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Staff satisfaction and organisational performance: evidence from a longitudinal secondary analysis of the NHS staff survey and outcome data

*Martin Powell, Jeremy Dawson, Anna Topakas,
Joan Durose and Chris Fewtrell*



Staff satisfaction and organisational performance: evidence from a longitudinal secondary analysis of the NHS staff survey and outcome data

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Abstract

Staff satisfaction and organisational performance: evidence from a longitudinal secondary analysis of the NHS staff survey and outcome data

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Background: The search for causal links between human resource management (HRM) and organisational performance has dominated academic and practitioner debates for many years. However, much of this work comes from contexts outside health care and/or the UK.

Objectives: This study tested the later stages of a well-established HRM model, testing whether or not there was evidence of causal links between staff experience and intermediate (staff) and final (patient and organisational) outcomes, and whether or not these differed in parts of the NHS. We used large-scale longitudinal secondary data sets in order to answer these questions in a thorough way.

Data sources: Searches were conducted using Health Management Information Consortium, MEDLINE, PsycINFO, Social Sciences Citation Index and EBSCOhost (from inception to May 2012).

Methods: Staff experience data came from the national NHS staff surveys of 2009, 2010 and 2011, with trust-level measures of staff absenteeism, turnover, patient satisfaction, mortality and infection rates gathered from the same NHS years. Several analytical methods were used, including multilevel analysis, mediated regression, latent growth curve modelling and cross-lagged correlation analysis.

Results: In general, the pattern was that better staff experiences are associated with better outcomes for employees and patients. Multilevel analysis found that the positive effects of staff perceiving equal opportunities on employee outcomes were especially strong, as were the negative effects of aggression and discrimination. Organisational-level analysis showed that better staff experiences (particularly those associated with better well-being and better job design, and more positive attitudes about the organisation generally) were linked to lower levels of absenteeism and greater patient satisfaction. There was some evidence that the relationship with absenteeism is causal, although the causal link with patient satisfaction was less clear-cut. Some relationships between staff experience and turnover, and some between staff experience and patient mortality, were also found (and a few with infection rates), with longitudinal analysis comparatively unclear about the direction of causality. Although many staff experiences were associated with absenteeism and patient satisfaction, these effects were not mediated and the reason staff experiences are linked to patient satisfaction appears to be separate from the link with absenteeism. In general, there is no single group of staff (or geographical region) for which staff experiences are the most important. However, nurses' experiences generally had the strongest effects on absenteeism, followed by medical/dental staff. Few clear or explainable patterns for other staff group effects were found. Absenteeism was most readily predicted by staff experience in the West Midlands. Two Action Learning Sets of managers, and patient and public involvement representatives broadly supported the emerging findings of the factors that seemed to be important indicators of staff satisfaction and organisational outcomes.

Limitations: The relatively blunt nature of the data used meant that conclusions about the direction of causality were less clear. More specific limitations included that we had to limit outcome variables to those that were available already, that many variables were available for acute trusts, and that we could not break down data further within trusts or years.

Conclusions: Overall, the research confirmed many expected links between staff experiences and outcomes, providing support for that part of the overall HRM model in the NHS. However, conclusions about the direction of causality were less clear (except for absenteeism). This is probably due in part to the relatively blunt nature of the data used. Future research may involve the careful evaluation of interventions designed to improve staff experience on more specific groups of staff, and the continued use of secondary data sources, such as those used in this report, to answer more specific, theoretically driven questions.

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Contents

List of tables	xi
List of figures	xv
List of abbreviations	xvii
Plain English summary	xix
Scientific summary	xxi
Chapter 1 Introduction	1
Chapter 2 The human resource management performance link	5
Introduction	5
Performance/dependent variable	6
<i>Organisational and employee perspectives</i>	6
<i>Employer and employee outcomes</i>	7
Human resource management/independent variable	7
<i>Single practices versus bundles</i>	7
<i>Fit/universalistic, configurational or contingency perspectives</i>	8
Linkage	10
Theory	10
Methodological issues	11
Models of the human resource management performance link	11
Job satisfaction	12
Job involvement	12
Work engagement	12
Employee well-being	13
The happy-productive worker hypothesis	14
Intermediate outcomes	14
Contextual perspectives on the NHS setting	15
Service sector	15
Health care	16
Public sector	17
Conclusion	18
Chapter 3 Systematic review of the high-performance work systems literature in the health-care sector	19
Structured summary	19
Background	19
Methods	19
Results	19
Discussion	19
Introduction	19
Method	20
Systematic review and critical evaluation of quantitative empirical studies: the 'hard' evidence	23
Conclusion	29

Chapter 4 Policy review	33
Introduction	33
The generic business case	33
The business case for the NHS	35
Conclusion	41
Chapter 5 Methods used in the quantitative analysis	43
Introduction	43
Analytical methods used	43
<i>Objectives of the analysis</i>	43
<i>Multilevel analysis</i>	44
<i>Latent growth curve modelling</i>	44
<i>Cross-lagged correlations</i>	45
<i>Mediated regression analysis</i>	45
<i>Regression analysis by groups</i>	45
Data from the NHS national staff survey	46
<i>Samples used</i>	46
<i>Variables used</i>	47
<i>Descriptive statistics for variables (individual level, 2010)</i>	47
Outcome data used	54
Other variables used	55
Chapter 6 Results from analysis of links between staff experience and intermediate outcomes	57
Chapter summary	57
Chapter structure	57
Multilevel analysis	57
Latent growth curve analysis	60
Cross-lagged correlations	63
Summary of results	65
Chapter 7 Results from analysis of links between staff experience, intermediate outcomes and organisational performance	67
Chapter summary	67
Chapter structure	67
Latent growth curve analysis	67
Cross-lagged correlations	71
Mediation	72
Summary of results	73
Chapter 8 Examination of relationships differing by groups	75
Chapter summary	75
Introduction	75
Analysis by staff groups	75
Analysis by region	78
Summary of results	79
Chapter 9 Reflections from the Action Learning Sets	81
Introduction	81
Rationale for Action Learning Sets	82
Action Learning Sets participants	83
Reflections from the Action Learning Sets	84
Conclusions	85

Chapter 10 Discussions and conclusions	87
Introduction	87
Summary of literature reviews	87
Summary and discussion of quantitative results	89
Discussion of Action Learning Sets	93
Integration of study elements	93
Practical implications	94
Limitations and directions for future research	96
Conclusions	98
Acknowledgements	99
References	101
Appendix 1 Summary of systematic literature review of high-performance work systems	115
Appendix 2 Detailed results from multilevel analysis	131
Appendix 3 Latent growth modelling: intermediate outcomes as dependent variables	143
Appendix 4 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes	157
Appendix 5 Latent growth modelling: trust outcomes as dependent variables	165
Appendix 6 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and trust outcomes (2010–11 and 2011–12)	191
Appendix 7 Regression analysis of intermediate and trust outcomes on key findings 2010: breakdown by demographic groups	205

List of tables

TABLE 1 Description of reviewed publications	21
TABLE 2 Response rates for NHS staff survey, 2009–11	47
TABLE 3 ‘Key findings’ from 2010 NHS staff survey	48
TABLE 4 Descriptive statistics for staff survey variables at individual and trust level (data from NHS staff survey, 2010, based on 167,736 responses from 290 trusts)	52
TABLE 5 Response rates for NHS acute inpatient survey, 2009–11	54
TABLE 6 Significant results from multilevel regression analysis	59
TABLE 7 The NHS staff survey key findings 2009 as predictors of starting levels (intercepts) of intermediate outcomes in latent growth curve models	61
TABLE 8 The NHS staff survey key findings 2009 as predictors of changes (slopes) in intermediate outcomes	62
TABLE 9 The NHS staff survey key findings (changes from 2009 to 2010) as predictors of changes (slopes) in intermediate outcomes	63
TABLE 10 Cross-lagged correlations between staff survey variables and employment stability, 2010/11–2011/12	63
TABLE 11 Cross-lagged correlations between staff survey variables and staff absenteeism, 2010/11–2011/12	64
TABLE 12 The NHS staff survey key findings 2009 as predictors of starting levels (intercepts) of trust outcomes	69
TABLE 13 The NHS staff survey key findings 2009 as predictors of changes (slopes) in intermediate outcomes	70
TABLE 14 NHS staff survey key findings (changes from 2009 to 2010) as predictors of changes (slopes) in intermediate outcomes	70
TABLE 15 Cross-lagged correlations between staff survey variables and intermediate outcomes	71
TABLE 16 Significant indirect effects of staff survey variables on trust outcomes via absenteeism	73
TABLE 17 Staff group breakdowns meeting criteria for differential prediction of outcomes, controlling for outcome variable of prior year	76
TABLE 18 Staff group breakdowns meeting criteria for differential prediction of outcomes, not controlling for the outcome variable of the previous year	76

TABLE 19 Regional breakdowns meeting criteria for differential prediction of outcomes, controlling for outcome variable of the previous year	78
TABLE 20 Regional breakdowns meeting criteria for differential prediction of outcomes, not controlling for prior year's outcome variable	79
TABLE 21 Summary of theoretical underpinnings of reviewed publications and inclusion in reviews	116
TABLE 22 Summary of methodological factors and main findings of reviewed publications	123
TABLE 23 Multilevel regression of the 'Impact of health and well-being on ability to perform work or daily activities' on the individual and trust control variables	131
TABLE 24 Multilevel regression of the 'Impact of health and well-being on ability to perform work or daily activities' on the NHS staff survey key findings	132
TABLE 25 Multilevel regression of the 'Suffering work-related stress in previous 12 months' on the individual and trust control variables	133
TABLE 26 Multilevel regression of the 'Suffering work-related stress in previous 12 months' on the NHS staff survey key findings	134
TABLE 27 Multilevel regression of 'Job satisfaction' on the individual and trust control variables	135
TABLE 28 Multilevel regression of 'Job satisfaction' on the NHS staff survey key findings	136
TABLE 29 Multilevel regression of 'Presenteeism' on the individual and trust control variables	137
TABLE 30 Multilevel regression of 'Presenteeism' on the NHS staff survey key findings	138
TABLE 31 Multilevel regression of 'Intention to leave' on the individual and trust control variables	139
TABLE 32 Multilevel regression of 'Intention to leave' on the NHS staff survey key findings	140
TABLE 33 Multilevel regression of 'Advocacy' on the individual and trust control variables	141
TABLE 34 Multilevel regression of 'Advocacy' on the NHS staff survey key findings	142
TABLE 35 NHS staff survey variables (2009) (percentage or scale score) as predictors of absenteeism (2009–11)	144
TABLE 36 Change in NHS staff survey variables (2010) minus (2009) as predictors of absenteeism (2009–11)	147

TABLE 37 NHS staff survey variables (2009) as predictors of turnover (2009–11)	150
TABLE 38 Change in NHS staff survey variables (2010) minus (2009) as predictors of turnover (2009–11)	153
TABLE 39 Cross-lagged correlations between NHS staff survey variables (2010 and 2011) and absenteeism (2010–11 and 2011–12)	158
TABLE 40 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and stability index (2010–11 and 2011–12)	161
TABLE 41 NHS staff survey variables (2009) as predictors of patient mortality rates (2009–2011)	166
TABLE 42 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of patient mortality rates (2009–2011)	169
TABLE 43 NHS staff survey variables (2009) as predictors of patient satisfaction (2009–2011)	172
TABLE 44 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of patient satisfaction (2009–2011)	175
TABLE 45 NHS staff survey variables (2009) as predictors of MRSA infection rates (2009–2011)	178
TABLE 46 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of MRSA infection rates (2009–2011)	181
TABLE 47 NHS staff survey variables (2009) as predictors of <i>C. difficile</i> infection rates (2009–2011)	184
TABLE 48 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of <i>C. difficile</i> infection rates (2009–2011)	187
TABLE 49 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient mortality rates (SHMI, 2010–11 and 2011–12)	192
TABLE 50 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient satisfaction (2010 and 2011)	195
TABLE 51 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and MRSA infection rates (2010–11 and 2011–12)	199
TABLE 52 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and <i>C. difficile</i> infection rates (2010–11 and 2011–12)	202

TABLE 53 Breakdown by age	206
TABLE 54 Breakdown by disability status	221
TABLE 55 Breakdown by ethnic group	226
TABLE 56 Breakdown by employment status: full time/part time	239
TABLE 57 Breakdown by geographical area	244
TABLE 58 Breakdown by occupational group	271
TABLE 59 Breakdown by gender	287
TABLE 60 Breakdown by tenure	292

List of figures

FIGURE 1 Flow diagram of literature search

22

List of abbreviations

AHP	allied health professional	MRSA	methicillin-resistant <i>Staphylococcus aureus</i>
ALS	Action Learning Set		
AMO	ability, motivation, opportunity	PCT	primary care trust
CEO	chief executive officer	PPI	patient and public involvement
CI	confidence interval	PSM	public service motivation
CQUIN	Commissioning for Quality and Innovation indicator	QIPP	quality, innovation, productivity and prevention
DH	Department of Health	RBV	resource-based view
HCM	high-commitment management	SEM	structural equation modelling
HIWP	high-involvement work practices	SHMI	Standardised Hospital Mortality Index
HIWS	high-involvement work systems	SHRM	strategic human resource management
HMIC	Her Majesty's Inspectorate of Constabulary	SPSS	Statistical Product and Service Solutions
HPWP	high-performance work practices	SSCI	Social Sciences Citation Index
HPWS	high-performance work systems	STS	sociotechnical systems
HR	human resources	VBA	Veteran Benefits Association
HRM	human resource management	VHA	Veteran Health Administration
HSMR	Hospital Standardised Mortality Ratio		
IIP	Investors in People		

Plain English summary

It has long been debated how people management practices link to organisational performance. Much research has been conducted, but mostly away from health care. This project aimed to fill some of this gap by testing links between staff experiences, absenteeism and turnover, and NHS trust performance.

We used secondary data from a 3-year period (2009–12) to test the model. In particular, we used extensive data from the national survey of NHS staff, absenteeism and turnover records, patient satisfaction, hospital mortality rates and infection rates. We used various statistical methods to examine links between these variables and to establish whether or not a change in one variable could be said to cause a change in another.

Overall, there was a clear pattern that better staff experiences are associated with better outcomes for employees and patients. In particular, negative experiences such as aggression, discrimination or perceiving unequal opportunities were harmful to staff, increased absence and were also linked to lower patient satisfaction. Several positive staff experiences, reflecting the quality of jobs and positive attitudes about organisations, were associated with higher patient satisfaction and lower absenteeism. Although there were some relationships between staff experience and turnover, patient mortality and infection rates, these were not found consistently. Apart from absenteeism, there was little clear evidence for causal relationships between staff experience and outcomes.

Two Action Learning Sets, comprising managers, and patient and public representatives, broadly supported the emerging findings indicating which staff factors were the most important predictors of staff satisfaction and organisational outcomes.

Scientific summary

Background

The search for causal links between human resource management (HRM) and organisational performance has dominated both academic and practitioner debates for many years. Despite much research on the HRM performance link, significant debates continue over its nature and strength, with many commentators pointing to conceptual and methodological weaknesses. Moreover, much of the research has been conducted in the USA and in the private sector. There are few studies on public services in general, and health care in particular, with only a handful of studies being conducted in the UK health sector.

The practitioner debate is linked to the 'business case' associated with staff satisfaction and well-being, with links in terms of engagement and sickness absence. The NHS has accepted large elements of the legal, economic/business and ethical cases for staff well-being in many documents over the last 15 years or so. More recently, the importance of staff engagement, and health and well-being has been recognised by its inclusion in the quality, innovation, productivity and prevention programme, the staff pledges in the NHS Constitution, and in the 'post-Francis' debate on culture and values in health care.

Aims

The main aim of this project was to test the later part of a well-established (outside health care) overall model that hypothesises a positive link between HRM and organisational performance, in the English NHS. Two broad 'chains' exist between human resources (HR) practices (e.g. training and development, appraisal) and staff satisfaction and intermediate outcomes; and between staff satisfaction, intermediate outcomes and final outcomes. This project focuses on the later links in the chain, between intermediate and final outcomes. We use the term 'staff satisfaction' as a broad umbrella term covering the experiences of staff. Intermediate outcomes include staff absenteeism and turnover, and final outcomes include patient satisfaction, patient mortality and infection rates.

The objectives of the study were:

- to examine the links between staff attitudes and behaviours with individual and organisational performance in NHS trusts
- to use this knowledge to develop actionable recommendations for national stakeholders and local managers.

The main research questions were:

(Q1) What are the links between individual staff attitudes (e.g. satisfaction, engagement, turnover intentions) and intermediate staff outcomes (e.g. staff absenteeism, actual turnover)?

(Q2) How do these link with organisational performance (e.g. patient satisfaction, mortality)?

(Q3) Do these measures and relationships differ by occupation demographic groups, trust types and geographical areas, and, if so, what is the relative change for each group?

We used existing, large-scale longitudinal secondary data sets in order to answer these questions in a systematic and thorough way.

Literature review

Existing literature tends to find a broadly positive association between HRM and performance, but includes optimistic and pessimistic verdicts, and commentators point to theoretical and methodological challenges. We focus on three broad issues. First, for performance/outcome variables, financial measures (e.g. profit) dominated, with measures of employees' experience somewhat rare, making it difficult to judge between the competing views of the 'mutual gains', 'optimistic' or 'win-win' (employers and employees both benefit from HRM) or 'conflicting outcomes', 'pessimistic' or 'sceptical', 'win-lose' or 'lose-lose', or 'counteracting effects' perspectives (HRM pays off in terms of organisational performance but has no, or even a negative, impact on employee well-being). Second, we look at the HRM variables and discuss single compared with integrated and coherent 'bundles' of mutually reinforcing practices, and 'best practice' and 'best fit' or universalistic, configurational, or contingency approaches. The main issue here is whether or not 'one size fits all' in all situations or whether or not best practices vary in different contexts of countries and industries. Finally, in terms of linkage, we discuss the so-called 'black box problem' of theory and method. The most common theory involves the ability, motivation, opportunity (AMO) framework, which focuses on the importance of taking into account variables at the individual level such as employees' skills and competences (A = abilities), their motivation (M = motivation) and their opportunity to participate (opportunity = O). The most significant methodological problem is said to be the dominance of cross-sectional over longitudinal designs, making it difficult to say anything significant about causality. In short, we know little about how, and in what circumstances, HRM may lead to enhanced performance.

There are also significant debates about defining and measuring terms. For example, one review found more than 50 definitions of work engagement, and the term has been used in the NHS in a number of documents in different ways. The reviews tend to conclude that the HRM-performance link is complex and unclear, and it is generally argued that, while context is important, there are few studies on health care in general and on the NHS in particular.

There are a series of reports by a number of bodies drawing on different, but connected, debates inside and outside the NHS. There is a generic business-case debate on employee health and well-being, and engagement. Similarly, a series of reports from the Department of Health and other organisations have stressed the importance of staff involvement and engagement, and health and well-being over a period of about 15 years. However, a number of untested optimistic assumptions – ignoring costs, transferring evidence from contexts such as the USA and from for-profit industry, causality and 'win-win' – have been largely taken for granted. Moreover, implementation has been rather variable and patchy. It is possible that renewed emphasis may be placed on this case in the 'post-Francis' era.

Methods

Owing to the complex nature of the study, we did not complete one single literature review, but instead conducted three separate reviews. The first examined the HRM performance literature in general terms, the second was a systematic review of this relationship in health care and the third studied policy literature relating to the topics.

We used secondary data to answer these questions in a number of different ways. Staff satisfaction (experience) data were taken from the national NHS staff surveys of 2009, 2010 and 2011; data from the earlier 2 years were available in full detail, and for 2011 in aggregate format. We used the published 'key findings', representing a wide range of topics relating to employees, to represent staff experiences. Measures of staff absenteeism and turnover from the same three NHS years (2009/10, 2010/11 and 2011/12) were gathered from the NHS Information Centre for all NHS trusts in England. We also gathered organisational performance data for acute trusts in the form of inpatient satisfaction, patient mortality and hospital-acquired infection rates for each of these years.

The research questions themselves broke down into a number of specific objectives, each of which required one or more different analytical methods. In particular we examined longitudinal relationships to attempt to answer questions about causality and direction of effects. The methods used included multilevel regression analysis (which we used to examine experiences that had the largest effect on staff self-reported outcomes, including satisfaction, turnover intentions and well-being), mediated regression analysis (used to test whether or not there was any evidence of indirect effects of staff experience on organisational performance via intermediate outcomes), latent growth curve modelling (used to examine whether or not staff experience could explain differences of level and change in intermediate and final outcomes) and cross-lagged correlation analysis (used to examine whether or not there was any evidence of directional effects between staff experience variables, intermediate and final outcomes).

Results

As was expected, in general there is a clear pattern that better staff experiences are associated with better health and behavioural outcomes for the employees concerned. The results from the individual (multilevel) analysis were similar to those found in other studies, but with some added illuminations; in particular, the effects of staff believing there were equal opportunities for career progression and promotion on individual outcomes were especially strong, and also the negative effects of aggression (particularly from colleagues) and discrimination were telling.

There was also a very clear pattern of organisational level analysis for the outcomes staff absenteeism and patient satisfaction. In both cases, the latent growth curve analysis determined that better staff experiences, in terms of experienced well-being, engagement, good job design and lack of negative incidents, was strongly associated with good outcomes. For staff absenteeism, this was enhanced by cross-lagged correlations that suggested clear evidence for the direction of the effect between absenteeism and most of the staff survey variables: it is much more likely that good staff experience leads to lower absenteeism than vice versa. These effects are particularly strong for negative experiences such as violence and harassment, but are also very strong for the positive experiences of staff being able to contribute towards improvements at work, and when there is good communication between management and staff. Although there were some results involving patient satisfaction that suggested directional effects, these were less consistent.

However, results involving other outcomes often provided more equivocal results. Although there was some strong latent growth curve analysis results suggesting that improvements in the number of staff having meaningful jobs increased – when there are decreases in aggression from other staff, and when belief in their employer as both a place to work and a place to receive treatment increases, then turnover tends to decrease over subsequent years. Many of the other results – particularly the cross-lagged correlations – gave inconsistent or counterintuitive findings. This has to be placed in the context of major changes in the NHS over the study period, including many large reorganisations of services, necessitating more movement of staff between trusts (and, in some cases, redundancies) than would normally be expected. Likewise, results involving patient mortality did not give many clear and consistent patterns and, although there was undoubtedly some evidence that better staff experiences was associated with lower patient mortality, the longitudinal analysis did not always give a clear direction to these effects. However, cross-lagged correlations did reveal some patterns suggesting directional effects, for example that absenteeism in 1 year is more closely associated with mortality in the subsequent year than vice versa. Few clear results were found involving infection rates as an outcome.

In terms of the mediation, a striking finding was that although staff experiences were associated with absenteeism, and with patient satisfaction, there were not any mediated effects here. That is, the reason for staff experiences affecting absenteeism appears completely separate from the reason they affect patient satisfaction. Given that both are important for trusts for different reasons, this points to an even greater importance of staff attitudes and experience.

One of the major findings for the separation into groups (research question 3) was that, for the most part, there is not a single group of staff (or geographical region) for which staff experiences are the most important. Despite this, there are some patterns that became evident when studying the findings in more detail.

There are the most effects and largest differentials for predictors of absenteeism. Nursing staff generally had the strongest effects of all the occupational groups – unsurprising given that they form the largest group of staff. However, medical/dental staff also had substantial effects for most predictors. The turnover intentions and perceptions of work pressure of allied health professionals were the strongest predictors of actual staff turnover, and all the main clinical groups as well as administrative/clerical staff had large effects as predictors of patient satisfaction. White employees' attitudes and experiences had larger effects as predictors of absenteeism than other groups, mainly because they formed the vast majority of the workforce. There were no other easily explainable differential effects by ethnic group.

In terms of geographic regions, absenteeism was most readily predicted – by most staff survey variables – in the West Midlands, while the health of workers in Yorkshire had the strongest effect on patient satisfaction, and work pressure in the South Central region was a stronger predictor of turnover than in other regions. However, aside from the West Midlands, these may be one-off results with no clear patterns emerging.

Two Action Learning Sets (ALSs) of managers, and patient and public involvement representatives were created to focus on the link between staff attitude and behaviour, the resultant outcomes and organisational performance. These groups met twice in addition to a final workshop. Set members broadly supported the emerging findings of the factors that seemed to be important indicators of staff satisfaction and organisational outcomes: quality of job design, work pressure felt, work–life balance and support from supervisor. Discussion at the final workshop focused on the implications of the findings linked to appraisal, teamworking and differences linked to gender and occupational group.

Conclusions

Overall, the research confirmed some of the expected results demonstrating links between staff experiences and outcomes, thus providing support for that part of the overall HR model in a health-care setting and in the NHS in particular. However, although there were some clear results regarding direction of causality, particularly involving absenteeism, other longitudinal results were far less pure.

This may be due, in part, to the way the research was conducted. Although it had many strengths, including the use of large-scale data sets, longitudinal data analysis and relatively sophisticated methods, there were also several limitations, in particular regarding the data available. Measurements of organisational level effects measured annually may simply be too blunt to capture some of the more intricate and less major effects, especially when the measurements themselves are sometimes not ideal.

This points to some interesting possible directions for future research. Certainly there is still much scope for detecting exactly how staff experiences and outcomes are linked, particularly when linked to more longitudinal data. The careful evaluation of interventions designed to improve staff experience, with the use of appropriate designs (e.g. randomised control trials or stepped-wedge designs at individual, group or department levels) and the continued use of secondary data sources, such as those used in this report, are used to answer more specific, theoretically driven questions.

Given that there are relatively few empirical studies in the NHS and we have demonstrated that it is not sensible to transfer findings from other contexts or countries, this represents a significant advance on our knowledge about how staff management and attitudes play an important role in health care. ALSs suggested that the emerging findings were broadly supported by a sample of NHS managers, although further validation work would be needed to confirm the findings fully.

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Chapter 1 Introduction

The experiences of staff in organisations have long been linked to outcomes for those organisations, in many different ways. The way employees are managed, the interactions they have, the attitudes they display and their behaviours at work have been the subject of much research explaining why some organisations perform better than others, both in health care and in other sectors. This report focuses on the NHS in England, examining the links between staff experiences and outcomes (for staff and patients). By using the term 'staff experiences', we include not only staff job satisfaction and other job attitudes, but also direct experiences of interactions with colleagues, managers and patients, behaviours, and perceptions of their individual jobs.

One of the main ways in which prior work has addressed such issues is by considering the management of people within organisations and how this is linked to outcomes. This has involved work in a number of academic disciplines associated with an array of terms. The main terms of human resource management (HRM), high-performance work systems (HPWS), high-involvement work systems (HIWS) and high-commitment management (HCM) all have some degree of ambiguity. Paauwe¹ considers that 'HRM focuses on the study of the employment relationship and is involved in the management of people'. However, there appears to be no consensus on the nature of HRM, and it is a field of inquiry that appeals to a number of related (sub)disciplines involving academics with different backgrounds who all seem to have their own way of defining HRM and, more importantly, also their own way of operationalising the concept in terms of a range of human resources (HR) practices. Similarly, Peccei² states that there is no agreed definition of HRM in the literature and, in particular, there is no real consensus as to the exact HR practices that make up a coherent HRM system.

Some studies tend to treat the terms of HPWS, high-involvement work practices (HIWP) and HCM as interchangeable.²⁻⁵ For example, Leggat *et al.*⁶ state that HPWS are 'also referred to as high-performance workplaces, high-commitment workplaces, high-involvement work systems and high-performance practices'. Gould-Williams⁷ writes that practices are very loosely labelled 'high performance', 'high commitment', or 'high involvement' practices. Similarly, Gittell *et al.*⁸ report 'multiple labels' including HPWS, high-commitment work systems, HIWS and high-performance HRM.

On the other hand, Ramsay *et al.*⁹ point to the different emphases in accounts of HPWS, or different variants of HPWS, with some stressing high-involvement management, which stresses enhanced opportunities to take initiative through empowerment, while others stress HCM, which works through reduction in need for monitoring and control.⁹ Macky and Boxall¹⁰ argue that, while there are common themes among 'family' of models of labour management, there are a number of theoretical, empirical and practical dimensions on which HCM, HIWP and HPWS differ. Similarly, Boxall and Macky¹¹ unpack the concept of HPWS and examine its relationship with its main conceptual companions: HIWS and HCM. Their response to the question of 'what's in a term?' is that the companion notions of HIWS, stemming from Lawler,¹² and HCM, stemming from Walton,¹³ are both more descriptive and more useful in helping us to identify the main thrusts in a particular HR system. However, they are not equivalent: while a move to higher involvement typically implies higher skill and is more rationally managed with high-commitment employment practices, the reverse is not always true.¹¹ Boxall¹⁴ argues that there are two main types of HPWS terminology that are significant: the term high-involvement management, as used by, for example, Lawler,¹² describes the desire to restructure jobs to increase the responsibilities and influence of the workers; whereas HCM, used by, for example, Walton,¹³ involves practices that aim to enhance employee commitment to the organisation rather than practices that are narrowly focused on control or compliance. In short, Boxall¹⁴ regards HPWS as a 'fuzzy phenomenon in which three concepts are loosely tied together: performance, systemic effects and work practices of some kind'.

The context of health care presents a different but important environment in which to study these issues: to what extent do the experiences and attitudes of staff influence the care that patients receive? In particular, the recent Francis report¹⁵ into the care provided by the Mid Staffordshire NHS Foundation Trust has highlighted the importance of staff experiences and management to outcomes for the organisation. However, much of the research into the management of staff and outcomes is from non-health-care sectors, and conclusions from health-care sectors often suffer from poor design (see *Chapter 2, Methodological issues*). The nature of the NHS workforce – built around large but not wholly autonomous public sector organisations, with a highly multiprofessional (and largely female) workforce delivering care and perhaps motivated more by the desire to do good than by financial gain – suggests that it may be folly to assume results from other sectors would automatically apply in this setting. This report aims to rectify some of these issues not by conducting new primary research, but by making use of existing secondary data sources.

The search for causal links between HRM and organisational performance has dominated both academic and practitioner debates for many years.^{16–19} This has been seen as the ‘Holy Grail’ of HRM research^{18,20} and has involved a number of academic disciplines and a variety of terms: HRM–performance link, strategic human resource management (SHRM) literature, the organisational behaviour paradigm, HIWS, HPWS, high-performance work practices (HPWP), HCM, and high-commitment employment practices.^{10,11,21,22} Boxall²³ (pp. 47–48) notes that ‘In recent years much of the interest in the HRM–performance relationship has been wrapped up in the debate around high-performance work systems (HPWS)’. This term has won popular appeal and, in the anglophone world, it is used by government ministries, think tanks, HR professional associations and trade unions. In the UK there is a raft of reports on how to foster ‘high-performance working’.

However, despite much research on the HRM–performance link (see *Chapter 2*), significant debates continue over its nature and strength, with many commentators pointing to conceptual and methodological weaknesses. Moreover, much of the research has been conducted in the USA and in the private sector. There are few studies on public services in general, and health care in particular, with only a handful of studies having been conducted in the UK health sector.^{7,19,24,25}

The practitioner debate is linked to the ‘business case’ associated with staff satisfaction and well-being. Patterson *et al.*²⁶ point out that a litany of companies claim that their employees are our most valuable resource and this has become a cliché. They continue that it has been widely argued over the last 40 years that job satisfaction and employee attitudes are likely to be associated with better organisational performance, on the basis that satisfied workers are likely to work harder than dissatisfied workers. This can be seen in arguments over good jobs^{27,28} and employee health and well-being.^{29–33} There have been links to the business case in terms of engagement,^{34,35} and sickness absence and presenteeism.^{28,32}

The NHS has accepted large elements of the legal, economic/business and ethical cases for staff well-being (see *Chapter 4*).^{36–39} For example, *The NHS Plan*⁴⁰ makes a commitment to invest in NHS staff. The 2000 *Improving Working Lives Standard* wished to make the NHS a ‘model employer’.⁴¹ There has been much discussion on staff involvement and engagement^{41–47} and on staff health and well-being.^{48–53} The importance of engagement and well-being is reported in a series of documents by NHS Employers,^{54–58} the Nuffield Trust³⁶ and The King’s Fund.⁵⁹

The importance of staff engagement is recognised by its inclusion in the staff pledges in the NHS Constitution,^{60,61} in which staff from NHS organisations must have a role in the decisions that affect them as well as in the facilities provided.⁶² Staff well-being can assist in delivering the four elements of the quality, innovation, productivity and prevention (QIPP) programme.^{39,48,49,57} The government response to the Francis report⁶³ recognises the importance of staff engagement and motivation, and the links between staff engagement and patient experience, with a question asking whether or not staff would recommend their place of work to a family member or friend as a high-quality place to receive treatment and care (equivalent to the ‘Friends and Family Test’) in the NHS National Staff Survey.

The main aim of this project was to test the later part of the overall model that hypothesises a positive link between HRM and organisational performance in the English NHS. While definitions vary to some extent in the literature^{19,64} (see *Chapter 2*), the 'HR Model' applied to health care is that HRM practice (e.g. training and development, appraisal/performance management) is associated with two stages of intermediate outcomes (the first more attitudinal, e.g. staff satisfaction, turnover intentions; the second more behavioural, e.g. staff absenteeism and turnover) and final outcomes (e.g. patient satisfaction, mortality),^{19,22,26} or as two 'chains': one between HR practices and intermediate outcomes, and one between intermediate outcomes and final outcomes. This project focuses on the later links in the chain, between staff experiences, intermediate and final outcomes. We define staff experiences as a broad umbrella term that covers attitudes, interactions, perceptions and management of staff, and immediate outcomes for staff including well-being, absenteeism and turnover.

The objectives are:

- to examine the links between staff experiences with individual and organisational outcomes in NHS trusts
- to use this knowledge to develop actionable recommendations for national stakeholders and local managers.

The main research questions are:

(Q1) What are the links between individual staff experiences (e.g. satisfaction, engagement, turnover intentions) and intermediate staff outcomes (e.g. staff absenteeism, actual turnover)?

(Q2) How do these link with organisational performance (e.g. patient satisfaction, mortality)?

(Q3) Do these measures and relationships differ by occupational, demographic groups, trust types and geographical areas and, if so, what is the relative change for each group?

We use secondary data from readily available sources to help us answer most of these questions. In addition, Action Learning Sets (ALSs) were used to help develop actionable recommendations for national stakeholders and local managers.

The report is structured as follows: *Chapter 2* reviews the literature around HRM and its links with performance, particularly focusing on the HPWS literature; *Chapter 3* provides a systematic review of the HPWS literature in health care in particular – this is not designed to be a full literature review of the topics being covered by this report, but instead is a useful piece of context about what is known about the links between HPWS and outcomes in health care; and *Chapter 4* reviews relevant UK policy documents from government and health care over recent years. These three chapters set the context within which the research questions can be answered and findings interpreted. *Chapter 5* describes the methods used in the quantitative analysis and the data sources used; *Chapters 6–8* give the findings from the quantitative analysis regarding research questions 1–3, respectively; *Chapter 9* describes the ALSs and highlights the main areas addressed by the participants; and *Chapter 10* integrates the findings from the quantitative analysis and the ALSs, and discusses what can be learned about the research questions in general.

Chapter 2 The human resource management performance link

Introduction

It was noted in *Chapter 1* that the search for causal links between HRM and organisational performance has involved a number of academic disciplines and a variety of terms;^{10,11,19,21} however, Macky and Boxall¹⁰ state that it broadly involves the following elements: a coherent and integrated 'bundle' of HR practices, a synergistic relationship between the practices, and an assumption of an underlying causal link flowing from HR practices via the responses of employees to organisational performance. Similarly, Patterson *et al.*¹⁹ write that there is substantial variability between studies included in the model of high-involvement management or used to assess the link to performance. Some of these are terminological and reflect disciplinary biases or a desire to make their merchandise stand out, but others represent different foci and approaches.

Guest¹⁷ provides a chronological overview of the HRM performance field. The first phase ('the beginnings') began in the 1980s with work linking business strategy to HRM. The second phase ('empiricism') began in the 1990s when the empirical analyses of HRM and performance started to appear, with the seminal paper by Huselid⁶⁵ and contributions by Arthur,⁶⁶ Ichniowski *et al.*,⁶⁷ MacDuffie⁶⁸ and Delery and Doty⁶⁹ suggesting a positive relationship between HR practices and performance. The third phase ('backlash and reflection') focused on some key conceptual issues. For example, Dyer and Reeves⁷⁰ and Becker and Gerhart⁷¹ showed that studies used many different dependent (performance) and independent variables (HR practices), raising questions over generalisability, differentiating between universalist (best practice), contingency and configurational perspectives.⁶⁹ A different type of backlash focused on the impact on employees.⁷²

Both sets of responses brought further streams of conceptual and empirical work, which were termed phases 4 and 5 by Guest.¹⁷ The fourth phase ('conceptual refinement') stressed theoretical underpinning, with Guest¹⁶ arguing that we needed a better theory about HR practices, about outcomes and about the link between them. A number of authors discussed the ability, motivation, opportunity (AMO) model, while European authors, such as Paauwe,⁷³ highlighted the importance of an institutional perspective. The fifth and overlapping phase ('bringing the worker centre-stage') pointed to the neglected impact on employees, suggesting the need to open the 'black box' that explored the process linking HRM and performance. The most recent phase ('growing sophistication') stressed the need for multilevel and longitudinal studies, including 'big science'.⁷⁴

The field has some highly cited sources, e.g. Huselid⁶⁵ (5559 Google Scholar citations; 1544 Web of Science citations; on 20 June 2013). It has also seen numerous special issues of international academic journals,⁷⁵ narrative reviews,⁶⁵ systematic reviews¹⁹ and meta-analyses.⁷⁶ In addition, there are reviews of the literature modelling the mediators and moderators of the HRM practice–performance relationship.⁷⁷ For example, Patterson *et al.*¹⁹ identified six recent major reviews, while Purcell and Kinnie¹⁸ claim there have been 'at least' (p. 533) 11 review papers since 2000.

Reviews tend to find a broadly positive association, but include optimistic and pessimistic verdicts. For example, Combs *et al.*⁷⁶ claim that the results of their meta-analysis (that decrease the effects of sampling and measurement error) eliminate any doubt about the presence of a relationship as well as providing researchers with a baseline approximation of the extent of this relationship. They state that

organisations can expand their performance by 0.20 of a standardised unit for each unit that HPWP use increases. On the other hand, Wall and Wood⁷⁴ write that 'it is premature to assume that HRM initiatives will inevitably result in performance gains . . . the existing evidence for a relationship between HRM and performance should be treated with caution.'

Commentators point to theoretical and methodological challenges.^{18,74,78} Paauwe and Boselie⁷⁹ state that empirical research provides evidence that 'HRM does matter', but the relationships are frequently weak in a statistical sense and the results are often unclear. Paauwe¹ writes that although there is considerable evidence (at least regarding the number of studies), several authors still question HRM and particularly the HRM–performance relationship. Purcell and Kinnie¹⁸ state that numerous review papers have found this field of research often wanting in terms of method, theory and the specification of HR practices to be used when establishing a relationship with performance outcomes. According to Combs *et al.*,⁷⁶ the diversity of 'sample characteristics, research designs, practices examined and organizational performance measures used' has exasperated efforts to approximate the extent of the link between organisational performance and HPWP. Harris *et al.*²⁵ reported that the reviews all mention difficulties in identifying the theoretical perspective taken in each study, measuring HRM and performance consistently and drawing causal conclusions about the HRM–performance link owing to the predominantly cross-sectional nature of the research designs.

Performance/dependent variable

Organisational and employee perspectives

Many studies draw on Dyer and Reeves⁷⁰ who differentiated between:

- financial outcomes (e.g. profits, sales, market share)
- organisational outcomes (e.g. output measures such as productivity, quality, efficiency)
- HR-related outcomes (e.g. attitudinal and behavioural impacts among employees, such as satisfaction, commitment, intention to quit).

Boselie *et al.*²⁰ found financial measures featured in half of the articles, with the most common measure of profits being followed by various measures for sales. For organisational and HR-related outcomes, the most popular variables were productivity and product or service quality measures. Measures of employees' experience were rather rare (26 in total), with the 'hard' measures, such as employee turnover or quit rates and absenteeism being most popular, while subjective attitudinal indicators included job satisfaction, commitment and trust in management. However, this focus on positive employee outcomes neglected possible negative effects of HRM on employees,⁹ see *Employer and employee outcomes*. Outcomes from the perspective of stakeholders other than shareholders and managers proved rather less prevalent, featuring in just two articles.

Harris *et al.*²⁵ point out that the type of performance outcomes explored also varies widely in the reviews. For example, Wall and Wood⁷⁴ focused on economic outcomes, Hyde *et al.*²⁴ pointed to a range of outcomes, but stressed patient outcomes, while Combs *et al.*⁷⁶ emphasised operational and financial performance.

Guest¹⁶ points to the problem of 'causal distance' between a HRM input and such outputs based on financial performance. He suggests that use of more 'proximal' (operational) rather than 'distal' (financial) outcome indicators is 'both theoretically more plausible and methodologically easier to link'. Guest¹⁷ points out that we would expect a stronger association between HRM and proximal rather than distal outcomes. However, the meta-analysis by Combs *et al.*⁷⁶ indicated a stronger link to financial outcomes than to productivity. This may reflect a problem of measurement, bearing in mind that the measurement of productivity in the service sector can be particularly problematic. However, Van de Voorde *et al.*⁸⁰ conclude that HRM and well-being have more impact on proximal outcomes than on distal outcomes.

Finally, Boselie *et al.*²⁰ found that many studies relied on the perceptual estimates of performance by managers. They argue that, although Wall *et al.*⁸¹ found subjective self-reports roughly as reliable as 'objective' measures, there are concerns over the possibility of potential social desirability bias (presenting one's employer in a positive light) and assessments of comparisons with organisational rivals. They claim that while objective performance data are more difficult to secure, they are to be preferred over respondent subjective judgement calls.

Employer and employee outcomes

As we saw above, commentators point out that most studies focus on organisational outcomes, while fewer studies focus on employee outcomes; however, the relationship between them is far from clear. There are two competing views:^{2,11,80,82} the first is that employers and employees both benefit from HRM^{16,83} (the 'mutual gains', 'optimistic' or 'win-win' perspective); the second, in contrast, is that HRM pays off in terms of organisational performance but has no, or even a negative, impact on employee well-being^{9,72} (the 'conflicting outcomes', 'pessimistic' or 'sceptical', 'win-lose' or 'lose-lose', or 'counteracting effects' perspective).

Wood and de Menezes⁸⁴ point out that research on the potential effects on well-being of employees, as opposed to individual and organisational performance, has been uncommon until recently. Ramsay *et al.*⁹ claim that many studies assume that the associations between HPWS and organisational performance measures reflect a link that 'flows from practices through people to performance', but 'the linkages from HPWS to employee outcomes and thence to organizational performance remain almost entirely untested'. However, this positive finding is hardly surprising as this was the way that the performance effect of HPWS practices would have been measured. Beneficial changes for employees and employers are often unclear.⁹ Ramsay *et al.*⁹ conclude that the common belief that positive performance outcomes from HPWS originate from positive employee outcomes is dubious. Tregaskis *et al.*⁸⁵ state that the performance effects of HPWP are contentious. While many studies find positive effects, this productivity gain may come through intensification of work, which may in turn have a detrimental impact on workers.⁹ Tregaskis *et al.*⁸⁵ point to the importance of context in their study and warn against the assumption of HPWP having a universally beneficial effect. Similarly, Boxall and Macky¹¹ conclude that while many studies find that worker groups get positive outcomes from high-involvement processes, it would be 'wise to suggest that the jury is still out in respect of the outcomes for workers'. In a systematic review of 36 empirical studies, Van de Voorde *et al.*⁸⁰ found that employee well-being, in terms of happiness and relationship, is compatible with the organisational performance/mutual gains perspective, but this is not the case for health-related well-being.

Human resource management/independent variable

Single practices versus bundles

Boxall and Macky¹¹ report that, while the dependent variable in HPWS is complicated, there is even greater difficulty with the independent variable. Boselie *et al.*²⁰ state that an organisation's HRM can be viewed as a collection of 'multiple, discrete practices with no explicit or discernible link between them', or as an 'integrated and coherent "bundle" of mutually reinforcing practices'. Studies based on the 'practices' approach tend to examine how many practices are used by the sample, while the 'systems' approach focuses on 'clusters' of inter-related HR activities. Boselie *et al.*²⁰ found that 58 out of the 104 articles applied a 'practices' approach. However, there is a confusing array of definitions and assertions of what constitute a HPWS.²⁴ For example, Becker and Gerhart⁷¹ show the diversity in a table of five leading HPWS studies, which were all carried out in the USA. These studies list a maximum of 11 practices and a minimum of four, with no one practice featuring in all five studies. Moreover, there is significant disagreement on whether or not some practices, such as variable pay, are positively or negatively related to

performance. Similarly, Harris *et al.*²⁵ write that reviews in their study contain a range of HRM practices, policies and systems. Boselie *et al.*²⁰ included 26 types of HRM practice and policy, Hyde *et al.*²⁴ included 10 types of HRM practice and Combs *et al.*⁷⁶ included 13 types of HRM practice. This highlights the confusing picture in the HRM performance literature regarding which practices, policies and/or systems are linked to performance.

Boselie *et al.*²⁰ found that the remaining 46 articles corresponded to the systems approach. For MacDuffie,⁶⁸ 'bundling' of work practices is critical in HPWS: 'it is the combination of practices into a bundle, rather than individual practices, which shapes the pattern of interactions between and among managers and employees' (see also Ichniowski *et al.*⁶⁷ and Applebaum *et al.*,⁸³ who agree with this point). Macky and Boxall¹⁰ report that the notion of 'complementarities among the relevant HR practices, with a synergistic or mutually reinforcing influence on organisational performance' is a central assumption underpinning most ideas of HPWS. However, few studies have directly tested these interaction effects and those that have are either industry specific⁶⁸ or suffer from methodological weaknesses (see *Methodological issues*). According to Boxall and Macky,¹¹ a number of HPWS have identified the systemic notion. They conclude that a key part of any reading of HPWS proposition involves 'systemic or synergistic effects in the cluster of chosen HR practices'. Combs *et al.*⁷⁶ found that 38 studies contained measures depicting the extent to which organisations deployed a system of HPWP. The number of practices included in the HPWP systems ranged between 2 and 13, with the average and median HPWP system containing 6.2 and 5 practices, respectively. According to Combs *et al.*,⁷⁶ the superior value of HPWP systems 'is a central pillar of SHRM theory . . . but research on HPWP systems is largely replacing research on individual practices'. However, the limited direct evidence on this estimates a correlation of 0.28 for HPWP systems compared with 0.14 for individual HPWP. Van der Voorde *et al.*⁸⁰ report that how HRM is measured seems to matter. This evidence supports the findings of Combs *et al.*⁷⁶ that HRM effects appear greater in studies on the effects of a HRM system than in studies on the effects of individual HR practices.

Boselie *et al.*²⁰ state that it is unclear whether or not HR practices should be bundled together to form a HRM 'system', which results in different 'systems' in different studies. They conclude that without a consensus on 'systems', it looks as though 'HRM can consist of whatever researchers wish, or perhaps what their samples and data sets dictate.' This elasticity reinforces the importance of a clear theoretical operationalisation of HRM.

Fit/universalistic, configurational or contingency perspectives

There is a continuing debate of how HRM is linked to organisational performance. Some authors tend to differentiate between 'best practice'²⁴ and 'best fit',²⁴ while others suggest 'universalistic, configurational, or contingency approaches'.^{69,71}

Paauwe and Boselie⁷⁹ differentiate between universalistic best practices and best-fit practices. Most commentators tend to argue that best practice/universal/internal fit models are the most widely tested and the most strongly supported type of fit.^{9,17,24,79} However, Legge⁷² notes that the greatest support appears to be for the universalistic model: 'that the greater the extent to which the characteristics of the HCM/HPWS model are adopted, the greater the association with organisational performance but, on examination, the empirical support for such universalism is more equivocal than it might appear at first sight'⁷² (pp. 25–26).

Delery and Doty⁶⁹ point to three different modes of theorising: universalistic, contingency and configurational perspectives. First, universalistic arguments assume that associations between independent and dependent variables are universal. Second, the contingency or 'best practice' approach argues that as some HR practices are always better than others, it follows that all organisations should adopt these best practices.

Contingency arguments are more complex than universalistic arguments because they imply interactions rather than the simple linear relationships incorporated in universalistic theories. In other words, contingency theories posit that the relationship between the relevant independent variable and the dependent variable will be different for different levels of the critical contingency variable, with the organisation's strategy considered to be the primary contingency factor in the SHRM literature. A contingency approach states that, in order to be effective, an organisation's HR policies must be consistent with other aspects of the organisation.

Configurational arguments are more complex than those of either of the previous two theoretical perspectives for several reasons. First, they draw on the holistic principle of inquiry to identify configurations, or unique patterns of factors, that are posited to be maximally effective. These configurations represent non-linear synergistic effects and higher-order interactions that cannot be represented with traditional bivariate contingency theories. Second, they incorporate the assumption of equifinality by positing that multiple unique configurations of the relevant factors can result in maximal performance. Third, these configurations are assumed to be ideal types that are theoretical constructs rather than empirically observable phenomena. In general, configurational theories are concerned with how the pattern of multiple independent variables is related to a dependent variable rather than with how individual independent variables are related to the dependent variable. Delery and Doty⁶⁹ regard MacDuffie's⁶⁸ configurations, or 'bundles' of HR practices, and the 'combinations' of HRM practices of Ichniowski *et al.*⁶⁷ as configurational perspectives. Effective organisations must develop a HR system that achieves both horizontal and vertical fit. The former concerns the internal consistency of the organisation's HR policies or practices, and the latter involves congruence of the HR system with other organisational characteristics, such as firm strategy. Delery and Doty,⁶⁹ in an empirical study of the banking industry, find relatively strong support for a universalistic perspective and some support for both the contingency and configurational perspectives.

The main issue here is whether 'one size fits all' in all situations or whether best practices vary in different contexts of countries and industries.^{24,73} Boxall and Macky¹¹ argue that constructing the independent variable in HPWS without regard to context is problematic, as there is significant variation in work systems and employment practices across occupational, hierarchical, workplace, industry and societal contexts. They conclude that there appears not to be a general consensus in the literature on the constitution of systems of best practices or on the link with performance.

According to Hyde *et al.*,²⁴ the HRM performance literature is predominantly based on research carried out in the USA and the UK. A total of 35 studies were US based and 24 UK based (61% of the total number of studies). Den Hartog *et al.*⁸⁶ stated that many studies were carried out in the USA or UK contexts and an interesting question is whether or not similar results are found in other countries. Boxall and Macky¹¹ argue that the further one moves from a focus on the American context, the more sociocultural variations in HPWS practices have to be accommodated. For example, a practice such as an employee grievance procedure, which Huselid⁶⁵ considers a high-performance indicator in the USA, is simply a legal requirement in countries such as the UK and, therefore, is hardly something that differentiates superior performers. Paauwe⁷³ highlights the importance of an institutional perspective, pointing out that in Europe the legislative framework as well as the institutions relating to education and training, and to employee representation ensured that a minimum set of HR practices were in place in most organisations.

Furthermore, Hyde *et al.*²⁴ discuss the contextual issue of industry. About half of the empirical papers they reviewed were multi-industry studies that provide neither industry-specific measures of performance nor the opportunity for exploring the context-specific contingencies such as strategy. Ramsay *et al.*⁹ discuss the differences between the 'contingency approach, in which the specific bundles would vary by sector and business strategy, and the universalist, one-style-fits-all view'.⁹ Combs *et al.*⁷⁶ focus on industry context, arguing that there are good reasons why the effect of HPWP are greater among manufacturing compared

with service industries. The meta-analysis by Combs *et al.*⁷⁶ claims that the effect size among manufacturers is nearly double that among services (0.30 compared with 0.17). In short, context matters. Guest¹⁷ speculates that its impact might be further diminished in highly complex services such as large hospitals.

Gould-Williams⁷ points out that most studies of HPWS have been in private sector, manufacturing organisations, and that evaluating the effects of HRM practices on performance in public sector organisations has received little attention. However, his empirical study of UK local government concluded that the positive effects of 'high commitment' HRM practices are similar across public and private sector organisations. A number of commentators point out that there are relatively few studies of health care^{19,24,25} (see *Chapter 3*).

Linkage

Many researchers note the 'black box problem'.^{1,9,18,72} According to Peccei *et al.*,⁸⁷ understanding of factors and processes that may help to mediate the HRM–performance relationship is still limited. For example, drawing on the job satisfaction–job performance relationship, Judge *et al.*⁷⁷ suggested seven possible models: job satisfaction causes job performance (Model 1), job performance causes job satisfaction (Model 2), reciprocal relationship (Model 3), spurious relationship (Model 4), moderated relationship (Model 5), no relationship (Model 6), and alternative conceptualisations (Model 7). Purcell and Kinnie¹⁸ note that exploring the causal chain requires data on employees and their behaviour, but only 3 out of 25 studies (Wall and Wood⁷⁴) and 11 out of 104 (Boselie *et al.*²⁰) used employee survey data. Hyde *et al.*²⁴ found that only 3 out of 97 papers explored the 'black box'. Boselie *et al.*²⁰ state that the linking mechanisms between HRM and performance and the mediating effects of key variables are largely disregarded. While many studies acknowledge the 'black box', and some studies speculate on its possible contents, few studies attempted to look inside. There are very few detailed expositions or diagrams of the conceptual model used to link HRM with performance. This leaves clues to its contents being inferred from the fragments of research design, methodology, or reported statistical analysis. Boselie *et al.*²⁰ conclude that the 'Holy Grail' of decisive proof remains elusive, leaving researchers in the field still requiring 'a theory about HRM, a theory about performance, and a theory about how they are linked'.¹⁶

Theory

Guest^{16,17} argues that the field requires conceptual refinement or a better theory about the link between HR practices and outcomes. The review of Boselie *et al.*²⁰ tried to identify which theory seemed to inform the research for each article they reviewed. However, this proved unclear in many of the articles, as very few studies used theory to derive an explicit set of propositions before testing them in the research design. Similarly, Hyde *et al.*²⁴ report that the papers did not generally make explicit the theoretical perspective used and, in some studies, a range of perspectives were used.

The review by Boselie *et al.*²⁰ shows that the three most commonly used theories, defined by counting all significant mentions of theories in the text, are contingency theory, resource-based view (RBV) and the AMO framework. Contingency theory and RBV are both situated at the organisational level, whereas the AMO framework focuses on the individual level, taking into account the importance of variables such as employees' skills and competences (A = abilities), their motivation (M = motivation) and their opportunity to participate (O = opportunity). These three theories reflect different traditions in HRM research. Contingency theory and RBV are mainly interested in performance effects from a business perspective, whereas the AMO framework has its foundations in industrial/organisational psychology. Boselie *et al.*²⁰ find that more than half of the papers using strategic contingency theory and RBV were published before 2000, but the AMO framework is the only one used in more than half of all articles published after 2000. Paauwe and Boselie⁷⁹ argue that it is possible to see convergence appearing surrounding AMO theory. Boxall²³ reports that 'the AMO model has been at the heart of HPWS thinking from the outset'²³ (pp. 55–57).^{65,68,83} Every HR system works through its impacts on the skills and knowledge of individual employees, their willingness to exert effort and their opportunities to express their talents in their work.

According to Macky and Boxall,¹⁰ the basic theory of performance being assumed in HPWS research, either implicitly or explicitly,^{68,83} is 'AMO theory'.

Boselie *et al.*²⁰ found that authors are increasingly blending insights from the 'Big Three' theories – contingency, RBV and AMO – into a formative overall theory of HRM. They claim that these theories seem to offer complementary frameworks. AMO pays attention to employees' skills, motivations and opportunities to participate. RBV points to the value of employees' input into performance, while contingency approaches offer a lens on the possible link between these two, particularly stressing the impact of external contextual factors.

Methodological issues

Many reviews also focus on methodological issues associated with the HRM–performance link. According to Tregaskis *et al.*,⁸⁵ the Achilles heel in the literatures lies in the robustness of the methods adopted.^{74,88}

Reviewing 68 studies, Wright and Boswell⁸⁸ found that the vast majority (50 out of the 70 designs) of studies used a 'post-predictive' design, which measures HR practices after the performance period. This is not surprising given the relative ease of data collection, but it does make one wonder how such studies can legitimately suggest that HR practices 'cause' performance. Hyde *et al.*²⁴ note that the authors of up to 80% of the papers reviewed used methods that enabled them to show that HRM is associated with performance, but could not provide evidence that HRM causes changes in performance. Paauwe and Boselie⁷⁹ point out that the possible time lag between a change in strategy, any subsequent HR intervention and performance, lacks of persuasive theory or robust empirical evidence. The few longitudinal studies suggest that most HR interventions impact on performance in the long-term effect (about 2 or 3 years). Although some HRM practices, such as individual performance-related pay, may have direct, short-term effects on performance measures such as productivity, it is probable that most other practices, such as training and development, participation, teamwork and decentralisation, may have little effect in the short or longer term. Paauwe and Richardson⁷⁵ stress that the cross-sectional nature of the majority of research on HRM and performance makes it impossible to rule out reverse causality. In short, most commentators^{16,72,75,79} stress the need for longitudinal research designs.

Paauwe and Boselie⁷⁹ argue the need to make a clear distinction between intended, actual and perceived HR. However, most studies focus on intended HR practices, which results in limited knowledge of their enactment or perception.

Other problems include large-scale postal surveys of single respondents, sometimes with low response rates; respondent knowledge; same person used to estimate HR practices and performance; subjective rather than objective performance measures; and distal rather than proximal measures.^{24,72}

Models of the human resource management performance link

There are a number of different models with varying terminologies that explore the HRM performance link. Paauwe and Richardson⁷⁵ suggest a representation of the HRM–performance relationship in terms of links between HRM activities, HRM outcomes and firm performance, see also Boselie *et al.*²⁰ Patterson *et al.*¹⁹ discuss the 'HR model' that essentially states that there are links between HRM practices, intermediate outcomes and final outcomes.^{19,22,25,26} Wright and Nishii⁶⁴ set out a 'process model of Strategic HRM': intended HR practices, actual HR practices, perceived HR practices, employee reaction and organisation performance. This gives linkages of intended to actual HRM practices (implementation), actual to perceived HR practices (communication), perceived HR to employee reactions (moderation) and employee reaction to performance (co-ordination).

We broadly follow the terminology of Patterson *et al.*,¹⁹ focusing on two 'chains', one between HR practices and intermediate outcomes, and the other between intermediate outcomes and final outcomes. We now explore in a little more detail some of the terms that are discussed within the academic and policy debate (see *Chapter 4*).

Job satisfaction

Patterson *et al.*¹⁹ consider that '[j]ob satisfaction is the most widely researched concept in organisational psychology and organisational behaviour'. Locke⁸⁹ estimated that over 3300 studies on job satisfaction had been conducted up to 1973. Judge *et al.*⁷⁷ then identified a further 7856 studies on job satisfaction since 1973 using the PsycINFO database. Job satisfaction was the most widely measured intermediate outcome in the review of Patterson *et al.*,¹⁹ which examined over 50 studies reporting data using 17 different measures.

Judge *et al.*⁷⁷ report that the relationship between job satisfaction and job performance has been described as the 'Holy Grail' of industrial psychologists. They state that previous meta-analyses reported results between 0.17 and 0.31. The results of their meta-analysis estimated the true mean correlation between overall job satisfaction and job performance to be 0.30; however, they observed that the more traditionally based models 1, 2, 3 and 4 have typically provided results that are disappointing to proponents of a job satisfaction–job performance relation. Moreover, the correlations from mostly cross-sectional investigations cannot differentiate between causation, reverse causation or both job satisfaction and performance being linked to additional variables.

Job involvement

The concept of job involvement has been the subject of a large volume of research for over 40 years. Although it is subject to some definitional confusion, Brown⁹⁰ notes that most research has followed the definition of job involvement by Lawler *et al.*:⁹¹ 'psychological identification with one's work' and 'the degree to which the job situation is central to the person and his [or her] identity'. In a meta-analysis of job involvement, Brown⁹⁰ claims that the cited scales tended to measure the same concept, with no substantive differences in relationships with other associated variables (e.g. job satisfaction).

Work engagement

The term work engagement is seen as being relatively new, with varying definitions from company, consultancy/survey house and academic sources.^{19,37,92–94} MacLeod and Clarke³⁴ came across more than 50 definitions in their review and Macey and Schneider⁹³ discuss psychological, behavioural and attitudinal/trait definitions. Similarly, West and Dawson⁹⁵ point out that engagement has been used in many different senses. Although the psychological orientation approach (e.g. involvement, commitment, attachment, mood) is the most dominant academic usage to date, other uses refer to a performance construct (e.g. either effort or observable behaviour), a disposition (e.g. positive affect) or some combination of these. Consistent with this approach, Schaufeli *et al.*⁹⁶ described engagement as 'a positive, fulfilling, work-related state of mind characterized by vigour, dedication, and absorption'.

The term has been used in the NHS in a number of documents in different ways³⁷ (see *Chapter 4*). According to West and Dawson,⁹⁵ the term tends to represent staff involvement in decision-making or, more broadly, relates to issues such as the openness of communication channels between management and staff in organisations. However, this type of involvement, while related to engagement, does not necessarily guarantee psychological engagement, in the sense of Schaufeli *et al.*⁹⁶

Rayton *et al.*⁹⁷ state that across all sectors of the economy there are clear associations between employee engagement and high organisational productivity and performance, whether seen in terms of effects on business performance (e.g. productivity, profits, customer measures and innovation) or in terms of people indicators (e.g. absence/turnover, well-being, and health and safety). However, some authors have argued that the engagement–performance link is not particularly robust and that causality is not clear.⁹⁸ The links between engagement and employee outcomes, such as health,⁹⁹ are less clear than those with organisational performance. Few studies discuss the costs of engagement, with the result being the case for engagement is not clear in cost/benefit terms.^{37,94,100}

MacLeod and Clarke³⁴ and Rayton *et al.*⁹⁷ argue that engagement precedes performance, but Riketta¹⁰¹ used 16 studies that measured performance and job attitudes on more than one occasion and carried out meta-analytic regression analyses to find that the effect of job attitudes on consequent performance was weakly statistically significant (when the baseline performance was controlled).

There are fewer studies for public services in general and the health services in particular. A review of engagement in the public sector¹⁰⁰ found that surprisingly few discuss the differences in employee engagement between the public and private sectors. However, it goes on to state that there appears to be little sectorial difference in the employee engagement process, but the public sector is inferior to the private sector in areas such as clarity of direction, effective communication and management. Public sector employees tend to be more satisfied with characteristics of their job, but private sector employees tend to be more satisfied with key drivers of employee engagement. In general, the differences between sectors are less important than differences within sectors.

MacLeod and Clarke³⁴ discussed two studies in the public sector using external regulators to measure and conclude that staff advocacy associated with stronger organisational performance.^{102,103} MacLeod and Clarke¹⁰⁴ point to the critical role that engagement plays in delivering improvements in public services, stressing the need for public sector organisations in taking the opportunity to involve staff in service reform. Research using data collected from 9930 employees across 12 UK public and private sector organisations including police forces, utilities, manufacturing, higher education, a local council and the financial services found a correlation between engagement and psychological well-being of 0.35, with these two variables explaining a large percentage of the variance in performance.^{97,105}

West and Dawson⁹⁵ point out that relatively little research on engagement has been conducted within health services specifically. Moreover, there is relatively little health-care-specific evidence regarding the antecedents of engagement, see also Mauno *et al.*⁹⁹ According to West *et al.*,¹⁰⁶ an increase of one standard deviation in engagement is associated with reductions in absence sufficient to generate savings in salary costs alone equivalent to approximately £150,000 for an average acute trust.

A longitudinal study of 46 mental health teams working in the NHS indicated that a culture of engagement predicted performance and was more important than other variables including competence.^{34,107}

Employee well-being

As seen above in *Employer and employee outcomes*, there are competing views on the position of employee well-being in the HRM organisational performance link: 'mutual gains'/optimistic/win-win compared with 'conflicting outcomes'/pessimistic/win-lose perspective.^{2,80} According to Danna and Griffin,¹⁰⁸ 'health and well-being in the workplace have become common topics in the mainstream media, in practitioner-oriented magazines and journals and, increasingly, in scholarly research journals'. However, the literature suggests a more complex picture, with different conclusions for different elements of well-being.

Employee well-being at work can broadly be described as the overall quality of an employee's experience and functioning at work.¹⁰⁹ This is often divided into elements of psychological well-being (happiness), physical well-being (health) and social well-being (relationships).¹¹⁰ Danna and Griffin¹⁰⁸ report that there exists 'a vast but surprisingly disjointed and unfocused body of literature across diverse fields that relates directly or indirectly to health and well-being in the workplace', which tackles health and well-being from several perspectives (i.e. emotional, physical, mental and psychological). In a systematic review, Van de Voorde *et al.*⁸⁰ find more evidence for the optimistic than for the pessimistic; the effects of HRM on happiness and relationship well-being support the mutual gains perspective, but health well-being may function as a conflicting outcome. In a study in the UK, Wood *et al.*⁸² find that job satisfaction mediates the relationship between enriched job design and four performance indicators, which supports the mutual gains model. However, they report that job satisfaction is negatively related to high-involvement management and the economic performance measures, and supports the counteracting effects model.

Finally, high-involvement management is negatively related to job-related 'anxiety-comfort' and enriched job design is unrelated to it.⁸² Grant *et al.*¹¹⁰ claim that '[a]lthough managerial practices are often structured with the explicit goal of improving performance by increasing employee well-being, these practices frequently create trade-offs between different dimensions of employee well-being, whereby one aspect of employee well-being improves but another aspect of employee well-being decreases'.

The happy-productive worker hypothesis

The happy-productive worker hypothesis has intrigued organisational scholars at least since the seminal Hawthorne experiments.^{111,112} According to this 'Holy Grail' of management research, all things being equal, workers who are 'happy' with their work – however defined – should have higher job performance. Wright and Cropanzano¹¹¹ state that the happy-productive worker hypothesis has most often been examined by correlating job satisfaction to performance, but recent research has expanded this to include measures of psychological well-being.

Early work seemed to support a positive link, but subsequent work has been more sceptical of the happy-productive worker hypothesis. Wright and Cropanzano¹¹¹ report the results of two field studies that examined job satisfaction and psychological well-being as predictors of performance. They found some support for the happy-productive worker hypothesis, at least when happiness is seen in terms of psychological well-being.

Wright *et al.*¹¹² considered that there are at least two happy-productive worker hypotheses – with job satisfaction and psychological well-being each serving as operationalisations of employee happiness. They propose that the relationship between job satisfaction and job performance is moderated by employee well-being, testing the hypothesis that the job satisfaction-job performance relationship is moderated by other variables (Model 5,⁷⁷ see *Linkage*). They conclude, in line with the Model 5 premise by Judge *et al.*,⁷⁷ that job satisfaction predicts job performance, assuming the employee also has a high level of psychological well-being. They report no clear association between job satisfaction and job performance for employees who are low in psychological well-being. They point out that if job satisfaction is viewed as a positive circumstance by workers, then a stronger relationship to performance when psychological well-being is high and a weaker relationship to performance when psychological well-being is low would be expected.¹¹²

Intermediate outcomes

According to Patterson *et al.*¹⁹ there is some overlap between work engagement and other established concepts of intermediate outcomes included in their review. They report moderate-to-high correlations among intermediate outcomes from meta-analyses. They find that meta-analyses tend to broadly classify variables in three ways: as 'antecedents variables', 'correlates variables' and 'consequences variables'. They find that meta-analyses that report correlations between intermediate outcomes and individual employee behaviours tend to find broadly small to moderate relationships.

There is some overlap between engagement and other terms.⁹³ While some definitions and measures equate engagement with satisfaction,¹¹³ or commitment,¹¹⁴ others suggest engagement is broader. According to Scottish Executive,¹⁰⁰ the literature on employee engagement builds on earlier research and discussion on issues of commitment and organisational citizenship behaviour, but means more than what these terms encapsulate. The defining distinction is that employee engagement is a two-way interaction between the employee and the employer, whereas the earlier focus tended to view the issues from only the employee's point of view. Patterson *et al.*¹⁹ report that while engagement does have clear overlaps with analytical antecedents such as commitment, 'organisational citizenship behaviour', job involvement and job satisfaction, there are also crucial differences. In particular, engagement is two way – organisations must work to engage the employee, who in turn has a choice about the level of engagement to offer the employer. Engagement builds on but adds to previous concepts such as 'commitment' and 'motivation'.¹¹⁵ West and Dawson⁹⁵ point out that the concept of engagement is distinct, while sharing some aspects of job satisfaction and organisational commitment. Moreover, overall engagement tends to be a better

predictor of employee performance than satisfaction and commitment. Finally, satisfaction appears to be a weaker predictor, lacking the two-way reciprocal relationship that characterises engagement.⁹⁴ Engagement is said to be greater than the sum of the parts (satisfaction and commitment).^{93,94,100}

Contextual perspectives on the NHS setting

As we saw above (see *Fit/universalistic, configurational or contingency perspectives*), there is a debate on the importance of context, with some authors differentiating between 'best practice' and 'best fit' approaches, while others suggest universalistic, configurational, or contingency approaches. At one level it is clear that context is important if only because many outcome measures used in studies of manufacturing such as profit are not appropriate for institutions such as the NHS. However, it is not fully clear which contextual features are most important. First, some studies point out that national context is important. According to Boselie *et al.*,³ the question is whether or not the US-oriented models, however suitable for that country, can be used in relation to other countries and in other contexts. For example, the strict Dutch labour laws mean that some HPWP that vary widely elsewhere are required by law or regulated in the Netherlands.⁸⁶ Second, in a study carried out in the Netherlands, Boselie *et al.*³ found evidence for mediating effects of institutionalisation. The effects on average duration of absence due to illness are weaker in a high-institutionalised context, such as hospitals and local authorities, than in a low-institutionalised context such as hotels. However, the discussion below focuses on three important but underexplored contextual elements relevant to the NHS setting of the study. The literature review of Hyde *et al.*²⁴ found few studies on services (3%), health care (2%) or the public sector (1%). It can be argued that important contextual features of a study on the NHS may be related to its setting within services, health care or the public sector.

Service sector

Boxall²³ argues that it is unwise to generalise about HR practices from sectors like capital-intensive manufacturing or professional services, which have high pay and HR investment levels, to mass, standardised services, which have much lower average pay and HR investment levels. Similarly, Eaton¹¹⁶ states that 'high-performance models borrowed from industry studies are insufficient' in health care and related social services, and that '[t]heorizing high-quality services requires an alternative to the model used in industry'. Datta *et al.*¹¹⁷ explored the industry context. Their results provide some support for both universal and contingency perspectives. In addition to seeing generally positive effects of HPWS practices on productivity, they observed significant contingency effects, with industry characteristics influencing the degree of high-performance HR practices' impact on labour productivity.

Similarly, Combs *et al.*⁷⁶ examined the industry context, setting out four reasons why effects should be higher in manufacturing than services. This is confirmed by the results of the meta-analysis, for which effect size is about twice as large for manufacturing as compared to services ($r = 0.30$ vs. $r = 0.17$).

Harley *et al.*¹¹⁸ point to the assumption that HPWP practices are likely to be both more prevalent and more effective in manufacturing settings than in services, see Applebaum *et al.*⁸³ However, they point to the limited body of research that suggests that some components of HPWS are present in parts of the service sector, for example Edwards *et al.*¹¹⁹ report on team-based work in health care, and that they are associated with positive employee outcomes. On the other hand, the research by Berg and Frost¹²⁰ on low-skilled service health-care workers in the USA found that such workers reap few benefits from HPWS because their jobs are so poorly paid, physically demanding and lacking in intrinsic reward that 'adjusting their contours does little to ameliorate the situation'.¹²⁰ However, in contrast to some previous work on HPWS that found a mixture of positive and negative outcomes for employees, Harley *et al.*¹¹⁸ found 'overwhelming positive outcomes'. In more detail, they present three main conclusions. First, HPWS practices are likely to deliver benefits outside their traditional settings. Second, HPWS practices are no less applicable to low-skilled workers than high-skilled workers. Third, low-skilled workers are no less likely than high-skilled workers to benefit from HPWS practices. The authors conclude that these collective findings challenge the theoretical argument that

the effects of HPWS are largely restricted to high skill, manufacturing settings, but they acknowledge that the empirical evidence of the applicability of HPWS to services remains far from conclusive.

Some studies point out that there is a vast variation within 'service industries'. For example, Boxall and Macky¹¹ point to the huge range of business models, ranging from mass services (for which prices are kept low through low-skilled work and labour-saving technology and customer self-service) to professional services. For example, Konrad and Mangel¹²¹ find that the effects of work–life practices were greater in firms with large numbers of women and professional workers (see *Health care*).

According to Boxall,¹⁴ there are major variations both across and within organisations 'as management applies different types of HR systems for workforce groups of different value'. Many studies measure practices without taking into account that organisations may use different practices for different groups of personnel. For instance, managers are often selected and rewarded in a different way from other employees. Den Hartog *et al.*⁸⁶ point to possible differences between different groups within firms. They warn against the assumption that organisations use only a single set of practices is problematic and that future studies should be more clear on describing their groups of people, as research on the areas of psychological contracts and person–environment fit suggest that different groups may value certain HRM practices to different extents. According to Harley *et al.*,¹¹⁸ it is commonly argued that occupational segmentation in services is a barrier to HPWS, with HPWS more likely to be applied to high-skilled rather than low-skilled workers. Gould-Williams⁷ notes the observation of Boyne *et al.*¹²² that the level of HRM practice varied considerably across public organisations, which suggests that the extent to which specific 'high commitment'⁷ practices impact worker attitude would vary depending on the nature of the work group. However, the regression analyses by Gould-Williams⁷ did not provide support for this view, as the dummy 'professional/non-professional' variable had no significant effect on any of the individual outcomes.

Health care

Scotti *et al.*¹²³ argue that 'the mission, design and resource constraints of health services organizations may differ meaningfully from those of firms operating in the broader services domain, and many health services providers are public or not-for-profit entities rather than for-profit enterprises'. According to Young *et al.*,¹²⁴ in theory, a labour intensive, highly motivated, highly skilled professional workforce, as in the health-care sector, should be an ideal context for the successful implementation of HPWS.

It is claimed that HRM in health-care organisations has unique characteristics.^{25,125} As Harris *et al.*²⁵ explain, the workforce is large, diverse and comprises many different occupations, with some having sector-specific skills (e.g. doctors and nurses). Some NHS professions are regulated by professional bodies (e.g. General Medical Council). Finally, there are multiple stakeholders in the NHS (e.g. government, tax payers, professionals, management, media, private and voluntary sector, regulators, researchers and users). According to Boselie *et al.*,³ hospitals function in a highly institutionalised environment that restricts the degree of freedom available to HR policies and practices. Leggat *et al.*⁶ view health care in terms of 'craft-based production', in which professionals treat individual patients in a mass production environment. Finally, contrary to the claim of Combs *et al.*,⁷⁶ some studies^{21,119,126} have argued that teamworking is central to health care. Boselie *et al.*¹²⁷ conclude that the empirical studies suggest that substantial influence exists with regard to the specific institutional environment and context of health care.

Turning to the more specific NHS context, Buchan¹²⁵ explores the changing face of the NHS HR function. He finds 'a transition from a staff welfare orientation to a business orientation, from a generalist service to a specialist function, from training to appraisal and development, from collective relations with staff to individualised relations, and from negotiation to consultation and communication'. Truss *et al.*¹²⁸ used interviews and questionnaires to compare the HR function of a NHS trust with a bank. They concluded that there are major sectoral differences (public vs. private; health care vs. financial institution), notably concerning the higher levels of restrictions applying to NHS HR strategies. Guest and Conway¹²⁹ conducted a survey of British workers employment relationship across a range of sectors, including the NHS.

They stated that NHS respondents reported higher levels of flexibility, more promises and commitments made by their employer, higher levels of commitment, work satisfaction and loyalty to clients or customers, but also higher levels of stress. More generally, the authors reported a group of 'good employer' practices such as good leadership, family-friendly practices and delivery of promises that lead to being seen as fair and trustworthy. The authors conclude there are unique features of working in the NHS. Atkinson and Hall⁵ report that some studies on HRM/performance work⁶⁵ and investigations into HPWS⁶⁸ tended to exclude the concept of flexible working practices. However, more recent studies² tend to include the concept and that it may restrain work amplification from other HPWS practices.¹⁰ Specifically in the NHS, a range of positive outcomes including enhanced patient care, reduced nurse turnover, reduced use of temporary staff hours and lower sickness absence have been associated with flexible working practices. Moreover, some limited evidence exists which supports positive employee outcomes such as improved satisfaction for staff and improved health and well-being for nursing staff. Their empirical work on one acute trust supported the return to the happy-productive worker idea and to the role of happiness, defined as subjective well-being, in enhancing performance.¹¹¹ They conclude that HPWS theory should include a wider range of attitudes,¹⁰ with happiness being an obvious candidate.

Public sector

Brown¹³⁰ reports that there has been scant attention afforded to the specific field of HRM research and academic inquiry in relation to the public sector, concluding that the public sector has a different orientation from the for-profit, private sector, which means that while HRM has commonalities across all sectors in its attention to workforce issues, HRM in the public sector will exhibit a range of differences to that of private sector HRM. Moreover, little is known about HR effectiveness in the public sector.^{38,118,127,131}

According to Bach and Kessler¹³¹ (pp. 470–1), many of the characteristics of public service employment derive from the unique role of the state as employer. They argue that the contextual features affecting the character of the public service workforce include highly labour intensive, feminised, part-time work, occupational composition and a high level of educational attainment, and the values of public servants. Similarly, Bach and Kessler³⁸ report that 'the distinctive features of UK public sector practice are paternalistic management, standardisation of employment practices, collective approach to industrial relations, and "model" working practices that emphasise equal opportunities and individual development'. Gould-Williams⁷ argues that the distinctive features of UK public sector practice are 'paternalistic management, standardisation of employment practices, collective approach to industrial relations, and "model" working practices that emphasise equal opportunities and individual development'. He continues that public managers have been using a form of 'high commitment' management with staff training, 'model' working practices and job security regarded as the norm. These practices should lead to highly committed and motivated workers, but there is some evidence that public managers may be less committed than their private sector counterparts.¹³²

Boyne *et al.*¹²² suggest that there were significant differences between the public and the private sector with regard to HR in the UK in the 1990s. The private sector appears to favour 'hard' HRM (e.g. variable pay linked to individual employee performance), while the public sector takes a relatively 'soft' HRM approach with an emphasis on employment security and employee participation. However, while there have been attempts to imitate private sector practice, making public services more 'business-like',^{38,122,131} these have been described as limited, piecemeal, opportunist and ad hoc.⁷

Gould-Williams⁷ concludes that the positive effects of 'high commitment' HRM practices are similar across public and private sector organisations. On the other hand, some studies have pointed to possible differentiating factors such as (variously termed) 'public service ethos', 'public sector ethos', 'public service values' or 'public service motivation' (PSM).^{133–135} The review of Perry *et al.*¹³³ concludes that while empirical research broadly supports a positive association between PSM and individual performance, the role of intermediate variables, that mediate this relationship, is still unclear. Moreover, the relationship between PSM and individual and organisational performance is complex, with limited consensus on issues such as

causal direction and the roles of intervening variables. Hyde *et al.*¹³⁴ explored public service values in a survey of 152 employees from six health-care organisations [acute trusts, mental health trusts and primary care trusts (PCTs)] in 2006–7. They concluded that ‘public service values militated against short-term adverse effects on performance, while storing up longer-term problems resulting from increased work pressures and lack of ability, motivation or opportunity to perform in the future’.¹³⁴ Participants identified a range of mechanisms through which having expectations met affected patient care, but an additional category of public service values was added which is consistent with previous research involving physicians.¹³⁵

Conclusion

The reviews tend to conclude that the HRM performance link is complex and unclear and that the literature still often suffers from theoretical and methodological problems. According to Patterson *et al.*,¹⁹ the HRM performance relationship is ‘complex, multifaceted and multidirectional’. They stress the lack of ‘longitudinal research exploring the totality of any causal chain from HRM to intermediate outcomes and employee behaviours, to organisational performance’.

Moreover, while much research argues that context is important, there are few studies on health care in general and on the NHS in particular (see *Chapter 3*).^{19,24–26} Patterson *et al.*¹⁹ go on to state that while associations between HRM and performance have been found in many cross-sectional studies outside the health sector, and by a small number within the health sector, this does not demonstrate a causal link. Considerably more longitudinal research is needed on a wider range of variables to understand the impact of HRM practices on final outcomes in the NHS. According to Hyde *et al.*,²⁴ although the NHS is clearly different from other types of organisations, this does not imply that a new theory of the relationship between HRM and performance is needed, but rather that great care is required when introducing successful approaches or practices that have not already been applied in this context.

Chapter 3 Systematic review of the high-performance work systems literature in the health-care sector

Structured summary

Background

Many recent studies have examined links between HPWS and outcomes, although few of these have been within health care. Although two reviews^{136,137} have recently been conducted giving us a basis for drawing generalisable conclusions on the effects of HPWS on outcomes in health care, these publications, as well as the main findings and conclusions the authors reach, differ markedly between the two reviews. This narrative systematic review attempts to bridge this gap.

Methods

We searched five databases covering managerial and health-care literatures [Her Majesty's Inspectorate of Constabulary (HMIC), MEDLINE, PsycINFO, Social Sciences Citation Index (SSCI), EBSCOhost (from inception to May 2012)] for studies relating to HRM or HPWS also including the keyword 'health'. Articles were included if they included a study on a relevant topic (HRM, HPWS) within a health-care setting.

Results

The initial search yielded 27 publications that met the criteria, with a further 15 identified from the reference lists of the previous reviews. This included 23 quantitative empirical studies, seven qualitative empirical studies, four mixed-methods studies, five reviews, two commentaries and one theoretical article. These were coded for several criteria and compared in a narrative review. Overall results suggested that it cannot be conclusively derived whether or not there is sufficient and appropriate evidence of the link between HPWS and performance in the health-care sector based on the reviewed papers.

Discussion

Many of the reviewed studies take into account the peculiarities of the health-care context and reflect this in their theorising and study design; however, there is insufficient evidence of the proposed characteristics of HPWS in the health-care literature (i.e. lack of evidence of synergies, internal and external fit, link to productivity). Few of the studies had similar designs or contexts, so it is unsurprising that a consistent pattern of results was not found. Further studies are needed to provide more relevant evidence.

Introduction

Research has demonstrated that HPWS are linked to a wide range of important organisational and employee outcomes across various research settings, designs and industries.^{8,138–142} Reviews and meta-analyses in the field have successfully confirmed the generalisability of these effects;^{71,76,138} nevertheless, there is strong evidence that context is an important factor that needs to be taken into consideration when studying the link between HRM and performance. This is because HR practices may differ between organisations in, for example, the public sector as compared with the private sector and in health care as compared with other industries.^{3,122,128,132}

With regards to the health-care sector in particular, two reviews that have recently been conducted give us a basis for drawing generalisable conclusions on the effects of HPWS on outcomes in health care. The first one, carried out by Etchegaray *et al.*,¹³⁶ is a narrative review that addresses issues of HPWS measurement,

as well as links between HPWS and performance. The second one is a realist review of the field conducted by Garman *et al.*,¹³⁷ which combines research from health care with findings from other industries to develop and propose a comprehensive framework of HPWS and the mechanisms through which they affect outcomes, tailored specifically for the health-care sector. Surprisingly, the publications identified in the searches, as well as the main findings and conclusions the authors reach, differ markedly between the two reviews. Possible reasons for the discrepancies between the two reviews are discussed in this chapter.

The primary purpose of this chapter is, therefore, to explore in more depth the literature on HPWS and thus address the discrepancies found in the two reviews. With this general objective in mind, a systematic literature review was conducted in order to obtain our own collection of publications on HPWS in health care and compare this with the published reviews. This is followed by an in-depth critical discussion of the published articles that report empirical quantitative studies in terms of (1) HPWS definitions in relation to those commonly adopted in non-health-care research and publications, (2) the extent to which the primary characteristics associated with HPWS in general literature are reflected in the health-care literature, (3) the dominant theoretical frameworks used in linking HPWS with outcomes in health care, (4) the terminological choices and their appropriateness in the health-care literature on HPWS, (5) the evidence on the link between HPWS and outcomes in health care and (6) the various mechanisms through which, and conditions under which, HPWS have a positive effect on outcomes in health care. Finally, articles reporting qualitative studies and commentaries are discussed and integrated with the quantitative evidence. This is not designed to be a full literature review of the topics being covered by this report, but instead provides context for the wider study about what is known about the links between HPWS and outcomes in health care.

Method

A systematic literature search was conducted to identify publications, published up to and including 2012, dealing with HPWS in health care. The keywords were derived from past reviews and general literature (e.g. 'high-performance work systems/practices/environment', 'high-commitment HRM practices', 'high-involvement HRM practices', 'HRM policy', 'HRM practice', 'human capital' and 'SHRM'). The search was restricted to publications containing any of the keywords and the word 'health'. The databases searched (HMIC, MEDLINE, PsycINFO, SSCI, EBSCOhost) cover both managerial and health-care literatures.

The search yielded 126 publications. Our screening identified 27 publications both relevant and referring to the health-care sector, 47 non-health care, 31 non-HPWS, nine duplicates, 10 non-peer reviewed and two book reviews. We focused on the 27 articles that were both relevant and specific to health care. These were further broken down into qualitative ($n = 5$), quantitative ($n = 13$), mixed method ($n = 2$), qualitative reviews ($n = 5$), commentaries ($n = 1$) and theoretical analyses ($n = 1$). As the overlap between the two recently published systematic reviews^{141,142} was modest, to say the least, we decided to extend our search in order to create as complete a list as possible of relevant publications. As a first step, we compared our search outputs with those of the two published reviews, which yielded 11 publications that were added to our database. One of these, by Dawson *et al.*,¹⁴³ was not included in further analysis as it was a working paper, not published yet at the time of our review. Further manual search and search of the citations within the identified publications produced another five relevant publications that were added to our database as well. Therefore, the final collection of publications that was reviewed comprised 42 publications, of which 23 were quantitative empirical studies, seven were qualitative empirical studies, four were mixed-methods studies, five were reviews, two were commentaries and one was a theoretical article. The description of all publications that were included in the review is presented in *Table 1*, including the excluded working paper for reasons of comparison between our literature search and the searches by Garman *et al.*¹³⁷ and Etchegaray *et al.*¹³⁶ Drawing on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2011 guidelines for systematic reviews, we present the search procedure using a four-stage flowchart (*Figure 1*).

TABLE 1 Description of reviewed publications

Author(s)	Year	Type	Our search	Garman <i>et al.</i> ¹³⁷ search	Etchegaray <i>et al.</i> ¹³⁶ search	Other sources
Young <i>et al.</i> ¹²⁴	2010	Quantitative		✓		
Berg and Frost ¹²⁰	2005	Quantitative				✓
Bonias, <i>et al.</i> ¹⁴⁴	2010	Quantitative	✓			
Boselie ¹²⁷	2010	Quantitative	✓			
Boselie <i>et al.</i> ³	2003	Quantitative			✓	
Buchan ¹²⁵	2004	Commentary				✓
Dawson <i>et al.</i> ¹⁴³	2008	Quantitative		✓		
Deshpande ¹⁴⁵	2002	Quantitative	✓			
Eaton ¹¹⁶	2011	Qualitative				✓
Etchegaray <i>et al.</i> ¹³⁶	2011	Review	✓			
Garman <i>et al.</i> ¹³⁷	2011	Review	✓			
Gittell <i>et al.</i> ⁸	2010	Mixed				✓
Gittell ¹⁴⁶	2008	Mixed		✓		
Gowen <i>et al.</i> ¹⁴⁷	2006	Quantitative		✓		
Harley <i>et al.</i> ¹¹⁸	2007	Quantitative	✓	✓		
Harmon <i>et al.</i> ⁴	2003	Quantitative	✓	✓	✓	
Harris <i>et al.</i> ²⁵	2007	Review	✓			
Kabene <i>et al.</i> ¹⁴⁸	2006	Review	✓			
Khatri <i>et al.</i> ¹⁴⁹	2006	Qualitative	✓			✓
Lammers <i>et al.</i> ¹⁵⁰	1996	Quantitative	✓			
Laschinger <i>et al.</i> ¹⁵¹	2001	Quantitative			✓	
Lee <i>et al.</i> ¹⁵²	2012	Quantitative	✓			
Leggat <i>et al.</i> ¹⁵³	2008	Quantitative	✓			
Leggat <i>et al.</i> ⁶	2011	Quantitative	✓			
Leggat <i>et al.</i> ¹⁵⁴	2010	Quantitative	✓			
Lemmens <i>et al.</i> ¹⁵⁵	2009	Quantitative	✓			
Marchal <i>et al.</i> ¹⁵⁶	2010	Qualitative	✓			
Marchal and Kegels ¹⁵⁷	2008	Theoretical	✓			
McAlearney <i>et al.</i> ¹⁵⁸	2011	Qualitative	✓			
Parkes <i>et al.</i> ¹⁵⁹	2007	Mixed		✓		
Pas <i>et al.</i> ¹⁶⁰	2011	Quantitative	✓			
Patterson, <i>et al.</i> ¹⁹	2010	Review	✓			
Preuss ¹⁶¹	2003	Quantitative		✓	✓	
Rondeau and Wager ¹⁶²	2001	Quantitative	✓			
Rondeau and Wager ¹⁶³	2006	Quantitative			✓	
Scotti <i>et al.</i> ¹²³	2007	Quantitative	✓		✓	

continued

TABLE 1 Description of reviewed publications (continued)

Author(s)	Year	Type	Our search	Garman <i>et al.</i> ¹³⁷ search	Etchegaray <i>et al.</i> ¹³⁶ search	Other sources
Scotti <i>et al.</i> ¹⁶⁴	2009	Quantitative	✓		✓	
Song <i>et al.</i> ¹⁶⁵	2012	Qualitative	✓			
Stanton and Leggat ¹⁶⁶	2010	Commentary	✓			
West <i>et al.</i> ¹²⁶	2002	Quantitative		✓	✓	
West <i>et al.</i> ²¹	2006	Quantitative		✓		
Young <i>et al.</i> ¹²⁴	2010	Mixed	✓			

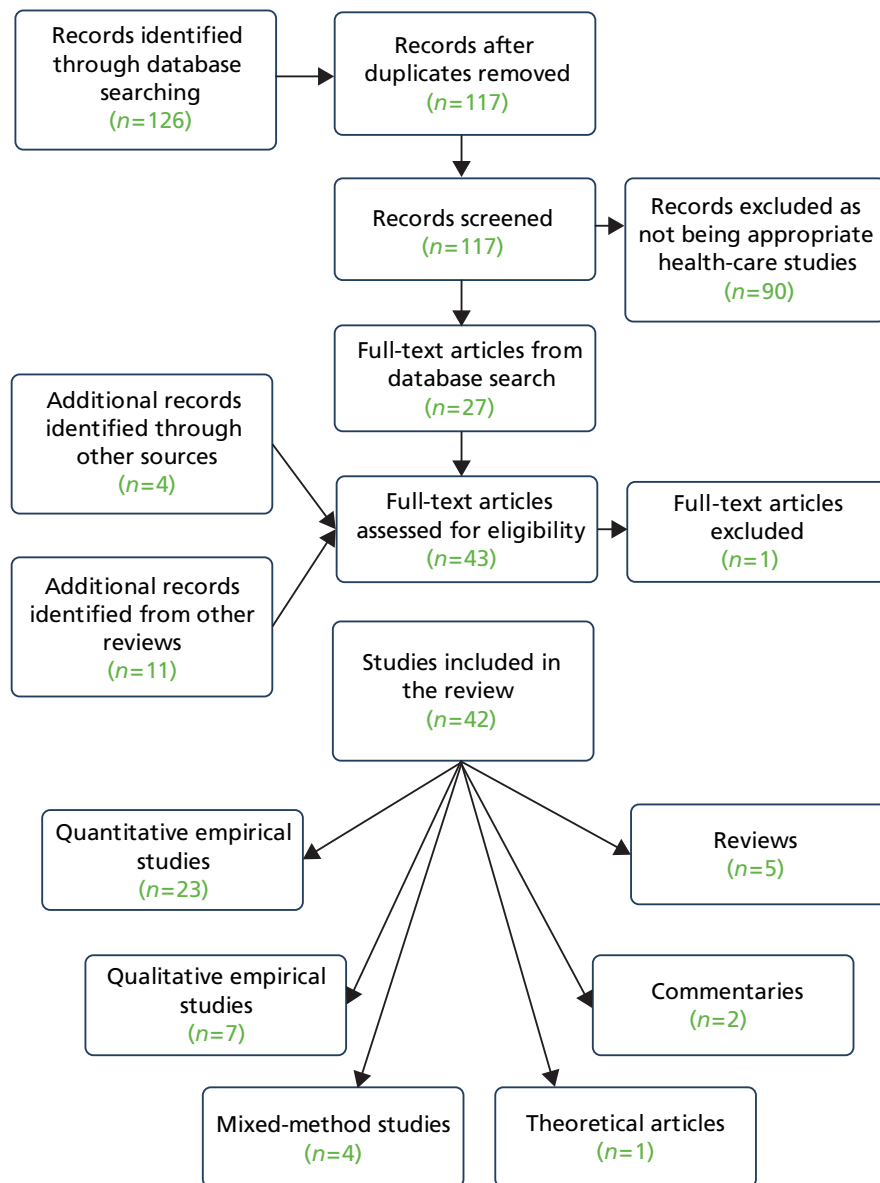


FIGURE 1 Flow diagram of literature search.

