

The background features a decorative graphic consisting of three overlapping circles in shades of blue, arranged diagonally from the top right to the bottom right. Two thin, light blue diagonal lines intersect the circles, creating a sense of depth and movement.

NHS Staff Survey Scores as Predictors of Trust Outcomes

A Multi-Method Longitudinal Analysis

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Executive Summary

Several previous studies have demonstrated links between staff experiences and organisational performance and other outcomes, both in healthcare and other sectors. It is always more difficult, however, to prove such links are causal, and if so in what direction: do changes in human resource management, for example, lead to subsequent improvements in patient care? In a real-world setting where many different factors can affect outcomes, there is no simple way of studying this.

This report takes an in-depth look at the relationships between staff experiences in the NHS and trust outcomes, to examine any evidence of causal links that can be distilled from this analysis. Two separate methods are used – regression analysis of change scores, and latent growth curve modelling – each of which examines the relationships in a slightly different way. Specifically, the regression analysis is used to determine whether a year-on-year change in an outcome can be associated with a year-on-year change in staff experiences, whereas the latent growth curve modelling studies change in both variables over a three-year period to determine whether links exist.

The data used in the report come from the NHS national staff survey, between 2006 and 2009, and from a variety of published outcome data: patient satisfaction, patient mortality, infection rates, Annual Health Check ratings, staff absenteeism and staff turnover. The staff survey variables data used encompass all of the “key scores” published in the annual survey results. As there were a few such scores introduced in 2008, these are only included in the regression analysis.

Overall, the analysis produced few clear messages that were consistent across both methods. This probably reflects the number of factors that can cause changes in the different outcome variables, and the relatively low sensitivity to changes in staff experience alone – particularly

when modelled across three (or more) years. The only clear message about changes in scores to come across very strongly from both methods was that the percentage of staff reporting errors, near misses and incidents (when they were witnessed) was strongly associated with an increase in the “Quality of services” Annual Health Check rating. This suggests that an increased focus on (and support for) incident reporting is associated with subsequent changes in overall quality performance ratings.

Another finding with some degree of clarity from both methods is the link between human resource management and patient satisfaction, with changes in a number of HR practice variables (particularly % staff receiving job-relevant training, % staff appraised, % staff appraised with personal development plans and Support from line managers) linked to improvements in the level of satisfaction with quality of care as reported by inpatients in acute trusts. Linked to this was the conclusion from both methods of analysis that acute trusts with higher levels of HR practices (even where they do not change) are more likely to see patient mortality rates decrease over time.

Other findings include:

- The percentage of staff believing their trust provides equal opportunities for career progression or promotion has associations with both of the Annual Health Check ratings as well as staff absenteeism.
- The following staff experience scores were linked to all outcomes: “Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy)”, “Quality of job design (clear job content, feedback and staff involvement)”, and “Staff job satisfaction”.
- Other staff experience scores that were linked to most of the outcomes are: “Percentage of staff receiving job-relevant training, learning or development in previous 12 months”, “Percentage of staff having had health and safety training in previous 12 months”, “Support from immediate managers”, “Extent of positive feeling (communication, staff involvement, innovation & patient care)”, and “Staff intention to leave jobs”.

Key implications for trusts, therefore, are that focussing on HR practices, particularly training, and supporting staff to be able to report errors and incidents as they occur, are most likely to help improve outcomes for patients.

1. *Introduction*

- The relationship between employee experience and organisational effectiveness in healthcare has been demonstrated by copious research (see e.g. Lowe and Chan, 2010).
- Many studies have shown that HR policies and practices, the work environment and employee attitudes and behaviours at work have an effect on important individual and organisational outcomes, in terms of both performance and the overall well-being of the employees.
- In general, high performance Human Resource Management (HRM) systems support effective information processing and decision-making, and thus can have a positive effect on health outcomes in hospitals and other care settings (e.g. Preuss, 2003).
- Outside of healthcare, HRM policies and practices have been shown to have an effect on organisational effectiveness, such as human resource outcomes (e.g., turnover, absenteeism), and organizational and financial outcomes (e.g., productivity, profits, market value) (e.g. Dyer and Reeves, 1995; Huselid, 1995).
- Within healthcare, West and colleagues (2002) found that HR practices and procedures are linked to lower patient mortality rates in acute hospitals. Particularly, they report that appraisal, training and teamworking are key factors affecting patient mortality rates. These findings were confirmed and extended in a later study that used a longitudinal design and a wider range of HR practices (West et al., 2006). Similarly, Thornton Bacon and Mark (2009) concluded from their study of 2720 nurses that organisational factors and employee engagement have a significant impact on patient satisfaction.
- The purpose of this study is to investigate the effect of several organisational factors and employee attitudes and behaviours on a range of important hospital performance outcomes. These comprise outcomes regarding both the quality of patient care (patient satisfaction, mortality rate, quality of services and hospital infection rates) and factors that are directly linked to the costs and the financial

performance of trusts (turnover, quality of financial management and absenteeism).

- A key development of this study compared with previous investigations is that it specifically allows for the investigation of causal effects. Although no method can ever prove causality in a non-experimental design, the use of longitudinal regression analysis and latent growth curve modelling over three years' data gives evidence that points to a causal link, or at the very least rules out an alternative causal link.

2. *Aim of the Study*

- The primary purpose of the study is to investigate the effect of several metrics of HR practices, work environment and employee attitudes and behaviours in the NHS on key trust-level outcomes. By using data from several sources and investigating the level and change in the outcome measures over time, we aim to assess the predictive value of several salient work environment factors in the NHS.
- We investigated the relationship between the most recent hospital outcomes and the key score variables of the NHS by using two methods, namely multiple regression analysis and latent growth curve modelling.
- The key difference between the methods is that the multiple regression analysis shows where a change in the predictors is associated with an increase or decrease in the outcomes, whereas the latent growth curve modelling indicates where high or low values of the predictors is associated with a change in the outcomes.
- In the multiple regression analysis we assessed the effect of organisational factors as measured by the NHS staff survey (NSS) in 2009 on the change on the outcome measures as compared to the previous year, while controlling for prior performance, prior organisational factors, as well as the organisational characteristics.
- In the latent growth curve modelling analysis we used as predictors the NSS key findings in the year 2007 (except for the the 2009 scores on employee engagement, as these were not available for earlier years).
- The outcome measures used for this study are: Patient satisfaction (2007-2009), Mortality Rates (2007/08-2009/10), Turnover (2008-2010), Financial Management (2007-2009), Quality of services (2007-2009), Absenteeism (2007/08-2009/10) and MRSA Infection rates (2007/08-2009/10).

3. *Research Methodology*

Regression Analysis of Change scores

- We used ordinary least squares regression analysis in order to investigate the longitudinal effects of the NHS key score variables on the following seven outcome variables: absenteeism (2009/10), financial management (2008/09), quality of services (2008/09), staff turnover in the NHS (2009/10) (all trusts), and patient satisfaction (2009/10), patient mortality in hospitals (2009/10), and MRSA rates (2009/10)).
- The outcome data used come from several sources, which allows for more confidence in the findings, as it minimizes the bias that is associated with the source of the data. The outcome data that we used were collected over three consecutive years, which allows for assessing of both trusts' performance on each outcome, as well as the change in trusts' performance over the three year period.
- Patient satisfaction was the trust-level response to the question "Overall, how would you rate your stay in hospital?" in the 2009 national acute inpatient survey. Mortality rates were the hospital standardised mortality ratios as published by Dr Foster. Financial management and Quality of services were the final (2008/9) Annual Health Check ratings. MRSA infection rates were the rates of Meticillin Resistant Staphylococcus Aureus infections per 10,000 bed days in the 2009/10 NHS year, as published by the Health Protection Agency. Turnover (% leavers in the year 2009/10) and absenteeism (% days lost to absence in the year 2009/10) were derived from the NHS Electronic Staff Record.
- Further information about the NHS staff survey scores can be found at www.nhsstaffsurveys.com.
- The method allows for the fact that the effect of organisational variables may not be felt immediately. It also allows us to rule out a "reverse causality" argument (i.e. outcomes affecting staff survey scores) because including earlier

measurements of the outcomes as independent variables in the regression removes this variance from the equation.

- The predictor variables used in this analysis are therefore trust outcomes from previous years that were highlighted previously, as well as staff experiences from 2008 (e.g. the key score variable for “job satisfaction”) and their respective change scores (i.e. the difference of one key score variable between years 2008 and 2009).
- We also included four control variables in our analysis. These are the size of trust (measured by number of staff), location (whether or not the trust is in London; previous research has shown that staff experience in London is often significantly different from elsewhere in the country), hospital status (specialist status vs. non-specialist status) and teaching status (teaching hospital vs. non-teaching hospitals). Controlling for these variables results in partialling out their effect on the outcomes, making our statistical models more accurate and increasing our confidence in the findings regarding the predictive power of our independent variables.
- We tested the hypothesis that staff experience (e.g. job satisfaction), at time 1 (2008) would predict hospital outcomes a year later at time 2 (2009/10), the only exception being annual health check variables for which the most recent data available is 2008/09.

Latent Growth Curve Modeling

- Latent Growth Curve Modeling is a technique used for investigating the effect of predictor variables on outcomes over time (see for example Kaplan, 2000).
- The majority of the predictor variables under this methodology were collected as part of the NHS National Staff Survey in 2007. This particular year was selected as the most appropriate since using data that was collected earlier than the outcome data permits for causality to be inferred.
- The employee engagement measures were collected for the first time as part of the NHS National Staff Survey in 2009, therefore 2009 data was used in the analysis. Though using predictors for which data was collected at the same time

or after the collection of the outcome measures is not ideal in terms of inferring causality, we can at least get an indication of potential relationships. These relationships can be retested and confirmed at a later time, when later outcome data become available.

- The outcome measures were the same as in the regression analysis, but we used the final three available years' data. We are using several statistical measures to evaluate the effect of the predictors on the outcomes. The “unstandardised estimated value” is in essence the coefficient of the relationship between each predictor and the outcome. For each model we report two unstandardised estimated values, one for the intercept and one for the slope of the outcome, as well as the test statistic and its significance (non-significant test statistics indicate that the unstandardised estimated values cannot be interpreted with any confidence). Intercept coefficients indicate the effect of the predictor on the mean level of the outcome in the three years, while the slope coefficients indicate the effect of the predictor on the change in the outcome over time.
- Finally, the model fit is an overall indication of how well the data that is used fit the proposed statistical models. Based on model fit indices (cut-off points: CFI>.9, NFI>.9, SRMR<.06), RMSEA<.06) we have categorised each model into one of three categories; Poor fit when the model does not meet any of the cut-off criteria, Satisfactory fit when the model meets at least one of the cut-off criteria and Good fit when the model meets all of the cut-off criteria. When model fit is poor this is an indication that other alternative models might be more representative of the data, as compared to the tested one.
- Where coefficients are not provided the model failed to run for statistical reasons.
- In all analyses we controlled for the size of the trusts, their location (London vs. other), hospital status (specialist vs. non-specialist)¹ and teaching status (teaching vs. non-teaching). Controlling for these variables results in partialling out their effect on the outcomes, making our statistical models more accurate and increasing our confidence in the findings regarding the predictive power of our independent variables.

¹ Apart from the models where Mortality in the outcome measure

4. Results

The overall results are summarised in tables 1 and 2, presenting key findings from the regression analysis and latent growth curve modelling respectively.

Key Results

Although there were plenty of significant results in both methods, there were surprisingly few results that were highly consistent across the two types of analysis.

The only message to come across very strongly involving both change outcomes (as opposed to results that focus on the level of the outcome variable) was that the percentage of staff reporting errors, near misses and incidents when they were witnessed was significantly associated with an increase in the “Quality of services” Annual Health Check rating.

Other findings with some evidence from both methods include predictors of change in patient satisfaction, which from the regression analysis were HR practice variables (% staff receiving job-relevant training, % staff appraised, % staff appraised with personal development plans and Support from line managers).

Both methods of analysis also led to the conclusion that higher levels of HR practices are associated with drops in hospital mortality rates.

