a subset of items. This gave a good fit to the data (Root Mean Square of Residuals (RMSR) = 0.047). The factor structure is shown in Appendix B. The loading structure indicates that this set of items is essentially unidimensional, but with substantive subgroups that have variance in common (the general factor loadings are higher than the group factor loadings). These results suggested that items could be grouped empirically into three major themes:

- Provision of information and decision-making in the hospital context.
- Transition of care and wider support beyond the hospital setting.
- Interpersonal relations with staff, dignity, respect and privacy.

Within these main groups, it was possible to identify a number of sub-themes based on item content and the relationship between general and group factor loadings. There appeared to be some correspondence with the NHS Patient Experience Framework, with the first group above corresponding with *Information, communication, and education* and

[2] *Velicer's MAP analysis (O'Connor, 2000), parallel analysis (Timmerman & Lorenzo-Seva, 2011), the Hull method (Lorenzo-Seva, Timmerman, & Kiers, 2011) and non-graphical solutions for the Cattell scree test (Raîche, Riopel, & Blais, 2006)*

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elements of *Respect for patient-centred values, preferences, and expressed needs*, the second with *Transition and continuity* and the last with *Emotional support* and elements of *Respect for patient-centred values, preferences, and expressed needs*. Based on these analyses, the following domains (with the first factor split into two) were proposed for further development and modelling:

- Provision of information.
- Involvement in decisions.
- Care transition and ongoing support.
- Interpersonal relations, respect and dignity.

The content is set out in Appendix B. Some items were moved between domains or deleted because their content did not fit well with the intended theme. These putative domains were then checked for homogeneity. The final factor analysis results, based on a unidimensional model for each domain, together with internal consistency coefficients are reported in Appendix B. These indicated good measurement properties for each composite.

Composite scores

Items were scored for the purpose of creating composite domain scores, with the most positive response option (such as 'yes, definitely') scored as 100 and the least positive options scored as zero. Intermediate options were scored at equal intervals between 0 and 100. Composites were then computed as the mean of the patient-level item scores, but only in cases where the patient has made an evaluative response to at least half the questions.

In addition to these domains, the item *In your opinion, were there enough nurses on duty to care for you in hospital?* was selected for modelling because of its strong relationship to a number of staff survey indicators. This was converted into a scored variable in the same way as the items used in the composites.

The survey-level statistics for these scores are reported in Table 1.

Table 1: Domain score descriptive statistics

Domain	N cases	Minimum	Maximum	Mean	Std. Deviation
Involvement	64272	0	100	79.7	28.3
Transition	50266	0	100	68.9	26.0
Interpersonal	48377	13.6	100	89.9	12.7
Information	70169	0	100	83.3	20.0
Q43 were there enough nurses on duty?	47742	0	100	75.6	33.4

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Modelled results

For analysis purposes, staff survey key findings (as used for the correlation analysis) were converted into trust-level Z-scores with a mean of zero and standard deviation of one. This put all these predictors onto the same measurement scale, easing comparison. These were then merged into the case-level CPES data on a trust-by-trust basis. Composite scores were computed for each of the domains identified above.

Patient-level domain scores were modelled using a two-level variance components regression model (Goldstein, 1999), with trust treated as a random effect. Independent variables were entered and assessed in groups to determine whether it was appropriate to retain them in the final models.

The variables assessed first were patient characteristics: age-gender grouping and main ICD-10 disease group. Next, contextual variables were entered (general v specialist trust; foundation v non-foundation trust). The resulting model formed a base against which the effect of staff survey indicators could be tested.

Staff survey indicators were selected for testing in the model based on the magnitude of their bivariate correlation with patient-level experience scores. Examination of the correlations suggested that the twelve most correlated key findings should be selected, with the exception of the model for Q43, where correlations with the staff survey tended to be higher and 23 potential predictors were tested. Staff survey indicators were added as a block, and then removed one-by-one starting with the least predictive until the remaining items were all significantly related to the dependent variable (at the 90 per cent level). All explanatory variables were entered as main effects: interactions were not examined.

Provision of information

Taking background factors into account, the following staff survey key findings were related to patient-level Information scores:

- KF16 had health & safety training in last 12 months
- KF38 suffered discrimination in last 12 months

There was a weaker relationship between patient experience and the following key finding:

- KF34 would recommend trust as place to work or receive treatment

Table 2 summarises the results for these variables. The 'difference' statistic shows the difference in patient level scores (out of 100) associated with a one standard deviation change in the staff survey key finding. This is presented with upper and lower 95 per cent confidence limits. A value is also reported (p) which is the probability that this magnitude of difference or greater would be found in a sample from a population where there is in fact no underlying effect.

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Whilst the difference estimates gives a direct interpretation in terms of impact on patient experience, how important an effect is depends on the amount of overall variation in the domain score. The 'effect size' statistic standardises the difference statistic, and can be interpreted as the correlation between the staff survey indicator and the patient level experience score, once the effect of the background variables (patient demographics and trust characteristics) on patient experience has been controlled. This can be interpreted using the same criteria as for the trust-level correlations, ie effects below 0.3 are small.

Table 2: Model results for Information

Staff survey item	Difference					Effect size		
	Statistic	Standard error[3]	p	Lower confidence limit	Upper confidence limit	Statistic	Lower confidence limit	Upper confidence limit
KF16	0.57	0.17	0.001	0.25	0.90	0.045	0.019	0.071
KF38	-0.40	0.18	0.026	-0.75	-0.05	-0.031	-0.059	-0.004
KF34	0.35	0.18	0.059	-0.01	0.71	0.027	-0.001	0.056

As an example, a one standard deviation[4] increase in trust score KF16 is associated with a 0.57 score point increase in the Information score at the patient level. In a trust at the 95th percentile of KF16, the average patient score for Information is about 1.1 points out of 100 higher than in the average trust, controlling for other sources of variation. This represents a small effect size (correlation) of about 0.05 at the individual patient level. In a similar way, KF38 is negatively related to patient experience with an effect size of about -0.03.