The publications reporting on empirical quantitative studies (including as part of a mixed-method approach) were coded based on 24 variables of interest: key words (if any reported in the original publication), source (whether the publication was identified in the systematic literature search or added manually through other searches or from citations in other publications), country, industry (if other non-health-care studies/samples are reported in the publication), type of health-care organisation (e.g. general practitioner practice, hospital, age-care sector, regional health service, etc.), sector (public, private, both), terminology used (e.g. HPWP, HPWS, HPM, etc.), appropriateness of terminology, conceptualisation of HPWS, theoretical framework underpinning the study, whether or not internal and external influence on HPWS have been assessed, internal and external fit of HPWS, the general approach to HPWS ('best practice', context-specific, organisation-specific approach), measurement of HPWS, level of analysis (e.g. individual, group, organisational, country, multilevel), method (e.g. survey, secondary data, multisource, etc.), methodology (e.g. cross-sectional, longitudinal, mixed methods, etc.), sample size, independent variables, dependent variables, control variables, moderators, mediators, and main findings.

Systematic review and critical evaluation of quantitative empirical studies: the 'hard' evidence

The reason a more detailed coding and analysis was conducted on the empirical studies was that these are most relevant in contextualising the findings of the analysis in the present report within the wider literature. The main factors addressed in the detailed review are summarised in *Appendix 1*, with *Table 21* summarising the theoretical factors under consideration and *Table 22* the methodological considerations and main findings. In this section, we provide a critical discussion of the quantitative empirical studies that were reviewed.

Bartram *et al.*¹⁶⁷ report on a survey study of hospital chief executive officers (CEOs), HR directors and senior managers in Australia regarding their views on SHRM and HR functions, as well as their effect on performance outcomes. They adopt the theoretical framework proposed by Bowen and Orsloff¹⁶⁸ to develop arguments on the link between SHRM and performance, with particular emphasis on communication and interaction among organisational members. The theory emphasises the importance of distinctiveness, consistency and consensus in SHRM as key factors that influence employees' behaviour and organisational performance. They found significant links between perceptions of SHRM and perceived organisational performance. Additionally, their analysis unveiled interesting differences between managers at different levels in the organisation and in different functions regarding their perceptions of SHRM. In particular, they investigated the moderating effects of managerial role, organisation size, industry tenure, managerial tenure and gender. They found significant differences in perceptions of SHRM between CEOs and other managers, and no differences in perceptions between types of managers on perceptions of HR priorities on the overall sample. More detailed moderation analysis revealed that these differences were more prominent in large organisations. In relation to managers' tenure in industry, tenure in organisation and gender there were no significant differences in perceptions among respondents. The authors conclude that 'the strategic human management paradigm is "lost in translation", particularly in large organisations, and consequently opportunities to understand and develop the link between people management practices and improved organisational outcomes may be missed'.¹⁶⁷ Overall, the study by Bartram *et al.*¹⁶⁷ has some very important advantages, such as a sample of senior managers, adequate measures of SHRM and other relevant variables and is theoretically robust in that it takes into account the strategic role of HRM in a holistic manner, as can be observed from the measures used in the study. Nevertheless, their findings cannot be classed as conclusive owing to the small sample size and common-method bias.

Berg and Frost¹²⁰ published a paper on the topic of dignity at work for low-paid, low-skill workers using a sample from 15 hospitals in the USA. They used the main premises and assertions of the HPWS theory and available empirical evidence to link various work-related factors to three indicators of dignity at work, namely, fair treatment, intrinsically satisfying work and economic security. Although not explicitly stated, the assumption underlying the investigation is that the work-related factors form part of a HPWS.

These include broadened jobs, participation in problem-solving teams, formal and informal training, union coverage, high-involvement union coverage, wages, staffing adequacy, resource adequacy and role overload. The main focus of the analysis was on the effects of enhancing workers' jobs and having union representation on workers' dignity at work. Although they did not find support for their overall model, they report some interesting associations: dignity at work was associated to higher pay, adequate levels of staffing and resources, and access to training. Some of the variables assessed were collected using surveys on the low-skilled workers sample, while others were collected from interviews with managers. Although the data are nested in organisations, the paper did not employ multilevel analysis; rather, the authors corrected for the effect of the organisation. Furthermore, rather limited information is provided regarding the psychometric properties of the scales used, which appear to be developed for the purpose of the reported study, rather than taken from other studies.

Bonias *et al.*¹⁴⁴ conducted an investigation in 2010 of the link between HPWS and organisational performance, measured as employees' perceptions of the quality of patient care in their hospital. The study was conducted in a public sector regional health service organisation in Australia and had an initial sample of 541 responses across various occupational groups, both clinical and non-clinical. The study's main finding was that HPWS are not directly associated to quality of patient care and that psychological empowerment fully mediates this relationship. Thus, the authors unveil one of the mechanisms through which HPWS have an effect on an important outcome in health-care settings, namely patient care. One of the concerns regarding this study is that the final sample used in testing the hypothesised relationships was markedly smaller, ranging from 319 to 329 responses. This is an indication of a large quantity of missing responses in the questionnaires and could raise concerns regarding the representativeness of the recorded responses, even though the authors tested for non-response bias and found that it was not an issue. Another concern is that the study was cross-sectional; therefore, we cannot infer causality in the reported relationships even though there was strong theoretical support for the direction of the relationships and the findings are potentially affected by common-source bias. With regard to the measurement of HPWS in health-care settings, Bonias *et al.*¹⁴⁴ initially used a general 42-item measure of HPWS that was developed by Zacharatos *et al.*¹⁴⁰ and used to measure HPWS in various industries. Nevertheless, on taking a closer look and analysing the scale, Bonias *et al.*¹⁴⁴ discovered that some of the dimensions from the general measure were inappropriate for their study. They omitted the 'status distinctions' dimensions owing to the prevalence of hierarchical structures in health care, the 'management practices' dimension owing to the working conditions being centrally determined through collective bargaining, and the 'contingent compensation' dimension as it is not employed in Australian public health-care organisations. This indicates that although general measures of HPWS have some benefits (e.g. they are reliable and validated), they may not always be appropriate for use in the health-care sector and in every country, owing to sector-specific and country-specific factors (e.g. culture, degree of centralisation, organisational structure, unionisation). The article by Bonias *et al.*¹⁴⁴ was not included in the two reviews of HPWS in health care; a possible reason is that the literature searches for these two reviews were most likely completed prior to the publication of the article.

Boselie *et al.*³ make a series of important contributions to our understanding of HPWS on a theoretical level. Even though they do not use the HPWS framework directly and explicitly in their study, they do investigate a bundle of HR practices in terms of their effect on important organisational outcomes, namely absence rates, absence duration and turnover. Their findings indicate that the positive effect of HR practices, in terms of reduced absence rates and duration, is higher in non-institutionalised industries (hotels), than in institutionalised ones (local government and hospitals). They did not find any significant effects of HR systems on turnover in their sample. Therefore, the authors provide evidence for the role of context, environment and organisational characteristics with regard to the effect of HR on performance, indicating clearly that what is true for one industry, for instance in manufacturing, is not necessarily true in another, such as health care. The second important finding is that they revealed a two-factor structure of HR systems, contrary to what is theorised in the case of HPWS.¹³⁸ Their findings, although enlightening, should be interpreted with caution for three reasons: (1) their sample size is relatively small and in the hospital sector includes only nurses, (2) they did not analyse their data for hospitals separately to the data

from other industries and (3) their statistical analysis is rather weak in terms of technique, where they claim to be testing mediating effect when in fact they are testing the moderating effect of institutionalisation on the relationship between HR systems and outcomes. The article by Boselie *et al.*³ was included in the review by Etchegaray *et al.*¹³⁶ but not in the review by Garman *et al.*,¹³⁷ nor was it a hit in our own literature search. Possible reasons for this may be that the study is not framed around the HPWS theory, nor is it limited to the health-care sector and, therefore, did not match the key words used in the searches for this article nor that by Garman *et al.*¹³⁷

Boselie¹²⁷ investigated the effect of HPWP in a public Dutch hospital on two individual level outcomes: affective commitment and organisational citizenship behaviour. The study is included in the present review with caution, as varying components of the study do not comply with the assumptions underlying the HPWS approach. In particular, HPWP was classified into three categories on the basis of the AMO model, namely practices enhancing abilities, motivation and opportunities. The study considers these as separate independent variables, therefore disregarding the 'systemic effect' assumption of HPWS, synergistic effects, and internal and external fit. However, the findings have important implications as they reveal that the 'best practice' approach is not always appropriate and that context-specific factors need to be taken into account. More specifically, it was found that abilities enhancing practices are linked to affective commitment, opportunities enhancing practices are linked to organisational citizenship behaviours, while motivation enhancing practices are not linked to any of the outcomes, contrary to what was hypothesised. As the motivation construct relates mostly to pay and rewards systems employed by the organisation and their degree of fairness, the author interprets the absence of statistically significant relationships to outcomes as a reflection of the contextual factors surrounding health-care organisations in the Netherlands. In particular, Boselie¹²⁷ concludes that the lack of relationship could be due to the high institutionalisation of the sector that is characterised by collective agreements and legislative interventions. One potential criticism of Boselie's study¹²⁷ is that it does not test for the potential mediating effect of affective commitment in the relationship between HPWP and organisational citizenship behaviour. Such a hypothesis would be justified by both extant literature on the relationship between affective commitment and organisational citizenship behaviour^{169,170} and the high correlation between the two in Boselie's sample ($r = 0.34$, $p < 0.001$). If this is the nature of the relationships, then a further indirect link between HPWP enhancing abilities and organisational citizenship behaviour might have been unveiled. The study by Boselie¹²⁷ was not reviewed by Garman *et al.*¹³⁷ or Etchegaray *et al.*,¹³⁶ most likely because the article was not yet published when the literature searches for the two reviews took place.

Deshpande¹⁴⁵ reports on a study looking at changes in HR practices and organisational performance following union elections in 101 hospitals in the USA. Although the data are methodologically strong, as they are collected from multiple sources and come from a wide range of HR practices and a relatively large number of organisations, the analysis that was conducted does not allow for any inferences to be made with regard to the link between HR practices and performance. However, some interesting differences in the use of HR practices and in performance are observed following union elections, both positive and negative regarding the HR practices, and generally negative regarding performance outcomes, with union certification having a negative effect and union rejection a positive one. Despite the fact that the author does not directly utilise the HPWS terminology and framework, the study can be classed as such, as it investigates a wide range of HR practices.

One of the more methodologically advanced studies in the health-care literature comes from Gittel¹⁴⁶ who used multisource and conducted a multilevel analysis in order to investigate the effect 'relational work systems' on employees' collective coping response (relational co-ordination) in nine hospitals in the USA. The author developed the 'relational work systems' theoretical framework drawing on the HPWS literature and proposed a series of practices, namely selection and training for cross-functional teamwork, the use of conflict resolution to build relationships between workers, feedback and rewards that are oriented towards contributions to shared goals, and information sharing or co-ordinating mechanisms (such as team meetings and boundary spanners) that will have a synergistic positive effect on employees' resilience to external pressures. The results provide support for the hypothesised mediated model with environmental

pressures being associated with perceived work pressures, which in turn are associated with collective coping response (relational co-ordination). Additionally, formal work practices (relational work systems) were found to be associated with collective coping response. Although this paper did not assess HPWS in a general sense, it provides a prime example of a theoretically and methodologically robust study that inspires confidence that targeted HPWS, when employed in health-care organisations, can produce targeted outcomes that are valuable to the organisation. Unfortunately, the direction of relationships and links to performance are hard to assert and further research should aim at filling these gaps.

Gittell *et al.*⁸ followed up the above study with an extension using what appears to be the same sample of hospital employees as reported in the original Gittell¹⁴⁶ paper discussed above. This article extends the study by adding performance outcomes collected from third sources. Theoretically, this study was framed around the HPWS paradigm; however, the conceptualisation remains focused on the relational aspect of HPWS and, using multilevel data analysis methods again, the authors find support for the proposed mediated model, with HPWS linking to relational co-ordination and this in turn linking to quality and efficiency outcomes. Therefore, this study fills one of the gaps identified in the previous study by showing that the proposed model links to organisational performance.

In a 2006 study, Gowen *et al.*¹⁴⁷ assessed the link between health-care error sources and error reduction barriers to quality management processes, SHRM and quality management practices, which were in turn assessed on the basis of the link with quality programme results and sustainable competitive advantage. The data used came from two sources (questionnaire surveys) and were analysed using regression analyses. The main findings show health-care error sources and error reduction barriers to be associated to quality management processes, quality management practices and SHRM. Quality management process, quality management practices and SHRM are related to quality programme results, and quality management practices and SHRM are related to sustainable competitive advantage. Owing to the way the variables and analysis are reported in the publication and the basic type of analysis that was conducted, it is difficult to assess the validity and generalisability of the reported findings.

Harley *et al.*¹¹⁸ conducted a large-scale cross-sectional investigation of HPWS in the aged-care sector in Australia, across both public and private organisations. Although they looked at the effects of individual groupings of practices, rather than HPWS as a system or bundle, their study makes important theoretical contributions. First, it demonstrates the positive effects on individual-level outcomes (including autonomy, affective commitment, job satisfaction, psychological strain, turnover intention, and work effort) of a wide range of HR practices. This finding provides support for the theories that propose that HPWS will positively affect organisational performance through employees' attitudes and behaviours and, in contrast to propositions under the RBV, that HPWS lead to work intensification and negative individual employee outcomes. Second, it demonstrates that HPWS are no less perceived by low-skilled than by high-skilled workers in the health-care sector. Third, it shows that there are no major differences in the nature of the relationships between HR practices and outcomes in the two occupational groups. Although these findings suggest that HPWS should be viewed as a 'best practice' because, according to the authors, they have positive effects across the board; these findings need to be interpreted with caution as several characteristics of HPWS were not investigated, such as synergistic effects, systemic effects, internal fit, external fit, external influences and link to performance.

Harmon *et al.*⁴ report on an exceptionally large-scale study conducted in the USA among Veteran Health Administration (VHA) organisations, which are publicly funded and provide various types of health services. They used 10 items from a 1997 nationwide survey to measure HIWS (dependent variable) and two items from the same survey to measure employee satisfaction (mediator). The outcome data were obtained from a different source and are a measure of service cost. This study has two advantages over the majority of health-care research on HPWS. First, the authors used structural equation modelling (SEM) to analyse their data, a technique that is an advancement on the regression analysis employed by most other researchers as it compensates for measurement error. Second, the outcome data were obtained from a different source, thus avoiding common-source bias which plagues the vast majority of research in health care.

The study's findings indicate that job satisfaction partially mediates the relationship between HIWS and service cost. The authors demonstrated that, on average, a one standard deviation increase in the adoption of HIWS by an organisation in the sample equates to a \$1.2M saving per annum.

The study by Harmon *et al.*⁴ was followed up by two similar investigations in the USA VHA organisations. With a somewhat smaller sample size and using the same measure of HPWS, Scotti *et al.*¹²³ found links between HPWS and customer satisfaction, mediated by customer orientation, employee-perceived service quality and customer-perceived service quality. Their outcome data also came from a different source and the analysis was conducted using SEM. Scotti *et al.*¹⁶⁴ supplemented the existing VHA data with further data from the Veterans Benefits Association (VBA) organisations, which deal with benefits claims and are not directly involved in providing patient care. They tested the Scotti *et al.*¹²³ model and found that the effects stand for both occupational groups the high-contact service (VHA) and low-contact (VBA) ones. However, the effect sizes of the relationships were different between the two groups, with a stronger relationship between HPWS and employee-perceived service quality among low-contact employees, and stronger links between HPWS and customer orientation among high-contact employees. Interestingly, although Scotti *et al.*^{123,164} use the same measure of HR practices as Harmon *et al.*,⁴ they use different terminology, with Harmon *et al.*,⁴ using HIWS and Scotti *et al.*^{123,164} using HPWS. This is a prime example of the ambiguities and inconsistencies in the terminology used in the HPWS literature.

Lammers *et al.*¹⁵⁰ report on a study that looked at the effects of commitment to quality improvement, quality councils, teams, budgets and training on perceptions of improvements as a result of total quality management programmes. This study was not framed around HPWS or relevant frameworks, but the measured variables could be argued to be loosely linked to HRM. The study showed some variation in the importance of level of commitment at different levels in the organisational hierarchy. Further, they report that the main factors explaining a large proportion of variance in numbers of teams, training intensity and total perceived improvement are the age of the quality council, overall organisational commitment to total quality management philosophy and physician commitment. Overall, the findings of the study need to be interpreted with caution owing to the small sample size and weak statistical analysis methods.

Laschinger *et al.*¹⁵¹ conducted a study on a large sample of nurses in Canada to test a proposed mediated theoretical model. The model suggested that organisational characteristics (autonomy, control and physician relationships) are linked to trust in peers and managers, which in turn links to burnout (emotional exhaustion), which leads to poorer job satisfaction and assessments of quality of patient care and unit. Their data supported a modified model with both burnout and organisational trust mediating the relationship between organisational characteristics and outcomes. Although the study does not address HPWS or related theories directly, the large sample size and sophisticated methods of data analysis indicate and we can conclude with some confidence that HR-related factors are associated with perceived performance among nurses.

One of the more sophisticated studies looking at the link between HPWS and organisational performance in the health-care sector comes from Lee *et al.*¹⁵² who investigated a complex mediational model to gain understanding of the mechanisms through which HPWS affect customer loyalty. Using multisource data and SEM, thus partly avoiding the problems of measurement error, they showed that HPWS predict employee reactions, which in turn predict service quality, which then predicts customer satisfaction, which finally links to customer loyalty. In spite of the relatively small sample size and the limited factors of HPWS measured, this study provides some strong evidence on the link between HPWS and performance with regard to customer satisfaction and loyalty.

Leggat *et al.*¹⁵³ conducted a cross-sectional survey investigation of the prevalence of various HRM related factors in hospitals of varying characteristics (12 metropolitan, 13 regional, 37 rural and district). In particular, they looked at HR priorities, performance management, training and development, employee participation and empowerment. The study revealed that there is insufficient emphasis in hospitals on practices that facilitate patient safety. Particular weaknesses of Australian hospitals were identified in the

areas of performance management, lack of link between organisational performance indicators and staff/management performance indicators, and insufficient emphasis on training. Further, there was no significant differences in HR-related factors among the different hospital types. Although the study investigates a wide range of HR factors, it is not possible to infer any links to employee and performance outcomes.

Leggat *et al.*⁶ also report on a series of studies, both qualitative and quantitative, the results of which have been published in detail in other articles. Their conclusions should therefore be interpreted with caution, as they might inflate the perception of readers and research users regarding particular findings. In terms of quantitative studies, they report on the findings from three surveys in Australian hospitals, without making references to the particulars of the statistical analysis that was conducted. They found that HPWS are associated with perceived quality of care and that HRM outcomes function as a mediator in this relationship. Furthermore, they observe that HPWS in Australian health-care organisations are generally deficient, in spite of the policies that encourage such systems. There is a difference in the identification of HPWS among various managers, with CEOs generally reporting higher levels than HR and other managers.

Lemmens *et al.*¹⁵⁵ report on a study of impressive design, conducted in the Netherlands. They measured various HR-related factors pre and post intervention, with a 1-year gap. The intervention was linked to changing the systems for delivering care to patients with chronic obstructive pulmonary disease. The factors that were assessed included culture, climate and quality improvement commitment. A change in the systems from pre to post intervention was observed in terms of self-management support, clinical information systems and delivery system design. The authors found associations between changes in processes of care, factors of organisation and professional commitment. Professional commitment and group culture appeared to be predictors of process implementation. As appealing as these findings are, we cannot draw conclusions regarding the effects of HPWS with regards to the interventions, as these were not directly assessed. A further limitation of the study is the small sample size (52 participants).

The study by Parkes *et al.*¹⁵⁹ was a large-scale longitudinal study in the UK, with data collected from both managers and employees at two time points. The main focus of the investigation was employee involvement. Unfortunately, statistical analysis and findings are not reported apart from the lack of link between employee involvement and organisational performance. However, without further details, it is difficult to draw any definite conclusions. The paper further reports on a series of case studies, which provide a rich insight into the potential relationships of employee involvement and outcomes.

Pas *et al.*¹⁶⁰ conducted a focused study that looked at family-friendly policies in a female sample of medical professionals in the Netherlands. Feminisation and collective labour agreements were found to have a positive effect on the offer of family-friendly policies. Offers of reduced participation arrangements had a negative effect on contracted working hours, while full participation arrangements had a positive one. Female doctors tend to work extra hours if they feel supported in improving their work–life balance, if they feel supported in achieving their career goals, and if they do not feel that their careers will be hindered. Reduced participation arrangements had a negative effect on contracted working hours, while full participation arrangements had a positive on effect. Family-friendly workforce philosophy was found to be a moderator in these relationships. Although limited in scope, this study provides some valuable insights with regard to the potential gender differences in terms of responses to various HPWS.

Preuss¹⁶¹ conducted a large-scale study of nurses in the Netherlands in order to investigate the mediating role of information quality in the relationship between HPWS and organisational outcomes. The author reports that the quality of information available for decision-making ‘partially mediates how employee knowledge, work design and total quality management systems affect organizational performance (measured as the inverse of medication error incidence)’. Although the paper reports significant results, it is ambiguous whether or not indeed the variables measured represent HPWS.

Rondeau and Wagar¹⁶³ conducted a study of nurses in nursing homes in Canada in which they investigated the effect of 'magnet' status on nurse and patient satisfaction, participatory decision-making cultures and resources dedicated to job-related training. They found support for all the above proposed links. Interestingly, they did not find a significant association between HIWP and 'magnet' status of nursing homes.

In an earlier study on nursing homes in Canada, Rondeau and Wagar¹⁶² found that high-performance HRM practices and workplace climates that value employee participation, empowerment and accountability are linked to favourable organisational outcomes. Similarly, high-performing organisations are characterised by implementation of high-involvement practices and favourable climate. Although the study suffers from common-method variance, it provides some tentative evidence of the HPWS–performance link.

West *et al.*¹²⁶ conducted an extensive study of HR practices on CEOs and HR directors from 81 hospital trusts in the UK using patient mortality rates as the outcome measure. They found that all three predictors, namely sophistication of training policies, teamworking and sophisticated appraisal systems, were linked negatively to patient mortality rates, with the strongest relationship found for appraisal. This study was followed up with a similar investigation by West *et al.*²¹ that extends these findings. They report links between a bundle of HR practices, including training, sophistication of performance appraisal system, staff participation, teamworking, employment security, Investors in People (IIP) status and patient mortality rate, even when controlling for previous patient mortality levels and other potentially confounding factors.

Finally, Young *et al.*¹²⁴ conducted a study of hospital employees in Australia and found that for managers what matters the most is the distinctiveness, consistency and consensus of HPWS. This finding provides evidence in support of the underlying theoretical principles of HPWS. Their findings further show that social identification facilitates the associations between HPWS and both affective commitment and job satisfaction.

Conclusion

The review found that a multiplicity of terminology, frameworks, settings and variables meant that overall conclusions were difficult, with little clear, consistent evidence for the link between HRM and performance in health care. This manifested itself in a number of ways, which we explain in more detail in the following paragraphs.

One of the limitations of the HPWS framework, which raises the difficulty of reviewing the literature and research evidence in the field, is the definitional ambiguity surrounding the term, which is reflected in the wide range of alternative terminologies used, such as HIWS, HCM and high-performance work environments, high-commitment work systems, high-performance management practices.^{3,171} An example of how HPWS is defined from the health-care domain comes from Etchegaray *et al.*,¹³⁶ who do not limit their definition to HR practices, but rather extend the concept to encompass a wider range of practices, termed 'work practices'. They further expand the implied effect of practices on outcomes beyond organisational performance to include employee attitudinal outcomes as well as outcomes at various levels. In particular, they define HPWS as 'an integrated set of practices that result in engaged employees and positive individual-, unit-, or organizational-level outcomes'.¹³⁶ From our review, we can conclude that in terms of both terminology and approaches to the definition of HPWS, there is extensive variation among the publications.

The term 'high performance' implies that some systems or HR practice configurations will produce 'low' performance.³ Therefore, in order to validate the HPWS theoretical underpinnings, research needs to show that not all system configurations lead to performance improvements and can be classified as HPWS, and to narrowly define the distinctive characteristics of high-performance compared with low-performance systems. When studying HR practice bundles that have the HPWS characteristics (e.g. synergistic effects), but are not

assumed to produce high performance, then the terminology used should be adjusted accordingly. For instance, if the bundle of practices enhances involvement it should be termed 'high-involvement' work system, while, when the bundle is tailored to enhance abilities and competencies it should be termed 'high-ability' work system, and so on. Our review revealed that there are a considerable number of publications that do not take into account the particular point of reference of each term and rarely justify their selection of terms in light of their theoretical framework and study design.

In spite of the wide literature on the theoretical underpinnings of HPWS as a HRM theory, ambiguities regarding the characteristics of HPWS and what distinguishes them from HR practices in general were prevalent in the early work on HPWS and still remain. One major area that lacks clarity is the question of whether HPWS are a 'best practice' theory of HR, or whether it is context sensitive. Becker and Huselid¹³⁸ put forward compelling arguments for the contingent nature of HPWS based on the notions of inimitability, internal (or horizontal) fit and external (or vertical) fit. Their arguments can even be interpreted to mean that a HPWS can only be characterised as such if it is unique to the organisation employing it, and uniquely aligned and fitted to the particular characteristics, strategy, culture, goals and environment of the organisation at hand. In this light, HPWS should be studied as organisation-specific configurations of practices and studies should go beyond identifying *which* practices are optimal for enhancing specific organisations' performance to investigate *how* these practices are being applied and enacted to complement each other (thus creating synergies) and to fit the organisation's strategy. Others, on the other hand, view HPWS as a universalistic 'best practice' approach and identify this as the main weakness of the HPWS approach.^{3,16} This approach is reflected in the body of research that aims to identify a set of HR practices that are linked to high performance across organisations and contexts. Although this appears to be the dominant approach, if not always explicitly stated and recognised, we argue that it is fundamentally flawed as it ignores the salient role played by organisational and contextual characteristics. This can be demonstrated simply by looking at a specific HR practice across different contexts – performance-contingent rewards. Pay-for-performance is generally considered as one of the performance-enhancing practices and has been consistently included in generalist bundles of HPWS.^{76,140} However, in the health-care sector, literature indicates that pay-for-performance is associated with various potential dangers and the evidence of the benefits of such practices is scarce and inconclusive.^{172,173} It is encouraging to see that a large proportion of the reviewed studies take into account the peculiarities of the health-care context and reflect this in their theorising and study design. However, there is insufficient evidence of the proposed characteristics of HPWS in the health-care literature (i.e. lack of evidence of synergies, internal and external fit, link to productivity). There is a need for a clearer distinction between organisational-level and individual-level effects – what is good for the organisation is not always good for the employee and vice versa.¹⁷⁴ For example, an increase in performance might come at the cost of increased stress levels. Overall, it cannot be conclusively derived whether or not there is sufficient and appropriate evidence of the link between HPWS and performance in the health-care sector based on the reviewed papers; nevertheless, the reported findings provide some initial evidence of such links.

A wide range of theoretical frameworks have been utilised by the authors of the reviewed publications in order to provide the rationale behind HPWS. Common theoretical perspectives include the RBV,⁸⁵ social exchange theory;¹⁷⁵ AMO theory,^{83,127,176} structure, process and outcomes;^{141,142,177} attraction–selection–attrition model;^{142,178} motivation;¹⁷⁹ configuration, contingency, universalistic;⁶⁹ and sociotechnical systems (STS) design.^{4,180} Harmon *et al.*⁴ justify the selection of the STS design as the framework behind HIWS, as it is based on the same principle of alignment between human and technical factors. Although the theoretical variation is often well justified and aligned to terminological and measurement choices, the sheer range of theoretical frameworks used makes a systematic review and comparison challenging.

Overall, the primary gaps and limitations identified in the literature are (1) a lack of longitudinal studies that investigate causality; (2) various studies appear to report on the same data, thus possibly inflating the reported effects; (3) the country variation among the reported studies is limited, thus making it difficult to reach generalisable conclusions; and (4) the majority of studies investigate a limited range of HR practices, thus making it difficult to reach conclusions with regards to the effects of the HR system overall.

In the health-care literature, two recent reviews give us a basis for drawing generalisable conclusions on the effects of HPWS on outcomes. The first, by Etchegaray *et al.*,¹³⁶ is a narrative review that addresses issues of HPWS measurement in health care and their link to performance. The second is a realist review of the field conducted by Garman *et al.*,¹⁴² which combines research from health care with findings from other industries to propose a comprehensive framework of HPWS and the mechanisms through which they affect outcomes, tailored specifically for health care. Surprisingly, the publications identified in the searches, and the main findings and conclusions, differ markedly between the two reviews. Owing to the conceptual and theoretical similarities among the various terms, the reviews that have been conducted thus far generally assess the concepts together. For example, in their review of HPWS in health care, Etchegaray *et al.*¹³⁶ included in their search the terms 'high commitment' and 'high involvement' as well. The present review aimed at overcoming this discrepancy by conducting a more thorough and inclusive literature search. Although it was not successful in providing clear, consistent evidence of the links between HPWS and outcomes, it does provide a firm basis for suggesting that more coherent research is needed. In addition, only three of the reported studies were conducted in the UK, suggesting a lack of evidence from within the NHS specifically.^{21,126,159}

Chapter 4 Policy review

Introduction

As noted earlier, the 'business case' that staff satisfaction leads to greater organisational performance has been accepted by government and the NHS. There are a series of reports by a number of bodies drawing on different, but connected, debates inside and outside the NHS. The generic business case has been carried out with reference to 'Good Jobs',^{27,28,181} work and well-being,²⁹⁻³³ and engagement.^{34,100} Similarly, a series of reports from the Department of Health (DH) and other organisations have stressed the importance of staff involvement and engagement and health and well-being over a period of about 15 years. According to Hyde *et al.*,¹⁸² the NHS presents a particularly interesting environment because of attempts, through national policies and legislation, to introduce HPWP throughout 2000–10. Atkinson and Hall⁵ report that, in line with HPWS theory, the NHS has adopted a range of HR practices as a means to enhance organisational performance. We present a chronological outline of the debates in general and for the NHS.

The generic business case

In a report for The Work Foundation, Coats and Max¹⁸¹ claim that studies demonstrate that better workplaces have better financial results. They argue that there is a compelling case for organisations of all sectors and sizes to move beyond the traditional health and safety agenda to embed health and well-being at their heart and to create an empowering and rewarding work environment for all employees. In particular, they focus on sickness absence, pointing out that the annual economic costs of sickness absence and worklessness associated with ill-health are over £100B a year – greater than the current annual NHS budget.

Waddell and Burton²⁹ were commissioned to review the link between work, and health and well-being. As part of this review, PricewaterhouseCoopers¹⁸³ were commissioned to consider the wider business case and specifically the economic case for employers to invest in wellness programmes for their staff. PricewaterhouseCoopers found considerable evidence from literature reviews and over 50 UK-based case studies that health and well-being programmes have a positive impact on intermediate and bottom-line benefits. Intermediate business benefits include reduced sickness absence, reduced staff turnover, reduced accidents and injuries, reduced resource allocation, increased employee satisfaction, a higher company profile and higher productivity. Waddell and Burton²⁹ sum up that work is usually good for both mental and physical health as well as well-being, but it should be 'good work' which is healthy, safe and offers the individual some influence over how work is done and a sense of self-worth. They conclude that the message is clear: good health is good business.

The Scottish Executive¹⁰⁰ considers that the literature finds measurable impacts of employee engagement and disengagement on the performance of the organisation. The level of employee engagement matters because it affects HR (e.g. recruitment and retention) as well as the bottom line for companies, although the links to these more distal outcomes tend to be more tenuous. Moreover, there is not an abundance of information on this in the literature and there is still discussion regarding quantifying the cost-effectiveness of commitment of an organisation to employee engagement.

In a report commissioned by government, Black³³ writes that research found substantial evidence that economic benefits in all types of business could be offered by health and well-being programmes; good health allows for good business. However, employers do not adequately understand the information regarding investment in the health and well-being of employees. The government response¹⁸⁴ welcomed the review, the evidence it presented, the conclusions drawn and the recommendations made.

Lekhi and Blaug²⁷ produced a literature review for the Health and Safety Executive which argued that the existing literature focuses on associations, saying little about causation. They argue that job satisfaction is not a useful measure of job quality or a good job, as satisfaction can sometimes reflect individuals getting used to anything, which suggests that job satisfaction per se may be a poor measure of organisational commitment to good jobs.

MacLeod and Clarke³⁴ were asked by ministers to explore how employee engagement can lead to organisational performance. They state that while the meaning of the term remains unclear, there is evidence that employers can increase engagement in a 'win-win' context (i.e. benefits for both employers and employees).

Writing for The Work Foundation, Constable *et al.*²⁸ report that considerable benefits can be achieved from increasing the number of jobs into 'Good Jobs' in the UK. These benefits can be reaped by government and other employers, and include greater labour productivity, higher workforce stability, a healthier workforce, and more engaged and committed employees. In particular, they stress the importance of impact on organisational performance by changing levels of sickness absence and presenteeism. They list the benefits of 'Good Jobs' for government departments such as the Treasury, the DH, the Department for Business, Innovation and Skills, and the Department for Work and Pensions.²⁸

Business in the Community³⁰ argues that healthy people lead to healthy profits. It sets out 20 case studies that document business benefits that followed the introduction of health and well-being interventions in their workplaces. Similarly, Business in the Community³¹ argues that it is good business to have a happy, healthy and engaged workforce. It stresses that maximising the wellness and engagement of your employees is a win-win situation in that it benefits employees, customers, the organisational 'bottom line' as well as the wider society and nation.

In a Bupa report, Vaughan-Jones and Barham³² note the cost of sickness absence to the economy and to society. They examine more than 600 pieces of evidence regarding how effective a range of interventions are to find what is best for different employers. It states that evidence demonstrates that a variety of interventions benefit employers (by providing better productivity and a decreased number of absences) and employees (by providing earlier discovery of disease and better well-being), presenting employers government and society with an uncommon chance for a win-win.

In a report for IIP, Bevan¹⁸⁵ argues that there is growing and convincing evidence that work is good for the vast majority of employees. He explores seven areas of business performance that are directly or indirectly linked to improvements in employee health: reduced work absenteeism, fewer work accidents, higher employee retention, greater employee commitment, increased labour productivity, enhanced employer brand and a higher level of employee resilience.

A report for the Chartered Institute of Personnel and Development¹⁸⁶ states that although we have limited knowledge about employee engagement in theoretical, conceptual and empirical terms, the concept has positive associations at individual and organisational levels with a range of beneficial outcomes. The evidence suggests that the UK has relatively low levels of engagement; however, it tends to be higher in the public sector than in the private sector. The report lists the following drivers of engagement: voice, the ability to feed views upwards; senior management communication and vision; supportive work environment; person-job fit; line management style; and the work that is perceived to be meaningfulness.

Following the publication of the review by MacLeod and Clarke,³⁴ the new government asked for additional evidence of the associations between employee performance and engagement. The Employee Engagement Task Force responded by calling for evidence of connections between employee engagement and organisational outcomes from UK-based organisations. Rayton *et al.*⁹⁷ report that the utter weight of the evidence should convince the most sceptical that employee engagement is not a weak topic, but an

important issue that has an impact on success or on service outcomes. The authors regard employee engagement as something essential, not just desirable.

Rayton *et al.*⁹⁷ examine the consequences on business performance (such as innovation, customer measures and profits, efficiency) and people indicators (such as health and safety, attendance and welfare) in the public and private sectors. Multiple reports using meta-analysis have confirmed strong associations between employee engagement and improved efficiency, returns, beneficial discretionary effort, innovation, customer happiness and retention. Moreover, they point to a causal relationship from engagement to performance. In short, the evidence supports the existence of a strong longitudinal synergistic connection between employee performance and employees who feel engaged work better.

The business case for the NHS

The term 'model employer' has often been used for public services in general and the NHS in particular^{7,38,187} when government seeks to manage its employees along 'best practice' lines. As in the section *The generic business case*, we provide a largely chronological summary of the main documents.³⁶⁻³⁹

The New Labour White Paper, 'The New NHS',⁴² acknowledged that staff involvement had not been a high priority, but pledged a new approach to appreciate staff more, spearheaded by a taskforce on staff involvement.⁴⁴ This was followed by the NHS HR Strategy, 'Working Together'.⁴³ According to Ellins and Ham,³⁶ this was one of the first documents produced by the DH that clearly linked better staff conditions with enhanced services. However, Bach and Kessler³⁸ consider that the proposals were relatively modest in terms of staff involvement, but they still represented a significant departure for government because it was the first time that the NHS had set out a detailed approach to employee relations. However, it appeared to have a low priority; in a survey of 75 trusts, 'reviewing staff involvement' and 'establishing a partnership agreement' were the lowest priority in terms of progress on 13 HR goals.

The NHS Taskforce⁴⁴ provided three key messages for ministers and for the NHS: staff involvement matters, works and can be made to work across the NHS. It issued 11 wide-ranging recommendations: encourage good leadership; promote good industrial relations; develop and use a self-assessment tool; develop a local statement of rights; provide support and advice; promote good practice on intelligence networks; improve communication; invest in personal development; monitor performance and progress; include in attitude surveys; and commission regular independent research.

Bach and Kessler³⁸ state that the NHS Taskforce report 'pointed to private sector best practice using almost evangelical language to persuade sceptical employers that staff involvement works'. However, the authors note that staff expressed scepticism about senior management's interest in workforce perspectives despite the development of an impressive array of top-down communication mechanisms. For example, the NHS staff survey indicated limited change. The 'What Matters' research highlighted widespread frustration and commented that many staff regard the NHS as moving an inappropriate business agenda on finance and incorrect targets.¹⁸⁸

The NHS Plan⁴⁰ makes a commitment to invest in NHS staff. It states that making the working lives of staff better partly results in improved patient care via staff retention and recruitment and because patients would rather be cared for by staff who are enthused. The way in which NHS Employers handle staff will in future be part of the central performance measures and related to the monetary resources provided.

This was set out in the *Improving Working Lives Standard*,⁴¹ which recognises the necessity for modern health services to be built on modern employment services. It sets out a series of targets to achieve annual improvements in the quality of working life for staff, and it expects that *the Improving Working Lives Standard* should be put into practice by all NHS employers by April 2003.

*Shifting the Balance of Power*⁴⁵ states that a real shift in the balance of power will not occur unless staff are empowered to make the necessary changes, stressing that issues of cultural shift and staff ownership needed will in many ways. It lists the actions that will support this work at a national level, including mainstreaming staff involvement; publishing leadership competencies; development programmes; developing a Staff Involvement Toolkit; and establishing a joint forum for partnership and involvement. Local actions include appointment of a staff involvement leader who reports to a nominated non-executive and executive director; the reduction of hierarchies and development of self-managed teams; the preparation of a staff involvement plan; and ensuring that staff involvement is built into objectives for managers and into the arrangements for performance monitoring.

In 2002, the government launched the first comprehensive HR strategy for the NHS, *HR in the NHS Plan*.¹⁸⁹ The strategy described four pillars on which the goal of additional staff who are operating differently would be built: making the NHS a model employer by implementation of best policies, facilities and practices; ensuring the NHS provides a model career through the concept of the skills escalator, with lasting learning and development; increasing staff morale; and building people management skills, by developing the capacity and proficiencies of HR.¹⁸⁹

In 2003, the DH initiated resources to aid NHS organisations translate the idea of staff participation into reality,³⁶ including a staff charter, partnership framework, staff forums, staff representation on committees, staff surveys and other feedback and communication tools.⁴⁷

The DH issued a national framework to support local workforce development that discussed staff engagement, enabling NHS organisations to provide high-quality services by using advanced employment methods and representing 'model employers'.⁴⁶ The framework proposed 10 changes in HR practices, which evidence indicated would have the greatest benefit to delivering organisational goals, one of which was participation, staff involvement, and positive employee relationships. It also put forward a number of model employment practices including flexible working, good appraisal systems and staff participation policies as well as partnerships with staff-side organisations.⁴⁶

NHS Employers has drawn attention to many aspects of staff satisfaction in a series of reports.^{55,57,62} Bullying and harassment are not normally considered in HPWS (and so was not considered in *Chapter 3*), but can clearly be an important factor in organisational performance. For example, Woodrow and Guest¹⁹⁰ state that both physical violence from members of the public and non-physical harassment from colleagues are highly prevalent in the health-care workforce. They note that while policy has tended to focus on the more visible problem of public violence, it is not clear which of the two behaviours is the most damaging. They compared the consequences of public violence and staff harassment for well-being in two large samples of English nurses. The results showed that, while both types of aggression were associated with decreased levels of staff well-being, staff harassment had a stronger negative association with well-being than public violence. The relationships between each of the types of aggression and some aspects of well-being were moderated by perceived supervisory support, such that the negative effects on well-being were greater for those with higher levels of support, although the effect sizes were very small. This is in contrast to previous research showing that support (although not specifically from supervisors) can buffer against the effects of aggression. They conclude that the major implication of the study is that health-care organisations must pay more attention to the prevention of staff harassment in the workplace.

NHS National Workforce Projects¹⁹¹ points to research that shows that an engaged workforce is more productive, with better recruitment and retention rates. It sets out top tips developed from lessons learned in this study.

The DH commissioned the 'What Matters' research programme to develop understanding of the improvement of NHS values and how staff experience relates to care of patients.¹⁸⁸ Qualitative and quantitative research concluded that it is particularly important that the NHS aims to improve the following elements for staff:

- I understand my role and where it fits in.
- Senior managers are involved with our work.
- I have the opportunity to develop my potential.¹⁸⁸

The final Darzi Report¹⁹² notes the importance of empowering staff and supporting NHS staff to provide high-quality care. It pointed to two national issues of high-quality places of work and high-quality training and education. In the same way that patients should have high-quality care, NHS staff should have high-quality work. It proposed a NHS constitution that would reflect NHS values as well as valuing and empowering staff.

Staff engagement was also identified as a major priority by Clare Chapman, then NHS Director General of Workforce.³⁶ This was reiterated in the NHS Operating Framework for 2009/10, which challenged all NHS organisations to increase staff involvement.¹⁹³

The interim Boorman report⁴⁸ argues the case for investing in improving staff health and well-being services as this will result in benefits to individual staff, patients and employers. It reported research from commissioned reports that shows that there is a positive relationship between staff health and well-being and key performance issues. It sets out the business case for improving staff health and well-being. For example, it calculated that reducing current sickness absence levels by one-third could lead to efficiency savings of some £555M. However, it points to a widely held view that staff health and well-being was not seen as a priority either at organisational or local management level. Finally, the report made a number of recommendations for action at both national and local level to deliver change.

The final Boorman report⁴⁹ made further recommendations that the NHS Operating Framework should require staff health and well-being to be included in national and local governance; form part of standards and targets for the Care Quality Commission's annual assessment of NHS; and to be considered as part of Monitor's assessment process for foundation trust status and in annual monitoring arrangements. At the local level, it recommends that a staff health and well-being strategy should be developed by all NHS organisations. In short, all NHS organisations should be seen as exemplar employers that need to invest in their workforce's health and well-being in order to deliver sustainable, high-quality services.

The DH⁵⁰ accepted Dr Boorman's recommendations, agreeing that this attitude must change and that all NHS staff and managers must give priority to staff health and well-being. In the foreword to the report, Secretary of State, Andy Burnham, stated that he was convinced by the business case presented in the report and accepted all suggestions. The document accepted the central case that good staff health and well-being is vital for ensuring that the NHS can meet the quality and productivity challenge is well made, and that the NHS must be an exemplar employer.⁵⁰

In the July 2010 health White Paper 'Equity and Excellence: Liberating the NHS',⁵¹ the coalition government committed to continuing to implement the recommendations from Dr Boorman's⁴⁹ report on NHS health and well-being. It stated that staff who are engaged, empowered and are supported provide better care of patients. The Coalition Government will therefore encourage staff engagement as well as partnership working and the initiation of Dr Boorman's improvements to staff health and well-being.

*The Operating Framework for the NHS in England 2011/12*⁵² stated that the NHS is dedicated to developing and protecting staff health and well-being as well as decreasing the level of unnecessary sickness leave, as discussed in Dr Boorman's review of NHS health and well-being.⁴⁸ It adds that substantial staff engagement will help to provide the productivity and quality challenges faced by NHS organisations and will lead to better patient outcomes and financial management.

*Briefing 78: Health, Work and Well-being in the NHS*⁵⁷ recognises that the improvements to staff health and well-being recommended in the Boorman review⁴⁸ contribute towards meeting the staff pledge in the NHS Constitution and delivering the four elements of the QIPP programme. Moreover, the 2010–11 Operating Framework¹⁹⁴ requires all NHS organisations to set up a health and well-being strategy for their staff. It argues that evidence from the Black³³ and Boorman⁴⁹ reviews in addition to earlier research show the close links between staff health and well-being and engagement, and that high-performing NHS organisations tend to have good staff engagement policies. The document notes a set of five high-impact actions (leadership, evidence-based plan, management capacity, staff engagement, occupational health service) from the DH's Well-being Delivery Group. It also notes that West *et al.*²¹ find evidence of a clear association between reducing patient morbidity and effective HR, occupational health and health and safety services.

*Briefing 78: Health, Work and Well-being in the NHS*⁵⁷ focuses on some local experience of staff engagement in the NHS. It argues that the challenges faced by the NHS such as reducing costs, increasing productivity and implementing the organisational changes associated with the NHS White Paper are linked with staff engagement as high levels of engagement are associated with positive outcomes for patients and for staff.

*The Operating Framework for the NHS in England 2012/13*⁵³ argues that staff continue to be the most fundamental resource of the service. It suggested that all organisations should continuously progress staff involvement and services to patients by drawing on the NHS staff survey, and suggested models and frameworks for improvement, which will help to achieve the Boorman ambition of reducing the level of sickness absence towards 3% and towards meeting the QIPP challenge.

In a report for the DH, West *et al.*¹⁰⁶ state that effective NHS staff management results in better care, happier patients and reduced mortality. In more detail, engagement, the number of staff receiving good appraisals, working in successful teams, receiving supportive training and management are associated with several trust outcomes.

*Generating Savings by Improving Health and Well-Being*⁵⁵ notes the high level of sickness absence in the NHS (10.7 days a year, compared with 9.7 days in the public sector as a whole and 6.4 days in the private sector). It states that evidence submitted to the Francis inquiry suggests that staff disengagement can damage care quality. NHS Employers⁵⁶ has produced a series of factsheets on the staff engagement challenge, which provide evidence from the commercial sectors in the UK and USA and from the NHS of the positive association between staff and organisational performance.

The Francis report¹⁵ said little on staff engagement, but stressed that staff must be valued and front-line staff must be empowered with the capability and accountability to deliver safe care. However, the report has cast a long shadow in terms of engagement. *Engaging Your Staff: The NHS Staff Engagement Resource*⁶² states that the importance of staff engagement has never been higher as the NHS faces the biggest reforms since its inception and begins to change the poor cultures highlighted in the Francis report. The document sets out a pledge to work to improve the health and well-being of health-care staff.

The government's response to the Francis report⁶⁰ includes a number of relevant issues. It stresses the importance of the 'Friends and Family Test'. However, as staff are asked this question only annually, the NHS Commissioning Board aims to ensure that this type of staff feedback becomes more frequent. It states that there is already good evidence to show organisations that treating their staff well will deliver better outcomes for patients. It adds that the Northumbria Healthcare NHS Foundation Trust has some of the most satisfied staff and patients in England and firmly believes the two must go hand in hand for a healthy organisational culture.

The business plan for NHS England¹⁹⁵ states that as the main touchstones of success are patients recommending their local NHS care and individual NHS staff members having faith in the service they are contributing towards, an 11-point scorecard will set out progress against the key measures of success of satisfied patients and staff who feel positive about what they are doing.

The government's mandate to Health Education England¹⁹⁶ include excellent education; competent and capable staff; flexible workforce, receptive to research and innovation; NHS values and behaviours; and widening participation. One of the 'longer-term objectives' includes continual improvement supporting efforts to deliver a continual improvement in proportion of staff, patients and the public who recommend friends and family by ensuring an adequate supply of suitably qualified staff.

The NHS Constitution was refreshed in 2013⁶⁰ with more details being given in the *Handbook to the NHS Constitution*.⁶¹ It draws on the 'What Matters'¹⁸⁸ research, which identified four themes, which are now reflected in the NHS staff survey and were also used to inform the NHS Constitution's values: the resources to deliver quality care for patients; the support they need to do a good job; a worthwhile job with chances to develop; and the opportunity to improve the way they work. To really embrace the full and challenging definition of quality set out in 'High Quality Care For All',¹⁹² it must be recognised that high-quality care requires high-quality workplaces, with commissioners and providers aiming to be employers of choice. In addition to legal rights, there are a number of pledges, which represent a commitment by the NHS to provide high-quality working environments for staff:

- to provide a positive working environment for staff and to promote supportive, open cultures that help staff do their job to the best of their ability
- to provide all staff with clear roles and responsibilities and rewarding jobs for teams and individuals that make a difference to patients, their families and carers and communities
- to provide all staff with personal development, access to appropriate education and training for their jobs, and line management support to enable them to fulfil their potential
- to provide support and opportunities for staff to maintain their health, well-being and safety
- to engage staff in decisions that affect them and the services they provide, individually, through representative organisations and through local partnership working arrangements. All staff will be empowered to put forward ways to deliver better and safer services for patients and their families.

It is argued that a positive working environment not only has benefits in terms of the experience of staff, it is also linked to positive outcomes for patients and that several studies have shown clear evidence of the link between good staff experience and good patient experience.^{39,106} An open and supportive culture has been identified by the Mid Staffordshire Foundation Trust Public Enquiry ('Francis inquiry') as a key element in successful organisations. It notes that there are already a considerable number of initiatives at all levels. The DH, NHS Protect, NHS Employers, NHS Plus and others are actively supporting programmes to provide a healthy working environment, improve the health and well-being of NHS staff and tackle violence, bullying, harassment and stress in the workplace. Finally, the NHS staff survey will continue to be an important benchmark, encouraging organisations to engage with their staff.

NHS Employers⁶² has produced the staff engagement toolkit. It presents the 'Staff Engagement Star' of:

- great management and leadership
- a healthy and safe work environment
- ensuring every role counts
- supporting personal development
- enabling involvement in decision-making.

*Engaging Your Staff: The NHS Staff Engagement Resource*⁶² points out that the Operating Framework for the NHS in England 2012/13⁵³ refers to the need to improve staff experience and take account of staff survey results.

The King's Fund⁵⁹ report on patient-centred leadership argues that a change in management, systems and the culture of organisations in the NHS is required if the recommendations of the Francis Inquiry¹⁵ are to be noted and implemented. The Francis Inquiry identified a culture that was dangerous and unhealthy, including detachment by medical leaders, low staff confidence and bullying, as a cause of the problems at Mid Staffordshire NHS Foundation Trust. The King's Fund report discusses the problems associated with disengagement between managers, staff and patients. It argues that a supportive and positive environment should be created for staff and that without this, staff may not attain good levels of employee engagement, and it has been shown that, patient happiness is higher and patient mortality is lower when they have been dealing with staff who are engaged.^{95,106} While organisational climate (or culture) played a role in staff well-being, the local work climate – the ward – was key.³⁹ In short, cultures of positivity, compassion, engagement, thoughtfulness and respect for staff and patients as well as the public delivers the perfect environment for caring for the nation's health. If staff are well cared for then they will be able to supply better patient care.⁹⁵

In short, this policy review has shown that issues such as staff engagement and health and well-being have been on the generic national and NHS agendas for a long time, although most of the focus has been on the topic of involvement or engagement. However, much of the discussion in the policy documents can be argued to be either too broad or too narrow. At one level, there are fairly vague assertions that 'staff engagement' will lead to better performance without consideration of issues such as cost, context, causality or mutual gains. At another level, the case study material reports that engagement interventions lead to reduced levels of absenteeism, but there is little consideration of whether or not they would work in different contexts. First, most studies report 'benefits' without any consideration of cost, making a 'business case', presumably based on assessing costs and benefits, difficult to sustain. Second, it has been shown (see *Chapter 2, Fit/universalistic, configurational or contingency perspectives*) that there are major debates over best practice compared with best fit. For commentators who favour a contingency perspective, it is difficult to argue that simple transfer of evidence from other countries, sectors/industries will produce enhanced organisational performance, and there is little evidence on the NHS (see *Chapter 3*). Third, most documents report cross-sectional correlations, making it difficult to establish causality (see *Chapter 2, Methodological issues*). For example, it is difficult to rule out reverse causality when high organisational performance causes staff satisfaction (rather than staff satisfaction causing organisational performance). Fourth, employer perspectives tend to get much more attention than employee perspectives. This lack of evidence makes it difficult to appraise the 'mutual gains' and 'conflicting outcomes' approaches (see *Chapter 2, Employer and employee outcomes*) and making it difficult to determine if high-performance work practices are 'win-win' or 'win-lose'.

Moreover, Ellins and Ham³⁶ note that despite many policy initiatives having been launched since 1998 to increase staff involvement, relatively few staff state that they are involved in important decisions, are consulted about changes that affect them, feel encouraged to suggest ideas for improving services or feel that their organisation values their work. Finally, they conclude that as there are strong similarities between recent DH initiatives and policy documents from the late 1990s, exhortation and guidance alone appear insufficient to convert policy into practice.

Conclusion

The business case for staff engagement and health and well-being has been recognised by a variety of bodies both inside and outside the NHS over a period of many years. However, a number of untested optimistic assumptions, ignoring costs, transferring evidence from contexts such as the USA and from for-profit industry, causality, and 'win-win' have been largely taken for granted. Moreover, implementation has been rather variable and patchy. It is possible that renewed emphasis may be placed on this case in the 'post-Stafford' era.

However, it is clear that there is little evidence on HPWS in the NHS. There is insufficient evidence on the applicability of HPWS concepts to the NHS in terms of its contextual setting of being located in England, in the service sector, as a public service organisation and in the health-care sector (see *Chapter 2*). There are few empirical studies on health care in general and on the NHS in particular (see *Chapter 3*). Finally, the policy review highlights a rather broad and vague 'business case' based on a number of untested optimistic assumptions (see *Chapter 4*). All these factors suggest that the empirical study of *Chapters 6–8* is worthwhile.

Chapter 5 Methods used in the quantitative analysis

Introduction

This chapter gives a detailed description of the quantitative analytical methods used to answer the research questions, and describes the data sources, the variables and (when appropriate) the samples used. As a reminder, the research questions were:

1. What are the links between individual staff experiences (e.g. satisfaction, engagement, turnover intentions) and intermediate staff outcomes (e.g. staff absenteeism, actual turnover)?
2. How do these link with organisational performance (e.g. patient satisfaction, mortality)?
3. Do these measures and relationships differ by occupational, demographic groups, trust types and geographical areas and, if so, what is the relative change for each group?

Analytical methods used

Objectives of the analysis

The research questions themselves break down into a number of objectives, each of which required one or more different methods to answer. The different objectives are as follows:

1. (Q1) What are the links between individual staff experiences (e.g. satisfaction, engagement, turnover intentions) and intermediate staff outcomes (e.g. staff absenteeism, actual turnover)?
 - i. Objective 1a: to examine what associations there are between individual staff experiences and self-reported outcome measures.
 - ii. Objective 1b: to examine what associations there are between aggregate levels of staff experiences within trusts and levels of staff absenteeism and turnover.
 - iii. Objective 1c: to examine what associations there are between aggregate levels of staff experiences within trusts and changes in staff absenteeism and turnover.
 - iv. Objective 1d: to examine whether or not the links between staff experiences and intermediate outcomes are stronger from year 1 to year 2 than from year 2 to year 1.
2. (Q2) How do these link with organisational performance (e.g. patient satisfaction, mortality)?
 - i. Objective 2a: to examine links between aggregate levels of staff experiences within trusts and trust outcomes.
 - ii. Objective 2b: to examine links between aggregate levels of staff experiences within trusts and changes in trust outcomes.
 - iii. Objective 2c: to examine links between intermediate outcomes (staff absenteeism and turnover) and levels of trust outcomes.
 - iv. Objective 2d: to examine links between intermediate outcomes (staff absenteeism and turnover) and changes in trust outcomes.
 - v. Objective 2e: to examine whether or not the links between staff experiences and intermediate outcomes, and trust outcomes, are stronger from year 1 to year 2 than from year 2 to year 1.
 - vi. Objective 2f: to determine whether or not there are any mediated effects between staff experiences within trusts and trust outcomes, via intermediate outcomes.

3. (Q3) Do these measures and relationships differ by occupational, demographic groups, trust types and geographical areas and, if so, what is the relative change for each group?
- i. Objective 3a: to describe the effects of key staff experiences on outcomes separately for different groups of staff and for different geographical regions.
 - ii. Objective 3b: to identify those effects that showed large differences between different groups of staff, or for different geographical regions.

Multilevel analysis

Objective 1a was examined via multilevel regression analysis, performed using International Business Machines Corporation (IBM) Statistical Product and Service Solutions (SPSS) version 20 (SPSS Inc., Chicago, IL, USA). Six different outcome variables, representing different elements of individual well-being, were considered (these are described fully in *Data from the NHS national staff survey*). These six variables can be considered staff experience variables in their own right (and are used as such elsewhere), but as well-being variables they also represent intermediate outcomes:

- impact of health and well-being on ability to perform work or daily activities
- work-related stress in previous 12 months
- job satisfaction
- presenteeism (feeling pressure to attend work when feeling unwell)
- intention to leave job
- advocacy (recommending trust as a place to work or receive treatment).

For each, a series of multilevel analyses were conducted, with each other 'key finding' from the NHS staff survey 2010 as a predictor controlling for age, gender, managerial status (whether or not they had line manager responsibility), tenure, full-time/part-time status (full time defined as > 30 hours per week), occupational group [split into nursing, medical/dental, general managers, administrative/clerical staff, allied health professionals (AHPs)/scientific and technical staff, ambulance staff and others], disability status, ethnic group, location (London vs. other region, based on previous findings that experiences in London may be different)¹⁰⁶ trust type (acute vs. other), foundation trust status, trust teaching status, trust size (log number of employees), and the ratio of doctors per bed in the trust.

Data from the 2010 survey were used because that was the most recent year for which full data were available to researchers (up to and including this survey, the data collection and analysis was the responsibility of one of the authors of this report). Even though some data from the 2011 survey (and subsequently the 2012 survey) have been made publicly available, they are not detailed enough to capture all of these variables at the individual level. However, it is unlikely that many of these relationships would change significantly over time.

Latent growth curve modelling

Objectives 1b, 1c, 2a, 2b, 2c and 2d were examined using latent growth curve modelling¹⁹⁷ in Mplus version 6 (Mplus, Los Angeles, CA, USA).¹⁹⁸ This allows the modelling of outcome variables (here including both intermediate and trust outcomes) over time. For each outcome in question, a 3-year linear change model was used to explain data from the years 2009/10, 2010/11 and 2011/12.

After controlling for relevant trust-level variables (see *Other variables used*), both the intercept (effectively the starting level) and the slope (rate of change over the 3-year period) were predicted in turn by each of the staff experience variables from 2009 (and intermediate outcomes from 2009/10, if appropriate). The associations with intercepts were used for objectives 1b, 2a and 2c. The associations with slopes were partly used for objectives 1c, 2b and 2d; however, these objectives were then subject to a stronger test in which similar analysis was performed, except the predictors were changes in staff experience from 2009 to 2010 (or in intermediate outcomes from 2009/10 to 2010/11). This represents a far stronger test of causal

relationships than a straightforward change-on-change regression analysis, as changes in both variables are considered, but the outcome is considered over a longer period of time.

Cross-lagged correlations

Objectives 1d and 2e were examined using cross-lagged correlation analysis, in a similar fashion to a famous paper by Schneider *et al.*¹⁹⁹ who sought to examine whether or not there was evidence for causal ordering between staff attitudes and organisational performance in a non-health-care sample. This analysis utilises tests for comparing elements of a correlation matrix.²⁰⁰ For objective 1d, all staff experience variables were compared with intermediate outcomes from the two more recent years of data available. For objective 2e, both staff experience and intermediate outcomes were compared with organisational performance data. When a correlation is significantly greater in one direction (e.g. X in year 1 is more strongly associated with Y in year 2 than the Y in year 1 is associated with X in year 2), this provides some evidence that if there is a causal relationship between the variables, it is more likely to be in one direction than the other (in this example it would be from X to Y).

Cross-lagged correlation analysis is recognised as an imperfect yet still useful method of exploring the direction of effects between variables.^{201,202} The imperfections stem largely from the inability to consider other variables (either mediators or exogenous variables) and so results from this analysis have to be treated with some caution.

Mediated regression analysis

Objective 2f was examined by using mediated regression analysis using the *MEDIATE* macro in SPSS.²⁰³ For each organisational performance variable, the mediated (indirect) path from each staff experience variable via each of the two intermediate outcomes (absenteeism and turnover) was examined using bootstrapping.²⁰⁴

Regression analysis by groups

Objectives 3a and 3b were achieved using regression analysis, in which the predictors were the staff experience variables separated out by different staff groupings. In particular, the following groupings were used (in most cases, these were limited by the nature of variables collected in the NHS staff survey):

- Occupational group: coded as nursing, medical/dental, general managers, administrative/clerical staff, AHPs/scientific and technical staff, others
- Managerial status: whether or not staff had line manager responsibility
- Full-time/part-time status
- Organisational tenure: coded as < 1 year, 1–2 years, 3–5 years, 6–10 years, 11–15 years or > 15 years
- Age (years): coded as 16–20, 21–30, 31–40, 41–50, 51–65 and > 65
- Gender (male or female)
- Disability status: whether or not the respondent considered themselves to have a disability
- Ethnic group: coded as white, black/black British, Asian/Asian British, mixed, or other (including Chinese) (codes originating from the 2001 UK Census).

For each of these, regression of trust outcomes and intermediate outcomes was performed with data from the 2010/11 NHS year (as this was the most recent staff survey available to us with these breakdowns), controlling for the variables described under *Other variables used*. We also repeated the analysis with an additional control, the outcome from the prior year (i.e. 2009/10), as this was a particularly strong form of the test.

Owing to the analysis being very extensive, we did not use every staff experience variable for this, but instead chose nine variables that best exemplified staff attitudes and well-being:

- job satisfaction
- intention to leave jobs

- work engagement (also known as staff motivation)
- staff advocacy – the extent to which staff would recommend their trust as a place to work or receive treatment
- staff involvement in decisions that affect them
- overall engagement (a composite score of the previous three variables)
- line manager support
- impact of health and well-being on ability to perform work or daily activities
- work pressure.

These were chosen as the variables most commonly associated as job attitudes in the organisational literature: job satisfaction, intention to leave jobs, and engagement, with the subdimensions of engagement (work engagement, staff advocacy and staff involvement) also included. We also included line manager support as a recognition that the 'people management' part of the Michie and West²² model revolves to a large extent around the line manager; impact of health and well-being and work pressure were chosen as representing intermediate well-being outcomes for individuals (stress may have been considered also, but was not used as the measurement is relatively poor). Each of these is described in *Data from the NHS national staff survey*.

We also performed analysis broken down by each of the 10 geographic regions in England that were (at the time of data collection) associated with the strategic health authorities. We did not conduct an equivalent analysis by trust type, as had originally been envisaged, and owing to the changing nature of PCTs, these could no longer be compared as a homogeneous unit; also there were too few ambulance trusts and mental health trusts to enable reliable regression estimates. Therefore, the analysis was conducted for all trust types for the intermediate outcomes (controlling for trust type) and for acute trusts only for the organisational performance variables, which were only available for acute trusts.

In order to meet objective 3b, which required identification of those breakdowns that gave the largest differences in effects, we needed to apply consistent criteria. Given the very large number of different analyses performed, we selected out those for which (1) the maximum difference in standardised regression coefficients for the different groups was at least 0.20 (the rationale for this being that Cohen's effect sizes²⁰⁵ suggested that a small effect was equivalent to a correlation of 0.1, a medium effect of 0.3 and a large effect of 0.5; therefore, such differences were equivalent to at least one order of magnitude on this scale), and (2) at least one group had a coefficient with a *p*-value of < 0.01 (to eliminate any that only just met statistical significance at the conventional 0.05 level, as these are more likely to be type I errors).

Data from the NHS national staff survey

Samples used

We used data from the NHS national staff surveys from 2009, 2010 and 2011, each of which was carried out in approximately the middle of the NHS year (which runs from April to March). We limited the data used to these three years because several important variables (e.g. engagement, general health) did not appear in the survey before 2009, and the 2011 data were the most recent available at the time of final analysis. The survey is run annually, with questionnaires being sent to 850 randomly selected employees in each trust (fewer in trusts with up to 3000 staff) by an independent survey contractor. Details of the numbers of participants in each of these years are shown in *Table 2*.

Longitudinal analysis used all trusts that remained unchanged as entities over the period, i.e. it excluded trusts that merged. This meant that the sample size for the longitudinal analysis across the three years was 331 organisations (note that this is longitudinal only when the cases considered are the trusts, not the individual respondents, as these were not followed between years). Analysis within an individual year used all available data for that year.

TABLE 2 Response rates for NHS staff survey, 2009–11

Year	Number of questionnaires sent out ^a	Number of questionnaires returned	Response rate	Number of trusts
2009	289,277	157,450	54%	387
2010	311,098	167,736	54%	390
2011	250,000	134,967	54%	365

a Valid participants only.

Responses to the 2010 survey (which we used the most of all three years, as the 2011 data were not available to us in its full individual-level form) included the following breakdowns by staff groups:

- Occupational group: 33.9% nursing, 5.5% medical/dental, 2.8% general managers, 23.4% administrative/clerical staff, 18.3% AHPs/scientific and technical staff, 1.9% ambulance staff, 14.4% others.
- Managerial status: 31.2% were line managers.
- Full-time/part-time status: 75.8% were full-time.
- Organisational tenure: 7.7% had been in place for < 1 year, 16.5% for 1–2 years, 17.4% for 3–5 years, 24.4% for 6–10 years, 12.0% for 11–15 years and 22.1% for > 15 years.
- Age (years): 0.5% were aged 16–20, 13.5% were 21–30, 22.3% were 31–40, 32.4% were 41–50, 30.3% were 51–65, and 1.0% were > 65.
- Gender: 20.3% were male, and 79.7% female.
- Disability status: 14.8% considered themselves to have a long-standing illness, health problem or disability.
- Ethnic group: 87.6% were white, 4.1% were black/black British, 5.9% were Asian/Asian British, 1.1% said they were of mixed ethnic background, 0.5% Chinese, and 0.7% classified themselves as other.

Variables used

Each year, the staff survey is published with around 38 ‘key findings’.²⁰⁶ These key findings represent summary variables for the whole NHS staff survey, which includes over 150 separate questionnaire items. Some of these key findings are individual binary items; some are derived binary variables, for which a particular set of responses is needed to qualify the respondent in one category or the other; and others still are Likert-type scales, with scale scores derived as the average of between three and eight separate Likert scale items (e.g. ‘Strongly disagree’ to ‘Strongly agree’ items, each scored from 1–5). These key findings are the variables that we used for our staff experience variables for most of the analysis and are described in *Table 3*.

In addition, there was an overall ‘staff engagement’ score, that comprised key findings 35 (staff motivation, also known as work engagement), 34 (recommendation of the trust as a place to work or receive treatment, also known as advocacy) and a scale (1–5) version of key finding 31 (percentage of staff able to contribute towards improvements at work, also known as staff involvement). We also examined the proportion of staff who worked shifts (from question 1 in the core questionnaire).

Descriptive statistics for variables (individual level, 2010)

Table 4 shows the mean and standard deviation for each of the staff survey variables described under *Variables used*, for the 2010 survey (at the individual level and trust level). Because the meaning and interpretation of these variables varies depending on the level they are used at (e.g. they are often percentages at the trust level), and the full name is sometimes very long, this table includes short forms of names for some of the variables, but indicates clearly which key finding is which.

TABLE 3 'Key findings' from 2010 NHS staff survey. Text in table reproduced from Care Quality Commission. *Making Sense of your Staff Survey Data 2010*. London: Care Quality Commission; 2011. URL: www.nhsstaffsurveys.com/Caches/Files/making_sense_of_your_staff_survey_data_2010%20FINAL.pdf (accessed 13 November 2014)²⁰⁷ with permission from NHS England

Key findings	Question number(s) in the acute trust version of the 2010 core questionnaire
Key finding 1. Percentage of staff feeling satisfied with the quality of work and patient care they are able to deliver	
This is the percentage of staff who agreed or strongly agreed with at least two of the following three statements: 'I am able to do my job to a standard I am personally pleased with', 'I am satisfied with the quality of care I give to patients/service users' and 'I am able to deliver the patient care I aspire to'. Note: staff giving 'not applicable to me' responses to the last two statements were excluded when calculating this score	11g, 22a and 22c
Key finding 2. Percentage of staff agreeing that their role makes a difference to patients	
This is the percentage of staff who agreed or strongly agreed with the following statement: 'I feel that my role makes a difference to patients/service users'. Note: staff giving 'not applicable to me' responses were excluded when calculating this score	22b
Key finding 3. Percentage of staff feeling valued by their work colleagues	
This is the percentage of staff who agreed or strongly agreed with at least three of the following four statements: 'The people I work with treat me with respect', 'The people I work with seek my opinions', 'I am trusted to do my job' and 'I feel I belong to a team'	15a–15d
Key finding 4. Quality of job design (clear job content, feedback and staff involvement)	
This scale assesses the extent to which staff are performing jobs that are well designed and rich in content. This includes having clear goals, providing clear feedback on performance, and giving staff the opportunity to participate in decision-making	11a–11c, 14a, 14b and 14d
Possible scores range from 1 to 5, with 1 representing jobs that are poorly designed and 5 representing jobs that are well designed	
Key finding 5. Work pressure felt by staff	
The work pressure score assesses the extent to which staff have a workload that is more than they can cope with and includes the extent to which staff feel there is a lack of time or resources to do their job well	11d, 11e, 11f and 14c
Possible scores range from 1 to 5, with 1 representing that staff experience low work pressures and 5 representing that staff experience high work pressures	
Key finding 6. Effective teamworking	
The effective teamworking score assesses the extent to which staff feel they work in a team where team members have shared objectives, meet often to discuss the team's effectiveness and have to communicate closely with each other to achieve the team's objectives. An 'effective' team is one that is rated highly on these aspects. Possible scores range from 1 to 5, with 1 representing ineffective teamwork and 5 representing effective teamwork	10a–10d
Key finding 7. Trust commitment to work–life balance	
The work–life balance score relates to staff perception of the level of commitment shown by the trust and immediate manager in helping them to achieve a balance between work and home life. It assesses the extent to which there is practical commitment to helping staff find a good work–life balance	
Possible scores range from 1 to 5, with 1 representing low commitment from the trust and 5 representing high commitment from the trust (see <i>Chapter 2, Performance/dependent variable</i> for information about how this type of score is calculated)	2a–2c
Key finding 8. Percentage of staff working extra hours	
This is the percentage of staff that said that, in an average week, they work longer than the hours for which they are contracted. This was calculated from those ticking 'Up to 5 hours per week'/'6–10 hours per week' or '11 or more hours per week' to question 1b (additional paid hours) or 1c (additional unpaid hours)	1b and 1c

TABLE 3 'Key findings' from 2010 NHS staff survey. Text in table reproduced from Care Quality Commission. *Making Sense of your Staff Survey Data 2010*. London: Care Quality Commission; 2011. URL: www.nhsstaffsurveys.com/Caches/Files/making_sense_of_your_staff_survey_data_2010%20FINAL.pdf (accessed 13 November 2014)²⁰⁷ with permission from NHS England (*continued*)

Key findings	Question number(s) in the acute trust version of the 2010 core questionnaire
<p>Key finding 9. Percentage of staff using flexible working options</p> <p>This is the percentage of staff who said that at least one of the following flexible working options applied to them: working flexitime (e.g. able to vary start and finish times); working reduced hours (e.g. part time); working from home in normal working hours; working an agreed number of hours over the year (e.g. annualised hours); working during school term-time only; being in a team that makes its own decisions about rotas; or job sharing with someone else</p>	3
<p>Key finding 10. Percentage of staff feeling there are good opportunities to develop their potential at work</p> <p>This is the percentage of staff who agreed or strongly agreed with at least three of the following four statements: 'There are opportunities for me to progress in my job', 'I am supported to keep up-to-date with developments in my field', 'I am encouraged to develop my own expertise' and 'There is strong support for training in my area of work'</p>	20a–20d
<p>Key finding 11. Percentage of staff receiving job-relevant training, learning or development in last 12 months</p> <p>This is the percentage of staff who in the past 12 months received any form of training, learning or development from their employer and also agreed or strongly agreed with at least one of the following statements: 'My training, learning and development has helped me to do my job better', 'It has helped me stay up-to-date with my job' and 'It has helped me stay up-to-date with professional requirements'</p>	4a–4g, 5a–5i and 6a–6c
<p>Key finding 12. Percentage of staff appraised in last 12 months</p> <p>This is the percentage of staff who answered 'yes' to having a 'KSF development review' and/or 'Other type of appraisal, performance development review or ARCP' in the last 12 months</p>	8a
<p>Key finding 13. Percentage of staff having well structured appraisals in last 12 months</p> <p>This is the percentage of staff who had a 'KSF development review' and/or 'Other type of appraisal, performance review or ARCP' in the previous 12 months and also answered 'yes' to each of the following three questions: 'Did the appraisal/review . . . help you to improve how you do your job?', '. . . help you agree clear objectives for your work?' and '. . . leave you feeling that your work is valued by your Trust?'</p>	8a–8d
<p>Key finding 14. Percentage of staff appraised with personal development plans in last 12 months</p> <p>This is the percentage of staff who answered 'yes' to having a 'KSF development review' and/or 'Other type of appraisal, performance development review or ARCP' and also answered 'yes' to having agreed a Personal Development Plan as part of that review</p>	8a and 9a
<p>Key finding 15. Support from immediate managers</p> <p>Support from immediate managers assesses the extent to which staff feel their manager or supervisor provides them with support, guidance and feedback on their work and takes into account their opinions before making decisions that affect their work</p> <p>Possible scores range from 1 to 5, with 1 representing unsupportive managers and 5 representing supportive managers</p>	7a–7e
<p>Key finding 16. Percentage of staff receiving health and safety training in last 12 months</p> <p>This is the percentage of staff who had received health and safety training paid for or provided by their trust, in the last 12 months</p>	5b
<p>Key finding 17. Percentage of staff suffering work related injury in last 12 months</p> <p>This is the percentage of staff who, in the previous year, had been injured or felt unwell as a result of one of the following problems: moving and handling; needle stick and sharps injuries; slips, trips or falls; or exposure to dangerous substances</p>	32a–32d

continued

TABLE 3 'Key findings' from 2010 NHS staff survey. Text in table reproduced from Care Quality Commission. *Making Sense of your Staff Survey Data 2010*. London: Care Quality Commission; 2011. URL: www.nhsstaffsurveys.com/Caches/Files/making_sense_of_your_staff_survey_data_2010%20FINAL.pdf (accessed 13 November 2014)²⁰⁷ with permission from NHS England (*continued*)

Key findings	Question number(s) in the acute trust version of the 2010 core questionnaire
Key finding 18. Percentage of staff suffering work related stress in last 12 months	
This is the percentage of staff who said that, in the last 12 months, they had been injured or felt unwell as a result of work related stress	32e
Key finding 19. Percentage of staff saying hand-washing materials are always available	
This is the percentage of staff who said that hand-washing materials, such as hot water, soap and paper towels, or alcohol rubs, were always available when needed by staff, patients/service users and visitors to the trust. To allow for some staff being unaware of the position in relation to patients/service users and visitors, the key finding is defined as the percentage of staff who answered: 'Always' to hand-washing materials being available when they are needed by <i>staff</i> , and 'Always' or 'Don't know' to them being available when they are needed by <i>patients/service users</i> , and 'Always' or 'Don't know' to them being available when they are needed by visitors to the trust. Questions about visitors were only asked of staff in acute trusts, acute specialist trusts and mental health/learning disability trusts. For other types of trust the key finding is based only on the questions about materials being available to staff and patients/service users	33a–33c
Key finding 20. Percentage of staff witnessing potentially harmful errors, near misses or incidents in last month	
This is the percentage of staff who, in the previous month, had witnessed at least one error or near miss that could have potentially hurt patients and/or staff	25a and/or 26a
Key finding 21. Percentage of staff reporting errors, near misses or incidents witnessed in the last month	
This is the percentage of staff who had, in the last month, seen errors, near misses, or incidents that could have hurt staff or patients and said that they or a colleague had reported it	25a and 25b and/or 26a and 26b
Respondents who had not seen any errors, near misses or incidents in the last month, or did not know whether or not such errors had been reported, were excluded from the calculation	
Key finding 22. Fairness and effectiveness of procedures for reporting errors, near misses and incidents	
This scale assesses culture of incident reporting in trusts. The scale measures the extent to which staff are aware of the procedures for reporting errors, near misses and incidents; to what extent they feel that the trust encourages such reports, and then treats the reports fairly and confidentially; and to what extent the trust takes action to ensure that such incidents do not happen again	
Possible scores range from 1 to 5, with 1 representing procedures that are perceived to be unfair and ineffective and 5 representing procedures that are perceived to be fair and effective	27a to 27g
Key finding 23. Percentage of staff experiencing physical violence from patients, relatives or the public in last 12 months	
This is the percentage of staff who, in the previous 12 months, had experienced physical violence from patients/service users, their relatives or other members of the public	28a
Key finding 24. Percentage of staff experiencing physical violence from staff in last 12 months	
This is the percentage of staff who, in the previous 12 months, had experienced physical violence from colleagues or managers.	28b
Key finding 25. Percentage of staff experiencing harassment, bullying or abuse from patients, relatives or the public in last 12 months	
This is the percentage of staff who, in the previous 12 months, had experienced harassment, bullying or abuse at work from patients/service users, patients/service users, their relatives or other members of the public	29a

TABLE 3 'Key findings' from 2010 NHS staff survey. Text in table reproduced from Care Quality Commission. *Making Sense of your Staff Survey Data 2010*. London: Care Quality Commission; 2011. URL: www.nhsstaffsurveys.com/Caches/Files/making_sense_of_your_staff_survey_data_2010%20FINAL.pdf (accessed 13 November 2014)²⁰⁷ with permission from NHS England (*continued*)

Key findings	Question number(s) in the acute trust version of the 2010 core questionnaire
Key finding 26. Percentage of staff experiencing harassment, bullying or abuse from staff in last 12 months	
This is the percentage of staff who, in the previous 12 months, had experienced harassment, bullying or abuse from colleagues or managers	29b
Key finding 27. Perceptions of effective action from employer towards violence and harassment	
Staff were asked questions about whether or not their employer takes effective action if staff are physically attacked, bullied, harassed or abused	30a–30d
Possible scores range from 1 to 5, with 1 representing the perception that the trust does not take effective action and 5 representing the perception that the trust does take effective action	
Key finding 28. Impact of health and well-being on ability to perform work or daily activities	
Staff were asked questions about the extent to which physical health and emotional problems have impacted on their abilities to perform their work or other daily activities	36 and/or 37
Possible scores range from 1 to 5, with 1 indicating that physical health and emotional problems have little impact on their abilities to perform their work or other daily activities and 5 indicating that physical health and emotional problems have a large impact on their abilities to perform their work or other daily activities	
Key finding 29. Percentage of staff feeling pressure in last 3 months to attend work when feeling unwell	
This is the percentage of staff who said that in the last 3 months they had felt pressure from either their manager and/or colleagues to attend work when they had not felt well enough to perform their duties	39a–39c
Key finding 30. Percentage of staff reporting good communication between senior management and staff	
This is the percentage of people who agreed or strongly agreed with at least four of the following six statements: 'Senior managers here try to involve staff in important decisions'; 'Communication between senior management and staff is effective'; 'Senior managers encourage staff to suggest new ideas for improving services'; 'I know who the senior managers are here'; 'Healthcare professionals and managers in non-clinical roles work well together in my area of work'; and 'Senior managers act on staff feedback'	16a–16c, 16f, 23d, and 23e
Key finding 31. Percentage of staff able to contribute towards improvements at work	
This is the percentage of people who agreed or strongly agreed with at least two of the following three statements: 'I am able to make suggestions to improve the work of my team/department'; 'There are frequent opportunities for me to show initiative in my role'; and 'I am able to make improvements happen in my area of work'	23a–23c
Key finding 32. Staff job satisfaction	
This scale measures job satisfaction in the following areas: recognition for good work; support from immediate managers and colleagues; freedom to choose methods of working; amount of responsibility; opportunities to use skills; and the extent to which the trust is seen to value the work of staff	13a–13g
Possible scores range from 1 to 5, with 1 representing that staff are dissatisfied with their jobs and 5 representing that staff are satisfied with their jobs	
Key finding 33. Staff intention to leave jobs	
Intention to leave is a measure of the extent to which staff are considering leaving their organisation and looking for a new job either within or outside of the NHS	12a–12c
Possible scores range from 1 to 5, with 1 representing that staff are unlikely to leave jobs and 5 representing that staff are likely to leave their jobs	

continued

TABLE 3 'Key findings' from 2010 NHS staff survey. Text in table reproduced from Care Quality Commission. *Making Sense of your Staff Survey Data 2010*. London: Care Quality Commission; 2011. URL: www.nhsstaffsurveys.com/Caches/Files/making_sense_of_your_staff_survey_data_2010%20FINAL.pdf (accessed 13 November 2014)²⁰⁷ with permission from NHS England (*continued*)

Key findings	Question number(s) in the acute trust version of the 2010 core questionnaire
Key finding 34. Staff recommendation of the trust as a place to work or receive treatment	
Staff were asked whether or not they thought care of patients and service users was the trust's top priority, whether or not they would recommend their trust to others as a place to work, and whether they would be happy with the standard of care provided by the trust if a friend or relative needed treatment	16e, 21a, and 21b
Possible scores range from 1 to 5, with 1 representing that staff would be unlikely to recommend the trust as a place to work or receive treatment and 5 representing that staff would be likely to recommend the trust as a place to work or receive treatment	
Key finding 35. Staff motivation at work	
Staff were asked questions about the extent to which they look forward to going to work and are enthusiastic and absorbed in their jobs	24a–24c
Possible scores range from 1 to 5, with 1 representing that staff are not enthusiastic and absorbed by their work and 5 representing that staff are enthusiastic and absorbed by their work	
Key finding 36. Percentage of staff having equality and diversity training in the last 12 months	
This is the percentage of staff who said that they had received equality and diversity training in the last 12 months	5a
Key finding 37. Percentage believing that trust provides equal opportunities for career progression or promotion	
This is the percentage of staff who said that their trust acts fairly with regards to career progression/promotion, regardless of ethnic background, gender, religion, sexual orientation, disability or age (note: staff giving 'Don't know' responses were excluded when calculating this score)	17
Key finding 38. Percentage of staff experiencing discrimination at work in the last 12 months	
This is the percentage of staff who said that they had experienced discrimination from patients/service users, their relatives or other members of the public and/or from colleagues or managers in the last 12 months	18a and 18b
ARCP, Annual Review of Competence Progression; KSF, Knowledge and Skills Framework.	

TABLE 4 Descriptive statistics for staff survey variables at individual and trust level (data from NHS staff survey, 2010, based on 167,736 responses from 290 trusts). The mean is provided as a percentage or as a scale score

Key finding	Individual level		Trust level	
	Mean	SD	Mean	SD
Satisfied with quality of work? (KF1)	73%	44%	73%	6%
Agree that your role makes a difference? (KF2)	89%	31%	89%	3%
Valued by your work colleagues? (KF3)	78%	41%	78%	4%
Quality of job design (KF4)	3.41	0.72	3.41	0.11
Work pressure felt (KF5)	3.06	0.81	3.06	0.13
Effective teamworking (KF6)	3.75	0.80	3.74	0.12
Quality of work–life balance (KF7)	3.51	0.90	3.51	0.18
Work extra hours? (KF8)	65%	48%	65%	6%
Used flexible working options? (KF9)	70%	46%	69%	10%

TABLE 4 Descriptive statistics for staff survey variables at individual and trust level (data from NHS staff survey, 2010, based on 167,736 responses from 290 trusts). The mean is provided as a percentage or as a scale score (*continued*)

Key finding	Individual level		Trust level	
	Mean	SD	Mean	SD
Good opportunities to develop? (KF10)	41%	49%	41%	7%
Received training, learning and development beneficial to career development in last 12 months? (KF11)	79%	41%	78%	4%
Had appraisal in last 12 months? (KF12)	78%	41%	77%	9%
Had good quality appraisal in last 12 months? (KF13)	35%	48%	35%	7%
Agreed personal development plan in last 12 months? (KF14)	68%	47%	68%	10%
Support from supervisor (KF15)	3.70	0.94	3.69	0.15
Health and safety training in last 12 months? (KF16)	78%	41%	77%	12%
Suffered work related injury in last 12 months? (KF17)	13%	33%	13%	6%
Suffered work related stress in last 12 months? (KF18)	29%	45%	29%	4%
Hand-washing materials are always available? (KF19)	60%	49%	60%	10%
Witnessed errors, near misses or incidents? (KF20)	28%	45%	28%	9%
Reporting of errors (KF21)	96%	19%	96%	3%
Fairness and effectiveness of incident reporting procedures (KF22)	3.44	0.54	3.44	0.11
Experienced physical violence from patients/relatives? (KF23)	7%	25%	7%	5%
Experienced physical violence from colleagues? (KF24)	1%	11%	1%	1%
Experienced harassment, bullying or abuse from patients/relatives? (KF25)	13%	34%	13%	5%
Experienced harassment, bullying or abuse from staff? (KF26)	14%	35%	14%	3%
Perceptions of effective action from employer towards violence and harassment (KF27)	3.59	0.72	3.58	0.10
Impact of health and well-being on ability to perform work or daily activities (KF28)	1.59	0.76	1.59	0.06
Presenteeism (felt pressure in last 3 months to attend work when feeling unwell)? (KF29)	22%	42%	22%	5%
Good communication between senior management and staff? (KF30)	30%	46%	30%	8%
Able to contribute towards improvements at work? (KF31)	65%	48%	65%	8%
Job satisfaction (KF32)	3.55	0.73	3.54	0.11
Intention to leave job (KF33)	2.61	1.08	2.62	0.21
Advocacy (recommend trust as a place to work or receive treatment?) (KF34)	3.50	0.79	3.50	0.21
Staff motivation (work engagement) (KF35)	3.81	0.80	3.81	0.09
Equality and diversity training (KF36)	47%	50%	46%	14%
Equal opportunities (KF37)	90%	30%	90%	5%
Experienced discrimination at work? (KF38)	12%	33%	12%	4%
Able to contribute towards improvements at work? (Scale version)	3.61	0.80	3.61	0.15
Overall engagement	3.64	0.64	3.64	0.12
Work shifts?	45%	50%	45%	10%

KF, key finding; SD, standard deviation.

Outcome data used

Outcome variables were selected based on the following criteria: (1) variables that clearly reflected either intermediate outcomes, patient outcomes or organisational performance, (2) variables that were published for all three years of the study and (3) variables that had a clear direction, i.e. in general terms 'more' is either better or worse. Because of criterion (3), we did not use financial performance as there is no clear consensus about an indicator that would uniformly reflect performance (e.g. having too much surplus at the end of a year is more likely to represent poor use of resources rather than good management). Other variables that were suggested either by the researchers or by members of the advisory group [e.g. Commissioning for Quality and Innovation indicators (CQUINs)] were not used because either they did not provide comparable data for all trusts, or they were not available for the three years of the study. The variables that were used were absenteeism, turnover, patient satisfaction, patient mortality and infection rates.