Table 1: Summary of findings (Regression Coefficients)

	Patient satisfaction	Mortality	Financial management	Quality of services	Absenteeism	Turnover rate
Staff job satisfaction	8.703**					
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver					1.992**	
Percentage of staff agreeing that they have an interesting job						-9.345*
Quality of job design (clear job content, feedback and staff involvement)	8.063*					
Work pressure felt by staff	-4.616*					
Percentage of staff using flexible working options	14.230*					
Percentage of staff receiving job-relevant training, learning or development in last 12 months	10.339**	-37.268*				
Percentage of staff appraised in last 12 months	5.796**				-0.706*	
Percentage of staff having well structured appraisals in last 12 months	8.487*					
Percentage of staff appraised with personal development plans in last 12 months	6.521**					
Support from immediate managers	6.483**	-18.532*				
Percentage of staff suffering work-related injury in last 12 months					2.243*	
Percentage of staff suffering work-related stress in last 12 months					2.983**	
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	21.056*				8.412*	
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month			1.922**			
Percentage of staff reporting errors, near misses or incidents witnessed in the last month				3.469*		
Trust commitment to work-life balance				1.106*		
Percentage of staff able to contribute towards improvements at work		-41.446**		2.086*		
Percentage of staff agreeing that they understand their role and where it fits in				1.516*		
Staff intention to leave jobs	-5.019*		-1.317***			
Staff recommendation of the trust as a place to work or receive treatment	4.324*			1.157**		
Percentage of staff having equality and diversity training in the last 12 months			-0.620*			
Percentage of staff believing trust provides equal opportunities for career progression or promotion			9.986***	2.906*	-0.644*	

Empty cells= non-significant results

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Table 2: Summary of findings (Latent growth curve modelling coefficients)

Key Finding		Patient Satisfaction	Mortality	Turnover	Financial Management	Quality of Services	Absenteeism	Infection Rates
Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept	.423 (8.620*)		1.775 (2.139*)	2.089 (10.404*)	1.242 (6.523*)	-1.667 (-7.588*)	
	slope	-.175 (-3.971*)		-1.662 (-3.829*)	-.334 (3.514*)			
Staff motivation at work (Motivation) (2009)	intercept							
	slope					.824 (2.610*)		
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept	.308 (2.473*)		5.398 (4.357*)	1.166 (3.926*)	.580 (2.112*)	-1.828 (-5.761*)	.719 (2.245*)
	slope			-3.264 (-5.001*)	-.297 (-2.233*)	.297 (1.871)		-.354 (-2.443*)
Overall engagement (2009)	intercept			5.811 (4.021*)	2.405 (6.681*)	1.341 (3.994*)	-2.999 (-8.031*)	
	slope			-4.105 (-5.416*)	-.392 (-2.378*)	.453 (2.308*)	.304 (1.988*)	
Percentage of staff using flexible working options (2007)	intercept			12.614 (3.638*)	-1.316 (-2.101*)	-2.730 (-4.711*)	-2.058 (-3.056*)	
	slope			-8.373 (-4.582*)	-.653 (-2.334*)	.932 (2.759*)		
Percentage of staff appraised within previous 12 months (2007)	intercept				1.358 (3.918*)	1.234 (3.861*)	-1.067 (-2.925*)	
	slope		-6.443 (-2.115*)				.477 (3.426*)	
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept				4.611 (7.153*)	3.760 (6.319*)	-2.517 (-3.560*)	
	slope		-25.774 (-3.593*)		-1.021 (-3.472*)		.986 (3.638*)	
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept				1.398 (4.030*)	1.019 (3.176*)	-1.147 (-3.128*)	
	slope		-7.337 (-2.320*)				.508 (3.622*)	
Percentage of staff having training/ development in previous 12 months (2007)	intercept				8.541 (6.113*)	3.563 (2.720*)	-4.239 (-2.875*)	3.629 (2.474*)
	slope				-2.372 (-3.759*)			-1.591 (-2.393*)
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept			8.888 (2.539*)	4.935 (6.173*)	2.054 (2.741*)	-4.666 (-5.575*)	2.039 (2.749*)
	slope			-5.728 (-3.143*)	-1.516 (-4.216*)			-.948 (-2.823*)
Percentage of staff working in a well structured team environment (2007)	intercept		-40.091 (-2.005*)	13.113 (4.751*)		-1.368 (-2.868*)	-2.920 (-5.480*)	
	slope			7.703 (-5.282*)	-.850 (3.744*)	.666 (2.422*)		

Key Finding		Patient Satisfaction	Mortality	Turnover	Financial Management	Quality of Services	Absenteeism	Infection Rates
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept	.430 (4.604*)		4.320 (3.063*)	1.777 (5.018*)		-1.075 (-2.956*)	.607 (1.993*)
	slope			-3.529 (-4.789*)	-.538 (-3.386*)		.190 (1.322)	-.384 (-2.805*)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept						-4.358 (-2.698*)	
	slope					1.724 (2.132*)		
Percentage of staff working extra hours (2007)	intercept						-3.799 (-5.036*)	
	slope							
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept			-6.047 (-2.124*)	-3.202 (-4.320*)	-1.502 (-2.184*)		
	slope				.967 (2.915*)			
Percentage of staff suffering work stress in previous 12 months (2007)	intercept	-1.025 (-4.368*)			-4.636 (-4.239*)		6.385 (5.610*)	
	slope	.200 (2.110*)			1.307 (2.667*)	-1.670 (-2.846*)	-1.527 (-3.435*)	
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept			21.447 (7.078*)		1.273 (2.281*)	-2.108 (-3.449*)	
	slope			-14.679 (-9.241*)			.480 (2.026*)	-.613 (-2.397*)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept	-1.287 (-3.378*)		-25.709 (-10.470*)		3.895 (6.980*)	5.234 (8.811*)	
	slope			19.025 (15.114*)	.936 (3.399*)	-1.356 (-4.048*)		
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept	-2.751 (-2.065*)				16.903 (3.120*)		-9.785 (-2.030*)
	slope					-6.820 (-2.173*)		
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept	-1.179 (-4.952*)		-23.162 (-8.386*)		2.362 (3.760*)	4.451 (6.458*)	
	slope	.205 (2.140*)			1.199 (4.000*)	-1.287 (-3.551*)		
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept	-.348 (-1.192)		26.795 (5.022*)				-2.511 (-2.841*)
	slope			-16.710 (-5.934*)				1.222 (3.061*)
Quality of work life balance (2007)	intercept	.278 (2.755*)				.728 (3.232*)		.602 (2.688*)
	slope	-.092 (-2.527*)			-.534 (-4.936*)		.260 (2.497*)	-.285 (-2.815*)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept	.442 (3.464*)		7.757 (5.567*)	2.371 (6.494*)	1.459 (4.313*)	-3.074 (-7.941*)	
	slope			-5.069 (-6.909*)	-.682 (-4.142*)		.621 (4.019*)	-.464 (-2.876*)

Key Finding		Patient Satisfaction	Mortality	Turnover	Financial Management	Quality of Services	Absenteeism	Infection Rates
Support from immediate managers (2007)	intercept			3.526 (2.871*)	1.603 (5.278*)	1.087 (3.875*)	-1.182 (-3.528*)	.889 (3.041*)
	slope			-1.807 (-2.786*)	-464 (-3.402*)			-.486 (-3.714*)
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept	.330 (6.200*)		2.981 (3.533*)	2.133 (11.101*)	1.191 (6.534*)	-1.552 (-7.486*)	
	slope	-.123 (-3.923*)	-5.231 (-2.515*)	-2.144 (-4.765*)	-.607 (-6.828*)		.239 (2.862*)	
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept			17.378 (5.553*)	3.591 (9.059*)	1.888 (5.043*)	-2.386 (-5.557*)	
	slope			-10.408 (-6.435*)	-.977 (-5.367*)		.427 (2.520*)	-.359 (-2.252*)
Perceptions of effective action from employer towards violence and harassment (2007)	intercept			12.239 (3.305*)	3.316 (7.657*)	1.579 (3.868*)	-2.427 (-5.402*)	
	slope			-7.491 (-3.908*)	-1.029 (-5.260*)		.365 (2.057*)	
Availability of handwashing materials (2007)	intercept	.386 (4.948*)		5.999 (5.988*)	.700 (2.789*)		-1.372 (-5.229*)	
	slope			-4.956 (-9.603*)		.301 (2.238*)		
Staff job satisfaction (2007)	intercept	.602 (4.918*)		8.378 (2.501*)	2.437 (6.341*)	1.455 (4.082*)	-2.003 (-4.936*)	1.164 (3.119*)
	slope	-.102 (-2.032*)		-4.076 (-2.343*)	-.806 (-4.680*)		.480 (3.039*)	-.580 (-3.452*)
Work pressure felt by staff (2007)	intercept			7.715 (5.158*)	-3.217 (-10.024*)	-2.230 (-7.342*)	-.886 (-2.434*)	
	slope			-5.404 (-6.899*)	.768 (5.137*)			
Staff intention to leave jobs (2007)	intercept			4.627 (3.411*)	-2.465 (-8.238*)	-1.387 (-4.893*)	1.169 (3.619*)	-.577 (-2.581*)
	slope			-2.611 (-3.643*)	.552 (4.012*)		-.287 (-2.292*)	

*p<.05

Empty cells = non-significant findings

4.1. *Patient Satisfaction*

4.1.1. Regression Analysis of Change scores

- Table 3 shows the relationships between patient satisfaction and its predictors (i.e. the control variables mentioned in section 2, the key score variables in 2008 as well as their respective change scores). Most of the figures are unstandardised regression coefficients; figures in parentheses in the final column are R^2 figures for each model with a significant change score.
- We particularly focus on the models where the change scores are statistically significant. These suggest that not only are the variables related, but a change in the staff survey variables is associated with a change in the outcomes.
- In table 1, we observe that there are twelve variables that have a longitudinal relationship with patient satisfaction.
- In all of these models, the R^2 values are above 0.770. This indicates that the predictors, entered as block account for 77% of the variance in patient satisfaction. In the remainder of this section, we will discuss these results in turn.
- As well as some effects of the control variables, the findings indicate that patient satisfaction in Time 1 predicts patient satisfaction in Time 2. As may be expected, higher patient satisfaction in Time 1 is associated with higher patient satisfaction in Time 2.
- The coefficients indicate the strength of the relationship between the variable in question and the outcome. For percentage scores, a change of one unit represents a 100% change. So, for example, the coefficient of 14.230 for the change score in '% staff using flexible working options' indicates that a 100% change would be associated with an increase of 14.23 points in the patient satisfaction score; or, more realistically, 10% more staff using flexible working options is associated with an increased patient satisfaction score of about 1.4 points – all else being equal.

- There is some evidence which suggests that there are longitudinal effects of ‘Staff job satisfaction’ on Patient Satisfaction. There is also some evidence which suggests that ‘Staff job satisfaction’ in year 2008 predicts patient satisfaction in year 2009/10.
- There is some evidence which suggests that there are longitudinal effects of ‘Work pressure felt by staff’ on Patient Satisfaction. This relationship is negative, indicating that when work pressure increases Patient Satisfaction declines.
- On the other hand, there is some evidence which suggests the longitudinal effects of ‘Support from immediate managers’ on Patient satisfaction. This relationship is positive, indicating that well executed managerial duties have positive impact on patient satisfaction.
- There is a positive longitudinal effect of ‘Percentage of staff using flexible working hours’ and ‘Percentage of staff receiving training, learning & development’ on Patient satisfaction.
- There is evidence in table 3 that appraisal related variables, (i.e. Percentage of staff appraised in last 12 months; Percentage of staff having well structured appraisals in last 12 months and Percentage of staff appraised with personal development plans in last 12 months) have positive longitudinal effects on patient satisfaction.
- The table also indicates that there are negative longitudinal effects of ‘Staff intention to leave’ on patient satisfaction (an increase in the extent of staff wanting to leave being associated with lower subsequent patient satisfaction).
- Table 3 also indicates that the ‘Percentage of staff experiencing physical violence from patients/relatives in last 12 months’ has a longitudinal effect on patient satisfaction. This might be because employees who experience violence have low morale, experience emotional as well as physical ailments or are intending to leave the NHS.

Table 3: The Relationship between NHS Staff Survey Key Score Variables and Patient Satisfaction (2009/10).