Positive patient experience of Information was therefore associated with clinical staff who were less likely to experience discrimination and more likely to have received health and safety training. There was some indication of a relationship with recommending the trust as a place to work, but this was not statistically significant by commonly-applied criteria. Full model results are presented in Appendix C.

Involvement in decisions

Taking background factors into account, the following staff survey key findings were related to patient-level Involvement scores:

- KF16 had health & safety training in last 12 months
- KF34 would recommend trust as place to work or receive treatment
- KF38 suffered discrimination in last 12 months

Table 3 summarises the results for these variables.

[3] *The standard error indicates the level of uncertainty around an estimated statistic and permits calculation of statistical significance.*
[4] *The standard deviation indicates the level of variation in a trust-level indicator*

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Table 3: Model results for Involvement

Staff survey item	Difference					Effect size		
	Statistic	Standard error	p	Lower confidence limit	Upper confidence limit	Statistic	Lower confidence limit	Upper confidence limit
KF16	0.67	0.22	0.002	0.24	1.09	0.024	0.009	0.038
KF34	0.47	0.24	0.048	0.00	0.94	0.017	0.000	0.033
KF38	-0.60	0.24	0.011	-1.06	-0.14	-0.021	-0.038	-0.005

Positive patient experience of involvement in their care was associated with clinical staff having had health and safety training, with staff who would recommend their hospital as a place to work, and with staff who were less likely to suffer discrimination.

Full model results are provided in Appendix C.

Care transition

Taking background factors into account, the following staff survey key findings were related to patient-level Transition scores:

- KF11 received training, learning & development beneficial to career development in last 12 months
- KF38 suffered discrimination in last 12 months

Table 4 summarises the results for these variables.

Table 4: Model results for Transition

Staff survey item	Difference					Effect size		
	Statistic	Standard error	p	Lower confidence limit	Upper confidence limit	Statistic	Lower confidence limit	Upper confidence limit
KF11	0.62	0.25	0.014	0.13	1.11	0.024	0.005	0.043
KF38	-1.05	0.27	0.000	-1.58	-0.52	-0.040	-0.061	-0.020

Positive patient experience of Transition was associated with clinical staff who were less likely to experience discrimination and more likely to receive beneficial personal development.

Full model results are presented in Appendix C.

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Interpersonal relations

Taking background factors into account, the following staff survey key findings were related to patient-level Interpersonal scores:

- KF16 had health & safety training in last 12 months
- KF38 suffered discrimination in last 12 months

Table 5 summarises the results for these variables.

Table 5: Model results for Interpersonal

Staff survey item	Difference					Effect size		
	Statistic	Standard error	p	Lower confidence limit	Upper confidence limit	Statistic	Lower confidence limit	Upper confidence limit
KF16	0.24	0.10	0.015	0.05	0.44	0.019	0.004	0.034
KF38	-0.70	0.11	0.000	-0.91	-0.48	-0.055	-0.072	-0.038

Positive patient experience of Interpersonal relationships was associated with clinical staff who were less likely to experience discrimination and more likely to have received health and safety training.

Full model results are presented in Appendix C.

Q43: enough nurses

Taking background factors into account, the following staff survey key findings were related to patient-level responses on whether there were enough nurses on duty:

- KF18 suffered work-related stress in last 12 months
- KF34 would recommend trust as place to work or receive treatment

There was a weaker relationship between patient experience and the following key finding:

- KF29 presenteeism amongst staff

Table 6 summarises the results for these variables.

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Table 6: Model results for Enough nurses

Staff survey item	Difference					Effect size		
	Statistic	Standard error	p	Lower confidence limit	Upper confidence limit	Statistic	Lower confidence limit	Upper confidence limit
KF18	-0.91	0.39	0.019	-1.67	-0.15	-0.027	-0.050	-0.004
KF34	1.84	0.60	0.002	0.66	3.03	0.055	0.020	0.091
KF29	-0.66	0.37	0.078	-1.39	0.07	-0.020	-0.042	0.002

Positive patient experience of having enough nurses on duty was associated with clinical staff who recommend the trust as a place to work or receive treatment and with those less likely to suffer work-related stress. There was also a negative relationship with 'presenteeism', but this was not statistically significant by commonly-applied criteria.

Full model results are presented in Appendix C.

Discussion

The models identified a number of staff survey key findings that were statistically significantly related to patient experience at the individual level, once various background factors were controlled. However, the magnitude of these relationships was small. This is in part a reflection of the amount of variation in patient scores – there is generally more variation between individuals within trusts than between trusts, and the magnitude of relationships found at trust level would not normally be expected at the patient level.

Three variables commonly related to positive patient experience were those identifying staff who had received health and safety training, who were less likely to have suffered discrimination and who were more likely to recommend their trust as a place to work or receive treatment. These results reflect those for the bivariate trust-level analysis, and positive staff experience was associated with positive patient experience in these areas. However, while the relationships are in the expected directions, it is not always easy to understand why these are the most prominent relationships in the data or what might give rise to the links. There are likely to be complex determinants that impact on results from both surveys.

One problem with model construction was the level of interrelationship between indicators in the same survey. This was dealt with in the CPES data by the construction of composite indicators, but this was not attempted for the staff survey findings, which in a number of cases were already composite scores. Because of the correlations between items, it is possible that slightly different relationships might come to the fore with different samples. However, it is unlikely that substantively different conclusions about the overall pattern of associations would be the result.

In addition to these findings, there were notable variations in patient experience associated with patient-level factors, such as cancer type and age-gender group (Appendix C). In some cases, whether the trust was a specialist and/or foundation trust was associated with more positive experience.