Absenteeism was measured via the Electronic Staff Record and obtained via the NHS Information Centre website (www.hscic.gov.uk).²⁰⁸ It is measured as the total proportion of working time lost to sickness absence in each of the three NHS years (April 2009–March 2010; April 2010–March 2011; and April 2011–March 2012). Because it was measured by the Electronic Staff Record – the official NHS HR information system – data should be comparable across trusts and across years, although there are some doubts about the fidelity of reporting absences particularly among senior medical staff.

Turnover was measured via the stability index (the proportion of staff working on 31 March of a given year still working on 31 March the following year; it excludes bank staff, locums and trainee doctors). It also came from the NHS Information Centre website. Although this was always intended as an outcome variable, it was compromised somewhat by the structural changes affecting the NHS over the study period, which meant that more staff may have left their organisations for reasons to do with restructuring rather than the more common reasons for turnover.

Patient satisfaction was measured via one question from the NHS acute inpatient survey, which is conducted each year in a similar fashion to the NHS staff survey, but is limited to acute trusts. The question asks 'Overall, how would you rate the care you received?', and response options are 'Excellent' (scored as 100), 'Very good' (scored as 75), 'Good' (scored as 50), 'Fair' (scored as 25), and 'Poor' (scored as 0). Data were gathered from the UK Data Service (<http://ukdataservice.ac.uk/>)²⁰⁹ and were aggregated from all patients in each trust to the trust level. Details of the numbers of participants in each trust in each year are shown in *Table 5*.

TABLE 5 Response rates for NHS acute inpatient survey, 2009–11

Year	Number of questionnaires sent out ^a	Number of questionnaires returned	Response rate	Number of trusts
2009	124,500	69,348	56%	162
2010	123,874	66,348	54%	161
2011	127,309	70,863	56%	161

^a Valid participants only.

Patient mortality was measured using two different indices: the Hospital Standardised Mortality Ratio (HSMR) for 2009/10 and previous years, and the Standardised Hospital Mortality Index (SHMI) for 2010/11 and 2011/12. The use of two different indices was forced on us by a change in policy during the study period. Although both indicators use similar data to give a ratio of actual to expected deaths (controlling for a variety of demographic and diagnostic data), a change in the formula used – and the number of conditions coded – between the two indicators means that the use of both in the same analysis presents a limitation that we cannot easily overcome. These data were gathered from Dr Foster® – a provider of health-care variation analysis – (www.drfooster.org.uk)²¹⁰ (HSMR) and the NHS Information Centre website (SHMI).

Infection rates for both methicillin-resistant *Staphylococcus aureus* (MRSA)²¹¹ and *Clostridium difficile*²¹² were gathered from the Health Protection Agency website (www.hpa.org.uk).^{211,212} Specifically, the MRSA rate measures the annual rates of trust apportioned cases of MRSA bacteraemia, while the *C. difficile* rate measures the rate per 100,000 bed-days for specimens taken from patients aged ≥ 2 years (trust-apportioned cases).

Other variables used

When indicated, we controlled for the following variables:

- trust type: acute, acute specialist, PCT, mental health/learning disability or ambulance
- teaching status (for acute trusts)
- foundation status
- location (whether or not the trust is in London)
- doctors per bed (ratio gathered from Dr Foster, www.drfooster.org.uk)²¹⁰
- trust size (log of number of employees gathered from NHS staff survey advice centre).

These are all variables that have been shown in previous research to be linked to one or more of the outcomes. In addition, we examined the effect of the trust chief executive's tenure on outcomes. This was gathered by using public records (including websites) and telephone calls to trusts when information was not available.

Chapter 6 Results from analysis of links between staff experience and intermediate outcomes

Chapter summary

This chapter gives the findings from the analysis relating to the first research question, which was ‘What are the links between individual staff experiences (e.g. satisfaction, engagement, turnover intentions) and immediate staff outcomes (e.g. staff absenteeism, turnover)?’. This included three main types of analysis: individual multilevel analysis, latent growth curve modelling and cross-lagged correlation tests. These three are reported separately, but findings are then brought together to examine common threads, so that overall conclusions can be drawn.

The main findings from this research question are that there are some very clear associations between staff experience and individual outcomes (e.g. job satisfaction, intention to leave jobs, well-being) and staff absenteeism, all in the expected direction, but less clear effects on turnover. Longitudinal analysis suggested that poorer staff experience is likely to lead to lower subsequent absence, rather than vice versa. However, there were a number of contradictory or counterintuitive longitudinal results involving turnover, which may reflect the complex restructuring of the NHS over recent years more than any truly causal effects.

Chapter structure

The analysis conducted, which was described fully in *Chapter 5*, was very extensive, and thus the full results of each analysis are not reproduced in the main body of the report. Therefore, full tables of results can be found in *Appendices 2–4*. Summary tables, with enough information to show the findings of primary interest, are instead given in the main body of the report. Within this chapter, the multilevel analysis is presented, with staff experiences predicting individual staff outcomes (measured from the NHS staff survey); the latent growth curve analysis is presented with staff experiences predicting intermediate outcomes (absenteeism and turnover), and the cross-lagged correlation analysis is presented, involving absenteeism and turnover. *Summary of results* identifies common themes between the different types of analysis and what can be concluded with appropriate levels of confidence from the findings.

Multilevel analysis

For each of six individual outcomes, we conducted multilevel analysis with each of the 21 staff survey variables identified in *Chapter 5* (as well as chief executive tenure) predicting the outcome, controlling for gender, age, managerial status, tenure, working hours, occupational group, disabled status, ethnic background, trust location, trust type, trust teaching status, foundation status, trust size, and ratio of doctors per bed (acute trusts). The outcome variables in question were:

- impact of health and well-being on ability to perform work or daily activities
- work-related stress in previous 12 months
- job satisfaction
- presenteeism (feeling pressure to attend work when feeling unwell)
- intention to leave job
- advocacy (recommending trust as a place to work or receive treatment).

Although we included all control variables in each analysis (i.e. with each separate predictor), we do not report the coefficients for each – if we did, the set of tables would run to several hundred pages. Instead, we report the effect of the control variables for each outcome without predictors and then give a table showing the effect of each predictor (separately) after taking the controls into account (see *Appendix 2*). Predictors are entered in separate analyses owing to the very large correlations between some of them, which would make estimates unstable.

The vast majority of effects were statistically significant, which is unsurprising given the large sample size and the possible common method variance due to the shared source of predictors and outcomes. Therefore, we have identified the most important effects – those with the largest effect size for each of the six outcomes – using unstandardised effect sizes, so that the effects shown are the effect of the presence of an experience for the binary variables, or a one-point change for the scale variables. These are shown in *Table 6*, with estimates and 95% confidence intervals (CIs) of effect sizes included. Note that because the direction of causality is unclear, we have included the outcomes as predictors of each other outcome also. We would wish to make clear that this does not equate to causal relationships in either direction – it is impossible to detect this from such analysis. Therefore, although we report them in the tables here, we do not discuss them in this summary.

The key findings were that most of the predictors behaved entirely as expected – those that represented positive experiences at work (e.g. good job design features, good people management practices, work engagement) were associated with better outcomes for staff and those that represented negative experiences (e.g. violence and harassment, work pressure, discrimination) were associated with poorer outcomes. It is somewhat instructive, therefore, to look at the size of the effects. As noted previously, the effect sizes shown are the expected change in the dependent variable given the presence of the experience (e.g. appraisal) for the binary variables, or a one-point change for the scale variables (usually equivalent to about a standard deviation, or a little more).

In predicting the impact of health and well-being on ability to perform work or daily activities, what are particularly noteworthy as predictors are the violence and harassment variables. Although there is a reasonable effect of violence or harassment from patients or their relatives, there is a far greater effect of that coming from colleagues. Thus aggression from colleagues appears particularly harmful to individual health. Similarly, large effects are found for experience of discrimination, or the belief that the trust does not present equal opportunities to all in terms of career progression/promotion.

Similar findings for these predictors arise with the other outcomes, notably presenteeism. For work-related stress, this is joined by a moderately large effect from work pressure, but also effects from staff motivation (work engagement), quality of job design and having a good-quality appraisal (these are not apparent in *Table 6*, but can be seen in *Appendix 2*). For job satisfaction as the outcome, a number of people management and job design factors are particularly important: good-quality appraisals, opportunities to develop, good communication and good incident reporting procedures are the most substantial. For intention to leave as an outcome, the key predictors were almost identical (although in reverse, of course, and, if anything, the effects tend to be even bigger). For example, if an individual believes that the trust does not provide equal opportunities to staff, they are likely to be around a standard deviation higher in terms of their intention to leave. Staff are most likely to recommend their trust as a place to work or to receive treatment when they have good opportunities to develop, they are satisfied with the quality of the work they deliver, there are fair and effective procedures for reporting incidents and near misses, there is good communication, and (again) there are equal opportunities for staff to progress with their careers. Note that the 'overall engagement' predictor should not be interpreted strongly because part of this indicator includes the outcome itself.

Overall, the really notable effects are those of negative experiences that adversely affect all of the outcomes, in particular, violence and harassment from colleagues (rather than from patients), perceptions of unequal treatment by the organisation, and experiencing discrimination come out consistently as big

TABLE 6 Significant results from multilevel regression analysis

Outcome	Predictor	Coefficient	p-value	95% CI
Impact of health and well-being on ability to perform work or daily activities	Experienced violence from colleagues in last 12 months?	0.46	0.00	0.41 to 0.52
	Experienced harassment from colleagues in last 12 months?	0.39	0.00	0.37 to 0.40
	Trust provides equal opportunities to staff?	-0.38	0.00	-0.41 to -0.36
	Work-related stress	0.57	0.01	0.55 to 0.58
	Presenteeism (feeling pressure to attend work when feeling unwell)	0.45	0.01	0.43 to 0.46
Work-related stress	Experienced violence from colleagues in last 12 months?	0.31	0.00	0.35 to 0.28
	Experienced harassment from colleagues in last 12 months?	0.35	0.00	0.36 to 0.34
	Trust provides equal opportunities to staff?	-0.29	0.00	-0.28 to -0.31
	Suffered discrimination in last 12 months?	0.30	0.00	0.31 to 0.28
	Presenteeism (feeling pressure to attend work when feeling unwell)	0.30	0.00	0.29 to 0.30
Job satisfaction	Good opportunities to develop?	0.71	0.00	0.70 to 0.72
	Overall staff engagement	0.84	0.00	0.83 to 0.84
	Quality of job design	0.78	0.00	0.77 to 0.79
	Good communication between managers and staff?	0.68	0.00	0.67 to 0.70
	Trust provides equal opportunities to staff?	0.91	0.00	0.89 to 0.93
Presenteeism (feeling pressure to attend work when feeling unwell)	Experienced violence from colleagues in last 12 months?	0.33	0.00	0.30 to 0.37
	Experienced harassment from colleagues in last 12 months?	0.30	0.00	0.29 to 0.31
	Trust provides equal opportunities to staff?	0.32	0.00	0.30 to 0.33
	Suffered discrimination in last 12 months?	0.29	0.00	0.28 to 0.30
	Work-related stress	0.27	0.00	0.26 to 0.28
Intention to leave job	Good opportunities to develop?	-0.75	0.00	-0.77 to -0.74
	Overall staff engagement	-1.04	0.00	-1.05 to -1.03
	Trust provides equal opportunities to staff?	-1.06	0.00	-1.10 to -1.03
	Work-related stress	0.76	0.00	0.74 to 0.78
	Job satisfaction	-0.84	0.00	-0.85 to -0.83
Advocacy (recommending trust as a place to work or receive treatment)	Satisfied with quality of work?	0.60	0.00	0.58 to 0.61
	Fairness and effectiveness of incident reporting	0.72	0.00	0.71 to 0.73
	Good communication between managers and staff?	0.71	0.00	0.70 to 0.72
	Trust provides equal opportunities to staff?	0.83	0.00	0.81 to 0.86
	Job satisfaction	0.58	0.00	0.58 to 0.59

predictors. Being treated badly by other employees may not be an everyday experience (even if it is more common than it should be), but when it does happen, it is particularly damaging.

Latent growth curve analysis

Two stages of latent growth curve analysis were completed, and each is used for a slightly different interpretation. Both stages predicted levels, and changes, in intermediate outcomes from 2009/10 to 2011/12; the first stage used 2009 staff experience variables as predictors, whereas the second stage used differences from 2009 to 2010 (denoted with a 'D' suffix in *Appendix 3, Tables 35–38*), to examine whether or not there was any evidence of change in staff experience affecting longer-term change in intermediate outcomes.

Owing to the complexity of the latent growth curve analysis procedure, there were occasionally statistical problems preventing the estimates being achieved, which was a common problem with latent variable procedures. In order to circumvent this, in some cases we had to omit control variables from the models to get estimates. These cases are clearly indicated in the relevant tables.

Table 7 shows the significant relationships between staff survey variables from 2009 and the starting level (intercept) in absenteeism and turnover. These indicate when there are significant cross-sectional relationships between aggregate staff experience and behaviour in terms of absenteeism or leaving jobs. Note that the outcome variable for turnover is actually the stability index and, therefore, a positive relationship for this suggests a negative result for turnover. The tables report what was found in the analysis in terms of stability (for the sake of accuracy), but the text reports these findings in terms of turnover instead.

In summary, absenteeism is lower in trusts for which:

- a higher proportion of staff report working extra hours
- a higher percentage of staff report feeling valued by colleagues
- staff have well-designed jobs
- a higher proportion of staff work in a well-structured team environment
- a lower percentage of staff report experiencing physical violence from other staff
- a lower percentage of staff report experiencing harassment, bullying or abuse from patients or their relatives
- a higher percentage of staff report good communication between management and staff
- a higher percentage of staff report that they are able to contribute towards improvements at work
- staff report that they are willing to recommend their trust as a place to work or receive treatment
- staff report a higher level of motivation at work
- staff report higher overall work engagement.

Almost all of these suggest that better experiences equate to lower absence. The only dubious finding is that when more staff report working extra hours, absenteeism is lower; however, this makes sense because, if more staff were absent, there would be less opportunity to work extra hours.

Turnover is lower in trusts for which:

- fewer staff work extra hours
- a higher percentage of staff receive any type of training and development (health and safety training in particular)
- staff report lower levels of work pressure
- a higher percentage of staff are appraised, or have agreed a personal development plan
- fewer staff experience harassment, bullying or abuse from other staff
- staff perceive that effective action is taken from the employer towards violence and harassment
- staff have lower intentions to leave their job

TABLE 7 The NHS staff survey key findings 2009 as predictors of starting levels (intercepts) of intermediate outcomes in latent growth curve models

Outcome	Predictor	Coefficient	p-value	Controls not included	
Absenteeism	% working extra hours	-0.05	0.00		
	% receiving job relevant training in previous 12 months	-0.03	0.01		
	% feeling valued by colleagues	-0.04	0.00		
	Quality of job design (clear job content, feedback and staff involvement)	-0.01	0.05		
	% working in a well-structured team environment	-0.18	0.02		
	% experiencing physical violence from other staff in previous 12 months	0.10	0.02	Teaching status, foundation status, doctors per bed	
	% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	0.08	0.00	Doctors per bed	
	% reporting good communication between management and staff	-0.03	0.00	Foundation status, doctors per bed	
	% able to contribute towards improvements at work	-0.03	0.01		
	% able to contribute towards improvements at work (scale)	-0.02	0.02		
	Staff recommendation of the trust as a place to work or receive treatment	-0.01	0.03		
	Motivation at work	-0.02	0.01		
	Overall engagement	-0.01	0.01		
	Stability	% working extra hours	-23.65	0.00	
		% receiving any training or development in previous 12 months	20.29	0.02	
Work pressure felt by staff		-4.77	0.01		
% appraised within previous 12 months		4.63	0.01		
% with personal development plans agreed within previous 12 months		5.41	0.00		
% having had health and safety training in previous 12 months		6.76	0.00		
% witnessing potentially harmful errors or near misses in previous month		-10.48	0.02		
% experiencing harassment, bullying or abuse from other staff in previous 12 months		-16.78	0.01		
Perceptions of effective action from employer towards violence and harassment		5.08	0.02		
Intention to leave job		-4.39	0.01		
% believing trust provides equal opportunities for career progression or promotion		11.15	0.04		
% experiencing discrimination at work in last 12 months		-28.94	0.00		
Availability of hand-washing materials		10.88	0.00		

- fewer staff experience discrimination at work
- availability of hand-washing materials is higher.

The ‘extra hours’ finding makes more sense here because, even though absenteeism may be lower when staff work extra hours, turnover is higher. All other findings are in the direction that suggests turnover is lower when staff experience is more positive.

Table 8 shows the significant relationships between staff survey variables from 2009 and the change (slope) in absenteeism and turnover. These indicate where starting levels of staff experience are associated with subsequent changes in absenteeism and turnover. These are more difficult to interpret because a drop in absenteeism (for example) may be due to a very high starting level – in other words, regression to the mean. Therefore, we recommend not interpreting these results particularly strongly, but instead focusing on the (far stronger) results in later tables. However, they are included for the sake of completeness.

A much stronger form of the analysis is using changes in staff experience (i.e. differences in staff survey variables between 2009 and 2010) as predictors of the change in intermediate outcomes (slopes). Table 9 shows the significant results from this analysis. In summary:

- An increase in staff agreeing that their role makes a difference to patients is associated with a decrease in turnover in subsequent years.
- An increase in the percentage of staff feeling that there are good opportunities to develop their potential at work is associated with a decrease in turnover in subsequent years.
- An increase in the percentage of staff suffering work-related injuries or illness is associated with a decrease in turnover in subsequent years.
- An increase in the percentage of staff experiencing harassment, bullying or abuse from other staff is associated with an increase in turnover in subsequent years.
- In trusts for which staff report an increase in their level of willingness to recommend the trust as a place to work or receive treatment, there is a decrease in turnover in subsequent years.
- There were no significant findings with absenteeism as the outcome.

TABLE 8 The NHS staff survey key findings 2009 as predictors of changes (slopes) in intermediate outcomes

Outcome	Predictor	Coefficient	p-value
Absenteeism	% working extra hours	-0.01	0.00
	% experiencing physical violence from patients or their relatives in previous 12 months	-0.02	0.02
Stability	% working extra hours	7.52	0.00
	% receiving any training or development in previous 12 months	-10.75	0.01
	Opportunities for flexible working	-6.50	0.01
	% appraised within previous 12 months	-2.32	0.01
	% with personal development plans agreed within previous 12 months	-2.38	0.01
	% having had health and safety training in previous 12 months	-2.67	0.01
	% suffering work related injuries or illness	-8.05	0.02
	% experiencing physical violence from patients or their relatives in previous 12 months	-7.41	0.04
	Intention to leave job	2.41	0.00
	% receiving equality and diversity training	-1.15	0.05
	Availability of hand-washing materials	-4.19	0.00

TABLE 9 The NHS staff survey key findings (changes from 2009 to 2010) as predictors of changes (slopes) in intermediate outcomes

Outcome	Predictor	Coefficient	p-value
Stability	% agreeing their role makes a difference to patients	7.46	0.05
	% feeling there are good opportunities to develop potential at work	3.97	0.04
	% suffering work related injuries or illness	7.34	0.01
	Staff recommendation of the trust as a place to work or receive treatment	1.80	0.04

This clearly indicates that when the number of staff having meaningful jobs increases, when there are decreases in aggression from other staff and when belief in their employer as both a place to work and a place to receive treatment increases, then turnover tends to decrease over the 3-year period in question.

Cross-lagged correlations

Cross-lagged correlations compare the relationship between two variables in subsequent years, testing whether or not there is a stronger effect in one direction than the other. Again, full results are in *Appendix 2*, but *Tables 10* and *11* show the significantly different cross-lagged correlations between staff experience and intermediate outcomes. All differences are for the two most recent years, i.e. staff survey variables from 2010 and 2011, and outcomes from 2010/11 and 2011/12.

TABLE 10 Cross-lagged correlations between staff survey variables and employment stability, 2010/11–2011/12. Note: p-value represents test of the null hypothesis that the correlations are equal

Staff survey variable	Survey 2010 and stability 2011/12	Stability 2010/11 and survey 2011	p-value
Quality of work–life balance	–0.25	–0.07	0.01
% agreeing their role makes a difference to patients	0.26	0.08	0.02
% witnessing potentially harmful errors or near misses in previous month	0.32	0.01	0.00
Opportunities for flexible working	–0.32	0.00	0.00
Impact of health and well-being on ability to perform work or daily activities	–0.22	0.02	0.00
% able to contribute towards improvements at work	–0.30	–0.06	0.00
Availability of hand-washing materials	0.26	–0.04	0.00
% suffering work related injuries or illness	0.32	0.05	0.00
Intention to leave job	–0.42	–0.10	0.00
Job satisfaction	–0.21	–0.05	0.03
% feeling pressure to attend work when feeling unwell	0.25	0.04	0.00
Staff recommendation of the trust as a place to work or receive treatment	0.12	–0.04	0.03
% feeling satisfied with quality of work and patient care they are able to deliver	0.23	0.08	0.05
% suffering work related stress in previous 12 months	–0.15	0.10	0.00
Support from supervisors	–0.21	–0.05	0.03
% working in a well-structured team environment	–0.18	–0.03	0.05

TABLE 11 Cross-lagged correlations between staff survey variables and staff absenteeism, 2010/11–2011/12.
 Note: *p*-value represents test of the null hypothesis that the correlations are equal

Staff survey variable	Survey 2010 and absenteeism 2011/12	Absenteeism 2010/11 and survey 2011	<i>p</i> -value
Quality of work–life balance	–0.19	–0.03	0.00
% reporting good communication between management and staff	–0.34	–0.19	0.00
% experiencing discrimination at work	0.18	0.07	0.02
% believing that trust provides equal opportunities for career progression or promotion	–0.19	–0.07	0.01
% witnessing potentially harmful errors or near misses in previous month	0.08	–0.10	0.00
% staff working extra hours	–0.06	–0.19	0.01
Opportunities for flexible working	–0.29	–0.01	0.00
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	0.50	0.30	0.00
% able to contribute towards improvements at work	–0.42	–0.21	0.00
% suffering work related injuries or illness	0.15	0.02	0.00
Intention to leave job	–0.18	–0.04	0.00
Job satisfaction	–0.26	–0.10	0.00
% feeling pressure to attend work when feeling unwell	0.08	–0.03	0.03
% reporting errors, near misses or incidents witnessed in the last month	–0.19	–0.04	0.04
% feeling satisfied with quality of work and patient care they are able to deliver	0.06	–0.04	0.07
Support from supervisors	–0.16	–0.04	0.01
% working in a well-structured team environment	–0.25	–0.15	0.04
% experiencing physical violence from patients or their relatives in previous 12 months	0.59	0.40	0.00
Work pressure felt by staff	0.08	–0.03	0.03

These findings reveal some unexpected results, particularly with regard to turnover. For example, the first finding in the table shows that the quality of work–life balance has a negative relationship with stability the next year, whereas the converse finding (stability in 2010/11 and quality of work–life balance in 2011) is that of a relationship close to zero. This suggests that in trusts for which the climate for work–life balance is better, turnover tends to subsequently increase.

Owing to the large number of separate tests here, and some seemingly contradictory or unexpected results, it makes most sense to concentrate on those for which there are obvious patterns. For this purpose, we define a pattern for which two distinct but theoretically similar staff survey variables have the same pattern of results with the same outcome, or one staff survey variable has the same pattern of results with both outcomes (i.e. higher stability/lower absenteeism, or vice versa). With this in mind, the patterns can be summarised as follows:

- Quality of work–life balance and opportunities for flexible working are both more closely related with higher subsequent turnover than vice versa. However, they are both also more closely related with lower subsequent absenteeism than vice versa, so there may be a contextual effect on turnover due to changes in the NHS.

- When staff agree that their role makes a difference to patients, or when they feel satisfied with the quality of care delivered, or would recommend their trust as a place to work or receive treatment, this is more negatively associated with subsequent turnover than vice versa.
- When staff say their health negatively impacts their ability to do their job or when they suffer from work-related stress, this is more positively associated with subsequent turnover than vice versa.
- Job satisfaction, support from supervisors and working in well-structure teams is more positively associated with subsequent turnover than vice versa.
- Absenteeism results are far more straightforward. In addition to those already mentioned, having good communication, less discrimination, fewer errors, less extra-hour working, less work pressure, less harassment and violence from patients, fewer injuries, higher job satisfaction and ability to contribute towards improvements, lower turnover intentions, less pressure to attend work when feeling unwell, better support from supervisors, and more well-structured teamworking are all associated with lower subsequent absenteeism than vice versa.

Summary of results

Overall, the results presented from all three sets of analysis give some clear messages, although for those involving turnover, the messages are sometimes far less clear. In general, there is a clear pattern that better staff experiences are associated with better health and behavioural outcomes for the employees concerned; the results from the individual (multilevel) analysis confirmed what had been expected here. In particular, the effects of staff believing there were equal opportunities for career progression and promotion on individual outcomes were especially strong and also the negative effects of aggression (particularly from colleagues) and discrimination were telling. Negative experiences, particularly negative treatment from colleagues, were far more damaging to staff well-being than the positive effect of positive experiences.

Organisational-level analysis with absenteeism is probably the most instructive and clear set of findings from this chapter. The cross-lagged correlations suggest that there is clear evidence for the direction of the effect between absenteeism and over half of the staff survey variables: it is much more likely that good staff experience leads to lower absenteeism than vice versa. These effects are particularly strong for negative experiences such as violence and harassment, but are also very strong for the positive experiences of staff being able to contribute towards improvements at work and when there is good communication between management and staff. Combined with the latent growth curve analysis that gave similar results, this presents a very clear and unambiguous set of findings about the nature of NHS staff jobs and absenteeism.

Results involving turnover were the most equivocal. Even though there was some strong latent growth curve analysis results suggesting that improvements in the number of staff having meaningful jobs increases, when there are decreases in aggression from other staff, and when belief in their employer as both a place to work and a place to receive treatment increases, then turnover tends to decrease over subsequent years. Many of the other results, particularly the cross-lagged correlations, gave inconsistent or counterintuitive findings. This has to be placed in the context of major changes over the NHS over the study period, including many large reorganisations of services, necessitating more movement of staff between trusts (and, in some cases, redundancies) than would normally be expected. Therefore, although objective data are usually better to use than subjective, it is probably more instructive to look at the patterns of results with self-reported turnover intentions (from the multilevel analysis), when the findings met with expectations, than the more surprising results using the stability index. Because of this, there is little that can be learned from the longitudinal analysis with turnover.

Chapter 7 Results from analysis of links between staff experience, intermediate outcomes and organisational performance

Chapter summary

This chapter gives the findings from the analysis relating to the second research question, which was 'How do staff experience and intermediate outcomes link with organisational performance (e.g. patient satisfaction, mortality, infection rates), and is there a mediated link from experiences to performance via intermediate outcomes?'. This again included three main types of analysis: latent growth curve modelling, cross-lagged correlation tests and mediated regression. As in *Chapter 6*, these three are reported separately but findings are brought together.

The main findings from this research question are that the relationships with organisational performance are complex. There is clear evidence of significant (and often strong) links between staff experience and patient satisfaction, although this does not appear to be mediated by intermediate outcomes. The longitudinal effects are much less clear. There were some links between changes in staff experiences and subsequent improvements in patient outcomes, but this was not consistently found across all predictors and all outcomes. The cross-lagged correlations failed to reveal a consistent pattern of results to provide evidence for causal relationships.

In terms of the mediation, a striking finding was that although many staff experiences were associated with absenteeism and with patient satisfaction, there were not any mediated effects here. That is, the reason for staff experiences affecting absenteeism appears completely separate from the reason they affect patient satisfaction. Given that both are important for trusts for different reasons, this points to an even greater importance of staff attitudes and experience.

Chapter structure

The analysis conducted for this chapter was extensive and, thus, the full results of each analysis are not reproduced in the main body of the report. The full tables of results can be found in *Appendices 5* and *6*. Summary tables, with enough information to show the findings of primary interest, are instead given in the main body of the report. Within this chapter, the latent growth curve analysis is presented, with staff experiences and intermediate outcomes predicting trust outcomes (patient satisfaction, mortality, and two forms of infection rates), and the equivalent cross-lagged correlation analysis is also presented, as are results of mediated regression analysis. *Summary of results* identifies common themes between the different types of analysis and what can be concluded with appropriate levels of confidence from the findings.

Because of the nature of these trust outcomes, they apply only to acute trusts. Therefore, the analysis in this chapter is for acute trusts only.

Latent growth curve analysis

There were two stages of latent growth curve analysis completed and each is used for a slightly different interpretation. Both stages predicted levels, and changes, in intermediate outcomes from 2009/10 to 2011/12; the first stage used 2009 staff experience variables as predictors, whereas the second stage used

differences from 2009 to 2010 (denoted with a 'D' suffix in *Appendix 5, Tables 41–48*), to examine whether or not there was any evidence of change in staff experience affecting longer-term change in intermediate outcomes.

Owing to the complexity of the latent growth curve analysis procedure, there were occasionally statistical problems preventing the estimates being achieved, which is a common problem with latent variable procedures. In order to circumvent this, in some cases we had to omit control variables from the models to get estimates. These cases are clearly indicated in the relevant tables.

Table 12 shows the significant relationships between staff survey variables from 2009, intermediate outcomes from the same year, and the starting level (intercept) in patient satisfaction, mortality, and infection rates for both MRSA and *C. difficile*. These indicate where there are significant cross-sectional relationships between aggregate staff experience and outcomes.

In summary, we can see that for patient satisfaction, there were many significant relationships and satisfaction was higher when:

- fewer staff work extra hours
- more staff have received any training and development and, in particular, health and safety training
- more staff feel valued by their colleagues
- staff report lower work pressure
- a higher percentage of staff have appraisals and personal development plans
- fewer staff report experiencing violence, harassment, bullying and abuse from patients and their relatives; it is also higher where staff perceive that action taken from the employer towards violence and harassment is effective
- the perceived fairness and effectiveness of incidence reporting is high
- more staff feel that they are able to contribute towards improvements at work
- there are high levels of job satisfaction among staff and lower intentions to leave jobs
- staff report that they would be more likely to recommend their trust as a place to work or receive treatment
- where staff believe that the trust provides equal opportunities for career progression or promotion and where fewer staff report experiencing discrimination at work
- there is a higher availability of hand-washing materials
- staff report high levels of engagement
- there are lower objective turnover rates (i.e. higher stability)
- there were fewer significant associations with patient mortality, but still some important (and theoretically expected) significant findings. In particular, mortality was lower when:
 - more staff report that they understand their role and where it fits in
 - more staff feel able to contribute towards improvements at work
 - staff are more likely to recommend the trust as a place to work or receive treatment
 - staff report higher overall work engagement.

However, mortality was also lower when more staff experienced physical violence from patients or their relatives. This is unexpected and also appears to be an anomaly because when compared with other types of analysis and different years, this was not replicated. Therefore, it is most likely to be a type I error.

For infection rates, one finding was that higher levels of harassment, bullying and abuse from patients or their relatives was associated with higher MRSA rates. If there is a genuine link between these two variables, then causality in either direction (or both) is perhaps reasonable. However, this is somewhat contradicted by the finding that such higher rates (as well as higher rates of work pressure and of shift working) are associated with lower *C. difficile* rates. This suggests that links with infection rates in general may not be very understandable.

TABLE 12 The NHS staff survey key findings 2009 as predictors of starting levels (intercepts) of trust outcomes

Outcome	Predictor	Coefficient	p-value	Controls not included
Patient satisfaction	% receiving any training or development in previous 12 months	35.508	0.002	
	% feeling valued by colleagues	25.257	0.001	
	Work pressure felt by staff	-4.969	0.036	
	% appraised within previous 12 months	5.773	0.013	
	% with personal development plans agreed within previous 12 months	7.322	0.003	
	% having had health and safety training in previous 12 months	7.701	0.006	
	Fairness and effectiveness of incident reporting	11.227	0.001	
	% experiencing physical violence from patients or their relatives in previous 12 months	24.831	0.013	
	% experiencing harassment, bullying or abuse from other staff in previous 12 months	-21.785	0.009	
	Perceptions of effective action from employer towards violence and harassment	7.227	0.012	
	% able to contribute towards improvements at work	7.656	0.030	
	Job satisfaction	8.807	0.009	
	Intention to leave job	-7.393	0.000	
	Staff recommendation of the trust as a place to work or receive treatment	7.628	0.000	
	% believing trust provides equal opportunities for career progression or promotion	26.748	0.000	
	% experiencing discrimination at work in last 12 months	-43.299	0.000	
	Availability of hand-washing materials	13.343	0.000	
	Overall engagement	10.198	0.000	
	Stability index	0.289	0.003	
	Patient mortality	% experiencing physical violence from patients or their relatives in previous 12 months	-63.352	0.031
% agreeing they understand their role and where it fits in		-19.301	0.037	Trust type
% able to contribute towards improvements at work		-46.39	0.008	Trust type
Staff recommendation of the trust as a place to work or receive treatment		-9.835	0.016	Trust type
Overall engagement		-17.324	0.026	Trust type
MRSA rates	% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	8.688	0.034	
<i>C. difficile</i> rates	% staff working shifts	-67.353	0.004	
	Work pressure felt by staff	-26.701	0.029	
	% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	-150.60	0.000	

Table 13 shows the significant relationships between staff survey variables from 2009 and the change (slope) in trust outcomes. These indicate where starting levels of staff experience are associated with subsequent changes in outcomes. These are more difficult to interpret because a drop in patient mortality (for example) may be due to a very high starting level – in other words, regression to the mean. Therefore, we recommend not interpreting these results particularly strongly, but instead focusing on the (far stronger) results in later tables. However, they are included for the sake of completeness. Indeed, some results (notably the positive links between work pressure and percentage staff experiencing harassment, bullying and abuse from patients or their relatives and changes in *C. difficile* rates) may partially explain the contradictory results in the previous table; when such negative experiences are high, there may also be a low starting value of infection rates, but these rates then increase over time.

A much stronger form of the analysis is using changes in staff experience (i.e. differences in staff survey variables between 2009 and 2010) as predictors of the change in intermediate outcomes (slopes).

Table 14 shows the significant results from this analysis. In summary:

- An increase in the reported negative impact of health and well-being on employees' ability to perform their work and daily activities is associated with a decrease in patient satisfaction.

TABLE 13 The NHS staff survey key findings 2009 as predictors of changes (slopes) in intermediate outcomes

Outcome	Predictor	Coefficient	p-value	Controls not included
Patient mortality	% feeling valued by colleagues	25.768	0.013	Trust type
	% suffering work related injuries or illness	-26.105	0.044	Trust type
	% experiencing physical violence from patients or their relatives in previous 12 months	27.909	0.046	Trust type
MRSA rates	% having had health and safety training in previous 12 months	1.674	0.049	
	% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	-7.39	0.002	
<i>C. difficile</i> rates	Work pressure felt by staff	12.193	0.031	
	% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	58.848	0.002	

TABLE 14 The NHS staff survey key findings (changes from 2009 to 2010) as predictors of changes (slopes) in intermediate outcomes

Outcome	Predictor	Coefficient	p-value	Controls not included
Patient satisfaction	Impact of health and well-being on ability to perform work or daily activities	3.778	0.041	
Patient mortality	Perceptions of effective action from employer towards violence and harassment	-10.321	0.044	
	% staff working shifts	49.344	0.039	Foundation status
MRSA rates	Line manager support	-2.254	0.008	
<i>C. difficile</i> rates	% staff working shifts	-89.545	0.018	Foundation status
	% feeling there are good opportunities to develop potential at work	-26.423	0.036	
	Fairness and effectiveness of incident reporting	-23.556	0.049	
	% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	-42.212	0.023	

- An increase in shift working is associated with an increase in patient mortality rates.
- An increase in perceptions of effective action from employer towards violence and harassment is associated with a decrease in patient mortality rates.
- An increase in line manager support is associated with a subsequent drop in MRSA rates.
- An increase in staff feeling there are good opportunities to develop potential at work and an increase in the fairness and effectiveness of incident reporting procedures are associated with a subsequent drop in *C. difficile* rates.
- However, an increase in shift working and in experiencing of harassment, bullying or abuse from patients or their relatives, is also associated with a drop in *C. difficile* rates.

Cross-lagged correlations

Cross-lagged correlations compare the relationship between two variables in subsequent years, testing whether or not there is a stronger effect in one direction than the other. Full results are in *Appendix 2*, but *Table 15* shows the significantly different cross-lagged correlations between staff experience and

TABLE 15 Cross-lagged correlations between staff survey variables and intermediate outcomes. The *p*-value represents test of the null hypothesis that the correlations are equal

Staff survey variable or intermediate outcome	Trust outcome	Staff variable year 1 and outcome year 2	Outcome year 1 and staff variable year 2	<i>p</i> -value
Absenteeism 2010–11	Mortality 11–12	0.45	0.32	0.04
Absenteeism 2010–11	<i>C. difficile</i> 10–11	0.03	0.19	0.03
Stability 2007–8	Mortality 07–08	0.27	–0.15	0.00
Stability 2009–10	Mortality 09–10	0.46	0.19	0.00
Opportunities for flexible working	Mortality 10–11	0.24	–0.02	0.00
% experiencing discrimination at work	Patient satisfaction 10	–0.45	–0.64	0.01
% believing that trust provides equal opportunities for career progression or promotion	Patient satisfaction 10	0.43	0.57	0.05
Opportunities for flexible working	Patient satisfaction 10	0.07	0.28	0.01
Quality of job design (clear job content, feedback and staff involvement)	Patient satisfaction 10	0.10	0.28	0.02
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	MRSA 10–11	–0.14	0.12	0.01
Staff recommendation of the trust as a place to work or receive treatment	MRSA 10–11	0.19	0.01	0.04
% reporting good communication between management and staff	<i>C. difficile</i> 10–11	–0.21	0.02	0.00
% agreeing their role makes a difference to patients	<i>C. difficile</i> 10–11	–0.08	0.11	0.05
% able to contribute towards improvements at work	<i>C. difficile</i> 10–11	–0.2	–0.02	0.05
Fairness and effectiveness of incident reporting	<i>C. difficile</i> 10–11	–0.13	0.07	0.01
Quality of job design (clear job content, feedback and staff involvement)	<i>C. difficile</i> 10–11	–0.17	0.05	0.01

intermediate outcomes, and also between staff experience and trust outcomes. Because of the changes in some outcomes (particularly mortality) in 2010 and 2011, we also give the year of measurement in the table because in this table only the interpretation of the values changes depending on which year is which.

These findings reveal a relatively small number of significant effects, but some are not as expected. In summary:

- When absenteeism is higher, this tends to lead to higher subsequent mortality, rather than vice versa.
- When turnover is lower, this is associated with greater mortality in the subsequent year.
- High infection rates of *C. difficile* are associated with higher subsequent staff absence than vice versa.
- When there are more opportunities for flexible working, mortality tends to be higher the following year rather than vice versa.
- Worryingly, when there is lower patient satisfaction, this is associated with higher subsequent discrimination (rather than vice versa).
- Higher patient satisfaction is associated with more flexible working subsequently and better subsequent job design, rather than vice versa.
- When more staff recommend the trust and fewer experience harassment, bullying or abuse from patients, this is associated with higher subsequent MRSA rates.
- A number of good job design factors are associated with lower subsequent *C. difficile* rates, rather than vice versa.

As in *Chapter 6*, it is dangerous to read too much into these results, particularly for those that stand alone and/or are contrary to the direction expected from theory. However, it is clear that the picture of how staff experience and trust outcomes are linked is not straightforward and the relationship is certainly not a simple causal one. Staff experiences are likely to be affected by trust outcomes as well and it appears that this may not always be a positive thing, but it is impossible to say exactly how these effects occur.

Mediation

We tested for whether or not there were significant indirect (mediated) effects of the staff experience variables on trust outcomes via absenteeism or turnover. This analysis controlled for the usual control variables for acute trusts, and used data from 2011/12 only.

Results suggested that there was not, on the whole, evidence of any mediated effects. Those that were significant are shown in *Table 16*. For patient mortality there were no significant indirect effects at all, as was the case for *C. difficile* rates. For patient satisfaction, there was a single indirect effect: that of the proportion of staff working extra hours, mediated by absenteeism. This is difficult to interpret because the indirect effect is positive, but small; the more staff working extra hours, the higher patient satisfaction is, but only very slightly. Given the singular nature of this effect, the fact it only just reaches statistical significance and the number of effects tested, it is quite possibly a type I error and, therefore, we do not attach any particular significance to it.

However, for MRSA infection rates, there were a large number of significant indirect effects, again all via absenteeism. Most of the effects are actually for job design factors, suggesting that, when jobs are better designed and staff experiences are better, absence rates are likely to be lower and, as a result, MRSA rates are likely to be lower. However, we need to temper the interpretation of this with the results from the previous section, which cast some doubt over the direction of relationships between staff experience and infection rates. Therefore, we cannot assume there is indeed such a causal relationship and although a set of consistent and interesting results, it is too much of a step to say that this proves such a mediated link.

TABLE 16 Significant indirect effects of staff survey variables on trust outcomes via absenteeism

Predictor	Outcome	Indirect effect estimate	95% CI
% staff working extra hours	Patient satisfaction	0.04	0.00 to 0.09
% feeling valued by colleagues	MRSA	-0.01	-0.05 to 0.00
Quality of job design (clear job content, feedback and staff involvement)	MRSA	-0.79	-2.33 to -0.15
% working in a well-structured team environment	MRSA	-0.52	-1.67 to -0.03
% staff working extra hours	MRSA	-0.01	-0.03 to 0.00
% feeling there are good opportunities to develop potential at work	MRSA	-0.01	-0.03 to 0.00
Support from supervisors	MRSA	-0.55	-1.58 to -0.10
% suffering work related stress in previous 12 months	MRSA	0.01	0.00 to 0.04
% experiencing physical violence from other staff in previous 12 months	MRSA	0.05	0.01 to 0.15
% reporting good communication between management and staff	MRSA	-0.01	-0.02 to 0.00
% able to contribute towards improvements at work	MRSA	-0.01	-0.03 to 0.00
Job satisfaction	MRSA	-0.61	-1.73 to -0.13
Intention to leave job	MRSA	0.27	0.01 to 0.90
Staff recommendation of the trust as a place to work or receive treatment	MRSA	-0.35	-1.00 to -0.07
Staff motivation at work	MRSA	-0.69	-2.00 to -0.13
Overall engagement	MRSA	-0.64	-1.79 to -0.15

Summary of results

Overall, there is a real mix of results presented here. By far the most consistent and clear finding is the link between staff experiences and levels of patient satisfaction, replicating previous work examining these constructs.¹⁰⁶ These reveal that there are clear associations, at least cross-sectionally, between many staff experiences (across most domains) and patient satisfaction.

However, the longitudinal effects are much less clear. Cross-lagged correlations did reveal some patterns suggesting directional effects, for example that absenteeism in one year is more closely associated with mortality in the subsequent year than vice versa; however, others (particularly those involving infection rates) were much less convincing. There were some links between changes in staff experiences (particularly those relating to the quality of job design) and subsequent improvements in patient outcomes, but this was not consistently found across all predictors and all outcomes. This reveals the limitations of the analysis: looking at year-on-year changes may not be sensitive enough to the variables in question (particularly across whole trusts) to be able to detect time-lagged effects that could help provide more evidence for causality. Overall, it would be dangerous to conclude anything substantial from the cross-lagged correlations. The latent growth curve model results were not much clearer, as the stronger design (modelling change in staff experiences) revealed only a few statistically significant results, some of which could have been false positive findings. However, experiences linked to violence, harassment and actions dealing with it were linked (in the expected direction) with a number of different outcomes, suggesting that this may have not only impact on the staff immediate outcomes, but also directly on patients too.

In terms of the mediation, a striking finding was that, although many staff experiences were associated with absenteeism and patient satisfaction, there were no mediated effects here. That is, the reason for staff experiences affecting absenteeism appears completely separate from the reason they affect patient satisfaction. Given that both are important for trusts for different reasons, this points to an even greater importance of staff attitudes and experience.

Chapter 8 Examination of relationships differing by groups

Chapter summary

This chapter gives the findings from the analysis relating to the third research question, which was 'Do these relationships [between staff variables and outcomes] differ by occupational, demographic groups, trust types and geographical areas, and if so what is the relative change for each group?'. This involved a series of many regression analyses, examining data aggregated by each particular staff breakdown, as well as some separating out trusts by geographical region.

The main findings from this research question are that few clear patterns emerge and some of those that do are not at all surprising. The most effects (and largest differentials) are for predictors of absenteeism, with nursing staff generally had the strongest effects of all the occupational groups followed by medical/dental staff. Most other differences by groups of staff were fairly inconsistent and, thus, more difficult to interpret reliably.

In terms of geographic regions, absenteeism was most readily predicted – by most staff survey variables – in the West Midlands, while the health of workers in Yorkshire had the strongest effect on patient satisfaction and work pressure in the South Central region was a stronger predictor of turnover than in other regions. Aside from the West Midlands results, which were consistent across many findings, these may be one-off results with no clear patterns emerging.

Introduction

This was, by its nature, a far more exploratory piece of work; we did not have a priori theoretical expectations about any particular group of staff – whether work-related or demographic groups – having more important relationships than any others (however, for some staff survey variables in particular it would seem likely that there could be some differences by occupational group). Because of this, and the fact that there were bound to be some differences between groups simply by chance, we report all of the analysis in *Appendix 7*, but only report a small subset of that analysis in this chapter. As described in *Chapter 5*, the criteria we used were that the standardised coefficients for two groups should have differences of at least 0.20 for them to be considered differential effects and at least one group's effect should have a *p*-value of < 0.01. We did this separately for the analysis that controlled for the prior year's outcome (a very strong control) and that which did not.

Analysis by staff groups

Six breakdowns met the criteria controlling for the outcomes of prior year and 39 met the criteria without this control included. These breakdowns are shown in *Tables 17* and *18*, respectively.

The differential breakdown for the effect of turnover intentions on turnover is particularly interesting, as this suggests that some groups are more likely to carry out their intentions than others. Examination of the results in *Appendix 7* reveals that there are larger effects for medical/dental staff ($\beta = -0.124$, $p = 0.008$) and AHPs ($\beta = -0.110$, $p = 0.021$), but not for nurses ($\beta = 0.023$, $p = 0.627$). It is noteworthy that these effects (negative because the actual outcome is stability rather than turnover) may seem small, but because the outcome refers to the whole of the trust and not just that staff group, they are still important differences.

TABLE 17 Staff group breakdowns meeting criteria for differential prediction of outcomes, controlling for outcome variable of prior year

Outcome	Predictor	Breakdown
Staff turnover	Turnover intentions	Occupational group
Staff turnover	Work pressure	Occupational group
<i>C. difficile</i> infection rates	Turnover intentions	Occupational group
MRSA infection rates	Impact of health on ability to do job	Tenure
Patient satisfaction	Impact of health on ability to do job	Gender
Patient mortality	Line manager support	Age

TABLE 18 Staff group breakdowns meeting criteria for differential prediction of outcomes, not controlling for the outcome variable of the previous year

Outcome	Predictor	Breakdown
Absenteeism	Advocacy	Occupational group
Absenteeism	Job satisfaction	Occupational group
Absenteeism	Line manager support	Occupational group
Absenteeism	Overall engagement	Occupational group
Absenteeism	Staff involvement	Occupational group
Absenteeism	Turnover intentions	Occupational group
Absenteeism	Work engagement	Occupational group
<i>C. difficile</i> infection rates	Turnover intentions	Occupational group
Patient satisfaction	Advocacy	Occupational group
Patient satisfaction	Turnover intentions	Occupational group
Patient satisfaction	Work pressure	Occupational group
Staff turnover	Turnover intentions	Occupational group
Staff turnover	Work pressure	Occupational group
Staff turnover	Impact of health on ability to do job	Full time/part time
Absenteeism	Impact of health on ability to do job	Tenure
Absenteeism	Staff involvement	Tenure
Absenteeism	Work engagement	Tenure
MRSA infection rates	Impact of health on ability to do job	Tenure
Staff turnover	Work engagement	Gender
Absenteeism	Job satisfaction	Age
Absenteeism	Line manager support	Age
Absenteeism	Staff involvement	Age
Patient mortality	Advocacy	Age
Patient mortality	Line manager support	Age
Patient mortality	Overall engagement	Age
Patient satisfaction	Advocacy	Age

TABLE 18 Staff group breakdowns meeting criteria for differential prediction of outcomes, not controlling for the outcome variable of the previous year (*continued*)

Outcome	Predictor	Breakdown
Patient satisfaction	Overall engagement	Age
Staff turnover	Line manager support	Age
Staff turnover	Impact of health on ability to do job	Disability
Absenteeism	Impact of health on ability to do job	Ethnic group
Absenteeism	Job satisfaction	Ethnic group
Absenteeism	Staff involvement	Ethnic group
Absenteeism	Work engagement	Ethnic group
Absenteeism	Work pressure	Ethnic group
Patient mortality	Advocacy	Ethnic group
Patient satisfaction	Advocacy	Ethnic group
Patient satisfaction	Overall engagement	Ethnic group
Patient satisfaction	Turnover intentions	Ethnic group
Staff turnover	Work pressure	Ethnic group

For the effect of work pressure on turnover, it was the AHPs who had the strongest effect by far ($\beta = -0.165$, $p = 0.001$). The other effects shown here are more difficult to interpret theoretically, but they suggest that the strongest link between turnover intentions and *C. difficile* rates is for general managers, the strongest links between general health and well-being and MRSA rates are for those who have been in post for between 6 and 15 years, the strongest links between general health and well-being and patient satisfaction are for women, and the links between line manager support and patient mortality are strongest for those in the 41–50 years age band.

There are many separate findings here and, as with *Table 17*, quite a few may be difficult to interpret. Therefore, we discuss those that are most likely to be understood theoretically: differential effects by occupational group and other effects on absenteeism.

For the various differential effects of occupational group on absenteeism, it is the nurses that have the strongest effect in each case, followed by medical/dental staff. The nurses' effects are easily understood by the fact that they are the largest constituent group in each trust and, therefore, it is completely reasonable that they would have the largest single effect on trust absence rates. The medical/dental staff findings are not so easily understood by this same explanation, as they do not usually form the second highest proportion of staff. Rather, it may be that the influence of medical staff in trusts is such that their attitudes and behaviours affect other staff to a great enough degree to have an impact on absenteeism. These results are clear and consistent and, given the criteria used, this is one set of findings that can be stated with confidence.

However, it is the turnover intentions of the AHPs and perceptions of work pressure that are the strongest predictors of actual staff turnover. As predictors of patient satisfaction, all main clinical groups as well as administrative/clerical staff had large effects – more so than the other non-clinical groups (for the effect of work pressure, it was nurses who had the greatest effect). The effect of turnover intentions on *C. difficile* mirrored that in *Table 17* and it was general managers who had the strongest effect. Of course, this may represent an inverse effect – if general managers are aware that infection rates are high, then they may be more likely to create workforce changes.

For the differential effects by age group on absenteeism, in the case of two of the three predictors (job satisfaction and staff involvement), it is the 'average' category of 41- to 50-year-olds who have the strongest effect on absenteeism. This suggests there is no particularly strong effect of young or old employees. However, for line manager support, the effect was strongest among 51- to 65-year-olds. This suggests that sickness absence is most likely to be affected by line manager support among older workers.

The effect of several variables on absenteeism differed significantly by ethnic group. In most cases, it was white workers' effects that were the largest, again, perhaps not surprising given they constitute the majority of employees in most trusts. However, for the effects of both work pressure and advocacy, it was the Asian staff who had the greatest effect. It is not clear whether this difference is meaningful or just down to statistical chance.

Analysis by region

Seven breakdowns met the criteria controlling for the outcomes of the prior year and 10 met the criteria without this control included. These breakdowns are shown in *Tables 19* and *20*, respectively.

It can clearly be seen that in the West Midlands there are much stronger predictors of absenteeism than in any other regions (in each case here, one region had a far stronger predictor than the other regions). This is not due to an unusual distribution of absenteeism or outliers; in fact, the range of absenteeism figures for 2010/11 was lowest in the West Midlands of all 10 geographical regions.

Once again, it is the West Midlands where absenteeism is most strongly predicted and these results essentially mirror those in *Table 20*. The same is true for the effect of general health on patient satisfaction in Yorkshire and the Humber, and for the effect of work pressure on turnover in the South Central region. Interestingly, London did not come out with the strongest effects in any of this analysis (although if the criteria were relaxed, that could change).

TABLE 19 Regional breakdowns meeting criteria for differential prediction of outcomes, controlling for outcome variable of the previous year

Outcome	Predictor	Region of strongest effect(s)
Absenteeism	Advocacy	West Midlands
Absenteeism	Impact of health on ability to do job	West Midlands
Absenteeism	Job satisfaction	West Midlands
Absenteeism	Line manager support	West Midlands
Absenteeism	Turnover intentions	West Midlands
Patient satisfaction	Impact of health on ability to do job	Yorkshire and the Humber
Staff turnover	Work pressure	South Central

TABLE 20 Regional breakdowns meeting criteria for differential prediction of outcomes, not controlling for prior year's outcome variable

Outcome	Predictor	Region of strongest effect(s)
Absenteeism	Advocacy	West Midlands
Absenteeism	Impact of health on ability to do job	West Midlands
Absenteeism	Job satisfaction	West Midlands
Absenteeism	Line manager support	West Midlands
Absenteeism	Turnover intentions	West Midlands
Absenteeism	Work pressure	West Midlands, South-East Coast
Patient satisfaction	Advocacy	West Midlands, East of England, South-East Coast
Patient satisfaction	Impact of health on ability to do job	Yorkshire and the Humber
Patient satisfaction	Turnover intentions	West Midlands, East of England, South-East Coast
Staff turnover	Work pressure	South Central

Summary of results

The sheer number of separate analyses presented in *Appendix 7*, combined with the variability of results and lack of consistent patterns for many of them, mean that interpretation of most results is impossible (or, at least, not sensible). This, in fact, can be considered a finding in its own right. For the most part, there is not a single group of staff (or geographical region) for which staff experiences are the most important; despite this, there are some patterns that become evident when studying the findings in more detail.

Unsurprisingly, given the theoretical proximity as an outcome, there are the most effects (and largest differentials) for predictors of absenteeism. Nursing staff generally had the strongest effects of all the occupational groups, perhaps unsurprising given that they form the largest group of staff. However, medical/dental staff also had substantial effects for most predictors. The turnover intentions of AHPs and perceptions of work pressure were the strongest predictors of actual staff turnover and all the main clinical groups, as well as administrative/clerical staff, had large effects as predictors of patient satisfaction. White employees' experiences had larger effects as predictors of absenteeism than those of other groups, mainly because they formed the vast majority of the workforce. There were no other easily explainable differential effects by ethnic group.

In terms of geographic regions, absenteeism was most readily predicted – by most staff survey variables – in the West Midlands, while the health of workers in Yorkshire had the strongest effect on patient satisfaction, and work pressure in the South Central region was a stronger predictor of turnover than in other regions. However, aside from the West Midlands, these may be one-off results, with no clear patterns emerging. It is not absolutely clear why these differences should emerge, but the West Midlands has been a region with significant levels of uncertainty in some trusts such as The Mid Staffordshire NHS Foundation Trust¹⁵ and a further 3 of the 14 hospitals included in the Keogh Review.²¹³

Chapter 9 Reflections from the Action Learning Sets

Introduction

We implemented two ALSs, partly to help ground the statistical findings in the 'real world' and partly to help start dissemination of findings. First, we wished to discover whether or not the statistical results from the study made sense to those dealing with the issues 'on the ground' and to hear the real 'stories' behind the statistical associations. However, this is not to say that we regarded the ALSs as a formal qualitative method to generate and analyse data such as interviews and focus groups. From the outset, it was made clear that the ALSs would provide support to the quantitative research but would not be part of formal data collection and, therefore, that only the general nature of discussions would be recorded. This means that it was not necessary to record detail as there was no intention to 'code' and analyse material.

The second reason was more important. While interviews or focus groups may have been a better way to generate and analyse data, they would, in our view, have been weaker in terms of participant involvement (or 'buy in') and dissemination, and so less tempting to those involved as they would not contain the element of shared learning on issues identified by the group. The ALSs were seen as an important element in dissemination to a group of over 40 NHS managers and staff, and public and patient representatives who had an interest in staff and patient experience, and gave them a personal stake in the research which was invaluable in local dissemination. However, our version of action learning differs in one major way from 'pure' ALSs (see *Rationale for Action Learning Sets*). Rather than only set members learning from the theories and results of the study (and from each other), the team aimed to learn from set members. Put another way, there was greater reciprocity in the process. In this way, participants were active subjects (rather than passive objects) and, in some ways, coproducers in the study.

It is generally argued that action learning is difficult to define and can take a variety of meanings in practice.²¹⁴ Dilworth²¹⁵ states that it is difficult to define action learning as it takes a variety of forms. Most commentators state that action learning dates back more than 50 years and has much in common with action research, a concept and term originated by the German psychologist, Kurt Lewin, in the 1940s. However, the term 'action learning' itself is generally associated with Reginald Revans, who is seen as the 'father' of action learning.²¹⁵

Throughout his various writing, Revans avoids defining 'action learning', arguing that definition was counterproductive,²¹⁴ as reported by Dilworth.²¹⁵ However, Revans²¹⁶ suggests that learning is derived in two ways – through both programmed instruction (which he calls 'P') and questioning insight ('Q'). However, by definition, the 'P' is all based in the past. Therefore, he suggests beginning with questioning insight ('Q') rather than by using past knowledge, which can highlight areas that require the creation of new knowledge (new 'P').²¹⁵ Revans²¹⁶ (p. 3) sets out his action learning formula of 'L (learning) = P (programmed knowledge) + Q (questioning)'. However, some authors also add R for reflection – for which the questioning insight is more important than knowledge acquisition in action learning. For example, Cho and Egan²¹⁷ stress that reflection is important to balance action and learning in the action learning process. Through reflection, action learning teams can convert tacit knowledge into explicit knowledge and improve their thinking and solutions to challenges. Dilworth²¹⁵ stresses the importance of bringing people together for reasons other than problem resolution, adding that the learning that occurs is regarded as the primary value.

Action learning has seen a significant growth and is now widely used. Park *et al.*²¹⁸ report a content analysis of 127 articles (case studies and case reports included) published in the journal *Action Learning: Research and Practice* between 2004 and 2012. Cho and Egan²¹⁷ point out that special issues on action learning have been included in the following journals: *Performance Improvement Quarterly* (1998), *Advances in Developing Human Resources* (1999 and 2010), *Journal of Workplace Learning* (2000), *Management Learning* (2001), *Learning Organization* (2002), *Journal of Asia Entrepreneurship and Sustainability* (2006), *Public Administration Quarterly* (2008) and *International Journal of Human Resources Development and Management* (2012).

Action learning is being used across diverse contexts. In their survey of recent 127 cases, Park *et al.*²¹⁸ found that health accounts for 18% of cases (with some of Revans' early work being in hospitals),²¹⁵ while organisation development make up 25% of total cases. Action learning is eclectic and can take a variety of forms. In a variant that is closely interwoven with other organisational interventions. It is closely related to organisation development, management development, team building and transformative learning. The flexibility of action learning in promoting learning and elevating organisational performance can be highly attractive²¹⁵ and it has been linked to HR development. Action learning has been used for effective communication, work climate, co-operation, shared vision and development at individual and organisational levels.²¹⁸ When used appropriately in organisational contexts, action learning can be a powerful approach to HR development.²¹⁹ Rigg and Trehan²¹⁴ write that action learning is a mode of inquiry that has particular value in situations in which people both want to change something about their situation and gain greater insight into the issue as well as their own practice. This leads to action learning being 'employed for a variety of individual and organisational development purposes as well as to address broad systemic and societal problems'.

Rationale for Action Learning Sets

Weinstein²²⁰ discusses the debate in the UK regarding whether some variants of action learning remain acceptable versions or are travesties, concluding that 'debates involving definitional purity rigid sets of principles and processes are unhelpful' and any effort to limit the use are unsafe as they hinder research and learning and 'privilege the ideas of the past and downgrade experience'. Revans himself has said that action learners are '... always having to re-invent their own ways of putting the basic ideas into practice. This inventing element is what maintains the life in action learning'.²²⁰

'Pure' ALSs generally last between 6 months and 1 year, with sets meeting around once a month and set size is generally small, usually no more than six people.^{215,220} Our sets were larger (albeit with smaller subset discussions) and met less frequently (see *Action Learning Sets participants*). We chose diverse sets (see *Action Learning Sets participants*). Weinstein²²⁰ argues that although 'horizontal' sets (participants with the same levels of responsibility and authority) are more common than 'vertical' or 'diagonal' sets (participants from different levels of responsibility and authority, either within the same function or across different ones), and 'vertical' or 'diagonal' sets often expose a range of issues from different perspectives that are missing in horizontal sets. Similarly, team members with diverse backgrounds are highly desired because participants of diversity can generate innovative ideas and explore different solutions.^{216,218}

However, we argue that we have kept to the spirit or ethos of action learning. According to Weinstein,²²⁰ a 'true action learning program' must incorporate the four 'P's of action learning. First, it should achieve the two end **P**roducts, a task accomplished and implemented, and learning gained; second, it must adhere to the **P**rocedures – the set, the processes in the set and the set adviser; third, it has to value the underpinning **P**hilosophy – honesty, respect for others and the taking of responsibility; fourth, it should explore **P**rogrammed 'knowledge'.

Similarly, we are in accordance with Dilworth's²¹⁵ summary of action learning fundamentals that includes the starting point of questioning insight, tackling real problems, strategic learning, the importance of reflection and the primacy of learning.

Moreover, our aim was in line with a key perception of the power of action learning and its benefits that was taken from interviews with a number of current practitioners and 'users': to resolve real business problems ('Action learning is a bridge between analysis and implementation').²²⁰

In short, our version of action learning made two major contributions to the project. First, it explored whether or not the statistical results from the study made sense to those dealing with the issues 'on the ground' and allowed the statistical associations to be compared with some real 'stories'. Second, it was associated with local involvement and dissemination, in which a stress on reciprocal learning made participants active subjects (rather than passive objects) or (in some ways) coproducers in the study and led to larger stake in dissemination.

Action Learning Sets participants

Given the topical and practical nature of the research, ALSs were used at three stages during the work to provide soundings with the current context of the NHS. First, ALSs were used at the commencement of the research in order to gauge the current preoccupations of managers and the challenges they face about issues connected with staff satisfaction and organisational performance. Second, they were used part-way through the work to hear the reflections of managers, and patient and public involvement (PPI) representatives on the initial findings. Finally, they were used in the closing stages of the research to test how strongly findings resonated with this group of individuals and as a part of local dissemination.

The NHS managers and staff representatives who participated in the ALSs had an interest in the area of study, working in trusts that were taking action to support staff in shifting attitude and behaviour, in the belief that such action would have a positive impact on patient outcomes and other organisational performance measures. Participating members of the public and patient representatives were foundation trust governors, and Local Involvement Networks (LiNK) and Healthwatch members, self selected from open invitations to the groups to which they belonged. All participants had links with, or worked for, a range of NHS trusts in the then West Midlands and the East Midlands and from national NHS organisations (a list of participants and their job roles is included in the *Acknowledgements*). Given their individual interests, there was no need to convince participants of the importance of the area of study.

The first meetings involved only managers and staff side representatives. Invitees were asked to select one of two dates and the same format was used for each session. The approach to the meetings was flexible and adapted to suit participants and discussion area. In those first meetings (June 2012), traditional set methodology was used focusing on the experiences and challenges faced by set members. In the second round of meetings (January and February 2013), PPI representatives were also invited and the methodology shifted into more of an inquiry set exploring the views and experiences of those present and focusing on themes emerging at this stage of the research. All who had participated were invited to a final workshop (June 2013) that discussed provisional findings from the research and commented on dissemination proposals. Notes were taken during meetings and circulated after the meeting to check accuracy. The summaries presented here are constructed from those notes.

Reflections from the Action Learning Sets

Reflections from the first set meetings were grouped into three areas of discussion: an initial exploration of issues perceived as important by NHS managers and staff; an exploration of challenges presented; and possible areas for action. With the frequently rehearsed caveats (response level, interpretation of questions, etc.), it was agreed that the staff survey did provide much useful information and the experience of participants was that NHS trusts did provide a serious focus on the action plan developed annually to improve survey ratings.

There was general agreement that there was a positive relationship between what can be termed staff satisfaction and outcomes and, therefore, that finding ways to improve satisfaction is important, but there was some discussion about terminology such as satisfaction, happiness, engagement, well-being or experience. It was broadly agreed that 'discretionary effort' given by the individual member of staff such as smiles, reassurances and personal touches can make a big difference to patient satisfaction (experience) and ultimately to organisational outcomes.

However, this link is complex as it was pointed out that professional cultures are often stronger than organisational ones and that sometimes there will be good engagement in some parts of an organisation and not in others. This reinforces the importance of the 'microsystem'³⁹ and that action at the organisational level does not permeate down to every ward.

The importance of the pivotal role of leadership, line management, the quantity and quality of appraisal and managing poor performance was pointed out. It was suggested that sometimes line managers tended to avoid 'difficult conversations', perhaps as there can be a thin line between fair criticism, and bullying and harassment.

At their second meeting, set participants were joined by a number of members of the public and the discussion was focused on the four factors that seemed (at this stage of the research) to be the most important indicators of staff satisfaction and organisational outcomes: quality of job design, work pressure felt, work-life balance and support from supervisor.

Members tended to agree that understanding roles and having clear goals and objectives in one's job was vital. This is related to the quality and quantity of feedback that one receives and the extent to which one is involved in decisions regarding changes to one's job, team or department. Members tended to recognise the differences in the staff survey between having an appraisal in the last 12 months, a well-structured appraisal and a personal development plan resulting from that appraisal. Work pressure involved time pressure, lack of sufficient staff to complete the allocated work and inability to maintain a desirable standard of work in terms of quality. Members pointed to the pressure associated with the organisational turbulence of 'change, change and more change'. Work-life balance referred to the extent to which the trust and the line manager are committed to offering opportunities for flexible working and how much they promote a work-life balance. Finally, support from supervisor referred to the extent to which the line manager encourages teamworking, provides help and feedback, encourages participation in decision-making and shows individualised interest.

There is much anecdotal evidence about a bullying and harassment culture in the NHS, and bullying, because of pressure to meet targets, was noted as a possible side effect of poor job design. Members pointed out that such managerial behaviour can result in a spiral of consequences including sickness and absenteeism. Finally, it was noted that agency staff are often disconnected from management systems (including the staff satisfaction survey) and can reduce productivity. It is possible for whole shifts on wards to be agency staff, making it very difficult for supervisors to know the skills and weaknesses of those they are supervising.

A final ALS was held in June 2013 to discuss the emerging findings from the research examining the links between staff satisfaction and organisational performance and to comment on policy implications. There were three areas for discussion: appraisal, teamworking and differences linked to gender and occupational group. There was strong agreement between the two groups of participants (NHS staff and PPI members) in seeing the value of a satisfactory and supportive appraisal process, but it was suggested that appraisal needs to be more of an ongoing process than an annual 'event', although the notion of ring fenced appraisal time was regarded as important. Although teamworking was seen as important, it was noted that the definition of a 'team' is often problematic and the notion of working in a team is sometimes hidden in many questions about such areas as 'feeling involved' or 'contributing to developments'. Finally, managers were particularly interested in the disaggregated results as they felt that there was little previously available research that raised questions regarding individually specific approaches and needs. For example, they recognised that there may be a range of approaches to promotion and to pressures external to work (e.g. women disproportionately affected by child care and other caring roles), and the question of possible increasing gender and occupation differences as people work longer was raised.

Conclusions

The second and third ALSs included a mixture of individuals with diverse backgrounds and experiences but sharing a common intention – to look for ideas within the unfolding research that would provide insights to enable NHS organisations to enhance their abilities to become high-performing organisations. The NHS managers found that working with members of the PPI representatives was valuable and challenging. Similarly, those members of the public who are part of external groups or serving as governors in foundation trusts were keen to take back discussions to their organisations and have some influence from a position of authority given by additional information gained.

Both groups recognised the importance of the issues discussed and noted that there were complex relationships between many contributing factors. Discussions frequently returned to the impact of appraisals, with participants stressing that it would be unwise to focus purely on the annual and possibly ritualistic process that brings together manager and member of staff to talk about progress and intentions. All participants emphasised the ongoing relationship between manager and staff as the key factor and one that would ensure a supportive and challenging environment for work.

Those managers who participated were well versed in using the information from the annual staff survey to tackle areas of concern within their organisation. They were also interested in exploring the tensions that the survey illuminates but cannot answer (for instance the 'right' way for middle managers to manage weaker members of staff) and were keen to see research results as headlines for exploration.

The ALSs involved over 40 managers, PPI representatives and national policy influencers in total, who added a valuable element to the quantitative research in three main ways. First, it has added an active dimension of staff and PPI involvement. Second, it provided some 'validation' for the statistics in checking findings against the real life stories and experiences of the set members, which feeds into implications for practice (see *Chapter 10*). Third, it gave set members a personal stake in the research, which is a valuable component of local dissemination.

Chapter 10 Discussions and conclusions

Introduction

This chapter aims to summarise and explore the main themes arising from the quantitative analysis. It also relates these to the ALSs, described in *Chapter 9*, which put some ‘flesh on the bones’ of the results in order to make them meaningful for NHS managers.

The main aim of the project was to use secondary data to test part of the overall model that hypothesises a positive link between HRM and organisational performance in the English NHS. In broad terms, HRM practices (e.g. training and development, appraisal/performance management) are associated with intermediate outcomes, including staff attitudes (e.g. staff satisfaction, turnover intentions, absenteeism) and final outcomes (e.g. patient satisfaction, mortality). This may be conveniently seen as two ‘chains’: between HR practices and intermediate outcomes, and between intermediate outcomes and final outcomes. This leads to the main research questions that are the focus of the main empirical chapters:

Q1 (see *Chapter 6*): What are the links between individual staff experiences (e.g. satisfaction, engagement, turnover intentions) and intermediate staff outcomes (e.g. staff absenteeism, actual turnover)?

Q2 (see *Chapter 7*): How do these link with organisational performance (e.g. patient satisfaction, mortality)?

Q3 (see *Chapter 8*): Do these measures and relationships differ by occupational, demographic groups, trust types and geographical areas and, if so, what is the relative change for each group?

It should be noted that, although we had originally framed the questions in terms of staff satisfaction and attitudes, this was broadened somewhat to explore staff ‘experiences’. Such experiences (as measured in the NHS National Staff Survey) included a variety of attitudinal and well-being scores, but also experiences of negative events at work (e.g. violence, harassment) and other features that are closer to the HR practices end of the chain (e.g. appraisal, training, a variety of job design features). Some of these measures could be seen to cut across different elements of the model (e.g. satisfaction with the ability to provide care for patients, which is an attitude in relation to a job design feature), and, therefore, we included all staff experience variables from the NHS staff survey for the first two research questions.

Summary of literature reviews

Owing to the complex nature of the study, we did not complete one single literature review, but instead conducted three separate reviews. The first examined the HRM performance literature in general terms, the second was a systematic review of this relationship in health care and the third studied policy literature relating to the topics.

Chapter 2 provides a critical review of the theoretical and methodological challenges associated with the broad field of the HRM–performance relationship. This was loosely structured around Guest’s¹⁶ argument that the field requires a better theory about HR practices, outcomes and the link between them. We discussed HRM/independent variables in terms of single practices compared with bundles, and fit/universalistic, configurational or contingency perspectives. The main issue here is whether ‘one size fits all’ in all situations or whether best practices vary in different contexts of countries and industries.

We discussed outcomes/dependent variables in terms of organisational and employee perspectives. Many commentators point out that most studies focus on organisational outcomes, while fewer studies focus on employee outcomes. However, the relationship between them is far from clear, with two competing views of the 'mutual gains', 'optimistic' or 'win-win' perspective and the 'conflicting outcomes', 'pessimistic' or 'sceptical', 'win-lose' or 'lose-lose', or 'counteracting effects' perspective.

Many researchers note the 'black box problem' in linking HR practices with outcomes. Although the theoretical basis of many studies is often implicit, commentators have noted some focus around AMO theory. Methodological problems include the dominance of cross-sectional rather than longitudinal designs, which makes it difficult to say anything meaningful about causality.

We argue in favour of the best fit rather than the universal best practice approach. However, while at one level it is clear that context is important if only because many outcome measures used in studies of manufacturing such as profit are not appropriate for institutions such as the NHS, it is not fully clear which contextual features are most important. We discuss three contexts from the literature that may justify a study of the NHS, associated with its setting within services, health care and the public sector. Commentators argue that there are few studies on health care in general and on the NHS in particular,^{19,24-26} which suggest that reviews focusing on health care and studies of the NHS are useful.

Our argument of both the limited information on HPWS in health care and importance of context suggests that a review of health care is valuable (see *Chapter 3*). Moreover, we found that some existing reviews Etchegary *et al.*¹³⁶ and Garman *et al.*¹³⁷ cover rather different ground and come to rather different conclusions from each other. This justified conducting our own systematic literature review in order to explore (1) HPWS definitions in relation to those commonly adopted in non-health-care research and publications, (2) the extent to which the primary characteristics associated with HPWS in general literature are reflected in the health-care literature, (3) the dominant theoretical frameworks used in linking HPWS with outcomes in health care, (4) the terminological choices and their appropriateness in the health-care literature on HPWS, (5) the evidence on the link between HPWS and outcomes in health care, and (6) the various mechanisms through which, and conditions under which, HPWS have a positive effect on outcomes in health care. We initially identified 27 publications and added a further 15 publications through snowballing to yield 42 publications (23 quantitative empirical studies, seven qualitative empirical studies, four mixed-methods studies, five reviews, two commentaries and one theoretical article). Our main conclusions are that there is a lack of longitudinal studies that investigate causality. Various studies appear to report on the same data, thus possibly inflating the reported effects. The country variation among the reported studies is limited, thus making it difficult to reach generalisable conclusions. Finally, the majority of studies investigate a limited range of HR practices, thus making it difficult to reach conclusions with regards to the effects of the HR system overall.

Chapter 4 reviewed the policy literature of documents from government, business and public bodies of the 'business case' that staff satisfaction leads to greater organisational performance. There are a series of reports by a number of bodies drawing on different, but connected, debates inside and outside the NHS. The generic business case has been carried out with reference to 'Good Jobs', work and well-being, and engagement. Similarly, a series of reports from the DH and other organisations have stressed the importance of staff involvement and engagement and health and well-being over a period of about 15 years.

We concluded that issues such as staff engagement, and health and well-being have been on the generic national and NHS agendas for a long time, although most of the focus has been on the topic of involvement or engagement. However, at one level much of the discussion in the policy documents is too broad, consisting of fairly vague assertions that 'staff engagement' will lead to better performance without consideration of issues such as cost, context, causality or mutual gains. Moreover, there is an element of a continuing and sometimes recycled policy debate with variable implementation into practice. In short, our literature reviews suggest that there is limited evidence on the applicability of HPWS concepts to the

NHS (English; service sector, public service; health care) setting (see *Chapter 2*); few empirical studies on health care in general and on the NHS in particular (see *Chapter 3*); and a rather broad and vague 'business case' based on a number of untested optimistic assumptions, which has seen a rather patchy pattern of implementation (see *Chapter 4*). All these factors suggest that the empirical study of the following chapters is needed.

Summary and discussion of quantitative results

The analyses in *Chapters 6* and *7* addressed research questions 1 and 2, which concerned the links between staff experience, intermediate outcomes and organisational performance. This included both cross-sectional (individual level and trust level) analysis and longitudinal analysis. Although previous work has examined cross-sectional individual data, this is the first study to do so in such a large NHS sample in a systematic way. There have been far fewer longitudinal studies and we believe that this is also the first to examine such longitudinal data on hundreds of health-care organisations in a systematic way. Thus, we believe that our analysis makes a significant contribution to our knowledge about substantial parts of the HR model and how it operates in the English NHS.

However, the nature of this contribution in terms of the findings is varied. Although many of the cross-sectional results were in line with expectations and demonstrate the more important staff experiences in determining outcomes, some of the longitudinal results actually demonstrated that the picture of how parts of the overall model (in terms of causality) is a lot less clear than might be anticipated.

Many of the individual level results are largely as expected and tend to confirm results found in earlier studies (in particular those discussed in *Chapter 2*), with some added insight in some cases. In general, there are highly significant links between positive experiences (particularly well-designed jobs, meaningful roles, lower work pressure) and individual outcomes including higher job satisfaction and advocacy, lower stress, lower presenteeism, fewer adverse effects of health and lower turnover intentions. These results are somewhat expected owing to large sample size and possible common method variance (i.e. outcomes being measured by the same people who have the experiences), so should not be overinterpreted; however, there were some strikingly substantial effects.

For example, individual outcomes (such as turnover intentions, well-being and satisfaction) are strongly affected by negative experiences – not just aggression from patients and (even more so) colleagues, but particularly by not believing that their employer offers equal opportunities for career progression and promotion. On the other hand, these outcomes were particularly enhanced by staff engagement, both in terms of affective work engagement and other job design factors that allow the contributions of employees to be clearly made, for example being able to provide care to a level that staff find satisfactory and being able to develop potential. It seems clear that the motivation of NHS staff to provide a good service is an important factor in their individual well-being.

In fact, the importance of discrimination and perceptions of equal opportunities was a feature of much of the analysis. This mirrors the earlier findings on an NHS data set²²¹ that showed links between discrimination on the basis of ethnic background and overall job satisfaction (not just for those being discriminated against); these authors also found that the level of diversity training in an organisation predicted the extent of discrimination. Taken in conjunction with the findings of this report, it appears that diversity training and other measures to prevent discrimination – whether on the basis of ethnic background, age, gender, disability or other characteristics – should be important not just to fulfil mandatory requirements, but to ensure the well-being and health of the workforce in general.

Absenteeism is lower when staff job design is better, including good-quality teamworking; when motivation is higher; when communication is better; and when there are fewer instances of violence and harassment, both from patients and from other staff. Absenteeism is actually lower when more staff work

extra hours, but this may be explained by the fact that staff cannot both be working more hours and be absent. However, when more staff work extra hours, turnover is higher, possibly indicating that the negative effect of working too much becomes clear in terms of employees wanting a change of direction. The cross-lagged correlations suggest that when staff work in a more supportive environment, they are less likely to be absent (rather than the other way round).

In fact, the organisational-level analysis with absenteeism is probably the most instructive and clear set of findings from this analysis. The cross-lagged correlations suggest that there is clear evidence for the direction of the effect between absenteeism and over half of the staff survey variables: it is much more likely that good staff experience leads to lower absenteeism than vice versa. These effects are particularly strong for negative experiences such as violence and harassment, but are also very strong for the positive experiences of staff being able to contribute towards improvements at work and when there is good communication between management and staff. Combined with the latent growth curve analysis that gave similar results, this presents a very clear and unambiguous set of findings about the nature of NHS staff jobs and absenteeism, mirroring and extending previous research on the same variables.^{48,50,106}

We found that turnover is lower when work pressure is lower, training is more widespread, appraisals happen more frequently and effective action towards violence and harassment is perceived to take place. Improvements in job design and decreases in aggression from other staff are associated with subsequent decreases in turnover. However, results from the longitudinal analysis involving turnover are far more difficult to interpret; there is certainly some evidence of direction of causality from turnover to these outcomes being quite confused. For example, while there is an increase in turnover in subsequent years in trusts for which a higher percentage of staff are experiencing physical violence from patients or their relatives, it is more difficult to explain the link with the availability of hand-washing materials. There is also an increase in turnover in subsequent years in trusts for which staff receive more training; have more opportunities for flexible working; and higher levels of appraisal. This may partly be linked with the training paradox: that a better trained workforce may be better placed to compete for posts and perhaps promotions in other organisations, but it is difficult to explain the link with flexible working.

There was some strong latent growth curve analysis results, suggesting that when the number of staff having meaningful jobs increases, when there are decreases in aggression from other staff, and when belief in their employer as both a place to work and a place to receive treatment increases, then turnover tends to decrease over subsequent years. However, many of the other results – particularly the cross-lagged correlations – gave inconsistent or counterintuitive findings. In some cases, it appears that trusts may react to high turnover by, for example, increasing opportunities for flexible working. Of course, these findings have to be placed in the context of major changes over the NHS over the study period, including many large reorganisations of services, necessitating more movement of staff between trusts (and, in some cases, redundancies) than would normally be expected. Therefore, although objective data is usually better to use than subjective, it is probably more instructive to look at the patterns of results with self-reported turnover intentions (from the multilevel analysis), where the findings met with expectations, than the more surprising results using the stability index. Because of this, there is far less that can be learned from the longitudinal analysis with turnover than would be the case under less turbulent circumstances.

Patient satisfaction is the one organisational performance variable (final outcome) that showed consistent results. As found in a less rigorous study of NHS staff and patient surveys,²²² a large number of staff experience variables – in particular when staff are engaged, not under particularly high work pressure, and do not experience discrimination – result in patients in those trusts being likely to rate the care they received more highly. Patient mortality, which had been shown in other studies^{126,223} to be related to HR variables, was not so clearly related in this instance.

However, it is more difficult to interpret some of the longitudinal analyses with many of the outcomes. Staff experiencing physical violence from patients or their relatives is associated with higher patient mortality

rates in subsequent years. However, feeling valued by colleagues is associated with higher mortality rates in subsequent years and the percentage of staff suffering work-related injuries or illness is associated with lower patient mortality rates in subsequent years. At least some of these counterintuitive results may partly be methodological artefacts – the latent growth models employed can pick up on ‘regression to the mean’, for example if a trust had an unusually low level of patient mortality one year, and in this same year it had good staff experiences, then the mortality rate may naturally rise back to its expected level in subsequent years, making it appear as though good staff experiences are followed by a rise in mortality rates. For this reason, we do not recommend interpreting these findings without much clearer attention to the other analyses, particularly those looking at changes in staff survey variables and subsequent changes in outcomes.

There are some links between changes in staff experience from 2009 to 2010 and changes in outcomes over the 2009–11 period. A decrease in turnover in subsequent years is associated with an increase in staff agreeing that their role makes a difference to patients, an increase in the percentage of staff feeling that there are good opportunities to develop their potential at work, and an increase in their level of willingness to recommend the trust as a place to work or receive treatment. An increase in the percentage of staff experiencing harassment, bullying or abuse from other staff is associated with an increase in turnover in subsequent years. However, an increase in the percentage of staff suffering work-related injuries or illness is associated with a decrease in turnover in subsequent years. An increase in perceptions of effective action from employer towards violence and harassment is associated with a decrease in patient mortality rates, but an increase in shift-working is associated with an increase in patient mortality rates. Finally, an increase in the reported impact of health and well-being on employees’ ability to perform their work and daily activities is associated with a decrease in patient satisfaction.

We also looked at cross-lagged correlations to examine whether or not there was evidence of directional relationship between staff variables and outcomes. This set of analyses was expected to be a great strength of the study; the availability of data from so many organisations in consecutive years allowed a large number of tests with relatively high statistical power. Although such cross-lagged correlation tests, which examine whether the relationship between two lagged variables is stronger in one direction than another, cannot say anything definitive about causal relationships, if there is a causal relationship between two variables then we would normally expect the correlation to be stronger in that direction. Therefore, if there were a consistent set of causal relationships, we would expect to see a clear pattern of results emerging for similar variables.

When looking at absenteeism as the (intermediate) outcome, there was a clear pattern that there was a stronger link between staff experiences and subsequent absenteeism (i.e. staff absence in the year following the measure of experience) than vice versa, i.e. there is evidence of a causal link between what staff experience and their subsequent levels of absence. This is entirely in line with theoretical expectations and represents a significant contribution above previous studies that have shown cross-sectional links between these variables, for example the Boorman review.⁴⁸

However, in general, for other outcomes this was not the case. When examining turnover, patient satisfaction, patient mortality and infection rates, these correlations were not always in the expected direction; for example, patient satisfaction was more closely related to subsequent levels of flexible working than vice versa. For some outcomes (turnover and mortality) there were methodological limitations that may contribute towards this. Infection rates as an outcome are more troublesome; the links between staff experience and infections are more distal theoretically and there is the danger of reverse causality (i.e. when infections abound, this may affect staff well-being both directly and indirectly). However, for patient satisfaction as an outcome, neither of these problems should be the case. Therefore, the mixture of direction in links between staff experiences and patient satisfaction suggests that we can be less certain about the causality here. It may be, in fact, that there are more complex relationships at play; not only do staff experiences affect outcomes, but outcomes (including patient satisfaction) also have an impact on staff attitudes. Such reciprocal relationships are difficult to capture, particularly when the measurements are relatively blunt (i.e. measured for entire, large organisations, and with annual frequency).

There were some clearer indications about the links between intermediate and final outcomes. In particular, mortality is lower following lower levels of absenteeism – the direction of causality is fairly clear here. However, we see that higher infection rates are usually associated with subsequent increases in staff absenteeism, as the infections can affect staff as well as patients.

Despite these clear effects, there is little or no evidence for the links between staff experience and organisational performance being mediated by intermediate outcomes. That is, although the experiences of staff contribute directly to levels of absenteeism (and maybe turnover), and in many cases to outcomes (particularly patient satisfaction), these appear to be separate mechanisms. Patients are not less satisfied because of greater absence among staff or a greater turnover among staff. These two intermediate outcomes have a great financial cost for trusts⁴⁸ and decreasing them is not only in the interests of general good management, as staff experiences and attitudes have a more direct effect on patient views.

We need to acknowledge that it is likely that some of these results are type I errors, that is, they are among the 1 in 20 non-relationships that are found to be statistically significant by chance alone. When testing as many relationships as we do in this report, it is inevitable that some type I errors will occur and it is impossible to know which these are. As a general rule, relationships that are predicted by theory and have been demonstrated in other samples are more likely to be believable. Patterns of similar findings arising from different variables, even if not replicating results found before, are also more likely to be representing genuine effects; one of the reasons for conducting this study is that many of these things had not previously been looked at in large health-care samples, and, therefore, the generation of new knowledge – or at least findings which may be confirmed by subsequent studies – is an important part of that. However, when a significant result does not conform to expectations, and stands alone (without similar patterns), these are most likely to be the type I errors. Although we would not discard such findings completely, we urge further examination before any firm conclusions are drawn.

The analyses in *Chapter 8* address research question 3, which concerns the differential effects by groups of staff and different geographical regions. It is possible that relationships may be contingent rather than universal. For example, it may be expected that the relationship between turnover intention and actual turnover may vary depending on the nature of the labour market in different parts of the country. Similarly, there may be different relationships between engagement and patient satisfaction for doctors and nurses, for example. If associations are differential rather than universal, this may suggest focusing on different issues in different contexts and exploring different 'policy levers'.

Few previous studies have examined this disaggregate level and so this should be considered exploratory – we did not begin with a priori expectations about which groups would differ from which. Previous reports¹⁰⁶ have shown there are differences in the experiences between groups of staff; these are also shown in the annual publication of NHS staff survey results at www.nhsstaffsurveys.com.²⁰⁶ Our interest was not in replicating results from these studies, but in examining relationships between experiences and outcomes.

A very large number of tests (corresponding to the large number of breakdowns and variables) were conducted and, especially given the lack of particular expectations, this would likely lead to a large number of type I errors if we were simply to consider the results at face value. Instead, we imposed criteria to select out those for which there was the clearest difference between groups or regions. Given the theoretical proximity as an outcome, it was not surprising that there are the most effects (and largest differentials) for predictors of absenteeism. Nursing staff generally had the strongest effects of all the occupational groups, which makes sense given that they form the largest group of staff and can, therefore, have the largest single effect on trust-level absence rates. However, medical/dental staff also had substantial effects for most predictors. The turnover intentions and perceptions of work pressure of AHPs were the strongest predictors of actual staff turnover, and all the main clinical groups as well as administrative/clerical staff had large effects as predictors of patient satisfaction. These results point to the conclusion that no single group of staff (clinical or non-clinical) has a monopoly on outcomes and,

although it may be tempting to conclude that nurses' experiences are the most important for some, this may simply be because nurses are the largest constituent of the workforce.

For other breakdowns by staff, there were few results meeting the criteria that were immediately explainable. One exception was that white employees' experiences had larger effects as predictors of absenteeism than did the experiences of other groups; however, this is likely, again, to be because white employees formed the vast majority of employees in most trusts. Overall, these results again point to the conclusion that it is the experiences of all staff, wherever they are in the organisation, that are important.

In terms of geographic regions, absenteeism was most readily predicted, by most staff survey variables, in the West Midlands, while the health of workers in Yorkshire had the strongest effect on patient satisfaction and work pressure in the South Central region was a stronger predictor of turnover than in other regions. Although regional differences are potentially interesting, it is difficult to attribute reason for these findings. In particular, it is tempting to interpret the West Midlands result in the light of the Francis report¹⁵ and the documented issues not just with Mid Staffordshire NHS Foundation Trust, but with others in the region as well (the West Midlands Strategic Health Authority being criticised for its use of, and reaction to, data within the report); however, it is not immediately clear why experiences should predict absenteeism more in this region than in others. Indeed, these may be one-off results, with no clear patterns emerging. Given the exploratory nature of the analysis, the difficulty of interpreting all these results, and the absence of many clear patterns, any conclusions must be tentative.

Discussion of Action Learning Sets

Action Learning Sets were used for two main reasons: to ground the statistical findings in participants' experiences and as a contribution towards local involvement and dissemination. The first meetings (June 2012) involved NHS managers and staff, while the second meetings (January and February 2013) and final workshop (June 2013) also involved PPI members.

Reflections from the first set meetings were grouped into three areas of discussion: an initial exploration of issues perceived as important by NHS managers and staff, an exploration of challenges presented and possible areas for action.

At their second meeting, set participants were joined by a number of members of the public. It was broadly agreed that the four factors that seemed (at this stage of the research) to be the most important indicators of staff satisfaction and organisational outcomes – quality of job design, work pressure felt, work–life balance and support from supervisor – made sense to participants.

A final ALS was held in June 2013 to discuss the emerging findings from the research examining the links between staff satisfaction and organisational performance and to comment on policy implications. There were three areas for discussion: appraisal, teamworking, and the differences linked to gender and occupational group. Although participants largely agreed on the importance of appraisal and teamworking (which was in line with previous studies), it was recognised that the implications of disaggregated results were much less clear as they posed new questions on issues with little previously available research.