	Status (Specialist=1)	Location (London=1)	Status (Teaching =1)	Inpatient satisfaction 2007/08	Key score year 2008	Change score
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Staff job satisfaction	2.959**	-0.833	0.502	0.616***	6.826**	8.703** (.786)
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	2.936**	-1.112	0.395	0.632***	7.804**	3.901
Percentage of staff agreeing that their role makes a difference to patients	3.065**	-1.066	0.481	0.633***	17.973**	11.223
Percentage of staff feeling valued by their work colleagues	3.490***	-0.548	0.483	0.607***	18.016**	9.597
Percentage of staff agreeing that they have an interesting job	3.251**	-0.675	0.467	0.632***	7.295	3.395
Quality of job design (clear job content, feedback and staff involvement)	3.000**	-.954**	0.402	0.640***	4.594	8.063* (.780)
Work pressure felt by staff	2.727**	-1.122*	0.427	0.619***	-4.478**	-4.616* (.783)
Percentage of staff working in a well-structured team environment	2.991**	-0.752	0.442	0.648***	2.22	3.306
Trust commitment to work-life balance	2.929**	-0.762	0.453	0.626***	3.719	3.934
Percentage of staff working extra hours	3.144**	-0.692	0.429	0.644***	0.79	-5.023
Percentage of staff using flexible working options	2.965**	-0.483	0.481	0.665***	3.293	14.230* (.780)
Percentage of staff feeling there are good opportunities to develop their potential at work	2.920**	-0.964	0.44	0.634***	6.998	5.44
Percentage of staff receiving job-relevant training, learning or development in last 12 months	3.248**	-0.931	0.475	0.637***	8.365	10.339** (.777)
Percentage of staff appraised in last 12 months	3.164**	-0.73	0.524	0.631***	4.662*	5.796** (.776)
Percentage of staff having well structured appraisals in last 12 months	2.823**	-0.972	0.445	0.652***	6.814	8.487* (.784)
Percentage of staff appraised with personal development plans in last 12 months	3.140**	-0.815	0.545	0.628***	5.486**	6.521** (.785)
Support from immediate managers	2.991**	-0.766	0.49	0.631***	4.382	6.483** (.782)
Percentage of staff having health and safety training in last 12 months	3.133**	-0.359	0.535	0.623***	4.298	-0.515
Percentage of staff suffering work-related injury in last 12 months	2.582**	-0.575	0.453	0.649***	-16.247	0.074
Percentage of staff suffering work-related stress in last 12 months	3.117**	-0.53	0.541	0.631***	-7.788	-7.506
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	3.584***	-0.962	0.402	0.640***	7.841	4.685
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	3.222**	-0.741	0.543	0.639***	-9.586	-12.803
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	4.113	-0.613	0.486	0.634***	10.901	21.056* (.779)
Percentage of staff experiencing physical violence from staff in last 12 months	3.097**	-0.437	0.491	0.636***	-25.373	-4.193
Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12	2.677	-0.618	0.503	0.631***	-7.169	-4.458
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	3.277**	-0.056	0.681	0.623***	-17.742*	-13.612
Perceptions of effective action from employer towards violence and harassment	3.112**	-0.680	0.480	0.615***	5.635	3.764
Percentage of staff reporting good communication between senior management and staff	2.708**	-1.056	0.430	0.633***	8.219*	8.573
Percentage of staff agreeing that they understand their role and where it fits in	2.883**	-1.311*	0.527	0.621***	7.379**	1.333
Percentage of staff able to contribute towards improvements at work	2.954**	-1.108	0.401	0.627***	9.728	8.812
Staff intention to leave jobs	3.480***	-0.236	0.556	0.601***	-4.645**	-5.019* (.786)
Staff recommendation of the trust as a place to work or receive treatment	2.583**	-1.283*	0.420	0.567***	2.968	4.324* (.790)
Percentage of staff having equality and diversity training in the last 12 months	3.124**	-0.716	0.473	0.643***	-0.002	-0.362
Percentage of staff believing trust provides equal	3.341**	-0.136	0.535	0.610***	9.088	3.305

opportunities for career progression or promotion						
Percentage of staff experiencing discrimination at work in last 12 months	3.430***	0.036	0.675	0.610***	-19.659	-14.032

*0.01<p<0.05 ;**0.001<p<0.01;***p<0.001; All Trust size coefficients have the value of 0.000 and they are non-significant.

4.1.2. Latent Growth Curve Analysis

- Table 4 presents the coefficients and model fit for our predictors using Patient Satisfaction (2007-2009) as the outcome. Although for the majority of predictors the model fit is poor, several coefficients are significant, indicating that some of the predictors are indeed associated with Patient Satisfaction.
- Two of the 2009 engagement measures are related to staff satisfaction, with ‘Staff recommendation of trust as a place to work or receive treatment’ predicting both the intercept and the slope of Patient Satisfaction. The positive intercept coefficient indicates that in trusts where staff is more willing to advocate in favour of their trust tend to have more satisfied patients. The negative slope coefficient designates that the trusts with higher staff advocacy levels have a negative change in patient satisfaction over time, i.e. patient satisfaction tends to reduce over the three years. Results involving employee engagement need to be interpreted with caution, as the predictor data were collected for the same or later period than the outcome measures.
- Several of the 2007 NSS Key Findings are associated with Patient Satisfaction. The highest effect size is observed for the mean level of Patient Satisfaction using ‘Percentage of staff experiencing physical violence from staff in previous 12 months (2007)’ as the predictor. Particularly, the mean Patient Satisfaction tends to be higher in trusts where staff report lower levels of physical violence from colleagues.
- Among other 2007 Key Findings that are associated to Patient Satisfaction are: ‘Percentage of staff having had health and safety training in previous 12 months (2007)’, ‘Percentage of staff suffering work stress in previous 12 months (2007)’, ‘Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)’, ‘Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)’, ‘Quality of work life balance (2007)’, ‘Extent of positive feeling (communication,

staff involvement, innovation & patient care) (2007)' and 'Staff job satisfaction (2007)'.

- However, it is important to note that most of these relationships involve the intercept of the outcome variable (representing an overall association between the predictor and general level of the outcome) rather than with the slope (representing an association between the predictor and change in the outcome). Where there is a relationship with the slope, it is in the opposite direction from the relationship with the intercept – suggesting this is more due to a correction from more extreme values (i.e. “regression to the mean”) than a true longitudinal effect.

Table 4: The effect of NHS NSS Key Findings on Patient Satisfaction (2007-2009)

Key Finding	Unstandardised estimated value (test statistic)
Staff recommendation of trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept .423 (8.620*)
	slope -.175 (-3.971*)
Staff motivation at work (Motivation) (2009)	intercept
	slope
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept .308 (2.473*)
	slope .042 (.856)
Overall engagement (2009)	intercept
	slope
Percentage of staff using flexible working options (2007)	intercept -.139 (-.524)
	slope -.148 (-1.433)
Percentage of staff appraised within previous 12 months (2007)	intercept .069 (.858)
	slope .016 (.520)
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept .320 (1.684)
	slope -.010 (-.130)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept .075 (.911)
	slope .014 (.420)
Percentage of staff having training/ development in previous 12 months (2007)	intercept
	slope
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept
	slope
Percentage of staff working in a well structured team environment (2007)	intercept .199 (.847)
	slope .004 (.039)

Key Finding	Unstandardised estimated value (test statistic)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept .430 (4.604*)
	slope .020 (.508)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept
	slope
Percentage of staff working extra hours (2007)	intercept -.135 (-.649)
	slope .081 (1.002)
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept -.572 (-1.633)
	slope .049 (.355)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept -1.025 (-4.368*)
	slope .200 (2.110*)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept -.349 (-1.627)
	slope .100 (1.195)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept -1.287 (-3.378*)
	slope .093 (.737)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept -2.751 (-2.065*)
	slope .450 (.859)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept -1.179 (-4.952*)
	slope .205 (2.140*)
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept -.348 (-1.192)
	slope -.032 (-.277)
Quality of work life balance (2007)	intercept .278 (2.755*)
	slope -.092 (-2.527*)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept .442 (3.464*)
	slope -.088 (-1.731)
Support from immediate managers (2007)	intercept
	slope
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept .330 (6.200*)
	slope -.123 (-3.923*)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept
	slope
Perceptions of effective action from employer towards violence and harassment (2007)	intercept
	slope
Availability of handwashing materials (2007)	intercept .386 (4.948*)
	slope .028 (.775)
Staff job satisfaction (2007)	intercept .602 (4.918*)
	slope -.102 (-2.032*)
Work pressure felt by staff (2007)	intercept
	slope
Staff intention to leave jobs (2007)	intercept
	slope

*p<.05

4.1.3. Common themes and differences

- There were no clear predictors of change in patient satisfaction that were consistent across both methods.
- The clearest predictors of change in patient satisfaction from the regression analysis were HR practice variables (% staff receiving job-relevant training, % staff appraised, % staff appraised with personal development plans and Support from line managers were the four with significance levels of $p < .01$).
- The only predictors of change in patient satisfaction from the latent growth curve modelling had opposite signs from the predictors of the initial level, indicating that this is probably due to regression to the mean.

4.2. Mortality

4.2.1. Regression Analysis of Change scores

- In Table 5 we present the relationship between mortality and its predictors (i.e. the control variables, the key score variables in year 2008 and their respective change scores).
- The table clearly shows that three variables namely 'Percentage of staff receiving job-relevant training, learning or development in last 12 months' ; 'Support from immediate managers' and 'Percentage of staff able to contribute towards improvements at work' have a longitudinal effect on hospital mortality in year 2009/10.
- The R^2 value for these regression models is 0.551 indicating that 55% of the variance the dependent variable (i.e. mortality) is explained by the predictors.
- As indicated above, 'Percentage of staff receiving job-relevant training, learning or development in last 12 months' has a longitudinal effect on hospital mortality in year 2009/10. Even though the NHS is an organization which incorporates a diverse range of employees that come from a vast array of occupational groups, training is crucial to maintain lower level of hospital mortality. We suspect that training and development programs that target clinical staff have a crucial impact on hospital mortality. Needless to say that the analysis of the NHS staff survey data by controlling for various occupational groups will be essential to find out training which occupational group will has a higher impact on hospital mortality.
- Moreover, it is important to note that 'Support from immediate managers' is crucial to alleviate patient mortality. Qualitative studies which identify the type of support that employees find more important are essential. Indeed, managers can be either task or people oriented. Once we identify the type of support employees find crucial, it might prove relevant to mix the leadership style.

- In addition 'Percentage of staff able to contribute towards improvements at work' is associated with hospital mortality. This indicates that when employees are more engaged in their work, mortality declines.

Table 5: The Relationship between NHS Staff Survey Key Score Variables and Mortality (2009/10).