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Overall conclusions

At the whole trust level, there were relationships between a number of patient experience items and staff survey key findings. With the exception of 'were there enough nurses on duty', there were few CPES items that were related to a range of staff survey results, while there were a number of staff survey indicators that were associated with a range of patient experience measures. These relationships were also present at the level of individual patient experience, but were rather less strong. Slightly different staff survey indicators emerged as the most predictive of individual patient experience, probably in part because of the level of intercorrelation amongst the staff survey indicators[5].

At the trust level, the staff survey findings most frequently associated with patient experience items were:

- KF19 availability of handwashing materials
- KF37 trust provides equal opportunities to staff
- KF38 suffered discrimination in last 12 months

Among the staff survey indicators most related to individual patient experience were

- KF16 had health & safety training in last 12 months
- KF34 would recommend trust as place to work or receive treatment
- KF38 suffered discrimination in last 12 months

These variables were predictive of patient experience in a number of domains, and in each case positive patient experience was related to positive staff experience.

The underlying reasons for the relationships found were not necessarily clear. In some cases, satisfied patients may give rise to positive staff experience and in others satisfied staff may better meet patients' expectations, but in all cases there are likely to be a range of unmeasured factors that impact on the relationship. Perhaps the most straightforward association to interpret is that between recommendation of the trust and positive patient experience: it appears that both staff and patient responses identify good provision of healthcare, and it may be that this item in the staff survey prompts staff to evaluate care from the patient perspective. Exactly how health and safety training might impact on patients' perceptions is less transparent, and would most likely depend on the nature of the training given as well as underlying factors that relate, for example, to financial performance. The links between equality of opportunities, discrimination (including discrimination by patients and by staff) and patient care are almost certainly complex and multifaceted. Because of this, it is also not always clear to what extent any initiative to improve staff experience might also impact on patient experience, or vice versa.

[5] *Because adjustments are made for one variable when estimating the independent effect of another, small changes to the amount of adjustment can affect these estimates. When predictors are correlated in the population, different samples or different levels of aggregation may give rise to different estimates of their relationship to an outcome variable and this in turn may give rise to a different ordering in their effect on the outcome.*

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It is wise to interpret the results with some caution. Whilst it appears highly likely that relationships exist between patient and staff experience, the complexity of the relationships involved means that the exact findings might be sensitive to the particular samples involved and the assumptions underlying the analysis. Different relationships might emerge as important if the approach were replicated using different samples.

In addition to the effects associated with staff survey indicators, there were effects (sometimes substantial) associated with background variables such as cancer type, age and gender.

A limitation of the study is that the staff survey results apply to staff associated with patient care in general, the majority of whom would not be involved in providing care for cancer patients. If for any reason the experience of staff in general is not representative of those in cancer services, above findings might not be appropriate. This is an example of where results could be affected by the assumptions made.

There is potential for extension of this research. One option would be to model case-level staff results as a function of trust-level experience scores. This would add an alternative perspective on the relationship between patient and staff experience. Another might be to explore the relationship between the surveys with a more specific data set, focusing on one major cancer type. Patient experience differs between cancer types, and the reduction in variation may be helpful for modelling, although the inability to isolate staff involved in cancer care may limit the usefulness of this. Beyond these possibilities, the scope for further informative analysis within the existing data appears limited. Of more value would be in-depth exploration of the link between cancer patient experience and experience of staff specifically involved in their care, which would entail a dedicated study to collect finer-grained data within relevant specialities. This could usefully be supported by qualitative work to help elucidate the nature of any relationships found.

An additional benefit from the current work is the identification of patient experience domains that may be of value in future analysis of survey data and related work. These are:

- Provision of information
- Involvement in decisions
- Care transition
- Interpersonal relations, respect and dignity

Details of the construction of these domains can be found in Appendix B.

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Appendix B: domain structure analysis