Integration of study elements

Just as the HPWS stresses the additionality of elements into synergistic bundles, links between the different elements are intended to increase the synergy of this study. The literature reviews provided the conceptual and policy foundations for the empirical study. The conceptual review (see *Chapter 2*) explored the relevance of the HPWS literature. It found that the literature suffers from some conceptual and methodological problems. In particular, the 'best fit' literature argued that conclusions from other settings

(countries, sectors) cannot easily be transferred to the NHS. This justified a literature review of health-care settings (see *Chapter 3*) and the subsequent empirical study of the NHS (see *Chapters 6–8*). In addition, it suggested that a major problem of the literature was the lack of longitudinal research, which justified the research design that analysed data from three data periods.

The literature review of HPWS in health care (see *Chapter 3*) found that many of the issues from the broader literature also occurred in this setting. In particular, we found that there were few studies on the NHS and very few that used longitudinal research designs.

The policy review (see *Chapter 4*) showed that the ‘business case’ linked staff satisfaction and organisational outcomes have been broadly accepted by government, public and other bodies both generally and within the NHS. However, a long history of policy documents have not clearly resulted in effective local action in all trusts.

There were some obvious links between the quantitative study and the ALSs. First, the ALSs were used to ‘validate’ the quantitative study in the sense that the relationships found were confirmed by set members as ‘real’ rather than statistical artefacts and that the data sources were seen as broadly relevant measures of the constructs. Second, emerging results from the quantitative study were generally ‘validated’ by set members in that they fitted into their experiences and this provided some experiential backing for findings and implications based on issues such as staff appraisal. The findings from the ALSs also help further interpret the findings from the quantitative analysis, including the analysis not presented in the ALSs (either because it had not been conducted by the time of the ALS in question, or because it was necessary to focus on a subsection of the findings only due to time constraints). For example, the ALSs participants described the subcultures that could exist within trusts and microsystems within organisations where things operated better (or worse) than elsewhere in an organisation. When such variation exists, the overall trust-level results (for either staff experience or outcomes) become less meaningful, as they represent an average of disparate departments or teams rather than a coherent organisation-wide culture. This is to be expected, of course, but the reports from the ALSs that individual line managers can vary significantly suggests that results around staff experiences where line managers are important (e.g. appraisal, well-structured teamworking, support from immediate managers, work pressure, opportunities for flexible working) may be particularly compromised by such variation and these relationships may benefit from more finely grained analysis on individual teams or departments.

The viewing of appraisal as more of an ongoing process rather than an annual event also suggests that the survey questions around appraisal may not be ideal for examining what goes on and this may be why fewer significant results involving appraisal were found than might be expected.

Practical implications

It is difficult to draw clear practical implications as we considered only the second link in the chain of the model (staff satisfaction and organisational outcomes) and did not focus on the first link between HR practices and staff satisfaction. This means that drawing implications for HR practices is problematic. However, some elements that appear in the staff survey (such as appraisal) can be linked, while others can be inferred (e.g. if reported harassment is strongly linked to organisational outcomes, then this suggests a focus on anti-harassment measures). Our broad conclusions support existing policy and other work in the field, e.g. by Maben *et al.*,³⁹ that individual employee satisfaction is best seen as a precursor rather than a result of the performance of patient care and so it is important to encourage staff satisfaction not just for its own sake but to enable the delivery of patient care that is of a high quality.

Many of the individual-level results are largely as expected and tend to confirm results found in earlier studies. For example, intermediate outcomes (e.g. higher job satisfaction and advocacy, lower stress, lower presenteeism, fewer adverse effects of health and lower turnover intentions) are positively linked with experiences (e.g. staff engagement, well-designed jobs, meaningful roles, lower work pressure) and negatively linked with aggression from patients and colleagues, and not believing that their employer offers equal opportunities for career progression and promotion, for example. Similarly, we found that turnover is lower when work pressure is lower, when training is more widespread, when appraisals occur more frequently and when effective action towards violence and harassment is perceived to take place. We found evidence of some causal relationships in some cases. For example, the cross-lagged correlations suggest that when staff work in a more supportive environment, they are less likely to be absent (rather than the other way round).

Some of these measures showed clear links to the organisational performance variable (final outcome) of patient satisfaction. In particular, when staff are engaged, are not under particularly high work pressure and do not experience discrimination, then patients in those trusts are likely to rate the care they received more highly.

There are some links between changes in staff experience from 2009–10 and changes in outcomes over the 2009–11 period; a decrease in turnover in subsequent years is associated with an increase in staff agreeing that their role makes a difference to patients, an increase in the percentage of staff feeling that there are good opportunities to develop their potential at work, an increase in their level of willingness to recommend the trust as a place to work or receive treatment. An increase in the percentage of staff experiencing harassment, bullying or abuse from other staff is associated with an increase in turnover in subsequent years.

We also looked at cross-lagged correlations to examine whether or not there was evidence of directional relationship between staff variables and outcomes. For example, there was a clear pattern of a stronger link between staff experiences and subsequent absenteeism (i.e. staff absence in the year following the measure of experience) than vice versa, i.e. there is evidence of a causal link between what staff experience and their subsequent levels of absence. This is in line with theoretical expectations and represents a significant contribution above previous studies that have shown cross-sectional links between these variables, e.g. the Boorman review.⁴⁸

The strongest evidence is derived from results associated with different methods and research questions, 'validated' by our ALSs and in line with prior evidence. On this basis, the most obvious implications for practice appear to be:

- Set clear guidelines and take effective action on harassment, bullying or abuse from other staff (as stated in Woodrow and Guest¹⁹⁰).
- Ensure that appraisals are conducted effectively, not just as a 'box-ticking' exercise: with clear objectives and personal development plans agreed, with appraisers trained to conduct these appropriately (i.e. see also Powell *et al.*²²⁴).
- Ensure that teams are constructed to meet the needs of the task and the patients, and that these teams have clear objectives, with clear interdependent roles of team members but with opportunities to reflect on performance (i.e. see also West *et al.*^{21,126} and Maben *et al.*³⁹).
- Invest in unit-level leadership and supervisor support, including appropriate training for both new and existing supervisors, so that clinicians promoted to management positions have the appropriate skills to deal with matters such as bullying and harassment, time management of staff, and monitoring health and well-being (as well as conducting appropriate appraisals and team leadership) (i.e. see also Maben *et al.*³⁹).

Limitations and directions for future research

The research conducted had many strengths, including the use of large-scale data sets in extensive analysis without the need for expensive primary data collection. It made use of 3 years' data across nearly 400 organisations [longitudinal data analysis on staff experiences in organisations is seldom (if ever) seen on such a scale in any industry and any part of the world] and so we believe that this is ground-breaking in that respect. It also made use of relatively sophisticated methods (latent growth curve modelling and cross-lagged correlation analysis, as well as multilevel regression analysis) to conduct the tests. Much of the analysis was informed by a clear theoretical model and, thus, we were able to test relationships that had been clearly hypothesised by previous researchers.

However, there were also several limitations. Most of these related to the measures available to us. First, the NHS staff survey – although providing excellent coverage of many issues – does not include everything that is part of the HR model.

Second, some of the outcome measures did not perfectly capture what we would want. The mortality index that is published and used within the NHS changed in the middle of our survey period, which makes it difficult to interpret longitudinal findings involving mortality. Turnover (or, more precisely, stability) is also difficult to assess longitudinally, owing to the changing NHS environment over the study period (a mixture of uncertainty about the future, cutbacks in many areas and reconfiguration of trusts and services) means that turnover cannot be assumed to be a result of individual decisions.

Third, the organisational performance variables (trust outcomes) were all measured in acute trusts only. We had hoped to include some performance measures that could be applied to all NHS trusts; however, despite our examination of a variety of potential sources (including measures relating to CQUIN), no suitable quantitative measures for the whole of the NHS were found. Previous research, for example West *et al.*,¹⁰⁶ had examined ratings produced for the Healthcare Commission's Annual Health Check as outcomes; however, these have not been produced since 2009. It is impossible to say whether or not relationships with patient satisfaction, for example, would also be applicable across other types of trust, although there is no particular reason to believe that they would not.

Fourth, owing to the nature of the data we were constrained to study entire trusts with annual measurements. In reality, this may not be sufficiently sensitive to pick up all the effects of staff experiences. Many may become a lot clearer if measured in smaller units and with appropriate outcomes measured a suitable length of time afterwards. Although it is somewhat reasonable to expect that the overall experiences of staff in a large hospital in 2010 may affect overall absence rates between April 2011 and March 2012, it is far more likely that the experiences of staff in a single team or department at a given point in time would be reflected in absenteeism over the next few weeks or months.

Fifth, the analytical methods themselves are often insufficient to detect causal relationships. This is partly due to that mentioned in the previous paragraph: the design of the study was too blunt to pick up more finely grained effects. However, it is partly because the actual relationships may be more complex than such methods can model, at least with the extent of data available to us. There may be reciprocal causal relationships between staff experiences and outcomes that we were unable to account for fully. In addition, the techniques of cross-lagged correlation analysis and latent growth curve modelling are known to be insufficient to capture complex, multivariable relationships with absolute accuracy.^{197,201,202} However, short of a fully randomised control trial, few methods are able to assign causality in a very clear way.

Finally, the staff experience variables themselves are often closely related and it is not always possible to distinguish between the effects of different variables. We chose not to include all staff experience variables in the same analysis and, for the most part, this would not allow sufficient degrees of freedom to conduct the tests adequately. Even if it would (which would be possible in the individual-level analysis), it would result in far too much multicollinearity between predictors for the results to be interpretable.

Therefore, although we find many links between different staff experiences and certain outcomes, it may well be that it is the same overall effect that we observe in multiple ways.

All of these point to some interesting possible directions for future research. There is still much scope for detecting exactly how staff experiences and outcomes are linked, but in our view there are some priorities for further research.

First, there is a need to explore the link between HRM and performance more fully in a health-care setting, exploring the full model rather than our focus on the second 'chain' between staff satisfaction and organisational outcomes. This might involve the careful evaluation of interventions designed to improve staff experience. The use of appropriate designs (e.g. randomised control trials or stepped-wedge designs at individual, group or department levels) could identify when such interventions actually do have an effect on staff experiences and patient outcomes. Many such interventions take place in trusts up and down the country, but most are evaluated in a far less rigorous way, if at all, meaning that the evidence base is rather thin. This could be connected to the HPWS literature to examine whether or not 'bundles' are more effective than individual practices. Moreover, the vast majority of work focuses on effectiveness or the benefit side with little or no consideration of efficiency, which also includes the cost side. Some work on cost-effectiveness of bundles or practices may suggest priorities for investment.

Second, most secondary data such as those used in this study focus on the organisational level. It is important to examine links between staff satisfaction and performance at the micro (e.g. ward) level, as it is clear that there may be some highly performing wards in poorly performing trusts (and vice versa).³⁹ Therefore, qualitative work exploring local leadership and microclimates are necessary to complement organisational-level quantitative work.

Third, there is a need to explore HPWS in settings beyond acute care. Many existing data are more clearly suited to acute settings, but there is much public, policy and professional concern over long-term care. It is unclear if broad conclusions that are largely based on acute care can be easily transferred to long-term care, with a very different pattern of staffing.

Fourth, we suggest continued longitudinal examination of the links between staff satisfaction and organisation performance. It is possible that links between satisfaction and performance may change from historical patterns owing to the change to less generous funding after the financial crisis (the 'Nicholson challenge') and the 'external shock' of the reorganisation associated with the coalition health reforms.

Fifth, we would recommend the continued use of secondary data sources, such as those used in this report, to answer more specific, theoretically driven questions. Such research is relatively inexpensive and can make good use of data that have already been collected. In some cases, this can be complemented by further data collection to expand the possibilities. For example, if outcome variables that could be applied in non-acute trusts were to be developed or collected, this would allow a far greater set of analyses that could be of use to the NHS more widely. The NHS staff survey itself could assist this process in a number of ways by collecting improved data on trust leadership, by asking more detailed questions about the ongoing support from line managers for staff (i.e. not just the annual appraisal), and by allowing identification of subsections of trusts, such as individual departments, localities or teams.

Finally, we would urge more longitudinal data to be collected for individual staff members because this way a far more sensitive analysis could be conducted. Although this would not allow examination of all of the outcomes, for some (e.g. absenteeism, turnover, patient satisfaction) careful design would allow linkages to be drawn, particularly if data were collected more frequently than once a year, which shed far greater light on the causal mechanisms behind the data.

Conclusions

Overall, this research using sophisticated analytical methods (including extensive use of longitudinal data) gives a mixture of clear answers and further questions. Clear answers include those that suggest staff experience is clearly linked to outcomes, especially intermediate outcomes such as absenteeism. Building on previous research, this has shown that negative experiences such as discrimination, violence and harassment are most detrimental to outcomes, while staff engagement and the design of jobs so that, for example, staff feel they are clearly able to make a difference to patients, are most beneficial. These links also apply clearly to patient satisfaction as a cross-sectional outcome, although less clearly to other organisational performance measurements. However, although there is some clear evidence for causal links between staff experiences and absenteeism, other causal relationships are much more equivocal and in many cases it is not possible to say whether or not there is a causal relationship in either direction.

Given that there are relatively few empirical studies in the NHS, and we have demonstrated that it is not sensible to transfer findings from other contexts or countries, this represents a significant advance on our knowledge about how staff management and experiences play an important role in health care.

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Martin Powell was the principal investigator and he drafted *Chapters 1, 2 and 4*.

Jeremy Dawson was the coinvestigator. He was responsible to overseeing the quantitative analysis. He drafted *Chapters 5, 6, 7, 8 and 10*.

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Joan Durose is an associate at Health Services Management Centre and was jointly responsible for the ALSs. She drafted *Chapter 9*.

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Appendix 1 Summary of systematic literature review of high-performance work systems

TABLE 21 Summary of theoretical underpinnings of reviewed publications and inclusion in reviews

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice' / context-specific/ organisation-specific approach
Berg and Frost (2005) ¹²⁰	HPWS	N	Drawing from various conceptual and empirical sources	Various	Not assessed	Context specific (with a focus on low-skilled, low-paid workers in the health-care sector)
Bartram <i>et al.</i> (2007) ¹⁶⁷	SHRM	Y	Does not deal with HPWS directly	Drawing from Bowen and Ostroff's (2004) ¹⁶⁸ model of distinctiveness, consistency and consensus of HR systems	Both assessed in the questionnaires; specific survey questions measuring internal and external alignment	Sector specific (some measures specifically developed for the health-care sector)
Bonias <i>et al.</i> (2010) ¹⁴⁴	HPWS	Y; does not distinguish clearly between HPWS and familial terms; instead, they treat them as synonym	'a group of separate, but interconnected human resource practices that together recruit, select, develop, motivate and retain employees' (Zacharatos <i>et al.</i> , 2005 ¹⁴⁰)	None	Not assessed	Best practice
Boselie <i>et al.</i> (2003) ³	HR practices	Y; does not distinguish clearly between HPWS and familial terms; instead, they treat them as synonyms	'Positive performance effects arise in part from the creation of more co-operative labor-management relations, which induce employees to work harder and share ideas in the pursuit of "mutual gains" with employers.' (Godard and Delaney, 2000 ¹⁷¹)	CCU: configurational approach. Draw greatly on the command and control framework (Arthur, 1994) ⁶⁶	External influence is investigated – the extent to which the degree of institutionalisation of an industrial branch has an effect on the performance benefits of HR systems	Assumes that HPWP are a 'best practice' approach, therefore rendering the framework as inappropriate owing to neglect of contextual factors
Boselie (2010) ¹²⁷	HPWP	Y; uses the term 'practices' and accordingly does not assume or hypothesise systemic effects or links to organisational-level outcomes	HPWP described as those practices that enhance abilities, motivation and opportunity, in line with the AMO framework. They are linked to enhancing discretionary effort among employees	AMO	Not assessed	Best practice approach, although there is some effort to contextualise research to the health-care setting
Deshpande (2002) ¹⁴⁵	HRM practices	Y	HRM practices as strategic source of competitive advantage	None	Effect of union elections investigated	Context specific (health-care organisations in the USA)

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice'/ context-specific/ organisation-specific approach
Gittel (2008) ¹⁴⁶	Relational work practices and relational work systems	Y	The following practices are proposed to have a synergistic effect in promoting resilience, through good communication and strong relationships: 'selection and training for cross-functional teamwork, the use of conflict resolution to build relationships between workers, feedback and rewards that are oriented towards contributions to shared goals, and information sharing or co-ordinating mechanisms like team meetings and boundary spanners'	Social capital approaches	Not assessed	Best practice
Gittel <i>et al.</i> (2010) ⁸	HPWS and HPWP	Y	The authors propose that 'each component practice reaches across multiple functions to engage employees in a coordinated effort'. They investigate HPWP that focus on building employee–employee relationships. Practices include cross-functional selection, cross-functional conflict resolution, cross-functional performance measurement, cross-functional rewards, cross-functional meetings and cross-functional boundary spanners	Human capital theory, relational models of HPWS	Not assessed	Best practice
Gowen <i>et al.</i> (2006) ¹⁴⁷	HCWP	Y	Links SHRM to quality management programme success and competitive advantage. 'The HCWP perspective emphasizes employee empowerment and progressive practices in selection, training, rewards, recognition, information sharing, team-building, and socialization'	HCWP, configurational fit, and contingency fit approaches	Not assessed	Best practice

continued

TABLE 21 Summary of theoretical underpinnings of reviewed publications and inclusion in reviews (*continued*)

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice'/ context-specific/ organisation-specific approach
Harley <i>et al.</i> (2007) ¹¹⁸	HPWS	Y	'... the systematic use of mutually reinforcing human resource management (HRM) practices'. They propose that these practices should include selection, development, job design that facilitated creative problem solving and reward systems that are aligned with the organisation's goals	RBV and 'mainstream' approaches discussed. 'Mainstream' refers to theories that link HPWS to positive employee outcomes, which are believed to lead to improved organisational performance	Internal influence is investigated in terms of the extent to which the makeup of the organisation's workforce has an effect on the extent to which HPWS are adopted and on the nature of the relationship between HPWS and employee outcomes	Takes an organisation-specific approach by building arguments regarding the applicability of HPWS and transferability of research findings in the service sector (from the manufacturing sector) and across different occupational groups
Harmon <i>et al.</i> (2003) ⁴	HIWS	Y; do not justify terminological choice and view it as synonym to other terms, such as HIWS	'High-involvement work systems (HIWS) represent a holistic work design that includes interrelated core features such as involvement, empowerment, development, trust, openness, teamwork, and performance-based rewards'	STS	Not assessed	Best practice approach
Lammers <i>et al.</i> (1996) ¹⁵⁰	Unspecified	N	Does not directly deal with HPWS, but investigates commitment, quality councils, teams, budgets and training, in the context of total quality management	NA	Not assessed	Context specific (focuses on health care)
Laschinger <i>et al.</i> (2001) ¹⁵¹	Unspecified	Y	Does not directly deal with HPWS, but investigates organisational characteristics, trust, emotional exhaustion and the outcomes of work satisfaction and perceived quality of care and unit	Draws on Aiken and Sochalski ²²⁵	Not assessed	Context specific (specific to nurses)

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice'/ context-specific/ organisation-specific approach
Lee <i>et al.</i> (2012) ¹⁵²	HPWS	Y	Draw on definitions by Evans and Davis ²²⁶ who view HPWS as internally and externally consistent and integrated practices that among others include staffing, communication, teamworking, reward, and by Scotti <i>et al.</i> (2007) ¹²³ who similarly propose that HPWS need to be aligned and inter-related and involve, for example, training, reward systems, communication and involvement	Various	Not assessed	Context specific (in relation to the health-care sector)
Leggat <i>et al.</i> (2008) ¹⁵³	HRM	Y	The study does not refer to HPWS, but there is reference to several practices that could qualify (ensuring staff, reducing patient risk, training, staff development, skill mix, staff well-being, effective teams, innovation, productivity, staff satisfaction, utilisation of staff, service quality, reducing labour costs)	Not provided	Not assessed	Context specific (in relation to the health-care sector)
Leggat <i>et al.</i> (2011) ⁶	HPWS	Y	Drawing from Zacharatos <i>et al.</i> (2005) ¹³⁸ 'a group of separate, but interconnected HR practices that together recruit, select, develop, motivate and retain employees'	Based on past research evidence	Takes into account organisational factors	Best practice
Lemmens <i>et al.</i> (2009) ¹⁵⁵	HR-related factors	Y	General organisational factors	Not specified (however, builds arguments on the need to consider professional and organisational levels)	Not assessed	Context specific

continued

TABLE 21 Summary of theoretical underpinnings of reviewed publications and inclusion in reviews (*continued*)

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice' / context-specific/ organisation-specific approach
Parkes <i>et al.</i> (2007) ¹⁵⁹	High-commitment practices and high-involvement practices	N	High-commitment practices conceptualised as employee involvement	Drawing on employee involvement literature	Not reported in the quantitative study	Context specific
Pas <i>et al.</i> (2011) ¹⁶⁰	HR	Y	Work-life balance	Strategic HR dilemma	External pressures on female doctors taken into consideration	Best practice
Preuss (2003) ¹⁶¹	HPWS	N	Not specified	Not specified	Internal influences of knowledge-sharing assessed	Context specific
Rondeau and Wagar (2006) ¹⁶³	HIWP	Y	'a loose coterie of approaches to organizing, deploying and managing human resources and include a disparate collection of nursing practices such as shared governance programmes, self-managing work teams, quality of worklife initiatives, flexible work arrangements, employee suggestion and recognition systems, job redesign activities, job enrichment and quality improvement teams'	Not specified	Organisational characteristics taken into account	Best practice

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice'/ context-specific/ organisation-specific approach
Rondeau and Wagar (2001) ¹⁶²	Progressive or high-performance HRM	Y	Conceptualised to include: shared governance, self-managing work teams, quality of work life initiatives, flexible work arrangements, employee suggestion systems, employee involvement programmes, quality circles, management-union codetermination councils and individual- and group performance-based pay incentives	Contingency theory	Organisational factors taken into consideration	Best practice
Scotti <i>et al.</i> (2007) ¹²³	HPWS	Y	HPWS are conceptualised as 'interrelated and aligned set of core characteristics'	None. Base arguments on linkage research	Not assessed	Best practice approach
Scotti <i>et al.</i> (2009) ¹⁶⁴	HPWS	Y	'... mutually reinforcing constellation of core workplace attributes including involvement, empowerment, trust, goal alignment, training, teamwork, communications and performance-based rewards'	None. Base arguments on linkage research	Internal influence assessed through the comparison of HPWS effects on outcomes between two occupational groups, namely low-contact and high-contact service providers	Best practice approach

continued

TABLE 21 Summary of theoretical underpinnings of reviewed publications and inclusion in reviews (*continued*)

Author	Terminology	Appropriateness of terminology	Conceptualisation	Theoretical framework	Internal influence/ external influence	'Best practice'/ context-specific/ organisation-specific approach
West <i>et al.</i> (2002) ¹²⁶	Progressive HRM practices	Y	'Progressive HRM practices, on the other hand, aim to maximize the knowledge, skill and motivation of employees. Examples include the use of validated selection procedures (e.g. structured interviews and psychometric tests), comprehensive training programmes, systematic performance appraisals, non-monetary benefits, incentives, job enrichment, teamworking and participation in decision making'	Various, including HPWS	Organisational characteristics taken into account	Best practice approach
West <i>et al.</i> (2006) ²¹	HR practices, SHRM, 'bundle', 'system'	Y	Drawing from Wright and McMahan (1992) ²²⁷ SHRM is conceptualised as 'the pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals' ²¹	Various, including HPWS and SHRM	Organisational characteristics taken into account	Best practice approach
Young <i>et al.</i> (2010) ¹²⁴	HPWS; SHRM	Y	'High performance work systems are a configuration of HRM practices designed to increase employee commitment and subsequently performance', term used interchangeably with SHRM	Not specified	Not assessed	Best practice

N, No; Y, Yes.
CCU, configuration, contingency, universal; HCWP, high-commitment work practices; NA, not applicable.

TABLE 22 Summary of methodological factors and main findings of reviewed publications

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Berg and Frost (2005) ¹²⁰	Broadness of work role, wage, involvement in problem-solving teams, unionisation, training, staffing adequacy, role overload	Cross-sectional survey, interviews	589 workers, 15 hospitals	USA	I	Three outcome measures relating to dignity at work: (1) fair treatment is associated to informal training, staff adequacy, resource adequacy and role overload; (2) intrinsically satisfying work is associated to formal training, low wages staff adequacy and resource adequacy; and (3) economic security is associated with formal training, union coverage and low wages
Bartram <i>et al.</i> (2007) ¹⁶⁷	Four HR-related variables were measured: SHRM, HR priorities, HR functions, and HR outcomes	Cross-sectional survey	<i>n</i> = 184 (64 CEOs, 35 HR directors, 85 senior managers)	Australia	I	Links found between HR functions and HR outcomes; managers in different functions have different perceptions and from different size organisations have significantly different views of SHRM and HR priorities; other factors also affected perceptions, such as industry tenure, organisational history, mandate and clarity of strategic objectives
Bonias <i>et al.</i> (2010) ¹⁴⁴	Adapted from Zacharatos <i>et al.</i> (2005). ¹⁴⁰ One factor ($\alpha = 0.89$), seven constructs (employment security, selective hiring, extensive training, self-managed teams and decentralised decision-making, information sharing, transformational leadership, and high-quality work)	Cross-sectional survey	<i>n</i> = 319–29 hospital employees, 32% RR	Australia	I	The relationship between HPWS and employee perceptions of quality of care was fully mediated by employee psychological empowerment (mediation was found for autonomy, competence and meaning, but not for impact)
Boselie <i>et al.</i> (2003) ³	20 items used to measure HR systems. Two factors: commitment (employee influence, training, attendance at seminars, skill development, participation, teamwork and reward systems; $\alpha = 0.80$) and control (direct supervision and quality control; $\alpha = 0.72$)	Survey	<i>n</i> = 132 (38 nurses, 31% RR; 25 hotel shop floor staff, 19% RR; and 69 civil servants, 40% RR)	The Netherlands	I	The effect of HR systems on outcomes (absence rate and duration) was found to be higher in non-institutionalised organisations, as compared with institutionalised (including hospitals). There was no effect of HR systems on turnover

continued

TABLE 22 Summary of methodological factors and main findings of reviewed publications (*continued*)

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Boselie (2010) ¹²⁷	Adapted from Huselid (1995) ⁶⁵ and Den Hartog and Verburg (2004) ¹⁴² to measure practices at the individual, rather than the organisational level. Three factors were extracted, in line with the AMO framework: abilities (seven items; opportunities for skills training, general training, personal development, coaching and task variety; $\alpha = 0.80$), motivation (five items; high wages, fair pay and pay for performance; $\alpha = 0.78$), and opportunity (nine items; influence, involvement in decision-making, and job autonomy; $\alpha = 0.90$)	Cross-sectional survey	157 hospital employees (excluding medical specialists), 43% RR	The Netherlands	I	Significant relationships were found for the links between (1) HPWP promoting ability and affective commitment and (2) HPWP promoting opportunity to participate and organisational citizenship behaviours. HPWS enhancing motivation were not linked to any of the outcomes. Overall effect not tested
Deshpande (2002) ¹⁴⁵	Employee staffing (three items), training (three items), employee relations (six items), performance outcomes (three items)	Multisource: survey, national labour relations board election reports, the American Hospital Association guide to the health care	101 presidents of hospitals	USA	O	In hospitals where the union was certified, observed changes include an increase in the number of people screened during selection procedures, employee training programmes, labour cost per unit, the use of formal appraisal methods, the use of technology in HR, and the number of job classifications, and a decrease in merit-based compensation and productivity. In hospitals where the union was rejected, there was an increase in the sophistication of employment tests, the number of people screened in selection, the training and development budget, training programmes, percentage of jobs receiving formal training, the use of formal appraisal methods, the use of technology in HR, employee participation initiatives, productivity and service quality, and a decrease in the number of job classifications and customer complaints

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Gittel (2008) ¹⁴⁶	Dimensions: selection for cross-functional teamwork (three items), rewards for cross-functional teamwork (three items), cross-functional performance measurement (four items), cross-functional conflict resolution (three items), cross-functional team meetings (three items) and cross-functional boundary spanners (four items)	Interviews, survey and publicly available data	338 physicians, nurses, physical therapists, social workers and case managers	USA	Multilevel	Mediated model supported: environmental pressures are associated with perceived work pressures, which in turn are associated with collective coping response (relational co-ordination). Additionally, formal work practices (relational work systems) are associated with collective coping response
Gittel <i>et al.</i> (2010) ⁸	Dimensions: cross-functional selection (three items), cross-functional rewards (three items), cross-functional performance measurement (four items), cross-functional conflict resolution (three items), cross-functional team meetings (six items), and cross-functional boundary spanners (four items)	Interviews, staff survey, patient survey and publicly available data	Nine organisations 588 patients for quality outcome, for 599 patients efficiency outcome, 388 employees for individual-level mediator	USA	Multilevel	Mediated model supported: HPWP associated to relational co-ordination, which in turn is associated to quality (patient survey) and efficiency outcomes (length of hospital stay)
Gowen <i>et al.</i> (2006) ¹⁴⁷	The SHRM measured consisted of: employee quality teams, program agent training, best-practices/information sharing, employee financial rewards, employee recognition and employee promotion opportunity (collapsed into a single variable)	Mixed	587 responses to quality programme survey. Approximately 300 responses to other survey measures	USA	0	Health-care error sources and error reduction barriers are associated to quality management processes, quality management practices and SHRM. Quality management process, quality management practices and SHRM are related to quality programme results. Quality management practices and SHRM are related to sustainable competitive advantage

continued

TABLE 22 Summary of methodological factors and main findings of reviewed publications (*continued*)

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Harley <i>et al.</i> (2007) ¹¹⁸	Seven variables (HPWS selection/performance, HPWS performance/outcomes, autonomous team membership, training, organisational communication, say in decisions, job characteristics)	Cross-sectional survey	<i>n</i> = 1318 employees in the aged-care sector (295 personal care workers, 976 registered nurses, 47 responses unaccounted for), 42% RR	Australia	I	Overall, the prevalence of HPWS and the relationships between HPWS and outcomes were not markedly different between the two occupational groups. Main findings include HPWS selection/performance linked to affective commitment, job satisfaction, psychological strain, turnover intention; HPWS performance/outcomes to affective commitment, psychological strain, work effort; autonomous team membership not linked to any outcomes; training linked to affective commitment, job satisfaction, turnover intention; organisational communication linked to affective commitment, turnover intention, work effort; say in decisions linked to all outcomes; job characteristics linked to autonomy, affective commitment, job satisfaction, psychological strain and turnover intention; occupational group moderates the relationships between autonomous team membership and autonomy, commitment and satisfaction
Harmon <i>et al.</i> (2003) ⁴	One factor, consisting of 10 items, $\alpha = 0.96$	Cross-sectional, multisource	112,360 employees, 55% RR, 146 VHA organisations	USA	O	The authors found support for a partially mediated model, with HIWS predicting service cost, mediated by employee satisfaction
Lammers <i>et al.</i> (1996) ¹⁵⁰	HPWS not assessed	Cross-sectional	228 team leaders; 36 quality co-ordinators	USA	O	Long-term commitment to improvement programs appears to be very beneficial. Differences were found at different levels of the organisational hierarchy

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Laschinger <i>et al.</i> (2001) ¹⁵¹	HPWS not assessed	Cross-sectional	135 hospitals; 3016 nurses	Canada	0	Burnout and organisational trust mediated the effect of organisational characteristics (autonomy, control, collaboration) on nurse job satisfaction and perceived quality of patient care and unit
Lee <i>et al.</i> (2012) ¹⁵²	Dimensions: training and education (three items), communication (three items), compensation (three items)	Cross-sectional, multisource	Four hospitals (two private and two public). 196 employee–customer pairs	The Republic of Korea	I	HPWS predict employee reactions and service quality which in turn predict customer satisfaction, which then predicts customer loyalty
Leggat <i>et al.</i> (2008) ¹⁵³	Factors: HR priorities, performance management, training and development, employee participation and empowerment. The survey measures were adopted from validated HRM questionnaires (i.e. for HRM priorities) and the Australian Council on Health Care Standards Equipe Guide (2003) (i.e. for HRM items); a full discussion of the measures is available in Bartram <i>et al.</i> ²²⁸ A combination of open-ended and structured questions were used to explore HRM in these organisations	Cross-sectional	62 hospitals (12 metropolitan, 13 regional, 37 rural and district), 130 managers	Australia	0	The study revealed that there is insufficient emphasis in hospitals on practices that facilitate patient safety. Particular weaknesses of Australian hospitals were identified in the areas of performance management, lack of link between organisational performance indicators and staff/management performance indicators, insufficient emphasis on training
Leggat <i>et al.</i> (2011) ⁶		Cross-sectional surveys	Sample 1: 72 respondents from a rural hospital; sample 2: 542 from a regional hospital; system-level survey: 268 HR managers	Australia		Statistical analysis not reported. A relationship between HPWS and the perceived quality of care that is mediated by HRM outcomes is reported. Health care organisations in Australia generally do not have the necessary aspects of HPWS in place. There is difference in the identification of HPWS among various managers, with CEOs generally reporting higher levels as compared with HR and other managers

continued

TABLE 22 Summary of methodological factors and main findings of reviewed publications (continued)

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Lemmens <i>et al.</i> (2009) ¹⁵⁵	Culture (20 items); quality improvement commitment (23 items); climate (four items)	Longitudinal (two times) with intervention	52 professionals	The Netherlands	I	A pre- and post-intervention change in the systems was observed in terms of support for self-management and decision-making, clinical information systems and delivery system design. The following factors were found to be associated: professional commitment, organisational factors and changes in processes of care. Process implementation was moderately predicted by group culture and professional commitment
Parkes <i>et al.</i> (2007) ¹⁵⁹	Manager survey: importance of employee involvement, rationale for staff involvement, the level of involvement in different types of decision-making, and the extent of trust between management and staff in the organisation. Employee survey: active involvement, organisational climate, job design, staff attitudes and well-being	Longitudinal	158 managers (time 1 – first wave of longitudinal study); 164 managers (time 2 – second wave of longitudinal study); 5564 employees from 33 trusts (time 1); 4702 employees from 30 trusts (time 2)	UK	Not reported	Statistical analysis not reported. Link between employee involvement and organisational performance not confirmed
Pas <i>et al.</i> (2011) ¹⁶⁰	Feminisation, presence of collective labour agreements, reduced participation arrangements, full participation arrangements, career support, support for work life balance, career hindrance	Cross-sectional survey	486 medical specialists	The Netherlands	I	Feminisation and collective labour agreements were found to have a positive effect on the offer of family-friendly policies. Offers of reduced participation arrangements had a negative effect on contracted working hours, while full participation arrangements had a positive one. Female doctors who feel supported in improving their work-life balance, who do not feel that their careers will be hindered, and who feel supported in achieving their career goals tend to work more hours. Reduced participation arrangements had a negative effect on contracted working hours, while full participation arrangements had a positive effect. Family-friendly workforce philosophy found to be a moderator

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Preuss (2003) ¹⁶¹	Not directly operationalised; instead, work design was measured	Cross-sectional survey	935 nurses; 185 nursing assistants; in 50 units in 13 hospitals	USA	I	Employee knowledge, work design and total quality management systems affect organisational performance and these relationships are partially mediated by quality of information available for decision-making
Rondeau and Wagar (2006) ¹⁶³	Employee suggestion system, employee recognition system, quality improvement teams, employee attitude surveys, self-managing teams, flexible work hours, job enrichment/job enlargement, self-scheduling, shared governance, incentive-based/merit pay	Cross-sectional; multisource	125 directors of nursing homes; 125 organisations	Canada	O	Regarding high-involvement practices, their presence was not found to be a significant predictor in magnet strength, nurse or resident satisfaction
Rondeau and Wagar (2001) ¹⁶²	Bundle of 24 HR activities (e.g. communication programmes, team-based programmes, incentive compensation)	Cross-sectional survey	283 CEOs or site administrators	Canada	O	High-performance HRM practices and workplace climates that value employee participation, empowerment and accountability are linked to favourable organisational outcomes. Similarly, high performing organisations are characterised by implementation of high-involvement practices and favourable climate
Scotti <i>et al.</i> (2007) ¹²³	One factor, consisting of 10 items, $\alpha = 0.97$. Same measure as Harmon <i>et al.</i> (2003) ⁴	Cross-sectional, multisource	59,464 employees, 72% RR, 113 facilities, 212,874 customers	USA	O	HPWS is associated with employee perceptions of ability to deliver customer service of good quality, and this is partially mediated by their perceptions of customer orientation. Further, employee perceptions of customer service are related to customer perceptions of service quality. Finally, they found an association between perceived service quality and customer satisfaction

continued

TABLE 22 Summary of methodological factors and main findings of reviewed publications (*continued*)

Author	Operationalisation: single index/dimensions	Method	Sample	Country	Level of analysis	Key findings
Scotti <i>et al.</i> (2009) ¹⁶⁴	One factor, consisting of 10 items, $\alpha = 0.97$. Same measure as Harmon <i>et al.</i> (2003) ⁴	Cross-sectional, multisource	59,464 VHA employees (high customer contact intensity), 72% RR; 6345 VBA employees (low customer contact intensity), 71% RR; 113 VHA facilities; 57 VBA offices; 212,874 VHA customers; 23,320 VBA customers	USA	O	The findings of the study replicated the findings of Scotti <i>et al.</i> ¹²³ In addition, they found that the hypothesised model is confirmed for both high- and low-customer contact employee groups. The relationship between HPWS and service quality as perceived by employees was stronger for low-contact as compared with high-contact employees, while the relationship between HPWS and customer orientation was higher for high-contact employees
West <i>et al.</i> (2002) ¹²⁶	Training, teamworking, appraisal	Cross-sectional, multisource	CEOs and HR directors from 81 hospital trusts	UK	O	Training, teamworking, appraisal negatively linked patient mortality rates
West <i>et al.</i> (2006) ²¹	Single index of: training (assessment of training needs and sophistication of training policy), sophistication of performance appraisal system, staff participation (contribution of staff views, staff involvement in decision-making), centralisation of decision-making, teamworking, employment security, IIP status	Cross-sectional, multisource	HR directors from 81 hospital trusts	UK	O	HR practices bundle linked to patient mortality, when controlling for past mortality level
Young <i>et al.</i> (2010) ¹²⁴	Adapted Zacharatos <i>et al.</i> (2005): ¹⁴⁰ 55 items. THPWS measure eight constructs including employment security; selective hiring; extensive training; self-managed teams; decentralised decision-making; reduced status distinctions; information sharing; transformational leadership high-quality work	Cross-sectional	68	Australia	I	It was found that for managers, the consistency, distinctiveness and consensus in the interpretation of SHRM and HPWS practices across the organisation was very important. Social identification was found to mediate the relationship between (a) HPWS and affective commitment and (b) HPWS and job satisfaction

I, individual; O, organisational; RR, response rate; VHA, Veterans Health Administration.

Appendix 2 Detailed results from multilevel analysis

Dependent variable: impact of health and well-being on ability to perform work or daily activities

TABLE 23 Multilevel regression of the 'Impact of health and well-being on ability to perform work or daily activities' on the individual and trust control variables

Predictor	Estimate	p-value	95% CI
Intercept	1.29	0.00	1.20 to 1.38
Gender (male)	-0.05	0.00	-0.06 to -0.03
Age (16–20 years)	0.41	0.00	0.31 to 0.51
Age (21–30 years)	0.33	0.00	0.26 to 0.40
Age (31–40 years)	0.29	0.00	0.22 to 0.36
Age (41–50 years)	0.26	0.00	0.19 to 0.32
Age (51–65 years)	0.21	0.00	0.14 to 0.28
Managerial status (yes)	-0.01	0.35	-0.02 to 0.01
Tenure (< 1 year)	-0.07	0.00	-0.09 to -0.04
Tenure (1–2 years)	-0.02	0.14	-0.04 to 0.01
Tenure (3–5 years)	0.03	0.01	0.01 to 0.05
Tenure (6–10 years)	0.04	0.00	0.02 to 0.05
Tenure (11–15 years)	0.03	0.01	0.01 to 0.05
Full time/part time (> 30 hours/week)	0.05	0.00	0.04 to 0.07
Nursing	0.08	0.00	0.06 to 0.11
Doctors	-0.10	0.00	-0.13 to -0.07
General managers	-0.01	0.56	-0.06 to 0.03
Administrative/clerical	0.00	0.75	-0.03 to 0.02
AHPs/S&T	0.03	0.02	0.00 to 0.06
Location (London)	0.02	0.06	0.00 to 0.04
Trust type (acute)	0.02	0.19	-0.01 to 0.04
Health status (disability)	0.50	0.00	0.48 to 0.52
Ethnicity (white)	-0.08	0.00	-0.13 to -0.04
Ethnicity (mixed)	-0.03	0.39	-0.10 to 0.04
Ethnicity (Asian/British Asian)	0.03	0.23	-0.02 to 0.08
Ethnicity (black/black British)	-0.11	0.00	-0.16 to -0.05
Teaching status (yes)	0.01	0.40	-0.01 to 0.03
Foundation status (yes)	-0.03	0.00	-0.04 to -0.01
Trust size (z-value)	0.00	0.58	-0.01 to 0.00
Doctors per bed	0.00	0.78	0.00 to 0.00

S&T, scientific and technical.

TABLE 24 Multilevel regression of the 'Impact of health and well-being on ability to perform work or daily activities' on the NHS staff survey key findings

Predictor	Estimate	p-value	95% CI
Had appraisal in last 12 months?	-0.07	0.01	-0.09 to -0.06
Had good quality appraisal in last 12 months?	-0.15	0.01	-0.16 to -0.14
Agreed personal development plan in last 12 months?	-0.07	0.01	-0.09 to -0.06
Received training, learning and development beneficial to career development in last 12 months?	-0.14	0.01	-0.16 to -0.13
Had any training/development in last 12 months?	-0.17	0.02	-0.21 to -0.14
Good opportunities to develop?	-0.22	0.01	-0.23 to -0.21
Support from supervisor?	-0.13	0.00	-0.13 to -0.12
Experienced violence from patients/relatives in last 12 months?	0.19	0.00	0.16 to 0.21
Experienced harassment from patients/relatives in last 12 months?	0.22	0.00	0.20 to 0.24
Experienced violence from colleagues in last 12 months?	0.46	0.00	0.41 to 0.52
Experienced harassment from colleagues in last 12 months?	0.39	0.00	0.37 to 0.40
Able to contribute towards improvements at work (scale)?	-0.18	0.00	-0.18 to -0.17
Staff motivation at work?	-0.25	0.00	-0.25 to -0.24
Overall staff engagement?	-0.32	0.00	-0.33 to -0.31
Satisfied with quality of work?	-0.25	0.00	-0.27 to -0.24
Quality of job design?	-0.24	0.00	-0.25 to -0.23
Work pressure felt?	0.19	0.00	0.19 to 0.20
Work in a real team?	-0.12	0.00	-0.13 to -0.11
Quality of work-life balance?	-0.14	0.00	-0.15 to -0.14
Fairness and effectiveness of incident reporting?	-0.23	0.00	-0.24 to -0.21
Effective action from employer towards violence/ bullying/harassment?	-0.15	0.00	-0.16 to -0.14
Good communication between managers and staff?	-0.20	0.00	-0.21 to -0.19
Trust provides equal opportunities to staff?	-0.38	0.00	-0.41 to -0.36
Suffered discrimination in last 12 months?	0.36	0.00	0.35 to 0.38
Intention to leave?	0.17	0.00	0.17 to 0.18
Job satisfaction?	-0.26	0.00	-0.26 to -0.25
Work-related stress?	0.57	0.01	0.55 to 0.58
Advocacy (recommend trust as a place to work or receive treatment)?	-0.19	0.00	-0.20 to -0.19
Presenteeism (feeling pressure to attend work when feeling unwell)?	0.45	0.01	0.43 to 0.46
CEO tenure in years?	0.00	0.15	0.00 to 0.00

Dependent variable: suffering work-related stress in previous 12 months

TABLE 25 Multilevel regression of the 'Suffering work-related stress in previous 12 months' on the individual and trust control variables

Predictor	Estimate	p-value	95% CI
Intercept	0.15	0.00	0.09 to 0.21
Gender (male)	-0.03	0.00	-0.04 to -0.02
Age (16–20 years)	0.12	0.00	0.06 to 0.18
Age (21–30 years)	0.14	0.00	0.10 to 0.19
Age (31–40 years)	0.13	0.00	0.09 to 0.17
Age (41–50 years)	0.14	0.00	0.10 to 0.18
Age (51–65 years)	0.12	0.00	0.08 to 0.17
Managerial status (yes)	0.03	0.00	0.02 to 0.04
Tenure (< 1 year)	-0.12	0.00	-0.13 to -0.10
Tenure (1–2 years)	-0.05	0.00	-0.06 to -0.04
Tenure (3–5 years)	-0.01	0.03	-0.03 to 0.00
Tenure (6–10 years)	0.00	0.66	-0.01 to 0.01
Tenure (11–15 years)	0.01	0.25	-0.01 to 0.02
Full time/part time (> 30 hours/week)	0.07	0.00	0.08 to 0.06
Nursing	0.07	0.00	0.05 to 0.09
Doctors	0.02	0.02	0.00 to 0.04
General managers	0.00	0.84	-0.03 to 0.03
Administrative/clerical	0.04	0.00	0.02 to 0.06
AHPs/S&T	0.05	0.00	0.03 to 0.07
Location (London)	0.02	0.01	0.03 to 0.00
Trust type (acute)	0.02	0.02	0.00 to 0.04
Health status (disability)	0.16	0.00	0.15 to 0.17
Ethnicity (white)	-0.05	0.00	-0.07 to -0.02
Ethnicity (mixed)	-0.01	0.75	-0.05 to 0.04
Ethnicity (Asian/British Asian)	-0.05	0.00	-0.08 to -0.02
Ethnicity (black/black British)	-0.06	0.00	-0.10 to -0.03
Teaching status (yes)	0.00	0.99	0.01 to -0.01
Foundation status (yes)	-0.01	0.02	0.00 to -0.02
Trust size (z-value)	0.00	0.83	0.00 to 0.01
Doctors per bed	0.00	0.32	0.00 to 0.00

S&T, scientific and technical.

TABLE 26 Multilevel regression of the 'Suffering work-related stress in previous 12 months' on the NHS staff survey key findings

Predictor	Estimate	p-value	95% CI
Had appraisal in last 12 months?	-0.05	0.00	-0.04 to -0.06
Had good quality appraisal in last 12 months?	-0.15	0.00	-0.14 to -0.16
Agreed personal development plan in last 12 months?	-0.06	0.00	-0.05 to -0.07
Received training, learning and development beneficial to career development in last 12 months?	-0.09	0.00	-0.08 to -0.10
Had any training/development in last 12 months?	-0.05	0.00	-0.03 to -0.08
Good opportunities to develop?	-0.16	0.00	-0.15 to -0.17
Support from supervisor?	-0.11	0.00	-0.11 to -0.11
Experienced violence from patients/relatives in last 12 months?	0.15	0.00	0.16 to 0.14
Experienced harassment from patients/relatives in last 12 months?	0.20	0.00	0.21 to 0.19
Experienced violence from colleagues in last 12 months?	0.31	0.00	0.35 to 0.28
Experienced harassment from colleagues in last 12 months?	0.35	0.00	0.36 to 0.34
Able to contribute towards improvements at work (scale)?	-0.12	0.00	-0.13 to -0.12
Staff motivation at work?	-0.16	0.00	-0.16 to -0.15
Overall staff engagement?	-0.22	0.00	-0.23 to -0.22
Satisfied with quality of work?	-0.22	0.00	-0.21 to -0.22
Quality of job design?	-0.18	0.00	-0.19 to -0.18
Work pressure felt?	0.17	0.00	0.17 to 0.18
Work in a real team?	-0.09	0.00	-0.10 to -0.09
Quality of work-life balance?	-0.13	0.00	-0.13 to -0.13
Fairness and effectiveness of incident reporting?	-0.16	0.00	-0.17 to -0.16
Effective action from employer towards violence/ bullying/harassment?	-0.11	0.00	-0.12 to -0.11
Impact of health and well-being on ability to perform work or daily activities?	0.22	0.00	0.21 to 0.22
Good communication between managers and staff?	-0.15	0.00	-0.15 to -0.16
Trust provides equal opportunities to staff?	-0.29	0.00	-0.28 to -0.31
Suffered discrimination in last 12 months?	0.30	0.00	0.31 to 0.28
Intention to leave?	0.14	0.00	0.13 to 0.14
Advocacy (recommend trust as a place to work or receive treatment)?	-0.15	0.00	-0.15 to -0.14
Presenteeism (feeling pressure to attend work when feeling unwell)?	0.30	0.00	0.29 to 0.30
Job satisfaction?	-0.20	0.00	-0.21 to -0.20
CEO tenure in years?	0.00	0.40	0.00 to 0.00

Dependent variable: job satisfaction

TABLE 27 Multilevel regression of 'Job satisfaction' on the individual and trust control variables

Predictor	Estimate	p-value	95% CI
Intercept	3.75	0.00	3.65 to 3.84
Gender (male)	-0.03	0.00	-0.05 to -0.02
Age (16–20 years)	-0.30	0.00	-0.40 to -0.20
Age (21–30 years)	-0.31	0.00	-0.38 to -0.24
Age (31–40 years)	-0.30	0.00	-0.36 to -0.23
Age (41–50 years)	-0.29	0.00	-0.35 to -0.22
Age (51–65 years)	-0.24	0.00	-0.31 to -0.18
Managerial status (yes)	0.17	0.00	0.15 to 0.18
Tenure (< 1 year)	0.18	0.00	0.15 to 0.20
Tenure (1–2 years)	0.06	0.00	0.04 to 0.08
Tenure (3–5 years)	0.00	0.63	-0.03 to 0.02
Tenure (6–10 years)	-0.04	0.00	-0.05 to -0.02
Tenure (11–15 years)	-0.04	0.00	-0.06 to -0.02
Full time/part time (> 30 hours/week)	0.00	0.95	-0.01 to 0.01
Nursing	-0.01	0.65	-0.03 to 0.02
Doctors	0.03	0.04	0.00 to 0.07
General managers	0.24	0.00	0.19 to 0.29
Administrative/clerical	0.08	0.00	0.05 to 0.11
AHPs/S&T	0.03	0.05	0.00 to 0.06
Location (London)	0.02	0.14	-0.01 to 0.05
Trust Type (acute)	-0.06	0.00	-0.10 to -0.03
Health status (disability)	-0.15	0.00	-0.17 to -0.14
Ethnicity (white)	0.04	0.08	0.00 to 0.09
Ethnicity (mixed)	-0.03	0.49	-0.10 to 0.05
Ethnicity (Asian/British Asian)	0.10	0.00	0.05 to 0.15
Ethnicity (black/black British)	0.01	0.72	-0.04 to 0.06
Teaching status (yes)	0.00	0.93	-0.03 to 0.02
Foundation status (yes)	0.03	0.00	0.01 to 0.05
Trust size (z-value)	0.00	0.42	-0.01 to 0.01
Doctors per bed	0.00	0.71	-0.01 to 0.00

S&T, scientific and technical.

TABLE 28 Multilevel regression of 'Job satisfaction' on the NHS staff survey key findings

Predictor	Estimate	p-value	95% CI
Had appraisal in last 12 months?	0.22	0.00	0.20 to 0.23
Had good-quality appraisal in last 12 months?	0.60	0.00	0.58 to 0.61
Agreed personal development plan in last 12 months?	0.27	0.00	0.25 to 0.28
Received training, learning and development beneficial to career development in last 12 months?	0.44	0.00	0.43 to 0.46
Had any training/development in last 12 months?	0.38	0.00	0.34 to 0.41
Good opportunities to develop?	0.71	0.00	0.70 to 0.72
Support from supervisor?	0.50	0.00	0.50 to 0.51
Experienced violence from patients/relatives in last 12 months?	-0.22	0.00	-0.24 to -0.20
Experienced harassment from patients/relatives in last 12 months?	-0.28	0.00	-0.30 to -0.27
Experienced violence from colleagues in last 12 months?	-0.57	0.00	-0.63 to -0.52
Experienced harassment from colleagues in last 12 months?	-0.61	0.00	-0.62 to -0.59
Able to contribute towards improvements at work (scale)?	0.59	0.00	0.59 to 0.60
Staff motivation at work?	0.49	0.00	0.48 to 0.49
Overall staff engagement?	0.84	0.00	0.83 to 0.84
Satisfied with quality of work?	0.54	0.00	0.53 to 0.55
Quality of job design?	0.78	0.00	0.77 to 0.79
Work pressure felt?	-0.37	0.00	-0.38 to -0.37
Work in a real team?	0.46	0.00	0.46 to 0.47
Quality of work-life balance?	0.48	0.00	0.47 to 0.48
Fairness and effectiveness of incident reporting?	0.61	0.00	0.60 to 0.62
Effective action from employer towards violence/ bullying/harassment?	0.39	0.00	0.38 to 0.40
Impact of health and well-being on ability to perform work or daily activities?	-0.25	0.00	-0.26 to -0.24
Good communication between managers and staff?	0.68	0.00	0.67 to 0.70
Trust provides equal opportunities to staff?	0.91	0.00	0.89 to 0.93
Suffered discrimination in last 12 months?	-0.59	0.00	-0.61 to -0.58
Intention to leave?	-0.39	0.00	-0.39 to -0.38
Advocacy (recommend trust as a place to work or receive treatment)?	0.51	0.00	0.51 to 0.52
Presenteeism (feeling pressure to attend work when feeling unwell)?	-0.62	0.00	-0.63 to -0.61
Work-related stress?	-0.52	0.00	-0.53 to -0.51
CEO tenure in years?	0.00	0.13	0.00 to 0.00

Dependent variable: presenteeism (feeling pressure to attend work when feeling unwell)

TABLE 29 Multilevel regression of 'Presenteeism' on the individual and trust control variables

Predictor	Estimate	p-value	95% CI
Intercept	0.06	0.04	0.00 to 0.12
Gender (male)	-0.05	0.00	-0.06 to -0.04
Age (16-20 years)	0.24	0.00	0.18 to 0.31
Age (21-30 years)	0.25	0.00	0.20 to 0.29
Age (31-40 years)	0.20	0.00	0.16 to 0.24
Age (41-50 years)	0.16	0.00	0.12 to 0.20
Age (51-65 years)	0.11	0.00	0.07 to 0.15
Managerial status (yes)	-0.03	0.00	-0.04 to -0.02
Tenure (< 1 year)	-0.13	0.00	-0.15 to -0.11
Tenure (1-2 years)	-0.05	0.00	-0.06 to -0.03
Tenure (3-5 years)	0.00	0.53	-0.02 to 0.01
Tenure (6-10 years)	0.02	0.00	0.01 to 0.03
Tenure (11-15 years)	0.03	0.00	0.01 to 0.04
Full time/part time (> 30 hours/week)	0.04	0.00	0.00 to 0.05
Nursing	0.03	0.00	0.02 to 0.05
Doctors	-0.06	0.00	-0.08 to -0.04
General managers	-0.10	0.00	-0.13 to -0.07
Administrative/clerical	-0.04	0.00	-0.06 to -0.03
AHPs/S&T	-0.01	0.12	-0.03 to 0.00
Location (London)	0.00	0.01	-0.71 to 0.01
Trust type (acute)	0.02	0.02	0.00 to 0.04
Health status (disability)	0.13	0.00	0.12 to 0.15
Ethnicity (white)	0.03	0.05	0.00 to 0.06
Ethnicity (mixed)	0.06	0.01	0.02 to 0.11
Ethnicity (Asian/British Asian)	-0.04	0.01	-0.07 to -0.01
Ethnicity (black/black British)	-0.02	0.19	-0.06 to 0.01
Teaching status (yes)	-0.01	0.34	-0.02 to 0.01
Foundation status (yes)	-0.02	0.01	-0.03 to 0.00
Trust size (z-value)	0.00	0.53	0.00 to 0.01
Doctors per bed	0.00	0.89	0.00 to 0.00

S&T, scientific and technical.

TABLE 30 Multilevel regression of 'Presenteeism' on the NHS staff survey key findings

Predictor	Estimate	p-value	95% CI
Had appraisal in last 12 months?	-0.03	0.00	-0.04 to -0.02
Had good-quality appraisal in last 12 months?	-0.15	0.00	-0.16 to -0.15
Agreed personal development plan in last 12 months?	-0.04	0.00	-0.05 to -0.03
Received training, learning and development beneficial to career development in last 12 months?	-0.12	0.00	-0.13 to -0.11
Had any training/development in last 12 months?	-0.10	0.00	-0.13 to -0.08
Good opportunities to develop?	-0.18	0.00	-0.19 to -0.18
Support from supervisor?	-0.14	0.00	-0.15 to -0.14
Experienced violence from patients/relatives in last 12 months?	0.18	0.00	0.16 to 0.19
Experienced harassment from patients/relatives in last 12 months?	0.18	0.00	0.17 to 0.19
Experienced violence from colleagues in last 12 months?	0.33	0.00	0.30 to 0.37
Experienced harassment from colleagues in last 12 months?	0.30	0.00	0.29 to 0.31
Able to contribute towards improvements at work (scale)?	-0.16	0.00	-0.16 to -0.15
Staff motivation at work?	-0.15	0.00	-0.15 to -0.14
Overall staff engagement?	-0.24	0.00	-0.24 to -0.23
Satisfied with quality of work?	-0.15	0.00	-0.16 to -0.14
Quality of job design?	-0.20	0.00	-0.20 to -0.19
Work pressure felt?	0.13	0.00	0.12 to 0.13
Work in a real team?	-0.12	0.00	-0.12 to -0.11
Quality of work-life balance?	-0.16	0.00	-0.17 to -0.16
Fairness and effectiveness of incident reporting?	-0.18	0.00	-0.19 to -0.17
Effective action from employer towards violence/ bullying/harassment?	-0.12	0.00	-0.12 to -0.11
Impact of health and well-being on ability to perform work or daily activities?	0.16	0.00	0.15 to 0.16
Good communication between managers and staff?	0.18	0.00	0.17 to 0.19
Trust provides equal opportunities to staff?	0.32	0.00	0.30 to 0.33
Suffered discrimination in last 12 months?	0.29	0.00	0.28 to 0.30
Intention to leave?	0.13	0.00	0.12 to 0.13
Advocacy (recommend trust as a place to work or receive treatment)?	-0.15	0.00	-0.15 to -0.14
Work-related stress?	0.27	0.00	0.26 to 0.28
Job satisfaction?	-0.23	0.00	-0.23 to -0.22
CEO tenure in years?	0.00	0.69	0.00 to 0.00

Dependent variable: intention to leave job

TABLE 31 Multilevel regression of 'Intention to leave' on the individual and trust control variables

Predictor	Estimate	p-value	95% CI
Intercept	1.95	0.00	1.80 to 2.10
Gender (male)	0.11	0.00	0.09 to 0.13
Age (16–20 years)	0.69	0.00	0.54 to 0.84
Age (21–30 years)	0.70	0.00	0.60 to 0.80
Age (31–40 years)	0.60	0.00	0.50 to 0.70
Age (41–50 years)	0.54	0.00	0.44 to 0.64
Age (51–65 years)	0.36	0.00	0.27 to 0.46
Managerial status (yes)	–0.05	0.00	–0.07 to –0.03
Tenure (< 1 year)	–0.22	0.00	–0.26 to –0.18
Tenure (1–2 years)	–0.04	0.02	–0.07 to –0.01
Tenure (3–5 years)	0.05	0.00	0.02 to 0.08
Tenure (6–10 years)	0.08	0.00	0.05 to 0.11
Tenure (11–15 years)	0.07	0.00	0.04 to 0.10
Full time/part time (> 30 hours/week)	0.08	0.00	0.06 to 0.11
Nursing	0.17	0.00	0.13 to 0.21
Doctors	–0.07	0.00	–0.12 to –0.02
General managers	0.12	0.00	0.05 to 0.19
Administrative/clerical	0.16	0.00	0.12 to 0.20
AHPs/S&T	0.10	0.00	0.06 to 0.15
Location (London)	0.09	0.00	0.04 to 0.15
Trust type (acute)	0.07	0.03	0.01 to 0.13
Health status (disability)	0.17	0.00	0.15 to 0.20
Ethnicity (white)	–0.09	0.01	–0.16 to –0.02
Ethnicity (mixed)	–0.01	0.84	–0.11 to 0.09
Ethnicity (Asian/British Asian)	–0.20	0.00	–0.27 to –0.13
Ethnicity (black/black British)	–0.09	0.02	–0.18 to –0.01
Teaching status (yes)	0.00	0.99	–0.05 to 0.05
Foundation status (yes)	–0.06	0.00	–0.10 to –0.02
Trust size (z-value)	–0.01	0.17	–0.03 to 0.01
Doctors per bed	–0.01	0.05	–0.02 to 0.00

S&T, scientific and technical.

TABLE 32 Multilevel regression of 'Intention to leave' on the NHS staff survey key findings

Predictor	Estimate	p-value	95% CI
Had appraisal in last 12 months?	-0.17	0.00	-0.19 to -0.15
Had good-quality appraisal in last 12 months?	-0.61	0.00	-0.63 to -0.59
Agreed personal development plan in last 12 months?	-0.24	0.00	-0.26 to -0.22
Received training, learning and development beneficial to career development in last 12 months?	-0.50	0.00	-0.52 to -0.48
Received any training or development in previous 12 months?	-0.34	0.00	-0.39 to -0.29
Good opportunities to develop?	-0.75	0.00	-0.77 to -0.74
Support from supervisor?	-0.45	0.00	-0.46 to -0.44
Experienced violence from patients/relatives in last 12 months?	0.30	0.00	0.26 to 0.33
Experienced harassment from patients/relatives in last 12 months?	0.32	0.00	0.30 to 0.35
Experienced violence from colleagues in last 12 months?	0.69	0.00	0.61 to 0.76
Experienced harassment from colleagues in last 12 months?	0.70	0.00	0.68 to 0.72
Able to contribute towards improvements at work (scale)?	-0.55	0.00	-0.56 to -0.54
Staff motivation at work?	-0.71	0.00	-0.72 to -0.70
Overall staff engagement?	-1.04	0.00	-1.05 to -1.03
Satisfied with quality of work?	-0.70	0.00	-0.72 to -0.67
Quality of job design?	-0.75	0.00	-0.76 to -0.74
Work pressure felt?	0.49	0.00	0.48 to 0.50
Work in a real team?	-0.41	0.00	-0.42 to -0.40
Quality of work-life balance?	-0.51	0.00	-0.52 to -0.50
Fairness and effectiveness of incident reporting?	-0.66	0.00	-0.68 to -0.64
Effective action from employer towards violence/ bullying/harassment?	-0.43	0.00	-0.44 to -0.42
Impact of health and well-being on ability to perform work or daily activities?	0.36	0.00	0.35 to 0.37
Good communication between managers and staff?	-0.71	0.00	-0.73 to -0.69
Trust provides equal opportunities to staff?	-1.06	0.00	-1.10 to -1.03
Suffered discrimination in last 12 months?	0.67	0.00	0.64 to 0.69
Presenteeism (feeling pressure to attend work when feeling unwell)?	0.75	0.00	0.73 to 0.77
Advocacy (recommend trust as a place to work or receive treatment)?	-0.72	0.00	-0.73 to -0.71
Work-related stress?	0.76	0.00	0.74 to 0.78
Job satisfaction?	-0.84	0.00	-0.85 to -0.83
CEO tenure in years?	0.00	0.32	-0.01 to 0.00

Dependent variable: advocacy (recommend trust as a place to work or receive treatment)

TABLE 33 Multilevel regression of 'Advocacy' on the individual and trust control variables

Predictor	Estimate	p-value	95% CI
Intercept	4.40	0.00	4.26 to 4.55
Gender (male)	-0.01	0.43	-0.02 to 0.01
Age (16–20 years)	-0.18	0.00	-0.29 to -0.08
Age (21–30 years)	-0.30	0.00	-0.37 to -0.22
Age (31–40 years)	-0.29	0.00	-0.36 to -0.22
Age (41–50 years)	-0.27	0.00	-0.34 to -0.20
Age (51–65 years)	-0.22	0.00	-0.29 to -0.15
Managerial status (yes)	0.11	0.00	0.10 to 0.13
Tenure (< 1 year)	0.31	0.00	0.28 to 0.34
Tenure (1–2 years)	0.20	0.00	0.18 to 0.22
Tenure (3–5 years)	0.12	0.00	0.10 to 0.14
Tenure (6–10 years)	0.04	0.00	0.03 to 0.06
Tenure (11–15 years)	0.00	0.75	-0.02 to 0.02
Full time/part time (> 30 hours/week)	0.00	0.57	-0.01 to 0.02
Nursing	-0.16	0.00	-0.19 to -0.14
Doctors	-0.20	0.00	-0.24 to -0.17
General managers	0.11	0.00	0.06 to 0.16
Administrative/clerical	-0.07	0.00	-0.09 to -0.04
AHPs/S&T	-0.13	0.00	-0.16 to -0.10
Location (London)	0.05	0.21	-0.03 to 0.12
Trust type (acute)	-0.33	0.00	-0.42 to -0.24
Health status (disability)	-0.12	0.00	-0.14 to -0.10
Ethnicity (white)	-0.14	0.00	-0.19 to -0.10
Ethnicity (mixed)	-0.16	0.00	-0.24 to -0.09
Ethnicity (Asian/British Asian)	0.07	0.01	0.01 to 0.12
Ethnicity (black/black British)	0.15	0.00	0.09 to 0.21
Teaching status (yes)	0.05	0.13	-0.02 to 0.12
Foundation status (yes)	0.16	0.00	0.10 to 0.21
Trust size (z-value)	0.00	0.80	-0.03 to 0.02
Doctors per bed	0.00	0.87	-0.01 to 0.01

S&T, scientific and technical.

TABLE 34 Multilevel regression of 'Advocacy' on the NHS staff survey key findings

Predictor	Estimate	p-value	95% CI
Had appraisal in last 12 months?	0.14	0.00	0.13 to 0.16
Had good-quality appraisal in last 12 months?	0.49	0.00	0.48 to 0.50
Agreed personal development plan in last 12 months?	0.19	0.00	0.17 to 0.20
Received training, learning and development beneficial to career development in last 12 months?	0.42	0.00	0.41 to 0.44
Received any training or development in previous 12 months?	0.30	0.00	0.27 to 0.34
Good opportunities to develop?	0.58	0.00	0.57 to 0.59
Support from supervisor?	0.32	0.00	0.31 to 0.33
Experienced violence from patients/relatives in last 12 months?	-0.23	0.00	-0.25 to -0.21
Experienced harassment from patients/relatives in last 12 months?	-0.27	0.00	-0.29 to -0.25
Experienced violence from colleagues in last 12 months?	-0.45	0.00	-0.51 to -0.39
Experienced harassment from colleagues in last 12 months?	-0.42	0.00	-0.43 to -0.40
Able to contribute towards improvements at work (scale)?	0.44	0.00	0.43 to 0.45
Staff motivation at work?	0.46	0.00	0.45 to 0.47
Overall staff engagement?	0.99	0.00	0.98 to 1.00
Satisfied with quality of work?	0.60	0.00	0.58 to 0.61
Quality of job design?	0.54	0.00	0.53 to 0.55
Work pressure felt?	-0.36	0.00	-0.37 to -0.35
Work in a real team?	0.32	0.00	0.31 to 0.33
Quality of work-life balance?	0.36	0.00	0.36 to 0.37
Fairness and effectiveness of incident reporting?	0.72	0.00	0.71 to 0.73
Effective action from employer towards violence/ bullying/harassment?	0.46	0.00	0.45 to 0.47
Impact of health and well-being on ability to perform work or daily activities?	-0.21	0.00	-0.22 to -0.21
Good communication between managers and staff?	0.71	0.00	0.70 to 0.72
Trust provides equal opportunities to staff?	0.83	0.00	0.81 to 0.86
Suffered discrimination in last 12 months?	-0.43	0.00	-0.45 to -0.41
Presenteeism (feeling pressure to attend work when feeling unwell)?	-0.46	0.00	-0.48 to -0.45
Intention to leave?	-0.38	0.00	-0.38 to -0.37
Work-related stress?	-0.43	0.00	-0.44 to -0.42
Job satisfaction?	0.58	0.00	0.58 to 0.59
CEO tenure in years?	0.01	0.00	0.00 to 0.02

Appendix 3 Latent growth modelling: intermediate outcomes as dependent variables

NHS staff survey variables as predictors of absenteeism

TABLE 35 NHS staff survey variables (2009) (percentage or scale score) as predictors of absenteeism (2009–11)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrs_09	-0.05	0.00	-0.06 to -0.03	0.00	0.93	-0.01 to 0.01	
	exthrsu_09	-0.01	0.24	-0.02 to 0.00	0.00	0.87	-0.01 to 0.01	
	exthrsp_09	-0.04	0.00	-0.06 to -0.03	0.00	0.92	-0.01 to 0.01	
	shifts_09	0.01	0.42	-0.01 to 0.02	-0.01	0.00	-0.02 to 0.00	
	rshifts_09	0.00	0.72	-0.02 to 0.01	-0.01	0.06	-0.01 to 0.00	
	nshifts_09	0.01	0.28	-0.01 to 0.02	-0.01	0.00	-0.02 to -0.01	
% receiving any training or development in previous 12 months	training_09	0.01	0.72	-0.03 to 0.04	-0.01	0.25	-0.02 to 0.00	
% receiving job relevant training in previous 12 months	qtrain_09	-0.03	0.01	-0.06 to -0.01	0.01	0.09	0.00 to 0.02	
% feeling satisfied with quality of work and patient care they are able to deliver	satis_09	0.00	0.75	-0.02 to 0.01	0.00	0.68	-0.01 to 0.01	
% agreeing their role makes a difference to patients	differ_09	-0.02	0.40	-0.05 to 0.02	0.00	0.78	-0.01 to 0.02	
% feeling valued by colleagues	value_09	-0.04	0.00	-0.07 to -0.02	0.00	0.51	-0.01 to 0.01	
% agreeing that they have an interesting job	interest_09	-0.02	0.13	-0.04 to 0.00	-0.01	0.19	-0.02 to 0.00	
Quality of job design (clear job content, feedback and staff involvement)	jobdes_09	-0.01	0.05	-0.03 to 0.00	0.00	0.87	0.00 to 0.01	
Work pressure felt by staff	wkpres_09	-0.01	0.23	-0.01 to 0.00	0.00	0.43	0.00 to 0.00	
% working in a well-structured team environment	team_09	-0.18	0.02	-0.04 to -0.01	0.16	0.23	0.00 to 0.02	
Quality of work–life balance	balance_09	0.00	0.37	-0.01 to 0.00	0.00	0.71	0.00 to 0.00	
Opportunities for flexible working	flexwork_09	0.00	0.89	-0.02 to 0.02	-0.01	0.18	-0.02 to 0.00	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% feeling there are good opportunities to develop potential at work	develop_09	-0.01	0.44	-0.02 to 0.01	0.00	0.49	-0.01 to 0.00	
% appraised within previous 12 months	apprais_09	0.00	0.85	-0.01 to 0.01	0.00	0.74	0.00 to 0.00	
% having well-structured appraisal reviews within previous 12 months	qualapp_09	-0.01	0.46	-0.02 to 0.01	0.00	0.50	-0.01 to 0.00	
% with personal development plans agreed within previous 12 months	pdp_09	0.00	1.00	-0.01 to 0.01	-0.03	0.78	0.00 to 0.00	
Support from supervisors	supsup_09	-0.01	0.06	-0.02 to 0.00	0.00	0.89	0.00 to 0.00	
% having had health and safety training in previous 12 months	hands_09	0.00	0.61	-0.01 to 0.01	0.00	0.06	-0.01 to 0.00	
% suffering work related injuries or illness	injury_09	0.01	0.79	-0.02 to 0.03	-0.01	0.08	-0.02 to 0.00	
% suffering work related stress in previous 12 months	stress_09	-0.01	0.67	-0.03 to 0.02	0.00	0.93	-0.01 to 0.01	
% witnessing potentially harmful errors or near misses in previous month	errors_09	-0.02	0.06	-0.04 to 0.00	0.00	0.69	-0.01 to 0.01	
% reporting errors, near misses or incidents witnessed in the last month	report_09	-0.02	0.31	-0.04 to 0.01	0.00	0.86	-0.01 to 0.01	Teaching status, foundation status, doctors per bed
Fairness and effectiveness of incident reporting	incident_09	-0.01	0.43	-0.02 to 0.01	0.00	0.41	-0.01 to 0.00	
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_09	0.03	0.11	0.00 to 0.06	-0.02	0.02	-0.03 to -0.01	
% experiencing physical violence from other staff in previous 12 months	violcol_09	0.10	0.02	0.03 to 0.17	0.01	0.66	-0.02 to 0.04	Teaching status, foundation status, doctors per bed
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_09	0.08	0.00	0.06 to 0.09	-0.01	0.17	-0.01 to 0.00	Doctors per bed

continued

TABLE 35 NHS staff survey variables (2009) (percentage or scale score) as predictors of absenteeism (2009–11) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_09	-0.01	0.67	-0.03 to 0.02	0.00	0.97	-0.01 to 0.01	
Perceptions of effective action from employer towards violence and harassment	action_09	0.00	0.74	-0.01 to 0.01	0.00	0.14	0.00 to 0.01	Foundation status
% reporting good communication between management and staff	commun_09	-0.03	0.00	-0.04 to -0.02	0.00	0.62	-0.01 to 0.00	Foundation status, doctors per bed
% agreeing they understand their role and where it fits in	fits_09	0.00	0.89	-0.01 to 0.01	0.00	0.23	-0.01 to 0.00	
% able to contribute towards improvements at work	improve_09	-0.03	0.01	-0.05 to -0.01	0.00	0.75	-0.01 to 0.01	
% able to contribute towards improvements at work (scale)	improves_09	-0.02	0.02	-0.03 to -0.01	0.00	0.53	-0.01 to 0.00	
Job satisfaction	jobsat_09	-0.01	0.06	-0.02 to 0.00	0.00	0.81	0.00 to 0.01	
Intention to leave job	intleave_09	0.00	0.39	0.00 to 0.01	0.00	0.53	0.00 to 0.00	
Staff recommendation of the trust as a place to work or receive treatment	recomd_09	-0.01	0.03	-0.01 to 0.00	0.00	0.36	0.00 to 0.00	
Motivation at work	engage_09	-0.02	0.01	-0.03 to -0.01	0.00	0.86	0.00 to 0.00	
% receiving equality and diversity training	divers_09	0.01	0.08	0.00 to 0.01	0.00	0.69	0.00 to 0.00	
% believing trust provides equal opportunities for career progression or promotion	equal_09	-0.01	0.32	-0.04 to 0.01	0.00	0.88	-0.01 to 0.01	
% experiencing discrimination at work in last 12 months	discrim_09	-0.03	0.12	-0.07 to 0.00	0.01	0.41	-0.01 to 0.02	
Impact of health and well-being on ability to perform work or daily activities	health_09	0.00	0.68	-0.02 to 0.01	-0.01	0.11	-0.01 to 0.00	
% feeling pressure to attend work when feeling unwell	present_09	0.00	0.82	-0.03 to 0.02	0.00	0.51	-0.01 to 0.01	Foundation status
Availability of hand-washing materials	infect_09	0.01	0.33	-0.01 to 0.02	0.00	0.80	-0.01 to 0.00	
Overall engagement	overall_09	-0.01	0.01	-0.02 to -0.01	0.00	0.42	-0.01 to 0.00	

TABLE 36 Change in NHS staff survey variables (2010) minus (2009) as predictors of absenteeism (2009–11)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrsD	0.02	0.08	0.00 to 0.04	0.00	0.86	–0.01 to 0.01	
	exthrsuD	0.00	0.77	–0.01 to 0.02	0.00	0.97	–0.01 to 0.01	
	exthrspD	0.02	0.02	0.01 to 0.04	0.00	0.56	–0.01 to 0.00	Foundation status
	shiftsD	–0.02	0.54	–0.06 to 0.03	0.02	0.19	–0.01 to 0.05	Foundation status
	rshiftsD	0.03	0.19	–0.01 to 0.08	0.00	0.83	–0.03 to 0.02	Foundation status
	nshiftsD	0.06	0.07	0.00 to 0.11	–0.01	0.61	–0.04 to 0.02	Foundation status, trust type, teaching status
% receiving any training or development in previous 12 months	trainingD	0.01	0.65	–0.03 to 0.05	0.00	0.78	–0.01 to 0.02	
% receiving job relevant training in previous 12 months	qtrainD	0.01	0.39	–0.01 to 0.03	0.00	0.86	–0.01 to 0.01	
% feeling satisfied with quality of work and patient care they are able to deliver	satisD	0.01	0.24	–0.01 to 0.03	0.00	0.45	–0.01 to 0.00	
% agreeing their role makes a difference to patients	differD	0.02	0.37	–0.01 to 0.05	–0.01	0.12	–0.03 to 0.00	
% feeling valued by colleagues	valueD	0.02	0.24	–0.01 to 0.04	0.00	0.53	–0.01 to 0.01	
Quality of job design (clear job content, feedback and staff involvement)	jobdesD	0.00	0.93	–0.01 to 0.01	0.00	0.45	0.00 to 0.01	Foundation status
Work pressure felt by staff	wkpresD	0.01	0.28	0.00 to 0.01	0.00	0.99	0.00 to 0.00	
% working in a well-structured team environment	teamD	0.01	0.28	–0.01 to 0.02	0.00	0.21	–0.01 to 0.00	
Quality of work–life balance	balanceD	0.00	0.65	–0.01 to 0.01	0.00	0.15	0.00 to 0.01	
Opportunities for flexible working	flexworkD	0.00	0.76	–0.01 to 0.02	0.00	0.74	–0.01 to 0.01	
% feeling there are good opportunities to develop potential at work	developD	–0.01	0.52	–0.02 to 0.01	0.00	0.39	0.00 to 0.01	

continued

TABLE 36 Change in NHS staff survey variables (2010) minus (2009) as predictors of absenteeism (2009–11) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	appraisD	0.00	0.81	−0.01 to 0.01	0.00	0.18	0.00 to 0.01	
% having well-structured appraisal reviews within previous 12 months	qualappD	0.00	0.86	−0.01 to 0.02	0.01	0.17	0.00 to 0.01	Foundation status
% with personal development plans agreed within previous 12 months	pdpD	0.00	0.99	−0.01 to 0.01	0.00	0.14	0.00 to 0.01	Foundation status, trust type
Support from supervisors	supsupD	0.00	0.77	−0.01 to 0.01	0.00	0.22	0.00 to 0.01	
% having had health and safety training in previous 12 months	handsD	0.01	0.18	0.00 to 0.02	0.00	0.42	0.00 to 0.01	
% suffering work related injuries or illness	injuryD	−0.01	0.52	−0.03 to 0.02	0.01	0.14	0.00 to 0.02	
% suffering work related stress in previous 12 months	stressD	0.02	0.06	0.00 to 0.04	0.00	0.79	−0.01 to 0.01	
% witnessing potentially harmful errors or near misses in previous month	errorsD	0.01	0.34	−0.01 to 0.03	0.01	0.14	0.00 to 0.01	
% reporting errors, near misses or incidents witnessed in the last month	reportD	−0.01	0.64	−0.03 to 0.02	0.00	0.72	−0.01 to 0.01	
Fairness and effectiveness of incident reporting	incidentD	0.00	0.65	−0.02 to 0.01	0.00	0.33	0.00 to 0.01	
% experiencing physical violence from patients or their relatives in previous 12 months	violpatD	0.01	0.82	−0.03 to 0.04	0.01	0.18	0.00 to 0.02	
% experiencing physical violence from other staff in previous 12 months	violcolD	−0.05	0.27	−0.12 to 0.02	0.01	0.56	−0.02 to 0.04	All controls excluded
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpatD	0.00	0.85	−0.03 to 0.02	0.01	0.18	0.00 to 0.02	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcolD	0.01	0.38	−0.01 to 0.04	0.00	0.85	−0.01 to 0.01	
Perceptions of effective action from employer towards violence and harassment	actionD	0.01	0.25	0.00 to 0.02	−0.01	0.07	−0.01 to 0.00	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% reporting good communication between management and staff	communD	0.00	0.71	-0.01 to 0.02	0.00	0.50	-0.01 to 0.00	
% able to contribute towards improvements at work	improved	0.01	0.69	-0.01 to 0.02	0.00	0.64	-0.01 to 0.01	Foundation status
% able to contribute towards improvements at work (scale)	improvesD	0.00	0.80	-0.01 to 0.01	0.00	0.33	0.00 to 0.01	Foundation status
Job satisfaction	jobsatD	-0.01	0.45	-0.02 to 0.01	0.00	0.50	0.00 to 0.01	
Intention to leave job	intleaveD	0.00	0.82	-0.01 to 0.01	0.00	0.71	0.00 to 0.00	
Staff recommendation of the trust as a place to work or receive treatment	recomdD	0.00	0.94	-0.01 to 0.01	0.00	0.40	0.00 to 0.00	Foundation status
Motivation at work	engageD	0.00	0.80	-0.01 to 0.01	0.00	0.26	0.00 to 0.01	
% receiving equality and diversity training	diversD	0.00	0.44	0.00 to 0.01	0.00	0.86	0.00 to 0.00	
% believing trust provides equal opportunities for career progression or promotion	equalD	0.02	0.11	0.00 to 0.04	-0.01	0.15	-0.02 to 0.00	
% experiencing discrimination at work in last 12 months	discrimD	0.02	0.20	-0.01 to 0.05	0.00	0.53	-0.01 to 0.01	Foundation status
Impact of health and well-being on ability to perform work or daily activities	healthD	0.00	0.77	-0.02 to 0.01	0.01	0.07	0.00 to 0.01	
% feeling pressure to attend work when feeling unwell	presentD	0.03	0.02	0.01 to 0.05	-0.01	0.02	-0.02 to 0.00	
Availability of hand-washing materials	infectD	-0.02	0.10	-0.03 to 0.00	0.00	0.79	-0.01 to 0.01	
Overall engagement	overallD	0.00	0.93	-0.01 to 0.01	0.00	0.22	0.00 to 0.01	Foundation status

NHS staff survey variables as predictors of turnover

TABLE 37 NHS staff survey variables (2009) as predictors of turnover (2009–11)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrs_09	-23.65	0.00	-29.15 to -18.15	7.52	0.00	4.67 to 10.38	
	exthrsu_09	-8.70	0.01	-14.45 to -2.94	4.38	0.01	1.65 to 7.10	
	exthrsp_09	-20.29	0.00	-25.25 to -15.32	5.60	0.00	3.01 to 8.19	
	shifts_09	-1.48	0.68	-7.28 to 4.33	-0.67	0.69	-3.42 to 2.09	
	rshifts_09	-1.55	0.68	-7.76 to 4.66	-1.35	0.45	-4.30 to 1.60	
	nshifts_09	-1.34	0.70	-7.04 to 4.36	-0.52	0.75	-3.22 to 2.19	
% receiving any training or development in previous 12 months	training_09	20.29	0.02	5.89 to 34.69	-10.75	0.01	-17.56 to -3.93	
% receiving job relevant training in previous 12 months	qtrain_09	-5.81	0.29	-14.91 to 3.30	1.32	0.62	-3.02 to 5.66	
% feeling satisfied with quality of work and patient care they are able to deliver	satis_09	5.71	0.15	-0.79 to 12.21	-1.46	0.44	-4.56 to 1.63	
% agreeing their role makes a difference to patients	differ_09	-3.79	0.67	-18.40 to 10.82	-2.23	0.60	-9.16 to 4.70	
% feeling valued by colleagues	value_09	-1.95	0.75	-11.82 to 7.93	-0.05	0.99	-4.75 to 4.65	
% agreeing that they have an interesting job	interest_09	-0.18	0.98	-9.33 to 8.98	-2.74	0.30	-7.08 to -2.74	
Quality of job design (clear job content, feedback and staff involvement)	jobdes_09	1.64	0.58	-3.18 to 6.45	-0.14	0.92	-2.43 to 2.15	
Work pressure felt by staff	wkpres_09	-4.77	0.01	-7.67 to -1.86	1.02	0.23	-0.39 to 2.42	
% working in a well-structured team environment	team_09	-4.20	0.34	-11.40 to 3.01	2.92	0.16	-0.50 to 6.33	
Quality of work–life balance	balance_09	3.04	0.13	-0.26 to 6.35	-0.68	0.48	-2.26 to 0.90	
Opportunities for flexible working	flexwork_09	8.89	0.08	0.43 to 17.35	-6.50	0.01	-10.46 to -2.54	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% feeling there are good opportunities to develop potential at work	develop_09	2.37	0.53	-3.78 to 8.51	-0.56	0.75	-3.48 to 2.36	
% appraised within previous 12 months	apprais_09	4.63	0.01	1.76 to 7.49	-2.32	0.01	-3.68 to -0.96	
% having well-structured appraisal reviews within previous 12 months	qualapp_09	4.51	0.15	-0.66 to 9.68	-1.72	0.25	-4.18 to 0.74	
% with personal development plans agreed within previous 12 months	pdp_09	5.41	0.00	2.36 to 8.47	-2.38	0.01	-3.84 to -0.92	
Support from supervisors	supsup_09	0.61	0.79	-3.13 to 4.35	-0.24	0.82	-2.02 to 1.53	
% having had health and safety training in previous 12 months	hands_09	6.76	0.00	3.32 to 10.19	-2.67	0.01	-4.31 to -1.02	
% suffering work related injuries or illness	injury_09	5.57	0.43	-6.09 to 17.22	-8.05	0.02	-13.51 to -2.59	
% suffering work related stress in previous 12 months	stress_09	-10.20	0.07	-19.28 to -1.12	2.90	0.27	-1.43 to 7.23	
% witnessing potentially harmful errors or near misses in previous month	errors_09	-10.48	0.02	-17.62 to -3.35	0.74	0.72	-2.71 to 4.19	
% reporting errors, near misses or incidents witnessed in the last month	report_09	1.81	0.85	-14.31 to 17.93	-0.61	0.90	-8.26 to 7.04	
Fairness and effectiveness of incident reporting	incident_09	3.99	0.13	-0.30 to 8.28	-1.22	0.33	-3.27 to 0.83	
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_09	9.09	0.24	-3.55 to 21.74	-7.41	0.04	-13.38 to -1.43	
% experiencing physical violence from other staff in previous 12 months	violcol_09	-11.06	0.54	-40.72 to 18.60	-1.03	0.91	-15.12 to 13.07	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_09	-11.05	0.07	-21.04 to -1.07	1.88	0.52	-2.90 to 6.66	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_09	-16.78	0.01	-27.12 to -6.44	2.51	0.41	-2.52 to 7.53	

continued

TABLE 37 NHS staff survey variables (2009) as predictors of turnover (2009–11) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
Perceptions of effective action from employer towards violence and harassment	action_09	5.08	0.02	1.52 to 8.65	-1.47	0.16	-3.19 to 0.25	
% reporting good communication between management and staff	commun_09	-3.33	0.36	-9.35 to 2.70	2.52	0.15	-0.34 to 5.38	
% agreeing they understand their role and where it fits in	fits_09	4.37	0.09	0.16 to 8.57	-0.63	0.61	-2.64 to 1.39	
% able to contribute towards improvements at work	improve_09	-6.31	0.19	-14.20 to 1.58	1.93	0.40	-1.85 to 5.72	
% able to contribute towards improvements at work (scale)	improves_09	-1.27	0.65	-5.87 to 3.32	0.34	0.80	-1.86 to 2.53	
Job satisfaction	jobsat_09	3.18	0.23	-1.16 to 7.52	-1.28	0.31	-3.34 to 0.79	
Intention to leave job	intleave_09	-4.39	0.01	-6.98 to -1.81	2.41	0.00	1.19 to 3.62	
Staff recommendation of the trust as a place to work or receive treatment	recomd_09	1.06	0.35	-0.79 to 2.91	-0.37	0.49	-1.25 to 0.51	
Motivation at work	engage_09	-3.63	0.15	-7.75 to 0.50	-0.49	0.69	-2.46 to 1.49	
% receiving equality and diversity training	divers_09	2.42	0.06	0.34 to 4.50	-1.15	0.05	-2.14 to -0.17	
% believing trust provides equal opportunities for career progression or promotion	equal_09	11.15	0.04	2.27 to 20.03	-1.59	0.54	-5.86 to 2.67	
% experiencing discrimination at work in last 12 months	discrim_09	-28.94	0.00	-42.69 to -15.19	6.29	0.12	-0.43 to 13.01	
Impact of health and well-being on ability to perform work or daily activities	health_09	-4.57	0.18	-10.20 to 1.06	1.21	0.46	-1.46 to 3.89	
% feeling pressure to attend work when feeling unwell	present_09	3.19	0.59	-6.57 to 12.95	-1.30	0.65	-5.94 to 3.34	
Availability of hand-washing materials	infect_09	10.88	0.00	6.35 to 15.41	-4.19	0.00	-6.38 to -2.00	
Overall engagement	overall_09	0.25	0.91	-3.26 to 3.76	-0.50	0.62	-2.17 to 1.17	