	Status (Specialist=1)	Location (London=1)	Mortality 2008/09	Key Score variable 2008	Change score
Staff job satisfaction	-4.754**	-0.841	0.541***	-34.660***	-12.649
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	-2.922	-0.291	0.577***	-28.532*	-22.827
Percentage of staff agreeing that their role makes a difference to patients	-3.134	-0.541	0.563***	-74.279*	-21.220
Percentage of staff feeling valued by their work colleagues	-6.108***	-.354	0.534***	-71.500***	-18.644
Percentage of staff agreeing that they have an interesting job	-4.609**	-.513	0.562***	-23.271	-10.904
Quality of job design (clear job content, feedback and staff involvement)	-2.041	-0.977	0.542***	-36.033***	-7.948
Work pressure felt by staff	-3.683*	-0.377	0.576***	14.219*	2.743
Percentage of staff working in a well-structured team environment	-3.237*	-0.491	0.546***	-33.278	-19.586
Trust commitment to work-life balance	-4.565**	-0.664	0.553***	-21.978**	-6.341
Percentage of staff working extra hours	-4.396**	-0.587	0.571***	1.920	11.088
Percentage of staff using flexible working options	-5.128**	-0.544	0.574***	-18.738	12.486
Percentage of staff feeling there are good opportunities to develop their potential at work	-3.453**	-0.311	0.540***	-45.621***	-13.850
Percentage of staff receiving job-relevant training, learning or development in last 12 months	-3.858	-0.669	0.550***	-59.382**	-37.268* (R ² =.551)
Percentage of staff appraised in last 12 months	-4.302**	-0.813	0.558***	-8.207	-3.480
Percentage of staff having well structured appraisals in last 12 months	-3.103*	-1.035	0.554***	-34.825**	-12.023
Percentage of staff appraised with personal development plans in last 12 months	-4.179**	-.910	0.559***	-9.587	-4.326
Support from immediate managers	-4.339**	-0.930	0.561***	-27.948***	-18.532* (R ² =.574)
Percentage of staff having health and safety training in last 12 months	-4.564**	-0.617	0.567***	-1.956	5.975
Percentage of staff suffering work-related injury in last 12 months	-4.488**	-0.464	0.567***	30.413	9.113
Percentage of staff suffering work-related stress in last 12 months	-4.487**	-0.643	0.563***	11.306	-9.422
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	-3.772*	-0.551	0.562***	-16.270	-13.081
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	-4.679**	-0.539	0.561***	-71.194	-33.868
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	-4.567	-0.656	0.562***	-21.105	-51.017
Percentage of staff experiencing physical violence from staff in last 12 months	-4.358*	-0.638	0.565***	9.260	-0.862
Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12	-4.443**	-0.635	0.564***	8.504	4.140
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	-4.532*	-0.752	0.568***	5.319	-31.370
Perceptions of effective action from employer towards violence and harassment	-4.485**	-0.663	0.561***	-7.543	7.114
Percentage of staff reporting good communication between senior management and staff	-3.053*	-0.707	0.541***	-37.771**	-16.733
Percentage of staff agreeing that they understand their role and where it fits in	-1.978	-1.067	0.543***	-32.901***	7.224
Percentage of staff able to contribute towards improvements at work	-2.310	-0.051	0.529***	-68.778***	-41.446** (R ² =.582)
Staff intention to leave jobs	-6.565***	-0.903	0.557***	14.800**	0.319
Staff recommendation of the trust as a place to work or receive	-4.062**	-0.594	0.533***	-20.227**	1.363

treatment					
Percentage of staff having equality and diversity training in the last 12 months	-4.332**	-0.601	0.563***	-2.307	-7.007
Percentage of staff believing trust provides equal opportunities for career progression or promotion	-3.085	-0.665	0.574***	11.863	-6.852
Percentage of staff experiencing discrimination at work in last 12 months	-2.005	-0.586	0.576***	-47.320	15.298

*0.01< p<0.05 ; **0.001< p<0.01; ***p<0.001; All Trust size variables have the value of 0.000 and they are non-significant.

4.2.2. Latent Growth Curve Analysis

- Table 6 presents the coefficients and model fit for our predictors using Mortality rates (2007/08-2009/10) as the outcome. Very few of the predictors included in the analysis are significantly related to the Mortality, with model fit being poor across the board.
- None of the employee engagement key findings are significantly related to mortality.
- The strongest predictor of the average mortality rates across the three years, namely 'Percentage of staff working in a well structured team environment (2007)' has a negative effect, indicating that higher proportion of teamworking in a trust is associated with lower mortality rates.
- Having well structured performance appraisals also has a positive effect on performance in terms of mortality rates. Specifically, larger proportions of staff having well-structured appraisals is associated with a reduction in patient mortality over time. The same is true with the proportion of staff who have received appraisal in any form.
- Finally, the good organisational climate measured as the 'Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)' is as well causing mortality rates in trusts to reduce over time.

Table 6: The effect of NHS NSS Key Findings on Mortality (2007/08-2009/10)

Key Finding	Unstandardised estimated value (test statistic)	
Staff recommendation of trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept	-8.885 (-2.074)
	slope	-2.256 (-1.110)
Staff motivation at work (Motivation) (2009)	intercept	
	slope	
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept	
	slope	
Overall engagement (2009)	intercept	
	slope	
Percentage of staff using flexible working options (2007)	intercept	
	slope	
Percentage of staff appraised within previous 12 months (2007)	intercept	6.604 (1.009)
	slope	-6.443 (-2.115*)
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept	17.768 (1.130)
	slope	-25.774 (-3.593*)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept	8.129 (1.195)
	slope	-7.337 (-2.320*)
Percentage of staff having training/ development in previous 12 months (2007)	intercept	
	slope	
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept	
	slope	
Percentage of staff working in a well structured team environment (2007)	intercept	-40.091 (-2.005*)
	slope	-2.682 (-.282)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept	-13.484 (-1.744)
	slope	4.944 (1.354)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept	
	slope	
Percentage of staff working extra hours (2007)	intercept	
	slope	
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept	-15.892 (-.549)
	slope	13.421 (.988)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept	20.352 (1.014)
	slope	-2.688 (-.284)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept	-9.378 (-.528)
	slope	3.891 (.466)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept	48.863 (1.421)
	slope	-3.198 (-.197)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept	-15.855 (-.148)
	slope	-16.438 (-.326)

Key Finding	Unstandardised estimated value (test statistic)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept
	slope
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept -21.769 (-.947)
	slope -1.119 (-.103)
Quality of work life balance (2007)	intercept
	slope
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept
	slope
Support from immediate managers (2007)	intercept
	slope
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept -3.804 (-.848)
	slope -5.231 (-2.515*)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept
	slope
Perceptions of effective action from employer towards violence and harassment (2007)	intercept
	slope
Availability of handwashing materials (2007)	intercept
	slope
Staff job satisfaction (2007)	intercept
	slope
Work pressure felt by staff (2007)	intercept
	slope
Staff intention to leave jobs (2007)	intercept
	slope

*p<.05

4.2.3. Common themes and differences

- There were no clear predictors of change in patient satisfaction that were consistent across both methods. However, the consistent message from both analyses is that higher levels of HR practices are associated with drops in hospital mortality rates.
- The regression analysis indicated that % staff receiving job-relevant training, % staff able to contribute towards improvements at work and Support from line managers were all associated with decreasing mortality rates.
- A complementary story from the latent growth curve modelling showed that % staff appraised, % staff with well-structured appraisals, % staff appraised

with personal development plans, % staff working in a well-structured team, and Organisational climate (Extent of positive feeling) were all associated with falling mortality rates.

4.3. *Turnover*

4.3.1. Regression Analysis of Change scores

- Only one of the key finding change scores was significantly associated with trust turnover rates - % staff agreeing that they have an interesting job (coefficient = - 9.345, $p < .05$). This implies that an increase in 10% of staff saying they have interesting jobs is associated with a 0.9 percentage point drop in turnover rates.
- As none of the other coefficients was significant, the detailed results for these are not repeated here, but please see Appendix 1 instead.

4.3.2. Latent Growth Curve Analysis

- Table 7 presents the coefficients and model fit for our predictors using Patient Satisfaction (2007-2009) as the outcome. The majority of the predictors included in the analysis are significantly related to turnover, although the overall fit of the models is often poor.
- Of the four employee engagement key findings (2009), three are predicting trust turnover; particularly, these are staff advocacy, involvement and overall engagement. The positive coefficients for the intercepts indicate that in trust where staff report higher engagement, the overall turnover rate is also higher, which is the opposite of what one would expect. The slope coefficients are more encouraging as they are all negative, indicating that in trusts with higher employee engagement, turnover tends to decrease over time. Again, these findings need to be interpreted with caution, as predictor data is collected during, rather than before the outcome data collection.

- Of the 2007 Key findings, the one with the strongest association to turnover rates is 'Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)'. The positive intercept coefficient shows that turnover is overall higher in trusts where employees report having experienced harassment, bullying or abuse from colleagues. The negative slope coefficient on the other hand indicates that in trusts where staff report high levels of harassment, bullying or abuse from colleagues, turnover tends to reduce over time.
- Interestingly, the findings for 'Percentage of staff experiencing physical violence from patients or relatives in previous 12 months' is exactly the opposite. That is, trusts where such abuse from patients and their relatives takes place tend to have lower overall turnover rates, but these are increasing over time.
- Other key findings are also strongly associated with turnover rates; among them are 'Percentage of staff using flexible working options (2007)', 'Percentage of staff working in a well structured team environment (2007)', 'Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)' and 'Perceptions of effective action from employer towards violence and harassment (2007)'.

Table 7: The effect of NHS NSS Key Findings on Turnover (2008-2010)

Key Finding	Unstandardised estimated value (test statistic)
Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept 1.775 (2.139*)
	slope -1.662 (-3.829*)
Staff motivation at work (Motivation) (2009)	intercept -1231.367 (-.005)
	slope 737.299 (.005)
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept 5.398 (4.357*)
	slope -3.264 (-5.001*)
Overall engagement (2009)	intercept 5.811 (4.021*)
	slope -4.105 (-5.416*)
Percentage of staff using flexible working options (2007)	intercept 12.614 (3.638*)
	slope -8.373 (-4.582*)
Percentage of staff appraised within previous 12 months (2007)	intercept 1.062 (.726)
	slope -.920 (-1.193)

Key Finding	Unstandardised estimated value (test statistic)	
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept	5.247 (1.777)
	slope	-2.875 (-1.845)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept	1.272 (.858)
	slope	-1.063 (-1.359)
Percentage of staff having training/ development in previous 12 months (2007)	intercept	-5680.624 (-.016)
	slope	3254.082 (.016)
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept	8.888 (2.539*)
	slope	-5.728 (-3.143*)
Percentage of staff working in a well structured team environment (2007)	intercept	13.113 (4.751*)
	slope	7.703 (-5.282*)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept	4.320 (3.063*)
	slope	-3.529 (-4.789*)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept	-2832.008 (-.005)
	slope	1622.296 (.005)
Percentage of staff working extra hours (2007)	intercept	3.734 (1.225)
	slope	-1.330 (-.827)
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept	-6.047 (-2.124*)
	slope	2.539 (1.690)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept	-2.148 (-.460)
	slope	3.291 (1.340)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept	21.447 (7.078*)
	slope	-14.679 (-9.241*)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept	-25.709 (-10.470*)
	slope	19.025 (15.114*)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept	36.214 (1.399)
	slope	-21.960 (-1.608)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept	-23.162 (-8.386*)
	slope	17.120 (11.972)
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept	26.795 (5.022*)
	slope	-16.710 (-5.934*)
Quality of work life balance (2007)	intercept	1.491 (1.352)
	slope	-.475 (-.818)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept	7.757 (5.567*)
	slope	-5.069 (-6.909*)
Support from immediate managers (2007)	intercept	3.526 (2.871*)
	slope	-1.807 (-2.786*)
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept	2.981 (3.533*)
	slope	-2.144 (-4.765*)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept	17.378 (5.553*)
	slope	-10.408 (-6.435*)
Perceptions of effective action from employer towards violence and harassment (2007)	intercept	12.239 (3.305*)
	slope	-7.491 (-3.908*)

Key Finding	Unstandardised estimated value (test statistic)	
Availability of handwashing materials (2007)	intercept	5.999 (5.988*)
	slope	-4.956 (-9.603*)
Staff job satisfaction (2007)	intercept	8.378 (2.501*)
	slope	-4.076 (-2.343*)
Work pressure felt by staff (2007)	intercept	7.715 (5.158*)
	slope	-5.404 (-6.899*)
Staff intention to leave jobs (2007)	intercept	4.627 (3.411*)
	slope	-2.611 (-3.643*)

*p<.05

4.3.3. Common themes and differences

- Only one key finding is predictive of the change in turnover using regression analysis - % staff saying that they have an interesting job. Because this was not introduced into the survey until 2008, it was not possible to test this same variable using the latent growth curve modelling approach.
- Most staff survey variables measured in 2007 were associated with change in turnover (in the expected direction) between 2007 and 2009.