Bifactor analysis results in question order

Question		Factor F1	F2	F3	G
Q02	How do you feel about the length of time you had to wait before your first appointment with a hospital doctor?	0.165	-0.121	0.243	0.368
Q03	How long was it from the time you first thought something might be wrong with you until you first saw a hospital doctor?	0.110	-0.092	0.181	0.250
Q06	Beforehand, did a member of staff explain the purpose of the test(s)?	0.045	0.008	0.465	0.576
Q07	Beforehand, did a member of staff explain what would be done during the test procedure(s)?	0.077	0.012	0.414	0.580
Q08	Beforehand, were you given written information about your test(s)?	-0.030	0.075	0.482	0.561
Q09	Were the results of the test(s) explained in a way you could understand?	0.099	-0.012	0.437	0.609
Q10	Who first told you that you had cancer?	-0.004	0.025	0.077	0.107
Q11	When you were first told that you had cancer, had you been told you could bring a family member or friend with you?	-0.064	0.201	0.061	0.225
Q12	How do you feel about the way you were told you had cancer?	0.107	0.016	0.261	0.472
Q13	Did you understand the explanation of what was wrong with you?	0.093	-0.059	0.400	0.497
Q14	When you were told you had cancer, were you given written information about the type of cancer you had?	-0.096	0.175	0.423	0.521
Q15	Before your cancer treatment started, were you given a choice of different types of treatment?	-0.005	0.171	0.427	0.668
Q16	Do you think your views were taken into account when ... discussing which treatment you should have?	-0.019	0.148	0.370	0.555
Q17	Were the possible side effects of treatment(s) explained in a way you could understand?	-0.008	0.195	0.349	0.611
Q18	Before you started your treatment, were you given written information about the side effects of treatment(s)?	-0.210	0.301	0.412	0.488
Q19	Were you involved as much as you wanted to be in decisions about your care and treatment?	0.091	0.115	0.362	0.683
Q23	When you have important questions to ask your CNS, how often do you get answers you can understand?	0.164	0.048	0.209	0.554
Q24	Did hospital staff give you information about support or self-help groups for people with cancer?	-0.060	0.429	0.152	0.627
Q25	Did hospital staff give you information about how to get financial help or any benefits you might be entitled to?	-0.143	0.540	0.019	0.495
Q26	Did hospital staff tell you that you could get free prescriptions?	-0.033	0.449	-0.026	0.508
Q27	Since your diagnosis, has anyone discussed with you whether you would like to take part in cancer research?	-0.112	0.159	0.104	0.135
Q31	The last time you went into hospital for a cancer operation, was your admission date changed to a later date by the hospital?	0.063	0.012	0.056	0.178
Q32	Before you had your operation, did a member of staff explain what would be done during the operation?	0.075	0.072	0.380	0.619
Q33	Beforehand, were you given written information about your operation?	-0.162	0.224	0.419	0.473
Q34	After the operation, did a member of staff explain how it had gone in a way you could understand?	0.138	0.106	0.253	0.632
Q36	When you had important questions to ask a doctor, how often did you get answers that you could understand?	0.293	-0.012	0.229	0.706
Q37	Did you have confidence and trust in the doctors treating you?	0.368	-0.025	0.100	0.675
Q38	Did doctors talk in front of you as if you werent there?	-0.363	0.234	-0.152	-0.449
Q39	If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?	0.235	0.130	0.082	0.643
Q40	When you had important questions to ask a ward nurse, how often did you get answers you could understand?	0.419	0.046	-0.055	0.689
Q41	Did you have confidence and trust in the ward nurses treating you?	0.471	0.063	-0.210	0.632
Q42	Did ward nurses talk in front of you as if you werent there?	-0.474	0.187	0.045	-0.484
Q43	In your opinion, were there enough nurses on duty to care for you in hospital?	0.349	0.035	-0.125	0.486
Q44	...did you ever think that the doctors or nurses were deliberately not telling you certain things that you wanted to know?	-0.382	0.185	-0.198	-0.592
Q45	...did it ever happen that one doctor or nurse said one thing about your condition or treatment, and another said something different?	-0.384	0.121	-0.060	-0.534

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Q46	While you were in hospital did the doctors and nurses ask you what name you prefer to be called by?	0.099	0.203	-0.090	|	0.334
Q47	Were you given enough privacy when discussing your condition or treatment?	0.360	0.064	-0.070	|	0.599
Q48	Were you given enough privacy when being examined or treated?	0.397	0.030	-0.082	|	0.602
Q49	Were you able to discuss any worries or fears with staff during your hospital visit?	0.352	0.114	-0.009	|	0.717
Q50	Do you think the hospital staff did everything they could to help control your pain?	0.387	0.103	-0.128	|	0.633
Q51	Were you treated with respect and dignity by the doctors and nurses and other hospital staff?	0.464	0.033	-0.130	|	0.666
Q52	Were you given clear written information about what you should or should not do after leaving hospital?	0.008	0.404	0.037	|	0.583
Q53	Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?	0.073	0.396	-0.027	|	0.611
Q54	Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you at home?	0.105	0.424	-0.059	|	0.667
Q55	After leaving hospital, were you given enough care and help from health or social services?	0.076	0.342	-0.054	|	0.516
Q56	Did hospital staff do everything possible to control the side effects of radiotherapy?	0.104	0.257	0.097	|	0.609
Q57	Did hospital staff do everything possible to control the side effects of chemotherapy?	0.115	0.255	0.055	|	0.582
Q58	While you were being treated as an outpatient or day case, did hospital staff do everything they could to help control your pain?	0.182	0.283	-0.011	|	0.658
Q59	While you were being treated as an outpatient or day case, were you given enough emotional support from hospital staff?	0.196	0.288	0.007	|	0.706
Q61	The last time you had an outpatients appointment ... how long after the stated appointment time did the appointment start?	0.106	0.055	0.007	|	0.254
Q63	The last time you had an appointment with a cancer doctor, did they have the right documents...?	0.159	0.080	0.036	|	0.402
Q66	Did the different people treating and caring for you work well together to give you the best possible care?	0.299	0.144	-0.006	|	0.673
Q68	Have you been offered a written assessment and care plan?	-0.105	0.390	0.040	|	0.383
Q69	Sometimes people with cancer feel they are treated as a set of cancer symptoms … did you feel like that?	-0.315	0.008	-0.108	|	-0.620

Note: loadings <0.2 shown in grey

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Bifactor analysis results by loading pattern