TABLE 38 Change in NHS staff survey variables (2010) minus (2009) as predictors of turnover (2009–11)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrsD	-0.73	0.88	-8.35 to 6.90	-0.85	0.70	-4.47 to 2.77	
	exthrsuD	-0.32	0.94	-7.45 to 6.81	-0.31	0.88	-3.69 to 3.07	
	exthrspD	-0.11	0.98	-7.12 to 6.90	-1.38	0.50	-4.71 to 1.95	
	shiftsD	-30.14	0.04	-54.10 to -6.17	18.52	0.10	0.27 to 36.77	Foundation status
	rshiftsD	-15.28	0.49	-51.28 to 20.73	5.99	0.71	-20.57 to 32.54	Foundation status
	nshiftsD	-30.78	0.06	-58.16 to -3.41	18.14	0.15	-2.67 to 38.94	Foundation status
% receiving any training or development in previous 12 months	trainingD	-4.53	0.64	-20.27 to 11.20	5.89	0.19	-1.55 to 13.34	
% receiving job relevant training in previous 12 months	qtrainD	1.32	0.79	-6.84 to 9.48	-0.25	0.92	-4.12 to 3.63	
% feeling satisfied with quality of work and patient care they are able to deliver	satisD	3.77	0.37	-3.12 to 10.66	1.28	0.52	-2.00 to 4.55	
% agreeing their role makes a difference to patients	differD	-7.03	0.38	-20.10 to 6.04	7.46	0.05	1.33 to 13.60	
% feeling valued by colleagues	valueD	-2.52	0.65	-11.75 to 6.72	3.66	0.17	-0.70 to 8.03	
Quality of job design (clear job content, feedback and staff involvement)	jobdesD	-2.54	0.42	-7.70 to 2.62	2.05	0.17	-0.38 to 4.49	
Work pressure felt by staff	wkpresD	-1.96	0.38	-5.60 to 1.68	-0.52	0.62	-2.25 to 1.21	
% working in a well-structured team environment	teamD	-2.34	0.49	-7.84 to 3.16	0.23	0.89	-2.39 to 2.85	
Quality of work–life balance	balanceD	0.03	0.17	-0.36 to 6.61	-0.01	0.58	-2.24 to 1.09	
Opportunities for flexible working	flexworkD	1.62	0.70	-5.38 to 8.62	2.07	0.30	-1.25 to 5.39	
% feeling there are good opportunities to develop potential at work	developD	-5.40	0.18	-11.98 to 1.17	3.97	0.04	0.87 to 7.06	
% appraised within previous 12 months	appraisD	-2.66	0.14	-5.62 to 0.31	1.48	0.08	0.08 to 2.89	

continued

TABLE 38 Change in NHS staff survey variables (2010) minus (2009) as predictors of turnover (2009–11) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% having well-structured appraisal reviews within previous 12 months	qualappD	-1.93	0.58	-7.66 to 3.79	2.04	0.22	-0.67 to 4.75	
% with personal development plans agreed within previous 12 months	pdpD	-2.50	0.19	-5.62 to 0.62	1.40	0.12	-0.08 to 2.88	
Support from supervisors	supsupD	-0.20	0.93	-3.81 to 3.42	0.83	0.43	-0.88 to 2.54	
% having had health and safety training in previous 12 months	handsD	-2.38	0.43	-7.30 to 2.54	1.45	0.31	-0.88 to 3.78	
% suffering work related injuries or illness	injuryD	-9.07	0.14	-19.10 to 0.96	7.34	0.01	2.65 to 12.04	
% suffering work related stress in previous 12 months	stressD	5.27	0.31	-3.22 to 13.76	-3.11	0.20	-7.13 to 0.91	
% witnessing potentially harmful errors or near misses in previous month	errorsD	-0.82	0.86	-8.45 to 6.82	1.57	0.48	-2.05 to 5.18	
% reporting errors, near misses or incidents witnessed in the last month	reportD	0.77	0.91	-10.08 to 11.61	-0.30	0.92	-5.45 to 4.84	
Fairness and effectiveness of incident reporting	incidentD	1.75	0.65	-4.59 to 8.09	-0.68	0.71	-3.69 to 2.33	
% experiencing physical violence from patients or their relatives in previous 12 months	violpatD	-3.20	0.70	-16.66 to 10.26	3.89	0.32	-2.48 to 10.26	
% experiencing physical violence from other staff in previous 12 months	violcolD	13.72	0.43	-14.73 to 42.17	0.19	0.98	-13.33 to 13.72	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpatD	-5.75	0.34	-15.55 to 4.06	2.89	0.31	-1.77 to 7.54	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcolD	13.68	0.04	2.63 to 24.73	-5.42	0.09	-10.70 to -0.14	
Perceptions of effective action from employer towards violence and harassment	actionD	4.78	0.09	0.14 to 9.42	-0.27	0.84	-2.49 to 1.95	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% reporting good communication between management and staff	communD	5.83	0.15	-0.77 to 12.42	-1.58	0.41	-4.73 to 1.57	
% able to contribute towards improvements at work	improveD	1.51	0.76	-6.44 to 9.45	-0.48	0.84	-4.25 to 3.29	
% able to contribute towards improvements at work (scale)	improvesD	-0.19	0.95	-4.79 to 4.41	0.22	0.87	-1.96 to 2.40	
Job satisfaction	jobsatD	-3.66	0.20	-8.33 to 1.01	2.30	0.09	0.09 to 4.50	
Intention to leave job	intleaveD	-0.36	0.84	-3.34 to 2.62	-1.54	0.07	-2.94 to -0.14	
Staff recommendation of the trust as a place to work or receive treatment	recomdD	-1.34	0.47	-4.41 to 1.73	1.80	0.04	0.36 to 3.24	
Motivation at work	engageD	1.96	0.53	-3.18 to 7.10	1.92	0.19	-0.51 to 4.35	
% receiving equality and diversity training	diversD	0.68	0.63	-1.67 to 3.04	0.01	0.98	-1.10 to 1.13	
% believing trust provides equal opportunities for career progression or promotion	equalD	2.15	0.70	-7.05 to 11.34	-1.07	0.69	-5.43 to 3.29	
% experiencing discrimination at work in last 12 months	discrimD	-10.48	0.10	-20.95 to 0.00	4.67	0.12	-0.31 to 9.66	
Impact of health and well-being on ability to perform work or daily activities	healthD	-5.44	0.09	-10.67 to -0.20	1.89	0.21	-0.61 to 4.39	
% feeling pressure to attend work when feeling unwell	presentD	-3.06	0.58	-12.27 to 6.14	-1.12	0.67	-5.49 to 3.26	
Availability of hand-washing materials	infectD	-2.03	0.62	-8.79 to 4.74	1.37	0.48	-1.85 to 4.58	
Overall engagement	overallD	-0.80	0.79	-5.85 to 4.24	2.39	0.10	0.02 to 4.77	

Appendix 4 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes

TABLE 39 Cross-lagged correlations between NHS staff survey variables (2010 and 2011) and absenteeism (2010–11 and 2011–12)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Employer action towards violence and harassment	action_10	action_11	Abs. 10_11	Abs. 11_12	-0.17	-0.08	-1.84	0.07
% appraised within previous 12 months	apprais_10	apprais_11	Abs. 10_11	Abs. 11_12	-0.01	-0.11	1.45	0.15
Quality of work–life balance	balance_10	balance_11	Abs. 10_11	Abs. 11_12	-0.19	-0.03	-3.55	0.00
% reporting good communication between management and staff	commun_10	commun_11	Abs. 10_11	Abs. 11_12	-0.34	-0.19	-3.05	0.00
% feeling there are good opportunities to develop potential at work	develop_10	develop_11	Abs. 10_11	Abs. 11_12	-0.22	-0.22	-0.05	0.96
% agreeing their role makes a difference to patients	differ_10	differ_11	Abs. 10_11	Abs. 11_12	0.10	0.00	1.72	0.09
% experiencing discrimination at work	discrim_10	discrim_11	Abs. 10_11	Abs. 11_12	0.18	0.07	2.35	0.02
% receiving equality and diversity training	divers_10	divers_11	Abs. 10_11	Abs. 11_12	0.13	0.13	0.10	0.92
Staff motivation at work	engage_10	engage_11	Abs. 10_11	Abs. 11_12	-0.20	-0.17	-0.56	0.58
% believing that trust provides equal opportunities for career progression or promotion	equal_10	equal_11	Abs. 10_11	Abs. 11_12	-0.19	-0.07	-2.49	0.01
% witnessing potentially harmful errors or near misses in previous month	errors_10	errors_11	Abs. 10_11	Abs. 11_12	0.08	-0.10	4.31	0.00
% staff working extra hours	exthrs_10	exthrs_11	Abs. 10_11	Abs. 11_12	-0.06	-0.19	2.71	0.01
Opportunities for flexible working	flexwork_10	flexwork_11	Abs. 10_11	Abs. 11_12	-0.29	-0.01	-6.53	0.00
% having had health and safety training in previous 12 months	hands_10	hands_11	Abs. 10_11	Abs. 11_12	-0.07	-0.04	-0.64	0.52
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_10	harcol_11	Abs. 10_11	Abs. 11_12	-0.04	-0.13	1.66	0.10

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_10	harpat_11	Abs. 10_11	Abs. 11_12	0.50	0.30	4.24	0.00
Impact of health and well-being on ability to perform work or daily activities	health_10	health_11	Abs. 10_11	Abs. 11_12	0.10	0.16	-0.91	0.36
% able to contribute towards improvements at work	improve_10	improve_11	Abs. 10_11	Abs. 11_12	-0.42	-0.21	-4.43	0.00
Fairness and effectiveness of incident reporting	incident_10	incident_11	Abs. 10_11	Abs. 11_12	-0.31	-0.27	-0.85	0.40
Availability of hand-washing materials	infect_10	infect_11	Abs. 10_11	Abs. 11_12	-0.08	-0.14	1.38	0.17
% suffering work related injuries or illness	injury_10	injury_11	Abs. 10_11	Abs. 11_12	0.15	0.02	2.82	0.00
Intention to leave job	intleave_10	intleave_11	Abs. 10_11	Abs. 11_12	-0.18	-0.04	-2.82	0.00
Quality of job design (clear job content, feedback and staff involvement)	jobdes_10	jobdes_11	Abs. 10_11	Abs. 11_12	-0.39	-0.31	-1.68	0.09
Job satisfaction	jobsat_10	jobsat_11	Abs. 10_11	Abs. 11_12	-0.26	-0.10	-3.23	0.00
Overall engagement	overall_10	overall_11	Abs. 10_11	Abs. 11_12	-0.38	-0.29	-1.82	0.07
% staff with personal development plans agreed within previous 12 months	pdp_10	pdp_11	Abs. 10_11	Abs. 11_12	-0.02	-0.08	1.06	0.29
% feeling pressure to attend work when feeling unwell	present_10	present_11	Abs. 10_11	Abs. 11_12	0.08	-0.03	2.16	0.03
% receiving job relevant training in previous 12 months	qtrain_10	qtrain_11	Abs. 10_11	Abs. 11_12	-0.07	-0.10	0.40	0.69
% having well-structured appraisal reviews within previous 12 months	qualapp_10	qualapp_11	Abs. 10_11	Abs. 11_12	-0.14	-0.19	0.88	0.38

continued

TABLE 39 Cross-lagged correlations between NHS staff survey variables (2010 and 2011) and absenteeism (2010–11 and 2011–12) (*continued*)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Staff recommendation of the trust as a place to work or receive treatment	recomd_10	recomd_11	Abs. 10_11	Abs. 11_12	-0.30	-0.27	-0.51	0.61
% reporting errors, near misses or incidents witnessed in the last month	report_10	report_11	Abs. 10_11	Abs. 11_12	-0.19	-0.04	-2.06	0.04
% feeling satisfied with quality of work and patient care they are able to deliver	satis_10	satis_11	Abs. 10_11	Abs. 11_12	0.06	-0.04	1.82	0.07
% suffering work related stress in previous 12 months	stress_10	stress_11	Abs. 10_11	Abs. 11_12	0.19	0.21	-0.27	0.79
Support from supervisors	supsup_10	supsup_11	Abs. 10_11	Abs. 11_12	-0.16	-0.04	-2.55	0.01
% working in a well-structured team environment	team_10	team_11	Abs. 10_11	Abs. 11_12	-0.25	-0.15	-2.06	0.04
% feeling valued by colleagues	value_10	value_11	Abs. 10_11	Abs. 11_12	-0.12	-0.06	-1.06	0.29
% experiencing physical violence from other staff in previous 12 months	violcol_10	violcol_11	Abs. 10_11	Abs. 11_12	0.08	0.09	-0.26	0.80
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_10	violpat_11	Abs. 10_11	Abs. 11_12	0.59	0.40	4.12	0.00
Work pressure felt by staff	wkpres_10	wkpres_11	Abs. 10_11	Abs. 11_12	0.08	-0.03	2.14	0.03

TABLE 40 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and stability index (2010–11 and 2011–12)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Employer action towards violence and harassment	action_10	action_11	Stab. 10_11	Stab. 11_12	0.01	–0.01	0.31	0.75
% appraised within previous 12 months	apprais_10	apprais_11	Stab. 10_11	Stab. 11_12	0.01	–0.03	0.48	0.63
Quality of work–life balance	balance_10	balance_11	Stab. 10_11	Stab. 11_12	–0.25	–0.07	–2.46	0.01
% reporting good communication between management and staff	commun_10	commun_11	Stab. 10_11	Stab. 11_12	–0.19	–0.07	–1.55	0.12
% feeling there are good opportunities to develop potential at work	develop_10	develop_11	Stab. 10_11	Stab. 11_12	–0.04	–0.08	0.62	0.53
% agreeing their role makes a difference to patients	differ_10	differ_11	Stab. 10_11	Stab. 11_12	0.26	0.08	2.30	0.02
% experiencing discrimination at work	discrim_10	discrim_11	Stab. 10_11	Stab. 11_12	0.08	0.02	0.76	0.45
% receiving equality and diversity training	divers_10	divers_11	Stab. 10_11	Stab. 11_12	–0.07	0.05	–1.65	0.10
Staff motivation at work	engage_10	engage_11	Stab. 10_11	Stab. 11_12	0.05	–0.04	1.19	0.23
% believing that trust provides equal opportunities for career progression or promotion	equal_10	equal_11	Stab. 10_11	Stab. 11_12	–0.05	0.01	–0.73	0.47
% witnessing potentially harmful errors or near misses in previous month	errors_10	errors_11	Stab. 10_11	Stab. 11_12	0.32	0.01	4.15	0.00
% staff working extra hours	exthrs_10	exthrs_11	Stab. 10_11	Stab. 11_12	–0.14	–0.06	–1.03	0.30
Opportunities for flexible working	flexwork_10	flexwork_11	Stab. 10_11	Stab. 11_12	–0.32	0.00	–4.29	0.00
% having had health and safety training in previous 12 months	hands_10	hands_11	Stab. 10_11	Stab. 11_12	–0.04	0.04	–1.18	0.24
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_10	harcol_11	Stab. 10_11	Stab. 11_12	0.02	–0.10	1.51	0.13

continued

TABLE 40 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and stability index (2010–11 and 2011–12) (*continued*)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_10	harpat_11	Stab. 10_11	Stab. 11_12	0.18	0.12	0.86	0.39
Impact of health and well-being on ability to perform work or daily activities	health_10	health_11	Stab. 10_11	Stab. 11_12	-0.22	0.02	-3.00	0.00
% able to contribute towards improvements at work	improve_10	improve_11	Stab. 10_11	Stab. 11_12	-0.30	-0.06	-3.24	0.00
Fairness and effectiveness of incident reporting	incident_10	incident_11	Stab. 10_11	Stab. 11_12	0.00	-0.07	0.91	0.36
Availability of hand-washing materials	infect_10	infect_11	Stab. 10_11	Stab. 11_12	0.26	-0.04	3.90	0.00
% suffering work related injuries or illness	injury_10	injury_11	Stab. 10_11	Stab. 11_12	0.32	0.05	3.69	0.00
Intention to leave job	intleave_10	intleave_11	Stab. 10_11	Stab. 11_12	-0.42	-0.10	-4.18	0.00
Quality of job design (clear job content, feedback and staff involvement)	jobdes_10	jobdes_11	Stab. 10_11	Stab. 11_12	-0.08	-0.10	0.24	0.81
Job satisfaction	jobsat_10	jobsat_11	Stab. 10_11	Stab. 11_12	-0.21	-0.05	-2.12	0.03
Overall engagement	overall_10	overall_11	Stab. 10_11	Stab. 11_12	-0.04	-0.06	0.35	0.72
% staff with personal development plans agreed within previous 12 months	pdp_10	pdp_11	Stab. 10_11	Stab. 11_12	-0.03	0.02	-0.59	0.55
% feeling pressure to attend work when feeling unwell	present_10	present_11	Stab. 10_11	Stab. 11_12	0.25	0.04	2.87	0.00
% receiving job relevant training in previous 12 months	qtrain_10	qtrain_11	Stab. 10_11	Stab. 11_12	-0.07	-0.06	-0.13	0.90
% having well-structured appraisal reviews within previous 12 months	qualapp_10	qualapp_11	Stab. 10_11	Stab. 11_12	-0.12	-0.07	-0.59	0.56

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Staff recommendation of the trust as a place to work or receive treatment	recomd_10	recomd_11	Stab. 10_11	Stab. 11_12	0.12	-0.04	2.13	0.03
% reporting errors, near misses or incidents witnessed in the last month	report_10	report_11	Stab. 10_11	Stab. 11_12	-0.19	-0.10	-1.04	0.30
% feeling satisfied with quality of work and patient care they are able to deliver	satis_10	satis_11	Stab. 10_11	Stab. 11_12	0.23	0.08	1.93	0.05
% suffering work related stress in previous 12 months	stress_10	stress_11	Stab. 10_11	Stab. 11_12	-0.15	0.10	-3.20	0.00
Support from supervisors	supsup_10	supsup_11	Stab. 10_11	Stab. 11_12	-0.21	-0.05	-2.17	0.03
% working in a well-structured team environment	team_10	team_11	Stab. 10_11	Stab. 11_12	-0.18	-0.03	-1.95	0.05
% feeling valued by colleagues	value_10	value_11	Stab. 10_11	Stab. 11_12	-0.12	0.02	-1.90	0.06
% experiencing physical violence from other staff in previous 12 months	violcol_10	violcol_11	Stab. 10_11	Stab. 11_12	-0.04	-0.06	0.24	0.81
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_10	violpat_11	Stab. 10_11	Stab. 11_12	0.14	0.17	-0.37	0.71
Work pressure felt by staff	wkpres_10	wkpres_11	Stab. 10_11	Stab. 11_12	0.03	0.04	-0.05	0.96

Appendix 5 Latent growth modelling: trust outcomes as dependent variables

NHS staff survey variables and intermediate outcomes as predictors of patient mortality rates

TABLE 41 NHS staff survey variables (2009) as predictors of patient mortality rates (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrs_09	-8.06	0.58	-31.96 to 15.84	4.22	0.55	-7.23 to 15.67	Trust type
	exthrsu_09	19.22	0.15	-2.47 to 40.91	2.20	0.73	-8.17 to 12.56	Trust type
	exthrsp_09	-17.08	0.20	-38.95 to 4.80	1.22	0.85	-9.24 to 11.69	Trust type
	shifts_09	28.97	0.04	5.31 to 52.63	-10.78	0.12	-22.11 to 0.56	Trust type
	rshifts_09	22.01	0.17	-4.14 to 48.17	-3.63	0.64	-16.24 to 8.98	Trust type
	nshifts_09	30.08	0.04	6.01 to 54.15	-11.78	0.10	-23.44 to -0.13	Trust type
% receiving any training or development in previous 12 months	training_09	-46.82	0.13	-98.07 to 4.43	12.78	0.39	-11.39 to 36.94	Trust type
% receiving job relevant training in previous 12 months	qtrain_09	-37.06	0.07	-70.59 to -3.52	4.99	0.61	-11.30 to 21.28	Trust type
% feeling satisfied with quality of work and patient care they are able to deliver	satis_09	4.21	0.78	-20.06 to 28.47	-0.67	0.92	-12.19 to 10.86	Trust type
% agreeing their role makes a difference to patients	differ_09	-5.32	0.87	-57.91 to 47.26	5.81	0.70	-18.92 to 30.53	Trust type
% feeling valued by colleagues	value_09	-38.71	0.08	-75.37 to -2.05	25.77	0.01	8.64 to 42.89	Trust type
% agreeing that they have an interesting job	interest_09	-12.23	0.55	-45.93 to 21.47	6.20	0.52	-9.70 to 22.09	Trust type
Quality of job design (clear job content, feedback and staff involvement)	jobdes_09	-11.91	0.26	-29.26 to 5.43	-0.52	0.92	-8.92 to 7.88	Trust type
Work pressure felt by staff	wkpres_09	-0.72	0.91	-11.75 to 10.30	2.06	0.52	-3.16 to 7.28	Trust type
% working in a well-structured team environment	team_09	-27.20	0.13	-56.67 to 2.28	3.46	0.69	-10.98 to 17.91	Trust type
Quality of work-life balance	balance_09	-7.70	0.29	-19.78 to 4.37	-0.50	0.89	-6.30 to 5.30	Trust type
Opportunities for flexible working	flexwork_09	-21.62	0.26	-53.48 to 10.25	10.06	0.27	-4.90 to 25.02	Trust type
% feeling there are good opportunities to develop potential at work	develop_09	-22.18	0.10	-44.48 to 0.12	3.82	0.56	-7.05 to 14.68	Trust type

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	apprais_09	-3.06	0.64	-13.86 to 7.74	-0.61	0.85	-5.72 to 4.51	Trust type
% having well-structured appraisal reviews within previous 12 months	qualapp_09	-5.59	0.63	-24.71 to 13.53	2.83	0.61	-6.27 to 11.94	Trust type
% with personal development plans agreed within previous 12 months	pdp_09	-5.31	0.45	-16.80 to 6.18	0.43	0.90	-5.04 to 5.91	Trust type
Support from supervisors	supsup_09	-10.01	0.23	-23.75 to 3.74	-0.04	0.99	-6.76 to 6.69	Trust type
% having had health and safety training in previous 12 months	hands_09	-5.13	0.51	-17.87 to 7.61	-0.49	0.90	-6.56 to 5.59	Trust type
% suffering work related injuries or illness	injury_09	24.89	0.37	-20.44 to 70.22	-26.11	0.04	-47.45 to -4.76	Trust type
% suffering work related stress in previous 12 months	stress_09	-20.59	0.31	-54.19 to 13.02	10.90	0.26	-5.00 to 26.80	Trust type
% witnessing potentially harmful errors or near misses in previous month	errors_09	4.10	0.81	-23.74 to 31.94	-10.55	0.19	-23.66 to 2.56	Trust type
% reporting errors, near misses or incidents witnessed in the last month	report_09	-5.71	0.88	-68.72 to 57.30	-22.19	0.22	-51.86 to 7.48	Trust type
Fairness and effectiveness of incident reporting	incident_09	-13.66	0.17	-30.04 to 2.72	-0.53	0.91	-8.32 to 7.26	Trust type
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_09	-63.35	0.03	-111.70 to -15.01	27.91	0.05	4.88 to 50.94	Trust type
% experiencing physical violence from other staff in previous 12 months	violcol_09	14.76	0.82	-92.78 to 122.30	25.43	0.41	-25.20 to 76.05	Trust type
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_09	-11.24	0.63	-49.43 to 26.94	6.13	0.59	-12.34 to 24.60	Trust type
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_09	-34.75	0.14	-73.82 to 4.31	10.40	0.36	-8.23 to 29.04	Trust type
Perceptions of effective action from employer towards violence and harassment	action_09	-2.35	0.78	-15.95 to 11.24	0.12	0.98	-6.30 to 6.54	Trust type

continued

TABLE 41 NHS staff survey variables (2009) as predictors of patient mortality rates (2009–2011) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% reporting good communication between management and staff	commun_09	-23.91	0.08	-46.64 to -1.17	-0.89	0.90	-11.99 to 10.22	Trust type
% agreeing they understand their role and where it fits in	fits_09	-19.30	0.04	-34.55 to -4.05	2.53	0.58	-4.88 to 9.94	Trust type
% able to contribute towards improvements at work	improve_09	-46.39	0.01	-75.33 to -17.45	2.88	0.74	-11.17 to 16.93	Trust type
% able to contribute towards improvements at work (scale)	improves_09	-21.62	0.03	-38.24 to -5.00	0.86	0.86	-7.21 to 8.93	Trust type
Job satisfaction	jobsat_09	-16.04	0.10	-31.99 to -0.09	0.74	0.88	-7.03 to 8.51	Trust type
Intention to leave job	intleave_09	6.22	0.29	-3.44 to 15.88	3.47	0.22	-1.15 to 8.08	Trust type
Staff recommendation of the trust as a place to work or receive treatment	recomd_09	-9.84	0.02	-16.54 to -3.13	-2.32	0.25	-5.62 to 0.98	Trust type
Motivation at work	engage_09	-5.33	0.58	-21.05 to 10.39	0.63	0.89	-6.87 to 8.13	Trust type
% receiving equality and diversity training	divers_09	-1.57	0.73	-9.17 to 6.03	0.44	0.84	-3.16 to 4.03	Trust type
% believing trust provides equal opportunities for career progression or promotion	equal_09	-14.97	0.46	-48.02 to 18.09	3.08	0.75	-12.79 to 18.96	Trust type
% experiencing discrimination at work in last 12 months	discrim_09	-3.96	0.91	-58.53 to 50.62	-16.66	0.29	-42.32 to 9.01	Trust type
Impact of health and well-being on ability to perform work or daily activities	health_09	-8.48	0.53	-30.45 to 13.50	3.24	0.61	-7.19 to 13.66	Trust type
% feeling pressure to attend work when feeling unwell	present_09	-16.96	0.45	-53.82 to 19.91	11.10	0.29	-6.29 to 28.49	Trust type
Availability of hand-washing materials	infect_09	-10.98	0.32	-29.17 to 7.21	-7.18	0.17	-15.78 to 1.41	Trust type
Overall engagement	overall_09	-17.32	0.03	-30.12 to -4.53	-2.51	0.51	-8.80 to 3.79	Trust type
Intermediate outcomes								
Turnover (2009_2010)	Stab. 09_10	0.08	0.79	-0.40 to 0.56	-0.13	0.36	-0.35 to 0.10	Trust type
Absenteeism (2009_2010)	Abs. 09_10	35.58	0.59	-73.27 to 144.44	13.59	0.66	-37.83 to 65.01	Trust type

TABLE 42 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of patient mortality rates (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exhrsD	27.52	0.10	−0.20 to 55.25	−4.46	0.58	−17.56 to 8.63	Trust type
	exhrsuD	−6.58	0.67	−31.98 to 18.82	0.90	0.90	−11.11 to 12.91	Trust type
	exthrspD	20.38	0.20	−5.64 to 46.40	−1.67	0.83	−14.09 to 10.76	Trust type
	shiftsD	−12.98	0.80	−97.91 to 71.96	49.34	0.04	10.05 to 88.64	Trust type, foundation status
	rshiftsD	−68.49	0.22	−159.91 to 22.94	48.39	0.09	1.13 to 95.65	Trust type, foundation status
	nshiftsD	74.11	0.19	−19.02 to 167.23	16.82	0.61	−36.95 to 70.59	Trust type, foundation status
% receiving any training or development in previous 12 months	trainingD	17.19	0.63	−41.00 to 75.38	−8.35	0.62	−35.74 to 19.05	Trust type
% receiving job relevant training in previous 12 months	qtrainD	14.77	0.42	−15.12 to 44.67	−12.04	0.16	−26.11 to 2.04	Trust type
% feeling satisfied with quality of work and patient care they are able to deliver	satisD	−17.75	0.26	−43.80 to 8.30	−2.69	0.72	−15.02 to 9.65	Trust type
% agreeing their role makes a difference to patients	differD	−12.18	0.68	−61.30 to 36.94	−14.21	0.31	−37.33 to 8.91	Trust type
% feeling valued by colleagues	valueD	23.63	0.25	−9.86 to 57.13	−13.04	0.18	−29.16 to 3.08	Trust type
Quality of job design (clear job content, feedback and staff involvement)	jobdesD	−1.98	0.87	−21.12 to 17.15	−1.20	0.83	−10.29 to 7.89	Trust type
Work pressure felt by staff	wkpresD	12.09	0.16	−2.17 to 26.35	−2.71	0.51	−9.55 to 4.12	Trust type
% working in a well-structured team environment	teamD	9.56	0.42	−10.10 to 29.22	3.50	0.54	−5.84 to 12.83	Trust type
Quality of work–life balance	balanceD	−1.72	0.82	−14.45 to 11.02	−5.87	0.11	−11.87 to 0.12	Trust type

continued

TABLE 42 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of patient mortality rates (2009–2011) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
Opportunities for flexible working	flexworkD	17.15	0.26	–7.67 to 41.97	–4.18	0.56	–15.96 to 7.60	Trust type
% feeling there are good opportunities to develop potential at work	developD	8.81	0.56	–15.72 to 33.35	–4.77	0.50	–16.40 to 6.86	Trust type
% appraised within previous 12 months	appraisD	–7.15	0.28	–18.10 to 3.80	2.65	0.40	–2.56 to 7.87	Trust type
% having well-structured appraisal reviews within previous 12 months	qualappD	–15.30	0.23	–36.34 to 5.74	1.26	0.84	–8.69 to 11.20	Trust type
% with personal development plans agreed within previous 12 months	pdpD	–4.13	0.56	–15.67 to 7.41	1.92	0.56	–3.55 to 7.40	Trust type
Support from supervisors	supsupD	4.03	0.62	–9.24 to 17.31	–3.44	0.37	–9.77 to 2.89	Trust type
% having had health and safety training in previous 12 months	handsD	9.05	0.42	–9.56 to 27.66	–2.23	0.68	–11.04 to 6.57	Trust type
% suffering work related injuries or illness	injuryD	7.30	0.75	–29.91 to 44.51	10.62	0.32	–6.94 to 28.18	Trust type
% suffering work related stress in previous 12 months	stressD	33.59	0.09	1.21 to 65.97	–6.34	0.50	–21.73 to 9.06	Trust type
% witnessing potentially harmful errors or near misses in previous month	errorsD	6.17	0.72	–21.80 to 34.14	3.66	0.65	–9.66 to 16.97	Trust type
% reporting errors, near misses or incidents witnessed in the last month	reportD	18.91	0.46	–22.75 to 60.58	0.76	0.95	–18.96 to 20.49	Trust type
Fairness and effectiveness of incident reporting	incidentD	1.64	0.91	–21.36 to 24.64	–7.45	0.27	–18.52 to 3.62	Trust type
% experiencing physical violence from patients or their relatives in previous 12 months	violpatD	15.13	0.60	–32.37 to 62.62	2.97	0.83	–19.34 to 25.28	Trust type
% experiencing physical violence from other staff in previous 12 months	violcolD	97.78	0.12	–5.09 to 200.65	–45.36	0.13	–94.14 to 3.43	Trust type
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpatD	34.27	0.11	–1.00 to 69.55	0.27	0.98	–16.52 to 17.05	Trust type
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcolD	45.27	0.07	3.94 to 86.59	–8.63	0.47	–28.16 to 10.91	Trust type
Perceptions of effective action from employer towards violence and harassment	actionD	–6.86	0.53	–24.74 to 11.03	–10.32	0.04	–18.74 to –1.91	Trust type

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% reporting good communication between management and staff	communD	-7.79	0.63	-34.00 to 18.41	-5.14	0.50	-17.56 to 7.28	Trust type
% able to contribute towards improvements at work	improved	10.13	0.57	-18.95 to 39.22	-5.82	0.48	-19.50 to 7.86	Trust type
% able to contribute towards improvements at work (scale)	improvesD	2.00	0.85	-15.09 to 19.09	-1.45	0.77	-9.58 to 6.69	Trust type
Job satisfaction	jobsatD	6.32	0.55	-11.26 to 23.89	-2.42	0.64	-10.85 to 6.01	Trust type
Intention to leave job	intleaveD	-3.59	0.61	-15.03 to 7.84	2.96	0.37	-2.48 to 8.40	Trust type
Staff recommendation of the trust as a place to work or receive treatment	recomdD	0.74	0.91	-10.41 to 11.89	-2.69	0.41	-8.03 to 2.65	Trust type
Motivation at work	engageD	4.05	0.73	-15.35 to 23.45	0.98	0.86	-8.25 to 10.21	Trust type
% receiving equality and diversity training	diversD	-13.45	0.01	-21.78 to -5.13	0.97	0.69	-3.02 to 4.97	Trust type
% believing trust provides equal opportunities for career progression or promotion	equalD	2.01	0.92	-31.61 to 35.62	-5.90	0.55	-21.93 to 10.12	Trust type
% experiencing discrimination at work in last 12 months	discrimD	14.04	0.54	-23.99 to 52.07	15.26	0.16	-2.73 to 33.24	Trust type
Impact of health and well-being on ability to perform work or daily activities	healthD	6.55	0.60	-13.85 to 26.94	3.61	0.55	-6.20 to 13.41	Trust type
% feeling pressure to attend work when feeling unwell	presentD	3.50	0.86	-30.05 to 37.04	4.64	0.63	-11.22 to 20.51	Trust type
Availability of hand-washing materials	infectD	-6.57	0.66	-31.43 to 18.29	-3.51	0.63	-15.51 to 8.48	Trust type
Overall engagement	overallD	2.57	0.82	-15.90 to 21.04	-2.79	0.60	-11.58 to 5.99	Trust type
Intermediate outcomes								
Turnover (2010_2011)-(2009_2010)	stabD	-0.08	0.81	-0.66 to 0.49	0.24	0.15	-0.04 to 0.52	Trust type
Absenteeism (2010_2011)-(2009_2010)	absD	1.15	0.99	-100.40 to 102.69	-4.25	0.88	-52.33 to 43.84	Trust type

NHS staff survey variables and intermediate outcomes as predictors of patient satisfaction

TABLE 43 NHS staff survey variables (2009) as predictors of patient satisfaction (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrs_09	-7.26	0.16	-15.66 to 1.14	-1.20	0.60	-4.91 to 2.51	
	exthrsu_09	-10.21	0.03	-17.89 to -2.52	-2.51	0.23	-5.92 to 0.90	
	exthrsp_09	-1.23	0.79	-8.77 to 6.31	-0.65	0.75	-3.96 to 2.65	
	shifts_09	4.87	0.29	-2.72 to 12.46	-3.20	0.11	-6.50 to 0.11	
	rshifts_09	5.70	0.25	-2.38 to 13.79	-3.38	0.12	-6.91 to 0.15	
	nshifts_09	5.31	0.25	-2.23 to 12.85	-3.58	0.07	-6.86 to -0.30	
% receiving any training or development in previous 12 months	training_09	35.51	0.00	17.01 to 54.01	5.18	0.31	-3.13 to 13.50	
% receiving job relevant training in previous 12 months	qtrain_09	7.54	0.31	-4.57 to 19.65	-2.55	0.43	-7.91 to 2.80	
% feeling satisfied with quality of work and patient care they are able to deliver	satis_09	1.95	0.71	-6.57 to 10.48	2.68	0.24	-1.04 to 6.40	
% agreeing their role makes a difference to patients	differ_09	0.08	0.19	-3.81 to 34.44	0.16	0.29	-2.58 to 14.22	
% feeling valued by colleagues	value_09	25.26	0.00	12.70 to 37.82	-4.37	0.21	-10.06 to 1.32	
% agreeing that they have an interesting job	interest_09	11.73	0.11	-0.40 to 23.86	-0.82	0.80	-6.18 to 4.54	
Quality of job design (clear job content, feedback and staff involvement)	jobdes_09	3.10	0.41	-3.13 to 9.32	-0.65	0.70	-3.38 to 2.09	
Work pressure felt by staff	wkpres_09	-4.97	0.04	-8.87 to -1.07	-0.87	0.41	-2.60 to 0.86	
% working in a well-structured team environment	team_09	-6.36	0.27	-15.92 to 3.19	-1.00	0.70	-5.20 to 3.20	
Quality of work–life balance	balance_09	4.95	0.06	0.69 to 9.20	-1.25	0.27	-3.13 to 0.63	
Opportunities for flexible working	flexwork_09	3.47	0.62	-7.93 to 14.87	0.41	0.89	-4.59 to 5.40	
% feeling there are good opportunities to develop potential at work	develop_09	0.86	0.86	-7.26 to 8.98	0.03	0.99	-3.53 to 3.59	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	apprais_09	5.77	0.01	1.95 to 9.59	-0.60	0.56	-2.30 to 1.10	
% having well-structured appraisal reviews within previous 12 months	qualapp_09	1.74	0.67	-5.09 to 8.58	-0.25	0.89	-3.24 to 2.75	
% with personal development plans agreed within previous 12 months	pdp_09	7.32	0.00	3.29 to 11.35	-0.92	0.40	-2.73 to 0.89	
Support from supervisors	supsup_09	4.38	0.13	-0.41 to 9.17	-0.52	0.69	-2.63 to 1.59	
% having had health and safety training in previous 12 months	hands_09	7.70	0.01	3.09 to 12.31	1.18	0.35	-0.88 to 3.24	
% suffering work related injuries or illness	injury_09	-8.03	0.38	-23.19 to 7.12	0.54	0.89	-6.12 to 7.19	
% suffering work related stress in previous 12 months	stress_09	-9.99	0.17	-21.89 to 1.92	-3.84	0.23	-9.07 to 1.38	
% witnessing potentially harmful errors or near misses in previous month	errors_09	9.85	0.09	0.28 to 19.43	-3.03	0.24	-7.27 to 1.20	
% reporting errors, near misses or incidents witnessed in the last month	report_09	-22.97	0.08	-44.38 to -1.56	-1.83	0.75	-11.29 to 7.64	
Fairness and effectiveness of incident reporting	incident_09	11.23	0.00	5.48 to 16.97	-1.10	0.49	-3.69 to 1.50	
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_09	24.83	0.01	8.33 to 41.33	-5.29	0.24	-12.64 to 2.06	
% experiencing physical violence from other staff in previous 12 months	violcol_09	-25.63	0.28	-64.60 to 13.34	0.74	0.94	-16.44 to 17.92	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_09	-7.44	0.36	-20.85 to 5.96	-6.79	0.06	-12.61 to -0.98	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_09	-21.79	0.01	-35.59 to -7.98	3.71	0.32	-2.44 to 9.86	
Perceptions of effective action from employer towards violence and harassment	action_09	7.23	0.01	2.48 to 11.98	0.09	0.94	-2.03 to 2.22	
% reporting good communication between management and staff	commun_09	4.40	0.38	-3.78 to 12.59	0.35	0.87	-3.24 to 3.95	

continued

TABLE 43 NHS staff survey variables (2009) as predictors of patient satisfaction (2009–2011) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% agreeing they understand their role and where it fits in	fits_09	5.94	0.08	0.35 to 11.54	0.36	0.81	–2.12 to 2.84	
% able to contribute towards improvements at work	improve_09	10.86	0.08	0.64 to 21.08	1.04	0.71	–3.49 to 5.57	
% able to contribute towards improvements at work (scale)	improves_09	7.66	0.03	1.86 to 13.45	0.20	0.90	–2.38 to 2.79	
Job satisfaction	jobsat_09	8.81	0.01	3.23 to 14.38	–0.98	0.52	–3.47 to 1.51	
Intention to leave job	intleave_09	–7.39	0.00	–10.76 to –4.02	0.13	0.89	–1.41 to 1.67	
Staff recommendation of the trust as a place to work or receive treatment	recomd_09	7.63	0.00	5.33 to 9.93	0.27	0.69	–0.83 to 1.36	
Motivation at work	engage_09	–2.05	0.54	–7.59 to 3.50	0.26	0.86	–2.17 to 2.69	
% receiving equality and diversity training	divers_09	1.40	0.40	–1.34 to 4.14	0.61	0.41	–0.59 to 1.81	
% believing trust provides equal opportunities for career progression or promotion	equal_09	26.75	0.00	15.34 to 38.15	0.95	0.77	–4.27 to 6.16	
% experiencing discrimination at work in last 12 months	discrim_09	–43.30	0.00	–61.27 to –25.33	–1.47	0.77	–9.71 to 6.78	
Impact of health and well-being on ability to perform work or daily activities	health_09	–8.39	0.06	–15.81 to –0.98	–0.59	0.77	–3.87 to 2.69	
% feeling pressure to attend work when feeling unwell	present_09	–0.89	0.91	–13.74 to 11.96	–1.89	0.58	–7.52 to 3.73	
Availability of hand-washing materials	infect_09	13.34	0.00	7.30 to 19.39	–0.08	0.96	–2.84 to 2.67	
Overall engagement	overall_09	10.20	0.00	5.69 to 14.71	0.43	0.73	–1.63 to 2.49	
Intermediate outcomes								
Turnover (2009_2010)	Stab. 09_10	0.29	0.00	0.13 to 0.45	0.02	0.61	–0.05 to 0.10	
Absenteeism (2009_2010)	Abs. 09_10	–2.79	0.91	–41.67 to 36.10	8.13	0.43	–8.94 to 25.19	

TABLE 44 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of patient satisfaction (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrsD	-9.79	0.10	-19.63 to 0.05	1.49	0.58	-2.88 to 5.86	
	exthrsuD	-0.58	0.92	-9.97 to 8.81	-1.17	0.64	-5.28 to 2.94	
	exthrspD	-9.45	0.09	-18.51 to -0.38	2.59	0.29	-1.42 to 6.60	
	shiftsD	-9.69	0.66	-46.02 to 26.65	6.98	0.56	-12.79 to 26.74	Foundation status
	rshiftsD	7.78	0.72	-28.21 to 43.77	-16.47	0.14	-34.76 to 1.83	Foundation status
	nshiftsD	-5.47	0.84	-50.56 to 39.63	19.77	0.16	-3.22 to 42.76	Foundation status
% receiving any training or development in previous 12 months	trainingD	-16.49	0.19	-37.01 to 4.04	-2.65	0.63	-11.68 to 6.38	
% receiving job relevant training in previous 12 months	qtrainD	-0.37	0.96	-11.22 to 10.48	-0.48	0.87	-5.24 to 4.27	
% feeling satisfied with quality of work and patient care they are able to deliver	satisD	14.32	0.01	5.38 to 23.26	-2.42	0.32	-6.41 to 1.57	
% agreeing their role makes a difference to patients	differD	8.95	0.40	-8.36 to 26.26	-0.71	0.88	-8.32 to 6.90	
% feeling valued by colleagues	valueD	-0.52	0.94	-12.57 to 11.53	-0.35	0.91	-5.62 to 4.93	
Quality of job design (clear job content, feedback and staff involvement)	jobdesD	-0.01	1.00	-6.76 to 6.74	0.24	0.89	-2.72 to 3.20	
Work pressure felt by staff	wkpresD	-2.75	0.35	-7.56 to 2.05	0.64	0.62	-1.47 to 2.75	
% working in a well-structured team environment	teamD	3.34	0.45	-3.86 to 10.53	2.61	0.17	-0.53 to 5.75	
Quality of work–life balance	balanceD	-0.56	0.84	-5.15 to 4.04	0.71	0.56	-1.30 to 2.72	
Opportunities for flexible working	flexworkD	-6.98	0.20	-15.91 to 1.95	-0.10	0.97	-4.03 to 3.83	
% feeling there are good opportunities to develop potential at work	developD	-0.88	0.87	-9.66 to 7.90	-0.43	0.86	-4.28 to 3.42	

continued

TABLE 44 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of patient satisfaction (2009–2011) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	appraisD	-1.97	0.41	-5.91 to 1.98	-1.30	0.22	-3.03 to 0.43	
% having well-structured appraisal reviews within previous 12 months	qualappD	0.10	0.98	-7.47 to 7.67	-2.04	0.31	-5.36 to 1.29	
% with personal development plans agreed within previous 12 months	pdpD	-3.68	0.14	-7.80 to 0.44	-1.13	0.31	-2.95 to 0.68	
Support from supervisors	supsupD	-0.01	1.00	-4.77 to 4.75	-0.39	0.76	-2.47 to 1.70	
% having had health and safety training in previous 12 months	handsD	-6.69	0.09	-13.21 to -0.17	-0.93	0.60	-3.81 to 1.95	
% suffering work related injuries or illness	injuryD	1.07	0.90	-12.43 to 14.57	0.34	0.93	-5.62 to 6.30	
% suffering work related stress in previous 12 months	stressD	-2.89	0.67	-14.12 to 8.35	2.29	0.44	-2.62 to 7.20	
% witnessing potentially harmful errors or near misses in previous month	errorsD	-15.48	0.01	-25.19 to -5.77	0.14	0.96	-4.22 to 4.49	
% reporting errors, near misses or incidents witnessed in the last month	reportD	11.34	0.20	-3.24 to 25.91	5.03	0.20	-1.36 to 11.42	
Fairness and effectiveness of incident reporting	incidentD	-3.53	0.49	-11.92 to 4.86	1.55	0.49	-2.16 to 5.25	
% experiencing physical violence from patients or their relatives in previous 12 months	violpatD	-17.87	0.09	-35.37 to -0.37	3.13	0.51	-4.59 to 10.85	
% experiencing physical violence from other staff in previous 12 months	violcolD	-18.61	0.42	-56.32 to 19.11	0.69	0.95	-15.90 to 17.27	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpatD	-13.49	0.09	-26.41 to -0.57	1.54	0.66	-4.20 to 7.27	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcolD	11.99	0.18	-2.71 to 26.68	-2.76	0.48	-9.22 to 3.71	
Perceptions of effective action from employer towards violence and harassment	actionD	6.75	0.07	0.60 to 12.90	-0.91	0.58	-3.64 to 1.81	
% reporting good communication between management and staff	communD	7.68	0.15	-1.04 to 16.40	1.30	0.58	-2.54 to 5.14	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% able to contribute towards improvements at work	improved	0.52	0.94	−9.95 to 10.99	−0.66	0.81	−5.25 to 3.93	
% able to contribute towards improvements at work (scale)	improvesD	−2.54	0.49	−8.58 to 3.49	−0.56	0.73	−3.21 to 2.09	
Job satisfaction	jobsatD	−2.71	0.48	−8.95 to 3.54	0.63	0.70	−2.10 to 3.37	
Intention to leave job	intleaved	−1.72	0.47	−5.61 to 2.17	−0.08	0.94	−1.79 to 1.64	
Staff recommendation of the trust as a place to work or receive treatment	recomdD	0.85	0.73	−3.15 to 4.86	0.32	0.76	−1.43 to 2.08	
Motivation at work	engageD	1.40	0.73	−5.33 to 8.14	−0.04	0.98	−3.00 to 2.91	
% receiving equality and diversity training	diversD	0.38	0.84	−2.73 to 3.50	−0.86	0.30	−2.22 to 0.50	
% believing trust provides equal opportunities for career progression or promotion	equalD	−4.27	0.56	−16.24 to 7.70	−0.59	0.85	−5.86 to 4.68	
% experiencing discrimination at work in last 12 months	discrimD	−13.84	0.10	−27.50 to −0.18	2.58	0.48	−3.45 to 8.61	
Impact of health and well-being on ability to perform work or daily activities	healthD	−3.15	0.46	−10.19 to 3.88	3.78	0.04	0.73 to 6.83	
% feeling pressure to attend work when feeling unwell	presentD	−0.24	0.97	−12.26 to 11.78	−1.07	0.74	−6.33 to 4.20	
Availability of hand-washing materials	infectD	−0.06	0.99	−9.12 to 9.00	1.28	0.60	−2.68 to 5.24	
Overall engagement	overallD	0.11	0.98	−6.46 to 6.68	0.04	0.98	−2.84 to 2.91	
Intermediate outcomes								
Turnover (2010_2011)–(2009_2010)	stabD	−0.04	0.73	−0.25 to 0.16	−0.08	0.14	−0.17 to 0.01	
Absenteeism (2010_2011)–(2009_2010)	absD	−6.27	0.78	−42.68 to 30.13	−3.02	0.76	−18.99 to 12.94	

NHS staff survey variables and intermediate outcomes as predictors of MRSA infection rates

TABLE 45 NHS staff survey variables (2009) as predictors of MRSA infection rates (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrs_09	-2.55	0.32	-6.76 to 1.66	-0.08	0.96	-2.56 to 2.41	
	exthrsu_09	-0.41	0.87	-4.45 to 3.63	0.95	0.51	-1.43 to 3.32	
	exthrsp_09	-2.77	0.22	-6.47 to 0.92	-0.35	0.79	-2.53 to 1.83	
	shifts_09	1.23	0.61	-2.71 to 5.18	-0.20	0.89	-2.52 to 2.12	
	rshifts_09	2.09	0.41	-2.07 to 6.25	-0.83	0.58	-3.28 to 1.62	
	nshifts_09	2.88	0.22	-1.00 to 6.75	-1.13	0.41	-3.42 to 1.15	
% receiving any training or development in previous 12 months	training_09	1.39	0.82	-8.46 to 11.24	2.03	0.56	-3.75 to 7.81	
% receiving job relevant training in previous 12 months	qtrain_09	5.55	0.13	-0.49 to 11.58	-1.98	0.36	-5.54 to 1.59	
% feeling satisfied with quality of work and patient care they are able to deliver	satis_09	4.50	0.09	10.13 to 8.87	-0.57	0.72	-3.16 to 2.02	
% agreeing their role makes a difference to patients	differ_09	9.07	0.13	-0.69 to 18.83	-4.27	0.22	-10.01 to 1.48	
% feeling valued by colleagues	value_09	0.47	0.91	-6.06 to 7.01	0.38	0.87	-3.46 to 4.21	
% agreeing that they have an interesting job	interest_09	-2.88	0.44	-8.97 to 3.22	-0.41	0.85	-4.00 to 3.17	
Quality of job design (clear job content, feedback and staff involvement)	jobdes_09	1.98	0.30	-1.14 to 5.11	-0.26	0.82	-2.10 to 1.58	
Work pressure felt by staff	wkpres_09	-1.65	0.18	-3.65 to 0.36	-0.82	0.25	-2.00 to 0.36	
% working in a well-structured team environment	team_09	-0.77	0.80	-5.63 to 4.10	-0.94	0.59	-3.79 to 1.92	
Quality of work–life balance	balance_09	1.29	0.32	-0.86 to 3.44	0.09	0.90	-1.17 to 1.36	
Opportunities for flexible working	flexwork_09	-0.28	0.94	-6.05 to 5.50	-1.65	0.42	-5.04 to 1.74	
% feeling there are good opportunities to develop potential at work	develop_09	3.70	0.13	-0.36 to 7.76	-0.54	0.71	-2.94 to 1.86	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	apprais_09	0.13	0.91	-1.85 to 2.12	0.45	0.52	-0.71 to 1.62	
% having well-structured appraisal reviews within previous 12 months	qualapp_09	1.47	0.49	-2.01 to 4.95	0.60	0.63	-1.45 to 2.64	
% with personal development plans agreed within previous 12 months	pdp_09	0.87	0.50	-1.26 to 2.99	0.20	0.79	-1.05 to 1.45	
Support from supervisors	supsup_09	0.11	0.94	-2.32 to 2.54	0.78	0.37	-0.64 to 2.21	
% having had health and safety training in previous 12 months	hands_09	-2.51	0.08	-4.91 to -0.12	1.67	0.05	0.27 to 3.08	
% suffering work related injuries or illness	injury_09	1.20	0.80	-6.60 to 8.99	2.76	0.32	-1.81 to 7.33	
% suffering work related stress in previous 12 months	stress_09	-3.23	0.39	-9.36 to 2.91	-1.11	0.61	-4.72 to 2.50	
% witnessing potentially harmful errors or near misses in previous month	errors_09	5.49	0.05	0.90 to 10.09	-1.78	0.28	-4.50 to 0.95	
% reporting errors, near misses or incidents witnessed in the last month	report_09	-0.54	0.94	-11.48 to 10.40	3.26	0.40	-3.15 to 9.68	
Fairness and effectiveness of incident reporting	incident_09	0.32	0.86	-2.60 to 3.24	1.20	0.25	-0.51 to 2.91	
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_09	6.09	0.24	-2.37 to 14.54	-4.29	0.16	-9.24 to 0.67	
% experiencing physical violence from other staff in previous 12 months	violcol_09	5.37	0.66	-14.62 to 25.37	-5.11	0.47	-16.85 to 6.63	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_09	8.69	0.03	1.94 to 15.44	-7.39	0.00	-11.30 to -3.48	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_09	-3.08	0.48	-10.25 to 4.08	-1.41	0.58	-5.62 to 2.80	
Perceptions of effective action from employer towards violence and harassment	action_09	1.69	0.25	-0.75 to 4.12	0.96	0.27	-0.47 to 2.39	
% reporting good communication between management and staff	commun_09	3.46	0.15	-0.45 to 7.37	1.78	0.20	-0.52 to 4.08	

continued

TABLE 45 NHS staff survey variables (2009) as predictors of MRSA infection rates (2009–2011) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% agreeing they understand their role and where it fits in	fits_09	2.42	0.16	−0.40 to 5.24	0.68	0.50	−0.98 to 2.35	
% able to contribute towards improvements at work	improve_09	4.88	0.11	−0.19 to 9.95	−2.61	0.15	−5.60 to 0.37	
% able to contribute towards improvements at work (scale)	improves_09	2.68	0.13	−0.23 to 5.59	−1.03	0.32	−2.75 to 0.69	
Job satisfaction	jobsat_09	0.17	0.92	−2.67 to 3.00	0.83	0.41	−0.83 to 2.49	
Intention to leave job	intleave_09	1.06	0.33	−0.73 to 2.85	−0.34	0.59	−1.39 to 0.71	
Staff recommendation of the trust as a place to work or receive treatment	recomd_09	0.10	0.89	−1.12 to 1.32	0.29	0.51	−0.43 to 1.00	
Motivation at work	engage_09	−0.91	0.59	−3.71 to 1.89	0.27	0.79	−1.38 to 1.91	
% receiving equality and diversity training	divers_09	−0.93	0.28	−2.33 to 0.48	0.67	0.18	−0.15 to 1.50	
% believing trust provides equal opportunities for career progression or promotion	equal_09	−2.58	0.48	−8.65 to 3.48	0.37	0.87	−3.20 to 3.93	
% experiencing discrimination at work in last 12 months	discrim_09	6.54	0.26	−3.09 to 16.18	−2.94	0.40	−8.61 to 2.74	
Impact of health and well-being on ability to perform work or daily activities	health_09	0.93	0.69	−2.91 to 4.77	−1.18	0.39	−3.43 to 1.07	
% feeling pressure to attend work when feeling unwell	present_09	−2.43	0.54	−8.96 to 4.10	1.15	0.62	−2.69 to 4.99	
Availability of hand-washing materials	infect_09	−1.18	0.54	−4.35 to 1.98	0.80	0.48	−1.06 to 2.66	
Overall engagement	overall_09	0.46	0.74	−1.84 to 2.76	0.18	0.83	−1.17 to 1.53	
Intermediate outcomes								
Turnover (2009_2010)	Stab. 09_10	−0.02	0.76	−0.10 to 0.07	0.05	0.13	0.00 to 0.10	
Absenteeism (2009_2010)	Abs. 09_10	9.92	0.42	−10.08 to 29.92	−0.08	0.99	−11.94 to 11.79	

TABLE 46 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of MRSA infection rates (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrsD	1.12	0.72	–4.01 to 6.26	0.05	0.98	–2.97 to 3.07	
	exthrsuD	4.77	0.10	0.02 to 9.52	–3.21	0.06	–6.00 to –0.43	
	exthrspD	0.10	0.97	–4.63 to 4.83	1.56	0.36	–1.22 to 4.33	
	shiftsD	13.04	0.02	4.00 to 22.08	0.21	0.96	–7.04 to 7.46	Foundation status
	rshiftsD	14.38	0.01	4.90 to 23.85	–1.61	0.73	–9.30 to 6.07	Foundation status
	nshiftsD	14.72	0.02	4.16 to 25.28	–1.29	0.80	–9.66 to 7.07	Foundation status
% receiving any training or development in previous 12 months	trainingD	7.09	0.27	–3.47 to 17.65	–5.21	0.17	–11.40 to 0.99	
% receiving job relevant training in previous 12 months	qtrainD	–2.98	0.37	–8.45 to 2.50	–0.66	0.74	–3.89 to 2.56	
% feeling satisfied with quality of work and patient care they are able to deliver	satisD	0.49	0.86	–4.16 to 5.13	–0.21	0.90	–2.94 to 2.52	
% agreeing their role makes a difference to patients	differD	0.21	0.97	–8.66 to 9.09	–0.63	0.84	–5.85 to 4.58	
% feeling valued by colleagues	valueD	–0.96	0.80	–7.20 to 5.27	–0.39	0.86	–4.06 to 3.28	
Quality of job design (clear job content, feedback and staff involvement)	jobdesD	1.02	0.63	–2.49 to 4.52	0.38	0.76	–1.68 to 2.44	
Work pressure felt by staff	wkpresD	2.00	0.18	–0.45 to 4.46	0.20	0.82	–1.25 to 1.65	
% working in a well-structured team environment	teamD	0.40	0.86	–3.25 to 4.05	0.04	0.98	–2.10 to 2.18	
Quality of work–life balance	balanceD	1.09	0.45	–1.30 to 3.48	–1.33	0.12	–2.72 to 0.07	
Opportunities for flexible working	flexworkD	–1.08	0.70	–5.68 to 3.51	–0.22	0.89	–2.93 to 2.48	
% feeling there are good opportunities to develop potential at work	developD	–1.66	0.54	–6.15 to 2.83	0.23	0.89	–2.42 to 2.87	

continued

TABLE 46 Change in NHS staff survey variables and intermediate outcomes (2010) minus (2009) as predictors of MRSA infection rates (2009–2011) (*continued*)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	appraisD	1.16	0.34	–0.86 to 3.18	–0.17	0.82	–1.36 to 1.02	
% having well-structured appraisal reviews within previous 12 months	qualappD	1.89	0.42	–1.99 to 5.78	–0.26	0.85	–2.54 to 2.03	
% with personal development plans agreed within previous 12 months	pdpD	1.04	0.42	–1.08 to 3.15	–0.15	0.84	–1.39 to 1.10	
Support from supervisors	supsupD	2.17	0.14	–0.26 to 4.59	–2.25	0.01	–3.66 to –0.85	
% having had health and safety training in previous 12 months	handsD	1.17	0.57	–2.18 to 4.52	–2.28	0.05	–4.22 to –0.33	
% suffering work related injuries or illness	injuryD	4.87	0.24	–1.90 to 11.65	–4.64	0.05	–8.59 to –0.69	
% suffering work related stress in previous 12 months	stressD	5.22	0.14	–0.52 to 10.95	0.83	0.69	–2.56 to 4.22	
% witnessing potentially harmful errors or near misses in previous month	errorsD	–0.13	0.17	–9.42 to 0.83	0.23	0.06	0.63 to 6.62	
% reporting errors, near misses or incidents witnessed in the last month	reportD	–6.92	0.12	–14.31 to 0.46	2.08	0.43	–2.28 to 6.45	
Fairness and effectiveness of incident reporting	incidentD	2.67	0.30	–1.60 to 6.94	–1.10	0.47	–3.61 to 1.41	
% experiencing physical violence from patients or their relatives in previous 12 months	violpatD	4.21	0.45	–4.89 to 13.31	1.19	0.71	–4.16 to 6.55	
% experiencing physical violence from other staff in previous 12 months	violcolD	–6.89	0.56	–26.09 to 12.31	7.03	0.30	–4.23 to 18.29	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpatD	–0.94	0.82	–7.61 to 5.72	2.64	0.27	–1.27 to 6.54	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcolD	1.61	0.73	–5.95 to 9.17	1.28	0.64	–3.16 to 5.72	
Perceptions of effective action from employer towards violence and harassment	actionD	1.18	0.54	–2.00 to 4.36	–1.08	0.34	–2.94 to 0.79	
% reporting good communication between management and staff	communD	–0.27	0.92	–4.78 to 4.25	–1.51	0.35	–4.15 to 1.13	
% able to contribute towards improvements at work	improveD	–1.12	0.73	–6.51 to 4.28	0.97	0.61	–2.20 to 4.14	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% able to contribute towards improvements at work (scale)	improvesD	0.41	0.83	−2.73 to 3.55	1.01	0.37	−0.84 to 2.85	
Job satisfaction	jobsatD	0.53	0.78	−2.65 to 3.71	−1.21	0.29	−3.07 to 0.65	
Intention to leave job	intleaveD	−2.20	0.07	−4.19 to −0.20	1.10	0.12	−0.07 to 2.28	
Staff recommendation of the trust as a place to work or receive treatment	recomdD	1.60	0.21	−0.48 to 3.67	−0.57	0.44	−1.79 to 0.65	
Motivation at work	engageD	2.13	0.31	−1.32 to 5.58	−0.05	0.97	−2.08 to 1.99	
% receiving equality and diversity training	diversD	0.04	0.97	−1.56 to 1.65	−0.31	0.59	−1.25 to 0.63	
% believing trust provides equal opportunities for career progression or promotion	equalD	7.78	0.04	1.68 to 13.88	−3.71	0.09	−7.30 to −0.11	
% experiencing discrimination at work in last 12 months	discrimD	−3.12	0.47	−10.21 to 3.97	2.34	0.36	−1.83 to 6.50	
Impact of health and well-being on ability to perform work or daily activities	healthD	−0.59	0.79	−4.17 to 2.99	−0.49	0.70	−2.59 to 1.62	
% feeling pressure to attend work when feeling unwell	presentD	−2.26	0.54	−8.35 to 3.84	2.70	0.21	−0.87 to 6.27	
Availability of hand-washing materials	infectD	2.06	0.46	−2.56 to 6.67	−1.99	0.23	−4.69 to 0.72	
Overall engagement	overallD	2.30	0.27	−1.11 to 5.70	−0.14	0.91	−2.15 to 1.87	
Intermediate outcomes								
Turnover (2010_2011)–(2009_2010)	stabD	0.08	0.22	−0.03 to 0.18	−0.06	0.09	−0.12 to 0.00	
Absenteeism (2010_2011)–(2009_2010)	absD	−0.57	0.96	−19.25 to 18.12	1.60	0.81	−9.38 to 12.57	

NHS staff survey variables and intermediate outcomes as predictors of *C. difficile* infection rates

TABLE 47 NHS staff survey variables (2009) as predictors of *C. difficile* infection rates (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% working extra hours	exthrs_09	-31.09	0.24	-74.14 to 11.96	8.27	0.49	-11.61 to 28.16	
	exthrsu_09	-57.53	0.02	-97.21 to -17.85	14.29	0.20	-4.21 to 32.79	
	exthrsp_09	-12.47	0.59	-50.68 to 25.74	4.89	0.65	-12.71 to 22.50	
	shifts_09	-67.35	0.00	-105.98 to -28.73	20.11	0.07	2.06 to 38.15	
	rshifts_09	-80.95	0.00	-121.49 to -40.42	20.43	0.08	1.34 to 39.53	
	nshifts_09	-63.11	0.01	-101.14 to -25.09	18.53	0.09	0.79 to 36.28	
% receiving any training or development in previous 12 months	training_09	-19.58	0.75	-119.65 to 80.49	-6.22	0.82	-52.33 to 39.88	
% receiving job relevant training in previous 12 months	qtrain_09	-32.77	0.38	-94.24 to 28.71	19.44	0.26	-8.83 to 47.72	
% feeling satisfied with quality of work and patient care they are able to deliver	satis_09	34.82	0.20	-9.35 to 78.99	-21.61	0.08	-41.88 to -1.35	
% agreeing their role makes a difference to patients	differ_09	-62.20	0.30	-161.31 to 36.91	12.20	0.66	-33.58 to 57.97	
% feeling valued by colleagues	value_09	9.22	0.82	-58.07 to 76.50	5.48	0.77	-25.51 to 36.47	
% agreeing that they have an interesting job	interest_09	-44.72	0.23	-106.15 to 16.70	27.34	0.11	-0.86 to 55.54	
Quality of job design (clear job content, feedback and staff involvement)	jobdes_09	26.53	0.17	-4.90 to 57.95	-9.68	0.27	-24.18 to 4.83	
Work pressure felt by staff	wkpres_09	-26.70	0.03	-46.83 to -6.57	12.19	0.03	2.92 to 21.47	
% working in a well-structured team environment	team_09	20.06	0.51	-29.50 to 69.63	0.26	0.99	-22.60 to 23.12	
Quality of work–life balance	balance_09	20.74	0.12	-0.97 to 42.44	-10.32	0.09	-20.30 to -0.33	
Opportunities for flexible working	flexwork_09	-46.91	0.19	-105.16 to 11.33	24.44	0.13	-2.35 to 51.23	
% feeling there are good opportunities to develop potential at work	develop_09	-5.45	0.83	-47.04 to 36.15	6.32	0.59	-12.82 to 25.47	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% appraised within previous 12 months	apprais_09	21.96	0.08	1.60 to 42.32	-3.63	0.53	-13.09 to 5.82	
% having well-structured appraisal reviews within previous 12 months	qualapp_09	31.94	0.14	-3.40 to 67.27	-8.16	0.41	-24.51 to 8.19	
% with personal development plans agreed within previous 12 months	pdp_09	21.67	0.10	-0.05 to 43.38	-4.41	0.47	-14.48 to 5.66	
Support from supervisors	supsup_09	23.06	0.12	-1.55 to 47.66	-7.94	0.25	-19.31 to 3.43	
% having had health and safety training in previous 12 months	hands_09	-11.10	0.45	-35.49 to 13.29	7.38	0.28	-3.84 to 18.59	
% suffering work related injuries or illness	injury_09	-74.75	0.12	-153.12 to 3.62	33.24	0.13	-2.88 to 69.36	
% suffering work related stress in previous 12 months	stress_09	12.17	0.75	-50.47 to 74.80	0.32	0.99	-28.55 to 29.18	
% witnessing potentially harmful errors or near misses in previous month	errors_09	4.55	0.87	-42.73 to 51.82	-2.57	0.85	-24.34 to 19.21	
% reporting errors, near misses or incidents witnessed in the last month	report_09	-37.09	0.58	-147.38 to 73.21	2.88	0.93	-47.97 to 53.73	
Fairness and effectiveness of incident reporting	incident_09	19.62	0.28	-10.20 to 49.43	-7.57	0.37	-21.32 to 6.18	
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_09	-80.76	0.12	-166.00 to 4.48	26.32	0.27	-13.09 to 65.73	
% experiencing physical violence from other staff in previous 12 months	violcol_09	27.90	0.82	-174.60 to 230.40	-23.62	0.68	-116.86 to 69.63	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_09	-150.60	0.00	-216.49 to -84.71	58.85	0.00	28.13 to 89.57	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_09	-43.47	0.32	-115.83 to 28.90	4.16	0.84	-29.27 to 37.59	
Perceptions of effective action from employer towards violence and harassment	action_09	4.71	0.75	-20.04 to 29.46	-0.21	0.98	-11.62 to 11.19	

continued

TABLE 47 NHS staff survey variables (2009) as predictors of *C. difficile* infection rates (2009–2011) (continued)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% reporting good communication between management and staff	commun_09	26.09	0.28	–13.88 to 66.07	–14.79	0.19	–33.17 to 3.59	
% agreeing they understand their role and where it fits in	fits_09	12.74	0.47	–16.14 to 41.61	–5.24	0.52	–18.55 to 8.07	
% able to contribute towards improvements at work	improve_09	3.09	0.15	–6.81 to 96.12	–4.24	0.12	–46.21 to 1.14	
% able to contribute towards improvements at work (scale)	improves_09	30.33	0.09	0.76 to 59.90	–11.95	0.15	–25.60 to 1.71	
Job satisfaction	jobsat_09	16.20	0.35	–12.46 to 44.86	–3.80	0.64	–17.03 to 9.43	
Intention to leave job	intleave_09	13.77	0.21	–4.30 to 31.83	–5.58	0.27	–13.92 to 2.75	
Staff recommendation of the trust as a place to work or receive treatment	recomd_09	2.16	0.78	–10.29 to 14.60	–1.87	0.59	–7.60 to 3.86	
Motivation at work	engage_09	2.07	0.91	–26.32 to 30.46	–1.12	0.89	–14.20 to 11.96	
% receiving equality and diversity training	divers_09	9.22	0.29	–5.04 to 23.48	–2.04	0.61	–8.62 to 4.55	
% believing trust provides equal opportunities for career progression or promotion	equal_09	21.21	0.57	–40.13 to 82.55	–0.96	0.96	–29.24 to 27.33	
% experiencing discrimination at work in last 12 months	discrim_09	–65.04	0.28	–162.94 to 32.87	16.31	0.55	–28.90 to 61.53	
Impact of health and well-being on ability to perform work or daily activities	health_09	–17.94	0.44	–56.44 to 20.57	9.24	0.39	–8.50 to 26.97	
% feeling pressure to attend work when feeling unwell	present_09	–11.04	0.78	–76.72 to 54.64	8.96	0.63	–21.28 to 39.20	
Availability of hand-washing materials	infect_09	2.79	0.89	–29.35 to 34.94	4.64	0.61	–10.16 to 19.43	
Overall engagement	overall_09	9.42	0.51	–14.01 to 32.85	–5.03	0.44	–15.81 to 5.76	
Intermediate outcomes								
Turnover (2009_2010)	Stab. 09_10	0.33	0.53	–0.54 to 1.21	0.13	0.60	–0.27 to 0.53	
Absenteeism (2009_2010)	Abs. 09_10	40.93	0.74	–164.79 to 246.64	–15.07	0.79	–109.97 to 79.83	

TABLE 48 Change in NHS staff survey variables and Intermediate outcomes (2010) minus (2009) as predictors of *C. difficile* infection rates (2009–2011)

Key finding	Variable	Intercept			Slope			Controls not included	
		Estimate	Significance	95% CI	Estimate	Significance	95% CI		
% working extra hours	exthrsD	25.48	0.42	–26.14 to 77.11	–9.17	0.53	–32.97 to 14.63	Foundation status	
	exthrsuD	59.74	0.04	11.88 to 107.61	–15.66	0.25	–37.90 to 6.58		
	exthrspD	–7.79	0.79	–55.65 to 40.08	–3.17	0.81	–25.21 to 18.88		
	shiftsD	262.73	0.00	123.27 to 402.19	–89.55	0.02	–151.68 to –27.41		
	rshiftsD	175.90	0.11	–7.38 to 359.17	–76.36	0.09	–149.38 to –3.34		Foundation status
	nshiftsD	287.86	0.00	131.10 to 444.62	–81.89	0.07	–155.66 to –8.11		
% receiving any training or development in previous 12 months	trainingD	–17.92	0.78	–124.82 to 88.98	26.38	0.38	–22.75 to 75.52		
% receiving job relevant training in previous 12 months	qtrainD	47.84	0.15	–21.41 to 0.17	–7.43	103.11	–46.88 to 4.06		
% feeling satisfied with quality of work and patient care they are able to deliver	satisD	53.44	0.06	6.89 to 100.00	–15.78	0.23	–37.37 to 5.80		
% agreeing their role makes a difference to patients	differD	105.67	0.05	16.81 to 194.54	–48.28	0.05	–89.22 to –7.34		
% feeling valued by colleagues	valueD	21.83	0.57	–41.28 to 84.93	–14.51	0.41	–43.55 to 14.52		
Quality of job design (clear job content, feedback and staff involvement)	jobdesD	–3.22	0.88	–38.76 to 32.33	–10.93	0.27	–27.24 to 5.39		
Work pressure felt by staff	wkpresD	–23.07	0.13	–47.91 to 1.77	7.91	0.26	–3.57 to 19.39		
% working in a well-structured team environment	teamD	14.20	0.53	–22.72 to 51.12	–11.97	0.25	–28.93 to 4.99		
Quality of work–life balance	balanceD	20.79	0.15	–3.20 to 44.78	–6.07	0.37	–17.16 to 5.03		
Opportunities for flexible working	flexworkD	44.97	0.11	–1.22 to 91.15	–6.72	0.61	–28.15 to 14.70		
% feeling there are good opportunities to develop potential at work	developD	56.09	0.04	11.05 to 101.13	–26.42	0.04	–47.16 to –5.69		
% appraised within previous 12 months	appraisD	–27.06	0.03	–47.27 to –6.85	5.06	0.38	–4.37 to 14.48		

continued

TABLE 48 Change in NHS staff survey variables and Intermediate outcomes (2010) minus (2009) as predictors of *C. difficile* infection rates (2009–2011) (continued)

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% having well-structured appraisal reviews within previous 12 months	qualappD	-8.41	0.73	-47.95 to 31.14	-3.98	0.72	-22.19 to 14.24	
% with personal development plans agreed within previous 12 months	pdpD	-28.49	0.03	-49.69 to -7.29	5.56	0.36	-4.32 to 15.45	
Support from supervisors	supsupD	-3.40	0.82	-28.16 to 21.36	-2.81	0.69	-14.21 to 8.59	
% having had health and safety training in previous 12 months	handsD	-22.15	0.28	-55.75 to 11.46	6.17	0.51	-9.34 to 21.68	
% suffering work related injuries or illness	injuryD	18.34	0.66	-50.52 to 87.21	-10.63	0.58	-42.34 to 21.08	
% suffering work related stress in previous 12 months	stressD	-7.83	0.83	-66.40 to 50.74	-9.45	0.56	-36.41 to 17.50	
% witnessing potentially harmful errors or near misses in previous month	errorsD	17.28	0.59	-34.82 to 69.37	-17.27	0.24	-41.18 to 6.65	
% reporting errors, near misses or incidents witnessed in the last month	reportD	58.69	0.20	-16.71 to 134.09	-22.98	0.28	-57.76 to 11.80	
Fairness and effectiveness of incident reporting	incidentD	26.22	0.32	-16.97 to 69.41	-23.56	0.05	-43.28 to -3.83	
% experiencing physical violence from patients or their relatives in previous 12 months	violpatD	121.65	0.03	31.26 to 212.05	-33.04	0.20	-75.08 to 9.01	
% experiencing physical violence from other staff in previous 12 months	violcolD	-18.53	0.88	-213.31 to 176.26	40.31	0.46	-49.27 to 129.89	
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpatD	112.40	0.01	46.70 to 178.10	-42.21	0.02	-72.72 to -11.70	
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcolD	54.72	0.24	-21.73 to 131.17	-9.87	0.65	-45.21 to 25.47	
Perceptions of effective action from employer towards violence and harassment	actionD	15.63	0.42	-16.52 to 47.78	-11.47	0.20	-26.23 to 3.30	
% reporting good communication between management and staff	communD	-5.84	0.83	-51.49 to 39.82	-6.84	0.59	-27.85 to 14.18	
% able to contribute towards improvements at work	improvedD	0.43	0.99	-54.03 to 54.89	-15.57	0.31	-40.58 to 9.43	

Key finding	Variable	Intercept			Slope			Controls not included
		Estimate	Significance	95% CI	Estimate	Significance	95% CI	
% able to contribute towards improvements at work (scale)	improvesD	2.14	0.91	−29.43 to 33.70	−9.65	0.27	−24.14 to 4.84	
Job satisfaction	jobsatD	8.24	0.68	−24.08 to 40.55	−8.74	0.33	−23.59 to 6.12	
Intention to leave job	intleaveD	−23.92	0.05	−44.08 to −3.76	6.95	0.22	−2.41 to 16.30	
Staff recommendation of the trust as a place to work or receive treatment	recomdD	24.18	0.06	3.26 to 45.10	−6.88	0.24	−16.58 to 2.82	
Motivation at work	engageD	46.52	0.03	11.74 to 81.30	−13.17	0.18	−29.34 to 3.00	
% receiving equality and diversity training	diversD	−4.12	0.68	−20.46 to 12.21	−0.77	0.87	−8.30 to 6.76	
% believing trust provides equal opportunities for career progression or promotion	equalD	−23.83	0.53	−86.34 to 38.68	−0.85	0.96	−29.68 to 27.98	
% experiencing discrimination at work in last 12 months	discrimD	63.78	0.14	−7.98 to 135.55	−20.71	0.30	−53.87 to 12.46	
Impact of health and well-being on ability to perform work or daily activities	healthD	−2.22	0.92	−38.40 to 33.96	−3.89	0.70	−20.55 to 12.77	
% feeling pressure to attend work when feeling unwell	presentD	−45.36	0.23	−107.04 to 16.33	17.17	0.32	−11.29 to 45.62	
Availability of hand-washing materials	infectD	7.42	0.79	−38.97 to 53.81	−3.73	0.77	−25.10 to 17.64	
Overall engagement	overallD	37.02	0.08	2.62 to 71.41	−14.21	0.14	−30.10 to 1.68	
Intermediate outcomes								
Turnover (2010_2011)–(2009_2010)	stabD	0.16	0.80	−0.89 to 1.21	−0.23	0.45	−0.71 to 0.26	
Absenteeism (2010_2011)–(2009_2010)	absD	41.72	0.72	−147.45 to 230.90	−3.85	0.94	−91.03 to 83.32	

Appendix 6 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and trust outcomes (2010–11 and 2011–12)

TABLE 49 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient mortality rates (SHMI, 2010–11 and 2011–12)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Employer action towards violence and harassment	action_10	action_11	Mort. 10_11	Mort. 11_12	-0.10	-0.12	0.30	0.76
% appraised within previous 12 months	apprais_10	apprais_11	Mort. 10_11	Mort. 11_12	0.01	-0.05	0.67	0.50
Quality of work–life balance	balance_10	balance_11	Mort. 10_11	Mort. 11_12	-0.24	-0.27	0.40	0.69
% reporting good communication between management and staff	commun_10	commun_11	Mort. 10_11	Mort. 11_12	-0.39	-0.33	-0.74	0.46
% feeling there are good opportunities to develop potential at work	develop_10	develop_11	Mort. 10_11	Mort. 11_12	-0.32	-0.29	-0.36	0.72
% agreeing their role makes a difference to patients	differ_10	differ_11	Mort. 10_11	Mort. 11_12	-0.24	-0.23	-0.08	0.94
% experiencing discrimination at work	discrim_10	discrim_11	Mort. 10_11	Mort. 11_12	-0.33	-0.26	-1.01	0.31
% receiving equality and diversity training	divers_10	divers_11	Mort. 10_11	Mort. 11_12	-0.14	-0.07	-0.88	0.38
Staff motivation at work	engage_10	engage_11	Mort. 10_11	Mort. 11_12	-0.19	-0.18	-0.09	0.93
% believing that trust provides equal opportunities for career progression or promotion	equal_10	equal_11	Mort. 10_11	Mort. 11_12	0.30	0.27	0.38	0.71
% witnessing potentially harmful errors or near misses in previous month	errors_10	errors_11	Mort. 10_11	Mort. 11_12	-0.25	-0.18	-0.77	0.44
% staff working extra hours	exthrs_10	exthrs_11	Mort. 10_11	Mort. 11_12	-0.23	-0.24	0.05	0.96
Opportunities for flexible working	flexwork_10	flexwork_11	Mort. 10_11	Mort. 11_12	0.24	-0.02	2.83	0.00
% having had health and safety training in previous 12 months	hands_10	hands_11	Mort. 10_11	Mort. 11_12	0.19	0.20	-0.11	0.91
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_10	harcol_11	Mort. 10_11	Mort. 11_12	-0.14	-0.14	0.09	0.93

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_10	harpat_11	Mort. 10_11	Mort. 11_12	0.00	-0.04	0.39	0.69
Impact of health and well-being on ability to perform work or daily activities	health_10	health_11	Mort. 10_11	Mort. 11_12	-0.12	-0.15	0.32	0.75
% able to contribute towards improvements at work	improve_10	improve_11	Mort. 10_11	Mort. 11_12	-0.32	-0.32	-0.02	0.98
Fairness and effectiveness of incident reporting	incident_10	incident_11	Mort. 10_11	Mort. 11_12	-0.18	-0.18	0.00	1.00
Availability of hand-washing materials	infect_10	infect_11	Mort. 10_11	Mort. 11_12	0.27	0.33	-0.89	0.37
% suffering work related injuries or illness	injury_10	injury_11	Mort. 10_11	Mort. 11_12	0.01	0.08	-0.71	0.48
Intention to leave job	intleave_10	intleave_11	Mort. 10_11	Mort. 11_12	-0.01	-0.07	0.72	0.47
Quality of job design (clear job content, feedback and staff involvement)	jobdes_10	jobdes_11	Mort. 10_11	Mort. 11_12	-0.29	-0.32	0.41	0.68
Job satisfaction	jobsat_10	jobsat_11	Mort. 10_11	Mort. 11_12	-0.15	-0.21	0.62	0.53
Overall engagement	overall_10	overall_11	Mort. 10_11	Mort. 11_12	-0.38	-0.33	-0.69	0.49
% staff with personal development plans agreed within previous 12 months	pdp_10	pdp_11	Mort. 10_11	Mort. 11_12	0.00	-0.11	1.29	0.20
% feeling pressure to attend work when feeling unwell	present_10	present_11	Mort. 10_11	Mort. 11_12	0.20	0.22	-0.22	0.82
% receiving job relevant training in previous 12 months	qtrain_10	qtrain_11	Mort. 10_11	Mort. 11_12	-0.28	-0.19	-0.93	0.35
% having well-structured appraisal reviews within previous 12 months	qualapp_10	qualapp_11	Mort. 10_11	Mort. 11_12	-0.24	-0.36	1.42	0.16

continued

TABLE 49 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient mortality rates (SHMI, 2010–11 and 2011–12) (*continued*)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Staff recommendation of the trust as a place to work or receive treatment	recomd_10	recomd_11	Mort. 10_11	Mort. 11_12	−0.42	−0.36	−0.88	0.38
% reporting errors, near misses or incidents witnessed in the last month	report_10	report_11	Mort. 10_11	Mort. 11_12	0.02	−0.09	0.95	0.34
% feeling satisfied with quality of work and patient care they are able to deliver	satis_10	satis_11	Mort. 10_11	Mort. 11_12	−0.25	−0.27	0.14	0.89
% suffering work related stress in previous 12 months	stress_10	stress_11	Mort. 10_11	Mort. 11_12	−0.08	−0.02	−0.70	0.48
Support from supervisors	supsup_10	supsup_11	Mort. 10_11	Mort. 11_12	−0.16	−0.23	0.74	0.46
% working in a well-structured team environment	team_10	team_11	Mort. 10_11	Mort. 11_12	−0.01	−0.12	1.30	0.19
% feeling valued by colleagues	value_10	value_11	Mort. 10_11	Mort. 11_12	0.06	−0.04	1.14	0.25
% experiencing physical violence from other staff in previous 12 months	violcol_10	violcol_11	Mort. 10_11	Mort. 11_12	−0.14	−0.09	−0.44	0.66
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_10	violpat_11	Mort. 10_11	Mort. 11_12	0.18	0.14	0.45	0.65
Work pressure felt by staff	wkpres_10	wkpres_11	Mort. 10_11	Mort. 11_12	0.17	0.15	0.24	0.81
Turnover	Stab. 10_11	Stab. 11_12	Mort. 10_11	Mort. 11_12	0.37	0.22	1.61	0.11
Absenteeism	Abs. 10_11	Abs. 11_12	Mort. 10_11	Mort. 11_12	0.45	0.32	2.05	0.04

TABLE 50 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient satisfaction (2010 and 2011)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Employer action towards violence and harassment	action_10	action_11	Patient satisfaction. 10	Patient satisfaction. 11	0.42	0.51	-1.13	0.26
% appraised within previous 12 months	apprais_10	apprais_11	Patient satisfaction. 10	Patient satisfaction. 11	0.10	0.10	-0.06	0.95
Quality of work-life balance	balance_10	balance_11	Patient satisfaction. 10	Patient satisfaction. 11	0.23	0.35	-1.71	0.09
% reporting good communication between management and staff	commun_10	commun_11	Patient satisfaction. 10	Patient satisfaction. 11	0.34	0.37	-0.47	0.64
% feeling there are good opportunities to develop potential at work	develop_10	develop_11	Patient satisfaction. 10	Patient satisfaction. 11	0.19	0.30	-1.65	0.10
% agreeing their role makes a difference to patients	differ_10	differ_11	Patient satisfaction. 10	Patient satisfaction. 11	0.15	0.12	0.41	0.68
% experiencing discrimination at work	discrim_10	discrim_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.45	-0.64	2.64	0.01
% receiving equality and diversity training	divers_10	divers_11	Patient satisfaction. 10	Patient satisfaction. 11	0.13	0.20	-0.96	0.34
Staff motivation at work	engage_10	engage_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.05	0.08	-1.66	0.10
% believing that trust provides equal opportunities for career progression or promotion	equal_10	equal_11	Patient satisfaction. 10	Patient satisfaction. 11	0.43	0.57	-1.99	0.05
% witnessing potentially harmful errors or near misses in previous month	errors_10	errors_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.34	-0.31	-0.36	0.72
% staff working extra hours	exthrs_10	exthrs_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.21	-0.13	-1.23	0.22

continued

TABLE 50 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient satisfaction (2010 and 2011) (*continued*)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Opportunities for flexible working	flexwork_10	flexwork_11	Patient satisfaction. 10	Patient satisfaction. 11	0.07	0.28	-2.45	0.01
% having had health and safety training in previous 12 months	hands_10	hands_11	Patient satisfaction. 10	Patient satisfaction. 11	0.30	0.32	-0.35	0.73
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_10	harcol_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.26	-0.40	1.71	0.09
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_10	harpat_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.68	-0.81	1.51	0.13
Impact of health and well-being on ability to perform work or daily activities	health_10	health_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.27	-0.33	0.61	0.54
% able to contribute towards improvements at work	improve_10	improve_11	Patient satisfaction. 10	Patient satisfaction. 11	0.19	0.22	-0.36	0.72
Fairness and effectiveness of incident reporting	incident_10	incident_11	Patient satisfaction. 10	Patient satisfaction. 11	0.43	0.47	-0.70	0.48
Availability of hand-washing materials	infect_10	infect_11	Patient satisfaction. 10	Patient satisfaction. 11	0.32	0.42	-1.58	0.11
% suffering work related injuries or illness	injury_10	injury_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.30	-0.30	0.01	0.99
Intention to leave job	intleave_10	intleave_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.37	-0.49	1.61	0.11
Quality of job design (clear job content, feedback and staff involvement)	jobdes_10	jobdes_11	Patient satisfaction. 10	Patient satisfaction. 11	0.10	0.28	-2.43	0.02
Job satisfaction	jobsat_10	jobsat_11	Patient satisfaction. 10	Patient satisfaction. 11	0.29	0.39	-1.31	0.19

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Overall engagement	overall_10	overall_11	Patient satisfaction. 10	Patient satisfaction. 11	0.45	0.52	-0.93	0.35
% staff with personal development plans agreed within previous 12 months	pdp_10	pdp_11	Patient satisfaction. 10	Patient satisfaction. 11	0.06	0.12	-0.73	0.47
% feeling pressure to attend work when feeling unwell	present_10	present_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.17	-0.27	1.26	0.21
% receiving job relevant training in previous 12 months	qtrain_10	qtrain_11	Patient satisfaction. 10	Patient satisfaction. 11	0.08	0.06	0.22	0.83
% having well-structured appraisal reviews within previous 12 months	qualapp_10	qualapp_11	Patient satisfaction. 10	Patient satisfaction. 11	0.05	0.07	-0.29	0.77
Staff recommendation of the trust as a place to work or receive treatment	recomd_10	recomd_11	Patient satisfaction. 10	Patient satisfaction. 11	0.66	0.68	-0.43	0.67
% reporting errors, near misses or incidents witnessed in the last month	report_10	report_11	Patient satisfaction. 10	Patient satisfaction. 11	0.19	0.07	1.09	0.28
% feeling satisfied with quality of work and patient care they are able to deliver	satis_10	satis_11	Patient satisfaction. 10	Patient satisfaction. 11	0.25	0.33	-1.03	0.30
% suffering work related stress in previous 12 months	stress_10	stress_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.33	-0.41	0.86	0.39
Support from supervisors	supsup_10	supsup_11	Patient satisfaction. 10	Patient satisfaction. 11	0.14	0.30	-1.86	0.06
% working in a well-structured team environment	team_10	team_11	Patient satisfaction. 10	Patient satisfaction. 11	0.23	0.30	-0.79	0.43
% feeling valued by colleagues	value_10	value_11	Patient satisfaction. 10	Patient satisfaction. 11	0.24	0.27	-0.40	0.69
								continued

TABLE 50 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and patient satisfaction (2010 and 2011) (*continued*)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% experiencing physical violence from other staff in previous 12 months	violcol_10	violcol_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.23	-0.27	0.39	0.70
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_10	violpat_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.37	-0.35	-0.28	0.78
Work pressure felt by staff	wkpres_10	wkpres_11	Patient satisfaction. 10	Patient satisfaction. 11	-0.39	-0.50	1.48	0.14
Turnover	Stab. 10_11	Stab. 11_12	Patient satisfaction. 10	Patient satisfaction. 11	0.39	0.42	-0.54	0.59
Absenteeism	Abs. 10_11	Abs. 11_12	Patient satisfaction. 10	Patient satisfaction. 11	0.06	0.00	1.08	0.28

TABLE 51 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and MRSA infection rates (2010–11 and 2011–12)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Employer action towards violence and harassment	action_10	action_11	MRSA 10_11	MRSA 11_12	0.17	0.00	1.84	0.07
% appraised within previous 12 months	apprais_10	apprais_11	MRSA 10_11	MRSA 11_12	0.19	0.02	1.77	0.08
Quality of work–life balance	balance_10	balance_11	MRSA 10_11	MRSA 11_12	0.09	0.03	0.65	0.52
% reporting good communication between management and staff	commun_10	commun_11	MRSA 10_11	MRSA 11_12	0.22	0.13	1.07	0.28
% feeling there are good opportunities to develop potential at work	develop_10	develop_11	MRSA 10_11	MRSA 11_12	0.16	0.11	0.44	0.66
% agreeing their role makes a difference to patients	differ_10	differ_11	MRSA 10_11	MRSA 11_12	0.04	0.06	−0.18	0.86
% experiencing discrimination at work	discrim_10	discrim_11	MRSA 10_11	MRSA 11_12	0.09	0.16	−0.82	0.41
% receiving equality and diversity training	divers_10	divers_11	MRSA 10_11	MRSA 11_12	0.01	−0.14	1.69	0.09
Staff motivation at work	engage_10	engage_11	MRSA 10_11	MRSA 11_12	0.10	0.08	0.18	0.86
% believing that trust provides equal opportunities for career progression or promotion	equal_10	equal_11	MRSA 10_11	MRSA 11_12	−0.11	−0.15	0.46	0.65
% witnessing potentially harmful errors or near misses in previous month	errors_10	errors_11	MRSA 10_11	MRSA 11_12	0.12	0.16	−0.45	0.65
% staff working extra hours	exthrs_10	exthrs_11	MRSA 10_11	MRSA 11_12	0.02	0.13	−1.11	0.27
Opportunities for flexible working	flexwork_10	flexwork_11	MRSA 10_11	MRSA 11_12	−0.13	−0.12	−0.09	0.93
% having had health and safety training in previous 12 months	hands_10	hands_11	MRSA 10_11	MRSA 11_12	−0.08	−0.22	1.60	0.11

continued

TABLE 51 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and MRSA infection rates (2010–11 and 2011–12) (*continued*)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_10	harcol_11	MRSA 10_11	MRSA 11_12	0.03	0.05	-0.21	0.84
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_10	harpat_11	MRSA 10_11	MRSA 11_12	-0.14	0.12	-2.74	0.01
Impact of health and well-being on ability to perform work or daily activities	health_10	health_11	MRSA 10_11	MRSA 11_12	-0.08	0.07	-1.46	0.14
% able to contribute towards improvements at work	improve_10	improve_11	MRSA 10_11	MRSA 11_12	0.13	0.13	0.03	0.98
Fairness and effectiveness of incident reporting	incident_10	incident_11	MRSA 10_11	MRSA 11_12	0.16	0.03	1.47	0.14
Availability of hand-washing materials	infect_10	infect_11	MRSA 10_11	MRSA 11_12	-0.11	-0.25	1.61	0.11
% suffering work related injuries or illness	injury_10	injury_11	MRSA 10_11	MRSA 11_12	-0.05	0.03	-0.78	0.43
Intention to leave job	intleave_10	intleave_11	MRSA 10_11	MRSA 11_12	0.07	0.17	-0.97	0.33
Quality of job design (clear job content, feedback and staff involvement)	jobdes_10	jobdes_11	MRSA 10_11	MRSA 11_12	0.18	0.08	1.07	0.29
Job satisfaction	jobsat_10	jobsat_11	MRSA 10_11	MRSA 11_12	0.07	0.02	0.59	0.55
Overall engagement	overall_10	overall_11	MRSA 10_11	MRSA 11_12	0.20	0.05	1.59	0.11
% staff with personal development plans agreed within previous 12 months	pdp_10	pdp_11	MRSA 10_11	MRSA 11_12	0.21	0.08	1.31	0.19
% feeling pressure to attend work when feeling unwell	present_10	present_11	MRSA 10_11	MRSA 11_12	0.03	0.03	-0.02	0.99
% receiving job relevant training in previous 12 months	qtrain_10	qtrain_11	MRSA 10_11	MRSA 11_12	0.03	0.08	-0.51	0.61