4.4. Financial Management

4.4.1. Regression Analysis of Change scores

- In Table 8 we present the relationship between the financial management and its predictors (i.e. the control variables, the thirty eight key findings in year 2008 as well as their respective change scores).
- We will discuss the change scores with significant values as this will enable us to highlight the variables which have significant longitudinal effect on the financial management.
- We have four key variables that have a longitudinal effect on the financial management in the NHS. We observe that the change score variables for 'Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month'; 'Staff intention to leave jobs'; 'Percentage of staff having equality and diversity training in the last 12 months' and 'Percentage of staff believing trust provides equal opportunities for career progression or promotion' are significant.
- The R^2 value is above 0.5 in three regression models where the change score variables are significant (See Table 8). This indicates that the predictors, entered as block account for more than 50% of the variance in the financial management. In the reminder of this section, we will discuss the models in which the change scores results are significant in turn.
- Across all of the models, Specialist Status is significant. On the other hand, the location variable is significant only in two of the models.
- We observe that 'Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month' predicts the financial management over time. This might be because those staff who witness such unprofessional practices will report them, resulting in the retraining or dismissal of staff who conducted harmful errors, near misses or incidents in last month. This will indeed improve

patient care and decrease legal costs by patients who sue for being treated inappropriately.

- ‘Staff intention to leave jobs’ has a negative association with financial management over time. This is because when staff are motivated and fulfilled in their jobs, they are less likely to be unproductive and exhibit shirking behavior.
- In addition, ‘Percentage of staff having equality and diversity training in the last 12 months’ and ‘Percentage of staff believing trust provides equal opportunities for career progression or promotion’ have a positive association with the financial management in the NHS. Since the NHS employs people from diverse background, training provided to appropriately use, fairly treat, motivate and promote this highly trained and diverse manpower is essential. Costs related to discriminatory and unfair treatment at work will decline, so will those related to sickness absence and inefficiency by employees who experience unfair treatment at work.
- The findings also indicate that the financial management in Time 1 predicts financial management in Time 2.

Table 8: The Relationship between NHS Staff Survey Key Score Variables and Financial management (2008/09).

	Status (Specialist=1)	Location (London=1)	Status (Teaching =1)	resources 2007/8	Key score year 2008	Change score
Staff job satisfaction	0.389**	-0.186*	0.056	0.611***	-0.094	0.472
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	0.315*	-0.229**	0.051	0.591***	1.633	0.791
Percentage of staff agreeing that their role makes a difference to patients	0.375**	-0.194**	0.055	0.606***	1.712	1.452
Percentage of staff feeling valued by their work colleagues	2.897**	-2.817**	0.878	0.609***	-1.527	1.109
Percentage of staff agreeing that they have an interesting job	3.113**	-2.481*	0.679	18.384***	0.826	1.793
Quality of job design (clear job content, feedback and staff involvement)	0.394**	-0.189**	0.049	0.603***	0.126	0.732
Work pressure felt by staff	0.373**	-0.196**	0.052	0.601***	-0.196	-0.610
Percentage of staff working in a well-structured team environment	0.334**	-0.151*	0.087	0.603***	-1.466***	-0.626
Trust commitment to work-life balance	0.376**	-0.191**	0.059	0.614***	-0.168	0.448
Percentage of staff working extra hours	0.377**	-0.236**	0.063	0.611***	0.820	0.949
Percentage of staff using flexible working options	0.302**	-0.301***	0.070	0.590***	-1.987	-0.294
Percentage of staff feeling there are good opportunities to develop their potential at work	0.386**	-0.195**	0.051	0.611***	0.127	1.061
Percentage of staff receiving job-relevant training, learning or development in last 12 months	0.380**	-0.189**	0.064	0.616***	-0.873	0.866

Percentage of staff appraised in last 12 months	0.412***	-0.203**	0.073	0.594***	0.544	-0.350
Percentage of staff having well structured appraisals in last 12 months	0.411***	-0.237**	0.064	0.583***	1.275**	-0.087
Percentage of staff appraised with personal development plans in last 12 months	0.408**	-0.198**	0.070	0.597***	0.400	-0.342
Support from immediate managers	0.392**	-0.183**	0.056	0.608***	-0.032	0.038
Percentage of staff having health and safety training in last 12 months	0.408***	-0.213**	0.060	0.612***	-0.347	-0.272
Percentage of staff suffering work-related injury in last 12 months	0.382**	-0.187**	0.064	0.611***	0.562	0.170
Percentage of staff suffering work-related stress in last 12 months	0.385**	-0.180*	0.058	0.605***	-0.250	-0.524
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	0.307*	-0.210**	0.079	0.601***	1.395**	1.922** (R ² =.545)
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	0.405**	-0.198**	0.062	0.612***	-1.788	-0.181
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	0.518***	-0.150*	0.126	0.588***	2.631***	2.290
Percentage of staff experiencing physical violence from staff in last 12 months	0.406**	-0.216**	0.047	0.610***	6.808	7.122
Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12 months	0.494***	-0.198**	0.094	0.604***	2.085***	2.062
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	0.391**	-0.203**	0.053	0.608***	0.686	-0.256
Perceptions of effective action from employer towards violence and harassment	0.391**	-0.181*	0.054	0.605***	0.067	0.008
Percentage of staff reporting good communication between senior management and staff	0.394**	-0.182**	0.052	0.610***	-0.030	0.725
Percentage of staff agreeing that they understand their role and where it fits in	0.389**	-0.207**	0.039	0.602***	0.367	1.189
Percentage of staff able to contribute towards improvements at work	0.382**	-0.171*	0.066	0.614***	-0.612	0.141
Staff intention to leave jobs	0.325**	-0.072	0.076	0.575***	-1.047***	-1.317*** (R ² =.559)
Staff recommendation of the trust as a place to work or receive treatment	0.269*	-0.212**	0.038	0.561***	0.785*	0.177
Percentage of staff having equality and diversity training in the last 12 months	0.382**	-0.195**	0.060	0.601***	-0.240	-0.620* (R ² =.535)
Percentage of staff believing trust provides equal opportunities for career progression or promotion	-0.094	0.214	0.133	0.032	8.454***	9.986*** (R ² =.256)
Percentage of staff experiencing discrimination at work in last 12 months	0.392***	-0.270***	0.077		2.707*	-3.078

*0.01<p<0.05 ; **0.001<p<0.01; ***p<0.001; All Trust size variables have the v

4.4.2. Latent Growth Curve Analysis

- Table 9 presents coefficients and model fit for our predictors using Patient Satisfaction (2007-2009) as the outcome. The majority of the predictors included in the analysis are significantly related to the Turnover, although the overall fit of the models is poor, apart from the 'Work pressure felt by staff (2007)' predictor for which the model fit is satisfactory.
- Of the engagement (2009) key findings, three out of four variables are significantly associated to the quality of the financial management in the trusts. For all three the intercept coefficients are positive, showing that in trusts where employees are more engaged, the quality of the financial management tends to be higher. The negative slope coefficients indicate that in trusts with high engagement, the quality of financial management tends to decrease over time.
- In trusts where staff experience high work pressure, the overall quality of financial management tends to be poorer. On the other hand, these trusts tend to have an improvement in their financial management over time.
- The stronger predictor of the quality of financial management appears to be the 'Percentage of staff having training/ development in previous 12 months (2007)'. The positive intercept coefficient indicates that the quality of financial management is overall higher in trusts where employees have received training and development. On the other hand, there is a decrease in the quality of financial management over time for those trusts where staff have had training and development.
- Another strong predictor is the 'Percentage of staff having well structured appraisals within the previous 12 months (2007)'. Trusts scoring highly on this variable tend to have overall better quality of financial management, which is decreasing over time, as compared to trusts that score lower on this variable.
- The 'Percentage of staff suffering work stress in previous 12 months (2007)' is negatively related to the overall quality of financial management in trusts over three year, meaning that the higher the stress levels the worse the trust

performance will be. Over time though, those trusts where employees report high stress levels tend to have an improvement in the quality of their financial management.

Table 9: The effect of NHS NSS Key Findings on Financial Management (2007-2009)

Key Finding	Unstandardised estimated value (test statistic)	
Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept	2.089 (10.404*)
	slope	-.334 (3.514*)
Staff motivation at work (Motivation) (2009)	intercept	-.813 (-1.368)
	slope	.441 (1.669)
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept	1.166 (3.926*)
	slope	-.297 (-2.233*)
Overall engagement (2009)	intercept	2.405 (6.681*)
	slope	-.392 (-2.378*)
Percentage of staff using flexible working options (2007)	intercept	-1.316 (-2.101*)
	slope	-.653 (-2.334*)
Percentage of staff appraised within previous 12 months (2007)	intercept	1.358 (3.918*)
	slope	-.146 (-.933)
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept	4.611 (7.153*)
	slope	-1.021 (-3.472*)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept	1.398 (4.030*)
	slope	-.249 (-1.590)
Percentage of staff having training/ development in previous 12 months (2007)	intercept	8.541 (6.113*)
	slope	-2.372 (-3.759*)
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept	4.935 (6.173*)
	slope	-1.516 (-4.216*)
Percentage of staff working in a well structured team environment (2007)	intercept	.328 (.638)
	slope	-.850 (3.744*)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept	1.777 (5.018*)
	slope	-.538 (-3.386*)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept	2.866 (1.885)
	slope	-1.325 (-1.960)
Percentage of staff working extra hours (2007)	intercept	-1.164 (-1.563)
	slope	.628 (1.896)
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept	-3.202 (-4.320*)
	slope	.967 (2.915*)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept	-4.636 (-4.239*)
	slope	1.307 (2.667*)

Key Finding	Unstandardised estimated value (test statistic)	
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept	-.094 (-.155)
	slope	.503 (1.872)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept	.840 (1.352)
	slope	.936 (3.399*)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept	7.650 (1.299)
	slope	1.524 (.579)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept	-.487 (-.715)
	slope	1.199 (4.000*)
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept	-.441 (-.371)
	slope	.525 (.989)
Quality of work life balance (2007)	intercept	1.497 (6.186*)
	slope	-.534 (-4.936*)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept	2.371 (6.494*)
	slope	-.682 (-4.142*)
Support from immediate managers (2007)	intercept	1.603 (5.278*)
	slope	-.464 (-3.402*)
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept	2.133 (11.101*)
	slope	-.607 (-6.828*)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept	3.591 (9.059*)
	slope	-.977 (-5.367*)
Perceptions of effective action from employer towards violence and harassment (2007)	intercept	3.316 (7.657*)
	slope	-1.029 (-5.260*)
Availability of handwashing materials (2007)	intercept	.700 (2.789*)
	slope	-.138 (-1.228)
Staff job satisfaction (2007)	intercept	2.437 (6.341*)
	slope	-.806 (-4.680*)
Work pressure felt by staff (2007)	intercept	-3.217 (-10.024*)
	slope	.768 (5.137*)
Staff intention to leave jobs (2007)	intercept	-2.465 (-8.238*)
	slope	.552 (4.012*)

*p<.05

4.4.3. Common themes and differences

- Both analyses suggested that staff intention to leave jobs was associated with a negative change in the financial performance indicator. However, the latent growth curve modelling suggested that this would start to change back towards average values over time.

- The regression model suggested that the changes in the percentage of staff believing their trust provided equal opportunities for career progression/promotion was linked to higher scores for financial performance.

4.5. *Quality of Services*

4.5.1. Regression Analysis of Change scores

- In Table 10 we present the relationship between the financial management and its predictors (i.e. the control variables, the thirty eight key findings in year 2008 as well as their respective change scores).
- We will discuss the change scores with significant values as this will enable us to highlight the variables which have significant longitudinal effect on the financial management.
- We have four key variables that have a longitudinal effect on the financial management in the NHS. We observe that the change score variables for 'Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month'; 'Staff intention to leave jobs'; 'Percentage of staff having equality and diversity training in the last 12 months' and 'Percentage of staff believing trust provides equal opportunities for career progression or promotion' are significant.
- The R^2 value is above 0.500 in three regression models where the change score variables are significant (See Table 10). This indicates that the predictors, entered as block account for more than 50% of the variance in the financial management. In the reminder of this section, we will discuss the models in which the change scores results are significant in turn.
- Across all of the models, Specialist Status is significant. On the other hand, the location variable is significant only in two of the models.
- We observe that 'Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month' predicts the financial management over time.

This might be because those staff who witness such unprofessional practices will report them, resulting in the retraining or dismissal of staff who conducted harmful errors, near misses or incidents in last month. This will indeed improve patient care and decrease legal costs by patients who sue for being treated inappropriately.