Question		Factor	F1	F2	F3	G	Comments
Q06	Beforehand, did a member of staff explain the purpose of the test(s)?		0.045	0.008	0.465	0.576	Provision of information and decision-making in the hospital context
Q07	Beforehand, did a member of staff explain what would be done during the test procedure(s)?		0.077	0.012	0.414	0.580	
Q08	Beforehand, were you given written information about your test(s)?		-0.030	0.075	0.482	0.561	
Q09	Were the results of the test(s) explained in a way you could understand?		0.099	-0.012	0.437	0.609	
Q12	How do you feel about the way you were told you had cancer?		0.107	0.016	0.261	0.472	
Q13	Did you understand the explanation of what was wrong with you?		0.093	-0.059	0.400	0.497	
Q14	When you were told you had cancer, were you given written information about the type of cancer you had?		-0.096	0.175	0.423	0.521	
Q15	Before your cancer treatment started, were you given a choice of different types of treatment?		-0.005	0.171	0.427	0.668	
Q16	Do you think your views were taken into account when ... discussing which treatment you should have?		-0.019	0.148	0.370	0.555	
Q17	Were the possible side effects of treatment(s) explained in a way you could understand?		-0.008	0.195	0.349	0.611	
Q18	Before you started your treatment, were you given written information about the side effects of treatment(s)?		-0.210	0.301	0.412	0.488	
Q19	Were you involved as much as you wanted to be in decisions about your care and treatment?		0.091	0.115	0.362	0.683	
Q23	When you have important questions to ask your Clinical Nurse Specialist, how often do you get answers you can understand?		0.164	0.048	0.209	0.554	
Q32	Before you had your operation, did a member of staff explain what would be done during the operation?		0.075	0.072	0.380	0.619	
Q33	Beforehand, were you given written information about your operation?		-0.162	0.224	0.419	0.473	
Q34	After the operation, did a member of staff explain how it had gone in a way you could understand?		0.138	0.106	0.253	0.632	
Q24	Did hospital staff give you information about support or self-help groups for people with cancer?		-0.060	0.429	0.152	0.627	Mainly about transition of care beyond the hospital setting
Q25	Did hospital staff give you information about how to get financial help or any benefits you might be entitled to?		-0.143	0.540	0.019	0.495	
Q26	Did hospital staff tell you that you could get free prescriptions?		-0.033	0.449	-0.026	0.508	
Q52	Were you given clear written information about what you should or should not do after leaving hospital?		0.008	0.404	0.037	0.583	
Q53	Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?		0.073	0.396	-0.027	0.611	
Q54	Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you at home?		0.105	0.424	-0.059	0.667	
Q55	After leaving hospital, were you given enough care and help from health or social services?		0.076	0.342	-0.054	0.516	
Q56	Did hospital staff do everything possible to control the side effects of radiotherapy?		0.104	0.257	0.097	0.609	
Q57	Did hospital staff do everything possible to control the side effects of chemotherapy?		0.115	0.255	0.055	0.582	
Q58	While you were being treated as an outpatient or day case, did hospital staff do everything they could to help control your pain?		0.182	0.283	-0.011	0.658	

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Q59	While you were being treated as an outpatient or day case, were you given enough emotional support from hospital staff?	0.196	0.288	0.007	|	0.706	
Q36	When you had important questions to ask a doctor, how often did you get answers that you could understand?	0.293	-0.012	0.229	|	0.706	Interpersonal relations with staff, dignity, respect and privacy
Q37	Did you have confidence and trust in the doctors treating you?	0.368	-0.025	0.100	|	0.675	
Q38	Did doctors talk in front of you as if you werent there?	-0.363	0.234	-0.152	|	-0.449	
Q39	If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?	0.235	0.130	0.082	|	0.643	
Q40	When you had important questions to ask a ward nurse, how often did you get answers you could understand?	0.419	0.046	-0.055	|	0.689	
Q41	Did you have confidence and trust in the ward nurses treating you?	0.471	0.063	-0.210	|	0.632	
Q42	Did ward nurses talk in front of you as if you werent there?	-0.474	0.187	0.045	|	-0.484	
Q43	In your opinion, were there enough nurses on duty to care for you in hospital?	0.349	0.035	-0.125	|	0.486	
Q44	...did you ever think that the doctors or nurses were deliberately not telling you certain things that you wanted to know?	-0.382	0.185	-0.198	|	-0.592	
Q45	...did it ever happen that one doctor or nurse said one thing about your condition or treatment, and another said something different?	-0.384	0.121	-0.060	|	-0.534	
Q47	Were you given enough privacy when discussing your condition or treatment?	0.360	0.064	-0.070	|	0.599	
Q48	Were you given enough privacy when being examined or treated?	0.397	0.030	-0.082	|	0.602	
Q49	Were you able to discuss any worries or fears with staff during your hospital visit?	0.352	0.114	-0.009	|	0.717	
Q50	Do you think the hospital staff did everything they could to help control your pain?	0.387	0.103	-0.128	|	0.633	
Q51	Were you treated with respect and dignity by the doctors and nurses and other hospital staff?	0.464	0.033	-0.130	|	0.666	
Q66	Did the different people treating and caring for you work well together to give you the best possible care?	0.299	0.144	-0.006	|	0.673	
Q69	Sometimes people with cancer feel they are treated as a set of cancer symptoms … did you feel like that?	-0.315	0.008	-0.108	|	-0.620	
Q61	The last time you had an outpatients appointment ... how long after the stated appointment time did the appointment start?	0.106	0.055	0.007	|	0.254	No strong loadings on any of the factors
Q63	The last time you had an appointment with a cancer doctor, did they have the right documents...?	0.159	0.080	0.036	|	0.402	
Q68	Have you been offered a written assessment and care plan?	-0.105	0.390	0.040	|	0.383	
Q02	How do you feel about the length of time you had to wait before your first appointment with a hospital doctor?	0.165	-0.121	0.243	|	0.368	
Q03	How long was it from the time you first thought something might be wrong with you until you first saw a hospital doctor?	0.110	-0.092	0.181	|	0.250	
Q11	When you were first told that you had cancer, had you been told you could bring a family member or friend with you?	-0.064	0.201	0.061	|	0.225	
Q10	Who first told you that you had cancer?	-0.004	0.025	0.077	|	0.107	
Q27	Since your diagnosis, has anyone discussed with you whether you would like to take part in cancer research?	-0.112	0.159	0.104	|	0.135	
Q31	The last time you went into hospital for a cancer operation, was your admission date changed to a later date by the hospital?	0.063	0.012	0.056	|	0.178	
Q46	While you were in hospital did the doctors and nurses ask you what name you prefer to be called by?	0.099	0.203	-0.090	|	0.334	

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Provision of information

Item parcel comprising the mean of

Q06 Beforehand, did a member of staff explain the purpose of the test(s)?
Q07 Beforehand, did a member of staff explain what would be done during the test procedure(s)?
Q08 Beforehand, were you given written information about your test(s)?
Q09 Were the results of the test(s) explained in a way you could understand?

Q13 Did you understand the explanation of what was wrong with you?

Q14 When you were told you had cancer, were you given written information about the type of cancer you had?

Q17 Were the possible side effects of treatment(s) explained in a way you could understand?