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% having well-structured appraisal reviews within previous 12 months	qualapp_10	qualapp_11	MRSA 10_11	MRSA 11_12	0.23	0.16	0.80	0.43
Staff recommendation of the trust as a place to work or receive treatment	recomd_10	recomd_11	MRSA 10_11	MRSA 11_12	0.19	0.01	2.02	0.04
% reporting errors, near misses or incidents witnessed in the last month	report_10	report_11	MRSA 10_11	MRSA 11_12	0.05	0.02	0.27	0.79
% feeling satisfied with quality of work and patient care they are able to deliver	satis_10	satis_11	MRSA 10_11	MRSA 11_12	0.16	0.18	-0.18	0.86
% suffering work related stress in previous 12 months	stress_10	stress_11	MRSA 10_11	MRSA 11_12	0.07	0.09	-0.24	0.81
Support from supervisors	supsup_10	supsup_11	MRSA 10_11	MRSA 11_12	0.02	0.04	-0.24	0.81
% working in a well-structured team environment	team_10	team_11	MRSA 10_11	MRSA 11_12	0.03	-0.02	0.44	0.66
% feeling valued by colleagues	value_10	value_11	MRSA 10_11	MRSA 11_12	0.02	0.01	0.06	0.95
% experiencing physical violence from other staff in previous 12 months	violcol_10	violcol_11	MRSA 10_11	MRSA 11_12	0.08	0.09	-0.13	0.90
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_10	violpat_11	MRSA 10_11	MRSA 11_12	-0.10	0.00	-1.12	0.26
Work pressure felt by staff	wkpres_10	wkpres_11	MRSA 10_11	MRSA 11_12	-0.15	-0.03	-1.33	0.18
Turnover	Stab. 10_11	Stab. 11_12	MRSA 10_11	MRSA 11_12	-0.05	-0.02	-0.37	0.71
Absenteeism	Abs. 10_11	Abs. 11_12	MRSA 10_11	MRSA 11_12	-0.06	-0.14	0.95	0.34

TABLE 52 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and *C. difficile* infection rates (2010–11 and 2011–12)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Employer action towards violence and harassment	action_10	action_11	C.diff 10_11	C.diff 11_12	-0.07	0.03	-1.24	0.21
% appraised within previous 12 months	apprais_10	apprais_11	C.diff 10_11	C.diff 11_12	-0.04	0.05	-0.96	0.34
Quality of work–life balance	balance_10	balance_11	C.diff 10_11	C.diff 11_12	-0.07	0.01	-0.91	0.36
% reporting good communication between management and staff	commun_10	commun_11	C.diff 10_11	C.diff 11_12	-0.21	0.02	-2.81	0.00
% feeling there are good opportunities to develop potential at work	develop_10	develop_11	C.diff 10_11	C.diff 11_12	-0.05	0.05	-1.28	0.20
% agreeing their role makes a difference to patients	differ_10	differ_11	C.diff 10_11	C.diff 11_12	-0.08	0.11	-1.95	0.05
% experiencing discrimination at work	discrim_10	discrim_11	C.diff 10_11	C.diff 11_12	0.05	0.00	0.62	0.54
% receiving equality and diversity training	divers_10	divers_11	C.diff 10_11	C.diff 11_12	0.00	0.01	-0.22	0.83
Staff motivation at work	engage_10	engage_11	C.diff 10_11	C.diff 11_12	0.00	-0.03	0.37	0.71
% believing that trust provides equal opportunities for career progression or promotion	equal_10	equal_11	C.diff 10_11	C.diff 11_12	-0.04	-0.01	-0.36	0.72
% witnessing potentially harmful errors or near misses in previous month	errors_10	errors_11	C.diff 10_11	C.diff 11_12	0.03	0.19	-1.79	0.07
% staff working extra hours	exthrs_10	exthrs_11	C.diff 10_11	C.diff 11_12	-0.09	0.00	-0.98	0.33
Opportunities for flexible working	flexwork_10	flexwork_11	C.diff 10_11	C.diff 11_12	0.07	-0.08	1.66	0.10
% having had health and safety training in previous 12 months	hands_10	hands_11	C.diff 10_11	C.diff 11_12	-0.04	-0.11	0.86	0.39
% experiencing harassment, bullying or abuse from other staff in previous 12 months	harcol_10	harcol_11	C.diff 10_11	C.diff 11_12	0.01	-0.04	0.52	0.61

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
% experiencing harassment, bullying or abuse from patients or their relatives in previous 12 months	harpat_10	harpat_11	C.diff 10_11	C.diff 11_12	0.13	0.02	1.24	0.21
Impact of health and well-being on ability to perform work or daily activities	health_10	health_11	C.diff 10_11	C.diff 11_12	-0.02	0.02	-0.34	0.74
% able to contribute towards improvements at work	improve_10	improve_11	C.diff 10_11	C.diff 11_12	-0.20	-0.02	-1.96	0.05
Fairness and effectiveness of incident reporting	incident_10	incident_11	C.diff 10_11	C.diff 11_12	-0.13	0.07	-2.45	0.01
Availability of hand-washing materials	infect_10	infect_11	C.diff 10_11	C.diff 11_12	0.02	0.01	0.23	0.82
% suffering work related injuries or illness	injury_10	injury_11	C.diff 10_11	C.diff 11_12	0.07	0.04	0.33	0.74
Intention to leave job	intleave_10	intleave_11	C.diff 10_11	C.diff 11_12	0.00	-0.06	0.67	0.50
Quality of job design (clear job content, feedback and staff involvement)	jobdes_10	jobdes_11	C.diff 10_11	C.diff 11_12	-0.17	0.05	-2.46	0.01
Job satisfaction	jobsat_10	jobsat_11	C.diff 10_11	C.diff 11_12	-0.10	0.03	-1.44	0.15
Overall engagement	overall_10	overall_11	C.diff 10_11	C.diff 11_12	-0.14	-0.02	-1.57	0.12
% staff with personal development plans agreed within previous 12 months	pdp_10	pdp_11	C.diff 10_11	C.diff 11_12	-0.08	0.04	-1.32	0.19
% feeling pressure to attend work when feeling unwell	present_10	present_11	C.diff 10_11	C.diff 11_12	0.05	-0.01	0.66	0.51
% receiving job relevant training in previous 12 months	qtrain_10	qtrain_11	C.diff 10_11	C.diff 11_12	-0.02	0.09	-1.14	0.25
% having well-structured appraisal reviews within previous 12 months	qualapp_10	qualapp_11	C.diff 10_11	C.diff 11_12	-0.06	0.02	-0.85	0.40

continued

TABLE 52 Cross-lagged correlations between NHS staff survey variables and intermediate outcomes (2010 and 2011) and *C. difficile* infection rates (2010–11 and 2011–12) (continued)

Staff survey variable	Staff experience variable name at time 1	Staff experience variable name at time 2	Absenteeism variable name at time 1	Absenteeism variable name at time 2	Correlation between staff experience at time 1 and absenteeism at time 2	Correlation between absenteeism at time 1 and staff experience at time 2	z-value	p-value
Staff recommendation of the trust as a place to work or receive treatment	recomd_10	recomd_11	C.diff 10_11	C.diff 11_12	-0.15	-0.02	-1.72	0.09
% reporting errors, near misses or incidents witnessed in the last month	report_10	report_11	C.diff 10_11	C.diff 11_12	-0.09	0.04	-1.14	0.25
% feeling satisfied with quality of work and patient care they are able to deliver	satis_10	satis_11	C.diff 10_11	C.diff 11_12	-0.07	-0.01	-0.68	0.49
% suffering work related stress in previous 12 months	stress_10	stress_11	C.diff 10_11	C.diff 11_12	0.00	-0.05	0.48	0.63
Support from supervisors	supsup_10	supsup_11	C.diff 10_11	C.diff 11_12	-0.10	0.07	-1.83	0.07
% working in a well-structured team environment	team_10	team_11	C.diff 10_11	C.diff 11_12	-0.08	0.04	-1.27	0.20
% feeling valued by colleagues	value_10	value_11	C.diff 10_11	C.diff 11_12	-0.06	0.08	-1.48	0.14
% experiencing physical violence from other staff in previous 12 months	violcol_10	violcol_11	C.diff 10_11	C.diff 11_12	0.06	0.07	-0.07	0.94
% experiencing physical violence from patients or their relatives in previous 12 months	violpat_10	violpat_11	C.diff 10_11	C.diff 11_12	0.22	0.16	0.67	0.50
Work pressure felt by staff	wkpres_10	wkpres_11	C.diff 10_11	C.diff 11_12	0.04	-0.03	0.95	0.34
Turnover	Stab. 10_11	Stab. 11_12	C.diff 10_11	C.diff 11_12	0.11	0.11	0.02	0.98
Absenteeism	Abs. 10_11	Abs. 11_12	C.diff 10_11	C.diff 11_12	0.03	0.19	-2.12	0.03

Appendix 7 Regression analysis of intermediate and trust outcomes on key findings 2010: breakdown by demographic groups

TABLE 53 Breakdown by age

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	16–20	0.85	0.00	–0.05	0.11	0.53	0.01	–0.09	0.09
Job satisfaction	Absenteeism	21–30	0.86	0.00	0.00	0.97	0.52	0.00	0.04	0.49
Job satisfaction	Absenteeism	31–40	0.86	0.00	–0.01	0.85	0.53	0.01	–0.09	0.11
Job satisfaction	Absenteeism	41–50	0.86	0.00	–0.05	0.13	0.55	0.03	–0.18	0.00
Job satisfaction	Absenteeism	51–65	0.86	0.00	–0.02	0.47	0.53	0.01	–0.10	0.07
Job satisfaction	Absenteeism	66+	0.87	0.00	–0.04	0.17	0.53	0.02	–0.14	0.01
Motivation	Absenteeism	16–20	0.85	0.01	–0.08	0.02	0.54	0.02	–0.14	0.01
Motivation	Absenteeism	21–30	0.86	0.00	0.00	0.98	0.52	0.00	–0.01	0.78
Motivation	Absenteeism	31–40	0.86	0.00	0.01	0.84	0.52	0.00	–0.05	0.28
Motivation	Absenteeism	41–50	0.86	0.00	–0.04	0.21	0.55	0.03	–0.19	0.00
Motivation	Absenteeism	51–65	0.86	0.00	0.02	0.45	0.52	0.00	–0.08	0.15
Motivation	Absenteeism	66+	0.87	0.00	–0.05	0.07	0.52	0.01	–0.10	0.05
Intention to leave job	Absenteeism	16–20	0.85	0.00	0.07	0.02	0.53	0.01	0.08	0.13
Intention to leave job	Absenteeism	21–30	0.86	0.00	–0.01	0.82	0.52	0.00	–0.02	0.63
Intention to leave job	Absenteeism	31–40	0.86	0.00	0.02	0.37	0.52	0.00	0.07	0.17
Intention to leave job	Absenteeism	41–50	0.86	0.00	0.05	0.07	0.53	0.01	0.13	0.01
Intention to leave job	Absenteeism	51–65	0.86	0.00	0.00	0.94	0.52	0.00	0.00	0.95
Intention to leave job	Absenteeism	66+	0.86	0.00	0.02	0.58	0.52	0.00	0.06	0.27
Engagement	Absenteeism	16–20	0.85	0.00	–0.06	0.05	0.55	0.02	–0.16	0.00
Engagement	Absenteeism	21–30	0.86	0.00	–0.01	0.63	0.52	0.00	–0.02	0.72
Engagement	Absenteeism	31–40	0.86	0.00	–0.01	0.70	0.53	0.01	–0.08	0.12
Engagement	Absenteeism	41–50	0.86	0.00	–0.05	0.14	0.54	0.03	–0.19	0.00

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Absenteeism	51–65	0.86	0.00	–0.01	0.75	0.53	0.01	–0.13	0.02
Engagement	Absenteeism	66+	0.87	0.00	–0.04	0.16	0.53	0.01	–0.12	0.01
Advocacy	Absenteeism	16–20	0.85	0.00	–0.04	0.19	0.54	0.02	–0.14	0.01
Advocacy	Absenteeism	21–30	0.86	0.00	–0.02	0.53	0.52	0.00	–0.05	0.37
Advocacy	Absenteeism	31–40	0.86	0.00	–0.04	0.27	0.53	0.01	–0.10	0.09
Advocacy	Absenteeism	41–50	0.86	0.00	–0.06	0.07	0.53	0.01	–0.15	0.01
Advocacy	Absenteeism	51–65	0.86	0.00	–0.03	0.41	0.53	0.01	–0.11	0.08
Advocacy	Absenteeism	66+	0.87	0.00	–0.04	0.13	0.53	0.01	–0.11	0.03
Involvement	Absenteeism	16–20	0.84	0.00	–0.03	0.29	0.54	0.01	–0.13	0.02
Involvement	Absenteeism	21–30	0.86	0.00	–0.02	0.59	0.52	0.00	0.03	0.59
Involvement	Absenteeism	31–40	0.86	0.00	0.02	0.48	0.52	0.00	–0.04	0.41
Involvement	Absenteeism	41–50	0.86	0.00	0.00	0.92	0.54	0.02	–0.17	0.00
Involvement	Absenteeism	51–65	0.86	0.00	0.00	0.99	0.53	0.01	–0.13	0.02
Involvement	Absenteeism	66+	0.86	0.00	–0.01	0.79	0.52	0.01	–0.09	0.06
Supervisory support	Absenteeism	16–20	0.85	0.00	–0.05	0.10	0.53	0.00	–0.03	0.53
Supervisory support	Absenteeism	21–30	0.86	0.00	0.02	0.53	0.53	0.01	0.09	0.12
Supervisory support	Absenteeism	31–40	0.86	0.00	0.00	0.96	0.52	0.00	–0.06	0.32
Supervisory support	Absenteeism	41–50	0.86	0.00	–0.04	0.23	0.53	0.01	–0.10	0.08
Supervisory support	Absenteeism	51–65	0.86	0.00	–0.05	0.16	0.54	0.02	–0.17	0.01
Supervisory support	Absenteeism	66+	0.87	0.00	–0.01	0.63	0.53	0.00	–0.07	0.16
Health and well-being	Absenteeism	16–20	0.84	0.00	0.01	0.82	0.53	0.00	0.01	0.87
Health and well-being	Absenteeism	21–30	0.86	0.00	0.04	0.18	0.52	0.00	–0.04	0.37

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Absenteeism	31–40	0.86	0.00	0.02	0.39	0.52	0.00	–0.01	0.77
Health and well-being	Absenteeism	41–50	0.86	0.00	0.05	0.11	0.53	0.01	0.09	0.08
Health and well-being	Absenteeism	51–65	0.86	0.00	0.05	0.05	0.54	0.02	0.13	0.01
Health and well-being	Absenteeism	66+	0.86	0.00	0.01	0.75	0.51	0.00	0.00	0.96
Work pressure	Absenteeism	16–20	0.85	0.00	0.03	0.40	0.53	0.00	0.02	0.76
Work pressure	Absenteeism	21–30	0.86	0.00	–0.02	0.57	0.53	0.01	–0.13	0.01
Work pressure	Absenteeism	31–40	0.86	0.00	0.01	0.77	0.52	0.00	–0.02	0.73
Work pressure	Absenteeism	41–50	0.86	0.00	0.02	0.52	0.52	0.00	–0.03	0.57
Work pressure	Absenteeism	51–65	0.86	0.00	–0.01	0.71	0.53	0.01	–0.12	0.03
Work pressure	Absenteeism	66+	0.87	0.00	0.05	0.06	0.52	0.00	0.01	0.84
Job satisfaction	Stability	16–20	0.62	0.00	0.06	0.19	0.37	0.00	0.03	0.65
Job satisfaction	Stability	21–30	0.56	0.00	0.03	0.64	0.36	0.00	0.08	0.22
Job satisfaction	Stability	31–40	0.56	0.00	0.01	0.80	0.36	0.00	0.00	0.96
Job satisfaction	Stability	41–50	0.56	0.00	0.04	0.48	0.36	0.00	–0.01	0.85
Job satisfaction	Stability	51–65	0.56	0.00	0.02	0.73	0.36	0.00	–0.04	0.55
Job satisfaction	Stability	66+	0.56	0.01	0.09	0.06	0.37	0.01	0.09	0.12
Motivation	Stability	16–20	0.62	0.00	0.02	0.72	0.37	0.00	–0.02	0.80
Motivation	Stability	21–30	0.56	0.00	0.03	0.52	0.36	0.00	0.04	0.53
Motivation	Stability	31–40	0.56	0.00	–0.05	0.34	0.36	0.01	–0.08	0.19
Motivation	Stability	41–50	0.56	0.00	0.03	0.54	0.36	0.00	–0.07	0.28
Motivation	Stability	51–65	0.56	0.00	–0.06	0.23	0.37	0.01	–0.13	0.03
Motivation	Stability	66+	0.56	0.00	0.02	0.60	0.36	0.00	0.00	0.93

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Stability	16–20	0.62	0.00	−0.06	0.27	0.38	0.01	−0.11	0.08
Intention to leave job	Stability	21–30	0.56	0.00	−0.04	0.41	0.37	0.01	−0.13	0.03
Intention to leave job	Stability	31–40	0.56	0.00	0.00	0.97	0.36	0.01	−0.08	0.17
Intention to leave job	Stability	41–50	0.56	0.00	−0.02	0.61	0.36	0.01	−0.08	0.17
Intention to leave job	Stability	51–65	0.57	0.01	−0.08	0.09	0.37	0.02	−0.14	0.02
Intention to leave job	Stability	66+	0.60	0.00	0.01	0.85	0.40	0.00	0.00	0.98
Engagement	Stability	16–20	0.62	0.00	0.02	0.75	0.37	0.00	−0.01	0.88
Engagement	Stability	21–30	0.56	0.00	0.05	0.36	0.36	0.00	0.07	0.30
Engagement	Stability	31–40	0.56	0.00	0.01	0.86	0.36	0.00	−0.01	0.93
Engagement	Stability	41–50	0.56	0.00	0.03	0.59	0.36	0.00	−0.03	0.64
Engagement	Stability	51–65	0.56	0.00	0.02	0.73	0.36	0.00	−0.02	0.80
Engagement	Stability	66+	0.56	0.00	0.00	1.00	0.36	0.00	−0.02	0.79
Advocacy	Stability	16–20	0.62	0.00	0.03	0.54	0.38	0.01	0.08	0.22
Advocacy	Stability	21–30	0.56	0.00	0.06	0.27	0.36	0.01	0.09	0.19
Advocacy	Stability	31–40	0.56	0.00	0.02	0.79	0.36	0.00	0.03	0.70
Advocacy	Stability	41–50	0.56	0.00	0.04	0.45	0.36	0.00	0.03	0.68
Advocacy	Stability	51–65	0.57	0.01	0.10	0.09	0.36	0.01	0.11	0.12
Advocacy	Stability	66+	0.56	0.00	0.07	0.16	0.37	0.01	0.08	0.17
Involvement	Stability	16–20	0.62	0.00	−0.01	0.83	0.39	0.01	−0.08	0.17
Involvement	Stability	21–30	0.56	0.00	0.02	0.68	0.36	0.00	0.03	0.70
Involvement	Stability	31–40	0.56	0.00	0.05	0.31	0.36	0.00	0.02	0.78

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Stability	41–50	0.56	0.00	–0.01	0.81	0.36	0.01	–0.09	0.18
Involvement	Stability	51–65	0.56	0.00	–0.05	0.39	0.36	0.01	–0.09	0.17
Involvement	Stability	66+	0.56	0.01	–0.09	0.05	0.37	0.01	–0.12	0.04
Supervisory support	Stability	16–20	0.63	0.00	–0.01	0.91	0.38	0.00	–0.02	0.73
Supervisory support	Stability	21–30	0.56	0.00	0.00	0.94	0.36	0.00	0.02	0.74
Supervisory support	Stability	31–40	0.56	0.00	–0.03	0.57	0.36	0.00	–0.08	0.26
Supervisory support	Stability	41–50	0.56	0.00	–0.01	0.92	0.36	0.00	–0.01	0.92
Supervisory support	Stability	51–65	0.56	0.00	–0.04	0.47	0.36	0.00	–0.06	0.43
Supervisory support	Stability	66+	0.59	0.01	0.12	0.01	0.38	0.02	0.15	0.01
Health and well-being	Stability	16–20	0.62	0.00	–0.01	0.77	0.38	0.00	–0.03	0.66
Health and well-being	Stability	21–30	0.56	0.00	–0.01	0.86	0.37	0.01	–0.11	0.06
Health and well-being	Stability	31–40	0.56	0.00	–0.05	0.28	0.37	0.01	–0.13	0.03
Health and well-being	Stability	41–50	0.56	0.00	0.02	0.75	0.36	0.00	–0.04	0.57
Health and well-being	Stability	51–65	0.56	0.00	0.01	0.85	0.36	0.00	0.01	0.92
Health and well-being	Stability	66+	0.56	0.00	–0.05	0.28	0.37	0.01	–0.09	0.12
Work pressure	Stability	16–20	0.63	0.00	–0.07	0.14	0.40	0.02	–0.13	0.03
Work pressure	Stability	21–30	0.57	0.01	–0.11	0.03	0.40	0.04	–0.22	0.00
Work pressure	Stability	31–40	0.56	0.00	–0.02	0.73	0.37	0.01	–0.10	0.07
Work pressure	Stability	41–50	0.57	0.01	–0.12	0.01	0.39	0.04	–0.20	0.00
Work pressure	Stability	51–65	0.57	0.01	–0.12	0.02	0.38	0.02	–0.17	0.01
Work pressure	Stability	66+	0.56	0.01	–0.08	0.09	0.38	0.01	–0.12	0.04
Job satisfaction	Mortality	16–20	0.59	0.01	0.11	0.09	0.44	0.02	0.16	0.03

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Mortality	21–30	0.64	0.01	−0.08	0.13	0.49	0.02	−0.13	0.04
Job satisfaction	Mortality	31–40	0.63	0.00	−0.03	0.58	0.47	0.00	−0.03	0.59
Job satisfaction	Mortality	41–50	0.64	0.01	−0.11	0.05	0.49	0.02	−0.16	0.02
Job satisfaction	Mortality	51–65	0.63	0.00	−0.06	0.28	0.48	0.01	−0.11	0.09
Job satisfaction	Mortality	66+	0.60	0.00	0.02	0.76	0.44	0.00	0.00	0.96
Motivation	Mortality	16–20	0.59	0.01	0.08	0.19	0.42	0.01	0.10	0.18
Motivation	Mortality	21–30	0.63	0.00	−0.01	0.83	0.48	0.01	−0.08	0.22
Motivation	Mortality	31–40	0.63	0.00	0.00	0.94	0.47	0.00	0.03	0.61
Motivation	Mortality	41–50	0.63	0.00	−0.02	0.68	0.47	0.00	−0.07	0.33
Motivation	Mortality	51–65	0.63	0.00	0.00	0.97	0.47	0.00	−0.02	0.76
Motivation	Mortality	66+	0.61	0.00	0.05	0.38	0.44	0.00	0.05	0.43
Intention to leave job	Mortality	16–20	0.56	0.00	0.02	0.78	0.38	0.00	−0.01	0.92
Intention to leave job	Mortality	21–30	0.64	0.01	0.11	0.04	0.49	0.02	0.15	0.02
Intention to leave job	Mortality	31–40	0.63	0.00	0.05	0.42	0.47	0.00	0.05	0.51
Intention to leave job	Mortality	41–50	0.64	0.01	0.10	0.07	0.49	0.02	0.15	0.02
Intention to leave job	Mortality	51–65	0.63	0.01	0.08	0.16	0.48	0.01	0.11	0.09
Intention to leave job	Mortality	66+	0.61	0.00	0.07	0.23	0.44	0.00	0.01	0.90
Engagement	Mortality	16–20	0.59	0.00	0.06	0.37	0.42	0.01	0.10	0.19
Engagement	Mortality	21–30	0.64	0.01	−0.10	0.06	0.51	0.04	−0.19	0.00
Engagement	Mortality	31–40	0.63	0.00	−0.02	0.69	0.48	0.01	−0.08	0.20

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Mortality	41–50	0.64	0.01	–0.13	0.02	0.51	0.04	–0.21	0.00
Engagement	Mortality	51–65	0.64	0.01	–0.09	0.15	0.50	0.03	–0.18	0.01
Engagement	Mortality	66+	0.61	0.00	–0.04	0.51	0.45	0.01	–0.08	0.26
Advocacy	Mortality	16–20	0.58	0.00	0.01	0.82	0.41	0.00	0.01	0.88
Advocacy	Mortality	21–30	0.66	0.03	–0.17	0.00	0.54	0.07	–0.26	0.00
Advocacy	Mortality	31–40	0.63	0.00	–0.07	0.21	0.49	0.02	–0.16	0.02
Advocacy	Mortality	41–50	0.65	0.02	–0.16	0.00	0.52	0.05	–0.23	0.00
Advocacy	Mortality	51–65	0.64	0.01	–0.12	0.04	0.51	0.04	–0.21	0.00
Advocacy	Mortality	66+	0.61	0.00	–0.07	0.26	0.45	0.01	–0.09	0.20
Involvement	Mortality	16–20	0.58	0.00	0.04	0.57	0.42	0.01	0.11	0.13
Involvement	Mortality	21–30	0.63	0.00	–0.02	0.72	0.48	0.01	–0.08	0.22
Involvement	Mortality	31–40	0.63	0.00	0.05	0.36	0.47	0.00	–0.02	0.76
Involvement	Mortality	41–50	0.64	0.01	–0.09	0.12	0.49	0.02	–0.15	0.02
Involvement	Mortality	51–65	0.63	0.00	–0.05	0.41	0.48	0.01	–0.13	0.06
Involvement	Mortality	66+	0.61	0.00	–0.05	0.35	0.45	0.01	–0.11	0.10
Supervisory support	Mortality	16–20	0.59	0.01	0.09	0.15	0.42	0.01	0.10	0.16
Supervisory support	Mortality	21–30	0.64	0.01	–0.10	0.07	0.49	0.02	–0.13	0.03
Supervisory support	Mortality	31–40	0.63	0.00	0.02	0.65	0.47	0.00	0.01	0.82
Supervisory support	Mortality	41–50	0.65	0.02	–0.16	0.00	0.51	0.04	–0.20	0.00
Supervisory support	Mortality	51–65	0.63	0.00	–0.06	0.25	0.47	0.00	–0.05	0.42
Supervisory support	Mortality	66+	0.60	0.00	–0.05	0.35	0.44	0.01	–0.07	0.27

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Mortality	16–20	0.58	0.00	−0.04	0.48	0.41	0.00	−0.05	0.52
Health and well-being	Mortality	21–30	0.64	0.01	0.11	0.04	0.48	0.01	0.10	0.11
Health and well-being	Mortality	31–40	0.63	0.00	0.06	0.31	0.47	0.00	0.05	0.47
Health and well-being	Mortality	41–50	0.63	0.00	0.03	0.61	0.47	0.00	0.07	0.30
Health and well-being	Mortality	51–65	0.63	0.00	0.03	0.55	0.47	0.00	0.05	0.44
Health and well-being	Mortality	66 +	0.61	0.00	−0.04	0.52	0.44	0.00	−0.05	0.43
Work pressure	Mortality	16–20	0.59	0.01	0.10	0.12	0.42	0.01	0.08	0.28
Work pressure	Mortality	21–30	0.63	0.00	0.06	0.26	0.47	0.00	0.04	0.49
Work pressure	Mortality	31–40	0.63	0.00	0.00	0.99	0.47	0.00	0.02	0.72
Work pressure	Mortality	41–50	0.64	0.01	0.08	0.13	0.49	0.02	0.12	0.04
Work pressure	Mortality	51–65	0.63	0.00	0.07	0.20	0.49	0.02	0.13	0.04
Work pressure	Mortality	66 +	0.60	0.00	0.02	0.70	0.44	0.00	−0.02	0.78
Job satisfaction	Patient satisfaction	16–20	0.83	0.00	0.04	0.31	0.62	0.01	0.09	0.09
Job satisfaction	Patient satisfaction	21–30	0.81	0.00	0.01	0.79	0.60	0.00	0.01	0.79
Job satisfaction	Patient satisfaction	31–40	0.82	0.01	0.10	0.01	0.62	0.02	0.14	0.01
Job satisfaction	Patient satisfaction	41–50	0.82	0.00	0.06	0.08	0.62	0.01	0.13	0.02
Job satisfaction	Patient satisfaction	51–65	0.81	0.00	0.02	0.53	0.61	0.01	0.09	0.13
Job satisfaction	Patient satisfaction	66 +	0.82	0.00	−0.03	0.44	0.59	0.00	0.00	0.95
Motivation	Patient satisfaction	16–20	0.83	0.00	0.04	0.26	0.62	0.01	0.08	0.15
Motivation	Patient satisfaction	21–30	0.81	0.00	0.00	0.94	0.60	0.00	0.00	0.93
Motivation	Patient satisfaction	31–40	0.82	0.00	0.05	0.18	0.60	0.00	0.05	0.37

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	Patient satisfaction	41–50	0.82	0.00	0.07	0.08	0.60	0.00	0.06	0.27
Motivation	Patient satisfaction	51–65	0.81	0.00	–0.02	0.68	0.60	0.00	–0.01	0.88
Motivation	Patient satisfaction	66+	0.82	0.00	0.04	0.26	0.59	0.00	–0.01	0.86
Intention to leave job	Patient satisfaction	16–20	0.83	0.01	–0.08	0.03	0.62	0.01	–0.13	0.03
Intention to leave job	Patient satisfaction	21–30	0.81	0.00	–0.01	0.72	0.61	0.01	–0.09	0.11
Intention to leave job	Patient satisfaction	31–40	0.82	0.01	–0.09	0.02	0.63	0.03	–0.20	0.00
Intention to leave job	Patient satisfaction	41–50	0.82	0.00	–0.07	0.06	0.63	0.03	–0.20	0.00
Intention to leave job	Patient satisfaction	51–65	0.82	0.00	–0.08	0.05	0.63	0.03	–0.20	0.00
Intention to leave job	Patient satisfaction	66+	0.82	0.00	0.02	0.67	0.60	0.00	–0.02	0.66
Engagement	Patient satisfaction	16–20	0.83	0.00	0.08	0.06	0.63	0.02	0.15	0.01
Engagement	Patient satisfaction	21–30	0.82	0.00	0.08	0.05	0.62	0.02	0.17	0.00
Engagement	Patient satisfaction	31–40	0.82	0.01	0.12	0.00	0.63	0.03	0.20	0.00
Engagement	Patient satisfaction	41–50	0.82	0.01	0.12	0.00	0.64	0.04	0.25	0.00
Engagement	Patient satisfaction	51–65	0.82	0.00	0.07	0.12	0.63	0.03	0.21	0.00
Engagement	Patient satisfaction	66+	0.82	0.00	0.00	0.90	0.60	0.00	0.03	0.56
Advocacy	Patient satisfaction	16–20	0.83	0.01	0.09	0.03	0.66	0.04	0.24	0.00
Advocacy	Patient satisfaction	21–30	0.82	0.01	0.16	0.00	0.68	0.08	0.37	0.00
Advocacy	Patient satisfaction	31–40	0.83	0.02	0.16	0.00	0.66	0.06	0.31	0.00
Advocacy	Patient satisfaction	41–50	0.83	0.01	0.16	0.00	0.67	0.07	0.34	0.00
Advocacy	Patient satisfaction	51–65	0.82	0.01	0.13	0.01	0.66	0.06	0.32	0.00
Advocacy	Patient satisfaction	66+	0.82	0.00	0.02	0.53	0.61	0.01	0.12	0.04

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Patient satisfaction	16–20	0.83	0.00	0.05	0.16	0.62	0.00	0.06	0.28
Involvement	Patient satisfaction	21–30	0.81	0.00	0.04	0.29	0.60	0.00	0.01	0.82
Involvement	Patient satisfaction	31–40	0.82	0.00	0.07	0.06	0.60	0.00	0.06	0.28
Involvement	Patient satisfaction	41–50	0.82	0.00	0.06	0.12	0.61	0.01	0.12	0.02
Involvement	Patient satisfaction	51–65	0.81	0.00	0.04	0.35	0.61	0.01	0.13	0.02
Involvement	Patient satisfaction	66+	0.82	0.00	−0.04	0.34	0.60	0.00	−0.03	0.60
Supervisory support	Patient satisfaction	16–20	0.83	0.00	−0.01	0.73	0.61	0.00	−0.01	0.86
Supervisory support	Patient satisfaction	21–30	0.81	0.00	0.01	0.78	0.60	0.00	0.01	0.88
Supervisory support	Patient satisfaction	31–40	0.81	0.00	0.03	0.38	0.60	0.00	0.05	0.35
Supervisory support	Patient satisfaction	41–50	0.81	0.00	0.04	0.23	0.61	0.01	0.10	0.05
Supervisory support	Patient satisfaction	51–65	0.81	0.00	0.04	0.35	0.61	0.01	0.08	0.14
Supervisory support	Patient satisfaction	66+	0.82	0.00	0.02	0.69	0.60	0.01	0.10	0.07
Health and well-being	Patient satisfaction	16–20	0.83	0.00	0.03	0.45	0.62	0.00	0.04	0.52
Health and well-being	Patient satisfaction	21–30	0.81	0.00	0.01	0.83	0.60	0.00	−0.04	0.51
Health and well-being	Patient satisfaction	31–40	0.81	0.00	0.02	0.56	0.61	0.01	−0.12	0.03
Health and well-being	Patient satisfaction	41–50	0.81	0.00	0.00	0.97	0.60	0.00	−0.05	0.39
Health and well-being	Patient satisfaction	51–65	0.81	0.00	0.04	0.32	0.60	0.00	0.03	0.56
Health and well-being	Patient satisfaction	66+	0.82	0.00	−0.04	0.28	0.61	0.01	−0.12	0.03
Work pressure	Patient satisfaction	16–20	0.83	0.00	−0.03	0.43	0.62	0.01	−0.10	0.07
Work pressure	Patient satisfaction	21–30	0.82	0.00	−0.08	0.05	0.62	0.02	−0.14	0.01
Work pressure	Patient satisfaction	31–40	0.82	0.00	−0.07	0.06	0.62	0.02	−0.14	0.01

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	Patient satisfaction	41–50	0.82	0.00	–0.05	0.18	0.62	0.02	–0.15	0.01
Work pressure	Patient satisfaction	51–65	0.82	0.00	–0.05	0.19	0.61	0.01	–0.12	0.04
Work pressure	Patient satisfaction	66+	0.82	0.00	–0.06	0.09	0.63	0.04	–0.20	0.00
Job satisfaction	MRSA	16–20	0.16	0.00	0.05	0.51	0.07	0.00	0.06	0.51
Job satisfaction	MRSA	21–30	0.21	0.00	0.02	0.79	0.10	0.00	–0.02	0.82
Job satisfaction	MRSA	31–40	0.21	0.00	–0.03	0.66	0.10	0.00	–0.03	0.71
Job satisfaction	MRSA	41–50	0.21	0.00	0.03	0.72	0.10	0.00	0.04	0.59
Job satisfaction	MRSA	51–65	0.21	0.00	0.05	0.51	0.11	0.01	0.09	0.26
Job satisfaction	MRSA	66+	0.22	0.01	0.11	0.14	0.11	0.02	0.13	0.10
Motivation	MRSA	16–20	0.15	0.00	–0.01	0.94	0.07	0.00	–0.02	0.78
Motivation	MRSA	21–30	0.22	0.00	0.06	0.40	0.10	0.00	0.03	0.67
Motivation	MRSA	31–40	0.22	0.00	–0.06	0.43	0.10	0.00	–0.05	0.51
Motivation	MRSA	41–50	0.22	0.01	0.09	0.23	0.11	0.01	0.11	0.16
Motivation	MRSA	51–65	0.22	0.01	0.08	0.30	0.11	0.01	0.10	0.27
Motivation	MRSA	66+	0.21	0.00	0.05	0.48	0.10	0.00	0.05	0.54
Intention to leave job	MRSA	16–20	0.14	0.00	0.07	0.43	0.06	0.01	0.09	0.33
Intention to leave job	MRSA	21–30	0.21	0.00	–0.02	0.83	0.10	0.00	0.00	0.95
Intention to leave job	MRSA	31–40	0.22	0.01	0.10	0.18	0.11	0.01	0.11	0.17
Intention to leave job	MRSA	41–50	0.21	0.00	–0.04	0.64	0.10	0.00	–0.05	0.51
Intention to leave job	MRSA	51–65	0.21	0.00	–0.01	0.94	0.10	0.00	–0.03	0.72
Intention to leave job	MRSA	66+	0.22	0.00	–0.05	0.51	0.11	0.01	–0.11	0.17

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	MRSA	16–20	0.16	0.00	–0.05	0.58	0.07	0.00	–0.06	0.46
Engagement	MRSA	21–30	0.21	0.00	0.03	0.70	0.10	0.00	0.02	0.86
Engagement	MRSA	31–40	0.21	0.00	–0.02	0.80	0.10	0.00	–0.01	0.90
Engagement	MRSA	41–50	0.22	0.01	0.09	0.29	0.11	0.01	0.13	0.13
Engagement	MRSA	51–65	0.22	0.01	0.13	0.16	0.12	0.02	0.18	0.06
Engagement	MRSA	66+	0.21	0.00	0.01	0.90	0.10	0.00	0.05	0.55
Advocacy	MRSA	16–20	0.17	0.01	–0.13	0.13	0.09	0.02	–0.15	0.11
Advocacy	MRSA	21–30	0.21	0.00	0.03	0.78	0.10	0.00	0.01	0.91
Advocacy	MRSA	31–40	0.21	0.00	0.04	0.65	0.10	0.00	0.04	0.67
Advocacy	MRSA	41–50	0.21	0.00	0.05	0.57	0.10	0.01	0.09	0.35
Advocacy	MRSA	51–65	0.22	0.01	0.12	0.23	0.11	0.01	0.16	0.11
Advocacy	MRSA	66+	0.21	0.00	–0.03	0.74	0.10	0.00	0.05	0.54
Involvement	MRSA	16–20	0.16	0.00	0.01	0.89	0.07	0.00	0.00	1.00
Involvement	MRSA	21–30	0.21	0.00	–0.01	0.91	0.10	0.00	–0.01	0.95
Involvement	MRSA	31–40	0.22	0.00	–0.06	0.42	0.10	0.00	–0.04	0.66
Involvement	MRSA	41–50	0.22	0.01	0.11	0.15	0.12	0.02	0.15	0.06
Involvement	MRSA	51–65	0.22	0.01	0.11	0.16	0.12	0.02	0.17	0.04
Involvement	MRSA	66+	0.21	0.00	0.01	0.92	0.10	0.00	0.02	0.83
Supervisory support	MRSA	16–20	0.16	0.00	0.06	0.46	0.08	0.00	0.06	0.48
Supervisory support	MRSA	21–30	0.21	0.00	–0.03	0.68	0.10	0.00	–0.03	0.71
Supervisory support	MRSA	31–40	0.21	0.00	–0.03	0.67	0.10	0.00	–0.01	0.86
Supervisory support	MRSA	41–50	0.21	0.00	0.00	0.96	0.10	0.00	0.03	0.70

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	MRSA	51–65	0.21	0.00	0.00	0.99	0.10	0.00	0.05	0.57
Supervisory support	MRSA	66+	0.22	0.02	0.15	0.05	0.12	0.03	0.19	0.02
Health and well-being	MRSA	16–20	0.16	0.01	–0.09	0.27	0.07	0.00	–0.06	0.45
Health and well-being	MRSA	21–30	0.21	0.00	–0.01	0.86	0.10	0.00	0.02	0.78
Health and well-being	MRSA	31–40	0.21	0.00	–0.02	0.77	0.10	0.00	–0.03	0.74
Health and well-being	MRSA	41–50	0.21	0.00	–0.04	0.56	0.10	0.00	–0.05	0.53
Health and well-being	MRSA	51–65	0.23	0.02	–0.13	0.07	0.12	0.02	–0.13	0.09
Health and well-being	MRSA	66+	0.21	0.00	0.00	1.00	0.10	0.00	–0.07	0.37
Work pressure	MRSA	16–20	0.17	0.01	0.10	0.22	0.09	0.01	0.11	0.19
Work pressure	MRSA	21–30	0.21	0.00	–0.03	0.67	0.10	0.00	–0.03	0.73
Work pressure	MRSA	31–40	0.21	0.00	–0.02	0.82	0.10	0.00	0.00	0.97
Work pressure	MRSA	41–50	0.22	0.01	–0.09	0.24	0.11	0.01	–0.09	0.26
Work pressure	MRSA	51–65	0.23	0.02	–0.15	0.06	0.12	0.02	–0.16	0.06
Work pressure	MRSA	66+	0.21	0.00	0.00	0.97	0.10	0.00	–0.01	0.85
Job satisfaction	<i>C. difficile</i>	16–20	0.51	0.01	0.10	0.12	0.17	0.02	0.15	0.06
Job satisfaction	<i>C. difficile</i>	21–30	0.51	0.00	0.07	0.27	0.12	0.00	0.07	0.37
Job satisfaction	<i>C. difficile</i>	31–40	0.50	0.00	–0.04	0.54	0.12	0.00	0.00	0.99
Job satisfaction	<i>C. difficile</i>	41–50	0.51	0.00	–0.07	0.25	0.12	0.00	0.02	0.78
Job satisfaction	<i>C. difficile</i>	51–65	0.50	0.00	0.04	0.54	0.12	0.00	0.06	0.49
Job satisfaction	<i>C. difficile</i>	66+	0.55	0.01	0.07	0.20	0.14	0.04	0.19	0.01
Motivation	<i>C. difficile</i>	16–20	0.52	0.02	0.15	0.02	0.16	0.01	0.08	0.32
Motivation	<i>C. difficile</i>	21–30	0.50	0.00	0.05	0.39	0.12	0.01	0.08	0.30

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	<i>C. difficile</i>	31–40	0.50	0.00	−0.04	0.52	0.12	0.00	0.02	0.82
Motivation	<i>C. difficile</i>	41–50	0.50	0.00	−0.06	0.37	0.13	0.01	0.11	0.17
Motivation	<i>C. difficile</i>	51–65	0.50	0.00	0.01	0.84	0.12	0.00	0.05	0.60
Motivation	<i>C. difficile</i>	66+	0.55	0.00	0.05	0.38	0.11	0.00	0.07	0.37
Intention to leave job	<i>C. difficile</i>	16–20	0.50	0.00	0.01	0.82	0.15	0.00	−0.01	0.95
Intention to leave job	<i>C. difficile</i>	21–30	0.51	0.00	−0.07	0.24	0.12	0.00	−0.06	0.44
Intention to leave job	<i>C. difficile</i>	31–40	0.50	0.00	0.04	0.55	0.12	0.00	0.05	0.54
Intention to leave job	<i>C. difficile</i>	41–50	0.50	0.00	0.03	0.67	0.12	0.00	−0.02	0.85
Intention to leave job	<i>C. difficile</i>	51–65	0.50	0.00	−0.01	0.83	0.12	0.00	−0.02	0.84
Intention to leave job	<i>C. difficile</i>	66+	0.52	0.00	0.01	0.91	0.12	0.00	0.00	0.98
Engagement	<i>C. difficile</i>	16–20	0.50	0.01	0.09	0.17	0.15	0.01	0.08	0.33
Engagement	<i>C. difficile</i>	21–30	0.51	0.01	0.09	0.15	0.13	0.01	0.14	0.12
Engagement	<i>C. difficile</i>	31–40	0.50	0.00	−0.01	0.83	0.12	0.00	0.06	0.51
Engagement	<i>C. difficile</i>	41–50	0.50	0.00	−0.01	0.90	0.12	0.01	0.10	0.26
Engagement	<i>C. difficile</i>	51–65	0.50	0.00	0.06	0.41	0.12	0.01	0.11	0.26
Engagement	<i>C. difficile</i>	66+	0.56	0.01	0.08	0.14	0.14	0.03	0.19	0.02
Advocacy	<i>C. difficile</i>	16–20	0.50	0.00	0.05	0.46	0.15	0.00	0.06	0.49
Advocacy	<i>C. difficile</i>	21–30	0.51	0.01	0.13	0.09	0.14	0.02	0.19	0.06
Advocacy	<i>C. difficile</i>	31–40	0.50	0.00	0.01	0.88	0.12	0.00	0.08	0.37
Advocacy	<i>C. difficile</i>	41–50	0.50	0.00	0.01	0.92	0.12	0.00	0.07	0.47
Advocacy	<i>C. difficile</i>	51–65	0.50	0.00	0.07	0.37	0.12	0.01	0.12	0.25
Advocacy	<i>C. difficile</i>	66+	0.55	0.00	0.03	0.55	0.13	0.02	0.15	0.07

continued

TABLE 53 Breakdown by age (continued)

Predictor	Outcome	Age group (years)	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	<i>C. difficile</i>	16–20	0.51	0.00	0.02	0.69	0.15	0.00	0.05	0.51
Involvement	<i>C. difficile</i>	21–30	0.50	0.00	0.04	0.46	0.12	0.00	0.05	0.51
Involvement	<i>C. difficile</i>	31–40	0.50	0.00	–0.01	0.81	0.12	0.00	0.03	0.67
Involvement	<i>C. difficile</i>	41–50	0.50	0.00	0.02	0.76	0.12	0.01	0.09	0.27
Involvement	<i>C. difficile</i>	51–65	0.50	0.00	0.05	0.42	0.12	0.01	0.08	0.33
Involvement	<i>C. difficile</i>	66+	0.56	0.01	0.10	0.07	0.15	0.04	0.21	0.01
Supervisory support	<i>C. difficile</i>	16–20	0.51	0.01	0.09	0.14	0.17	0.02	0.13	0.10
Supervisory support	<i>C. difficile</i>	21–30	0.51	0.01	0.08	0.19	0.13	0.01	0.11	0.16
Supervisory support	<i>C. difficile</i>	31–40	0.50	0.00	–0.01	0.81	0.12	0.00	–0.02	0.81
Supervisory support	<i>C. difficile</i>	41–50	0.50	0.00	–0.03	0.59	0.12	0.00	0.03	0.72
Supervisory support	<i>C. difficile</i>	51–65	0.51	0.01	0.08	0.17	0.12	0.01	0.09	0.25
Supervisory support	<i>C. difficile</i>	66+	0.55	0.00	0.02	0.74	0.11	0.00	0.04	0.66
Health and well-being	<i>C. difficile</i>	16–20	0.51	0.00	0.03	0.60	0.15	0.00	–0.04	0.65
Health and well-being	<i>C. difficile</i>	21–30	0.50	0.00	0.03	0.58	0.12	0.00	–0.01	0.91
Health and well-being	<i>C. difficile</i>	31–40	0.50	0.00	–0.02	0.73	0.12	0.00	–0.03	0.72
Health and well-being	<i>C. difficile</i>	41–50	0.50	0.00	–0.05	0.38	0.13	0.01	–0.13	0.10
Health and well-being	<i>C. difficile</i>	51–65	0.50	0.00	–0.04	0.45	0.12	0.00	–0.03	0.74
Health and well-being	<i>C. difficile</i>	66+	0.55	0.00	–0.02	0.74	0.11	0.00	–0.05	0.50
Work pressure	<i>C. difficile</i>	16–20	0.50	0.00	0.01	0.91	0.15	0.00	–0.02	0.82
Work pressure	<i>C. difficile</i>	21–30	0.50	0.00	0.04	0.54	0.13	0.01	–0.11	0.21
Work pressure	<i>C. difficile</i>	31–40	0.51	0.01	0.09	0.14	0.12	0.00	0.01	0.86
Work pressure	<i>C. difficile</i>	41–50	0.51	0.01	0.08	0.20	0.12	0.01	–0.08	0.31

TABLE 54 Breakdown by disability status

Predictor	Outcome	Disability	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	Yes	0.86	0.01	-0.08	0.00	0.53	0.01	-0.13	0.01
Job satisfaction	Absenteeism	No	0.86	0.00	-0.02	0.49	0.53	0.01	-0.13	0.03
Motivation	Absenteeism	Yes	0.86	0.00	-0.05	0.07	0.53	0.01	-0.09	0.06
Motivation	Absenteeism	No	0.86	0.00	0.00	0.94	0.53	0.01	-0.13	0.01
Intention to leave job	Absenteeism	Yes	0.86	0.00	0.05	0.08	0.52	0.00	0.07	0.18
Intention to leave job	Absenteeism	No	0.86	0.00	0.02	0.38	0.52	0.00	0.07	0.20
Engagement	Absenteeism	Yes	0.86	0.00	-0.07	0.01	0.54	0.02	-0.15	0.01
Engagement	Absenteeism	No	0.86	0.00	-0.02	0.46	0.53	0.01	-0.14	0.01
Advocacy	Absenteeism	Yes	0.86	0.00	-0.06	0.06	0.53	0.01	-0.11	0.05
Advocacy	Absenteeism	No	0.86	0.00	-0.05	0.16	0.53	0.01	-0.13	0.03
Involvement	Absenteeism	Yes	0.86	0.00	-0.07	0.02	0.54	0.02	-0.17	0.00
Involvement	Absenteeism	No	0.86	0.00	0.02	0.51	0.53	0.01	-0.11	0.08
Supervisory support	Absenteeism	Yes	0.86	0.00	-0.08	0.01	0.53	0.01	-0.10	0.06
Supervisory support	Absenteeism	No	0.86	0.00	-0.02	0.65	0.53	0.01	-0.11	0.10
Health and well-being	Absenteeism	Yes	0.86	0.00	0.07	0.01	0.54	0.02	0.15	0.00
Health and well-being	Absenteeism	No	0.86	0.00	0.06	0.05	0.52	0.00	0.01	0.90
Work pressure	Absenteeism	Yes	0.86	0.00	0.06	0.03	0.52	0.00	0.02	0.63
Work pressure	Absenteeism	No	0.86	0.00	0.00	0.99	0.53	0.01	-0.09	0.09
Job satisfaction	Stability	Yes	0.56	0.00	0.01	0.82	0.36	0.00	0.01	0.82
Job satisfaction	Stability	No	0.56	0.00	0.04	0.47	0.36	0.00	0.00	0.98
Motivation	Stability	Yes	0.57	0.01	-0.07	0.12	0.36	0.01	-0.08	0.19
Motivation	Stability	No	0.56	0.00	0.01	0.85	0.36	0.00	-0.07	0.23

continued

TABLE 54 Breakdown by disability status (continued)

Predictor	Outcome	Disability	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Stability	Yes	0.56	0.00	0.03	0.59	0.36	0.00	-0.04	0.47
Intention to leave job	Stability	No	0.56	0.00	-0.07	0.20	0.38	0.02	-0.16	0.01
Engagement	Stability	Yes	0.56	0.00	-0.03	0.52	0.36	0.00	-0.05	0.46
Engagement	Stability	No	0.56	0.00	0.05	0.41	0.36	0.00	0.01	0.86
Advocacy	Stability	Yes	0.56	0.00	0.02	0.75	0.36	0.00	0.02	0.72
Advocacy	Stability	No	0.56	0.00	0.07	0.24	0.36	0.00	0.08	0.29
Involvement	Stability	Yes	0.56	0.00	-0.04	0.50	0.36	0.00	-0.08	0.22
Involvement	Stability	No	0.56	0.00	0.01	0.85	0.36	0.00	-0.05	0.51
Supervisory support	Stability	Yes	0.56	0.00	0.03	0.60	0.36	0.00	0.03	0.64
Supervisory support	Stability	No	0.56	0.00	-0.04	0.51	0.36	0.00	-0.07	0.37
Health and well-being	Stability	Yes	0.56	0.00	0.06	0.20	0.36	0.00	0.04	0.44
Health and well-being	Stability	No	0.56	0.00	-0.06	0.25	0.38	0.02	-0.18	0.00
Work pressure	Stability	Yes	0.57	0.01	-0.08	0.10	0.37	0.02	-0.13	0.02
Work pressure	Stability	No	0.57	0.01	-0.13	0.02	0.39	0.04	-0.22	0.00
Job satisfaction	Mortality	Yes	0.62	0.01	-0.09	0.11	0.42	0.01	-0.10	0.14
Job satisfaction	Mortality	No	0.62	0.01	-0.09	0.10	0.43	0.03	-0.17	0.01
Motivation	Mortality	Yes	0.61	0.00	-0.06	0.23	0.42	0.01	-0.10	0.11
Motivation	Mortality	No	0.61	0.00	0.02	0.68	0.41	0.00	-0.03	0.67
Intention to leave job	Mortality	Yes	0.62	0.01	0.10	0.07	0.42	0.02	0.13	0.05
Intention to leave job	Mortality	No	0.62	0.01	0.10	0.08	0.42	0.02	0.14	0.06
Engagement	Mortality	Yes	0.63	0.02	-0.14	0.01	0.45	0.05	-0.23	0.00
Engagement	Mortality	No	0.62	0.01	-0.11	0.07	0.45	0.04	-0.23	0.00

Predictor	Outcome	Disability	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	Mortality	Yes	0.64	0.03	-0.18	0.00	0.47	0.07	-0.28	0.00
Advocacy	Mortality	No	0.63	0.02	-0.17	0.01	0.48	0.07	-0.29	0.00
Involvement	Mortality	Yes	0.62	0.01	-0.07	0.18	0.42	0.02	-0.13	0.05
Involvement	Mortality	No	0.61	0.00	-0.05	0.41	0.43	0.02	-0.15	0.03
Supervisory support	Mortality	Yes	0.61	0.00	-0.05	0.33	0.41	0.00	-0.03	0.68
Supervisory support	Mortality	No	0.63	0.02	-0.14	0.01	0.44	0.04	-0.20	0.00
Health and well-being	Mortality	Yes	0.62	0.01	0.10	0.08	0.42	0.01	0.10	0.15
Health and well-being	Mortality	No	0.61	0.00	0.02	0.73	0.41	0.00	-0.01	0.91
Work pressure	Mortality	Yes	0.62	0.01	0.08	0.15	0.41	0.00	0.06	0.34
Work pressure	Mortality	No	0.61	0.00	0.06	0.30	0.41	0.01	0.09	0.20
Job satisfaction	Patient satisfaction	Yes	0.82	0.00	0.07	0.09	0.62	0.02	0.17	0.00
Job satisfaction	Patient satisfaction	No	0.82	0.00	0.07	0.08	0.61	0.01	0.11	0.04
Motivation	Patient satisfaction	Yes	0.82	0.00	0.07	0.07	0.61	0.01	0.12	0.02
Motivation	Patient satisfaction	No	0.81	0.00	0.01	0.69	0.60	0.00	-0.02	0.74
Intention to leave job	Patient satisfaction	Yes	0.81	0.00	-0.03	0.47	0.62	0.02	-0.16	0.00
Intention to leave job	Patient satisfaction	No	0.82	0.01	-0.10	0.02	0.64	0.04	-0.22	0.00
Engagement	Patient satisfaction	Yes	0.82	0.01	0.12	0.01	0.65	0.05	0.25	0.00
Engagement	Patient satisfaction	No	0.82	0.01	0.12	0.01	0.64	0.04	0.24	0.00
Advocacy	Patient satisfaction	Yes	0.82	0.01	0.15	0.00	0.67	0.07	0.33	0.00
Advocacy	Patient satisfaction	No	0.83	0.02	0.18	0.00	0.68	0.08	0.37	0.00
Involvement	Patient satisfaction	Yes	0.82	0.00	0.07	0.06	0.61	0.01	0.13	0.02
Involvement	Patient satisfaction	No	0.82	0.00	0.06	0.12	0.61	0.01	0.11	0.06

continued

TABLE 54 Breakdown by disability status (continued)

Predictor	Outcome	Disability	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Patient satisfaction	Yes	0.82	0.00	0.08	0.05	0.62	0.01	0.13	0.02
Supervisory support	Patient satisfaction	No	0.81	0.00	0.04	0.33	0.61	0.00	0.07	0.18
Health and well-being	Patient satisfaction	Yes	0.81	0.00	0.00	1.00	0.61	0.01	-0.10	0.05
Health and well-being	Patient satisfaction	No	0.82	0.00	0.07	0.10	0.60	0.00	-0.01	0.88
Work pressure	Patient satisfaction	Yes	0.81	0.00	-0.02	0.67	0.62	0.02	-0.14	0.01
Work pressure	Patient satisfaction	No	0.82	0.01	-0.10	0.02	0.63	0.03	-0.18	0.00
Job satisfaction	MRSA	Yes	0.21	0.00	0.02	0.78	0.10	0.00	0.07	0.41
Job satisfaction	MRSA	No	0.21	0.00	0.02	0.85	0.10	0.00	0.03	0.70
Motivation	MRSA	Yes	0.22	0.01	0.09	0.20	0.11	0.01	0.10	0.21
Motivation	MRSA	No	0.21	0.00	0.05	0.48	0.10	0.00	0.06	0.44
Intention to leave job	MRSA	Yes	0.21	0.00	-0.03	0.69	0.10	0.00	-0.05	0.55
Intention to leave job	MRSA	No	0.21	0.00	0.02	0.82	0.10	0.00	0.02	0.83
Engagement	MRSA	Yes	0.23	0.01	0.14	0.10	0.11	0.01	0.14	0.12
Engagement	MRSA	No	0.21	0.00	0.06	0.51	0.11	0.01	0.10	0.28
Advocacy	MRSA	Yes	0.22	0.01	0.12	0.19	0.11	0.01	0.12	0.22
Advocacy	MRSA	No	0.21	0.00	0.05	0.59	0.10	0.00	0.08	0.41
Involvement	MRSA	Yes	0.22	0.01	0.11	0.15	0.11	0.01	0.11	0.18
Involvement	MRSA	No	0.21	0.00	0.06	0.48	0.11	0.01	0.12	0.14
Supervisory support	MRSA	Yes	0.21	0.00	-0.05	0.49	0.10	0.00	-0.06	0.48
Supervisory support	MRSA	No	0.21	0.00	0.02	0.78	0.10	0.00	0.07	0.39
Health and well-being	MRSA	Yes	0.24	0.03	-0.17	0.02	0.13	0.03	-0.19	0.01
Health and well-being	MRSA	No	0.22	0.00	-0.06	0.46	0.10	0.00	-0.04	0.61

Predictor	Outcome	Disability	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	MRSA	Yes	0.22	0.01	-0.08	0.30	0.10	0.00	-0.03	0.74
Work pressure	MRSA	No	0.22	0.01	-0.09	0.28	0.10	0.01	-0.09	0.29
Job satisfaction	<i>C. difficile</i>	Yes	0.50	0.00	0.03	0.66	0.12	0.00	0.05	0.51
Job satisfaction	<i>C. difficile</i>	No	0.50	0.00	0.00	0.99	0.12	0.00	0.06	0.48
Motivation	<i>C. difficile</i>	Yes	0.51	0.00	-0.07	0.26	0.12	0.00	-0.05	0.53
Motivation	<i>C. difficile</i>	No	0.50	0.00	0.00	0.97	0.13	0.01	0.11	0.19
Intention to leave job	<i>C. difficile</i>	Yes	0.50	0.00	0.04	0.46	0.12	0.00	0.06	0.41
Intention to leave job	<i>C. difficile</i>	No	0.50	0.00	-0.01	0.88	0.12	0.00	-0.03	0.75
Engagement	<i>C. difficile</i>	Yes	0.50	0.00	-0.01	0.83	0.12	0.00	0.04	0.61
Engagement	<i>C. difficile</i>	No	0.50	0.00	0.05	0.50	0.13	0.01	0.13	0.16
Advocacy	<i>C. difficile</i>	Yes	0.50	0.00	0.00	1.00	0.12	0.00	0.06	0.56
Advocacy	<i>C. difficile</i>	No	0.50	0.00	0.06	0.44	0.13	0.01	0.12	0.23
Involvement	<i>C.c difficile</i>	Yes	0.50	0.00	0.03	0.60	0.12	0.01	0.09	0.25
Involvement	<i>C. difficile</i>	No	0.50	0.00	0.05	0.39	0.13	0.01	0.11	0.19
Supervisory support	<i>C. difficile</i>	Yes	0.50	0.00	0.04	0.50	0.12	0.00	0.06	0.42
Supervisory support	<i>C. difficile</i>	No	0.50	0.00	0.05	0.36	0.12	0.01	0.08	0.29
Health and well-being	<i>C. difficile</i>	Yes	0.50	0.00	-0.01	0.92	0.12	0.00	0.01	0.89
Health and well-being	<i>C. difficile</i>	No	0.50	0.00	-0.05	0.43	0.12	0.01	-0.10	0.24
Work pressure	<i>C. difficile</i>	Yes	0.50	0.00	0.04	0.50	0.12	0.00	-0.03	0.73
Work pressure	<i>C. difficile</i>	No	0.50	0.00	0.06	0.38	0.13	0.01	-0.13	0.15

TABLE 55 Breakdown by ethnic group

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	White	0.86	0.00	-0.04	0.22	0.53	0.01	-0.15	0.01
Job satisfaction	Absenteeism	Mixed	0.86	0.00	-0.01	0.85	0.53	0.00	-0.03	0.49
Job satisfaction	Absenteeism	Asian	0.86	0.00	-0.02	0.54	0.52	0.00	-0.06	0.22
Job satisfaction	Absenteeism	Black	0.86	0.00	0.02	0.38	0.53	0.01	0.09	0.06
Job satisfaction	Absenteeism	Chinese/other	0.85	0.00	-0.04	0.12	0.51	0.00	-0.03	0.56
Motivation	Absenteeism	White	0.86	0.00	-0.02	0.44	0.53	0.01	-0.13	0.01
Motivation	Absenteeism	Mixed	0.86	0.00	0.03	0.20	0.53	0.00	0.01	0.85
Motivation	Absenteeism	Asian	0.86	0.00	0.02	0.42	0.52	0.00	-0.03	0.50
Motivation	Absenteeism	Black	0.86	0.00	0.03	0.28	0.53	0.01	0.09	0.05
Motivation	Absenteeism	Chinese/other	0.85	0.00	0.02	0.41	0.51	0.00	-0.01	0.89
Intention to leave job	Absenteeism	White	0.86	0.00	0.03	0.37	0.52	0.00	0.07	0.17
Intention to leave job	Absenteeism	Mixed	0.86	0.00	-0.01	0.77	0.53	0.00	0.01	0.87
Intention to leave job	Absenteeism	Asian	0.86	0.00	0.05	0.07	0.52	0.00	0.05	0.28
Intention to leave job	Absenteeism	Black	0.86	0.00	0.00	0.94	0.52	0.00	-0.06	0.25
Intention to leave job	Absenteeism	Chinese/other	0.85	0.00	-0.03	0.37	0.51	0.00	-0.04	0.41
Engagement	Absenteeism	White	0.86	0.00	-0.03	0.28	0.53	0.01	-0.14	0.01
Engagement	Absenteeism	Mixed	0.86	0.00	0.00	0.88	0.53	0.00	-0.04	0.46
Engagement	Absenteeism	Asian	0.86	0.00	0.00	0.96	0.52	0.00	-0.07	0.15
Engagement	Absenteeism	Black	0.86	0.00	0.03	0.31	0.53	0.01	0.12	0.02
Engagement	Absenteeism	Chinese/other	0.85	0.00	-0.01	0.62	0.51	0.00	-0.02	0.70

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	Absenteeism	White	0.86	0.00	-0.05	0.16	0.53	0.01	-0.12	0.06
Advocacy	Absenteeism	Mixed	0.86	0.00	0.00	0.92	0.53	0.00	-0.07	0.15
Advocacy	Absenteeism	Asian	0.86	0.00	0.00	0.93	0.53	0.01	-0.10	0.05
Advocacy	Absenteeism	Black	0.86	0.00	0.00	0.95	0.52	0.00	0.06	0.23
Advocacy	Absenteeism	Chinese/other	0.85	0.00	-0.03	0.39	0.51	0.00	0.00	0.95
Involvement	Absenteeism	White	0.86	0.00	0.00	0.99	0.53	0.01	-0.14	0.02
Involvement	Absenteeism	Mixed	0.86	0.00	-0.02	0.52	0.53	0.00	-0.01	0.79
Involvement	Absenteeism	Asian	0.86	0.00	-0.01	0.59	0.52	0.00	-0.04	0.38
Involvement	Absenteeism	Black	0.86	0.00	0.04	0.13	0.53	0.02	0.14	0.01
Involvement	Absenteeism	Chinese/other	0.85	0.00	-0.03	0.28	0.51	0.00	-0.04	0.41
Supervisory support	Absenteeism	White	0.86	0.00	-0.02	0.52	0.53	0.01	-0.11	0.08
Supervisory support	Absenteeism	Mixed	0.86	0.00	-0.02	0.40	0.54	0.01	-0.10	0.06
Supervisory support	Absenteeism	Asian	0.86	0.00	-0.03	0.25	0.52	0.00	-0.02	0.63
Supervisory support	Absenteeism	Black	0.86	0.00	0.01	0.61	0.52	0.00	0.03	0.51
Supervisory support	Absenteeism	Chinese/other	0.86	0.00	-0.05	0.06	0.51	0.00	-0.03	0.55
Health and well-being	Absenteeism	White	0.86	0.00	0.08	0.01	0.53	0.01	0.14	0.01
Health and well-being	Absenteeism	Mixed	0.86	0.00	0.00	0.90	0.53	0.00	0.04	0.38
Health and well-being	Absenteeism	Asian	0.86	0.00	0.00	0.88	0.53	0.01	-0.08	0.10
Health and well-being	Absenteeism	Black	0.86	0.00	-0.04	0.12	0.53	0.02	-0.13	0.01
Health and well-being	Absenteeism	Chinese/other	0.85	0.00	0.01	0.75	0.51	0.00	0.04	0.42

continued

TABLE 55 Breakdown by ethnic group (continued)

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	Absenteeism	White	0.86	0.00	0.00	0.96	0.53	0.01	-0.10	0.06
Work pressure	Absenteeism	Mixed	0.86	0.00	0.00	0.89	0.53	0.00	0.03	0.56
Work pressure	Absenteeism	Asian	0.86	0.00	0.06	0.03	0.54	0.02	0.13	0.01
Work pressure	Absenteeism	Black	0.86	0.00	-0.01	0.81	0.52	0.01	-0.09	0.09
Work pressure	Absenteeism	Chinese/other	0.85	0.00	-0.01	0.68	0.51	0.00	-0.05	0.33
Job satisfaction	Stability	White	0.56	0.00	0.03	0.63	0.36	0.00	-0.01	0.83
Job satisfaction	Stability	Mixed	0.57	0.00	0.04	0.45	0.36	0.00	0.01	0.81
Job satisfaction	Stability	Asian	0.57	0.01	0.10	0.03	0.36	0.01	0.09	0.11
Job satisfaction	Stability	Black	0.57	0.01	0.07	0.12	0.37	0.02	0.13	0.02
Job satisfaction	Stability	Chinese/other	0.57	0.00	0.01	0.81	0.36	0.00	0.05	0.36
Motivation	Stability	White	0.56	0.00	-0.02	0.71	0.36	0.00	-0.05	0.34
Motivation	Stability	Mixed	0.57	0.00	0.04	0.39	0.36	0.00	0.04	0.45
Motivation	Stability	Asian	0.56	0.00	0.04	0.36	0.36	0.00	0.07	0.23
Motivation	Stability	Black	0.56	0.00	0.04	0.36	0.37	0.01	0.09	0.13
Motivation	Stability	Chinese/other	0.57	0.00	0.04	0.38	0.36	0.00	0.05	0.42
Intention to leave job	Stability	White	0.56	0.00	-0.04	0.42	0.37	0.01	-0.13	0.03
Intention to leave job	Stability	Mixed	0.57	0.00	0.01	0.81	0.36	0.00	0.04	0.54
Intention to leave job	Stability	Asian	0.56	0.00	-0.04	0.35	0.37	0.01	-0.10	0.07
Intention to leave job	Stability	Black	0.56	0.00	-0.04	0.39	0.36	0.01	-0.08	0.14
Intention to leave job	Stability	Chinese/other	0.57	0.00	-0.02	0.64	0.36	0.00	-0.04	0.50
Engagement	Stability	White	0.56	0.00	0.03	0.56	0.36	0.00	0.02	0.79
Engagement	Stability	Mixed	0.57	0.00	0.04	0.46	0.36	0.00	0.02	0.75

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Stability	Asian	0.56	0.00	0.05	0.27	0.36	0.00	0.04	0.51
Engagement	Stability	Black	0.56	0.00	0.06	0.24	0.37	0.01	0.11	0.05
Engagement	Stability	Chinese/other	0.57	0.00	0.02	0.74	0.36	0.00	0.03	0.67
Advocacy	Stability	White	0.56	0.00	0.07	0.24	0.36	0.00	0.09	0.22
Advocacy	Stability	Mixed	0.57	0.00	0.01	0.91	0.36	0.00	-0.05	0.42
Advocacy	Stability	Asian	0.56	0.00	0.02	0.72	0.36	0.00	0.00	0.94
Advocacy	Stability	Black	0.56	0.00	0.04	0.43	0.37	0.01	0.08	0.18
Advocacy	Stability	Chinese/other	0.57	0.00	0.00	1.00	0.36	0.00	0.04	0.49
Involvement	Stability	White	0.56	0.00	-0.01	0.89	0.36	0.00	-0.06	0.35
Involvement	Stability	Mixed	0.57	0.00	0.05	0.34	0.36	0.00	0.06	0.31
Involvement	Stability	Asian	0.56	0.00	0.07	0.14	0.36	0.00	0.02	0.67
Involvement	Stability	Black	0.56	0.00	0.04	0.36	0.37	0.01	0.09	0.10
Involvement	Stability	Chinese/other	0.57	0.00	0.00	0.93	0.36	0.00	-0.03	0.62
Supervisory support	Stability	White	0.56	0.00	-0.03	0.66	0.36	0.00	-0.05	0.49
Supervisory support	Stability	Mixed	0.57	0.00	0.07	0.14	0.36	0.00	0.06	0.29
Supervisory support	Stability	Asian	0.56	0.00	0.03	0.54	0.36	0.00	0.00	0.95
Supervisory support	Stability	Black	0.56	0.00	0.01	0.89	0.36	0.00	0.05	0.42
Supervisory support	Stability	Chinese/other	0.57	0.00	-0.03	0.51	0.36	0.00	0.03	0.67
Health and well-being	Stability	White	0.56	0.00	0.01	0.81	0.36	0.00	-0.07	0.30
Health and well-being	Stability	Mixed	0.57	0.00	-0.05	0.30	0.36	0.00	-0.06	0.26
Health and well-being	Stability	Asian	0.56	0.00	-0.04	0.43	0.36	0.01	-0.09	0.12

continued

TABLE 55 Breakdown by ethnic group (continued)

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Stability	Black	0.56	0.00	-0.04	0.42	0.37	0.01	-0.07	0.20
Health and well-being	Stability	Chinese/other	0.57	0.00	0.03	0.47	0.36	0.00	0.01	0.86
Work pressure	Stability	White	0.58	0.02	-0.15	0.01	0.41	0.05	-0.26	0.00
Work pressure	Stability	Mixed	0.57	0.00	0.01	0.76	0.36	0.00	0.02	0.75
Work pressure	Stability	Asian	0.56	0.00	-0.02	0.68	0.36	0.00	-0.04	0.49
Work pressure	Stability	Black	0.56	0.00	-0.07	0.18	0.37	0.01	-0.12	0.04
Work pressure	Stability	Chinese/other	0.57	0.00	0.00	0.92	0.36	0.00	-0.04	0.55
Job satisfaction	Mortality	White	0.63	0.00	-0.07	0.21	0.48	0.01	-0.11	0.09
Job satisfaction	Mortality	Mixed	0.65	0.00	-0.07	0.20	0.48	0.00	-0.06	0.32
Job satisfaction	Mortality	Asian	0.63	0.00	-0.02	0.68	0.47	0.00	-0.05	0.44
Job satisfaction	Mortality	Black	0.65	0.00	0.02	0.77	0.50	0.00	-0.02	0.70
Job satisfaction	Mortality	Chinese/other	0.64	0.00	0.01	0.81	0.48	0.00	0.00	0.98
Motivation	Mortality	White	0.63	0.00	-0.01	0.80	0.47	0.00	-0.05	0.41
Motivation	Mortality	Mixed	0.64	0.00	0.00	0.97	0.48	0.00	-0.03	0.60
Motivation	Mortality	Asian	0.63	0.00	-0.01	0.88	0.47	0.00	-0.01	0.87
Motivation	Mortality	Black	0.65	0.00	0.01	0.92	0.50	0.00	-0.01	0.83
Motivation	Mortality	Chinese/other	0.64	0.00	0.01	0.81	0.48	0.00	0.02	0.76
Intention to leave job	Mortality	White	0.64	0.01	0.10	0.09	0.49	0.02	0.13	0.04
Intention to leave job	Mortality	Mixed	0.64	0.00	-0.02	0.65	0.48	0.00	-0.01	0.88
Intention to leave job	Mortality	Asian	0.63	0.00	-0.02	0.73	0.47	0.00	-0.01	0.82
Intention to leave job	Mortality	Black	0.66	0.01	0.07	0.16	0.51	0.01	0.08	0.22
Intention to leave job	Mortality	Chinese/other	0.64	0.00	-0.03	0.58	0.48	0.00	-0.05	0.47

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Mortality	White	0.64	0.01	-0.10	0.07	0.50	0.03	-0.19	0.00
Engagement	Mortality	Mixed	0.64	0.00	-0.04	0.42	0.48	0.00	-0.06	0.38
Engagement	Mortality	Asian	0.63	0.00	-0.02	0.73	0.48	0.01	-0.08	0.22
Engagement	Mortality	Black	0.65	0.00	-0.03	0.51	0.51	0.00	-0.07	0.26
Engagement	Mortality	Chinese/other	0.64	0.00	-0.02	0.77	0.48	0.00	-0.02	0.71
Advocacy	Mortality	White	0.64	0.02	-0.13	0.02	0.51	0.04	-0.22	0.00
Advocacy	Mortality	Mixed	0.64	0.00	-0.03	0.53	0.48	0.00	-0.05	0.45
Advocacy	Mortality	Asian	0.63	0.00	-0.05	0.38	0.49	0.02	-0.15	0.02
Advocacy	Mortality	Black	0.65	0.00	-0.07	0.17	0.52	0.01	-0.12	0.05
Advocacy	Mortality	Chinese/other	0.64	0.00	0.00	0.93	0.48	0.00	-0.01	0.89
Involvement	Mortality	White	0.63	0.00	-0.05	0.38	0.48	0.01	-0.13	0.06
Involvement	Mortality	Mixed	0.65	0.01	-0.07	0.17	0.48	0.00	-0.05	0.43
Involvement	Mortality	Asian	0.63	0.00	0.01	0.82	0.47	0.00	-0.03	0.59
Involvement	Mortality	Black	0.65	0.00	-0.01	0.86	0.50	0.00	-0.02	0.78
Involvement	Mortality	Chinese/other	0.64	0.00	-0.05	0.33	0.48	0.00	-0.07	0.28
Supervisory support	Mortality	White	0.64	0.01	-0.09	0.11	0.48	0.01	-0.11	0.09
Supervisory support	Mortality	Mixed	0.65	0.01	-0.12	0.03	0.50	0.02	-0.14	0.04
Supervisory support	Mortality	Asian	0.63	0.00	-0.01	0.85	0.47	0.00	-0.06	0.37
Supervisory support	Mortality	Black	0.65	0.00	-0.02	0.76	0.50	0.00	0.01	0.87
Supervisory support	Mortality	Chinese/other	0.64	0.00	0.00	0.96	0.48	0.00	0.01	0.92

continued

TABLE 55 Breakdown by ethnic group (continued)

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Mortality	White	0.63	0.00	0.07	0.22	0.48	0.01	0.11	0.09
Health and well-being	Mortality	Mixed	0.64	0.00	-0.01	0.81	0.48	0.00	0.00	0.95
Health and well-being	Mortality	Asian	0.63	0.00	0.06	0.31	0.47	0.00	-0.03	0.66
Health and well-being	Mortality	Black	0.65	0.00	-0.04	0.47	0.51	0.00	-0.06	0.35
Health and well-being	Mortality	Chinese/other	0.64	0.00	0.03	0.56	0.48	0.01	0.07	0.25
Work pressure	Mortality	White	0.63	0.00	0.06	0.22	0.48	0.01	0.11	0.07
Work pressure	Mortality	Mixed	0.64	0.00	0.04	0.41	0.48	0.00	0.03	0.61
Work pressure	Mortality	Asian	0.64	0.01	0.08	0.12	0.48	0.01	0.10	0.13
Work pressure	Mortality	Black	0.65	0.00	0.04	0.51	0.51	0.00	0.07	0.25
Work pressure	Mortality	Chinese/other	0.64	0.00	0.03	0.58	0.48	0.01	0.07	0.25
Job satisfaction	Patient satisfaction	White	0.82	0.00	0.07	0.06	0.61	0.01	0.11	0.05
Job satisfaction	Patient satisfaction	Mixed	0.82	0.00	0.05	0.17	0.62	0.00	0.05	0.35
Job satisfaction	Patient satisfaction	Asian	0.81	0.00	0.04	0.26	0.62	0.01	0.12	0.02
Job satisfaction	Patient satisfaction	Black	0.82	0.00	0.00	0.90	0.62	0.00	0.05	0.37
Job satisfaction	Patient satisfaction	Chinese/other	0.81	0.00	0.02	0.54	0.62	0.00	0.06	0.23
Motivation	Patient satisfaction	White	0.82	0.00	0.05	0.20	0.61	0.01	0.09	0.10
Motivation	Patient satisfaction	Mixed	0.83	0.00	0.07	0.07	0.62	0.00	0.05	0.37
Motivation	Patient satisfaction	Asian	0.82	0.00	0.05	0.16	0.60	0.00	0.06	0.22
Motivation	Patient satisfaction	Black	0.81	0.00	-0.07	0.05	0.60	0.00	0.00	0.93
Motivation	Patient satisfaction	Chinese/other	0.81	0.00	-0.05	0.22	0.62	0.01	-0.09	0.08
Intention to leave job	Patient satisfaction	White	0.82	0.01	-0.08	0.04	0.64	0.04	-0.21	0.00
Intention to leave job	Patient satisfaction	Mixed	0.83	0.00	-0.05	0.16	0.62	0.00	0.00	0.96

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Patient satisfaction	Asian	0.82	0.00	-0.05	0.19	0.62	0.02	-0.15	0.01
Intention to leave job	Patient satisfaction	Black	0.82	0.00	0.03	0.35	0.62	0.00	-0.04	0.45
Intention to leave job	Patient satisfaction	Chinese/other	0.81	0.00	0.00	0.99	0.61	0.00	-0.02	0.74
Engagement	Patient satisfaction	White	0.82	0.01	0.13	0.00	0.65	0.05	0.29	0.00
Engagement	Patient satisfaction	Mixed	0.83	0.01	0.11	0.00	0.63	0.01	0.11	0.04
Engagement	Patient satisfaction	Asian	0.82	0.01	0.08	0.02	0.62	0.02	0.16	0.00
Engagement	Patient satisfaction	Black	0.81	0.00	-0.03	0.41	0.61	0.00	0.05	0.37
Engagement	Patient satisfaction	Chinese/other	0.81	0.00	0.01	0.81	0.61	0.00	0.02	0.77
Advocacy	Patient satisfaction	White	0.83	0.02	0.18	0.00	0.69	0.09	0.39	0.00
Advocacy	Patient satisfaction	Mixed	0.84	0.01	0.12	0.00	0.64	0.02	0.15	0.01
Advocacy	Patient satisfaction	Asian	0.83	0.01	0.13	0.00	0.66	0.06	0.27	0.00
Advocacy	Patient satisfaction	Black	0.81	0.00	0.01	0.83	0.62	0.01	0.12	0.03
Advocacy	Patient satisfaction	Chinese/other	0.81	0.00	0.03	0.48	0.62	0.00	0.07	0.20
Involvement	Patient satisfaction	White	0.82	0.00	0.07	0.07	0.61	0.01	0.12	0.04
Involvement	Patient satisfaction	Mixed	0.83	0.01	0.08	0.03	0.62	0.00	0.06	0.22
Involvement	Patient satisfaction	Asian	0.81	0.00	0.04	0.27	0.61	0.01	0.08	0.14
Involvement	Patient satisfaction	Black	0.81	0.00	-0.02	0.57	0.61	0.00	-0.02	0.69
Involvement	Patient satisfaction	Chinese/other	0.81	0.00	0.04	0.30	0.62	0.00	0.06	0.27
Supervisory support	Patient satisfaction	White	0.82	0.00	0.05	0.19	0.61	0.01	0.09	0.11
Supervisory support	Patient satisfaction	Mixed	0.82	0.00	0.01	0.77	0.62	0.00	0.06	0.30
Supervisory support	Patient satisfaction	Asian	0.82	0.00	0.05	0.18	0.61	0.01	0.08	0.12

continued

TABLE 55 Breakdown by ethnic group (continued)

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Patient satisfaction	Black	0.82	0.00	-0.01	0.71	0.62	0.00	-0.01	0.87
Supervisory support	Patient satisfaction	Chinese/other	0.81	0.00	0.01	0.88	0.61	0.00	0.03	0.54
Health and well-being	Patient satisfaction	White	0.81	0.00	0.02	0.68	0.61	0.01	-0.09	0.11
Health and well-being	Patient satisfaction	Mixed	0.83	0.01	-0.09	0.02	0.63	0.01	-0.10	0.07
Health and well-being	Patient satisfaction	Asian	0.81	0.00	0.03	0.33	0.60	0.00	0.04	0.49
Health and well-being	Patient satisfaction	Black	0.81	0.00	0.03	0.46	0.61	0.00	0.06	0.27
Health and well-being	Patient satisfaction	Chinese/other	0.81	0.00	0.04	0.27	0.61	0.00	0.03	0.63
Work pressure	Patient satisfaction	White	0.82	0.01	-0.09	0.03	0.63	0.03	-0.20	0.00
Work pressure	Patient satisfaction	Mixed	0.83	0.01	-0.10	0.00	0.63	0.01	-0.09	0.08
Work pressure	Patient satisfaction	Asian	0.82	0.00	-0.06	0.11	0.62	0.02	-0.16	0.00
Work pressure	Patient satisfaction	Black	0.81	0.00	-0.02	0.64	0.62	0.01	-0.12	0.02
Work pressure	Patient satisfaction	Chinese/other	0.81	0.00	-0.01	0.77	0.62	0.01	-0.11	0.05
Job satisfaction	MRSA	White	0.21	0.00	0.04	0.62	0.10	0.00	0.04	0.62
Job satisfaction	MRSA	Mixed	0.25	0.00	-0.04	0.57	0.09	0.00	-0.04	0.63
Job satisfaction	MRSA	Asian	0.23	0.02	0.13	0.08	0.11	0.01	0.11	0.13
Job satisfaction	MRSA	Black	0.23	0.00	-0.02	0.76	0.10	0.00	0.02	0.84
Job satisfaction	MRSA	Chinese/other	0.25	0.00	0.06	0.39	0.12	0.01	0.08	0.29
Motivation	MRSA	White	0.21	0.00	0.03	0.72	0.10	0.00	0.03	0.68
Motivation	MRSA	Mixed	0.25	0.00	-0.01	0.94	0.09	0.00	-0.02	0.77
Motivation	MRSA	Asian	0.22	0.01	0.09	0.20	0.10	0.00	0.04	0.61
Motivation	MRSA	Black	0.23	0.00	-0.06	0.42	0.10	0.00	-0.02	0.80
Motivation	MRSA	Chinese/other	0.25	0.00	-0.01	0.93	0.11	0.00	0.00	0.99

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	MRSA	White	0.21	0.00	0.01	0.88	0.10	0.00	0.01	0.91
Intention to leave job	MRSA	Mixed	0.26	0.00	0.06	0.45	0.09	0.00	0.03	0.68
Intention to leave job	MRSA	Asian	0.22	0.01	-0.10	0.16	0.10	0.01	-0.08	0.30
Intention to leave job	MRSA	Black	0.24	0.01	0.10	0.15	0.11	0.01	0.10	0.20
Intention to leave job	MRSA	Chinese/other	0.25	0.00	0.03	0.70	0.11	0.00	0.03	0.73
Engagement	MRSA	White	0.21	0.00	0.06	0.50	0.10	0.01	0.09	0.34
Engagement	MRSA	Mixed	0.25	0.00	-0.05	0.52	0.09	0.00	-0.05	0.57
Engagement	MRSA	Asian	0.23	0.01	0.12	0.11	0.11	0.01	0.09	0.23
Engagement	MRSA	Black	0.23	0.00	-0.05	0.50	0.10	0.00	-0.01	0.94
Engagement	MRSA	Chinese/other	0.25	0.00	0.01	0.94	0.11	0.00	0.04	0.65
Advocacy	MRSA	White	0.22	0.00	0.08	0.43	0.10	0.01	0.10	0.32
Advocacy	MRSA	Mixed	0.25	0.00	0.00	1.00	0.09	0.00	0.00	0.97
Advocacy	MRSA	Asian	0.22	0.01	0.08	0.31	0.10	0.00	0.07	0.41
Advocacy	MRSA	Black	0.23	0.01	-0.08	0.32	0.10	0.00	-0.04	0.61
Advocacy	MRSA	Chinese/other	0.25	0.00	-0.05	0.48	0.11	0.00	-0.02	0.85
Involvement	MRSA	White	0.21	0.00	0.04	0.66	0.10	0.00	0.08	0.36
Involvement	MRSA	Mixed	0.27	0.01	-0.12	0.11	0.10	0.01	-0.09	0.25
Involvement	MRSA	Asian	0.23	0.02	0.13	0.06	0.12	0.02	0.13	0.08
Involvement	MRSA	Black	0.23	0.00	0.03	0.72	0.11	0.00	0.05	0.50
Involvement	MRSA	Chinese/other	0.25	0.00	0.06	0.40	0.12	0.01	0.10	0.21

continued

TABLE 55 Breakdown by ethnic group (continued)

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	MRSA	White	0.21	0.00	-0.01	0.89	0.10	0.00	0.01	0.91
Supervisory support	MRSA	Mixed	0.26	0.01	-0.10	0.18	0.10	0.00	-0.06	0.46
Supervisory support	MRSA	Asian	0.22	0.01	0.10	0.17	0.11	0.01	0.11	0.16
Supervisory support	MRSA	Black	0.23	0.00	-0.06	0.39	0.10	0.00	0.00	0.98
Supervisory support	MRSA	Chinese/other	0.25	0.00	0.00	0.98	0.11	0.00	0.02	0.78
Health and well-being	MRSA	White	0.22	0.01	-0.11	0.15	0.11	0.01	-0.11	0.16
Health and well-being	MRSA	Mixed	0.25	0.00	0.05	0.50	0.09	0.00	0.02	0.78
Health and well-being	MRSA	Asian	0.22	0.00	-0.06	0.42	0.10	0.00	-0.03	0.70
Health and well-being	MRSA	Black	0.23	0.00	0.05	0.48	0.10	0.00	0.01	0.87
Health and well-being	MRSA	Chinese/other	0.25	0.00	0.02	0.84	0.11	0.00	-0.01	0.88
Work pressure	MRSA	White	0.22	0.01	-0.11	0.19	0.11	0.01	-0.10	0.23
Work pressure	MRSA	Mixed	0.26	0.00	-0.07	0.34	0.10	0.01	-0.10	0.20
Work pressure	MRSA	Asian	0.21	0.00	0.00	0.98	0.10	0.00	0.02	0.82
Work pressure	MRSA	Black	0.23	0.00	-0.06	0.39	0.11	0.01	-0.09	0.24
Work pressure	MRSA	Chinese/other	0.25	0.00	0.03	0.68	0.11	0.00	0.04	0.63
Job satisfaction	<i>C. difficile</i>	White	0.50	0.00	-0.01	0.82	0.12	0.00	0.06	0.49
Job satisfaction	<i>C. difficile</i>	Mixed	0.51	0.00	0.04	0.47	0.12	0.00	-0.07	0.39
Job satisfaction	<i>C. difficile</i>	Asian	0.50	0.00	0.03	0.60	0.12	0.00	0.00	0.97
Job satisfaction	<i>C. difficile</i>	Black	0.50	0.00	-0.06	0.29	0.13	0.00	0.05	0.51
Job satisfaction	<i>C. difficile</i>	Chinese/other	0.49	0.00	-0.05	0.36	0.11	0.00	-0.03	0.67
Motivation	<i>C. difficile</i>	White	0.50	0.00	0.00	0.97	0.13	0.01	0.11	0.14
Motivation	<i>C. difficile</i>	Mixed	0.51	0.00	0.03	0.65	0.12	0.00	-0.01	0.91