- 'Staff intention to leave jobs' has a negative association with financial management over time. This is because when staff are motivated and fulfilled in their jobs, they are less likely to be unproductive and exhibit shirking behavior.
- In addition, 'Percentage of staff having equality and diversity training in the last 12 months' and 'Percentage of staff believing trust provides equal opportunities for career progression or promotion' have a positive association with the financial management in the NHS. Since the NHS employs people from diverse background, training provided to appropriately use, fairly treat, motivate and promote this highly trained and diverse manpower is essential. Costs related to discriminatory and unfair treatment at work will decline, so will those related to sickness absence and inefficiency by employees who experience unfair treatment at work.
- The findings also indicate that the financial management in Time 1 predicts financial management in Time 2.

Table 10: The Relationship between NHS Staff Survey Key Score Variables and Financial management (2008/09).

	Status (Specialist=1)	Location (London=1)	Status (Teaching =1)	resources 2007/8	Key score year 2008	Change score
Staff job satisfaction	0.389**	-0.186*	0.056	0.611***	-0.094	0.472
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	0.315*	-0.229**	0.051	0.591***	1.633	0.791
Percentage of staff agreeing that their role makes a difference to patients	0.375**	-0.194**	0.055	0.606***	1.712	1.452
Percentage of staff feeling valued by their work colleagues	2.897**	-2.817**	0.878	0.609***	-1.527	1.109
Percentage of staff agreeing that they have an interesting job	3.113**	-2.481*	0.679	18.384***	0.826	1.793
Quality of job design (clear job content, feedback and staff involvement)	0.394**	-0.189**	0.049	0.603***	0.126	0.732
Work pressure felt by staff	0.373**	-0.196**	0.052	0.601***	-0.196	-0.610
Percentage of staff working in a well-structured team environment	0.334**	-0.151*	0.087	0.603***	-1.466***	-0.626
Trust commitment to work-life balance	0.376**	-0.191**	0.059	0.614***	-0.168	0.448

Percentage of staff working extra hours	0.377**	-0.236**	0.063	0.611***	0.820	0.949
Percentage of staff using flexible working options	0.302**	-0.301***	0.070	0.590***	-1.987	-0.294
Percentage of staff feeling there are good opportunities to develop their potential at work	0.386**	-0.195**	0.051	0.611***	0.127	1.061
Percentage of staff receiving job-relevant training, learning or development in last 12 months	0.380**	-0.189**	0.064	0.616***	-0.873	0.866
Percentage of staff appraised in last 12 months	0.412***	-0.203**	0.073	0.594***	0.544	-0.350
Percentage of staff having well structured appraisals in last 12 months	0.411***	-0.237**	0.064	0.583***	1.275**	-0.087
Percentage of staff appraised with personal development plans in last 12 months	0.408**	-0.198**	0.070	0.597***	0.400	-0.342
Support from immediate managers	0.392**	-0.183**	0.056	0.608***	-0.032	0.038
Percentage of staff having health and safety training in last 12 months	0.408***	-0.213**	0.060	0.612***	-0.347	-0.272
Percentage of staff suffering work-related injury in last 12 months	0.382**	-0.187**	0.064	0.611***	0.562	0.170
Percentage of staff suffering work-related stress in last 12 months	0.385**	-0.180*	0.058	0.605***	-0.250	-0.524
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	0.307*	-0.210**	0.079	0.601***	1.395**	1.922** (R ² =.545)
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	0.405**	-0.198**	0.062	0.612***	-1.788	-0.181
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	0.518***	-0.150*	0.126	0.588***	2.631***	2.290
Percentage of staff experiencing physical violence from staff in last 12 months	0.406**	-0.216**	0.047	0.610***	6.808	7.122
Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12 months	0.494***	-0.198**	0.094	0.604***	2.085***	2.062
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	0.391**	-0.203**	0.053	0.608***	0.686	-0.256
Perceptions of effective action from employer towards violence and harassment	0.391**	-0.181*	0.054	0.605***	0.067	0.008
Percentage of staff reporting good communication between senior management and staff	0.394**	-0.182**	0.052	0.610***	-0.030	0.725
Percentage of staff agreeing that they understand their role and where it fits in	0.389**	-0.207**	0.039	0.602***	0.367	1.189
Percentage of staff able to contribute towards improvements at work	0.382**	-0.171*	0.066	0.614***	-0.612	0.141
Staff intention to leave jobs	0.325**	-0.072	0.076	0.575***	-1.047***	-1.317*** (R ² =.559)
Staff recommendation of the trust as a place to work or receive treatment	0.269*	-0.212**	0.038	0.561***	0.785*	0.177
Percentage of staff having equality and diversity training in the last 12 months	0.382**	-0.195**	0.060	0.601***	-0.240	-0.620* (R ² =.535)
Percentage of staff believing trust provides equal opportunities for career progression or promotion	-0.094	0.214	0.133	0.032	8.454***	9.986*** (R ² =.256)
Percentage of staff experiencing discrimination at work in last 12 months	0.392***	-0.270***	0.077		2.707*	-3.078

*0.01<p<0.05 ; **0.001<p<0.01; ***p<0.001; All Trust size variables have the value of 0.000 and they are non-significant.

4.5.2. Latent Growth Curve Analysis

- Table 11 presents the coefficients and model fit for our predictors using Quality of Services (2007-2009) as the outcome. Although for the all of predictors the model fit is poor, several coefficients are significant, indicating that some of the predictors are indeed associated with Quality of Services.
- All of the engagement variables are associated with the quality of services provided by the trusts, predicting either the level or the change of the outcome, or both. The significant intercept coefficients are all positive, indicating that higher engagement is related to higher overall service quality over the three year period. The significant slope coefficients for the engagement variables are also all positive, indicating that trusts with higher employee engagement tend to experience an improvement in the quality of services they provide. This is therefore a consistent finding, highlighting the overall positive effect that engagement has on the quality of services provided.
- The strongest predictor of Quality of Services of the 2007 NSS key findings is the 'Percentage of staff experiencing physical violence from staff in previous 12 months (2007)'. Rather unexpectedly, trusts where more staff experience violence from colleagues tend to perform better in terms of the quality of services they provide to patients. Nevertheless, these trust tend to have a decline over time in the quality of services they provide.
- The same trend in the findings is evident for the 'Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)' finding.
- In trusts where more employees report having had well-structured appraisals the overall quality of services tends to be higher over the three years. The same is true for trusts where more staff report that they have received training and development.

Table 11: The effect of NHS NSS Key Findings on Quality of Services (2007-2009)

Key Finding	Unstandardised estimated value (test statistic)
Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept 1.242 (6.523*)
	slope .198 (1.733)
Staff motivation at work (Motivation) (2009)	intercept -.729 (-1.325)
	slope .824 (2.610*)
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept .580 (2.112*)
	slope .297 (1.871)
Overall engagement (2009)	intercept 1.341 (3.994*)
	slope .453 (2.308*)
Percentage of staff using flexible working options (2007)	intercept -2.730 (-4.711*)
	slope .932 (2.759*)
Percentage of staff appraised within previous 12 months (2007)	intercept 1.234 (3.861*)
	slope -.096 (-.510)
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept 3.760 (6.319*)
	slope -.618 (-1.738)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept 1.019 (3.176*)
	slope -.017 (-.092)
Percentage of staff having training/ development in previous 12 months (2007)	intercept 3.563 (2.720*)
	slope .721 (.946)
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept 2.054 (2.741*)
	slope .230 (.528)
Percentage of staff working in a well structured team environment (2007)	intercept -1.368 (-2.868*)
	slope .666 (2.422*)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept .588 (1.693)
	slope .328 (1.718)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept -.266 (-.189)
	slope 1.724 (2.132*)
Percentage of staff working extra hours (2007)	intercept -.515 (-.749)
	slope -.323 (-.812)
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept -1.502 (-2.184*)
	slope -.186 (-.467)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept -.672 (-.661)
	slope -1.670 (-2.846*)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept 1.273 (2.281*)
	slope -.299 (-.926)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept 3.895 (6.980*)
	slope -1.356 (-4.048*)

Key Finding	Unstandardised estimated value (test statistic)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept 16.903 (3.120*)
	slope -6.820 (-2.173*)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept 2.362 (3.760*)
	slope -1.287 (-3.551*)
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept .913 (.830)
	slope -1.112 (-1.754)
Quality of work life balance (2007)	intercept .728 (3.232*)
	slope .120 (.914)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept 1.459 (4.313*)
	slope .193 (.973)
Support from immediate managers (2007)	intercept 1.087 (3.875*)
	slope .050 (.304)
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept 1.191 (6.534*)
	slope .046 (.418)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept 1.888 (5.043*)
	slope .182 (.820)
Perceptions of effective action from employer towards violence and harassment (2007)	intercept 1.579 (3.868*)
	slope .017 (.069)
Availability of handwashing materials (2007)	intercept .205 (.883)
	slope .301 (2.238*)
Staff job satisfaction (2007)	intercept 1.455 (4.082*)
	slope .075 (.360)
Work pressure felt by staff (2007)	intercept -2.230 (-7.342*)
	slope .291 (1.577)
Staff intention to leave jobs (2007)	intercept -1.387 (-4.893*)
	slope .036 (.211)

*p<.05

4.5.3. Common themes and differences

- Although most of the results suggested by both analyses fit with prior expectations, the only one to give a consistent result in terms of effects on change across both methods was that of % staff reporting potentially harmful errors, near misses or incidents.
- In both cases, a higher proportion of staff reporting such occurrences is associated with a subsequent increase in the Quality of services rating in the annual health check.

- Most of the other findings were in line with expectations when significant, but did not reach significance in both methods.

4.6. Absenteeism

4.6.1. Regression Analysis of Change scores

- In Table 12 we present the relationship between absenteeism, the control variables, the key score variables as well as their respective change scores. We particularly focus on the significant change scores where the R^2 values are above 0.500 within the model.
- In Table 12, we observe that there are six change score variables that have a longitudinal effect on absenteeism. In all of the models where the change scores are significant, the R^2 value is above 0.680. This indicates that the predictors, entered as block account for more than 68% of the variance in absenteeism. In the remainder of this section, we will discuss these results in turn.
- Across all of these six models where the change scores are significant, Specialist Status and teaching status are non-significant. On the other hand, the location variable is significant.
- The findings also indicate that absenteeism in Time 1 predicts absenteeism in Time 2 and the relationship is positive across the board. This means higher absenteeism in Time 1 is associated with higher absenteeism in Time 2.
- In table 5, we present the variables that have longitudinal effect on absenteeism. These are 'Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver'; 'Percentage of staff appraised in last 12 months'; 'Percentage of staff suffering work-related injury in last 12 months'; 'Percentage of staff suffering work-related stress in last 12 months'; 'Percentage of staff experiencing physical violence from staff in last 12 months' and 'Percentage of staff having equality and diversity training in the last 12 months'.
- Staff health and well being is really important and it improves staff absenteeism in the NHS. This is evidenced by the positive values of change scores we found for

three key score variables (See table 5). These are : ‘Percentage of staff suffering work-related injury in last 12 months’; ‘Percentage of staff suffering work-related stress in last 12 months’ and ‘Percentage of staff experiencing physical violence from staff in last 12 months’.

- We expect that absenteeism in the NHS decreases when staff are satisfied. But we find a positive association between the change score of ‘Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver’ and absenteeism. This is an outcome we would not normally expect and is somehow puzzling. It may be due to a statistical anomaly – these are not uncommon in longitudinal analysis.
- On the other hand, the change scores for ‘Percentage of staff appraised in last 12 months’ and ‘Percentage of staff having equality and diversity training in the last 12 months’ are negative and significant. This indicates that staff absenteeism can decline if staff is appraised regularly as well as appropriate attention is given to equality and diversity training.
- Moreover, table 5 shows that specialist status variable the key score variables in year 2008 predict absenteeism in year 2009/10.

Table 12: The Relationship between NHS Staff Survey Key Score Variables and Absenteeism (2009/10).