Q18 Before you started your treatment, were you given written information about the side effects of treatment(s)?

Item parcel comprising the mean of

Q32 Before you had your operation, did a member of staff explain what would be done during the operation?
Q33 Beforehand, were you given written information about your operation?
Q34 After the operation, did a member of staff explain how it had gone in a way you could understand?

Standardized factor loadings based upon correlation matrix

	F1	Communality	Uniqueness
tests	0.63	0.39	0.61
operations	0.64	0.41	0.59
Q13	0.57	0.32	0.68
Q14	0.70	0.49	0.51
Q17	0.76	0.57	0.43
Q18	0.76	0.57	0.43

Cronbach's alpha =0.84

McDonald's omega =0.84

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Involvement in decisions

Q15 Before your cancer treatment started, were you given a choice of different types of treatment?

Q16 Do you think your views were taken into account when ... discussing which treatment you should have?

Q19 Were you involved as much as you wanted to be in decisions about your care and treatment?

Standardized factor loadings based upon correlation matrix

	F1	Communality	Uniqueness
Q15	0.96	0.92	0.082
Q16	0.87	0.75	0.250
Q19	0.81	0.66	0.339

Cronbach's alpha =0.91

McDonald's omega =0.91

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Care transition

Q24 Did hospital staff give you information about support or self-help groups for people with cancer?

Q25 Did hospital staff give you information about how to get financial help or any benefits you might be entitled to?

Q26 Did hospital staff tell you that you could get free prescriptions?

Q52 Were you given clear written information about what you should or should not do after leaving hospital?

Q53 Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?

Q54 Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you at home?

Q55 After leaving hospital, were you given enough care and help from health or social services?

Q68 Have you been offered a written assessment and care plan?

Standardized factor loadings based upon correlation matrix

	F1	Communality	Uniqueness
Q24	0.76	0.58	0.42
Q25	0.69	0.48	0.52
Q26	0.65	0.43	0.57
Q52	0.75	0.56	0.44
Q53	0.78	0.61	0.39
Q54	0.80	0.63	0.37
Q55	0.60	0.36	0.64
Q68	0.50	0.25	0.75

Cronbach's alpha =0.88

McDonald's omega =0.88

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Interpersonal relations, respect and dignity

Q23 When you have important questions to ask your Clinical Nurse Specialist, how often do you get answers you can understand?

Q36 When you had important questions to ask a doctor, how often did you get answers that you could understand?

Q37 Did you have confidence and trust in the doctors treating you?

Q38 Did doctors talk in front of you as if you weren't there?

Q39 If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?

Q40 When you had important questions to ask a ward nurse, how often did you get answers you could understand?

Q41 Did you have confidence and trust in the ward nurses treating you?

Q42 Did ward nurses talk in front of you as if you weren't there?

Q44 ...did you ever think that the doctors or nurses were deliberately not telling you certain things that you wanted to know?

Q45 ...did it ever happen that one doctor or nurse said one thing about your condition or treatment, and another said something different?

Q47 Were you given enough privacy when discussing your condition or treatment?

Q48 Were you given enough privacy when being examined or treated?

Q49 Were you able to discuss any worries or fears with staff during your hospital visit?

Q51 Were you treated with respect and dignity by the doctors and nurses and other hospital staff?

Q69 Sometimes people with cancer feel they are treated as a set of cancer symptoms ... did you feel like that?

Standardized factor loadings based upon correlation matrix

	F1	Communality	Uniqueness
Q23	0.56	0.31	0.69
Q36	0.76	0.58	0.42
Q37	0.77	0.59	0.41
Q38	0.55	0.30	0.70
Q39	0.67	0.45	0.55
Q40	0.81	0.66	0.34
Q41	0.77	0.60	0.40
Q42	0.61	0.37	0.63
Q44	0.69	0.48	0.52
Q45	0.65	0.43	0.57
Q47	0.68	0.46	0.54
Q48	0.69	0.48	0.52
Q51	0.80	0.64	0.36
Q69	0.55	0.30	0.70

Cronbach's alpha =0.92

McDonald's omega =0.93

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Appendix C: Multilevel models

Results are displayed in the following tables for three model stages: the null model (without predictors), the model with background variables and the model with selected staff survey indicators included as predictors.

Glossary

Null:	the base model without predictors. Used to test the significance of adding predictors to the model
Background:	the base model with background variables (patient demographics and trust-level characteristics) added
Full:	the model with selected staff survey indicators added
Coeff:	the regression coefficient, interpreted as the difference in score on the dependent variable associated with a one-unit increase in the predictor. For categorical predictors, this means the presence of the characteristic compared to a designated reference category. For staff survey indicators, this means a one standard deviation increase in score
S.E:	the standard error of the estimated coefficient (an indication of how reliably it is estimated)
p:	the probability that a coefficient of this magnitude (or greater) would be found in a sample from a population where there was no relationship
Level 2 variance:	the modelled variance between hospital trusts
Level 1 variance:	the modelled variance within trusts