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	<i>C. difficile</i>	Asian	0.50	0.00	0.02	0.67	0.12	0.00	-0.04	0.55
Motivation	<i>C. difficile</i>	Black	0.50	0.01	-0.10	0.08	0.11	0.00	-0.02	0.79
Motivation	<i>C. difficile</i>	Chinese/other	0.50	0.01	-0.11	0.07	0.14	0.02	-0.15	0.05
Intention to leave job	<i>C. difficile</i>	White	0.50	0.00	0.03	0.64	0.12	0.00	0.01	0.89
Intention to leave job	<i>C. difficile</i>	Mixed	0.51	0.00	-0.05	0.41	0.12	0.00	0.00	0.98
Intention to leave job	<i>C. difficile</i>	Asian	0.52	0.02	-0.14	0.02	0.12	0.00	-0.07	0.39
Intention to leave job	<i>C. difficile</i>	Black	0.50	0.00	0.01	0.86	0.13	0.00	-0.02	0.75
Intention to leave job	<i>C. difficile</i>	Chinese/other	0.49	0.00	0.01	0.90	0.11	0.00	0.05	0.51
Engagement	<i>C. difficile</i>	White	0.50	0.00	0.04	0.54	0.13	0.01	0.14	0.15
Engagement	<i>C. difficile</i>	Mixed	0.51	0.00	0.07	0.27	0.12	0.00	0.02	0.85
Engagement	<i>C. difficile</i>	Asian	0.50	0.00	0.06	0.34	0.12	0.00	0.01	0.85
Engagement	<i>C. difficile</i>	Black	0.49	0.01	-0.07	0.22	0.11	0.00	0.04	0.60
Engagement	<i>C. difficile</i>	Chinese/other	0.50	0.01	-0.12	0.05	0.13	0.02	-0.15	0.06
Advocacy	<i>C. difficile</i>	White	0.50	0.00	0.05	0.47	0.12	0.01	0.12	0.24
Advocacy	<i>C. difficile</i>	Mixed	0.52	0.01	0.10	0.10	0.12	0.00	0.07	0.41
Advocacy	<i>C. difficile</i>	Asian	0.50	0.00	0.06	0.31	0.12	0.00	0.07	0.42
Advocacy	<i>C. difficile</i>	Black	0.49	0.00	0.07	0.28	0.12	0.01	0.11	0.17
Advocacy	<i>C. difficile</i>	Chinese/other	0.49	0.00	-0.07	0.29	0.12	0.01	-0.08	0.34
Involvement	<i>C. difficile</i>	White	0.50	0.00	0.04	0.55	0.13	0.01	0.11	0.19
Involvement	<i>C. difficile</i>	Mixed	0.51	0.00	0.03	0.60	0.12	0.00	-0.02	0.80
Involvement	<i>C. difficile</i>	Asian	0.50	0.00	0.06	0.29	0.12	0.00	0.02	0.83

continued

TABLE 55 Breakdown by ethnic group (continued)

Predictor	Outcome	Ethnic group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	<i>C. difficile</i>	Black	0.50	0.02	-0.13	0.03	0.11	0.00	0.01	0.85
Involvement	<i>C. difficile</i>	Chinese/other	0.50	0.02	-0.13	0.03	0.14	0.02	-0.16	0.05
Supervisory support	<i>C. difficile</i>	White	0.50	0.00	0.05	0.37	0.12	0.01	0.08	0.33
Supervisory support	<i>C. difficile</i>	Mixed	0.51	0.00	0.00	0.95	0.12	0.00	-0.05	0.56
Supervisory support	<i>C. difficile</i>	Asian	0.50	0.00	0.06	0.30	0.12	0.01	0.08	0.31
Supervisory support	<i>C. difficile</i>	Black	0.50	0.01	-0.08	0.15	0.13	0.00	-0.02	0.82
Supervisory support	<i>C. difficile</i>	Chinese/other	0.49	0.00	-0.05	0.45	0.11	0.00	-0.03	0.69
Health and well-being	<i>C. difficile</i>	White	0.50	0.00	-0.02	0.70	0.12	0.01	-0.08	0.30
Health and well-being	<i>C. difficile</i>	Mixed	0.51	0.01	-0.07	0.22	0.13	0.01	-0.08	0.32
Health and well-being	<i>C. difficile</i>	Asian	0.50	0.00	-0.06	0.32	0.12	0.00	-0.06	0.44
Health and well-being	<i>C. difficile</i>	Black	0.50	0.01	0.12	0.04	0.11	0.00	0.03	0.67
Health and well-being	<i>C. difficile</i>	Chinese/other	0.49	0.00	-0.03	0.59	0.12	0.01	-0.10	0.22
Work pressure	<i>C. difficile</i>	White	0.50	0.00	0.07	0.29	0.12	0.01	-0.10	0.26
Work pressure	<i>C. difficile</i>	Mixed	0.51	0.00	-0.05	0.42	0.13	0.01	-0.11	0.18
Work pressure	<i>C. difficile</i>	Asian	0.50	0.00	-0.04	0.45	0.13	0.01	-0.12	0.13
Work pressure	<i>C. difficile</i>	Black	0.49	0.00	0.02	0.78	0.11	0.00	-0.06	0.42
Work pressure	<i>C. difficile</i>	Chinese/other	0.49	0.00	-0.01	0.92	0.11	0.00	0.01	0.87

TABLE 56 Breakdown by employment status: full time/part time

Predictor	Outcome	Employment status	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	PT	0.86	0.00	-0.05	0.12	0.53	0.01	-0.12	0.03
Job satisfaction	Absenteeism	FT	0.86	0.00	-0.04	0.22	0.53	0.01	-0.15	0.01
Motivation	Absenteeism	PT	0.86	0.00	-0.01	0.61	0.52	0.00	-0.07	0.15
Motivation	Absenteeism	FT	0.86	0.00	-0.03	0.37	0.54	0.02	-0.15	0.00
Intention to leave job	Absenteeism	PT	0.86	0.00	0.01	0.65	0.52	0.00	0.00	0.95
Intention to leave job	Absenteeism	FT	0.86	0.00	0.04	0.15	0.53	0.01	0.08	0.10
Engagement	Absenteeism	PT	0.86	0.00	-0.01	0.67	0.52	0.00	-0.07	0.18
Engagement	Absenteeism	FT	0.86	0.00	-0.05	0.13	0.54	0.02	-0.18	0.00
Advocacy	Absenteeism	PT	0.86	0.00	0.00	0.92	0.52	0.00	0.00	0.94
Advocacy	Absenteeism	FT	0.86	0.00	-0.06	0.06	0.54	0.02	-0.17	0.01
Involvement	Absenteeism	PT	0.86	0.00	-0.01	0.71	0.53	0.01	-0.13	0.01
Involvement	Absenteeism	FT	0.86	0.00	-0.01	0.70	0.53	0.01	-0.14	0.02
Supervisory support	Absenteeism	PT	0.86	0.00	-0.05	0.09	0.53	0.01	-0.10	0.08
Supervisory support	Absenteeism	FT	0.86	0.00	-0.02	0.59	0.53	0.01	-0.10	0.12
Health and well-being	Absenteeism	PT	0.86	0.00	0.02	0.51	0.52	0.00	0.01	0.82
Health and well-being	Absenteeism	FT	0.86	0.00	0.07	0.02	0.53	0.01	0.10	0.07
Work pressure	Absenteeism	PT	0.86	0.00	-0.01	0.70	0.54	0.02	-0.14	0.01
Work pressure	Absenteeism	FT	0.86	0.00	0.02	0.45	0.52	0.00	-0.04	0.43
Job satisfaction	Stability	PT	0.56	0.00	-0.02	0.72	0.36	0.00	0.00	0.94
Job satisfaction	Stability	FT	0.56	0.00	0.05	0.41	0.36	0.00	0.00	0.95
Motivation	Stability	PT	0.56	0.00	-0.03	0.50	0.36	0.00	-0.05	0.41
Motivation	Stability	FT	0.56	0.00	-0.01	0.79	0.36	0.01	-0.08	0.16

continued

TABLE 56 Breakdown by employment status: full time/part time (continued)

Predictor	Outcome	Employment status	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Stability	PT	0.56	0.00	-0.06	0.18	0.38	0.02	-0.15	0.01
Intention to leave job	Stability	FT	0.56	0.00	-0.03	0.54	0.37	0.01	-0.12	0.04
Engagement	Stability	PT	0.56	0.00	0.02	0.70	0.36	0.00	0.04	0.57
Engagement	Stability	FT	0.56	0.00	0.02	0.70	0.36	0.00	-0.02	0.78
Advocacy	Stability	PT	0.57	0.00	0.09	0.12	0.37	0.02	0.15	0.02
Advocacy	Stability	FT	0.56	0.00	0.05	0.43	0.36	0.00	0.03	0.63
Involvement	Stability	PT	0.56	0.00	-0.02	0.65	0.36	0.00	-0.06	0.35
Involvement	Stability	FT	0.56	0.00	-0.01	0.82	0.36	0.00	-0.06	0.36
Supervisory support	Stability	PT	0.56	0.00	0.02	0.66	0.36	0.00	0.06	0.36
Supervisory support	Stability	FT	0.56	0.00	-0.05	0.43	0.36	0.01	-0.10	0.18
Health and well-being	Stability	PT	0.57	0.01	0.09	0.05	0.36	0.00	0.05	0.42
Health and well-being	Stability	FT	0.56	0.00	-0.07	0.21	0.38	0.02	-0.17	0.01
Work pressure	Stability	PT	0.58	0.02	-0.13	0.01	0.40	0.05	-0.23	0.00
Work pressure	Stability	FT	0.57	0.01	-0.10	0.06	0.38	0.02	-0.18	0.00
Job satisfaction	Mortality	PT	0.63	0.00	-0.04	0.46	0.48	0.01	-0.09	0.15
Job satisfaction	Mortality	FT	0.64	0.01	-0.08	0.13	0.49	0.01	-0.13	0.05
Motivation	Mortality	PT	0.63	0.00	-0.03	0.54	0.47	0.00	-0.06	0.30
Motivation	Mortality	FT	0.63	0.00	0.02	0.68	0.47	0.00	0.01	0.92
Intention to leave job	Mortality	PT	0.63	0.00	0.05	0.36	0.48	0.01	0.12	0.07
Intention to leave job	Mortality	FT	0.64	0.01	0.10	0.09	0.48	0.01	0.13	0.06
Engagement	Mortality	PT	0.64	0.01	-0.08	0.14	0.49	0.02	-0.15	0.02
Engagement	Mortality	FT	0.64	0.01	-0.09	0.11	0.50	0.03	-0.18	0.01

Predictor	Outcome	Employment status	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	Mortality	PT	0.64	0.01	-0.10	0.06	0.50	0.03	-0.18	0.01
Advocacy	Mortality	FT	0.65	0.02	-0.14	0.01	0.52	0.05	-0.24	0.00
Involvement	Mortality	PT	0.63	0.00	-0.03	0.52	0.48	0.01	-0.09	0.15
Involvement	Mortality	FT	0.63	0.00	-0.04	0.48	0.48	0.01	-0.11	0.08
Supervisory support	Mortality	PT	0.63	0.00	-0.03	0.52	0.48	0.01	-0.07	0.24
Supervisory support	Mortality	FT	0.64	0.01	-0.13	0.02	0.49	0.02	-0.13	0.04
Health and well-being	Mortality	PT	0.63	0.00	-0.07	0.22	0.47	0.00	-0.02	0.81
Health and well-being	Mortality	FT	0.64	0.01	0.13	0.02	0.48	0.01	0.12	0.06
Work pressure	Mortality	PT	0.63	0.00	0.03	0.63	0.48	0.01	0.09	0.14
Work pressure	Mortality	FT	0.63	0.01	0.07	0.16	0.48	0.01	0.12	0.06
Job satisfaction	Patient satisfaction	PT	0.81	0.00	0.01	0.70	0.60	0.00	0.04	0.52
Job satisfaction	Patient satisfaction	FT	0.82	0.01	0.09	0.02	0.62	0.02	0.16	0.01
Motivation	Patient satisfaction	PT	0.81	0.00	0.02	0.61	0.60	0.00	0.02	0.70
Motivation	Patient satisfaction	FT	0.81	0.00	0.04	0.30	0.60	0.00	0.02	0.70
Intention to leave job	Patient satisfaction	PT	0.82	0.00	-0.05	0.14	0.62	0.02	-0.15	0.00
Intention to leave job	Patient satisfaction	FT	0.82	0.01	-0.10	0.02	0.64	0.04	-0.23	0.00
Engagement	Patient satisfaction	PT	0.82	0.00	0.06	0.15	0.63	0.03	0.20	0.00
Engagement	Patient satisfaction	FT	0.83	0.01	0.14	0.00	0.65	0.05	0.26	0.00
Advocacy	Patient satisfaction	PT	0.82	0.01	0.12	0.01	0.66	0.06	0.31	0.00
Advocacy	Patient satisfaction	FT	0.83	0.02	0.19	0.00	0.68	0.08	0.37	0.00

continued

TABLE 56 Breakdown by employment status: full time/part time (continued)

Predictor	Outcome	Employment status	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Patient satisfaction	PT	0.81	0.00	-0.01	0.88	0.60	0.00	0.07	0.23
Involvement	Patient satisfaction	FT	0.82	0.01	0.09	0.02	0.62	0.01	0.13	0.02
Supervisory support	Patient satisfaction	PT	0.81	0.00	0.05	0.22	0.61	0.00	0.07	0.19
Supervisory support	Patient satisfaction	FT	0.82	0.00	0.05	0.19	0.61	0.01	0.08	0.15
Health and well-being	Patient satisfaction	PT	0.81	0.00	0.03	0.42	0.60	0.00	0.00	0.97
Health and well-being	Patient satisfaction	FT	0.81	0.00	0.03	0.48	0.61	0.01	-0.08	0.13
Work pressure	Patient satisfaction	PT	0.81	0.00	-0.02	0.66	0.60	0.00	-0.06	0.28
Work pressure	Patient satisfaction	FT	0.82	0.01	-0.12	0.00	0.64	0.04	-0.23	0.00
Job satisfaction	MRSA	PT	0.21	0.00	0.04	0.62	0.10	0.00	0.01	0.86
Job satisfaction	MRSA	FT	0.21	0.00	0.03	0.68	0.10	0.00	0.05	0.54
Motivation	MRSA	PT	0.21	0.00	0.05	0.49	0.10	0.00	0.02	0.79
Motivation	MRSA	FT	0.22	0.00	0.06	0.44	0.10	0.00	0.07	0.39
Intention to leave job	MRSA	PT	0.21	0.00	0.00	0.97	0.10	0.00	0.01	0.88
Intention to leave job	MRSA	FT	0.21	0.00	0.03	0.72	0.10	0.00	0.02	0.82
Engagement	MRSA	PT	0.21	0.00	0.06	0.51	0.10	0.00	0.07	0.45
Engagement	MRSA	FT	0.22	0.00	0.07	0.42	0.11	0.01	0.10	0.26
Advocacy	MRSA	PT	0.21	0.00	0.05	0.61	0.10	0.00	0.08	0.45
Advocacy	MRSA	FT	0.21	0.00	0.05	0.59	0.10	0.00	0.08	0.44
Involvement	MRSA	PT	0.21	0.00	0.04	0.59	0.10	0.00	0.07	0.42
Involvement	MRSA	FT	0.22	0.01	0.09	0.27	0.11	0.01	0.13	0.11
Supervisory support	MRSA	PT	0.21	0.00	0.03	0.70	0.10	0.00	0.00	0.98
Supervisory support	MRSA	FT	0.21	0.00	0.01	0.90	0.10	0.00	0.06	0.47

Predictor	Outcome	Employment status	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	MRSA	PT	0.21	0.00	-0.04	0.59	0.10	0.00	-0.02	0.81
Health and well-being	MRSA	FT	0.22	0.01	-0.09	0.24	0.11	0.01	-0.09	0.25
Work pressure	MRSA	PT	0.22	0.01	-0.10	0.18	0.11	0.01	-0.09	0.26
Work pressure	MRSA	FT	0.22	0.00	-0.07	0.42	0.10	0.00	-0.07	0.40
Job satisfaction	<i>C. difficile</i>	PT	0.50	0.00	-0.03	0.58	0.12	0.00	0.03	0.67
Job satisfaction	<i>C. difficile</i>	FT	0.50	0.00	0.03	0.65	0.12	0.01	0.09	0.30
Motivation	<i>C. difficile</i>	PT	0.51	0.01	-0.10	0.10	0.12	0.00	-0.04	0.62
Motivation	<i>C. difficile</i>	FT	0.50	0.00	0.02	0.80	0.13	0.01	0.12	0.15
Intention to leave job	<i>C. difficile</i>	PT	0.50	0.00	0.04	0.44	0.12	0.00	0.03	0.67
Intention to leave job	<i>C. difficile</i>	FT	0.50	0.00	-0.01	0.87	0.12	0.00	-0.03	0.71
Engagement	<i>C. difficile</i>	PT	0.50	0.00	-0.01	0.89	0.12	0.00	0.06	0.51
Engagement	<i>C. difficile</i>	FT	0.50	0.00	0.06	0.40	0.13	0.01	0.14	0.13
Advocacy	<i>C. difficile</i>	PT	0.50	0.00	0.04	0.60	0.12	0.00	0.07	0.46
Advocacy	<i>C. difficile</i>	FT	0.50	0.00	0.06	0.43	0.13	0.01	0.13	0.21
Involvement	<i>C. difficile</i>	PT	0.50	0.00	0.03	0.61	0.13	0.01	0.10	0.19
Involvement	<i>C. difficile</i>	FT	0.51	0.00	0.07	0.26	0.13	0.01	0.11	0.20
Supervisory support	<i>C. difficile</i>	PT	0.50	0.00	-0.02	0.74	0.12	0.00	0.00	0.96
Supervisory support	<i>C. difficile</i>	FT	0.50	0.00	0.06	0.33	0.13	0.01	0.12	0.14
Health and well-being	<i>C. difficile</i>	PT	0.50	0.00	0.00	0.96	0.12	0.00	0.00	0.97
Health and well-being	<i>C. difficile</i>	FT	0.51	0.00	-0.07	0.24	0.14	0.02	-0.15	0.07
Work pressure	<i>C. difficile</i>	PT	0.52	0.02	0.15	0.02	0.12	0.00	0.04	0.59
Work pressure	<i>C. difficile</i>	FT	0.50	0.00	0.03	0.68	0.13	0.02	-0.15	0.08

FT, full time; PT, part time.

TABLE 57 Breakdown by geographical area

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			<i>R</i> ²	ΔR^2	Regression coefficient	<i>p</i> -value	<i>R</i> ²	ΔR^2	Regression coefficient	<i>p</i> -value
Job satisfaction	Absenteeism	North East	0.90	0.06	0.30	0.16	0.82	0.06	0.30	0.21
Job satisfaction	Absenteeism	North West	0.83	0.00	-0.01	0.91	0.74	0.00	-0.05	0.65
Job satisfaction	Absenteeism	Yorkshire and the Humber	0.94	0.00	-0.02	0.89	0.86	0.03	0.35	0.13
Job satisfaction	Absenteeism	East Midlands	0.96	0.00	-0.04	0.82	0.78	0.01	0.15	0.66
Job satisfaction	Absenteeism	West Midlands	0.83	0.13	-0.43	0.00	0.77	0.20	-0.51	0.00
Job satisfaction	Absenteeism	East of England	0.89	0.01	-0.12	0.24	0.81	0.01	-0.11	0.40
Job satisfaction	Absenteeism	London	0.86	0.01	-0.11	0.28	0.32	0.02	-0.20	0.36
Job satisfaction	Absenteeism	South-East Coast	0.90	0.07	-0.51	0.06	0.90	0.17	-0.55	0.01
Job satisfaction	Absenteeism	South Central	0.87	0.01	-0.14	0.64	0.47	0.00	0.05	0.92
Job satisfaction	Absenteeism	South West	0.86	0.01	0.16	0.37	0.77	0.00	-0.10	0.60
Motivation	Absenteeism	North East	0.92	0.08	0.31	0.09	0.78	0.03	0.18	0.40
Motivation	Absenteeism	North West	0.83	0.00	-0.03	0.77	0.75	0.01	-0.12	0.25
Motivation	Absenteeism	Yorkshire and the Humber	0.94	0.00	0.04	0.60	0.86	0.02	0.17	0.14
Motivation	Absenteeism	East Midlands	0.96	0.00	0.03	0.77	0.79	0.02	-0.15	0.46
Motivation	Absenteeism	West Midlands	0.77	0.07	-0.28	0.03	0.70	0.12	-0.36	0.01
Motivation	Absenteeism	East of England	0.88	0.00	-0.03	0.79	0.81	0.01	-0.09	0.47
Motivation	Absenteeism	London	0.86	0.00	-0.04	0.56	0.30	0.00	0.04	0.81
Motivation	Absenteeism	South-East Coast	0.85	0.01	-0.19	0.48	0.82	0.09	-0.38	0.08
Motivation	Absenteeism	South Central	0.87	0.00	-0.05	0.76	0.48	0.01	0.13	0.67
Motivation	Absenteeism	South West	0.86	0.01	0.13	0.33	0.76	0.00	0.05	0.73

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Absenteeism	North East	0.92	0.08	-0.36	0.08	0.91	0.15	-0.43	0.02
Intention to leave job	Absenteeism	North West	0.83	0.00	-0.02	0.82	0.74	0.00	0.04	0.67
Intention to leave job	Absenteeism	Yorkshire and the Humber	0.95	0.01	0.11	0.20	0.84	0.00	0.02	0.89
Intention to leave job	Absenteeism	East Midlands	0.97	0.01	0.10	0.33	0.77	0.00	0.01	0.96
Intention to leave job	Absenteeism	West Midlands	0.80	0.10	0.34	0.01	0.72	0.15	0.40	0.01
Intention to leave job	Absenteeism	East of England	0.88	0.00	0.01	0.90	0.81	0.00	0.02	0.90
Intention to leave job	Absenteeism	London	0.85	0.00	0.05	0.58	0.31	0.00	0.07	0.72
Intention to leave job	Absenteeism	South-East Coast	0.84	0.00	0.11	0.68	0.78	0.05	0.32	0.22
Intention to leave job	Absenteeism	South Central	0.90	0.04	0.23	0.17	0.48	0.01	-0.08	0.80
Intention to leave job	Absenteeism	South West	0.85	0.00	0.00	0.99	0.76	0.00	0.06	0.72
Engagement	Absenteeism	North East	0.92	0.08	0.30	0.08	0.88	0.12	0.35	0.05
Engagement	Absenteeism	North West	0.83	0.00	-0.01	0.92	0.75	0.01	-0.12	0.29
Engagement	Absenteeism	Yorkshire and the Humber	0.94	0.00	0.08	0.53	0.88	0.04	0.33	0.06
Engagement	Absenteeism	East Midlands	0.96	0.01	-0.09	0.42	0.78	0.00	-0.08	0.75
Engagement	Absenteeism	West Midlands	0.79	0.09	-0.34	0.02	0.70	0.12	-0.40	0.01
Engagement	Absenteeism	East of England	0.89	0.00	-0.07	0.52	0.81	0.00	-0.08	0.52
Engagement	Absenteeism	London	0.86	0.01	-0.11	0.29	0.31	0.01	-0.14	0.54
Engagement	Absenteeism	South-East Coast	0.84	0.01	-0.18	0.59	0.81	0.07	-0.44	0.12
Engagement	Absenteeism	South Central	0.87	0.01	-0.12	0.54	0.48	0.00	0.09	0.81
Engagement	Absenteeism	South West	0.85	0.00	0.00	0.98	0.77	0.01	-0.13	0.49

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	Absenteeism	North East	0.88	0.04	0.25	0.23	0.86	0.11	0.33	0.07
Advocacy	Absenteeism	North West	0.83	0.00	0.02	0.88	0.75	0.01	-0.11	0.41
Advocacy	Absenteeism	Yorkshire and the Humber	0.94	0.00	-0.06	0.65	0.85	0.01	0.19	0.34
Advocacy	Absenteeism	East Midlands	0.97	0.02	-0.16	0.15	0.77	0.00	-0.01	0.96
Advocacy	Absenteeism	West Midlands	0.80	0.10	-0.43	0.01	0.71	0.13	-0.49	0.01
Advocacy	Absenteeism	East of England	0.88	0.00	-0.07	0.54	0.81	0.00	-0.03	0.85
Advocacy	Absenteeism	London	0.86	0.00	-0.11	0.33	0.32	0.02	-0.21	0.39
Advocacy	Absenteeism	South-East Coast	0.84	0.01	-0.16	0.63	0.79	0.05	-0.42	0.19
Advocacy	Absenteeism	South Central	0.87	0.01	-0.11	0.58	0.48	0.01	0.10	0.78
Advocacy	Absenteeism	South West	0.85	0.00	-0.09	0.59	0.78	0.02	-0.21	0.28
Involvement	Absenteeism	North East	0.93	0.09	0.36	0.05	0.85	0.10	0.37	0.09
Involvement	Absenteeism	North West	0.83	0.00	-0.04	0.70	0.75	0.01	-0.10	0.37
Involvement	Absenteeism	Yorkshire and the Humber	0.96	0.01	0.20	0.07	0.88	0.04	0.34	0.06
Involvement	Absenteeism	East Midlands	0.96	0.00	-0.04	0.84	0.77	0.00	-0.06	0.89
Involvement	Absenteeism	West Midlands	0.73	0.03	-0.20	0.15	0.62	0.05	-0.24	0.14
Involvement	Absenteeism	East of England	0.89	0.01	-0.11	0.35	0.83	0.02	-0.19	0.16
Involvement	Absenteeism	London	0.86	0.01	-0.12	0.24	0.31	0.01	-0.14	0.53
Involvement	Absenteeism	South-East Coast	0.84	0.00	-0.14	0.76	0.81	0.07	-0.52	0.12
Involvement	Absenteeism	South Central	0.88	0.02	-0.23	0.42	0.47	0.00	-0.10	0.84
Involvement	Absenteeism	South West	0.85	0.00	0.12	0.49	0.77	0.00	-0.10	0.61

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Absenteeism	North East	0.92	0.08	0.38	0.08	0.86	0.10	0.42	0.09
Supervisory support	Absenteeism	North West	0.83	0.00	-0.06	0.59	0.74	0.00	-0.07	0.63
Supervisory support	Absenteeism	Yorkshire and the Humber	0.94	0.00	-0.01	0.94	0.85	0.01	0.20	0.42
Supervisory support	Absenteeism	East Midlands	0.96	0.00	-0.08	0.72	0.78	0.01	0.18	0.70
Supervisory support	Absenteeism	West Midlands	0.80	0.10	-0.42	0.01	0.70	0.12	-0.47	0.01
Supervisory support	Absenteeism	East of England	0.88	0.00	-0.02	0.86	0.81	0.00	-0.07	0.66
Supervisory support	Absenteeism	London	0.86	0.01	-0.12	0.25	0.31	0.01	-0.16	0.49
Supervisory support	Absenteeism	South-East Coast	0.90	0.07	-0.59	0.06	0.90	0.17	-0.69	0.01
Supervisory support	Absenteeism	South Central	0.87	0.01	-0.20	0.51	0.50	0.03	-0.33	0.56
Supervisory support	Absenteeism	South West	0.86	0.02	0.22	0.19	0.76	0.00	-0.02	0.90
Health and well-being	Absenteeism	North East	0.89	0.06	0.32	0.17	0.82	0.06	0.34	0.20
Health and well-being	Absenteeism	North West	0.85	0.02	0.19	0.08	0.79	0.05	0.32	0.01
Health and well-being	Absenteeism	Yorkshire and the Humber	0.94	0.00	0.01	0.91	0.84	0.00	-0.08	0.52
Health and well-being	Absenteeism	East Midlands	0.96	0.00	-0.10	0.52	0.90	0.12	-0.39	0.04
Health and well-being	Absenteeism	West Midlands	0.82	0.12	0.47	0.00	0.75	0.17	0.55	0.00
Health and well-being	Absenteeism	East of England	0.88	0.00	-0.02	0.85	0.81	0.01	-0.11	0.45
Health and well-being	Absenteeism	London	0.85	0.00	0.03	0.72	0.33	0.02	0.17	0.32
Health and well-being	Absenteeism	South-East Coast	0.84	0.01	0.17	0.57	0.73	0.00	-0.02	0.95
Health and well-being	Absenteeism	South Central	0.87	0.01	0.13	0.56	0.50	0.03	-0.22	0.55
Health and well-being	Absenteeism	South West	0.85	0.00	-0.04	0.84	0.78	0.02	-0.21	0.28

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	Absenteeism	North East	0.91	0.07	-0.32	0.11	0.87	0.12	-0.39	0.06
Work pressure	Absenteeism	North West	0.83	0.00	-0.02	0.85	0.75	0.01	0.08	0.41
Work pressure	Absenteeism	Yorkshire and the Humber	0.95	0.01	0.12	0.26	0.84	0.01	-0.11	0.49
Work pressure	Absenteeism	East Midlands	0.96	0.00	0.06	0.63	0.79	0.01	-0.16	0.55
Work pressure	Absenteeism	West Midlands	0.78	0.08	0.32	0.02	0.71	0.14	0.40	0.01
Work pressure	Absenteeism	East of England	0.89	0.00	0.08	0.50	0.81	0.01	-0.10	0.40
Work pressure	Absenteeism	London	0.86	0.00	0.09	0.36	0.30	0.00	0.01	0.96
Work pressure	Absenteeism	South-East Coast	0.88	0.04	0.31	0.17	0.87	0.13	0.42	0.02
Work pressure	Absenteeism	South Central	0.87	0.00	0.06	0.83	0.48	0.01	-0.19	0.69
Work pressure	Absenteeism	South West	0.85	0.00	-0.06	0.61	0.77	0.00	-0.08	0.58
Job satisfaction	Stability	North East	0.58	0.02	0.18	0.68	0.57	0.05	0.27	0.45
Job satisfaction	Stability	North West	0.43	0.00	-0.01	0.95	0.22	0.00	-0.03	0.90
Job satisfaction	Stability	Yorkshire and the Humber	0.77	0.00	-0.14	0.64	0.53	0.00	-0.07	0.87
Job satisfaction	Stability	East Midlands	0.16	0.02	-0.23	0.76	0.15	0.03	-0.27	0.67
Job satisfaction	Stability	West Midlands	0.53	0.01	-0.10	0.60	0.52	0.01	-0.11	0.56
Job satisfaction	Stability	East of England	0.55	0.00	0.05	0.81	0.45	0.00	0.03	0.91
Job satisfaction	Stability	London	0.73	0.03	0.24	0.09	0.48	0.02	0.20	0.30
Job satisfaction	Stability	South-East Coast	0.78	0.01	0.11	0.69	0.58	0.01	-0.11	0.72
Job satisfaction	Stability	South Central	0.54	0.23	0.93	0.14	0.53	0.22	0.92	0.11
Job satisfaction	Stability	South West	0.66	0.01	0.17	0.50	0.39	0.01	-0.12	0.71

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	Stability	North East	0.57	0.00	-0.08	0.82	0.53	0.00	0.03	0.92
Motivation	Stability	North West	0.43	0.00	0.03	0.87	0.22	0.00	0.02	0.90
Motivation	Stability	Yorkshire and the Humber	0.78	0.01	-0.13	0.39	0.60	0.07	-0.30	0.14
Motivation	Stability	East Midlands	0.43	0.29	-0.56	0.17	0.40	0.28	-0.54	0.15
Motivation	Stability	West Midlands	0.53	0.00	-0.01	0.96	0.51	0.00	-0.01	0.94
Motivation	Stability	East of England	0.57	0.03	0.18	0.35	0.47	0.02	0.16	0.43
Motivation	Stability	London	0.72	0.01	0.12	0.25	0.49	0.03	0.18	0.19
Motivation	Stability	South-East Coast	0.79	0.02	0.24	0.47	0.63	0.05	-0.29	0.33
Motivation	Stability	South Central	0.70	0.39	0.70	0.03	0.69	0.38	0.68	0.02
Motivation	Stability	South West	0.67	0.02	0.21	0.32	0.39	0.01	-0.09	0.71
Intention to leave job	Stability	North East	0.58	0.02	0.21	0.68	0.53	0.00	-0.07	0.83
Intention to leave job	Stability	North West	0.44	0.01	-0.09	0.57	0.25	0.03	-0.19	0.25
Intention to leave job	Stability	Yorkshire and the Humber	0.77	0.00	0.02	0.92	0.53	0.00	-0.06	0.82
Intention to leave job	Stability	East Midlands	0.23	0.09	0.35	0.49	0.23	0.11	0.36	0.40
Intention to leave job	Stability	West Midlands	0.53	0.00	-0.01	0.95	0.51	0.00	-0.04	0.80
Intention to leave job	Stability	East of England	0.56	0.01	-0.14	0.51	0.48	0.03	-0.22	0.30
Intention to leave job	Stability	London	0.73	0.03	-0.21	0.08	0.55	0.09	-0.36	0.02
Intention to leave job	Stability	South-East Coast	0.78	0.01	-0.12	0.66	0.58	0.00	-0.02	0.95
Intention to leave job	Stability	South Central	0.47	0.16	-0.43	0.23	0.47	0.16	-0.43	0.19
Intention to leave job	Stability	South West	0.75	0.09	-0.42	0.03	0.49	0.11	-0.45	0.08

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Stability	North East	0.60	0.03	-0.26	0.56	0.53	0.00	0.02	0.93
Engagement	Stability	North West	0.44	0.01	-0.09	0.60	0.22	0.00	-0.07	0.75
Engagement	Stability	Yorkshire and the Humber	0.78	0.01	-0.14	0.59	0.61	0.08	-0.49	0.11
Engagement	Stability	East Midlands	0.20	0.06	-0.31	0.56	0.20	0.08	-0.33	0.48
Engagement	Stability	West Midlands	0.53	0.00	-0.05	0.78	0.51	0.00	-0.03	0.87
Engagement	Stability	East of England	0.57	0.02	0.17	0.40	0.46	0.01	0.14	0.51
Engagement	Stability	London	0.71	0.01	0.13	0.39	0.48	0.02	0.21	0.27
Engagement	Stability	South-East Coast	0.78	0.00	0.08	0.79	0.58	0.01	-0.12	0.75
Engagement	Stability	South Central	0.66	0.35	0.77	0.05	0.63	0.32	0.72	0.04
Engagement	Stability	South West	0.71	0.06	0.43	0.09	0.38	0.00	-0.05	0.86
Advocacy	Stability	North East	0.65	0.08	-0.37	0.32	0.53	0.01	-0.10	0.73
Advocacy	Stability	North West	0.44	0.00	-0.08	0.68	0.22	0.00	-0.04	0.86
Advocacy	Stability	Yorkshire and the Humber	0.77	0.00	0.05	0.84	0.54	0.01	-0.20	0.56
Advocacy	Stability	East Midlands	0.14	0.00	0.04	0.95	0.12	0.00	-0.02	0.96
Advocacy	Stability	West Midlands	0.53	0.00	-0.06	0.81	0.51	0.00	0.00	0.99
Advocacy	Stability	East of England	0.56	0.01	0.15	0.50	0.46	0.01	0.14	0.56
Advocacy	Stability	London	0.71	0.01	0.12	0.48	0.48	0.02	0.22	0.32
Advocacy	Stability	South-East Coast	0.78	0.00	0.04	0.90	0.58	0.00	-0.02	0.97
Advocacy	Stability	South Central	0.68	0.37	0.79	0.04	0.63	0.32	0.69	0.04
Advocacy	Stability	South West	0.75	0.09	0.57	0.03	0.39	0.00	0.09	0.79

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Stability	North East	0.62	0.05	0.37	0.44	0.62	0.10	0.37	0.27
Involvement	Stability	North West	0.45	0.02	-0.17	0.31	0.24	0.02	-0.17	0.37
Involvement	Stability	Yorkshire and the Humber	0.78	0.01	-0.22	0.40	0.63	0.11	-0.56	0.07
Involvement	Stability	East Midlands	0.40	0.26	-1.35	0.20	0.37	0.25	-1.09	0.17
Involvement	Stability	West Midlands	0.53	0.00	-0.07	0.68	0.52	0.01	-0.08	0.66
Involvement	Stability	East of England	0.58	0.03	0.22	0.32	0.46	0.01	0.16	0.51
Involvement	Stability	London	0.70	0.00	0.08	0.62	0.46	0.00	0.09	0.64
Involvement	Stability	South-East Coast	0.78	0.00	0.13	0.72	0.58	0.00	-0.13	0.77
Involvement	Stability	South Central	0.36	0.05	0.40	0.54	0.35	0.04	0.37	0.53
Involvement	Stability	South West	0.66	0.00	0.11	0.70	0.42	0.04	-0.31	0.32
Supervisory support	Stability	North East	0.59	0.02	0.25	0.64	0.58	0.06	0.32	0.39
Supervisory support	Stability	North West	0.45	0.02	-0.20	0.36	0.23	0.01	-0.15	0.54
Supervisory support	Stability	Yorkshire and the Humber	0.77	0.00	-0.12	0.70	0.52	0.00	0.02	0.96
Supervisory support	Stability	East Midlands	0.14	0.00	0.10	0.92	0.12	0.00	0.02	0.98
Supervisory support	Stability	West Midlands	0.54	0.02	-0.17	0.43	0.53	0.02	-0.18	0.40
Supervisory support	Stability	East of England	0.55	0.00	0.04	0.88	0.45	0.01	0.11	0.68
Supervisory support	Stability	London	0.72	0.02	0.20	0.19	0.46	0.00	0.07	0.74
Supervisory support	Stability	South-East Coast	0.80	0.03	0.28	0.38	0.58	0.00	0.09	0.83
Supervisory support	Stability	South Central	0.34	0.03	-0.33	0.64	0.34	0.03	-0.33	0.61
Supervisory support	Stability	South West	0.67	0.02	-0.20	0.41	0.46	0.08	-0.45	0.13

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Stability	North East	0.58	0.01	0.17	0.72	0.56	0.04	0.27	0.49
Health and well-being	Stability	North West	0.47	0.04	0.29	0.14	0.23	0.00	0.08	0.71
Health and well-being	Stability	Yorkshire and the Humber	0.79	0.02	0.17	0.30	0.60	0.08	0.33	0.13
Health and well-being	Stability	East Midlands	0.18	0.04	0.24	0.64	0.18	0.06	0.27	0.54
Health and well-being	Stability	West Midlands	0.55	0.02	0.20	0.36	0.53	0.01	0.16	0.45
Health and well-being	Stability	East of England	0.56	0.01	-0.14	0.55	0.49	0.04	-0.28	0.25
Health and well-being	Stability	London	0.72	0.02	-0.14	0.19	0.48	0.02	-0.16	0.29
Health and well-being	Stability	South-East Coast	0.85	0.07	-0.50	0.11	0.69	0.12	-0.62	0.12
Health and well-being	Stability	South Central	0.40	0.09	-0.40	0.38	0.40	0.09	-0.39	0.34
Health and well-being	Stability	South West	0.65	0.00	0.08	0.76	0.39	0.00	0.08	0.80
Work pressure	Stability	North East	0.69	0.12	0.54	0.22	0.54	0.01	0.12	0.71
Work pressure	Stability	North West	0.44	0.00	-0.04	0.79	0.24	0.02	-0.14	0.43
Work pressure	Stability	Yorkshire and the Humber	0.77	0.00	0.06	0.80	0.58	0.06	-0.36	0.18
Work pressure	Stability	East Midlands	0.20	0.06	0.38	0.58	0.20	0.08	0.36	0.48
Work pressure	Stability	West Midlands	0.53	0.00	-0.06	0.76	0.52	0.00	-0.07	0.70
Work pressure	Stability	East of England	0.55	0.00	0.05	0.78	0.45	0.00	0.05	0.82
Work pressure	Stability	London	0.73	0.03	-0.25	0.07	0.52	0.05	-0.32	0.07
Work pressure	Stability	South-East Coast	0.78	0.00	-0.05	0.82	0.59	0.02	0.15	0.59
Work pressure	Stability	South Central	0.80	0.49	-1.17	0.01	0.80	0.49	-1.17	0.00
Work pressure	Stability	South West	0.65	0.00	0.00	0.98	0.38	0.00	-0.02	0.94

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Mortality	North East	0.67	0.01	0.12	0.75	0.25	0.03	0.17	0.71
Job satisfaction	Mortality	North West	0.28	0.03	-0.19	0.44	0.23	0.09	-0.31	0.17
Job satisfaction	Mortality	Yorkshire and the Humber	0.74	0.09	0.38	0.21	0.30	0.01	0.10	0.81
Job satisfaction	Mortality	East Midlands	0.68	0.18	-0.57	0.40	0.60	0.10	-0.37	0.45
Job satisfaction	Mortality	West Midlands	0.57	0.02	-0.16	0.57	0.26	0.00	-0.02	0.95
Job satisfaction	Mortality	East of England	0.60	0.09	-0.35	0.14	0.43	0.17	-0.47	0.08
Job satisfaction	Mortality	London	0.64	0.02	0.16	0.31	0.37	0.02	0.17	0.41
Job satisfaction	Mortality	South-East Coast	0.58	0.03	-0.27	0.60	0.52	0.29	-0.59	0.11
Job satisfaction	Mortality	South Central	0.51	0.18	-1.15	0.38	0.33	0.15	-1.05	0.40
Job satisfaction	Mortality	South West	0.33	0.03	0.18	0.50	0.33	0.03	0.18	0.48
Motivation	Mortality	North East	0.69	0.03	0.18	0.61	0.26	0.04	0.20	0.68
Motivation	Mortality	North West	0.26	0.00	-0.07	0.77	0.16	0.02	-0.14	0.53
Motivation	Mortality	Yorkshire and the Humber	0.72	0.07	0.29	0.28	0.30	0.00	0.04	0.92
Motivation	Mortality	East Midlands	0.68	0.18	1.35	0.40	0.62	0.12	0.78	0.39
Motivation	Mortality	West Midlands	0.56	0.01	-0.11	0.68	0.28	0.03	-0.19	0.57
Motivation	Mortality	East of England	0.58	0.07	-0.32	0.21	0.43	0.17	-0.48	0.08
Motivation	Mortality	London	0.65	0.03	0.18	0.23	0.38	0.04	0.19	0.31
Motivation	Mortality	South-East Coast	0.56	0.01	-0.13	0.80	0.34	0.11	-0.49	0.35
Motivation	Mortality	South Central	0.57	0.24	0.87	0.29	0.22	0.03	0.27	0.69
Motivation	Mortality	South West	0.30	0.00	0.05	0.84	0.30	0.00	0.06	0.83

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Mortality	North East	0.89	0.23	-0.51	0.09	0.28	0.06	-0.25	0.59
Intention to leave job	Mortality	North West	0.30	0.04	0.22	0.35	0.23	0.09	0.31	0.17
Intention to leave job	Mortality	Yorkshire and the Humber	0.72	0.07	-0.31	0.25	0.36	0.06	-0.29	0.43
Intention to leave job	Mortality	East Midlands	0.68	0.18	0.53	0.40	0.68	0.19	0.53	0.27
Intention to leave job	Mortality	West Midlands	0.56	0.01	0.10	0.70	0.27	0.01	-0.10	0.75
Intention to leave job	Mortality	East of England	0.64	0.13	0.44	0.07	0.51	0.25	0.58	0.03
Intention to leave job	Mortality	London	0.66	0.05	-0.23	0.12	0.37	0.02	-0.14	0.47
Intention to leave job	Mortality	South-East Coast	0.61	0.05	0.26	0.44	0.37	0.15	0.41	0.28
Intention to leave job	Mortality	South Central	0.48	0.15	-0.51	0.42	0.25	0.07	-0.33	0.58
Intention to leave job	Mortality	South West	0.30	0.01	0.08	0.76	0.30	0.01	0.08	0.76
Engagement	Mortality	North East	0.83	0.17	0.43	0.19	0.27	0.05	0.22	0.64
Engagement	Mortality	North West	0.31	0.05	-0.26	0.27	0.27	0.13	-0.36	0.09
Engagement	Mortality	Yorkshire and the Humber	0.65	0.00	0.06	0.87	0.37	0.07	-0.33	0.40
Engagement	Mortality	East Midlands	0.90	0.40	-0.88	0.10	0.89	0.40	-0.87	0.04
Engagement	Mortality	West Midlands	0.57	0.02	-0.18	0.52	0.27	0.01	-0.11	0.74
Engagement	Mortality	East of England	0.60	0.09	-0.36	0.14	0.49	0.23	-0.52	0.04
Engagement	Mortality	London	0.65	0.04	0.24	0.18	0.36	0.01	0.12	0.58
Engagement	Mortality	South-East Coast	0.60	0.05	-0.28	0.48	0.45	0.23	-0.53	0.16
Engagement	Mortality	South Central	0.76	0.42	1.10	0.11	0.49	0.30	0.90	0.20
Engagement	Mortality	South West	0.30	0.00	-0.07	0.81	0.30	0.00	-0.07	0.80

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	Mortality	North East	0.90	0.24	0.58	0.07	0.23	0.01	0.08	0.86
Advocacy	Mortality	North West	0.37	0.11	-0.40	0.10	0.36	0.22	-0.47	0.02
Advocacy	Mortality	Yorkshire and the Humber	0.65	0.00	-0.05	0.86	0.37	0.07	-0.31	0.40
Advocacy	Mortality	East Midlands	0.93	0.42	-0.72	0.08	0.93	0.43	-0.71	0.02
Advocacy	Mortality	West Midlands	0.60	0.05	-0.28	0.30	0.26	0.00	-0.04	0.89
Advocacy	Mortality	East of England	0.64	0.13	-0.43	0.07	0.54	0.28	-0.58	0.02
Advocacy	Mortality	London	0.65	0.04	0.28	0.19	0.35	0.00	0.06	0.82
Advocacy	Mortality	South-East Coast	0.64	0.08	-0.35	0.33	0.51	0.28	-0.56	0.11
Advocacy	Mortality	South Central	0.76	0.43	0.90	0.11	0.56	0.37	0.84	0.14
Advocacy	Mortality	South West	0.30	0.01	-0.09	0.73	0.30	0.01	-0.09	0.72
Involvement	Mortality	North East	0.70	0.04	0.22	0.56	0.37	0.15	0.39	0.38
Involvement	Mortality	North West	0.26	0.00	-0.04	0.86	0.16	0.02	-0.14	0.55
Involvement	Mortality	Yorkshire and the Humber	0.65	0.00	-0.06	0.89	0.42	0.12	-0.50	0.27
Involvement	Mortality	East Midlands	0.76	0.26	-0.78	0.28	0.75	0.26	-0.78	0.18
Involvement	Mortality	West Midlands	0.55	0.00	0.04	0.90	0.27	0.01	-0.16	0.68
Involvement	Mortality	East of England	0.52	0.02	-0.15	0.55	0.35	0.09	-0.32	0.23
Involvement	Mortality	London	0.63	0.02	0.15	0.34	0.36	0.01	0.11	0.58
Involvement	Mortality	South-East Coast	0.56	0.00	-0.10	0.83	0.38	0.15	-0.46	0.27
Involvement	Mortality	South Central	0.35	0.02	-0.20	0.80	0.20	0.01	-0.19	0.80
Involvement	Mortality	South West	0.31	0.02	-0.15	0.63	0.31	0.01	-0.13	0.64

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Mortality	North East	0.71	0.05	0.24	0.50	0.35	0.13	0.37	0.41
Supervisory support	Mortality	North West	0.28	0.02	-0.15	0.53	0.19	0.05	-0.24	0.30
Supervisory support	Mortality	Yorkshire and the Humber	0.65	0.00	0.02	0.95	0.30	0.01	-0.12	0.80
Supervisory support	Mortality	East Midlands	0.79	0.28	-0.67	0.24	0.70	0.20	-0.51	0.25
Supervisory support	Mortality	West Midlands	0.55	0.00	-0.07	0.82	0.26	0.00	-0.06	0.87
Supervisory support	Mortality	East of England	0.67	0.17	-0.48	0.04	0.56	0.30	-0.60	0.02
Supervisory support	Mortality	London	0.64	0.03	0.18	0.26	0.39	0.05	0.24	0.24
Supervisory support	Mortality	South-East Coast	0.58	0.03	-0.28	0.58	0.52	0.30	-0.60	0.10
Supervisory support	Mortality	South Central	0.54	0.21	-0.53	0.32	0.46	0.28	-0.59	0.22
Supervisory support	Mortality	South West	0.30	0.00	0.08	0.80	0.30	0.00	0.08	0.79
Health and well-being	Mortality	North East	0.68	0.01	0.14	0.74	0.23	0.01	0.11	0.83
Health and well-being	Mortality	North West	0.29	0.03	-0.17	0.42	0.16	0.02	-0.14	0.53
Health and well-being	Mortality	Yorkshire and the Humber	0.73	0.07	-0.34	0.25	0.31	0.02	0.14	0.69
Health and well-being	Mortality	East Midlands	0.56	0.05	0.95	0.67	0.50	0.00	0.01	0.99
Health and well-being	Mortality	West Midlands	0.56	0.00	-0.09	0.76	0.27	0.02	-0.17	0.64
Health and well-being	Mortality	East of England	0.70	0.20	0.49	0.02	0.50	0.24	0.53	0.03
Health and well-being	Mortality	London	0.61	0.00	0.00	0.99	0.36	0.01	-0.09	0.62
Health and well-being	Mortality	South-East Coast	0.88	0.33	0.77	0.01	0.62	0.39	0.84	0.05
Health and well-being	Mortality	South Central	0.34	0.01	-0.13	0.85	0.19	0.00	-0.04	0.95
Health and well-being	Mortality	South West	0.33	0.03	-0.22	0.50	0.33	0.03	-0.22	0.49

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	Mortality	North East	0.89	0.23	-0.52	0.09	0.28	0.06	-0.25	0.60
Work pressure	Mortality	North West	0.26	0.00	0.04	0.87	0.17	0.03	0.17	0.45
Work pressure	Mortality	Yorkshire and the Humber	0.75	0.10	-0.35	0.16	0.41	0.11	-0.37	0.29
Work pressure	Mortality	East Midlands	0.74	0.23	0.52	0.31	0.73	0.23	0.51	0.20
Work pressure	Mortality	West Midlands	0.73	0.18	0.50	0.04	0.32	0.07	0.29	0.35
Work pressure	Mortality	East of England	0.56	0.05	0.23	0.30	0.37	0.11	0.34	0.17
Work pressure	Mortality	London	0.62	0.01	-0.12	0.51	0.35	0.00	0.02	0.92
Work pressure	Mortality	South-East Coast	0.63	0.08	0.45	0.35	0.59	0.37	0.68	0.06
Work pressure	Mortality	South Central	0.45	0.12	-0.75	0.49	0.27	0.09	-0.64	0.53
Work pressure	Mortality	South West	0.31	0.01	0.12	0.64	0.31	0.01	0.12	0.63
Job satisfaction	Patient satisfaction	North East	0.54	0.01	-0.11	0.76	0.43	0.03	-0.17	0.65
Job satisfaction	Patient satisfaction	North West	0.91	0.00	0.08	0.38	0.83	0.04	0.24	0.04
Job satisfaction	Patient satisfaction	Yorkshire and the Humber	0.54	0.02	0.29	0.54	0.48	0.00	0.00	0.99
Job satisfaction	Patient satisfaction	East Midlands	0.86	0.00	-0.02	0.96	0.84	0.00	-0.04	0.89
Job satisfaction	Patient satisfaction	West Midlands	0.88	0.00	0.05	0.79	0.74	0.18	0.46	0.02
Job satisfaction	Patient satisfaction	East of England	0.75	0.01	0.09	0.61	0.57	0.08	0.30	0.15
Job satisfaction	Patient satisfaction	London	0.90	0.00	0.05	0.56	0.80	0.00	0.00	0.98
Job satisfaction	Patient satisfaction	South-East Coast	0.90	0.01	0.19	0.45	0.86	0.09	0.39	0.10
Job satisfaction	Patient satisfaction	South Central	0.95	0.00	-0.20	0.77	0.48	0.01	-0.59	0.76
Job satisfaction	Patient satisfaction	South West	0.61	0.00	-0.10	0.74	0.31	0.00	0.01	0.98

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	Patient satisfaction	North East	0.59	0.06	-0.30	0.50	0.57	0.16	-0.41	0.23
Motivation	Patient satisfaction	North West	0.91	0.00	-0.03	0.70	0.79	0.00	0.02	0.86
Motivation	Patient satisfaction	Yorkshire and the Humber	0.66	0.15	-0.43	0.10	0.65	0.17	-0.45	0.07
Motivation	Patient satisfaction	East Midlands	0.86	0.00	0.03	0.94	0.85	0.01	0.11	0.69
Motivation	Patient satisfaction	West Midlands	0.88	0.00	0.06	0.72	0.74	0.18	0.45	0.02
Motivation	Patient satisfaction	East of England	0.74	0.00	0.03	0.88	0.55	0.06	0.26	0.24
Motivation	Patient satisfaction	London	0.90	0.00	-0.03	0.72	0.81	0.01	-0.12	0.22
Motivation	Patient satisfaction	South-East Coast	0.92	0.03	0.22	0.23	0.85	0.07	0.33	0.14
Motivation	Patient satisfaction	South Central	0.95	0.00	0.07	0.71	0.47	0.00	0.09	0.87
Motivation	Patient satisfaction	South West	0.61	0.01	0.14	0.59	0.32	0.01	0.13	0.68
Intention to leave job	Patient satisfaction	North East	0.67	0.13	-0.37	0.28	0.53	0.12	-0.35	0.30
Intention to leave job	Patient satisfaction	North West	0.91	0.00	-0.01	0.94	0.81	0.01	-0.13	0.23
Intention to leave job	Patient satisfaction	Yorkshire and the Humber	0.55	0.04	-0.23	0.43	0.52	0.04	-0.23	0.43
Intention to leave job	Patient satisfaction	East Midlands	0.90	0.04	-0.23	0.44	0.90	0.06	-0.26	0.27
Intention to leave job	Patient satisfaction	West Midlands	0.88	0.00	-0.08	0.64	0.72	0.16	-0.44	0.03
Intention to leave job	Patient satisfaction	East of England	0.74	0.00	-0.01	0.96	0.60	0.12	-0.40	0.09
Intention to leave job	Patient satisfaction	London	0.90	0.00	-0.08	0.35	0.81	0.01	-0.10	0.36
Intention to leave job	Patient satisfaction	South-East Coast	0.95	0.06	-0.39	0.06	0.95	0.17	-0.46	0.00
Intention to leave job	Patient satisfaction	South Central	0.97	0.02	0.16	0.29	0.47	0.00	0.06	0.90
Intention to leave job	Patient satisfaction	South West	0.64	0.04	-0.26	0.30	0.42	0.11	-0.43	0.16

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Patient satisfaction	North East	0.55	0.02	0.14	0.70	0.42	0.01	0.12	0.75
Engagement	Patient satisfaction	North West	0.91	0.00	0.08	0.40	0.83	0.04	0.25	0.04
Engagement	Patient satisfaction	Yorkshire and the Humber	0.53	0.02	-0.20	0.62	0.50	0.02	-0.24	0.53
Engagement	Patient satisfaction	East Midlands	0.90	0.04	0.25	0.49	0.89	0.06	0.29	0.30
Engagement	Patient satisfaction	West Midlands	0.89	0.01	0.15	0.37	0.75	0.19	0.50	0.01
Engagement	Patient satisfaction	East of England	0.76	0.02	0.18	0.36	0.61	0.13	0.41	0.07
Engagement	Patient satisfaction	London	0.90	0.00	0.07	0.50	0.80	0.00	0.08	0.55
Engagement	Patient satisfaction	South-East Coast	0.94	0.05	0.43	0.12	0.93	0.15	0.55	0.01
Engagement	Patient satisfaction	South Central	0.96	0.01	-0.15	0.54	0.52	0.06	0.41	0.52
Engagement	Patient satisfaction	South West	0.65	0.05	0.33	0.23	0.37	0.06	0.37	0.29
Advocacy	Patient satisfaction	North East	0.60	0.07	0.27	0.44	0.51	0.11	0.33	0.34
Advocacy	Patient satisfaction	North West	0.91	0.01	0.13	0.21	0.85	0.06	0.33	0.01
Advocacy	Patient satisfaction	Yorkshire and the Humber	0.54	0.03	0.31	0.50	0.51	0.03	0.32	0.47
Advocacy	Patient satisfaction	East Midlands	0.91	0.05	0.31	0.40	0.91	0.07	0.34	0.22
Advocacy	Patient satisfaction	West Midlands	0.90	0.02	0.28	0.14	0.80	0.24	0.65	0.00
Advocacy	Patient satisfaction	East of England	0.76	0.02	0.22	0.33	0.63	0.14	0.47	0.06
Advocacy	Patient satisfaction	London	0.91	0.01	0.17	0.16	0.83	0.03	0.29	0.06
Advocacy	Patient satisfaction	South-East Coast	0.94	0.05	0.53	0.10	0.94	0.16	0.54	0.01
Advocacy	Patient satisfaction	South Central	0.96	0.01	-0.19	0.42	0.56	0.09	0.47	0.41
Advocacy	Patient satisfaction	South West	0.67	0.07	0.40	0.16	0.41	0.10	0.48	0.18

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Patient satisfaction	North East	0.53	0.00	0.02	0.96	0.41	0.00	-0.04	0.92
Involvement	Patient satisfaction	North West	0.91	0.00	0.04	0.63	0.81	0.01	0.13	0.22
Involvement	Patient satisfaction	Yorkshire and the Humber	0.57	0.05	-0.33	0.35	0.56	0.08	-0.37	0.25
Involvement	Patient satisfaction	East Midlands	0.90	0.04	0.40	0.49	0.86	0.03	0.34	0.50
Involvement	Patient satisfaction	West Midlands	0.88	0.00	0.02	0.86	0.62	0.05	0.25	0.25
Involvement	Patient satisfaction	East of England	0.78	0.04	0.23	0.20	0.60	0.12	0.38	0.08
Involvement	Patient satisfaction	London	0.90	0.00	-0.02	0.83	0.80	0.00	-0.08	0.52
Involvement	Patient satisfaction	South-East Coast	0.94	0.05	0.53	0.09	0.92	0.14	0.73	0.02
Involvement	Patient satisfaction	South Central	0.95	0.00	-0.15	0.65	0.50	0.04	-0.46	0.61
Involvement	Patient satisfaction	South West	0.65	0.05	0.30	0.25	0.35	0.04	0.29	0.40
Supervisory support	Patient satisfaction	North East	0.53	0.00	0.02	0.95	0.41	0.00	-0.01	0.97
Supervisory support	Patient satisfaction	North West	0.91	0.00	-0.05	0.54	0.80	0.00	0.06	0.61
Supervisory support	Patient satisfaction	Yorkshire and the Humber	0.74	0.22	0.69	0.03	0.59	0.11	0.42	0.16
Supervisory support	Patient satisfaction	East Midlands	0.86	0.00	-0.01	0.99	0.84	0.00	-0.01	0.98
Supervisory support	Patient satisfaction	West Midlands	0.88	0.00	0.02	0.87	0.67	0.10	0.34	0.09
Supervisory support	Patient satisfaction	East of England	0.76	0.02	0.16	0.42	0.66	0.17	0.43	0.03
Supervisory support	Patient satisfaction	London	0.90	0.00	0.00	0.98	0.81	0.01	-0.12	0.30
Supervisory support	Patient satisfaction	South-East Coast	0.90	0.01	0.19	0.46	0.87	0.09	0.39	0.09
Supervisory support	Patient satisfaction	South Central	0.98	0.03	-0.26	0.14	0.50	0.04	-0.32	0.60
Supervisory support	Patient satisfaction	South West	0.62	0.02	-0.19	0.45	0.33	0.02	-0.19	0.56

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Patient satisfaction	North East	0.53	0.00	-0.05	0.91	0.41	0.00	-0.01	0.97
Health and well-being	Patient satisfaction	North West	0.92	0.01	0.11	0.12	0.79	0.00	-0.01	0.91
Health and well-being	Patient satisfaction	Yorkshire and the Humber	0.81	0.30	0.61	0.01	0.81	0.33	0.61	0.00
Health and well-being	Patient satisfaction	East Midlands	0.98	0.12	0.42	0.08	0.98	0.14	0.43	0.02
Health and well-being	Patient satisfaction	West Midlands	0.89	0.02	0.21	0.22	0.65	0.09	-0.33	0.13
Health and well-being	Patient satisfaction	East of England	0.74	0.00	-0.09	0.73	0.65	0.17	-0.45	0.03
Health and well-being	Patient satisfaction	London	0.90	0.00	0.02	0.79	0.80	0.00	0.04	0.70
Health and well-being	Patient satisfaction	South-East Coast	0.94	0.05	0.36	0.12	0.77	0.00	0.04	0.90
Health and well-being	Patient satisfaction	South Central	0.95	0.00	-0.08	0.65	0.51	0.04	0.25	0.59
Health and well-being	Patient satisfaction	South West	0.61	0.00	-0.07	0.79	0.31	0.00	-0.05	0.88
Work pressure	Patient satisfaction	North East	0.55	0.01	-0.12	0.75	0.42	0.01	-0.13	0.74
Work pressure	Patient satisfaction	North West	0.91	0.00	0.01	0.92	0.81	0.02	-0.15	0.14
Work pressure	Patient satisfaction	Yorkshire and the Humber	0.56	0.05	-0.31	0.38	0.48	0.00	-0.04	0.87
Work pressure	Patient satisfaction	East Midlands	0.89	0.03	-0.75	0.52	0.84	0.00	0.05	0.93
Work pressure	Patient satisfaction	West Midlands	0.88	0.01	-0.12	0.45	0.69	0.13	-0.43	0.06
Work pressure	Patient satisfaction	East of England	0.75	0.01	-0.12	0.56	0.58	0.09	-0.36	0.14
Work pressure	Patient satisfaction	London	0.90	0.00	-0.09	0.39	0.81	0.01	-0.15	0.28
Work pressure	Patient satisfaction	South-East Coast	0.89	0.00	-0.08	0.72	0.83	0.05	-0.28	0.23
Work pressure	Patient satisfaction	South Central	0.96	0.01	-0.22	0.45	0.47	0.00	-0.12	0.88
Work pressure	Patient satisfaction	South West	0.62	0.02	-0.15	0.52	0.33	0.02	-0.15	0.61

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	MRSA	North East	0.26	0.00	-0.02	0.96	0.20	0.00	-0.03	0.95
Job satisfaction	MRSA	North West	0.10	0.02	0.16	0.52	0.05	0.01	0.13	0.61
Job satisfaction	MRSA	Yorkshire and the Humber	0.57	0.00	-0.07	0.85	0.55	0.01	-0.11	0.75
Job satisfaction	MRSA	East Midlands	0.63	0.01	0.15	0.82	0.37	0.02	-0.19	0.77
Job satisfaction	MRSA	West Midlands	0.34	0.07	0.31	0.27	0.28	0.05	0.26	0.34
Job satisfaction	MRSA	East of England	0.23	0.00	0.07	0.80	0.22	0.01	0.12	0.66
Job satisfaction	MRSA	London	0.60	0.01	0.10	0.53	0.32	0.00	0.01	0.96
Job satisfaction	MRSA	South-East Coast	0.87	0.01	0.11	0.66	0.87	0.01	0.10	0.62
Job satisfaction	MRSA	South Central	0.50	0.02	-0.77	0.77	0.46	0.07	-1.32	0.52
Job satisfaction	MRSA	South West	0.29	0.02	0.23	0.57	0.24	0.01	0.12	0.75
Motivation	MRSA	North East	0.26	0.00	0.05	0.91	0.21	0.01	0.08	0.84
Motivation	MRSA	North West	0.09	0.01	-0.10	0.66	0.04	0.00	-0.05	0.82
Motivation	MRSA	Yorkshire and the Humber	0.67	0.10	0.36	0.17	0.60	0.06	0.26	0.28
Motivation	MRSA	East Midlands	0.62	0.00	0.03	0.96	0.40	0.06	0.26	0.63
Motivation	MRSA	West Midlands	0.38	0.11	0.34	0.17	0.32	0.09	0.31	0.21
Motivation	MRSA	East of England	0.24	0.02	0.14	0.65	0.23	0.03	0.18	0.54
Motivation	MRSA	London	0.61	0.02	0.13	0.36	0.32	0.00	0.06	0.73
Motivation	MRSA	South-East Coast	0.86	0.00	-0.02	0.92	0.86	0.00	-0.02	0.94
Motivation	MRSA	South Central	0.57	0.09	-0.43	0.49	0.53	0.14	-0.52	0.34
Motivation	MRSA	South West	0.28	0.02	0.19	0.60	0.24	0.01	0.11	0.74

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	MRSA	North East	0.51	0.25	-0.51	0.23	0.38	0.18	-0.42	0.29
Intention to leave job	MRSA	North West	0.09	0.01	0.08	0.71	0.05	0.01	0.09	0.70
Intention to leave job	MRSA	Yorkshire and the Humber	0.58	0.01	0.09	0.76	0.55	0.01	0.09	0.75
Intention to leave job	MRSA	East Midlands	0.79	0.16	0.48	0.34	0.71	0.36	0.63	0.15
Intention to leave job	MRSA	West Midlands	0.30	0.03	-0.18	0.48	0.25	0.02	-0.15	0.54
Intention to leave job	MRSA	East of England	0.23	0.00	-0.06	0.85	0.22	0.01	-0.11	0.71
Intention to leave job	MRSA	London	0.59	0.00	0.01	0.97	0.33	0.01	0.09	0.67
Intention to leave job	MRSA	South-East Coast	0.87	0.01	-0.09	0.64	0.87	0.01	-0.09	0.60
Intention to leave job	MRSA	South Central	0.50	0.02	0.19	0.74	0.45	0.06	0.29	0.56
Intention to leave job	MRSA	South West	0.26	0.00	0.02	0.95	0.24	0.00	-0.02	0.96
Engagement	MRSA	North East	0.34	0.08	0.29	0.52	0.25	0.05	0.23	0.59
Engagement	MRSA	North West	0.11	0.03	0.21	0.44	0.06	0.02	0.18	0.50
Engagement	MRSA	Yorkshire and the Humber	0.61	0.04	0.36	0.42	0.56	0.01	0.19	0.65
Engagement	MRSA	East Midlands	0.71	0.08	-0.36	0.53	0.50	0.16	-0.48	0.40
Engagement	MRSA	West Midlands	0.30	0.03	0.22	0.46	0.25	0.02	0.17	0.54
Engagement	MRSA	East of England	0.24	0.01	-0.14	0.68	0.21	0.00	-0.04	0.89
Engagement	MRSA	London	0.60	0.00	0.07	0.73	0.32	0.00	0.00	0.99
Engagement	MRSA	South-East Coast	0.87	0.00	0.07	0.78	0.86	0.00	0.07	0.75
Engagement	MRSA	South Central	0.67	0.19	-0.78	0.28	0.65	0.26	-0.86	0.16
Engagement	MRSA	South West	0.27	0.01	0.14	0.73	0.24	0.00	0.06	0.87

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	MRSA	North East	0.41	0.15	0.40	0.38	0.30	0.10	0.31	0.45
Advocacy	MRSA	North West	0.14	0.06	0.35	0.23	0.08	0.04	0.27	0.34
Advocacy	MRSA	Yorkshire and the Humber	0.57	0.00	0.14	0.78	0.55	0.00	0.10	0.83
Advocacy	MRSA	East Midlands	0.82	0.19	-0.64	0.28	0.74	0.40	-0.81	0.12
Advocacy	MRSA	West Midlands	0.26	0.00	0.03	0.93	0.23	0.00	0.00	0.99
Advocacy	MRSA	East of England	0.24	0.01	-0.16	0.67	0.21	0.00	-0.05	0.89
Advocacy	MRSA	London	0.59	0.00	0.04	0.86	0.32	0.00	-0.03	0.93
Advocacy	MRSA	South-East Coast	0.87	0.01	0.10	0.68	0.87	0.01	0.10	0.64
Advocacy	MRSA	South Central	0.68	0.20	-0.69	0.26	0.63	0.23	-0.73	0.19
Advocacy	MRSA	South West	0.26	0.00	-0.02	0.97	0.24	0.00	-0.07	0.86
Involvement	MRSA	North East	0.26	0.00	0.02	0.97	0.20	0.00	-0.05	0.91
Involvement	MRSA	North West	0.09	0.01	0.09	0.71	0.05	0.01	0.10	0.68
Involvement	MRSA	Yorkshire and the Humber	0.57	0.00	0.09	0.83	0.55	0.00	-0.07	0.83
Involvement	MRSA	East Midlands	0.70	0.08	-0.70	0.53	0.61	0.26	-1.07	0.25
Involvement	MRSA	West Midlands	0.36	0.10	0.35	0.20	0.30	0.08	0.30	0.25
Involvement	MRSA	East of England	0.30	0.08	-0.33	0.30	0.25	0.04	-0.22	0.44
Involvement	MRSA	London	0.59	0.00	0.01	0.95	0.32	0.00	0.00	0.98
Involvement	MRSA	South-East Coast	0.87	0.00	0.10	0.78	0.87	0.00	0.10	0.74
Involvement	MRSA	South Central	0.53	0.04	0.97	0.63	0.42	0.02	-0.34	0.72
Involvement	MRSA	South West	0.35	0.08	0.43	0.26	0.29	0.05	0.31	0.38

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	MRSA	North East	0.26	0.00	-0.02	0.96	0.21	0.01	-0.09	0.83
Supervisory support	MRSA	North West	0.09	0.01	0.09	0.72	0.05	0.01	0.11	0.65
Supervisory support	MRSA	Yorkshire and the Humber	0.65	0.08	-0.37	0.22	0.62	0.08	-0.37	0.20
Supervisory support	MRSA	East Midlands	0.62	0.00	0.09	0.92	0.41	0.06	-0.35	0.61
Supervisory support	MRSA	West Midlands	0.29	0.03	0.20	0.48	0.24	0.01	0.11	0.68
Supervisory support	MRSA	East of England	0.23	0.00	0.00	0.99	0.21	0.00	0.06	0.81
Supervisory support	MRSA	London	0.63	0.03	0.20	0.17	0.36	0.03	0.21	0.28
Supervisory support	MRSA	South-East Coast	0.88	0.01	0.16	0.50	0.87	0.01	0.14	0.47
Supervisory support	MRSA	South Central	0.54	0.06	0.39	0.59	0.49	0.09	0.48	0.44
Supervisory support	MRSA	South West	0.28	0.02	0.19	0.60	0.25	0.01	0.12	0.72
Health and well-being	MRSA	North East	0.28	0.01	0.13	0.80	0.21	0.01	0.09	0.84
Health and well-being	MRSA	North West	0.11	0.02	-0.16	0.46	0.06	0.02	-0.16	0.47
Health and well-being	MRSA	Yorkshire and the Humber	0.65	0.08	-0.32	0.21	0.59	0.04	-0.22	0.36
Health and well-being	MRSA	East Midlands	0.99	0.36	-0.83	0.02	0.40	0.05	-0.26	0.65
Health and well-being	MRSA	West Midlands	0.29	0.02	-0.17	0.56	0.25	0.02	-0.18	0.52
Health and well-being	MRSA	East of England	0.24	0.01	-0.14	0.66	0.23	0.03	-0.19	0.52
Health and well-being	MRSA	London	0.61	0.02	-0.15	0.31	0.33	0.01	-0.10	0.59
Health and well-being	MRSA	South-East Coast	0.86	0.00	0.02	0.94	0.86	0.00	0.03	0.90
Health and well-being	MRSA	South Central	0.50	0.02	-0.61	0.73	0.45	0.05	0.28	0.56
Health and well-being	MRSA	South West	0.27	0.00	-0.07	0.86	0.24	0.00	-0.09	0.80

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	MRSA	North East	0.32	0.06	-0.27	0.59	0.22	0.02	-0.14	0.75
Work pressure	MRSA	North West	0.23	0.15	-0.42	0.05	0.14	0.10	-0.34	0.11
Work pressure	MRSA	Yorkshire and the Humber	0.60	0.03	0.21	0.46	0.58	0.04	0.23	0.40
Work pressure	MRSA	East Midlands	0.64	0.02	0.46	0.78	0.56	0.22	1.14	0.31
Work pressure	MRSA	West Midlands	0.27	0.01	-0.11	0.69	0.24	0.01	-0.13	0.64
Work pressure	MRSA	East of England	0.23	0.00	-0.09	0.80	0.22	0.02	-0.15	0.63
Work pressure	MRSA	London	0.60	0.00	0.05	0.82	0.33	0.01	0.13	0.61
Work pressure	MRSA	South-East Coast	0.87	0.01	-0.12	0.57	0.87	0.01	-0.12	0.52
Work pressure	MRSA	South Central	0.53	0.05	0.50	0.61	0.47	0.07	0.60	0.50
Work pressure	MRSA	South West	0.28	0.01	0.15	0.64	0.25	0.01	0.13	0.69
Job satisfaction	<i>C. difficile</i>	North East	0.78	0.19	0.47	0.14	0.76	0.27	0.52	0.07
Job satisfaction	<i>C. difficile</i>	North West	0.77	0.04	0.25	0.07	0.31	0.15	0.47	0.04
Job satisfaction	<i>C. difficile</i>	Yorkshire and the Humber	0.86	0.12	0.54	0.03	0.36	0.05	0.35	0.41
Job satisfaction	<i>C. difficile</i>	East Midlands	0.96	0.05	-0.29	0.26	0.96	0.05	-0.28	0.16
Job satisfaction	<i>C. difficile</i>	West Midlands	0.86	0.01	-0.11	0.42	0.69	0.00	0.04	0.83
Job satisfaction	<i>C. difficile</i>	East of England	0.39	0.06	0.29	0.32	0.36	0.14	0.39	0.13
Job satisfaction	<i>C. difficile</i>	London	0.52	0.01	-0.14	0.43	0.20	0.00	-0.06	0.78
Job satisfaction	<i>C. difficile</i>	South-East Coast	0.96	0.02	-0.20	0.14	0.68	0.02	-0.17	0.59
Job satisfaction	<i>C. difficile</i>	South Central	0.74	0.14	2.49	0.29	0.55	0.01	0.62	0.73
Job satisfaction	<i>C. difficile</i>	South West	0.67	0.01	0.18	0.52	0.53	0.06	0.37	0.22

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	<i>C. difficile</i>	North East	0.61	0.02	-0.22	0.68	0.51	0.03	0.17	0.61
Motivation	<i>C. difficile</i>	North West	0.78	0.05	0.27	0.03	0.35	0.19	0.49	0.02
Motivation	<i>C. difficile</i>	Yorkshire and the Humber	0.75	0.02	0.15	0.47	0.32	0.02	0.15	0.62
Motivation	<i>C. difficile</i>	East Midlands	0.99	0.08	-0.33	0.07	0.98	0.07	-0.30	0.04
Motivation	<i>C. difficile</i>	West Midlands	0.86	0.01	-0.09	0.43	0.70	0.01	-0.07	0.64
Motivation	<i>C. difficile</i>	East of England	0.55	0.22	0.57	0.04	0.54	0.32	0.62	0.01
Motivation	<i>C. difficile</i>	London	0.57	0.06	-0.26	0.10	0.24	0.04	-0.21	0.28
Motivation	<i>C. difficile</i>	South-East Coast	0.96	0.02	-0.18	0.18	0.67	0.01	0.10	0.73
Motivation	<i>C. difficile</i>	South Central	0.64	0.04	0.28	0.61	0.55	0.01	0.17	0.74
Motivation	<i>C. difficile</i>	South West	0.66	0.00	-0.05	0.83	0.48	0.01	0.11	0.70
Intention to leave job	<i>C. difficile</i>	North East	0.60	0.01	-0.09	0.81	0.53	0.05	-0.22	0.50
Intention to leave job	<i>C. difficile</i>	North West	0.74	0.02	-0.14	0.26	0.20	0.04	-0.22	0.29
Intention to leave job	<i>C. difficile</i>	Yorkshire and the Humber	0.76	0.02	-0.20	0.40	0.30	0.00	-0.03	0.94
Intention to leave job	<i>C. difficile</i>	East Midlands	0.92	0.01	0.11	0.67	0.92	0.01	0.11	0.58
Intention to leave job	<i>C. difficile</i>	West Midlands	0.88	0.04	0.20	0.07	0.70	0.01	0.07	0.65
Intention to leave job	<i>C. difficile</i>	East of England	0.42	0.09	-0.38	0.21	0.38	0.16	-0.47	0.11
Intention to leave job	<i>C. difficile</i>	London	0.55	0.04	0.26	0.16	0.23	0.03	0.23	0.33
Intention to leave job	<i>C. difficile</i>	South-East Coast	0.98	0.04	0.21	0.03	0.68	0.02	0.17	0.52
Intention to leave job	<i>C. difficile</i>	South Central	0.86	0.26	-0.73	0.10	0.63	0.09	-0.37	0.38
Intention to leave job	<i>C. difficile</i>	South West	0.71	0.06	-0.31	0.17	0.50	0.03	-0.23	0.40

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	<i>C. difficile</i>	North East	0.67	0.08	0.36	0.39	0.66	0.18	0.43	0.16
Engagement	<i>C. difficile</i>	North West	0.78	0.06	0.31	0.03	0.30	0.14	0.48	0.04
Engagement	<i>C. difficile</i>	Yorkshire and the Humber	0.74	0.01	0.15	0.65	0.31	0.00	-0.10	0.85
Engagement	<i>C. difficile</i>	East Midlands	0.94	0.04	-0.25	0.38	0.94	0.03	-0.22	0.28
Engagement	<i>C. difficile</i>	West Midlands	0.86	0.01	-0.13	0.31	0.69	0.00	-0.04	0.81
Engagement	<i>C. difficile</i>	East of England	0.44	0.11	0.44	0.18	0.42	0.20	0.52	0.06
Engagement	<i>C. difficile</i>	London	0.52	0.01	-0.14	0.53	0.20	0.00	0.04	0.87
Engagement	<i>C. difficile</i>	South-East Coast	0.97	0.03	-0.25	0.06	0.68	0.02	-0.21	0.53
Engagement	<i>C. difficile</i>	South Central	0.94	0.34	1.04	0.02	0.77	0.23	0.82	0.12
Engagement	<i>C. difficile</i>	South West	0.65	0.00	0.05	0.86	0.49	0.02	0.22	0.47
Advocacy	<i>C. difficile</i>	North East	0.64	0.05	0.27	0.48	0.62	0.13	0.37	0.25
Advocacy	<i>C. difficile</i>	North West	0.77	0.04	0.28	0.06	0.23	0.07	0.36	0.17
Advocacy	<i>C. difficile</i>	Yorkshire and the Humber	0.73	0.00	-0.04	0.92	0.39	0.09	-0.63	0.29
Advocacy	<i>C. difficile</i>	East Midlands	0.91	0.01	-0.10	0.75	0.91	0.01	-0.10	0.67
Advocacy	<i>C. difficile</i>	West Midlands	0.88	0.04	-0.26	0.08	0.70	0.00	-0.09	0.66
Advocacy	<i>C. difficile</i>	East of England	0.37	0.04	0.30	0.41	0.34	0.12	0.43	0.17
Advocacy	<i>C. difficile</i>	London	0.51	0.00	-0.01	0.98	0.21	0.01	0.20	0.53
Advocacy	<i>C. difficile</i>	South-East Coast	0.98	0.04	-0.25	0.04	0.71	0.06	-0.32	0.32
Advocacy	<i>C. difficile</i>	South Central	0.96	0.35	0.92	0.02	0.83	0.29	0.82	0.06
Advocacy	<i>C. difficile</i>	South West	0.66	0.01	0.13	0.67	0.51	0.04	0.31	0.33

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	<i>C. difficile</i>	North East	0.74	0.15	0.41	0.21	0.71	0.22	0.47	0.11
Involvement	<i>C. difficile</i>	North West	0.78	0.05	0.27	0.03	0.37	0.21	0.52	0.01
Involvement	<i>C. difficile</i>	Yorkshire and the Humber	0.75	0.02	0.18	0.51	0.33	0.03	0.25	0.55
Involvement	<i>C. difficile</i>	East Midlands	0.92	0.01	-0.31	0.60	0.92	0.01	-0.24	0.53
Involvement	<i>C. difficile</i>	West Midlands	0.85	0.00	0.04	0.73	0.70	0.00	0.07	0.67
Involvement	<i>C. difficile</i>	East of England	0.46	0.13	0.45	0.13	0.45	0.22	0.52	0.05
Involvement	<i>C. difficile</i>	London	0.51	0.01	-0.09	0.59	0.20	0.00	0.05	0.81
Involvement	<i>C. difficile</i>	South-East Coast	0.97	0.03	-0.31	0.10	0.67	0.01	-0.22	0.63
Involvement	<i>C. difficile</i>	South Central	0.65	0.05	0.67	0.57	0.54	0.00	0.02	0.98
Involvement	<i>C. difficile</i>	South West	0.65	0.00	-0.02	0.94	0.47	0.00	0.07	0.82
Supervisory support	<i>C. difficile</i>	North East	0.78	0.19	0.48	0.14	0.76	0.28	0.53	0.06
Supervisory support	<i>C. difficile</i>	North West	0.74	0.02	0.15	0.26	0.23	0.07	0.32	0.16
Supervisory support	<i>C. difficile</i>	Yorkshire and the Humber	0.82	0.08	0.39	0.09	0.33	0.02	0.20	0.60
Supervisory support	<i>C. difficile</i>	East Midlands	0.95	0.04	-0.30	0.30	0.95	0.04	-0.30	0.19
Supervisory support	<i>C. difficile</i>	West Midlands	0.85	0.00	0.01	0.93	0.69	0.00	0.07	0.70
Supervisory support	<i>C. difficile</i>	East of England	0.43	0.10	0.35	0.20	0.39	0.17	0.43	0.09
Supervisory support	<i>C. difficile</i>	London	0.51	0.00	0.03	0.87	0.21	0.01	0.12	0.57
Supervisory support	<i>C. difficile</i>	South-East Coast	0.96	0.02	-0.20	0.12	0.68	0.03	-0.20	0.52
Supervisory support	<i>C. difficile</i>	South Central	0.60	0.00	0.04	0.95	0.54	0.00	0.04	0.94
Supervisory support	<i>C. difficile</i>	South West	0.67	0.02	0.19	0.44	0.54	0.07	0.35	0.20

continued

TABLE 57 Breakdown by geographical area (continued)

Predictor	Outcome	Geographical area	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R^2	ΔR^2	Regression coefficient	p -value	R^2	ΔR^2	Regression coefficient	p -value
Health and well-being	<i>C. difficile</i>	North East	0.82	0.23	0.55	0.09	0.79	0.30	0.61	0.05
Health and well-being	<i>C. difficile</i>	North West	0.74	0.01	-0.12	0.34	0.25	0.09	-0.32	0.10
Health and well-being	<i>C. difficile</i>	Yorkshire and the Humber	0.78	0.05	-0.24	0.21	0.38	0.07	-0.29	0.33
Health and well-being	<i>C. difficile</i>	East Midlands	0.91	0.00	0.09	0.80	0.91	0.00	0.03	0.89
Health and well-being	<i>C. difficile</i>	West Midlands	0.86	0.01	0.12	0.37	0.69	0.00	0.00	1.00
Health and well-being	<i>C. difficile</i>	East of England	0.42	0.09	-0.35	0.21	0.36	0.14	-0.41	0.14
Health and well-being	<i>C. difficile</i>	London	0.51	0.00	0.01	0.93	0.20	0.00	-0.05	0.80
Health and well-being	<i>C. difficile</i>	South-East Coast	0.94	0.00	0.04	0.80	0.67	0.01	0.18	0.63
Health and well-being	<i>C. difficile</i>	South Central	0.60	0.00	-0.06	0.93	0.56	0.02	0.18	0.69
Health and well-being	<i>C. difficile</i>	South West	0.66	0.01	-0.12	0.66	0.47	0.00	0.08	0.80
Work pressure	<i>C. difficile</i>	North East	0.65	0.06	-0.43	0.44	0.65	0.17	-0.43	0.18
Work pressure	<i>C. difficile</i>	North West	0.73	0.00	-0.03	0.79	0.21	0.05	-0.24	0.24
Work pressure	<i>C. difficile</i>	Yorkshire and the Humber	0.82	0.09	-0.36	0.08	0.37	0.07	-0.32	0.34
Work pressure	<i>C. difficile</i>	East Midlands	0.92	0.01	-0.27	0.67	0.92	0.01	-0.20	0.66
Work pressure	<i>C. difficile</i>	West Midlands	0.87	0.02	0.17	0.22	0.69	0.00	-0.06	0.71
Work pressure	<i>C. difficile</i>	East of England	0.33	0.00	-0.05	0.89	0.25	0.03	-0.22	0.48
Work pressure	<i>C. difficile</i>	London	0.56	0.06	0.36	0.11	0.20	0.01	0.11	0.70
Work pressure	<i>C. difficile</i>	South-East Coast	0.96	0.02	0.17	0.18	0.66	0.00	0.08	0.78
Work pressure	<i>C. difficile</i>	South Central	0.61	0.00	-0.15	0.87	0.54	0.00	-0.02	0.98
Work pressure	<i>C. difficile</i>	South West	0.68	0.03	-0.21	0.35	0.49	0.02	-0.16	0.53

TABLE 58 Breakdown by occupational group

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	Nursing	0.86	0.00	-0.07	0.02	0.56	0.04	-0.23	0.00
Job satisfaction	Absenteeism	Doctors	0.86	0.00	-0.01	0.78	0.54	0.02	-0.14	0.01
Job satisfaction	Absenteeism	General managers	0.86	0.00	-0.02	0.44	0.52	0.00	-0.01	0.82
Job satisfaction	Absenteeism	Administrative/clerical	0.86	0.00	0.02	0.50	0.52	0.00	0.01	0.92
Job satisfaction	Absenteeism	AHPs/S&T	0.86	0.00	-0.04	0.20	0.52	0.00	-0.08	0.16
Job satisfaction	Absenteeism	Assorted other specialists	0.86	0.00	0.10	0.46	0.52	0.00	-0.10	0.70
Job satisfaction	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.03	0.23	0.52	0.00	0.04	0.43
Motivation	Absenteeism	Nursing	0.86	0.01	-0.09	0.00	0.56	0.04	-0.24	0.00
Motivation	Absenteeism	Doctors	0.86	0.00	0.01	0.76	0.52	0.00	-0.07	0.17
Motivation	Absenteeism	General managers	0.86	0.00	-0.03	0.29	0.52	0.00	-0.02	0.66
Motivation	Absenteeism	Administrative/clerical	0.86	0.00	0.03	0.22	0.52	0.00	-0.02	0.65
Motivation	Absenteeism	AHPs/S&T	0.86	0.00	-0.02	0.41	0.52	0.00	-0.06	0.25
Motivation	Absenteeism	Assorted other specialists	0.86	0.00	-0.04	0.81	0.52	0.00	-0.08	0.77
Motivation	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.02	0.45	0.52	0.00	0.00	0.97
Intention to leave job	Absenteeism	Nursing	0.86	0.00	0.06	0.02	0.54	0.02	0.14	0.00
Intention to leave job	Absenteeism	Doctors	0.86	0.00	-0.01	0.73	0.52	0.00	-0.01	0.84
Intention to leave job	Absenteeism	General managers	0.86	0.00	0.05	0.07	0.52	0.00	0.02	0.66
Intention to leave job	Absenteeism	Administrative/clerical	0.86	0.00	-0.01	0.69	0.52	0.00	-0.01	0.83
Intention to leave job	Absenteeism	AHPs/S&T	0.86	0.00	0.02	0.40	0.52	0.00	0.00	0.92
Intention to leave job	Absenteeism	Assorted other specialists	0.86	0.00	0.01	0.92	0.52	0.00	-0.17	0.32
Intention to leave job	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.07	0.01	0.52	0.00	0.00	0.99

continued

TABLE 58 Breakdown by occupational group (continued)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Absenteeism	Nursing	0.86	0.00	-0.09	0.01	0.56	0.04	-0.26	0.00
Engagement	Absenteeism	Doctors	0.86	0.00	0.00	1.00	0.53	0.01	-0.12	0.02
Engagement	Absenteeism	General managers	0.86	0.00	-0.04	0.18	0.52	0.00	-0.01	0.90
Engagement	Absenteeism	Administrative/clerical	0.86	0.00	0.02	0.58	0.52	0.00	-0.02	0.67
Engagement	Absenteeism	AHPs/S&T	0.86	0.00	-0.04	0.24	0.52	0.01	-0.08	0.13
Engagement	Absenteeism	Assorted other specialists	0.86	0.00	-0.09	0.54	0.52	0.00	-0.17	0.56
Engagement	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.02	0.42	0.52	0.00	0.03	0.58
Advocacy	Absenteeism	Nursing	0.86	0.00	-0.08	0.02	0.55	0.03	-0.22	0.00
Advocacy	Absenteeism	Doctors	0.86	0.00	0.00	0.89	0.53	0.01	-0.13	0.02
Advocacy	Absenteeism	General managers	0.86	0.00	-0.03	0.24	0.52	0.00	0.00	0.95
Advocacy	Absenteeism	Administrative/clerical	0.86	0.00	-0.02	0.63	0.52	0.00	-0.03	0.61
Advocacy	Absenteeism	AHPs/S&T	0.86	0.00	-0.04	0.21	0.53	0.01	-0.10	0.08
Advocacy	Absenteeism	Assorted other specialists	0.86	0.00	-0.19	0.16	0.52	0.00	-0.37	0.14
Advocacy	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.03	0.32	0.52	0.00	0.03	0.52
Involvement	Absenteeism	Nursing	0.86	0.00	-0.05	0.11	0.55	0.03	-0.21	0.00
Involvement	Absenteeism	Doctors	0.86	0.00	0.00	0.88	0.53	0.01	-0.13	0.01
Involvement	Absenteeism	General managers	0.86	0.00	-0.03	0.32	0.52	0.00	0.01	0.82
Involvement	Absenteeism	Administrative/clerical	0.86	0.00	0.04	0.24	0.52	0.00	0.01	0.88
Involvement	Absenteeism	AHPs/S&T	0.86	0.00	-0.02	0.56	0.52	0.00	-0.03	0.64
Involvement	Absenteeism	Assorted other specialists	0.86	0.00	-0.01	0.92	0.52	0.00	0.02	0.95
Involvement	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.01	0.58	0.52	0.00	0.05	0.31