Absenteeism	Status (Specialist=1)	Location (London=1)	Status (Teaching =1)	Absence Rate- April 2008 to March 2009	Key score year 2008	Change score
Staff job satisfaction	-0.110	-0.262	0.079	0.783***	-0.459	-0.781
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	-0.112	-0.263**	0.063	0.794***	0.765	1.992** (R ² =.695)
Percentage of staff agreeing that their role makes a difference to patients	-0.116	-0.242**	0.085	0.794***	-0.506	2.341
Percentage of staff feeling valued by their work colleagues	-0.160	-0.315**	0.088	0.771***	-2.002*	-0.019
Percentage of staff agreeing that they have an interesting job	-0.083	-0.280**	0.079	0.788***	-0.295	1.658
Quality of job design (clear job content, feedback and staff involvement)	-0.090	-0.236**	0.078	0.777***	-0.446	-0.417
Work pressure felt by staff	-0.075	-0.233**	0.061	0.793***	-0.173	0.556
Percentage of staff working in a well-structured team environment	-0.151	-0.247**	0.091	0.775***	-1.006*	-0.384
Trust commitment to work-life balance	-0.082	-0.240**	0.066	0.797***	0.081	-0.260
Percentage of staff working extra hours	-0.082	-0.221**	0.065	0.785***	-0.646	-0.412
Percentage of staff using flexible working options	-0.136	-0.308**	0.077	0.785***	-0.776	-0.202

Percentage of staff feeling there are good opportunities to develop their potential at work	-0.087	-0.260**	0.084	0.784***	-0.435	0.400
Percentage of staff receiving job-relevant training, learning or development in last 12 months	-0.094	-0.246**	0.072	0.793***	-0.237	-0.690
Percentage of staff appraised in last 12 months	-0.078	-0.256**	0.082	0.801***	-0.181	-0.706* (R ² =.689)
Percentage of staff having well structured appraisals in last 12 months	-0.074	-0.252**	0.080	0.801***	0.359	-0.836
Percentage of staff appraised with personal development plans in last 12 months	-0.073	-0.250**	0.084	0.804***	-0.714	-0.112
Support from immediate managers	-0.096	-0.241**	0.068	0.798***	-0.075	-0.571
Percentage of staff having health and safety training in last 12 months	-0.076	-0.292**	0.077	0.789***	-0.386	-0.095
Percentage of staff suffering work-related injury in last 12 months	-0.104	-0.244**	0.083	0.798***	0.542	2.243* (R ² =.688)
Percentage of staff suffering work-related stress in last 12 months	-0.013	-0.264**	0.053	0.788***	1.893*	2.983** (R ² =.695)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	-0.114	-0.253**	0.074	0.800***	0.280	0.694
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	-0.088	-0.249**	0.071	0.797***	0.225	0.498
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	-0.045	-0.282***	0.124	0.732***	2.065***	0.632
Percentage of staff experiencing physical violence from staff in last 12 months	-0.072	-0.310***	0.063	0.784***	8.610*	8.412* (R ² =.690)
Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12	-0.031	-0.292***	0.105	0.760***	1.653**	1.144
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	-0.124	-0.307***	0.053	0.797***	2.153*	1.860
Perceptions of effective action from employer towards violence and harassment	-0.072	-0.265**	0.081	0.790***	-0.427	-0.796
Percentage of staff reporting good communication between senior management and staff	-0.086	-0.237**	0.084	0.777***	-0.831	-0.581
Percentage of staff agreeing that they understand their role and where it fits in	-0.082	-0.221**	0.087	0.784***	-0.573	-1.255*
Percentage of staff able to contribute towards improvements at work	-0.103	-0.235**	0.089	0.782***	-0.670	-1.547
Staff intention to leave jobs	-0.087	-0.283**	0.068	0.790***	0.233	0.160
Staff recommendation of the trust as a place to work or receive treatment	0.023	-0.247**	0.087	0.777***	0.000	-0.502
Percentage of staff having equality and diversity training in the last 12 months	-0.113	-0.253**	0.065	0.798***	-0.082	-0.644* (R ² =.689)
Percentage of staff believing trust provides equal opportunities for career progression or promotion	-0.092	-0.375***	0.088	0.775***	-1.657*	-1.062
Percentage of staff experiencing discrimination at work in last 12 months	-0.105	-0.370***	0.085	0.782***	3.011*	-0.326

*0.01<p<0.05 ;**0.001<p<0.01;***p<0.001; All Trust size variables have the value of 0.000 and they are non-significant.

4.6.2. Latent Growth Curve Analysis

- Table 13 presents coefficients and model fit for our predictors using Absenteeism (2007/08-2009/10) as the outcome. The majority of the predictors included in the analysis are significantly related to the Absenteeism, with several of the models fitting the data at a satisfactory level.
- Three out of the four engagement variables are negatively associated to trust absenteeism levels for the three year period, meaning that trusts with more engaged employees tend to have lower absenteeism. The positive coefficient of the effect of Overall Engagement on absenteeism indicates that trusts with high engagement tend to have an increase in absenteeism over time.
- Of the 2007 NSS key findings, the strongest predictor of absenteeism with satisfactory model fit is the 'Percentage of staff suffering work stress in previous 12 months (2007)'. Specifically, we can confidently infer that in trusts where a large number of staff experience high stress levels, later absenteeism tends to be higher. Additionally, for those trusts the level of absenteeism tends to decrease over time.
- For trusts with a high 'Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)', the mean level of subsequent absenteeism tends to be higher.
- A lower overall level of absenteeism is observed for trusts with a higher percentage of staff having had training/ development, job-relevant training, learning or development, as well as reporting errors, near misses or incidents.

Table 13: The effect of NHS NSS Key Findings on Absenteeism (2007/08-2009/10)

Key Finding	Unstandardised estimated value (test statistic)
Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept -1.667 (-7.588*)
	slope .172 (1.926)
Staff motivation at work (Motivation) (2009)	intercept
	slope
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept -1.828 (-5.761*)
	slope .077 (.609)
Overall engagement (2009)	intercept -2.999 (-8.031*)
	slope .304 (1.988*)
Percentage of staff using flexible working options (2007)	intercept -2.058 (-3.056*)
	slope -.075 (-.287)
Percentage of staff appraised within previous 12 months (2007)	intercept -1.067 (-2.925*)
	slope .477 (3.426*)
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept -2.517 (-3.560*)
	slope .986 (3.638*)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept -1.147 (-3.128*)
	slope .508 (3.622*)
Percentage of staff having training/ development in previous 12 months (2007)	intercept -4.239 (-2.875*)
	slope 1.050 (1.841)
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept -4.666 (-5.575*)
	slope 1.201 (3.679*)
Percentage of staff working in a well structured team environment (2007)	intercept -2.920 (-5.480*)
	slope .336 (1.603)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept -1.075 (-2.956*)
	slope .190 (1.322)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept -4.358 (-2.698*)
	slope .404 (.643)
Percentage of staff working extra hours (2007)	intercept -3.799 (-5.036*)
	slope .477 (1.500)
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept -.695 (-.838)
	slope -.099 (-.309)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept 6.385 (5.610*)
	slope -1.527 (-3.435*)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept -2.108 (-3.449*)
	slope .480 (2.026*)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept 5.234 (8.811*)
	slope -.206 (-.825)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept 1.317 (.213)
	slope .396 (.166)

Key Finding	Unstandardised estimated value (test statistic)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept 4.451 (6.458*)
	slope -.257 (-.931)
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept -2.096 (-1.739)
	slope .556 (1.195)
Quality of work life balance (2007)	intercept -.462 (-1.707)
	slope .260 (2.497*)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept -3.074 (-7.941*)
	slope .621 (4.019*)
Support from immediate managers (2007)	intercept -1.182 (-3.528*)
	slope .362 (2.803)
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept -1.552 (-7.486*)
	slope .239 (2.862*)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept -2.386 (-5.557*)
	slope .427 (2.520*)
Perceptions of effective action from employer towards violence and harassment (2007)	intercept -2.427 (-5.402*)
	slope .365 (2.057*)
Availability of handwashing materials (2007)	intercept -1.372 (-5.229*)
	slope -.074 (-.707)
Staff job satisfaction (2007)	intercept -2.003 (-4.936*)
	slope .480 (3.039*)
Work pressure felt by staff (2007)	intercept -.886 (-2.434*)
	slope -.107 (-.757)
Staff intention to leave jobs (2007)	intercept 1.169 (3.619*)
	slope -.287 (-2.292*)

*p<.05

4.6.3. Common themes and differences

- Although both methods produced some significant results, there were no cases where the change in absenteeism rates was consistently predicted by the same staff survey variable.
- Most other results were in line with expectations, particularly with increases in work-related stress related to increases in absenteeism in the regression analysis, and related to overall absenteeism levels in the latent growth curve analysis.

4.7. Infection Rates (MRSA)

4.7.1. Regression Analysis of Change scores

None of the relationships in the regression analyses was significant, and so the detailed results for these are not repeated here: please see Appendix 2 instead.

4.7.2. Latent Growth Curve Analysis

- Table 15 presents coefficients and model fit for our predictors using hospital MRSA Infection Rates (2007/08-2009/10) as the outcome. A modest proportion of the predictors included in the analysis are significantly related to the MRSA Infection Rates, with all of the models fitting the data poorly.
- The only one of the 2009 employee engagement measures that is related to infection is 'Percentage of staff able to contribute towards improvements at work (Involvement) (2009)'. The positive intercept coefficient indicates that in trusts where employees are more involved in improvements infection rates tend to be higher. An encouraging finding is that the slope intercept is negative, meaning that in trusts where a large percentage of staff contribute towards improvements at work infection rates tend to decrease in time.
- A rather unusual finding is the strong negative relationship of 'Percentage of staff experiencing physical violence from staff in previous 12 months (2007)' to infection rates. This means that in trusts with a high percentage of staff experiencing violence from colleagues, infection rates tend to be lower. The same trend is observed for 'Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)'. In this case though the slope coefficient is positive, showing a decrease in infection rates in the period that follows.

- Similarly unexpected are the positive relationships of ‘Percentage of staff having training/ development in previous 12 months (2007)’ and ‘Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)’ to the mean level of infections over the three year, though it is encouraging that in those trusts where more staff are being trained infection rates tend to reduce over the following three year period.

Table 15: The effect of NHS NSS Key Findings on Infection Rates (2007/08-2009/10)

Key Finding	Unstandardised estimated value (test statistic)
Staff recommendation of Trust as a place to work or receive treatment (Staff Advocacy) (2009)	intercept .127 (.623)
	slope -.084 (-.910)
Staff motivation at work (Motivation) (2009)	intercept .011 (.022)
	slope -.368 (-1.625)
Percentage of staff able to contribute towards improvements at work (Involvement) (2009)	intercept .719 (2.245*)
	slope -.354 (-2.443*)
Overall engagement (2009)	intercept .420 (1.129)
	slope -.304 (-1.809)
Percentage of staff using flexible working options (2007)	intercept -.086 (-.155)
	slope .027 (.109)
Percentage of staff appraised within previous 12 months (2007)	intercept .214 (.849)
	slope -.154 (-1.356)
Percentage of staff having well structured appraisals within the previous 12 months (2007)	intercept .427 (.914)
	slope -.377 (-1.792)
Percentage of staff appraised with personal development plans within previous 12 months (2007)	intercept .148 (.594)
	slope -.124 (-1.104)
Percentage of staff having training/ development in previous 12 months (2007)	intercept 3.629 (2.474*)
	slope -1.591 (-2.393*)
Percentage of staff receiving job-relevant training, learning or development in previous 12 months (2007)	intercept 2.039 (2.749*)
	slope -.948 (-2.823*)
Percentage of staff working in a well structured team environment (2007)	intercept .741 (1.467)
	slope -.331 (-1.444)
Percentage of staff having had health and safety training in previous 12 months (2007)	intercept .607 (1.993*)
	slope -.384 (-2.805*)
Percentage of staff reporting errors, near misses or incidents (2007)	intercept
	slope
Percentage of staff working extra hours (2007)	intercept -.590 (-.986)
	slope .251 (.925)