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Provision of information

	Null		Background		Full		
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	p
Intercept	83.14	0.19	79.78	0.33	80.23	0.33	
Cancer type (Urology reference)							
Prostate			4.89	0.35	4.91	0.35	0.000
Sarcoma			-1.53	0.47	-1.53	0.47	0.001
Lung			3.26	0.37	3.25	0.37	0.000
Breast			7.74	0.29	7.75	0.29	0.000
Gynaecological			3.50	0.39	3.51	0.39	0.000
Haematological			1.29	0.30	1.30	0.29	0.000
Colorectal/Lower Gastrointestinal			4.25	0.30	4.26	0.30	0.000
Skin			2.36	0.55	2.35	0.55	0.000
Brain/Central Nervous System			-2.98	0.78	-3.00	0.78	0.000
Head and Neck			-0.64	0.47	-0.64	0.47	0.174
Other			1.10	0.64	1.11	0.64	0.083
Upper Gastrointestinal			1.68	0.38	1.68	0.38	0.000
Age.gender group (51-65.Male reference)							
66 - 75.Male			0.27	0.28	0.26	0.28	0.349
76+.Male			-3.40	0.30	-3.41	0.30	0.000
Missing.Male			-3.12	0.61	-3.13	0.61	0.000
36 - 50.Male			-1.52	0.55	-1.50	0.55	0.006
16 - 25.Male			-0.24	1.46	-0.22	1.46	0.878
26 - 35.Male			0.61	1.10	0.62	1.10	0.575
51 - 65.Female			-2.31	0.30	-2.31	0.30	0.000
66 - 75.Female			-1.45	0.31	-1.46	0.31	0.000
76+.Female			-5.62	0.34	-5.62	0.34	0.000
Missing.Female			-3.47	0.60	-3.46	0.60	0.000
36 - 50.Female			-2.93	0.38	-2.92	0.38	0.000
16 - 25.Female			-4.27	1.59	-4.25	1.59	0.007
26 - 35.Female			-3.33	0.84	-3.31	0.84	0.000
Trust characteristics							
acute (specialist) trust			0.07	0.80	-1.09	0.82	0.184
Foundation trust			1.15	0.34	0.52	0.34	0.127
Staff survey key findings (z scores)							
KF16					0.57	0.17	0.001
KF38					-0.40	0.18	0.026
KF34					0.35	0.18	0.059
Level 2 variance	4.16	0.61	3.01	0.48	2.39	0.40	
Level 1 variance	397.25	2.12	386.59	2.09	386.59	2.09	

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Involvement in decisions

	Null		Background		Full		
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	p
Intercept	79.66	0.23	71.96	0.46	72.53	0.46	
Cancer type (Urology reference)							
Prostate			9.53	0.52	9.55	0.52	0.000
Sarcoma			3.03	0.71	3.04	0.71	0.000
Lung			6.83	0.55	6.81	0.55	0.000
Breast			10.40	0.44	10.41	0.44	0.000
Gynaecological			6.95	0.59	6.96	0.59	0.000
Haematological			5.56	0.45	5.58	0.45	0.000
Colorectal/Lower Gastrointestinal			7.61	0.46	7.61	0.46	0.000
Skin			9.46	0.83	9.44	0.83	0.000
Brain/Central Nervous System			2.93	1.17	2.93	1.17	0.012
Head and Neck			6.08	0.70	6.10	0.70	0.000
Other			6.43	0.95	6.44	0.95	0.000
Upper Gastrointestinal			5.82	0.56	5.83	0.56	0.000
Age.gender group (51-65.Male reference)							
66 - 75.Male			0.70	0.42	0.69	0.42	0.097
76+.Male			-2.58	0.45	-2.59	0.45	0.000
Missing.Male			-2.18	0.91	-2.18	0.91	0.016
36 - 50.Male			-1.16	0.81	-1.13	0.81	0.166
16 - 25.Male			0.38	2.17	0.42	2.17	0.847
26 - 35.Male			-0.85	1.64	-0.81	1.64	0.622
51 - 65.Female			-3.05	0.45	-3.06	0.45	0.000
66 - 75.Female			-0.38	0.46	-0.39	0.46	0.397
76+.Female			-1.83	0.51	-1.84	0.51	0.000
Missing.Female			-2.69	0.91	-2.68	0.91	0.003
36 - 50.Female			-4.48	0.57	-4.47	0.57	0.000
16 - 25.Female			-5.56	2.38	-5.51	2.38	0.021
26 - 35.Female			-3.58	1.23	-3.54	1.23	0.004
Trust characteristics							
acute (specialist) trust			2.85	1.08	1.10	1.09	0.316
Foundation trust			1.50	0.45	0.69	0.45	0.126
Staff survey key findings (z scores)							
KF16					0.67	0.22	0.002
KF38					-0.60	0.24	0.011
KF34					0.47	0.24	0.048
Level 2 variance	5.53	0.91	4.66	0.81	3.55	0.67	
Level 1 variance	796.60	4.45	786.50	4.45	786.52	4.45	

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Care transition

	Null		Background		Full		
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	p
Intercept	68.98	0.28	60.24	0.52	60.73	0.51	
Cancer type (Urology reference)							
Prostate			5.45	0.59	5.46	0.59	0.000
Sarcoma			2.79	0.75	2.83	0.75	0.000
Lung			8.79	0.58	8.79	0.58	0.000
Breast			12.27	0.44	12.27	0.44	0.000
Gynaecological			7.23	0.59	7.24	0.59	0.000
Haematological			7.55	0.48	7.55	0.48	0.000
Colorectal/Lower Gastrointestinal			8.64	0.46	8.62	0.46	0.000
Skin			8.38	0.90	8.39	0.90	0.000
Brain/Central Nervous System			8.24	1.12	8.28	1.12	0.000
Head and Neck			9.29	0.68	9.30	0.68	0.000
Other			5.41	0.96	5.42	0.96	0.000
Upper Gastrointestinal			6.88	0.58	6.89	0.58	0.000
Age.gender group (51-65.Male reference)							
66 - 75.Male			3.89	0.43	3.88	0.43	0.000
76+.Male			4.19	0.48	4.18	0.48	0.000
Missing.Male			4.99	0.96	4.98	0.96	0.000
36 - 50.Male			-0.81	0.78	-0.79	0.78	0.312
16 - 25.Male			10.13	2.00	10.18	2.00	0.000
26 - 35.Male			1.31	1.59	1.35	1.59	0.395
51 - 65.Female			-6.63	0.45	-6.63	0.45	0.000
66 - 75.Female			-0.50	0.47	-0.51	0.47	0.271
76+.Female			-0.50	0.53	-0.51	0.53	0.331
Missing.Female			-3.17	0.91	-3.18	0.91	0.000
36 - 50.Female			-8.77	0.55	-8.77	0.55	0.000
16 - 25.Female			1.89	2.20	1.94	2.20	0.377
26 - 35.Female			-9.19	1.17	-9.18	1.17	0.000
Trust characteristics							
acute (specialist) trust			3.22	1.22	1.98	1.19	0.095
Foundation trust			1.68	0.53	0.98	0.52	0.061
Staff survey key findings (z scores)							
KF38					-1.05	0.27	0.000
KF11					0.62	0.25	0.014
Level 2 variance	8.89	1.33	7.55	1.18	6.28	1.03	
Level 1 variance	669.38	4.23	654.63	4.18	654.64	4.18	