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Absenteeism	Nursing	0.86	0.00	-0.05	0.09	0.54	0.02	-0.18	0.00
Supervisory support	Absenteeism	Doctors	0.86	0.00	-0.01	0.60	0.53	0.01	-0.13	0.01
Supervisory support	Absenteeism	General managers	0.86	0.00	-0.04	0.12	0.53	0.01	-0.08	0.11
Supervisory support	Absenteeism	Administrative/clerical	0.86	0.00	0.05	0.10	0.52	0.00	-0.01	0.79
Supervisory support	Absenteeism	AHPs/S&T	0.86	0.00	-0.06	0.06	0.52	0.00	-0.06	0.29
Supervisory support	Absenteeism	Assorted other specialists	0.86	0.00	0.15	0.23	0.52	0.00	-0.11	0.64
Supervisory support	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.03	0.29	0.52	0.00	0.05	0.26
Health and well-being	Absenteeism	Nursing	0.86	0.00	0.06	0.03	0.53	0.01	0.12	0.02
Health and well-being	Absenteeism	Doctors	0.86	0.00	-0.01	0.60	0.52	0.00	-0.06	0.23
Health and well-being	Absenteeism	General managers	0.86	0.00	0.05	0.08	0.53	0.01	0.08	0.11
Health and well-being	Absenteeism	Administrative/clerical	0.86	0.00	0.03	0.33	0.52	0.00	0.06	0.20
Health and well-being	Absenteeism	AHPs/S&T	0.86	0.00	0.02	0.54	0.52	0.00	-0.02	0.64
Health and well-being	Absenteeism	Assorted other specialists	0.86	0.00	0.08	0.38	0.52	0.00	0.00	0.99
Health and well-being	Absenteeism	Maintenance/ancillary	0.86	0.00	0.00	0.96	0.52	0.00	0.04	0.39
Work pressure	Absenteeism	Nursing	0.86	0.00	0.03	0.26	0.52	0.00	0.05	0.37
Work pressure	Absenteeism	Doctors	0.86	0.00	-0.01	0.80	0.52	0.01	-0.08	0.12
Work pressure	Absenteeism	General managers	0.86	0.00	0.01	0.77	0.52	0.00	-0.05	0.33
Work pressure	Absenteeism	Administrative/clerical	0.86	0.00	-0.03	0.26	0.53	0.01	-0.13	0.02
Work pressure	Absenteeism	AHPs/S&T	0.86	0.00	0.01	0.71	0.52	0.00	-0.07	0.20
Work pressure	Absenteeism	Assorted other specialists	0.86	0.00	0.01	0.89	0.52	0.00	-0.13	0.51
Work pressure	Absenteeism	Maintenance/ancillary	0.86	0.00	-0.02	0.47	0.52	0.00	0.01	0.81

continued

TABLE 58 Breakdown by occupational group (*continued*)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Stability	Nursing	0.56	0.00	-0.03	0.62	0.36	0.00	-0.02	0.71
Job satisfaction	Stability	Doctors	0.56	0.00	0.04	0.38	0.36	0.00	0.05	0.40
Job satisfaction	Stability	General managers	0.56	0.00	0.01	0.87	0.36	0.00	0.00	1.00
Job satisfaction	Stability	Administrative/clerical	0.56	0.00	0.01	0.81	0.36	0.00	0.01	0.82
Job satisfaction	Stability	AHPs/S&T	0.56	0.00	0.03	0.57	0.36	0.00	-0.02	0.81
Job satisfaction	Stability	Assorted other specialists	0.56	0.00	0.05	0.84	0.36	0.00	-0.06	0.84
Job satisfaction	Stability	Maintenance/ancillary	0.56	0.00	0.03	0.56	0.36	0.00	0.03	0.62
Motivation	Stability	Nursing	0.56	0.00			0.36	0.01	-0.09	0.17
Motivation	Stability	Doctors	0.56	0.00	0.00	0.98	0.36	0.00	0.00	0.98
Motivation	Stability	General managers	0.56	0.00	0.00	0.99	0.36	0.00	0.03	0.57
Motivation	Stability	Administrative/clerical	0.56	0.00	-0.07	0.16	0.36	0.00	-0.05	0.37
Motivation	Stability	AHPs/S&T	0.56	0.00	0.02	0.73	0.36	0.00	-0.06	0.33
Motivation	Stability	Assorted other specialists	0.56	0.00	0.21	0.43	0.36	0.00	-0.01	0.98
Motivation	Stability	Maintenance/ancillary	0.56	0.00	-0.01	0.85	0.36	0.00	-0.01	0.85
Intention to leave job	Stability	Nursing	0.56	0.00	0.02	0.63	0.36	0.00	-0.05	0.42
Intention to leave job	Stability	Doctors	0.57	0.01	-0.12	0.01	0.37	0.01	-0.13	0.03
Intention to leave job	Stability	General managers	0.56	0.00	0.00	0.94	0.36	0.00	-0.05	0.37
Intention to leave job	Stability	Administrative/clerical	0.56	0.00	0.04	0.40	0.36	0.00	-0.05	0.46
Intention to leave job	Stability	AHPs/S&T	0.57	0.01	-0.11	0.02	0.39	0.04	-0.20	0.00
Intention to leave job	Stability	Assorted other specialists	0.56	0.00	-0.16	0.34	0.36	0.00	-0.25	0.21
Intention to leave job	Stability	Maintenance/ancillary	0.56	0.00	-0.04	0.36	0.36	0.00	-0.04	0.50

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Stability	Nursing	0.56	0.00	-0.03	0.61	0.36	0.00	-0.05	0.42
Engagement	Stability	Doctors	0.56	0.00	0.03	0.57	0.36	0.00	0.04	0.48
Engagement	Stability	General managers	0.56	0.00	-0.03	0.53	0.36	0.00	0.01	0.91
Engagement	Stability	Administrative/clerical	0.56	0.00	-0.02	0.70	0.36	0.00	0.00	1.00
Engagement	Stability	AHPs/S&T	0.56	0.00	0.06	0.25	0.36	0.00	0.03	0.59
Engagement	Stability	Assorted other specialists	0.56	0.00	0.18	0.51	0.36	0.00	0.07	0.82
Engagement	Stability	Maintenance/ancillary	0.56	0.00	0.00	0.94	0.36	0.00	0.01	0.90
Advocacy	Stability	Nursing	0.56	0.00	0.00	0.95	0.36	0.00	0.00	0.97
Advocacy	Stability	Doctors	0.56	0.00	0.06	0.26	0.36	0.00	0.08	0.22
Advocacy	Stability	General managers	0.56	0.00	-0.03	0.61	0.36	0.00	0.01	0.84
Advocacy	Stability	Administrative/clerical	0.56	0.00	0.02	0.69	0.36	0.00	0.06	0.36
Advocacy	Stability	AHPs/S&T	0.56	0.00	0.08	0.16	0.36	0.00	0.09	0.21
Advocacy	Stability	Assorted other specialists	0.56	0.00	-0.01	0.96	0.36	0.00	-0.06	0.84
Advocacy	Stability	Maintenance/ancillary	0.56	0.00	0.03	0.59	0.36	0.00	0.04	0.46
Involvement	Stability	Nursing	0.56	0.00	-0.06	0.25	0.37	0.01	-0.10	0.10
Involvement	Stability	Doctors	0.56	0.00	0.01	0.76	0.36	0.00	0.03	0.59
Involvement	Stability	General managers	0.56	0.00	-0.04	0.34	0.36	0.00	-0.02	0.73
Involvement	Stability	Administrative/clerical	0.56	0.00	-0.02	0.73	0.36	0.00	-0.04	0.58
Involvement	Stability	AHPs/S&T	0.56	0.00	0.04	0.42	0.36	0.00	0.03	0.69
Involvement	Stability	Assorted other specialists	0.56	0.00	0.26	0.28	0.36	0.00	0.23	0.42
Involvement	Stability	Maintenance/ancillary	0.56	0.00	0.00	1.00	0.36	0.00	0.00	0.99

continued

TABLE 58 Breakdown by occupational group (continued)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Stability	Nursing	0.56	0.00	-0.03	0.57	0.36	0.00	-0.01	0.93
Supervisory support	Stability	Doctors	0.56	0.00	-0.01	0.88	0.36	0.00	0.00	0.98
Supervisory support	Stability	General managers	0.56	0.00	-0.03	0.53	0.36	0.00	-0.03	0.55
Supervisory support	Stability	Administrative/clerical	0.56	0.00	-0.03	0.63	0.36	0.01	-0.10	0.11
Supervisory support	Stability	AHPs/S&T	0.56	0.00	-0.04	0.50	0.36	0.00	-0.02	0.80
Supervisory support	Stability	Assorted other specialists	0.56	0.00	-0.33	0.14	0.36	0.01	-0.36	0.17
Supervisory support	Stability	Maintenance/ancillary	0.56	0.00	0.02	0.60	0.36	0.00	0.04	0.48
Health and well-being	Stability	Nursing	0.56	0.00	-0.01	0.82	0.36	0.01	-0.09	0.13
Health and well-being	Stability	Doctors	0.57	0.01	-0.07	0.12	0.36	0.00	-0.03	0.55
Health and well-being	Stability	General managers	0.56	0.00	0.01	0.77	0.36	0.00	0.01	0.87
Health and well-being	Stability	Administrative/clerical	0.57	0.01	0.09	0.08	0.36	0.00	0.02	0.78
Health and well-being	Stability	AHPs/S&T	0.56	0.00	-0.07	0.18	0.37	0.01	-0.10	0.10
Health and well-being	Stability	Assorted other specialists	0.56	0.00	0.05	0.74	0.36	0.00	-0.01	0.96
Health and well-being	Stability	Maintenance/ancillary	0.56	0.00	0.00	0.98	0.36	0.00	0.00	0.98
Work pressure	Stability	Nursing	0.56	0.00	-0.06	0.27	0.37	0.01	-0.12	0.07
Work pressure	Stability	Doctors	0.57	0.01	-0.08	0.08	0.37	0.01	-0.10	0.09
Work pressure	Stability	General managers	0.57	0.01	-0.08	0.09	0.36	0.01	-0.09	0.11
Work pressure	Stability	Administrative/clerical	0.56	0.00	-0.06	0.22	0.38	0.02	-0.16	0.01
Work pressure	Stability	AHPs/S&T	0.58	0.02	-0.16	0.00	0.41	0.05	-0.24	0.00
Work pressure	Stability	Assorted other specialists	0.56	0.00	0.08	0.68	0.36	0.00	-0.08	0.73
Work pressure	Stability	Maintenance/ancillary	0.56	0.00	0.03	0.51	0.36	0.00	0.06	0.32

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Mortality	Nursing	0.64	0.01	-0.09	0.08	0.48	0.01	-0.12	0.07
Job satisfaction	Mortality	Doctors	0.63	0.00	-0.03	0.60	0.48	0.01	-0.08	0.21
Job satisfaction	Mortality	General managers	0.63	0.00	-0.06	0.26	0.47	0.00	-0.04	0.52
Job satisfaction	Mortality	Administrative/clerical	0.64	0.01	-0.10	0.07	0.48	0.01	-0.11	0.09
Job satisfaction	Mortality	AHPs/S&T	0.63	0.00	-0.01	0.87	0.47	0.00	-0.05	0.44
Job satisfaction	Mortality	Maintenance/ancillary	0.63	0.00	-0.07	0.18	0.48	0.01	-0.09	0.14
Motivation	Mortality	Nursing	0.63	0.00	-0.07	0.22	0.48	0.01	-0.10	0.15
Motivation	Mortality	Doctors	0.64	0.01	0.09	0.07	0.47	0.00	0.06	0.35
Motivation	Mortality	General managers	0.63	0.00	0.01	0.84	0.47	0.00	-0.01	0.93
Motivation	Mortality	Administrative/clerical	0.63	0.00	-0.03	0.52	0.47	0.00	-0.06	0.31
Motivation	Mortality	AHPs/S&T	0.63	0.00	0.05	0.43	0.47	0.00	0.05	0.45
Motivation	Mortality	Maintenance/ancillary	0.63	0.00	-0.04	0.51	0.47	0.00	-0.05	0.39
Intention to leave job	Mortality	Nursing	0.64	0.01	0.08	0.12	0.48	0.01	0.09	0.14
Intention to leave job	Mortality	Doctors	0.63	0.00	0.03	0.58	0.47	0.00	0.06	0.37
Intention to leave job	Mortality	General managers	0.63	0.00	0.01	0.87	0.47	0.00	0.03	0.67
Intention to leave job	Mortality	Administrative/clerical	0.64	0.01	0.10	0.09	0.48	0.01	0.12	0.10
Intention to leave job	Mortality	AHPs/S&T	0.64	0.01	0.08	0.14	0.48	0.01	0.09	0.15
Intention to leave job	Mortality	Maintenance/ancillary	0.63	0.00	-0.03	0.58	0.47	0.00	-0.03	0.60
Engagement	Mortality	Nursing	0.64	0.01	-0.11	0.06	0.49	0.02	-0.17	0.01
Engagement	Mortality	Doctors	0.63	0.00	0.01	0.83	0.47	0.00	-0.06	0.33
Engagement	Mortality	General managers	0.63	0.01	-0.07	0.17	0.48	0.01	-0.10	0.12
Engagement	Mortality	Administrative/clerical	0.64	0.02	-0.13	0.02	0.51	0.04	-0.22	0.00

continued

TABLE 58 Breakdown by occupational group (*continued*)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Mortality	AHPs/S&T	0.63	0.00	-0.05	0.40	0.48	0.01	-0.12	0.07
Engagement	Mortality	Maintenance/ancillary	0.63	0.00	-0.07	0.22	0.48	0.01	-0.09	0.16
Advocacy	Mortality	Nursing	0.64	0.01	-0.13	0.03	0.50	0.03	-0.20	0.00
Advocacy	Mortality	Doctors	0.63	0.00	-0.05	0.33	0.49	0.02	-0.13	0.04
Advocacy	Mortality	General managers	0.64	0.01	-0.10	0.06	0.50	0.03	-0.17	0.01
Advocacy	Mortality	Administrative/clerical	0.65	0.02	-0.15	0.00	0.53	0.05	-0.24	0.00
Advocacy	Mortality	AHPs/S&T	0.64	0.01	-0.11	0.04	0.51	0.04	-0.20	0.00
Advocacy	Mortality	Maintenance/ancillary	0.64	0.01	-0.08	0.13	0.48	0.01	-0.11	0.07
Involvement	Mortality	Nursing	0.63	0.00	-0.05	0.36	0.48	0.01	-0.07	0.25
Involvement	Mortality	Doctors	0.63	0.00	0.03	0.53	0.47	0.00	-0.02	0.70
Involvement	Mortality	General managers	0.64	0.01	-0.08	0.13	0.47	0.00	-0.04	0.51
Involvement	Mortality	Administrative/clerical	0.64	0.01	-0.10	0.08	0.50	0.03	-0.17	0.01
Involvement	Mortality	AHPs/S&T	0.63	0.00	0.02	0.68	0.47	0.00	-0.05	0.47
Involvement	Mortality	Maintenance/ancillary	0.64	0.01	-0.08	0.12	0.48	0.01	-0.10	0.13
Supervisory support	Mortality	Nursing	0.64	0.01	-0.09	0.08	0.48	0.01	-0.08	0.22
Supervisory support	Mortality	Doctors	0.63	0.00	-0.05	0.33	0.48	0.01	-0.09	0.14
Supervisory support	Mortality	General managers	0.64	0.01	-0.08	0.13	0.49	0.02	-0.13	0.05
Supervisory support	Mortality	Administrative/clerical	0.64	0.01	-0.09	0.10	0.48	0.01	-0.11	0.07
Supervisory support	Mortality	AHPs/S&T	0.63	0.00	0.04	0.42	0.47	0.00	0.03	0.60
Supervisory support	Mortality	Maintenance/ancillary	0.64	0.01	-0.09	0.11	0.48	0.01	-0.10	0.11
Health and well-being	Mortality	Nursing	0.65	0.02	0.13	0.01	0.49	0.02	0.14	0.02
Health and well-being	Mortality	Doctors	0.63	0.00	-0.03	0.52	0.47	0.00	-0.05	0.43

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Mortality	General managers	0.63	0.01	0.07	0.17	0.48	0.01	0.07	0.24
Health and well-being	Mortality	Administrative/clerical	0.64	0.01	0.09	0.12	0.48	0.01	0.09	0.18
Health and well-being	Mortality	AHPs/S&T	0.63	0.00	-0.02	0.69	0.47	0.00	0.00	0.99
Health and well-being	Mortality	Maintenance/ancillary	0.63	0.00	-0.06	0.27	0.48	0.01	-0.08	0.18
Work pressure	Mortality	Nursing	0.64	0.01	0.10	0.07	0.48	0.01	0.13	0.05
Work pressure	Mortality	Doctors	0.63	0.00	0.02	0.76	0.47	0.00	0.00	0.95
Work pressure	Mortality	General managers	0.63	0.00	0.05	0.38	0.47	0.00	0.01	0.90
Work pressure	Mortality	Administrative/clerical	0.63	0.01	0.07	0.16	0.49	0.02	0.14	0.03
Work pressure	Mortality	AHPs/S&T	0.63	0.00	0.04	0.45	0.48	0.01	0.08	0.19
Work pressure	Mortality	Maintenance/ancillary	0.63	0.00	-0.03	0.61	0.47	0.00	-0.05	0.44
Job satisfaction	Patient satisfaction	Nursing	0.82	0.01	0.08	0.03	0.63	0.03	0.18	0.00
Job satisfaction	Patient satisfaction	Doctors	0.82	0.00	0.06	0.11	0.62	0.02	0.16	0.00
Job satisfaction	Patient satisfaction	General managers	0.81	0.00	0.02	0.51	0.60	0.00	-0.02	0.70
Job satisfaction	Patient satisfaction	Administrative/clerical	0.82	0.00	0.05	0.15	0.60	0.00	0.05	0.40
Job satisfaction	Patient satisfaction	AHPs/S&T	0.82	0.00	0.06	0.14	0.61	0.01	0.09	0.12
Job satisfaction	Patient satisfaction	Maintenance/ancillary	0.81	0.00	0.03	0.46	0.61	0.01	0.10	0.07
Motivation	Patient satisfaction	Nursing	0.81	0.00	0.03	0.39	0.60	0.00	0.04	0.48
Motivation	Patient satisfaction	Doctors	0.81	0.00	-0.01	0.76	0.61	0.01	-0.08	0.16
Motivation	Patient satisfaction	General managers	0.81	0.00	0.00	0.98	0.60	0.00	0.00	0.95
Motivation	Patient satisfaction	Administrative/clerical	0.82	0.00	0.06	0.08	0.60	0.00	0.05	0.33
Motivation	Patient satisfaction	AHPs/S&T	0.81	0.00	0.04	0.31	0.61	0.00	0.08	0.19
Motivation	Patient satisfaction	Maintenance/ancillary	0.81	0.00	-0.02	0.66	0.60	0.00	0.03	0.63

continued

TABLE 58 Breakdown by occupational group (continued)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Patient satisfaction	Nursing	0.82	0.01	-0.09	0.01	0.63	0.03	-0.18	0.00
Intention to leave job	Patient satisfaction	Doctors	0.82	0.00	-0.05	0.17	0.63	0.03	-0.20	0.00
Intention to leave job	Patient satisfaction	General managers	0.81	0.00	0.02	0.50	0.60	0.00	0.01	0.78
Intention to leave job	Patient satisfaction	Administrative/clerical	0.82	0.00	-0.06	0.14	0.62	0.02	-0.14	0.01
Intention to leave job	Patient satisfaction	AHPs/S&T	0.82	0.00	-0.07	0.08	0.64	0.03	-0.20	0.00
Intention to leave job	Patient satisfaction	Maintenance/ancillary	0.81	0.00	0.03	0.33	0.60	0.00	0.03	0.63
Engagement	Patient satisfaction	Nursing	0.82	0.01	0.12	0.00	0.64	0.03	0.22	0.00
Engagement	Patient satisfaction	Doctors	0.82	0.01	0.09	0.03	0.63	0.02	0.19	0.00
Engagement	Patient satisfaction	General managers	0.81	0.00	0.04	0.23	0.61	0.01	0.08	0.12
Engagement	Patient satisfaction	Administrative/clerical	0.82	0.01	0.10	0.02	0.64	0.03	0.21	0.00
Engagement	Patient satisfaction	AHPs/S&T	0.82	0.01	0.10	0.02	0.64	0.04	0.23	0.00
Engagement	Patient satisfaction	Maintenance/ancillary	0.81	0.00	0.00	0.94	0.60	0.00	0.06	0.23
Advocacy	Patient satisfaction	Nursing	0.83	0.02	0.17	0.00	0.66	0.06	0.31	0.00
Advocacy	Patient satisfaction	Doctors	0.83	0.01	0.15	0.00	0.67	0.07	0.32	0.00
Advocacy	Patient satisfaction	General managers	0.82	0.00	0.05	0.19	0.61	0.01	0.12	0.04
Advocacy	Patient satisfaction	Administrative/clerical	0.82	0.01	0.14	0.00	0.67	0.07	0.33	0.00
Advocacy	Patient satisfaction	AHPs/S&T	0.83	0.01	0.16	0.00	0.69	0.08	0.36	0.00
Advocacy	Patient satisfaction	Maintenance/ancillary	0.81	0.00	0.03	0.42	0.61	0.01	0.11	0.04
Involvement	Patient satisfaction	Nursing	0.82	0.01	0.08	0.02	0.62	0.02	0.13	0.01
Involvement	Patient satisfaction	Doctors	0.82	0.01	0.08	0.04	0.62	0.02	0.14	0.01
Involvement	Patient satisfaction	General managers	0.82	0.00	0.06	0.10	0.61	0.01	0.08	0.13
Involvement	Patient satisfaction	Administrative/clerical	0.81	0.00	0.01	0.80	0.60	0.00	0.06	0.29
Involvement	Patient satisfaction	AHPs/S&T	0.81	0.00	0.03	0.46	0.60	0.00	0.06	0.31

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Patient satisfaction	Maintenance/ancillary	0.81	0.00	0.00	0.98	0.60	0.00	0.06	0.29
Supervisory support	Patient satisfaction	Nursing	0.82	0.00	0.05	0.13	0.61	0.01	0.09	0.07
Supervisory support	Patient satisfaction	Doctors	0.82	0.00	0.06	0.12	0.61	0.01	0.11	0.03
Supervisory support	Patient satisfaction	General managers	0.81	0.00	-0.02	0.61	0.60	0.00	0.00	0.99
Supervisory support	Patient satisfaction	Administrative/clerical	0.81	0.00	0.03	0.43	0.60	0.00	0.03	0.53
Supervisory support	Patient satisfaction	AHPs/S&T	0.81	0.00	0.03	0.40	0.61	0.01	0.07	0.16
Supervisory support	Patient satisfaction	Maintenance/ancillary	0.81	0.00	0.02	0.60	0.61	0.01	0.09	0.08
Health and well-being	Patient satisfaction	Nursing	0.81	0.00	0.00	0.91	0.61	0.01	-0.08	0.15
Health and well-being	Patient satisfaction	Doctors	0.81	0.00	0.00	0.96	0.60	0.00	0.04	0.44
Health and well-being	Patient satisfaction	General managers	0.82	0.00	-0.06	0.08	0.60	0.00	-0.06	0.26
Health and well-being	Patient satisfaction	Administrative/clerical	0.81	0.00	-0.03	0.50	0.61	0.01	-0.09	0.08
Health and well-being	Patient satisfaction	AHPs/S&T	0.81	0.00	0.02	0.61	0.60	0.00	-0.06	0.25
Health and well-being	Patient satisfaction	Maintenance/ancillary	0.82	0.01	0.08	0.02	0.61	0.01	0.10	0.05
Work pressure	Patient satisfaction	Nursing	0.83	0.01	-0.14	0.00	0.64	0.04	-0.22	0.00
Work pressure	Patient satisfaction	Doctors	0.82	0.01	-0.08	0.03	0.62	0.02	-0.14	0.01
Work pressure	Patient satisfaction	General managers	0.81	0.00	0.01	0.70	0.60	0.00	-0.02	0.77
Work pressure	Patient satisfaction	Administrative/clerical	0.82	0.00	-0.05	0.20	0.61	0.01	-0.10	0.06
Work pressure	Patient satisfaction	AHPs/S&T	0.81	0.00	-0.04	0.32	0.62	0.02	-0.15	0.01
Work pressure	Patient satisfaction	Maintenance/ancillary	0.82	0.00	0.05	0.15	0.61	0.00	0.07	0.19
Job satisfaction	MRSA	Nursing	0.21	0.00	0.00	0.97	0.10	0.00	-0.01	0.94
Job satisfaction	MRSA	Doctors	0.21	0.00	0.01	0.93	0.10	0.00	-0.01	0.94

continued

TABLE 58 Breakdown by occupational group (continued)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	MRSA	General managers	0.21	0.00	-0.03	0.65	0.10	0.00	-0.01	0.89
Job satisfaction	MRSA	Administrative/clerical	0.21	0.00	-0.02	0.79	0.10	0.00	0.03	0.75
Job satisfaction	MRSA	AHPs/S&T	0.22	0.00	0.06	0.47	0.10	0.00	0.06	0.44
Job satisfaction	MRSA	Maintenance/ancillary	0.21	0.00	0.00	0.96	0.10	0.00	-0.03	0.71
Motivation	MRSA	Nursing	0.21	0.00	0.03	0.74	0.10	0.00	0.02	0.85
Motivation	MRSA	Doctors	0.21	0.00	0.01	0.89	0.10	0.00	-0.02	0.85
Motivation	MRSA	General managers	0.21	0.00	-0.01	0.88	0.10	0.00	0.00	0.95
Motivation	MRSA	Administrative/clerical	0.21	0.00	0.00	0.95	0.10	0.00	0.03	0.67
Motivation	MRSA	AHPs/S&T	0.23	0.02	0.16	0.05	0.12	0.02	0.18	0.04
Motivation	MRSA	Maintenance/ancillary	0.21	0.00	0.00	0.96	0.10	0.00	-0.02	0.77
Intention to leave job	MRSA	Nursing	0.21	0.00	0.02	0.84	0.10	0.00	0.03	0.73
Intention to leave job	MRSA	Doctors	0.21	0.00	0.04	0.62	0.10	0.00	0.05	0.55
Intention to leave job	MRSA	General managers	0.22	0.00	0.06	0.43	0.10	0.00	0.07	0.38
Intention to leave job	MRSA	Administrative/clerical	0.21	0.00	0.06	0.48	0.10	0.00	0.01	0.91
Intention to leave job	MRSA	AHPs/S&T	0.21	0.00	0.03	0.64	0.10	0.00	0.03	0.73
Intention to leave job	MRSA	Maintenance/ancillary	0.24	0.03	-0.18	0.01	0.13	0.03	-0.17	0.02
Engagement	MRSA	Nursing	0.21	0.00	0.04	0.68	0.10	0.00	0.05	0.55
Engagement	MRSA	Doctors	0.21	0.00	0.00	0.97	0.10	0.00	0.01	0.94
Engagement	MRSA	General managers	0.21	0.00	0.02	0.79	0.10	0.00	0.03	0.70
Engagement	MRSA	Administrative/clerical	0.21	0.00	0.05	0.55	0.11	0.01	0.11	0.21
Engagement	MRSA	AHPs/S&T	0.22	0.01	0.10	0.24	0.11	0.01	0.14	0.12
Engagement	MRSA	Maintenance/ancillary	0.21	0.00	-0.02	0.76	0.10	0.00	-0.04	0.60

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	MRSA	Nursing	0.21	0.00	0.04	0.70	0.10	0.00	0.05	0.63
Advocacy	MRSA	Doctors	0.21	0.00	-0.02	0.84	0.10	0.00	0.00	0.97
Advocacy	MRSA	General managers	0.21	0.00	0.01	0.94	0.10	0.00	0.00	0.97
Advocacy	MRSA	Administrative/clerical	0.22	0.00	0.08	0.37	0.11	0.01	0.14	0.14
Advocacy	MRSA	AHPs/S&T	0.22	0.00	0.07	0.42	0.10	0.01	0.09	0.33
Advocacy	MRSA	Maintenance/ancillary	0.21	0.00	-0.04	0.57	0.10	0.00	-0.07	0.39
Involvement	MRSA	Nursing	0.21	0.00	0.03	0.70	0.10	0.00	0.07	0.37
Involvement	MRSA	Doctors	0.21	0.00	0.02	0.78	0.10	0.00	0.04	0.66
Involvement	MRSA	General managers	0.21	0.00	0.05	0.53	0.11	0.01	0.08	0.28
Involvement	MRSA	Administrative/clerical	0.21	0.00	0.02	0.80	0.10	0.00	0.07	0.40
Involvement	MRSA	AHPs/S&T	0.21	0.00	0.03	0.67	0.11	0.01	0.09	0.26
Involvement	MRSA	Maintenance/ancillary	0.21	0.00	-0.02	0.79	0.10	0.00	-0.03	0.70
Supervisory support	MRSA	Nursing	0.21	0.00	0.03	0.64	0.10	0.00	0.05	0.49
Supervisory support	MRSA	Doctors	0.21	0.00	0.01	0.89	0.10	0.00	0.03	0.67
Supervisory support	MRSA	General managers	0.22	0.01	-0.08	0.26	0.10	0.00	-0.05	0.48
Supervisory support	MRSA	Administrative/clerical	0.22	0.00	-0.07	0.35	0.10	0.00	-0.01	0.91
Supervisory support	MRSA	AHPs/S&T	0.21	0.00	0.01	0.91	0.10	0.00	0.02	0.78
Supervisory support	MRSA	Maintenance/ancillary	0.21	0.00	0.00	0.98	0.10	0.00	-0.01	0.88
Health and well-being	MRSA	Nursing	0.22	0.00	-0.07	0.34	0.10	0.00	-0.06	0.46
Health and well-being	MRSA	Doctors	0.21	0.00	0.03	0.73	0.10	0.00	0.06	0.45
Health and well-being	MRSA	General managers	0.22	0.01	0.07	0.32	0.10	0.01	0.08	0.29

continued

TABLE 58 Breakdown by occupational group (continued)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	MRSA	Administrative/clerical	0.21	0.00	-0.02	0.81	0.10	0.00	-0.02	0.81
Health and well-being	MRSA	AHPs/S&T	0.21	0.00	-0.04	0.63	0.10	0.00	-0.05	0.51
Health and well-being	MRSA	Maintenance/ancillary	0.23	0.02	-0.15	0.04	0.13	0.03	-0.18	0.01
Work pressure	MRSA	Nursing	0.22	0.00	-0.07	0.41	0.10	0.00	-0.06	0.50
Work pressure	MRSA	Doctors	0.22	0.01	-0.08	0.28	0.10	0.00	-0.04	0.60
Work pressure	MRSA	General managers	0.21	0.00	-0.03	0.73	0.10	0.00	-0.02	0.76
Work pressure	MRSA	Administrative/clerical	0.21	0.00	0.01	0.95	0.10	0.00	-0.02	0.84
Work pressure	MRSA	AHPs/S&T	0.23	0.01	-0.13	0.10	0.11	0.01	-0.12	0.14
Work pressure	MRSA	Maintenance/ancillary	0.23	0.02	-0.13	0.08	0.12	0.02	-0.15	0.05
Job satisfaction	<i>C. difficile</i>	Nursing	0.50	0.00	0.05	0.40	0.13	0.01	0.12	0.14
Job satisfaction	<i>C. difficile</i>	Doctors	0.50	0.00	-0.03	0.64	0.12	0.00	0.00	0.96
Job satisfaction	<i>C. difficile</i>	General managers	0.51	0.00	-0.07	0.23	0.12	0.01	-0.09	0.26
Job satisfaction	<i>C. difficile</i>	Administrative/clerical	0.52	0.02	-0.13	0.03	0.12	0.00	-0.04	0.57
Job satisfaction	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.06	0.33	0.12	0.00	0.01	0.91
Job satisfaction	<i>C. difficile</i>	Maintenance/ancillary	0.51	0.00	0.07	0.25	0.13	0.01	0.12	0.10
Motivation	<i>C. difficile</i>	Nursing	0.50	0.00	-0.04	0.48	0.12	0.00	0.05	0.57
Motivation	<i>C. difficile</i>	Doctors	0.50	0.00	-0.04	0.55	0.12	0.00	0.03	0.68
Motivation	<i>C. difficile</i>	General managers	0.51	0.01	-0.08	0.14	0.12	0.01	-0.08	0.32
Motivation	<i>C. difficile</i>	Administrative/clerical	0.51	0.00	-0.06	0.27	0.12	0.00	0.02	0.76
Motivation	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.00	0.97	0.12	0.00	-0.02	0.83
Motivation	<i>C. difficile</i>	Maintenance/ancillary	0.50	0.00	0.04	0.46	0.13	0.02	0.13	0.08
Intention to leave job	<i>C. difficile</i>	Nursing	0.50	0.00	0.01	0.88	0.12	0.00	0.01	0.91
Intention to leave job	<i>C. difficile</i>	Doctors	0.50	0.00	-0.05	0.45	0.12	0.00	-0.05	0.51

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	<i>C. difficile</i>	General managers	0.52	0.02	0.16	0.01	0.16	0.05	0.23	0.00
Intention to leave job	<i>C. difficile</i>	Administrative/clerical	0.50	0.00	0.02	0.81	0.12	0.00	-0.01	0.95
Intention to leave job	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.05	0.37	0.12	0.00	0.07	0.38
Intention to leave job	<i>C. difficile</i>	Maintenance/ancillary	0.51	0.00	-0.07	0.23	0.12	0.00	-0.03	0.65
Engagement	<i>C. difficile</i>	Nursing	0.50	0.00	0.03	0.70	0.13	0.01	0.12	0.18
Engagement	<i>C. difficile</i>	Doctors	0.50	0.00	0.00	1.00	0.12	0.00	0.05	0.59
Engagement	<i>C. difficile</i>	General managers	0.51	0.01	-0.09	0.14	0.12	0.01	-0.08	0.29
Engagement	<i>C. difficile</i>	Administrative/clerical	0.50	0.00	-0.05	0.42	0.12	0.00	0.04	0.65
Engagement	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.04	0.54	0.12	0.00	0.05	0.61
Engagement	<i>C. difficile</i>	Maintenance/ancillary	0.50	0.00	0.04	0.45	0.13	0.01	0.12	0.12
Advocacy	<i>C. difficile</i>	Nursing	0.50	0.00	0.05	0.52	0.13	0.01	0.13	0.19
Advocacy	<i>C. difficile</i>	Doctors	0.50	0.00	0.05	0.46	0.12	0.00	0.06	0.56
Advocacy	<i>C. difficile</i>	General managers	0.51	0.01	-0.10	0.13	0.12	0.00	-0.05	0.54
Advocacy	<i>C. difficile</i>	Administrative/clerical	0.50	0.00	0.00	0.95	0.12	0.00	0.05	0.61
Advocacy	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.05	0.51	0.12	0.00	0.07	0.45
Advocacy	<i>C. difficile</i>	Maintenance/ancillary	0.50	0.00	0.04	0.47	0.13	0.01	0.10	0.18
Involvement	<i>C. difficile</i>	Nursing	0.50	0.00	0.05	0.44	0.13	0.01	0.12	0.14
Involvement	<i>C. difficile</i>	Doctors	0.50	0.00	-0.03	0.65	0.12	0.00	0.03	0.70
Involvement	<i>C. difficile</i>	General managers	0.50	0.00	-0.04	0.50	0.12	0.01	-0.08	0.27
Involvement	<i>C. difficile</i>	Administrative/clerical	0.50	0.00	-0.06	0.29	0.12	0.00	0.02	0.80
Involvement	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.05	0.39	0.12	0.00	0.04	0.60
Involvement	<i>C. difficile</i>	Maintenance/ancillary	0.50	0.00	0.04	0.45	0.13	0.01	0.11	0.16

continued

TABLE 58 Breakdown by occupational group (continued)

Predictor	Outcome	Occupational group	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	<i>C. difficile</i>	Nursing	0.51	0.00	0.06	0.27	0.12	0.01	0.09	0.25
Supervisory support	<i>C. difficile</i>	Doctors	0.50	0.00	-0.01	0.87	0.12	0.00	0.05	0.55
Supervisory support	<i>C. difficile</i>	General managers	0.50	0.00	-0.02	0.70	0.12	0.00	-0.03	0.66
Supervisory support	<i>C. difficile</i>	Administrative/clerical	0.50	0.00	-0.02	0.68	0.12	0.00	0.05	0.50
Supervisory support	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.05	0.40	0.12	0.00	0.02	0.83
Supervisory support	<i>C. difficile</i>	Maintenance/ancillary	0.50	0.00	0.05	0.34	0.13	0.01	0.12	0.11
Health and well-being	<i>C. difficile</i>	Nursing	0.50	0.00	-0.02	0.76	0.12	0.00	-0.04	0.61
Health and well-being	<i>C. difficile</i>	Doctors	0.51	0.01	-0.11	0.08	0.13	0.01	-0.11	0.18
Health and well-being	<i>C. difficile</i>	General managers	0.50	0.00	-0.04	0.52	0.12	0.00	-0.01	0.94
Health and well-being	<i>C. difficile</i>	Administrative/clerical	0.51	0.00	0.07	0.28	0.13	0.02	0.14	0.07
Health and well-being	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	-0.04	0.47	0.15	0.03	-0.18	0.02
Health and well-being	<i>C. difficile</i>	Maintenance/ancillary	0.50	0.00	-0.03	0.58	0.12	0.00	0.00	0.98
Work pressure	<i>C. difficile</i>	Nursing	0.50	0.00	0.04	0.55	0.13	0.01	-0.13	0.16
Work pressure	<i>C. difficile</i>	Doctors	0.50	0.00	0.04	0.46	0.12	0.00	0.07	0.41
Work pressure	<i>C. difficile</i>	General managers	0.51	0.01	0.07	0.20	0.12	0.01	0.08	0.30
Work pressure	<i>C. difficile</i>	Administrative/clerical	0.52	0.02	0.14	0.02	0.12	0.00	0.05	0.53
Work pressure	<i>C. difficile</i>	AHPs/S&T	0.50	0.00	0.04	0.53	0.13	0.01	-0.13	0.12
Work pressure	<i>C. difficile</i>	Maintenance/ancillary	0.51	0.01	-0.10	0.09	0.12	0.01	-0.08	0.29

S&T, scientific and technical.

TABLE 59 Breakdown by gender

Predictor	Outcome	Gender	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	M	0.85	0.00	0.04	0.63	0.41	0.03	-0.20	0.20
Job satisfaction	Absenteeism	F	0.87	0.02	0.16	0.03	0.39	0.00	-0.04	0.82
Motivation	Absenteeism	M	0.85	0.00	0.02	0.77	0.49	0.10	-0.35	0.01
Motivation	Absenteeism	F	0.87	0.02	0.15	0.04	0.39	0.00	0.00	0.98
Intention to leave job	Absenteeism	M	0.85	0.00	-0.03	0.65	0.39	0.00	-0.04	0.81
Intention to leave job	Absenteeism	F	0.86	0.01	-0.11	0.12	0.40	0.01	-0.12	0.41
Engagement	Absenteeism	M	0.86	0.00	0.08	0.35	0.42	0.04	-0.24	0.14
Engagement	Absenteeism	F	0.88	0.02	0.21	0.01	0.39	0.00	0.00	0.98
Advocacy	Absenteeism	M	0.86	0.00	0.09	0.30	0.39	0.00	-0.05	0.76
Advocacy	Absenteeism	F	0.87	0.02	0.18	0.03	0.39	0.00	0.04	0.83
Involvement	Absenteeism	M	0.86	0.00	0.06	0.47	0.43	0.05	-0.27	0.09
Involvement	Absenteeism	F	0.87	0.02	0.16	0.06	0.39	0.00	-0.07	0.68
Supervisory support	Absenteeism	M	0.85	0.00	0.04	0.70	0.43	0.04	-0.27	0.11
Supervisory support	Absenteeism	F	0.86	0.01	0.12	0.15	0.39	0.00	-0.08	0.64
Health and well-being	Absenteeism	M	0.85	0.00	0.04	0.63	0.39	0.01	-0.08	0.58
Health and well-being	Absenteeism	F	0.85	0.00	-0.02	0.80	0.39	0.00	-0.06	0.68
Work pressure	Absenteeism	M	0.86	0.00	-0.06	0.41	0.40	0.01	-0.10	0.49
Work pressure	Absenteeism	F	0.87	0.02	-0.16	0.03	0.47	0.08	-0.31	0.03
Job satisfaction	Stability	M	0.78	0.00	0.01	0.93	0.47	0.02	-0.17	0.26
Job satisfaction	Stability	F	0.78	0.00	0.04	0.71	0.46	0.01	-0.09	0.53
Motivation	Stability	M	0.80	0.02	-0.17	0.06	0.57	0.12	-0.37	0.00
Motivation	Stability	F	0.78	0.00	-0.05	0.60	0.46	0.01	-0.09	0.51

continued

TABLE 59 Breakdown by gender (continued)

Predictor	Outcome	Gender	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Stability	M	0.79	0.01	0.10	0.28	0.47	0.02	0.14	0.33
Intention to leave job	Stability	F	0.78	0.01	0.08	0.37	0.47	0.01	-0.12	0.37
Engagement	Stability	M	0.78	0.00	-0.09	0.40	0.51	0.06	-0.30	0.05
Engagement	Stability	F	0.78	0.00	-0.02	0.84	0.46	0.01	-0.10	0.55
Advocacy	Stability	M	0.78	0.00	-0.05	0.65	0.46	0.01	-0.11	0.47
Advocacy	Stability	F	0.78	0.00	-0.07	0.53	0.46	0.00	-0.08	0.65
Involvement	Stability	M	0.78	0.00	-0.01	0.92	0.52	0.07	-0.32	0.03
Involvement	Stability	F	0.79	0.01	0.14	0.19	0.46	0.00	-0.08	0.62
Supervisory support	Stability	M	0.78	0.00	-0.06	0.58	0.49	0.04	-0.25	0.11
Supervisory support	Stability	F	0.78	0.00	0.03	0.78	0.46	0.00	-0.06	0.71
Health and well-being	Stability	M	0.79	0.01	0.13	0.17	0.47	0.02	0.16	0.24
Health and well-being	Stability	F	0.79	0.01	-0.10	0.24	0.45	0.00	-0.03	0.84
Work pressure	Stability	M	0.78	0.00	0.02	0.78	0.46	0.00	-0.07	0.63
Work pressure	Stability	F	0.78	0.00	-0.03	0.75	0.49	0.04	-0.22	0.10
Job satisfaction	Mortality	M	0.81	0.00	0.07	0.48	0.61	0.00	-0.05	0.72
Job satisfaction	Mortality	F	0.81	0.01	0.09	0.36	0.61	0.00	-0.05	0.72
Motivation	Mortality	M	0.81	0.00	0.07	0.46	0.61	0.00	0.02	0.87
Motivation	Mortality	F	0.81	0.01	0.11	0.26	0.62	0.01	-0.11	0.40
Intention to leave job	Mortality	M	0.80	0.00	0.05	0.61	0.63	0.02	0.18	0.17
Intention to leave job	Mortality	F	0.80	0.00	-0.01	0.92	0.61	0.00	0.04	0.74
Engagement	Mortality	M	0.80	0.00	0.04	0.71	0.62	0.01	-0.14	0.35
Engagement	Mortality	F	0.81	0.00	0.09	0.41	0.62	0.02	-0.16	0.25

Predictor	Outcome	Gender	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Advocacy	Mortality	M	0.80	0.00	0.00	0.97	0.64	0.03	-0.22	0.11
Advocacy	Mortality	F	0.80	0.00	0.05	0.67	0.63	0.02	-0.17	0.23
Involvement	Mortality	M	0.81	0.00	0.06	0.54	0.61	0.00	-0.01	0.97
Involvement	Mortality	F	0.81	0.01	0.11	0.31	0.61	0.01	-0.10	0.45
Supervisory support	Mortality	M	0.81	0.01	0.14	0.19	0.61	0.01	0.11	0.46
Supervisory support	Mortality	F	0.80	0.00	0.01	0.87	0.61	0.00	-0.05	0.69
Health and well-being	Mortality	M	0.80	0.00	-0.05	0.56	0.61	0.00	0.00	0.97
Health and well-being	Mortality	F	0.80	0.00	-0.01	0.92	0.61	0.00	0.07	0.56
Work pressure	Mortality	M	0.81	0.01	0.09	0.32	0.64	0.03	0.19	0.11
Work pressure	Mortality	F	0.82	0.02	-0.16	0.06	0.61	0.01	-0.08	0.48
Job satisfaction	Patient satisfaction	M	0.56	0.03	0.19	0.16	0.44	0.05	0.23	0.12
Job satisfaction	Patient satisfaction	F	0.53	0.00	0.04	0.80	0.39	0.00	-0.01	0.96
Motivation	Patient satisfaction	M	0.53	0.00	-0.02	0.86	0.39	0.00	0.01	0.96
Motivation	Patient satisfaction	F	0.53	0.00	-0.04	0.76	0.39	0.00	-0.06	0.69
Intention to leave job	Patient satisfaction	M	0.53	0.00	-0.01	0.96	0.40	0.01	-0.12	0.44
Intention to leave job	Patient satisfaction	F	0.54	0.01	-0.10	0.44	0.41	0.02	-0.16	0.27
Engagement	Patient satisfaction	M	0.55	0.02	0.17	0.27	0.43	0.04	0.25	0.13
Engagement	Patient satisfaction	F	0.54	0.01	0.14	0.38	0.42	0.02	0.20	0.26
Advocacy	Patient satisfaction	M	0.59	0.07	0.35	0.03	0.52	0.13	0.47	0.01
Advocacy	Patient satisfaction	F	0.56	0.03	0.25	0.13	0.46	0.07	0.35	0.05
Involvement	Patient satisfaction	M	0.53	0.00	0.04	0.79	0.39	0.00	0.03	0.86
Involvement	Patient satisfaction	F	0.53	0.00	0.03	0.83	0.39	0.00	0.03	0.84

continued

TABLE 59 Breakdown by gender (continued)

Predictor	Outcome	Gender	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Supervisory support	Patient satisfaction	M	0.53	0.00	0.06	0.67	0.41	0.02	0.16	0.29
Supervisory support	Patient satisfaction	F	0.53	0.00	-0.07	0.64	0.40	0.01	-0.11	0.46
Health and well-being	Patient satisfaction	M	0.53	0.00	0.07	0.59	0.40	0.01	0.10	0.53
Health and well-being	Patient satisfaction	F	0.62	0.10	0.33	0.01	0.47	0.08	0.30	0.04
Work pressure	Patient satisfaction	M	0.53	0.01	-0.09	0.55	0.42	0.03	-0.18	0.24
Work pressure	Patient satisfaction	F	0.55	0.02	-0.16	0.27	0.42	0.02	-0.19	0.26
Job satisfaction	MRSA	M	0.52	0.00	0.00	0.98	0.41	0.00	-0.06	0.66
Job satisfaction	MRSA	F	0.53	0.01	-0.09	0.53	0.42	0.01	-0.12	0.43
Motivation	MRSA	M	0.53	0.01	0.13	0.33	0.41	0.01	0.08	0.57
Motivation	MRSA	F	0.52	0.00	0.05	0.73	0.41	0.00	0.05	0.74
Intention to leave job	MRSA	M	0.53	0.01	0.12	0.39	0.42	0.02	0.15	0.32
Intention to leave job	MRSA	F	0.54	0.02	0.16	0.20	0.43	0.02	0.16	0.25
Engagement	MRSA	M	0.52	0.00	0.02	0.89	0.40	0.00	-0.01	0.95
Engagement	MRSA	F	0.53	0.00	-0.10	0.57	0.41	0.00	-0.05	0.77
Advocacy	MRSA	M	0.52	0.00	-0.06	0.72	0.40	0.00	-0.05	0.79
Advocacy	MRSA	F	0.53	0.01	-0.10	0.56	0.41	0.00	-0.08	0.69
Involvement	MRSA	M	0.52	0.00	0.03	0.85	0.41	0.00	-0.05	0.76
Involvement	MRSA	F	0.54	0.02	-0.16	0.30	0.41	0.00	-0.07	0.69
Supervisory support	MRSA	M	0.53	0.01	0.13	0.37	0.40	0.00	0.02	0.90
Supervisory support	MRSA	F	0.52	0.00	-0.04	0.74	0.41	0.00	-0.06	0.66
Health and well-being	MRSA	M	0.52	0.00	0.03	0.82	0.42	0.02	0.14	0.34
Health and well-being	MRSA	F	0.52	0.00	-0.05	0.72	0.41	0.00	-0.04	0.79

Predictor	Outcome	Gender	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Work pressure	MRSA	M	0.52	0.00	0.01	0.93	0.41	0.00	0.06	0.72
Work pressure	MRSA	F	0.53	0.01	0.15	0.36	0.43	0.02	0.20	0.25
Job satisfaction	<i>C. difficile</i>	M	0.41	0.01	0.11	0.47	0.21	0.01	0.08	0.63
Job satisfaction	<i>C. difficile</i>	F	0.44	0.04	0.24	0.14	0.27	0.06	0.29	0.10
Motivation	<i>C. difficile</i>	M	0.40	0.00	0.03	0.82	0.21	0.00	0.02	0.91
Motivation	<i>C. difficile</i>	F	0.40	0.00	0.02	0.88	0.21	0.01	0.10	0.60
Intention to leave job	<i>C. difficile</i>	M	0.40	0.00	0.02	0.88	0.23	0.02	0.17	0.33
Intention to leave job	<i>C. difficile</i>	F	0.40	0.00	0.06	0.68	0.21	0.00	0.04	0.81
Engagement	<i>C. difficile</i>	M	0.41	0.02	0.17	0.33	0.22	0.01	0.13	0.49
Engagement	<i>C. difficile</i>	F	0.41	0.02	0.18	0.35	0.24	0.03	0.24	0.26
Advocacy	<i>C. difficile</i>	M	0.40	0.01	0.12	0.50	0.21	0.00	0.07	0.74
Advocacy	<i>C. difficile</i>	F	0.42	0.02	0.20	0.31	0.22	0.02	0.20	0.37
Involvement	<i>C. difficile</i>	M	0.45	0.05	0.27	0.09	0.25	0.05	0.25	0.15
Involvement	<i>C. difficile</i>	F	0.42	0.02	0.20	0.25	0.28	0.07	0.32	0.08
Supervisory support	<i>C. difficile</i>	M	0.42	0.03	0.19	0.22	0.22	0.01	0.13	0.45
Supervisory support	<i>C. difficile</i>	F	0.50	0.10	0.34	0.02	0.34	0.13	0.38	0.02
Health and well-being	<i>C. difficile</i>	M	0.40	0.00	-0.08	0.63	0.21	0.01	0.08	0.63
Health and well-being	<i>C. difficile</i>	F	0.40	0.01	-0.09	0.58	0.23	0.03	-0.18	0.27
Work pressure	<i>C. difficile</i>	M	0.40	0.00	0.00	0.99	0.21	0.00	0.04	0.81
Work pressure	<i>C. difficile</i>	F	0.40	0.01	0.12	0.52	0.21	0.00	0.00	1.00

F, female; M, male.

TABLE 60 Breakdown by tenure

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Absenteeism	< 1 year	0.86	0.00	-0.01	0.66	0.52	0.00	-0.01	0.87
Job satisfaction	Absenteeism	1–2 years	0.86	0.00	-0.02	0.57	0.52	0.00	-0.05	0.32
Job satisfaction	Absenteeism	3–5 years	0.86	0.00	0.00	0.99	0.52	0.00	-0.01	0.87
Job satisfaction	Absenteeism	6–10 years	0.86	0.00	-0.03	0.27	0.54	0.02	-0.17	0.00
Job satisfaction	Absenteeism	11–15 years	0.86	0.00	-0.03	0.23	0.53	0.01	-0.12	0.02
Job satisfaction	Absenteeism	> 15 years	0.86	0.00	-0.05	0.08	0.54	0.02	-0.15	0.01
Motivation	Absenteeism	< 1 year	0.86	0.00	0.01	0.62	0.52	0.00	-0.02	0.68
Motivation	Absenteeism	1–2 years	0.86	0.00	-0.02	0.49	0.52	0.00	-0.05	0.29
Motivation	Absenteeism	3–5 years	0.86	0.00	0.01	0.69	0.52	0.00	-0.01	0.89
Motivation	Absenteeism	6–10 years	0.86	0.00	-0.02	0.43	0.52	0.00	-0.07	0.14
Motivation	Absenteeism	11–15 years	0.86	0.00	0.02	0.45	0.53	0.01	-0.09	0.06
Motivation	Absenteeism	> 15 years	0.86	0.00	-0.04	0.15	0.56	0.04	-0.23	0.00
Intention to leave job	Absenteeism	< 1 year	0.86	0.00	-0.02	0.44	0.52	0.00	0.04	0.46
Intention to leave job	Absenteeism	1–2 years	0.86	0.00	0.03	0.32	0.52	0.00	0.03	0.60
Intention to leave job	Absenteeism	3–5 years	0.86	0.00	-0.01	0.74	0.52	0.00	-0.03	0.57
Intention to leave job	Absenteeism	6–10 years	0.86	0.00	0.05	0.09	0.53	0.01	0.10	0.04
Intention to leave job	Absenteeism	11–15 years	0.86	0.00	0.02	0.40	0.52	0.00	0.03	0.52
Intention to leave job	Absenteeism	> 15 years	0.86	0.00	0.05	0.05	0.54	0.02	0.16	0.00
Engagement	Absenteeism	< 1 year	0.86	0.00	0.01	0.75	0.52	0.00	-0.03	0.51
Engagement	Absenteeism	1–2 years	0.86	0.00	-0.02	0.61	0.52	0.00	-0.06	0.23
Engagement	Absenteeism	3–5 years	0.86	0.00	0.01	0.76	0.52	0.00	-0.01	0.82

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Absenteeism	6–10 years	0.86	0.00	−0.05	0.10	0.54	0.02	−0.16	0.00
Engagement	Absenteeism	11–15 years	0.86	0.00	−0.02	0.53	0.54	0.02	−0.15	0.01
Engagement	Absenteeism	> 15 years	0.86	0.00	−0.04	0.15	0.54	0.02	−0.17	0.00
Advocacy	Absenteeism	< 1 year	0.86	0.00	−0.01	0.78	0.52	0.00	−0.08	0.14
Advocacy	Absenteeism	1–2 years	0.86	0.00	−0.01	0.68	0.52	0.00	−0.06	0.29
Advocacy	Absenteeism	3–5 years	0.86	0.00	−0.02	0.50	0.52	0.00	−0.06	0.30
Advocacy	Absenteeism	6–10 years	0.86	0.00	−0.06	0.05	0.53	0.01	−0.15	0.01
Advocacy	Absenteeism	11–15 years	0.86	0.00	−0.03	0.28	0.52	0.00	−0.09	0.14
Advocacy	Absenteeism	> 15 years	0.86	0.00	−0.05	0.10	0.53	0.01	−0.12	0.04
Involvement	Absenteeism	< 1 year	0.86	0.00	0.02	0.41	0.52	0.00	0.03	0.52
Involvement	Absenteeism	1–2 years	0.86	0.00	0.00	0.90	0.52	0.00	−0.03	0.60
Involvement	Absenteeism	3–5 years	0.86	0.00	0.04	0.14	0.52	0.00	0.05	0.33
Involvement	Absenteeism	6–10 years	0.86	0.00	−0.03	0.31	0.54	0.02	−0.18	0.00
Involvement	Absenteeism	11–15 years	0.86	0.00	−0.02	0.50	0.55	0.03	−0.19	0.00
Involvement	Absenteeism	> 15 years	0.86	0.00	−0.01	0.80	0.53	0.01	−0.12	0.02
Supervisory support	Absenteeism	< 1 year	0.86	0.00	−0.01	0.84	0.52	0.00	0.01	0.89
Supervisory support	Absenteeism	1–2 years	0.86	0.00	−0.03	0.34	0.52	0.00	−0.06	0.28
Supervisory support	Absenteeism	3–5 years	0.86	0.00	0.03	0.30	0.52	0.00	0.05	0.43
Supervisory support	Absenteeism	6–10 years	0.86	0.00	−0.05	0.14	0.53	0.01	−0.13	0.02
Supervisory support	Absenteeism	11–15 years	0.86	0.00	−0.01	0.65	0.52	0.00	−0.06	0.25
Supervisory support	Absenteeism	> 15 years	0.86	0.00	−0.03	0.29	0.53	0.01	−0.11	0.08

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Absenteeism	< 1 year	0.86	0.00	0.01	0.69	0.52	0.00	-0.05	0.30
Health and well-being	Absenteeism	1–2 years	0.86	0.00	0.07	0.01	0.52	0.00	0.03	0.60
Health and well-being	Absenteeism	3–5 years	0.86	0.00	0.03	0.23	0.52	0.00	0.05	0.33
Health and well-being	Absenteeism	6–10 years	0.86	0.00	0.00	0.95	0.52	0.00	-0.03	0.52
Health and well-being	Absenteeism	11–15 years	0.86	0.00	0.00	0.89	0.52	0.00	0.06	0.25
Health and well-being	Absenteeism	> 15 years	0.86	0.00	0.07	0.01	0.55	0.03	0.18	0.00
Work pressure	Absenteeism	< 1 year	0.86	0.00	-0.01	0.71	0.52	0.00	-0.05	0.33
Work pressure	Absenteeism	1–2 years	0.86	0.00	-0.05	0.07	0.53	0.01	-0.10	0.06
Work pressure	Absenteeism	3–5 years	0.86	0.00	0.00	0.96	0.53	0.01	-0.08	0.10
Work pressure	Absenteeism	6–10 years	0.86	0.00	0.04	0.16	0.52	0.00	-0.03	0.62
Work pressure	Absenteeism	11–15 years	0.86	0.00	0.01	0.84	0.53	0.01	-0.10	0.05
Work pressure	Absenteeism	> 15 years	0.86	0.00	0.03	0.33	0.52	0.00	-0.06	0.29
Job satisfaction	Stability	< 1 year	0.56	0.00	0.00	0.93	0.36	0.00	0.04	0.47
Job satisfaction	Stability	1–2 years	0.57	0.01	0.09	0.10	0.36	0.01	0.10	0.11
Job satisfaction	Stability	3–5 years	0.56	0.00	0.05	0.35	0.36	0.00	0.04	0.52
Job satisfaction	Stability	6–10 years	0.56	0.00	-0.02	0.76	0.36	0.00	-0.05	0.43
Job satisfaction	Stability	11–15 years	0.56	0.00	0.04	0.39	0.36	0.00	0.01	0.83
Job satisfaction	Stability	> 15 years	0.56	0.00	-0.04	0.43	0.36	0.01	-0.09	0.13
Motivation	Stability	< 1 year	0.56	0.00	-0.03	0.45	0.36	0.00	-0.02	0.76
Motivation	Stability	1–2 years	0.56	0.00	0.03	0.54	0.36	0.00	-0.01	0.89
Motivation	Stability	3–5 years	0.56	0.00	0.02	0.72	0.36	0.00	0.02	0.70
Motivation	Stability	6–10 years	0.56	0.00	0.01	0.86	0.36	0.00	-0.03	0.63

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	Stability	11–15 years	0.56	0.00	−0.01	0.85	0.36	0.00	−0.05	0.39
Motivation	Stability	> 15 years	0.56	0.01	−0.09	0.10	0.38	0.02	−0.18	0.00
Intention to leave job	Stability	< 1 year	0.56	0.00	0.03	0.54	0.36	0.00	−0.01	0.90
Intention to leave job	Stability	1–2 years	0.56	0.00	−0.02	0.73	0.36	0.01	−0.08	0.15
Intention to leave job	Stability	3–5 years	0.56	0.00	−0.07	0.16	0.39	0.03	−0.18	0.00
Intention to leave job	Stability	6–10 years	0.56	0.00	−0.02	0.65	0.36	0.01	−0.09	0.13
Intention to leave job	Stability	11–15 years	0.56	0.00	−0.03	0.56	0.37	0.01	−0.09	0.10
Intention to leave job	Stability	> 15 years	0.56	0.00	0.00	0.97	0.36	0.00	−0.02	0.77
Engagement	Stability	< 1 year	0.56	0.00	−0.04	0.43	0.36	0.00	0.00	0.96
Engagement	Stability	1–2 years	0.57	0.01	0.10	0.05	0.36	0.00	0.08	0.22
Engagement	Stability	3–5 years	0.56	0.00	0.04	0.41	0.36	0.00	0.05	0.45
Engagement	Stability	6–10 years	0.56	0.00	0.02	0.70	0.36	0.00	0.00	0.95
Engagement	Stability	11–15 years	0.56	0.00	0.02	0.75	0.36	0.00	−0.01	0.91
Engagement	Stability	> 15 years	0.56	0.00	−0.01	0.83	0.36	0.00	−0.06	0.38
Advocacy	Stability	< 1 year	0.56	0.00	−0.01	0.84	0.36	0.00	0.05	0.48
Advocacy	Stability	1–2 years	0.57	0.01	0.14	0.01	0.37	0.01	0.14	0.05
Advocacy	Stability	3–5 years	0.56	0.00	0.04	0.48	0.36	0.00	0.07	0.33
Advocacy	Stability	6–10 years	0.56	0.00	0.04	0.49	0.36	0.00	0.06	0.38
Advocacy	Stability	11–15 years	0.56	0.00	0.07	0.20	0.36	0.01	0.10	0.14
Advocacy	Stability	> 15 years	0.56	0.00	0.07	0.25	0.36	0.00	0.06	0.42
Involvement	Stability	< 1 year	0.56	0.00	−0.05	0.34	0.36	0.00	−0.04	0.51
Involvement	Stability	1–2 years	0.56	0.00	0.06	0.27	0.36	0.00	0.04	0.52

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Stability	3–5 years	0.56	0.00	0.05	0.37	0.36	0.00	0.01	0.85
Involvement	Stability	6–10 years	0.56	0.00	–0.01	0.84	0.36	0.00	–0.06	0.38
Involvement	Stability	11–15 years	0.56	0.00	–0.03	0.48	0.37	0.01	–0.10	0.09
Involvement	Stability	> 15 years	0.56	0.00	–0.06	0.26	0.36	0.01	–0.09	0.13
Supervisory support	Stability	< 1 year	0.56	0.00	–0.05	0.29	0.36	0.00	–0.04	0.54
Supervisory support	Stability	1–2 years	0.56	0.00	0.06	0.25	0.36	0.00	0.05	0.41
Supervisory support	Stability	3–5 years	0.56	0.00	0.06	0.26	0.36	0.00	0.04	0.55
Supervisory support	Stability	6–10 years	0.56	0.00	–0.03	0.57	0.36	0.00	–0.07	0.33
Supervisory support	Stability	11–15 years	0.56	0.00	–0.01	0.89	0.36	0.00	–0.02	0.78
Supervisory support	Stability	> 15 years	0.56	0.00	–0.08	0.18	0.36	0.00	–0.07	0.34
Health and well-being	Stability	< 1 year	0.56	0.00	0.07	0.17	0.36	0.00	–0.01	0.90
Health and well-being	Stability	1–2 years	0.56	0.00	–0.03	0.58	0.36	0.00	–0.07	0.20
Health and well-being	Stability	3–5 years	0.56	0.00	0.03	0.56	0.36	0.01	–0.07	0.19
Health and well-being	Stability	6–10 years	0.56	0.00	–0.05	0.30	0.37	0.01	–0.12	0.04
Health and well-being	Stability	11–15 years	0.56	0.00	–0.01	0.77	0.36	0.00	–0.03	0.54
Health and well-being	Stability	> 15 years	0.56	0.00	0.06	0.26	0.36	0.00	0.08	0.20
Work pressure	Stability	< 1 year	0.56	0.00	–0.01	0.77	0.36	0.01	–0.08	0.15
Work pressure	Stability	1–2 years	0.57	0.01	–0.13	0.01	0.39	0.03	–0.19	0.00
Work pressure	Stability	3–5 years	0.56	0.00	–0.06	0.18	0.38	0.02	–0.15	0.01
Work pressure	Stability	6–10 years	0.57	0.01	–0.10	0.05	0.39	0.03	–0.19	0.00
Work pressure	Stability	11–15 years	0.58	0.02	–0.14	0.00	0.40	0.04	–0.22	0.00
Work pressure	Stability	> 15 years	0.57	0.01	–0.10	0.06	0.38	0.02	–0.18	0.00

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	Mortality	< 1 year	0.63	0.00	-0.01	0.79	0.47	0.00	-0.06	0.37
Job satisfaction	Mortality	1-2 years	0.63	0.00	-0.06	0.24	0.47	0.00	-0.05	0.45
Job satisfaction	Mortality	3-5 years	0.63	0.00	0.00	0.95	0.47	0.00	-0.06	0.35
Job satisfaction	Mortality	6-10 years	0.63	0.00	-0.07	0.21	0.48	0.01	-0.11	0.09
Job satisfaction	Mortality	11-15 years	0.63	0.01	-0.07	0.17	0.48	0.01	-0.08	0.21
Job satisfaction	Mortality	> 15 years	0.64	0.01	-0.08	0.13	0.49	0.02	-0.14	0.03
Motivation	Mortality	< 1 year	0.63	0.00	0.00	0.95	0.47	0.00	-0.01	0.84
Motivation	Mortality	1-2 years	0.63	0.00	0.05	0.34	0.47	0.00	0.05	0.43
Motivation	Mortality	3-5 years	0.63	0.00	0.07	0.21	0.47	0.00	0.06	0.34
Motivation	Mortality	6-10 years	0.63	0.00	0.01	0.88	0.47	0.00	-0.02	0.79
Motivation	Mortality	11-15 years	0.64	0.01	-0.09	0.10	0.48	0.01	-0.11	0.09
Motivation	Mortality	> 15 years	0.63	0.00	-0.05	0.38	0.48	0.00	-0.08	0.27
Intention to leave job	Mortality	< 1 year	0.64	0.01	0.12	0.04	0.48	0.01	0.11	0.10
Intention to leave job	Mortality	1-2 years	0.64	0.01	0.09	0.10	0.48	0.01	0.11	0.10
Intention to leave job	Mortality	3-5 years	0.63	0.00	0.02	0.72	0.47	0.00	0.05	0.46
Intention to leave job	Mortality	6-10 years	0.63	0.00	0.06	0.27	0.48	0.01	0.10	0.15
Intention to leave job	Mortality	11-15 years	0.64	0.01	0.08	0.12	0.48	0.01	0.08	0.21
Intention to leave job	Mortality	> 15 years	0.63	0.00	0.05	0.38	0.48	0.01	0.09	0.14
Engagement	Mortality	< 1 year	0.63	0.00	-0.05	0.39	0.48	0.01	-0.12	0.07
Engagement	Mortality	1-2 years	0.63	0.00	-0.06	0.24	0.49	0.02	-0.13	0.04
Engagement	Mortality	3-5 years	0.63	0.00	-0.06	0.27	0.49	0.01	-0.13	0.05
Engagement	Mortality	6-10 years	0.63	0.00	-0.06	0.27	0.49	0.02	-0.16	0.02

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	Mortality	11–15 years	0.64	0.01	−0.12	0.03	0.50	0.03	−0.18	0.00
Engagement	Mortality	> 15 years	0.64	0.01	−0.09	0.13	0.49	0.02	−0.15	0.03
Advocacy	Mortality	< 1 year	0.64	0.01	−0.11	0.06	0.51	0.04	−0.20	0.00
Advocacy	Mortality	1–2 years	0.64	0.01	−0.12	0.02	0.51	0.04	−0.22	0.00
Advocacy	Mortality	3–5 years	0.65	0.02	−0.14	0.01	0.52	0.05	−0.23	0.00
Advocacy	Mortality	6–10 years	0.64	0.01	−0.11	0.06	0.51	0.03	−0.20	0.00
Advocacy	Mortality	11–15 years	0.64	0.01	−0.12	0.03	0.50	0.03	−0.19	0.00
Advocacy	Mortality	> 15 years	0.64	0.01	−0.11	0.04	0.50	0.03	−0.17	0.01
Involvement	Mortality	< 1 year	0.63	0.00	0.02	0.77	0.47	0.00	−0.03	0.65
Involvement	Mortality	1–2 years	0.63	0.00	−0.04	0.41	0.48	0.01	−0.08	0.22
Involvement	Mortality	3–5 years	0.63	0.00	−0.02	0.71	0.47	0.00	−0.05	0.42
Involvement	Mortality	6–10 years	0.63	0.00	−0.01	0.82	0.48	0.01	−0.12	0.08
Involvement	Mortality	11–15 years	0.64	0.01	−0.08	0.13	0.48	0.01	−0.12	0.06
Involvement	Mortality	> 15 years	0.63	0.00	−0.03	0.55	0.48	0.01	−0.08	0.19
Supervisory support	Mortality	< 1 year	0.63	0.00	−0.05	0.30	0.48	0.01	−0.08	0.20
Supervisory support	Mortality	1–2 years	0.63	0.00	−0.04	0.42	0.47	0.00	−0.06	0.38
Supervisory support	Mortality	3–5 years	0.63	0.00	−0.03	0.56	0.48	0.01	−0.10	0.13
Supervisory support	Mortality	6–10 years	0.63	0.00	−0.07	0.20	0.47	0.00	−0.05	0.46
Supervisory support	Mortality	11–15 years	0.64	0.01	−0.09	0.09	0.48	0.01	−0.10	0.13
Supervisory support	Mortality	> 15 years	0.64	0.01	−0.08	0.13	0.48	0.01	−0.11	0.09
Health and well-being	Mortality	< 1 year	0.63	0.00	0.00	0.99	0.47	0.00	0.03	0.65
Health and well-being	Mortality	1–2 years	0.64	0.01	0.11	0.03	0.48	0.01	0.10	0.14

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	Mortality	3–5 years	0.63	0.00	0.05	0.39	0.47	0.00	0.01	0.85
Health and well-being	Mortality	6–10 years	0.63	0.00	0.05	0.36	0.48	0.01	0.07	0.24
Health and well-being	Mortality	11–15 years	0.63	0.00	–0.07	0.23	0.47	0.00	–0.04	0.57
Health and well-being	Mortality	> 15 years	0.63	0.00	0.05	0.34	0.48	0.00	0.07	0.28
Work pressure	Mortality	< 1 year	0.63	0.00	0.06	0.26	0.48	0.01	0.12	0.07
Work pressure	Mortality	1–2 years	0.64	0.01	0.09	0.09	0.48	0.01	0.12	0.06
Work pressure	Mortality	3–5 years	0.63	0.00	0.05	0.35	0.48	0.01	0.09	0.15
Work pressure	Mortality	6–10 years	0.63	0.00	0.01	0.91	0.47	0.00	0.01	0.82
Work pressure	Mortality	11–15 years	0.63	0.00	–0.02	0.75	0.47	0.00	–0.01	0.92
Work pressure	Mortality	> 15 years	0.64	0.01	0.10	0.06	0.50	0.03	0.17	0.01
Job satisfaction	Patient satisfaction	< 1 year	0.82	0.00	0.06	0.08	0.60	0.00	0.06	0.25
Job satisfaction	Patient satisfaction	1–2 years	0.82	0.01	0.08	0.03	0.62	0.02	0.13	0.01
Job satisfaction	Patient satisfaction	3–5 years	0.82	0.01	0.08	0.03	0.61	0.01	0.11	0.04
Job satisfaction	Patient satisfaction	6–10 years	0.81	0.00	0.05	0.22	0.61	0.01	0.08	0.14
Job satisfaction	Patient satisfaction	11–15 years	0.81	0.00	–0.01	0.82	0.60	0.00	0.02	0.75
Job satisfaction	Patient satisfaction	> 15 years	0.81	0.00	0.02	0.67	0.61	0.01	0.12	0.02
Motivation	Patient satisfaction	< 1 year	0.82	0.00	0.07	0.05	0.60	0.00	0.06	0.25
Motivation	Patient satisfaction	1–2 years	0.81	0.00	0.04	0.23	0.60	0.00	0.06	0.23
Motivation	Patient satisfaction	3–5 years	0.81	0.00	0.05	0.21	0.60	0.00	0.03	0.58
Motivation	Patient satisfaction	6–10 years	0.81	0.00	0.00	0.97	0.60	0.00	0.00	0.97
Motivation	Patient satisfaction	11–15 years	0.81	0.00	–0.02	0.55	0.60	0.00	–0.04	0.41
Motivation	Patient satisfaction	> 15 years	0.81	0.00	0.01	0.84	0.60	0.00	0.03	0.63

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Intention to leave job	Patient satisfaction	< 1 year	0.82	0.01	-0.09	0.02	0.61	0.01	-0.12	0.03
Intention to leave job	Patient satisfaction	1–2 years	0.82	0.00	-0.06	0.13	0.62	0.01	-0.13	0.02
Intention to leave job	Patient satisfaction	3–5 years	0.82	0.01	-0.11	0.01	0.64	0.04	-0.21	0.00
Intention to leave job	Patient satisfaction	6–10 years	0.81	0.00	-0.03	0.52	0.62	0.02	-0.16	0.01
Intention to leave job	Patient satisfaction	11–15 years	0.81	0.00	-0.02	0.62	0.61	0.01	-0.09	0.09
Intention to leave job	Patient satisfaction	> 15 years	0.81	0.00	-0.04	0.25	0.62	0.02	-0.15	0.00
Engagement	Patient satisfaction	< 1 year	0.82	0.01	0.12	0.00	0.62	0.02	0.17	0.00
Engagement	Patient satisfaction	1–2 years	0.82	0.01	0.12	0.00	0.64	0.04	0.24	0.00
Engagement	Patient satisfaction	3–5 years	0.82	0.01	0.11	0.01	0.63	0.03	0.20	0.00
Engagement	Patient satisfaction	6–10 years	0.82	0.01	0.10	0.02	0.63	0.03	0.20	0.00
Engagement	Patient satisfaction	11–15 years	0.81	0.00	0.04	0.28	0.62	0.01	0.14	0.02
Engagement	Patient satisfaction	> 15 years	0.82	0.00	0.07	0.12	0.63	0.03	0.20	0.00
Advocacy	Patient satisfaction	< 1 year	0.83	0.02	0.15	0.00	0.66	0.06	0.29	0.00
Advocacy	Patient satisfaction	1–2 years	0.83	0.02	0.20	0.00	0.70	0.10	0.41	0.00
Advocacy	Patient satisfaction	3–5 years	0.83	0.01	0.15	0.00	0.67	0.07	0.33	0.00
Advocacy	Patient satisfaction	6–10 years	0.83	0.01	0.15	0.00	0.66	0.06	0.31	0.00
Advocacy	Patient satisfaction	11–15 years	0.82	0.01	0.12	0.01	0.65	0.05	0.28	0.00
Advocacy	Patient satisfaction	> 15 years	0.82	0.01	0.11	0.01	0.66	0.06	0.30	0.00
Involvement	Patient satisfaction	< 1 year	0.82	0.00	0.05	0.20	0.60	0.00	0.03	0.63
Involvement	Patient satisfaction	1–2 years	0.81	0.00	0.03	0.38	0.60	0.00	0.03	0.60
Involvement	Patient satisfaction	3–5 years	0.82	0.01	0.08	0.03	0.61	0.01	0.10	0.06

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	Patient satisfaction	6–10 years	0.82	0.00	0.06	0.10	0.61	0.01	0.10	0.07
Involvement	Patient satisfaction	11–15 years	0.81	0.00	–0.01	0.80	0.60	0.00	0.05	0.33
Involvement	Patient satisfaction	> 15 years	0.81	0.00	0.02	0.60	0.61	0.01	0.10	0.07
Supervisory support	Patient satisfaction	< 1 year	0.82	0.00	0.05	0.13	0.60	0.00	0.02	0.66
Supervisory support	Patient satisfaction	1–2 years	0.82	0.00	0.06	0.13	0.61	0.01	0.09	0.11
Supervisory support	Patient satisfaction	3–5 years	0.81	0.00	0.03	0.44	0.60	0.00	0.06	0.30
Supervisory support	Patient satisfaction	6–10 years	0.82	0.00	0.06	0.09	0.61	0.01	0.08	0.11
Supervisory support	Patient satisfaction	11–15 years	0.82	0.00	–0.07	0.06	0.60	0.00	–0.04	0.51
Supervisory support	Patient satisfaction	> 15 years	0.81	0.00	0.02	0.57	0.61	0.01	0.11	0.04
Health and well-being	Patient satisfaction	< 1 year	0.81	0.00	0.00	0.98	0.60	0.00	–0.04	0.43
Health and well-being	Patient satisfaction	1–2 years	0.82	0.00	–0.05	0.14	0.62	0.02	–0.13	0.01
Health and well-being	Patient satisfaction	3–5 years	0.81	0.00	0.01	0.84	0.61	0.01	–0.11	0.04
Health and well-being	Patient satisfaction	6–10 years	0.82	0.01	0.08	0.04	0.60	0.00	0.04	0.43
Health and well-being	Patient satisfaction	11–15 years	0.81	0.00	–0.02	0.51	0.60	0.00	–0.04	0.46
Health and well-being	Patient satisfaction	> 15 years	0.81	0.00	0.04	0.24	0.60	0.00	0.03	0.59
Work pressure	Patient satisfaction	< 1 year	0.82	0.00	–0.08	0.04	0.62	0.02	–0.15	0.00
Work pressure	Patient satisfaction	1–2 years	0.81	0.00	–0.03	0.50	0.62	0.02	–0.14	0.01
Work pressure	Patient satisfaction	3–5 years	0.81	0.00	–0.05	0.22	0.61	0.01	–0.11	0.03
Work pressure	Patient satisfaction	6–10 years	0.82	0.01	–0.08	0.04	0.61	0.01	–0.12	0.03
Work pressure	Patient satisfaction	11–15 years	0.82	0.00	–0.06	0.10	0.60	0.00	–0.04	0.48
Work pressure	Patient satisfaction	> 15 years	0.82	0.00	–0.06	0.17	0.63	0.03	–0.19	0.00
Job satisfaction	MRSA	< 1 year	0.22	0.00	–0.07	0.33	0.10	0.00	–0.05	0.49

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Job satisfaction	MRSA	1–2 years	0.22	0.01	0.10	0.19	0.10	0.01	0.08	0.31
Job satisfaction	MRSA	3–5 years	0.22	0.01	–0.08	0.31	0.10	0.00	–0.05	0.55
Job satisfaction	MRSA	6–10 years	0.22	0.00	0.06	0.40	0.10	0.00	0.07	0.39
Job satisfaction	MRSA	11–15 years	0.21	0.00	–0.02	0.78	0.10	0.00	0.01	0.89
Job satisfaction	MRSA	> 15 years	0.21	0.00	0.04	0.59	0.10	0.00	0.03	0.68
Motivation	MRSA	< 1 year	0.22	0.00	0.06	0.37	0.10	0.00	0.07	0.37
Motivation	MRSA	1–2 years	0.22	0.01	0.08	0.28	0.10	0.00	0.07	0.35
Motivation	MRSA	3–5 years	0.21	0.00	0.03	0.69	0.10	0.00	0.07	0.38
Motivation	MRSA	6–10 years	0.21	0.00	0.01	0.93	0.10	0.00	–0.02	0.84
Motivation	MRSA	11–15 years	0.21	0.00	0.04	0.61	0.10	0.00	0.05	0.55
Motivation	MRSA	> 15 years	0.22	0.01	0.10	0.24	0.10	0.01	0.09	0.31
Intention to leave job	MRSA	< 1 year	0.21	0.00	–0.01	0.85	0.10	0.00	–0.05	0.58
Intention to leave job	MRSA	1–2 years	0.21	0.00	–0.02	0.83	0.10	0.00	–0.01	0.93
Intention to leave job	MRSA	3–5 years	0.22	0.00	0.07	0.36	0.10	0.01	0.08	0.32
Intention to leave job	MRSA	6–10 years	0.21	0.00	0.01	0.88	0.10	0.00	0.00	0.99
Intention to leave job	MRSA	11–15 years	0.21	0.00	–0.04	0.56	0.10	0.00	–0.04	0.62
Intention to leave job	MRSA	> 15 years	0.21	0.00	0.03	0.70	0.10	0.00	0.03	0.67
Engagement	MRSA	< 1 year	0.21	0.00	–0.01	0.95	0.10	0.00	0.02	0.81
Engagement	MRSA	1–2 years	0.22	0.01	0.09	0.30	0.11	0.01	0.10	0.26
Engagement	MRSA	3–5 years	0.21	0.00	0.03	0.69	0.10	0.00	0.07	0.38
Engagement	MRSA	6–10 years	0.21	0.00	0.04	0.61	0.10	0.00	0.06	0.48

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Engagement	MRSA	11–15 years	0.21	0.00	0.05	0.55	0.10	0.00	0.07	0.44
Engagement	MRSA	> 15 years	0.22	0.01	0.11	0.18	0.11	0.01	0.14	0.13
Advocacy	MRSA	< 1 year	0.21	0.00	0.04	0.62	0.10	0.00	0.07	0.48
Advocacy	MRSA	1–2 years	0.21	0.00	0.00	0.99	0.10	0.00	0.02	0.85
Advocacy	MRSA	3–5 years	0.21	0.00	0.04	0.64	0.10	0.00	0.07	0.48
Advocacy	MRSA	6–10 years	0.21	0.00	0.06	0.53	0.10	0.00	0.07	0.46
Advocacy	MRSA	11–15 years	0.21	0.00	0.06	0.51	0.10	0.00	0.08	0.42
Advocacy	MRSA	> 15 years	0.22	0.00	0.08	0.35	0.11	0.01	0.11	0.25
Involvement	MRSA	< 1 year	0.22	0.01	−0.11	0.14	0.10	0.00	−0.07	0.37
Involvement	MRSA	1–2 years	0.23	0.01	0.14	0.09	0.12	0.02	0.15	0.07
Involvement	MRSA	3–5 years	0.21	0.00	0.00	0.98	0.10	0.00	0.04	0.63
Involvement	MRSA	6–10 years	0.21	0.00	0.04	0.60	0.11	0.01	0.09	0.25
Involvement	MRSA	11–15 years	0.21	0.00	0.02	0.78	0.10	0.00	0.03	0.67
Involvement	MRSA	> 15 years	0.23	0.01	0.12	0.10	0.12	0.02	0.15	0.06
Supervisory support	MRSA	< 1 year	0.23	0.02	−0.13	0.08	0.11	0.01	−0.10	0.19
Supervisory support	MRSA	1–2 years	0.22	0.00	−0.07	0.33	0.10	0.00	−0.03	0.66
Supervisory support	MRSA	3–5 years	0.22	0.01	−0.08	0.27	0.10	0.00	−0.06	0.46
Supervisory support	MRSA	6–10 years	0.21	0.00	0.02	0.73	0.10	0.00	0.04	0.57
Supervisory support	MRSA	11–15 years	0.22	0.01	0.10	0.16	0.12	0.02	0.14	0.07
Supervisory support	MRSA	> 15 years	0.22	0.00	0.06	0.42	0.10	0.00	0.06	0.43
Health and well-being	MRSA	< 1 year	0.22	0.01	−0.08	0.25	0.11	0.01	−0.11	0.15
Health and well-being	MRSA	1–2 years	0.22	0.00	0.06	0.43	0.10	0.01	0.07	0.34

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Health and well-being	MRSA	3–5 years	0.22	0.00	0.07	0.36	0.10	0.01	0.07	0.33
Health and well-being	MRSA	6–10 years	0.23	0.01	–0.12	0.10	0.11	0.02	–0.14	0.09
Health and well-being	MRSA	11–15 years	0.25	0.04	–0.20	0.01	0.13	0.03	–0.19	0.01
Health and well-being	MRSA	> 15 years	0.21	0.00	–0.01	0.91	0.10	0.00	0.00	0.98
Work pressure	MRSA	< 1 year	0.21	0.00	0.01	0.89	0.10	0.00	0.01	0.90
Work pressure	MRSA	1–2 years	0.21	0.00	–0.05	0.49	0.10	0.00	–0.06	0.45
Work pressure	MRSA	3–5 years	0.21	0.00	–0.04	0.57	0.10	0.00	–0.03	0.73
Work pressure	MRSA	6–10 years	0.21	0.00	–0.03	0.70	0.10	0.00	–0.03	0.76
Work pressure	MRSA	11–15 years	0.23	0.02	–0.16	0.04	0.12	0.02	–0.15	0.07
Work pressure	MRSA	> 15 years	0.21	0.00	–0.04	0.58	0.10	0.00	–0.03	0.74
Job satisfaction	<i>C. difficile</i>	< 1 year	0.50	0.00	–0.02	0.71	0.12	0.01	–0.09	0.25
Job satisfaction	<i>C. difficile</i>	1–2 years	0.50	0.00	0.04	0.50	0.12	0.00	0.06	0.48
Job satisfaction	<i>C. difficile</i>	3–5 years	0.50	0.00	–0.01	0.83	0.12	0.01	0.08	0.32
Job satisfaction	<i>C. difficile</i>	6–10 years	0.50	0.00	0.01	0.81	0.12	0.00	0.07	0.36
Job satisfaction	<i>C. difficile</i>	11–15 years	0.50	0.00	–0.04	0.55	0.12	0.00	0.05	0.49
Job satisfaction	<i>C. difficile</i>	> 15 years	0.50	0.00	0.02	0.78	0.12	0.00	0.00	0.99
Motivation	<i>C. difficile</i>	< 1 year	0.50	0.00	–0.04	0.52	0.12	0.01	–0.09	0.24
Motivation	<i>C. difficile</i>	1–2 years	0.51	0.01	0.09	0.10	0.13	0.01	0.12	0.12
Motivation	<i>C. difficile</i>	3–5 years	0.50	0.00	–0.05	0.41	0.12	0.01	0.08	0.27
Motivation	<i>C. difficile</i>	6–10 years	0.50	0.00	–0.02	0.76	0.12	0.01	0.08	0.30
Motivation	<i>C. difficile</i>	11–15 years	0.50	0.00	–0.03	0.67	0.13	0.01	0.11	0.17

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Motivation	<i>C. difficile</i>	> 15 years	0.50	0.00	-0.01	0.83	0.12	0.00	-0.04	0.63
Intention to leave job	<i>C. difficile</i>	< 1 year	0.50	0.00	0.01	0.88	0.12	0.00	0.00	0.96
Intention to leave job	<i>C. difficile</i>	1–2 years	0.51	0.01	-0.09	0.14	0.12	0.00	-0.03	0.74
Intention to leave job	<i>C. difficile</i>	3–5 years	0.50	0.00	0.00	0.94	0.12	0.00	-0.06	0.48
Intention to leave job	<i>C. difficile</i>	6–10 years	0.50	0.00	0.05	0.38	0.12	0.00	0.02	0.83
Intention to leave job	<i>C. difficile</i>	11–15 years	0.50	0.00	0.05	0.38	0.12	0.00	0.04	0.58
Intention to leave job	<i>C. difficile</i>	> 15 years	0.50	0.00	0.01	0.86	0.12	0.00	0.07	0.40
Engagement	<i>C. difficile</i>	< 1 year	0.50	0.00	-0.03	0.63	0.12	0.00	-0.04	0.61
Engagement	<i>C. difficile</i>	1–2 years	0.51	0.01	0.11	0.13	0.13	0.01	0.14	0.13
Engagement	<i>C. difficile</i>	3–5 years	0.50	0.00	0.02	0.78	0.14	0.02	0.17	0.05
Engagement	<i>C. difficile</i>	6–10 years	0.50	0.00	0.00	0.98	0.12	0.00	0.06	0.46
Engagement	<i>C. difficile</i>	11–15 years	0.50	0.00	0.01	0.85	0.13	0.01	0.11	0.20
Engagement	<i>C. difficile</i>	> 15 years	0.50	0.00	0.05	0.43	0.12	0.00	0.07	0.41
Advocacy	<i>C. difficile</i>	< 1 year	0.50	0.00	-0.01	0.94	0.12	0.00	0.05	0.58
Advocacy	<i>C. difficile</i>	1–2 years	0.50	0.00	0.08	0.32	0.13	0.01	0.13	0.20
Advocacy	<i>C. difficile</i>	3–5 years	0.50	0.00	0.05	0.49	0.14	0.02	0.20	0.03
Advocacy	<i>C. difficile</i>	6–10 years	0.50	0.00	0.03	0.71	0.12	0.00	0.07	0.48
Advocacy	<i>C. difficile</i>	11–15 years	0.50	0.00	0.03	0.67	0.12	0.00	0.09	0.36
Advocacy	<i>C. difficile</i>	> 15 years	0.50	0.00	0.06	0.44	0.12	0.00	0.07	0.48
Involvement	<i>C. difficile</i>	< 1 year	0.50	0.00	-0.03	0.63	0.12	0.00	-0.07	0.40
Involvement	<i>C. difficile</i>	1–2 years	0.50	0.00	0.06	0.37	0.12	0.00	0.05	0.54
Involvement	<i>C. difficile</i>	3–5 years	0.50	0.00	0.04	0.47	0.13	0.01	0.11	0.16

continued

TABLE 60 Breakdown by tenure (continued)

Predictor	Outcome	Tenure	Controlling for 2009 outcome				Not controlling for 2009 outcome			
			R ²	ΔR ²	Regression coefficient	p-value	R ²	ΔR ²	Regression coefficient	p-value
Involvement	<i>C. difficile</i>	6–10 years	0.50	0.00	−0.02	0.73	0.12	0.00	0.01	0.89
Involvement	<i>C. difficile</i>	11–15 years	0.50	0.00	0.02	0.76	0.12	0.01	0.08	0.30
Involvement	<i>C. difficile</i>	> 15 years	0.51	0.01	0.08	0.19	0.13	0.02	0.14	0.08
Supervisory support	<i>C. difficile</i>	< 1 year	0.50	0.00	−0.01	0.89	0.12	0.00	−0.06	0.46
Supervisory support	<i>C. difficile</i>	1–2 years	0.51	0.00	0.07	0.24	0.14	0.03	0.17	0.03
Supervisory support	<i>C. difficile</i>	3–5 years	0.50	0.00	−0.06	0.36	0.12	0.00	0.06	0.47
Supervisory support	<i>C. difficile</i>	6–10 years	0.50	0.00	0.00	0.93	0.12	0.00	0.01	0.85
Supervisory support	<i>C. difficile</i>	11–15 years	0.50	0.00	0.05	0.44	0.12	0.01	0.09	0.27
Supervisory support	<i>C. difficile</i>	> 15 years	0.51	0.01	0.10	0.07	0.12	0.00	0.03	0.68
Health and well-being	<i>C. difficile</i>	< 1 year	0.50	0.00	−0.05	0.35	0.12	0.01	−0.07	0.34
Health and well-being	<i>C. difficile</i>	1–2 years	0.50	0.00	0.04	0.45	0.12	0.00	0.04	0.63
Health and well-being	<i>C. difficile</i>	3–5 years	0.50	0.00	−0.03	0.55	0.12	0.01	−0.08	0.30
Health and well-being	<i>C. difficile</i>	6–10 years	0.50	0.00	0.03	0.59	0.12	0.00	−0.01	0.94
Health and well-being	<i>C. difficile</i>	11–15 years	0.51	0.01	−0.08	0.19	0.13	0.01	−0.10	0.21
Health and well-being	<i>C. difficile</i>	> 15 years	0.50	0.00	−0.04	0.47	0.12	0.00	−0.05	0.50
Work pressure	<i>C. difficile</i>	< 1 year	0.50	0.00	0.06	0.30	0.12	0.00	0.00	0.97
Work pressure	<i>C. difficile</i>	1–2 years	0.51	0.01	0.08	0.20	0.12	0.00	−0.07	0.37
Work pressure	<i>C. difficile</i>	3–5 years	0.50	0.00	0.02	0.73	0.14	0.02	−0.16	0.04
Work pressure	<i>C. difficile</i>	6–10 years	0.50	0.00	0.04	0.49	0.12	0.01	−0.09	0.27
Work pressure	<i>C. difficile</i>	11–15 years	0.50	0.00	0.04	0.52	0.12	0.00	−0.06	0.44
Work pressure	<i>C. difficile</i>	> 15 years	0.50	0.00	0.05	0.42	0.12	0.00	−0.04	0.61

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