Key Finding	Unstandardised estimated value (test statistic)
Percentage of staff suffering work related injury in previous 12 months (2007)	intercept -.836 (-.969)
	slope .491 (1.256)
Percentage of staff suffering work stress in previous 12 months (2007)	intercept -.171 (-.203)
	slope .294 (.768)
Percentage of staff witnessing potentially harmful errors, near misses or incidents in previous month (2007)	intercept .859 (1.511)
	slope -.613 (-2.397*)
Percentage of staff experiencing physical violence from patients or relatives in previous 12 months (2007)	intercept .100 (.122)
	slope -.345 (-.927)
Percentage of staff experiencing physical violence from staff in previous 12 months (2007)	intercept -9.785 (-2.030*)
	slope 2.444 (1.112)
Percentage of staff experiencing harassment, bullying or abuse from patients or relatives in previous 12 months (2007)	intercept -.443 (-.577)
	slope -.095 (-.274)
Percentage of staff experiencing harassment, bullying or abuse from staff in previous 12 months (2007)	intercept -2.511 (-2.841*)
	slope 1.222 (3.061*)
Quality of work life balance (2007)	intercept .602 (2.688*)
	slope -.285 (-2.815*)
Quality of job design (clear job content, feedback and staff involvement) (2007)	intercept .615 (1.708)
	slope -.464 (-2.876*)
Support from immediate managers (2007)	intercept .889 (3.041*)
	slope -.486 (-3.714*)
Extent of positive feeling (communication, staff involvement, innovation & patient care) (2007)	intercept .164 (.918)
	slope -.116 (-1.438)
Fairness and effectiveness of procedures for reporting errors, near misses and incidents (2007)	intercept .522 (1.471)
	slope -.359 (-2.252*)
Perceptions of effective action from employer towards violence and harassment (2007)	intercept .070 (.189)
	slope -.142 (-.848)
Availability of handwashing materials (2007)	intercept .301 (1.497)
	slope -.172 (-1.897)
Staff job satisfaction (2007)	intercept 1.164 (3.119*)
	slope -.580 (-3.452*)
Work pressure felt by staff (2007)	intercept -.253 (-.984)
	slope .071 (.611)
Staff intention to leave jobs (2007)	intercept -.577 (-2.581*)
	slope .271 (2.686)

*p<.05

4.7.3. Common themes and differences

- None of the relationships in the regression analyses was significant, and therefore there is nothing to add to the previous section.

5. *Conclusion*

- This report covers the effects of several organisational factors as well as employee attitudes and behaviours on a variety of trust outcomes. The methodological approach taken has three main strengths. Firstly, we have used longitudinal data which allowed us to infer causal relationships with NHS staff survey key findings as predictors. Secondly, the outcome data are all collected by sources different than the predictor data, thus avoiding the issue of common-source bias that is often present with survey data. Finally, we have used two different statistical techniques to conduct data analysis; this will allow for the verification of results and the discovery of potentially unstable findings. We therefore highlight in this section only the findings that have been confirmed by both sets of analyses in order to reach generalisable conclusions.
- Both analyses have confirmed that patient satisfaction is predicted by employees' job satisfaction and the quality of their job design.
- Although both analyses revealed some links of key findings to patient mortality, these are not the same across the two analyses; therefore the results here need to be interpreted with caution.
- Trusts' quality of financial management is predicted by employees' intentions to leave their jobs.
- The quality of services provided by the trusts is predicted by the percentage of staff reporting errors, near misses or incidents, as well as by the quality of work-life balance and staff advocacy of their trust as place to work or receive treatment.
- Absenteeism levels in trusts are predicted consistently by the percentage of staff in the trust experiencing work related stress.
- Our analysis did not reveal any consistent predictors of staff turnover or hospital MRSA infection rates.
- The current analysis only presents overall results at the trust level. In order to learn more from the data and be able to provide more tailored recommendations

to the NHS a possible follow-up would be to analyse a breakdown of the effects according to trust type and occupational group.

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7. Appendices

Appendix 1: The Relationship between MRSA (2009/10) and NHS Staff Survey Key Score Variables.

	Status (Specialist=1)	Location (London=1)	Status (Teaching =1)	MRSA 2008/09	Key Score year 2008	Change score
Staff job satisfaction	-0.226***	0.148**	-0.005	0.280***	0.036	-0.103
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	-0.231***	0.137**	-0.010	0.283***	0.215	0.050
Percentage of staff agreeing that their role makes a difference to patients	-0.244***	0.114**	-0.006	0.285***	1.806	1.258
Percentage of staff feeling valued by their work colleagues	-0.231***	0.160**	-0.002	0.283***	0.979	0.925
Percentage of staff agreeing that they have an interesting job	-0.233***	0.162**	-0.010	0.285***	0.614	-0.274
Quality of job design (clear job content, feedback and staff involvement)	-0.228***	0.142**	-0.005	0.280***	0.062	-0.039
Work pressure felt by staff	-0.227***	0.143**	-0.007	0.281***	-0.003	-0.132
Percentage of staff working in a well-structured team environment	-0.219***	0.153**	-0.005	0.281***	-0.225	-0.077
Trust commitment to work-life balance	-0.240***	0.148**	-0.005	0.279***	0.168	0.038
Percentage of staff working extra hours	-0.218***	0.161**	-0.010	0.281***	-0.065	-0.769
Percentage of staff using flexible working options	-0.223***	0.176**	-0.009	0.284***	0.569	-0.124
Percentage of staff feeling there are good opportunities to develop their potential at work	-0.228***	0.143**	-0.007	0.281***	0.074	0.128
Percentage of staff receiving job-relevant training, learning or development in last 12 months	-0.227***	0.120**	-0.006	0.283***	1.411**	1.512
Percentage of staff appraised in last 12 months	-0.221***	0.145**	-0.009	0.283***	-0.136	-0.120
Percentage of staff having well structured appraisals in last 12 months	-0.219***	0.155**	-0.009	0.280***	-0.247	-0.040
Percentage of staff appraised with personal development plans in last 12 months	-0.222***	0.147**	-0.009	0.282***	-0.071	0.001
Support from immediate managers	-0.225***	0.147**	-0.007	0.279***	0.003	0.086
Percentage of staff having health and safety training in last 12 months	-0.212***	0.117**	-0.009	0.279***	-0.303	-0.119
Percentage of staff suffering work-related injury in last 12 months	-0.225***	0.147**	-0.007	0.280***	-0.015	-0.103
Percentage of staff suffering work-related stress in last 12 months	-0.231***	0.155**	-0.006	0.284***	-0.429	-0.051
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	-0.200***	0.126**	-0.004	0.272***	0.704	0.666
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	-0.213***	0.139**	-0.005	0.278***	-1.308	-0.416
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	-0.191**	0.156**	-0.004	0.274***	0.614	-0.218
Percentage of staff experiencing physical violence from staff in last 12 months	-0.237***	0.177**	-0.011	0.280***	-1.572	1.635

Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12	-0.143	0.128**	-0.006	0.275***	1.089	0.404
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	-0.225***	0.150**	-0.005	0.280***	-0.085	-0.145
Perceptions of effective action from employer towards violence and harassment	-0.218***	0.147**	-0.006	0.275***	-0.110	0.240
Percentage of staff reporting good communication between senior management and staff	-0.224***	0.144**	-0.012	0.285***	0.028	0.396
Percentage of staff agreeing that they understand their role and where it fits in	-0.228***	0.144**	-0.004	0.277***	0.057	-0.111
Percentage of staff able to contribute towards improvements at work	-0.236***	0.139**	-0.008	0.278***	0.256	0.163
Staff intention to leave jobs	-0.222***	0.134**	-0.006	0.273***	0.106	0.114
Staff recommendation of the trust as a place to work or receive treatment	-0.218***	0.148**	-0.004	0.277***	0.097	-0.077
Percentage of staff having equality and diversity training in the last 12 months	-0.227***	0.144**	-0.003	0.276***	-0.122	-0.242
Percentage of staff believing trust provides equal opportunities for career progression or promotion	-0.216***	0.113**	-0.009	0.274***	-0.476	-0.538
Percentage of staff experiencing discrimination at work in last 12 months	-0.222***	0.123*	-0.005	0.276***	0.632	-0.402

8. Trust size has the value of 0.000 which is non-significant across the board.

Appendix 2: The Relationship between Staff Turnover (2009/10) and NHS Staff Survey Key Score Variables.

	Status (Specialist= 1)	Location (London=1)	Status (Teaching =1)	Turnover rate rate in 2008/09	Key Score variabl e 2008	Change score
Staff job satisfaction	-0.104	0.701	-0.282	0.752***	2.032	-0.550
Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	0.001	0.705	-0.288	0.762***	-0.235	-1.467
Percentage of staff agreeing that their role makes a difference to patients	-0.094	0.541	-0.286	0.763***	8.223	6.756
Percentage of staff feeling valued by their work colleagues	-0.046	0.779	-0.286	0.752***	6.096	3.589
Percentage of staff agreeing that they have an interesting job	-0.060	0.801*	-0.292	0.753***	-7.451	-9.345*
Quality of job design (clear job content, feedback and staff involvement)	-0.211	0.596	-0.270	0.725***	2.746*	-0.017
Work pressure felt by staff	0.032	0.737	-0.272	0.758***	0.692	0.354
Percentage of staff working in a well-structured team environment	-0.226	0.592	-0.349	0.728***	6.740*	5.333
Trust commitment to work-life balance	-0.087	0.706	-0.300	0.757***	1.400	0.930
Percentage of staff working extra hours	-0.017	0.713	-0.286	0.764***	-0.535	0.314
Percentage of staff using flexible working options	-0.038	0.809*	-0.289	0.755***	1.826	-1.897
Percentage of staff feeling there are good opportunities to develop their potential at work	-0.101	0.689	-0.326	0.756***	2.082	-3.346
Percentage of staff receiving job-relevant training, learning or development in last 12 months	-0.066	0.685	-0.274	0.746***	6.551*	1.201
Percentage of staff appraised in last 12 months	0.009	0.643	-0.280	0.767***	-0.238	-1.576
Percentage of staff having well structured appraisals in last 12 months	-0.009	0.597	-0.245	0.765***	1.844	-2.793
Percentage of staff appraised with personal development plans in last 12 months	0.002	0.649	-0.271	0.767***	-0.002	-1.770
Support from immediate managers	-0.044	0.702	-0.276	0.752***	1.606	1.185
Percentage of staff having health and safety training in last 12 months	-0.086	0.812*	-0.288	0.756***	0.986	0.515
Percentage of staff suffering work-related injury in last 12 months	-0.021	0.727*	-0.351	0.754***	- 4.051*	-4.691
Percentage of staff suffering work-related stress in last 12 months	0.009	0.670	-0.299	0.763***	0.387	2.748
Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	0.003	0.693	-0.340	0.770***	-0.344	-3.568
Percentage of staff reporting errors, near misses or incidents witnessed in the last month	-0.104	0.796*	-0.300	0.749***	8.840	4.158
Percentage of staff experiencing physical violence from patients/relatives in last 12 months	-0.780	0.845	-0.327	0.704***	- 7.255*	-2.779
Percentage of staff experiencing physical violence from staff in last 12 months	-0.236	0.873*	-0.215	0.759***	- 30.364	-30.918
Percentage of staff experiencing harassment, bullying or abuse from patients/relatives in last 12	-0.630	0.952*	-0.310	0.723***	- 5.708*	-0.900
Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	-0.034	0.664	-0.303	0.761***	1.324	4.488
Perceptions of effective action from employer towards violence and harassment	-0.151	0.727*	-0.298	0.760***	1.381	0.461
Percentage of staff reporting good communication between senior management and staff	-0.235	0.537	-0.245	0.753***	3.843*	-4.454
Percentage of staff agreeing that they understand their role and where it fits in	-0.079	0.642	-0.285	0.761***	0.697	-0.290
Percentage of staff able to contribute towards improvements at work	-0.141	0.636	-0.329	0.736***	4.237*	0.472

Staff intention to leave jobs	0.034	0.636	-0.297	0.755***	0.963	1.707
Staff recommendation of the trust as a place to work or receive treatment	-0.243	0.637	-0.305	0.760***	0.862	0.325
Percentage of staff having equality and diversity training in the last 12 months	-0.024	0.694	-0.228	0.756***	-1.099	0.534
Percentage of staff believing trust provides equal opportunities for career progression or promotion	-0.140	0.886*	-0.300	0.754***	2.633	-0.215
Percentage of staff experiencing discrimination at work in last 12 months	-0.059	0.785	-0.323	0.761***	-2.735	5.255

9. Trust size has the value of 0.000 which is non-significant across the board.