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Interpersonal relations

	Null		Background		Full		
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	p
Intercept	90.00	0.13	88.90	0.22	89.13	0.20	
Cancer type (Urology reference)							
Prostate			1.49	0.30	1.51	0.30	0.000
Sarcoma			-2.23	0.39	-2.19	0.39	0.000
Lung			-0.99	0.29	-1.00	0.29	0.001
Breast			1.84	0.21	1.84	0.20	0.000
Gynaecological			-0.30	0.28	-0.31	0.28	0.276
Haematological			0.44	0.23	0.45	0.23	0.054
Colorectal/Lower Gastrointestinal			-0.44	0.22	-0.45	0.22	0.037
Skin			3.63	0.42	3.62	0.41	0.000
Brain/Central Nervous System			-3.53	0.56	-3.50	0.56	0.000
Head and Neck			0.30	0.33	0.29	0.33	0.368
Other			-0.94	0.48	-0.93	0.48	0.054
Upper Gastrointestinal			-1.54	0.28	-1.53	0.28	0.000
Age.gender group (51-65.Male reference)							
66 - 75.Male			1.70	0.22	1.69	0.22	0.000
76+.Male			1.72	0.24	1.71	0.24	0.000
Missing.Male			-0.25	0.48	-0.25	0.48	0.606
36 - 50.Male			-1.82	0.41	-1.79	0.41	0.000
16 - 25.Male			-1.81	1.06	-1.79	1.06	0.090
26 - 35.Male			-2.69	0.82	-2.66	0.82	0.001
51 - 65.Female			-2.33	0.23	-2.33	0.23	0.000
66 - 75.Female			0.63	0.24	0.62	0.24	0.009
76+.Female			0.86	0.26	0.85	0.26	0.001
Missing.Female			-2.20	0.46	-2.22	0.46	0.000
36 - 50.Female			-4.37	0.29	-4.37	0.29	0.000
16 - 25.Female			-6.56	1.16	-6.53	1.16	0.000
26 - 35.Female			-4.54	0.60	-4.52	0.60	0.000
Trust characteristics							
acute (specialist) trust			2.35	0.54	1.40	0.47	0.003
Foundation trust			1.20	0.23	0.86	0.19	0.000
Staff survey key findings (z scores)							
KF38					-0.70	0.11	0.000
KF11					0.24	0.10	0.015
Level 2 variance	1.83	0.29	1.22	0.21	0.66	0.14	
Level 1 variance	159.78	1.03	156.69	1.02	156.70	1.02	

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Enough nurses on duty

	Null		Background		Full		
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	p
Intercept	76.01	0.37	75.46	0.63	76.59	0.64	
Cancer type (Urology reference)							
Prostate			0.33	0.78	0.31	0.78	0.690
Sarcoma			-6.59	1.03	-6.64	1.03	0.000
Lung			-1.33	0.78	-1.43	0.78	0.066
Breast			2.31	0.54	2.30	0.54	0.000
Gynaecological			-2.53	0.75	-2.55	0.75	0.001
Haematological			-2.78	0.62	-2.79	0.62	0.000
Colorectal/Lower Gastrointestinal			-4.76	0.57	-4.78	0.57	0.000
Skin			9.67	1.13	9.67	1.12	0.000
Brain/Central Nervous System			-2.91	1.49	-3.04	1.49	0.041
Head and Neck			0.04	0.87	0.03	0.87	0.974
Other			-1.82	1.28	-1.90	1.28	0.139
Upper Gastrointestinal			-5.51	0.75	-5.58	0.75	0.000
Age.gender group (51-65.Male reference)							
66 - 75.Male			4.31	0.58	4.32	0.58	0.000
76+.Male			7.44	0.63	7.45	0.63	0.000
Missing.Male			3.97	1.28	4.00	1.28	0.002
36 - 50.Male			-2.74	1.08	-2.77	1.08	0.010
16 - 25.Male			-4.41	2.81	-4.47	2.81	0.111
26 - 35.Male			-5.32	2.16	-5.35	2.16	0.013
51 - 65.Female			-4.65	0.61	-4.65	0.61	0.000
66 - 75.Female			1.24	0.63	1.26	0.63	0.044
76+.Female			3.87	0.69	3.88	0.69	0.000
Missing.Female			-3.27	1.23	-3.26	1.23	0.008
36 - 50.Female			-8.50	0.76	-8.50	0.76	0.000
16 - 25.Female			-10.05	3.09	-10.03	3.09	0.001
26 - 35.Female			-5.09	1.59	-5.09	1.59	0.001
Trust characteristics							
acute (specialist) trust			8.90	1.55	5.54	1.57	0.000
Foundation trust			2.01	0.68	0.67	0.67	0.319
Staff survey key findings (z scores)							
KF34					1.84	0.60	0.002
KF4					-0.92	0.56	0.102
KF18					-0.91	0.39	0.019
KF29					-0.66	0.37	0.078
Level 2 variance	15.56	2.34	11.85	1.90	9.14	1.57	
Level 1 variance	1100.30	7.13	1086.71	7.13	1086.69	7.13	

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